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ABSTRACTS

The 9th World Congress of International Society of Physical and Rehabilitation Medicine

June 19–23, 2015, Berlin, Germany

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Abstracts

The 9th World Congress of International Society of Physical and Rehabilitation Medicine

June 19-23, 2015, Berlin, Germany

Dear Colleagues and Friends:

On behalf of the International Society of Physical and Rehabilitation Medicine I have great pleasure in welcoming you to the 9th World Congress held in Berlin from 19–23 June 2015.

With more than one billion people in the world disabled according to WHO, ISPRM and its members have a significant role to play in optimizing the functioning and health-related quality of life, and to minimizing disability in persons with disability and/or medical problems throughout the world.

The World Congress remains a unique opportunity to share knowledge and expertise, advance science, promote education and most importantly to network with PRM colleagues. Experts in the field have travelled across the globe to attend this cutting-edge educational and scientific experience, focusing on the latest developments in Physical Rehabilitation and Medicine.

I would like to thank Tatjana Paternostro-Sluga, MD (Congress President), Christoph Gutenbrunner, MD (Congress President) and the late Veronika Fialka-Moser, MD† (Honorary Congress President) for their work.

They have worked tirelessly on this 2015 ISPRM World Congress, providing an update on where the science of Physical and Rehabilitation Medicine is today. I am sure that each member of ISPRM will be very proud of where ISPRM are today and excited about where we are headed.

Thank you for joining us and for your active participation to the meeting. Throughout this congress, I ask you to stay engaged, keep proactive and help ISPRM shape the future of Physical and Rehabilitation Medicine. Thank you for your enthusiasm ultimately driving us to achieve our common vision with WHO: “better health for people with disabilities”.

Jianan Li

President of ISPRM

Dear Colleagues and Friends,

On behalf of the German and Austrian Societies of Physical Medicine and Rehabilitation (DGPMR & ÖGPMR) we cordially invite you to the 9th World Congress of the International Society of Physical and Rehabilitation Medicine (ISPRM) that will be held in

Berlin from 19–23 June, 2015. We hope to organize an outstanding event with important scientific outcomes and educational contents at a top level. Additionally, we hope that you will experience an open and relaxed atmosphere as a basis of a good and intense communication among colleagues from all around the world. Many national and international scientific societies and organizations support us in this goal, in particular the three main European bodies of Physical and Rehabilitation Medicine.

In order to prepare a scientific programme at the highest possible level, we invited speakers who are top quality experts in their fields and chose 12 main topics of recent interest in Physical and Rehabilitation Medicine. To structure the original papers, we used the recent published ISPRM topic list that provides a comprehensive structure of science in our field. The sessions of these topics will be introduced by a lecture of an internationally recognized expert in the area followed by original papers. Additionally, we will provide a large spectrum of other sessions, such as hands-on-workshops and seminars, sessions for medical students and young scientists as well as special interest sessions of collaboration partners and national societies that are member of the ISPRM. Furthermore, a plenary session deals with recent topics of the ISPRM-WHO liaison, with regard to ISPRM’s special role as NGO in official relation with World Health Organization (WHO).

The programme has been planned by a scientific programme committee and reviewed by international committee that includes members from all the nine ISPRM subareas and a broad spectrum of scientific expertise. We are convinced that this will ensure the best possible level of contents.

Together with our PCO, Conventus Congress Management, we organized an attractive social programme including get together dinners and tours. Additionally we are happy to collaborate with the 15th congress of the International Society for Prosthetics and Orthotics (ISPO) that will be held immediately after our congress in Lyon (France). Special packages to attend both congresses are provided for you.

We hope to see you in June 2015 in Berlin and hope that you will contribute by sharing your knowledge and expertise and discussing recent issues. It is our goal and passion to prepare a high level conference and provide an open and friendly atmosphere for communication among expert coming from all areas of the world.

We will be happy to see you in Berlin!

Tatjana Paternostro-Sluga, MD Christoph Gutenbrunner, MD
Congress President (Austria) *Congress President (Germany)*

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These abstracts are scientifically evaluated by the organizing committee and not by the journal.

SYMPOSIA (JUNE 19–23, 2015)

A.1 PAIN

TA001

Efficacy of Extremely Low Frequency Magnetic Fields (ELF-MF) in the Treatment of Patients with Fibromyalgia**T. Paolucci, *G. Piccinini, S. De Angelis, C. Piermattei, M. R. Grasso, F. Zangrando, V. M. Saraceni***Policlinico Umberto I Hospital, Rome, IT*

Background: There are several evidences on the effects of extremely low frequency magnetic fields on modulation of biological variables and on various aspects of human and animal behavior, in particular they have been shown to have analgesic and antinociceptive effects in several organisms. **Objective:** To test the effects of extremely low frequency magnetic fields in reducing pain in patients with fibromyalgia (FM). **Study Design:** Randomized double-blind crossover study. **Setting:** Outpatient clinic of Physical Medicine and Rehabilitation. **Population:** Eleven FM patients with a mean age of 52.36 ± 4.99 years. **Material and Method:** Patients were randomized to receive either half an-hour session of extremely low frequency magnetic fields therapy (CMF-OR-THO®), frequency 50 Hz intensity 0.5 mT) or placebo, 3 times a week for 4 weeks. The primary outcome measure was the Visual Analogue Scale (VAS) for the assessment of pain generalized or localized to a single joint or district. Secondary outcome measures were: Fibromyalgia Impact Questionnaire (FIQ) for the evaluation of range of symptoms experienced by FM patients, functionality with ADLs and work difficulties; Fibromyalgia Assessment Status (FAS) for the assessment of fatigue, sleep disturbances and pain; Health Assessment Questionnaire (HAQ) for the evaluation of the ability in daily living-tasks. Each subject was evaluated before, at the end (T1), after 3 (T2) and 6 months (T3) from the conclusion of the treatment. **Results:** At the end of treatment patients experienced improvements in all outcome measures relatives to baseline values with a significant improvement only in VAS ($p < 0.05$) and FIQ ($p < 0.01$). **Conclusions:** It is worth noting that this is the first study on pain in fibromyalgia and therefore further research are needed. ELF-MF therapy is effective in reducing pain in FM patients at the end of treatment. Further evaluations are ongoing to demonstrate whether these positive results will be maintained even at follow-up.

TA002

Aerobic Exercise and Cognitive Behavioural Therapy for Treating Fibromyalgia Syndrome Patients: a Preliminary Result***B. Nugraha, C. Korallus, S. Zastrutzki, S. Jasper, B. Jäger, C. Gutenbrunner***Hanover Medical School, Hanover, DE*

Introduction and Aim: Fibromyalgia syndrome (FMS) is a debilitating chronic widespread pain syndrome. Besides chronic pain as major symptom, FMS patients have other symptoms, including fatigue, sleep disturbance, and mood related disorders. As these complex symptoms in FMS, no single treatment is proposed to treat these patients. In addition to pharmacological treatment, non-pharmacological treatments have been recommended for FMS patients. In this study, we compared the effectiveness of exercise, cognitive behavioural therapy (CBT) and their combinations were used to treat FMS patients for 12 weeks to health-related quality of life and mood related disorders. **Material and Methods:** In this study, 125 female patients have been recruited according to the criteria of American College of Rheumatology 1990 criteria. They were randomized into four groups which consisted of aerobic

exercise (Exe), cognitive behavioural therapy (CBT), combination (Exe+CBT), and non-treatment group. Aerobic exercise was performed with ergometer for 30 minutes twice per week. Meanwhile CBT was performed by experienced psychologists for 2 hours (once a week). Assessment of the level of mood related disorders were done by using Hospital Anxiety and Depression Score (HADS) questionnaire before treatment (T0) and after 12 weeks of treatment (T1). Other assessment tool was fibromyalgia impact questionnaire (FIQ). Statistics evaluation was done by using SPSS 22. **Results:** The results demonstrated significant reduction of FIQ, anxiety (HADS-A) and depression (HADS-D) score in the group of exercise, CBT, and combination ($p < 0.05$). However, there were no significant reduction of HADS-A and HADS-D score in non-treatment group. **Conclusion:** Non-pharmacological treatments gave benefit to FMS patients, including in improving health related quality of life, including the level of mood related disorder. As this was only pilot study, further study with higher number of patients is needed. Additionally, long-term follow-up data are also necessary to observe long effect of these non-pharmacological treatments.

TA003

Effects of a Tailored Positive Psychology Intervention on Well-Being and Pain in Individuals with Chronic Pain and a Physical Disability: a Feasibility Trial***R. Müller, K. Gertz², A. Terrill², I. Molton², C. Bombar-dier², D. Ehde², M. Jensen²***Swiss Paraplegic Research, Nottwil, CH, ²University of Washington, Seattle, WA, US*

Introduction/Background: Chronic pain is a significant problem in individuals with physical disabilities. Pharmacological, non-pharmacological and psychological treatments of chronic pain can provide some relief for some individuals. However, all of the available treatments have weaknesses, such as absence of long-term effects, significant side-effects, and high costs. Therefore, there is a compelling need to identify additional effective chronic pain treatments. Positive psychology interventions complement the traditional treatment of pathology and promote the understanding of human resources such as gratitude, optimism and kindness. Positive psychology interventions consist of brief, simple and self-administered positive activities that are easy to perform, require little time, are inexpensive, and have no known negative side-effects. They have been effectively applied to the general population to enhance subjective well-being and to reduce depression and anxiety. The purpose of this study was to determine the effects, feasibility and acceptability of a computer-based tailored intervention based on positive psychology to enhance subjective well-being and reduce pain in individuals with physical disabilities. **Material and Methods:** We pilot-tested the positive psychology intervention via a randomized-controlled trial in persons diagnosed with SCI, MS, NMD, or PPS, with chronic disability-related pain intensity of ≥ 4 (0-10) at least half the days in the past month. Participants in the intervention group were instructed to practice 4 personalized exercises during 8 weeks. Participants in the control group were instructed to write about life details. At baseline, post-treatment, and 2.5 months follow-up, participants completed online well-being and pain-related questionnaires and rated treatment-satisfaction. **Results:** Sixty-eight participants completed follow-up assessment. The positive psychology intervention resulted in immediate significant increases in positive affect and control over pain and significant decreases in depression, pain intensity, pain interference and catastrophizing, relative to no change in the active control treatment. Both groups showed improvements in life satisfaction. Significant changes in enhanced pain control and reduced pain interference maintained at 2.5 months follow-up. Average treatment-

satisfaction ratings were between somewhat satisfied" and "very satisfied". *Conclusion:* The results support the potential efficacy of a computer-based positive psychology intervention for improving multiple outcomes in individuals with physical disabilities and chronic pain. The findings indicate that a full size trial of the intervention is warranted.

TA004

Effect of Cognitive Task on Postural Control in Participants with Chronic Fatigue Syndrome, Fibromyalgia Syndrome and Healthy Controls

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Introduction/Background: There is a great symptom overlap between chronic fatigue syndrome (CFS) and fibromyalgia syndrome (FMS), and it is questioned whether this is an effect of comorbidity of different syndromes or differing expressions of the same syndrome. Cognitive impairment and poor postural control has been reported in separate studies in participants with FMS compared with healthy controls (HC), and CFS compared with HC, but, to our knowledge no one has compared dual task in FMS and CFS. The aim was to investigate the effect of concurrent cognitive task on postural control using structural analysis of centre of pressure (CoP) signal; to explore how CFS and FMS affect dual task and if these expressions differ from controls. *Material and Methods:* Eighty one subjects (CFS, FMS and HC, 27 in each group), age 19-49 years, performed 60 s of quiet standing for each of two conditions: 1) firm surface with open eyes (C1), 2) firm surface with a concurrent cognitive task that consisted of counting backwards aloud from 150 in steps of 7 and only say the numbers as the figured them out (C2). Tests were performed in the standing on a Kistler force-plate (100 Hz). Decomposition of the medial-lateral (ML) and anterior-posterior (AP) components of COP into rambling (Rm) and trembling (Tr) was performed and expressed as magnitude of Rm and Tr. *Results:* HC had the lowest magnitude of Rm and Tr in both conditions. Generally, From C1 to C2, Rm decreased and Tr increased in both AP and ML directions in all 3 groups, although the percentages were different. Statistical tests showed CFS had a different trend of Rm and Tr compared with FMS and HC. CFS group had significantly higher Rm in ML in C1 ($p < 0.02$) and higher Rm in AP in C2 compared with HC ($p < 0.01$). Tr was only significant in AP in C1 in CFS group ($p < 0.04$). *Conclusion(s):* The results indicated that subjects with CFS had more impaired pattern of controlling postural sway during cognitive task than FMS group comparing with HC but FMS and CFS had similar results.

TA005

Vibration Elastography to Assess the Effect of Dry Needling on Myofascial Trigger Points in Patients Affected by Myofascial Pain Syndrome

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Introduction: Myofascial pain is a chronic, poorly understood syndrome, associated with myofascial trigger points. (MTrPs). The MTrP is a palpable, discreet nodule in a taut band of muscle. Its relationship to MPS is not established. This study attempts to develop objective and reliable diagnostic measures for assessing the MTrP and surrounding muscle properties. *Methods:* 48 subjects with > 3 months' duration of trapezius pain and at least one active(a)-MTrP were selected for an approved study. The most symptomatic aMTrP received 3 weekly dry needling treatments. Two sites for each subject were scanned using B-mode ultrasound imaging and vibration

elastography using an SonixRP ultrasound scanner (Ultrasound Corporation, Vancouver, BC) to assess the size and tissue characteristics of the nodule, using color Doppler variance imaging of the upper trapezius while vibrated with an external massager (North Coast Medical, Inc, CA, model NC70209) at a frequency of 100 Hz. Methods for quantifying the MTrP size from these elastography images have been previously described. The ratio of the size of non-vibrating regions to the size of the upper trapezius muscle was used to measure the proportion of muscle that had a-MTrP. A change of the MTrP status from active to latent or normal evaluated at baseline and follow-up visits was used for assessing the response of the dry needling treatment. The change of the relative size of the MTrPs measured at baseline and follow-up visits was compared to the change of the pressure pain threshold (PPT) score and status of the patient. *Results:* Relative size of "Treated" aMTrP was significantly lower at the follow-up visit ($p < 0.008$) compared to the baseline. The relative size of "Untreated" MTrPs was unchanged ($p = 0.38$). PPT significantly improved ($p < 0.001$) after treatment for "Treated" MTrPs whereas it did not improve for "Untreated" MTrPs. In the "Treated" group, a significant decrease of the relative MTrP size corresponded to a significant improvement of the PPT score and an increase in relative MTrP size was not associated with any significant change in PPT. *Conclusions:* There is evidence that the relative MTrP size on ultrasound elastography is a sensitive measure of muscle tissue property changes following dry needling therapy.

TA006

Hypnosis Enhances the Efficacy of Cognitive Therapy for Reducing Pain Interference and Depression in Individuals with Disabilities and Chronic Pain

**M. Jensen, T. Dillworth, C. Garcia, H. George, K. Gertz, L. Johnson, M. E. Mendoza*
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Introduction/Background: Pain is a common problem in individuals with multiple sclerosis (MS) and spinal cord injury (SCI). There remains an urgent need to develop treatments that could effectively reduce pain and its negative impact on individuals with physical disabilities. Hypnosis (HYP) has been shown to enhance the efficacy of cognitive therapy (CT) for non-pain problems; its ability to enhance the efficacy of CT for pain has not yet been examined. *Materials and Methods:* 31 individuals with MS (22) or SCI (9) and chronic pain were randomly assigned to receive four sessions of: (1) education control (EC); (2) CT; (3) HYP; or (4) hypnotic cognitive therapy (HYP-CT). Pain intensity, depression, and pain interference were assessed before and after treatment by research staff blind to treatment condition. *Results:* Participants in the HYP-CT condition reported larger improvements on all outcomes (Cohen's ds for pain intensity, depression, and pain interference were 1.66, 0.67, and 1.52; all indicating moderate to large effects) than participants in either the CT (0.60, 0.63, 0.74) or HYP (0.41, 0.33, 0.54) conditions. Improvements tended to be smaller for participants in the EC condition (ds: 0.63, 0.23, 0.33) than the treatment conditions; only HYP-CT evidenced significantly more improvement than EC in pain interference ($p < 0.05$) and pain intensity ($p < 0.10$). *Conclusion:* The findings from this initial sample of 31 subjects are consistent with research indicating that adding hypnosis increases the efficacy of cognitive therapy, and support the practice of combining hypnosis with cognitive therapy as a way of enhancing therapeutic outcomes in individuals with SCI or MS.

TA007

Associations between Post-Traumatic Stress Disorder Symptoms, Pain, Mental, Social and Physical Functioning in Patients with Spinal Cord Injury

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Introduction: Prevalence of pain after SCI is high, varying from 65–85%. Consequently pain has an immense negative impact on the quality of life (QoL). In order to improve QoL we investigated the association between pain, PTSD and other psychological factors. **Methods:** SCI patients (all ASIA scores) who underwent treatment between 2005 and 2010 in Reade, a rehabilitation center in Amsterdam, were invited. In total 186 patients filled in a questionnaire evaluating pain characteristics, PTSD, anxiety, depression, and other psychological factors. The three most severe locations of pain were separately scored on the numerical rating scale (NRS). Symptoms of PTSD were assessed using the Trauma Screening Questionnaire (TSQ) and the Impact of Event Scale (IES). Anxiety and depression were assessed with the Hospital Anxiety and Depression Scale (HADS) and feelings of helplessness were measured with the Illness Cognition Questionnaire (ICQ). Hostility was measured with one subscale from the Symptom Checklist (SCL-90-R). Univariate regression analyses were performed to determine associations between pain (most severe location), PTSD and other psychological factors. Analyses were controlled for possible confounders: gender, age, living alone/together, education and duration of the lesion. **Results:** Analyses were performed on 175 patients of which 114 (65%) were male, 51 (29%) had a complete lesion (ASIA A), 87 (50%) had a traumatic lesion, 151 (86.3%) suffered from pain, of which 138 (79%) had chronic pain (> 6 months). After adjustment for education as a confounding factor, the severity of PTSD symptoms ($\beta=0.28$; $P=0.001$), depression and anxiety ($\beta=0.35$; $P=0.001$), hostility ($\beta=0.27$; $P<0.001$), and helplessness ($\beta=0.35$; $P<0.001$) turned out to be associated with higher intensity of pain. **Conclusion:** In this study psychological factors are associated with pain intensity of the worst pain location. As a result, we suggest psychological health should be given more attention during rehabilitation treatment. Perhaps psychological assessment should even become a standard element of pain treatment after SCI.

A.2. MUSCULOSKELETAL CONDITIONS: BONE AND INFLAMMATORY JOINT DISEASES

TA008

Muscle Strength and Physical Performance in Patients with Vitamin D Deficiency

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Background: Many observational studies and some clinical trials suggested a role of vitamin D counteracting bone and muscle loss in aging. Serum levels of 25-hydroxyvitamin D (25OHD) seem to be associated to muscle strength and physical performance. The aim of our study was to compare physical performance and muscle strength in subjects with different serum levels of vitamin D. **Materials and Methods:** We compared 40 patients with vitamin D deficiency (25 OHD < 30 ng/ml) to 37 subjects with normal serum levels of 25 OHD (> 30 ng/ml). The muscle strength and muscle performance were, respectively, assessed with the Jamar handheld dynamometer and the Short Physical Performance Battery (SPPB). **Results:** Results are showed in table.

	Vitamin D deficiency subjects (n=40)	Normal subjects (n=37)	p-value
Age (years)	66.9±7.27	67.54±8.29	NS
Body	25.37±3.59	25.72±3.25	NS
Mass Index (BMI) (kg/m ²)			
HGS (kg)	12.81±5.10	15.70±6.89	0.038
Gait speed	<1 m/s: 25/40 (62.5%)	<1 m/s: 20/37 (54.1%)	NS
	>1m/s: 15/40 (37.5%)	>1 m/s: 17/37 (45.9%)	
SPPB score	<8: 17/40: (42.5%)	<8: 10/37 (27%)	NS
	>8: 23/40 (57.5%)	>8: 20/37 (73%)	

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Conclusions: Subjects with hypovitaminosis resulted to have a significant reduction in muscle strength but not in physical performance.

TA009

Osteomalacia: a Case of a Fragile Life

***F. Quintas**

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Case Report: RFCA female, 55 years with a history of pathological growth retardation, bony deformities, with correction surgery at 13 years of age. Between 35 and 39 year old was taken into medical consultation because of progressive difficulty in walking, recurrent episodes of mechanical pain in the hips, having been treated with alendronate, calcium, nandrolone, obtaining a significant improvement of symptoms. Objectively the patient had a short stature (140 cm), obese and hip varum. Since 48 years old, had bilateral mechanical hip pain (left most intense) using crutches to the assist gear. She rarely leave home, and consequently with low sun exposure. On 24.01.2012 fell resulting a neck fracture of the left femur and was submitted on the same day a non-cimented total hip replacement. Subsequently started a rehabilitation program which included ice, early mobilization, strengthening of rotators and hip abductors muscles, gait training and balance. On 31.01.2012 when performing gait training with support, without any trauma, began pain in the right elbow. The X-ray has shown fracture of the right proximal diaphyseal ulna, having been submitted to osteosynthesis of the proximal ulna using a plate. Analytically observed elevation of parathyroid hormone, vitamin D deficiency, and hypocalciuria hipofosfatúria. **Discussion:** Osteomalacia is a disease associated with reversible cause alteration of phospho-calcium metabolism and important factor to skeletal muscle weakness and disability, pain and significant socio-economic losses worldwide. However, it still a very underdiagnosed pathologies, sometimes only taken in the presence of signs of unusual fractures. Rickets and osteomalacia are disorders involving the deficiency of vitamin-D. The first occurs only during growth and is a defect in mineralization of the epiphyseal plate. Osteomalacia is defined by inadequate matrix mineralization. It is more common in elderly and middle-aged women. In this case, the epidemiological, clinical, analytical and imaging features are many suggestive of the diagnosis. Treatment with 1000 IU/day of vitamin D is usually effective. The rehabilitation treatment will always depend of the sequelae caused by bony lesions, there is always a major concern with gains balance and proprioception to prevent falls and serious fractures. **Conclusion:** The osteomalacia is a rare diagnosis but may be under-identified.

TA010

Effects of Pamidronate, Calcium and Vitamin D on Treatment of Experimental Osteoporosis

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Background: Bisphosphonates are well known potent inhibitors of osteoclast activity and widely used clinically for postmenopausal osteoporosis. **Aim:** of the study was to evaluate the effects of pamidronate (P), calcium (Ca) and vitamin D on osteoporosis induced by ovarian hormone (estrogen) deficiency. **Material and Methods:** 14-weeks-old female Wistar rats (n=21) were randomized to three groups (n=7 in each): OVX+P+Ca+vit D (experimental), OVX (bilaterally ovariectomized) and INT (intact control). The accommodation conditions and feeding were the same for all groups. After six weeks the OVX+P+Ca+vit D group was treated with pamidronate 0.3 mg/100 g of body weight intraperitoneally every fourth day, during five weeks, Ca (500 mg) and vit D (400 i.j.) per os during five days in week, for five weeks. At the end of five weeks period the experimental animals were sacrificed. The biochemical analyses: osteocalcin (OC), alkaline phosphatase (AP), calcium (Ca) and phosphorus (P) were evaluated.

The histological analyses of left tibia stained with hematoxylin-eosin (HE) were studied by routine light microscopy. Biomechanical properties were tested on TOMI-2001. *Results:* Statistically significant decrease of OC ($p < 0.01$), AP ($p < 0.05$) and PHOS ($p < 0.01$) was obtained in experimental OVX+P+Ca+vit D group compared to OVX group. Histological analysis showed increased ossification, the trabecules were unequal and irregular, with fewer connections between themselves, in comparison with INT group. Biomechanical analyses of left femur on bending and torsion in experimental group showed higher resistance in comparison with untreated OVX group, but without statistical significance. *Conclusion:* This study shows that pamidronate, calcium and vitamin D have antiresorptive effect in the treatment of experimental osteoporosis. Bone markers were useful in monitoring the biochemical effect of bisphosphonates, but could not predict the bone quality. Biomechanical tests of bone had significant role in analyzing effects of medication and strongly correlated with bone quality. *Keywords:* experimental osteoporosis, pamidronate, calcium, vitamin D. *Acknowledgements:* This study is supported by Grant N° 06/06-020/961-49/05 Ministry of Science and Technology of Republic Srpska.

TA011

Safety of Zoledronic Acid in Patients with Postmenopausal Osteoporosis

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Introduction: Bisphosphonates are usually applied via oral route during clinical practice with good efficacy in reducing fracture risk. However patient compliance during oral treatment and gastrointestinal side effects are factors restrictions for their use. Intravenous bisphosphonates are a good treatment option for the patients who could not use the oral route. Zoledronic acid is a tertiary nitrogen containing bisphosphonate which is approved for treatment of postmenopausal osteoporosis. Renal toxicity has been reported with use of zoledronic acid in cancer patients. There are also reported cases of hypocalcemia after intravenous use of zoledronic acid. The objective of this study is to evaluate the effects of intravenous infusion of zoledronic acid on serum renal and hepatic function tests; serum calcium, phosphorus and alkaline phosphatase levels in patients with postmenopausal osteoporosis. *Materials and Methods:* Records of 50 zoledronic acid infusions of osteoporotic women were investigated retrospectively. Changes in serum calcium, phosphate, alkaline phosphatase, creatinine, and alanine transaminase and aspartate transaminase levels were analyzed after the infusion of zoledronic acid. Reported side effects were also documented. *Results:* The mean age of the study population was 74 ± 7.37 (range between 54 and 86). Zoledronic acid was applied for the first time in 37 patients (74%), 10 patients were using zoledronic acid second time (20%), 3 patients were using for the third time (6%). The mean time interval for the post-treatment control was 19.02 ± 8.4 days (range between 2-47) Mean serum Ca level decreased to 9.4 ± 0.9 from 9.6 ± 0.6 . The decrease in serum Ca levels were statistically significant ($p = 0.018$). Of the investigated parameters only serum calcium level changed significantly after zoledronic acid infusion. Reported side effects were influenza like symptoms, myalgia, arthralgia, headache and pyrexia. Side effects were less frequent compared to literature. *Conclusion:* Intravenous infusion of zoledronic acid is safe in terms of renal and hepatic side effects. However serum calcium level may decrease despite precautions against hypocalcemia.

TA012

Effectiveness of Deep Tissue Massage on Patient with Ankylosing Spondylitis

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Background: Ankylosing spondylitis (AS) is a chronic and systemic rheumatic disease that presents as inflammation of the vertebrae and joints, presenting around 20 to 30 years of age. The exact cause of AS is unknown, but the hypothesis is that the body's mechanisms for coping with inflammation lead to abnormal bone formation (syndesmophytes) through ossification, which can eventually lead to spinal fusion. The prevalence of AS is between 0.1-0.5%. Main symptoms are pain, stiffness and fatigue, which may cause activity limitation and reduced physical, social and psychosocial well-being. Massage is defined as "a mechanical manipulation of body tissues with rhythmic pressure and stroking for the purpose of promoting health and well-being". The aims of massage therapy include: to identify and eliminate hyperirritability in muscle and fascia, to reduce soft tissue pain and spasm, to restore lymph and blood circulation to tissues. This study compared the effectiveness of two different kind of massage: therapeutic and deep tissue on AS patients. *Methods:* The study included 16 patients with AS. They were separated into group 1 [deep tissue massage, n=14 men] and group 2 [therapeutic massage, n=13 men]. Patient were eligible for the study if they fulfilled inclusion and exclusion criteria. Both groups received treatment once a day for 10 days. Patients were assessed according to motion function (BASFI), disease activity (BASDAI), chest expansion (CE), modified Schober test (MS). The evaluation was performed at the beginning and at the end of therapy. Both therapies include using a registered massage therapist and making attempt to ensure fidelity to a treatment model. *Results:* There was not statistically significant differences between groups according to age ($p = 0.775$), BMI ($p = 0.712$), BASDAI ($p = 0.448$). Statistically significant differences were noted after therapy in group 1: BASFI ($p = 0.029$); BASDAI ($p = 0.007$); MS ($p = 0.017$) and in group 2: BASDAI ($p = 0.018$). Group 1 was statistically significant better therapy than group 2 in MS ($p = 0.038$). *Conclusion:* The study showed positive, statistically significant effects of massages on the AS patients. Further research is needed to verify the results.

TA013

Not Flesh and Bones But Veggies and Bones: an Approach on Vegetarian Diet and Osteoporosis

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Introduction: Osteoporosis, or bone mineral loss, has several etiologies. Factors such as race, gender, physical constitution, lifestyle, exercise, sunlight, diet, and drugs influence the rate of bone formation or re-absorption and lead to changes in bone mineral density. About 9-10% of the world population are vegetarian/vegan. As it is a low/absent animal protein diet, does it have a risk to development of osteoporosis? Several studies suggest that average BMD would be lower and that the incidence of osteoporosis higher in vegetarians compared with non-vegetarians. *Methods:* A systematic review of literature was made using the research motor PubMed using the terms "Vegetarian diet" and "osteoporosis". *Results:* A prospective study showed that there was not a significant impact of the vegetarian diet on age-related decline of BMD in their study population. Other meta analysis not evidenced a negative impact of a vegetarian/vegan diet on BMD. *Conclusion:* As several studies evidence, vegetarianism is not a serious risk factor for osteoporotic fracture. More studies should be designed in order to evaluate the benefits of higher intake of fruit and vegetables to the bone remodeling.

TA014

Effects of Aromatherapy on Pain and Fatigue in Patients with Rheumatoid Arthritis

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Introduction/Background: Rheumatoid arthritis is a chronic inflammatory disease that is known to cause pain, disability, fatigue, and reduces patients' quality of life. Although, treatment options are common, symptoms of the disease cannot be cured. Aromatherapy oils that have analgesic, anti-inflammatory, immunostimulatory effects, can relieve pain and fatigue in rheumatoid arthritis. **Material and Methods:** This experimental study is designed to determine the effects of aromatherapy on pain and fatigue suffering from rheumatoid arthritis. The demographic data of the patients were recorded, Visual Analogue Scale, which is used to assess the pain of patient and Fatigue Severity Scale, which is used to assess fatigue of patient, and Health Assessment questionnaire (HAQ), which is used to assess the quality of life in patients with rheumatoid arthritis were filled out. Aromatherapy massage was applied to knee area along with 6 weeks/three times in a week, for 30 minutes. 5% mixture of aromatherapy was formed juniper, medical lavender, ylang ylang, rosemary (3: 3: 2: 2) and 100 ml of coconut oils. There were no intervention in the control group, but their pain and fatigue scores was questioned by phone during 6 weeks. All patients continued to get their rheumatoid arthritis medication during the research. Pain and fatigue scores of experimental group were measured in the first hour after each aromatherapy massage. To analyze the data, descriptive statistics, independent samples t-test, Mann-Whitney *U* test were used. **Results:** Of the 24 patients admitted, 8.3% were male, and 91.7% were female, the mean age of 53.9, the mean duration of disease 11.97 year. After a 6-week aromatherapy patient's assessment of pain (M=60.0 to 10.7), fatigue (M=52.3 to 23.2) and HAQ (M=12.06 to 3.5) decreased significantly for the aromatherapy participants compared to the control group. **Conclusion:** These findings suggest that aromatherapy could decrease joint pain, fatigue, and could increase quality of life in patients with rheumatoid arthritis. Aromatherapy should be used safely by nurses in the management of chronic rheumatic pain and fatigue.

A.2.1 INFLAMMATORY JOINT DISEASES

TA015

Lipid Profile in Rheumatoid Arthritis Patients and Its Relation to Disease Activity

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Background: Cardiovascular morbidity and mortality are enhanced in Rheumatoid Arthritis (RA), which may be attributable to dyslipidemia. The dyslipidemia observed in RA appears to be dependent on disease activity, but only a few studies in the world literature are there, providing definite correlation and mechanisms. In this study we prospectively assessed the correlation of lipid profile with the disease activity. **Material and Methods:** A total of 60 patients who fulfilled the "Revised Criteria for the Classification of Rheumatoid Arthritis 1987" were included in this study. The patients who satisfied at least 4 out of 7 criteria were included in the study. The serum was collected from rheumatoid arthritis patients for the determination of lipid values which are triglycerides (TG), total cholesterol (TC), high density lipoprotein (HDL), low density lipoprotein (LDL). Disease activity was assessed by using DAS 28 ESR score. Disease activity was then correlated to the lipid profile of the patients using co-efficient of correlation. DAS 28 ESR <or=3.2 Inactive disease, >3.2 to < or=5.1 Moderate disease, >5.1 Very active disease. **Results:** Out of 60 patients, 42 (70%) patients had very active disease activity at the time of presentation. 16 (26.7%) patients had moderately active and 2 (3.3%) had inactive disease. Patients with very active disease were found to have low levels of LDL, HDL and TC as compared to patients with inactive disease. However the reduction in HDL levels was significantly higher than TC levels. Levels of TG were found to be higher in patients with very active disease. **Conclusions:** In patients with RA it is more important to measure both total cholesterol and HDL

and to use their ratio for the calculation of absolute cardiovascular disease risk. HDL, LDL, TC can be used as corroborating markers of disease activity in RA. **References:** Wells G et al. Validation of the 28-joint Disease activity score (DAS28) and European League Against Rheumatism response criteria based on C-reactive protein against disease progression in patients with rheumatoid arthritis, and comparison with the DAS28 based on erythrocyte sedimentation rate. *Ann Rheum Dis*: 2009 ; 68: 954–960.

TA016

Exercise for Patients with Ankylosing Spondylitis: What Is New?

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Introduction/Background: Ankylosing Spondylitis (AS) is a chronic, inflammatory and progressive rheumatic disease. The aims of this study were to review the current evidence and evaluate the role of exercise for the management of patients with ankylosing spondylitis in the biological era. **Material and Methods:** Systematic review of the literature published until September 2014 in Medline, Embase, Cochrane Library, Web of Science and Scopus databases. **Results:** Thirty-one studies were included for further analysis (land or water exercise; combined or not with biological drugs). Most studies showed a positive effect of exercise on BASFI, BASDAI, pain, mobility, function and quality of life. The benefit was statistically significant on randomized controlled trials. Results support a multimodal approach, including educational sessions and maintaining home-based program. **Conclusion:** The research suggests that the exercise interventions have an important role on management of AS, therefore it should be encouraged and individually prescribed for patients with AS. More studies with good methodological quality are needed to strengthen the results and to determine which exercise protocols should be recommended.

TA017

The Efficacy of Very Low Density Infra Red Laser Therapy on Pro-Oxidant Status in Relation to Inflammatory Markers in Patients with Rheumatoid Arthritis

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Cells of patients with rheumatoid arthritis (RA) generate a large amount of reactive oxygen species and monoxide nitrogen (NO) production which is one of the many causes of cartilage and bone tissue destruction, maintaining the inflammation. Damaging effect of NO mediated primarily due to peroxynitrite (interaction of superoxide and NO), correlates with disease-activity parameters and with the levels of TNF α in RA patients. The effects of laser therapy (LT) could be different and still controversial. This paper studies the efficacy of very low density infra red laser therapy (VLD-IRLT) on RA patients' pro-oxidant status (peroxynitrite, superoxide anion radical by phorbol myristate acetate-PMA stimulated and unstimulated cells and NADPHoxidase) and its relation to CRP and the soluble receptor of TNF α (sTNF α R). According to ACR criteria, a study of 74 RA patients (44 in elementary, 30 in placebo group) and peripheral blood from 40 healthy donors was carried out in a double-blind randomised and placebo-controlled study over two weeks. Irradiation parameters chosen individually (pulse power 7 W, 80-1500 Hz, 0.008-0.15 J/cm², 0.004 J-0.3 J per point). Before LT, non-activated superoxide production by neutrophils in RA patients (0.545 \pm 0.105 in elementary vs. 0.504 \pm 0.1 placebo group) was much higher than that in the donor group (0.216 \pm 0.07; p<0.01), while after VLD-IRLT it was decreased

and comparable with the healthy donors (0.312 ± 0.196 ; $p < 0.05$). The placebo group did not show any significant changes. Similarly, peroxynitrite production by RA neutrophils which was increased in comparison with the healthy donor group (41.73 ± 16.9 vs 27.7 ± 6.02 ; $p < 0.01$) normalised after VLD-IRLT (16.6 ± 11.2 ; $p < 0.01$) in the elementary and went unchanged in the placebo group. Using PMA as an additional stimulus did not lead to further cell activation. The levels of CRP and sTNF α R, in the RA patients were in correlation with other investigated parameters and significantly higher than in healthy donors. VLD-IRLT reduced the level of sTNF α R and CRP ($p < 0.05$) in the elementary group and hasn't any effect on the NADPH oxidase, whilst the placebo ($p > 0.05$) remained unchanged. It appears the primary effect of VLD-IRLT is realised through the action of cytokines homeostasis.

TA018

Exuberant Gout Arthropathy on a Rehabilitation Unit: Clinical Case and Review of Current Treatment Evidence

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Case diagnosis: Gout arthropathy. *Case description:* 88 year female, previously semi-dependent (living alone, social care support). History of hypertension, cardiac failure NYHA II, dyslipidemia, hyperuricemia with gout episodes. Admitted to our rehabilitation unit due to a lacunar motor syndrome, with no acute change on brain CT scan. *On neuromotor examination:* discrete dysarthria, mobilization of right elbow was painful and ROM was -40° extension to 100° flexion. Gouty tophi and degenerative changes were present on right elbow, multiple articulations of hands and feet. Right hemiparesis with muscle strength graded at 3/5 MRC scale on both upper and lower right limbs. Spasticity was graded at 1+ modified Ashworth scale on right elbow, knee and ankle joints. Her orthostatic balance was not effective and she could just do very short gait distances, complaining of elbow, hand and feet pain. Lab exams revealed hyperuricemia, high reactive C protein and ESR. *Discussion:* Gout is the most common type of arthritis on fourth to sixth decades of life, afflicting 1-2% of men in western countries. Classically it presents as a mono or oligoarthritis, eventually evolving into a chronic polyarticular arthritis, with bony lesion and formation of gouty tophi. Besides hyperuricemia, it associates with dyslipidemia, diabetes mellitus, hypertension, which ought to be controlled. Allopurinol is still mainstay on the treatment of hyperuricemic and/or gout patients, but a variety of additional or alternative drugs (in case of contraindication or side-effects) can be chosen from. When treating acute gout flares, NSAIDs and colchicine are first drug choices, or alternatively corticosteroids. Prophylaxis of new flares is recommended but frequently not prescribed. Upper limb and balance and gait rehabilitation (using walker) were greatly limited by articular pain on hands and feet and diminished ROM in major joints. Physiotherapy and physical agents along with optimisation of allopurinol, NSAIDs/analgesics allowed for a better participation. Comorbidities were accounted for in drug choice. *Conclusions:* This case depicts the characteristics chronic gout arthropathy and the signs, symptoms and functional impairment it may be associated to. The superimposed stroke (and need for participation in a rehabilitation program) highlighted the importance of controlling disease activity.

TA019

Health-Related Quality of Life and Depressive Symptoms in a Sample of Latin American Adults with Rheumatoid Arthritis

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Background: Rheumatoid arthritis (RA) is a heterogeneous chronic inflammatory disease that affects joints and typically follows a progressive course leading to disability. RA is ranked as one of the chronic illnesses to have the greatest impact on health-related quality of life (HRQOL), which has important implications for the mental and physical health of those with the disease. Although research has begun to examine HRQOL and depression in individuals with RA, there is a paucity of research on these factors in Latin American RA patients, where medical resources and health services for coping with RA may vary substantially from those in developed countries. *Methods:* One hundred and three individuals with RA were recruited from ambulatory centers in Colombia. Seventy-three healthy control participants were recruited from the local community. HRQOL was assessed using the Short Form-36 (SF-36) and depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9). *Results:* Compared to controls, RA patients were significantly older and more likely to be female and married ($p < 0.001$). An analysis of covariance (ANCOVA) found that, compared to controls, RA patients had higher PHQ-9 scores ($p < 0.01$). A multivariate analysis of covariance and follow-up ANCOVAs found that, compared to controls, RA patients had lower scores on all SF-36 sub-scales ($p < 0.01$). PHQ-9 was correlated with all SF-36 sub-scales in both patients and controls ($p < 0.05$). In the RA group, multivariate linear regression analysis showed that social functioning and vitality scores were independently associated with PHQ-9 scores ($p < 0.01$ and $p < 0.05$, respectively), controlling for age, gender, education, Disease Activity Score-28, and other SF-36 sub-scale scores. In the control group, education and social functioning scores were independently associated with PHQ-9 scores ($p < 0.05$ and $p < 0.01$, respectively) controlling for age, gender, and other SF-36 sub-scale scores. *Conclusion:* Prior research indicated that individuals with RA have deteriorated HRQOL and more depressive symptoms, and this study extends these findings to a Colombian sample. Depressive symptoms and social functioning are independently related in both Colombians with RA and healthy controls. However, the relationship between depressive symptoms and vitality is especially unique to those with RA in Colombia.

TA020

Rehabilitation in Inflammatory Rheumatology– Statistical Data, Requirements and Results from the Quality Assurance Program of German Federal Pension Insurance

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Background: The objective was to highlight if there are outcome differences in the rehabilitation of patients with inflammatory rheumatism compared to other patients receiving an inpatient rehabilitation on behalf of the German Federal Pension Insurance (GFPI). *Methods:* Register data of the GFPI were used to analyse inpatient rehabilitation services due to inflammatory rheumatism (ICD-10 diagnosis groups M05-M14, M30-M36 and M45-M49) concerning prevalence over time, differences in work capacity and access to early retirement after rehabilitation. Work capacity evaluation and further recommendations were extracted from the standardised forms at discharge of rehabilitation; data on pensions due to early reduced earning capacity were extracted from the rehabilitation statistics database (RSD) of German Pension Insurance. Furthermore additional data from quality assurance were used to analyse differences of persons suffering from inflammatory rheumatism and other persons in rehabilitation. *Results:* In 2012 the GFPI provided 462,517 medical rehabilitation services, 399,036 were carried out in an inpatient setting. 14,366 were rehabilitation measures due to inflammatory rheumatism (3.6%), with a considerable increase in years 2008-2012. Full time work capacity (more than 6 hours a day) at the end of rehabilitation was significantly lower than in other diagnosis groups. Data on pensions due to reduced earning capacity show, that 1,596 persons with in-

flammatory rheumatism went into early retirement in year 2012 (2.5 %). Recommendations for post-rehabilitation support and for a subsequent vocational rehabilitation were higher than in other indications. The quantitative and qualitative level of therapeutic procedures in the process of rehabilitation was higher. On the other hand, data from our patient questionnaire showed, that patient satisfaction and subjective success of the rehabilitation were lower. **Conclusion:** Patients with inflammatory rheumatism are only a small group in rehabilitation on behalf of the GFPI. Nevertheless this relatively small group causes relatively high health costs and furthermore shows a high risk to loose work ability. Due to these poor outcomes quantitative and qualitative level of therapeutic procedures in rehabilitation have to be higher.

TA021

A Case Report on Effect of Electro Acupuncture, Massage, Mud and Sauna Therapies in the Management of Rheumatoid Arthritis

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Case Diagnosis: A 48-year married woman, diagnosed with rheumatoid arthritis (RA) in 2007, visited our hospital in July 2014. She fulfilled the 2010 American College of Rheumatology and the European League against Rheumatism classification criteria for RA at the time of admission. **Case Description:** Our subject came to our hospital with the complaint of severe pain associated with swelling, stiffness in multiple joints especially small joints, elbow, shoulder, knee and hip joints with symmetrical distribution and deformities of fingers and toes. She underwent conventional medications till 2013 and Ayurvedic medicines with Diclofenac sodium till get admitted in our hospital but she could not get improvement. In our hospital, she received 14-sessions (30-min/session/day) of electro-acupuncture; 18-sessions of Swedish massage (45-min/session) and hot-mud application (30-min/session) to bilateral hands and legs for 1-session/day for 6-days/week; and 3-sessions of sauna-bath once/week for 3 weeks. We assessed visual analog scale score for pain, 10-meter walk test, isometric hand grip test before, during and after intervention; and Pittsburgh sleep quality index (PSQI), depression anxiety and stress scales (DASS), Short Form-36 version 2 (SF-36v2) health survey and blood and urine analysis before and after intervention. **Result and Discussion:** Result of our study showed better improvement in pain (8.2 to 1.9), 10-meter walk test (self selected velocity 0.24 to 0.52-m/s and fast velocity 0.35 to 0.72-m/s), hand grip (right hand 10.67 to 16.67-mmHg and left hand 8.67 to 14.67- mmHg), depression (31 to 8), anxiety (21 to 8), stress (23 to 6), PSQI (11 to 7), SF-36v2 (12.36 to 63.33), Erythrocyte sedimentation rate (100 to 55-mm/hr) with improvement in urine and other blood analysis compared with baseline. Electro-acupuncture, Mud, Massage and sauna (EMMS) might attribute to reduce pain along with inflammation; stiffness, motor functions and daily activities; stress, anxiety, muscle relaxation, mobility and quality of sleep; improve locomotor and psycho-emotional status respectively. **Conclusions:** Results of our study suggest that EMMS therapies were effective in rheumatoid arthritis. Though the results are encouraging, further studies are required with larger sample size for validation.

A.2.2 DEGENERATIVE JOINT DISEASES

TA022

Computational Analysis of Human Gait in Patients Diagnosed with Knee Arthritis

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Introduction: Walking Quality (WQ) is a computational system for the analysis and monitoring of the different phases of human gait. The app installed in the smartphone registers the accelerations generated during the movement, sending a detailed report to the doctor which allows tracking the corresponding rehabilitation processes. Resulting from the studies in engineering and artificial intelligence, WQ is an exponent of e-Health technology. The doctor will be able to monitor human gait anywhere without needing to go to the hospital. It also allows for an easy, integrated and continuous register of human gait aiding the control and tracking of the recommendations made from the clinical unit. **Material and Methods:** Prospective clinical validation study with transversal design. The goals are to assess the validity of the criteria, acceptability and terms of use of WQ as an instrument to evaluate the clinical situation of patients with knee arthritis using the WOMAC questionnaire as Gold Standard. Evaluate the result of a specific rehabilitation program on patients with knee arthritis that have been subject or not to knee arthroplasty. Patients will complete a hospital or home-based treatment program designed specifically for the study. Anthropometric variables, WOMAC questionnaire results and WQ quantitative specific variables (accelerations, durations, symmetries and homogeneities) will be analyzed. **Results:** Presently, we are acquiring the necessary data to carry out a rigorous statistic study. The preliminary results after observing the recovery degree of patients subject to knee arthroplasty show an apparent correlation between the results given by the WOMAC test and those given by WQ. (The final results will be available at the date of the congress). **Conclusions:** The result of our investigation is an important contribution to the set of tools developed within the new field known as e-Health. Validation of WQ as a clinical instrument to assess the gait quality will provide the therapist with an objective measurement tool with which a more detailed information about the effectiveness of the rehabilitation programs will be obtained.

TA023

Relationship between Knee Extensor Strength and Functional Performance in Patients with Knee Osteoarthritis

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Introduction: Deficits in functional abilities begin early and aggravate progressively in knee osteoarthritis people. At the same time, a loss of muscle strength at the knee level is noted throughout the evolution. Therefore, the purpose of this study was to evaluate functional performance in knee osteoarthritis patients and to correlate it with knee extensor strength. **Methods:** 32 patients (14 men and 18 women) with moderate knee osteoarthritis (grade 2 and 3 Kellgren-Lawrence) were included in this cross-sectional study. Knee extensor strength was measured by the isokinetic method at the velocities of 60°/s, 90°/s and 120°/s, using a Gymnax Iso 1 Dynamometer. The following parameters were recorded: quadriceps peak torque, power and work. Functional performance was assessed using the timed up-and-go (TUG), stair climbing test (SCT) and 6-minute walk (6MW). Analyses of the relationships between functional performance and strength parameters were done. **Results:** Quadriceps peak torque, power and total work significantly correlated ($p < 0.05$) with all three functional performance tests. The higher level of correlation was found between extensor power and TUG. Significance was met for each of the angular velocities used. **Conclusions:** Knee extensor strength, and quadriceps power particularly, play a central role in increasing functional performance. Therefore, in knee osteoarthritis patients rehabilitation programs should emphasize corrective muscle strengthening in order to prevent disabilities and to maintain long term autonomy.

TA024

Hip Osteoarthritis Conservative Treatment – Fluoroscopy Guided Injection

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Introduction: Hip Osteoarthritis is a common degenerative joint disorder among both men and women, and increases in frequency with age. The clinical signs are pain and a decreased range of motion. Total hip replacements are common among persons with osteoarthritis of the hip, but not always this surgical procedure is need. Some etiological factors for osteoarthritis of the hip are congenital and developmental changes, hereditary factors, history of trauma and overweight. Patients with an unknown aetiology are classified as having idiopathic or primary osteoarthritis of the hip. Sports activities of different kinds have been found in many studies to be associated with early development of osteoarthritis of the hip in men. Soccer and field athletics, in particular, seem to be harmful to the hip joints, although in other studies no relation between osteoarthritis of the hip and sports activities has been observed. **Material and Methods:** We apply the scale Hip disability and Osteoarthritis Outcome Score (HOOS) and the WOMAC score scale to 19 patients with osteoarthritis of the hip grade 3, 11 males and 7 females, with a mean age of 69 years. **Results:** After conservative treatment (paracetamol, NSAIDs and glucosamine) 70%, 25% and 5% of patients were 20, 35 and 55 points in the Hoos scale, respectively, and 65%, 30% and 5% were 18, 30 and 58 point in WOMAC scale, respectively. After hyaluronic acid Fluoroscopy guided injection and 4 weeks after the procedure, 58%, 35% and 7% of patients exhibited 90, 75 and 5 points in the range HOOS, respectively, 55%, 36% and 9% were 96 74 and 6 points in the WOMAC scale, respectively. **Conclusion:** Hip Osteoarthritis can be very limiting in gait and activities of daily living primarily in patients with various underlying pathologies. As a patient has a Hip Osteoarthritis resistant to conservative treatment, minimally invasive image-guided techniques, including injection of hyaluronic acid guided by Fluoroscopy, should be considered as a treatment.

TA025

A Novel and Promising Treatment for Osteoarthritis: Extracorporeal Shockwave Therapy. a Qualitative Analysis of the Literature*Q. Ji^{1,2}, P. Wang^{1,2}, X. Yang^{1,2}, C. Q. He^{1,2}¹Department of Rehabilitation Medicine, West China Hospital, Sichuan University, ²Key Laboratory of Rehabilitation Medicine in Sichuan, Chengdu, CN

Introduction: A growing number of investigations demonstrated the therapeutic effects of extracorporeal shockwave therapy (ESWT) on joints with osteoarthritis (OA). The efficacy and exact mechanisms are still under exploration. At present, a summary of the evidence regarding effectiveness of ESWT in OA is not available. The purpose of this qualitative study of literature is thus to offer an overview of ESWT in the treatment and/or management of OA, and in particular its therapeutic effects, in hopes of eliciting further multi-disciplinary scientific investigations into this promising application as an adjunct to other modalities or surgery. **Material and Methods:** Based on the 'grounded theory' of Glaser and Strauss, four steps were carried out: articles scrutinize, key points extractions, concepts build and categories formation. Firstly, experimental, clinical and animal studies from MEDLINE, EMBASE and Physiotherapy Evidence Database (PEDRO) that presented applications of ESWT in the treatment of OA and its underlying mechanisms were examined. Secondly, two researchers independently extracted key points from the collected data. And then, key points were grouped into similar concepts. At last, categories were formed based on these concepts from the articles.

Results: Seventeen studies between 2005 and 2014 finally met the criteria and were included. Four categories of modified effects were formed: articular cartilage, subchondral bone, pain sensation and motor function. Based on summary and analysis of relevant papers, the present qualitative study critically presents the use of ESWT in the treatment and/or management of OA for chondroprotective and subchondral bone remodeling effects as well as pain reduction and motor function improvements. **Conclusion:** While in its infancy and the optimal frequencies, impulses, energy intensity and shock waves protocol in the management of OA continues to be elucidated, ESWT may turn out to be a novel and promising treatment for OA. Further studies are required to reveal its mechanisms, benefits and safety prior to the wide clinical application.

TA026

Home-Based Exercise for Knee Osteoarthritis: Efficiency and Adherence Factors

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Introduction: Adherence is an important factor contributing to the effectiveness of exercise-based rehabilitation. But in home based programs it is not possible to control whether the program is regularly applied by the patients, and non-adherence to unsupervised long-term exercise is a major problem that affects treatment outcome. The objective of our study is to evaluate the efficiency and adherence factors of a home based exercises program. **Patients and Methods:** Forty adults were included to an unsupervised home based exercises program. Measured outcomes were the intensity of pain, range of movement; functional impairment and quality of life. Patients were assessed before and after treatment, at 6 and 12 months. **Results:** All patients completed the program at 5 weeks. However, only 25 patients were adherent at 6 months and 24 at 12 months. The compliance to home exercises decreased throughout the year. A significant improvement in pain, range of movement, function and quality of life was seen despite the decrease in adherence and this improvement is maintained significant at one year. Improved parameters are independent of age, sex, BMI and educational level. However, the results will be better for those with recent symptoms and a non-advanced radiological stage. Patient who were non compliant to the home-based exercise program, were mostly illiterate, having a greater functional impairment, a BMI and satisfaction levels below to those who were compliant. **Conclusion:** A home-based exercise program may be prescribed for all patients with knee osteoarthritis and this regardless of age, sex, BMI and educational level. The main challenge is to design effective strategies for helping patients initiate and maintain a regimen of regular exercises.

TA027

Pain, Physical Functioning and Physical Activity of Patients with Joint Replacement before and after the Stay in Rehabilitation Clinic: a 9-Month Catamnestic Survey*A. Gottschling-Lang¹, L. Köhler¹, K. Höpner¹, K. Thren², C. Gutenbrunner¹, M. Bethge³¹Hanover Medical School, Hanover, ²Klinik Niedersachsen, Bad Nenndorf, ³University of Lübeck, Lübeck, DE

Introduction/Background: Aim of rehabilitation after joint replacement surgery is the recovering of physical functioning. Physical functioning and absence of pain are important factors for quality of life. In this study, physical functioning, pain, depressiveness and the level of physical activity were analyzed for rehabilitation patients during and after their stay in a rehabilitation clinic. **Material/Methods:** Patients aged between 60 and 85 years with implanted hip or knee replacement were included. Data were collected via standardized questionnaires for 3 measurements points: t0=begin

of rehabilitation, t1=one month after rehabilitation, t2=nine month after rehabilitation. T2 will be completed in April 2015. T0 was a retrospective survey over the period before the surgery. Survey instruments: Godin Leisure Time Exercise Questionnaire (physical activity), Western Ontario and McMaster Universities Osteoarthritis Index (subscales physical functioning and pain), Short Form Health Survey (health related quality of life), Patient Health Questionnaire (subscales depressiveness). Statistical analyses: one-way repeated-measures ANOVA. *Results:* For t0 and t1 149 patients were included in the analysis (average age: 71.2 years (SD 5.5), female: 54.5%; indication hip: 50.3%). T2 includes actually 70 participants. Over the period of nine month, rehabilitation patients show significant improvements in the scales of depressiveness (means: t0=2.01, t1=1.01, t2=1.01, $p<0.001$), pain (means: t0=50.36, t1=24.32, t2=17.16, $p<0.001$) and physical functioning (means: t0=50.57, t1=29.07, t2=25.78, $p<0.001$). Positive effects were stronger from t0 to t1 and decrease to t2. Mean differences in health related quality of life (means: t0=59.78, t1=63.89, t2=61.76) and in the self-reported level of physical activity in minutes per week (means: t0=148.72, t1=162.86, t2=151.71) were not significant between the measurement points. *Conclusion:* One month after the stay in rehabilitation clinic patients show a lower level of depressiveness and pain and a better physical functioning. Eight month later a tendency to further improvements are visible. However, there is no significant influence on health related quality of life. Self-reported level of physical activity is already high on t0 and perhaps affected by social desirability. That could be the reason, why no behavioral changes have been identified to t3.

TA028

The Use of Complementary and Alternative Medicine (Cam) among Patients with Knee Osteoarthritis in Pakistan: a Hospital Based Survey

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Introduction/Background: Osteoarthritis is the commonest degenerative joint disease worldwide. Patients in their quest to find pain relief frequently explore complementary and alternative medicine (CAM). These practices are prevalent globally but the local data from Pakistan is not available. This study aimed to document use of CAM in a cohort of Pakistani patients with knee osteoarthritis presenting to the largest rehabilitation institute of the country. *Material and Methods:* A Cross sectional survey with semi-structured face to face interviews was conducted at the Outpatient department of the Armed Forces Institute of Rehabilitation Medicine, Rawalpindi, Pakistan. Patients of both genders fulfilling the American College of Rheumatology Criteria for Knee Osteoarthritis were enrolled. Demographic data was documented and questions were asked about the use of different CAM therapies. Data was analyzed with SPSS version 19.0. *Results:* Three hundred patients (mean age: 62±10 years) were enrolled. Majority of them were male (68%), having age between 61–70 years (37.3%), with monthly income <Rs.10,000 (75.3%), educational level from grade 6–10 (48%) and were based in urban areas (51.3%). CAM was used by 45.3% of the patients. Therapeutic massage was the preferred by 12.7%, but most individuals (18.7%) used a combination of therapies. Patients used CAM chiefly based on self-knowledge (15.3%), primarily for pain relief (38.7%) and in combination with conventional allopathic medicines at least five times a week. The use of CAM was more common in rural population ($p=0.023$), in illiterate patients or who had education from grade 1–5 ($p=0.038$) and individuals between 41–40 years ($p=0.008$). *Conclusions:* The use of CAM in Pakistani patients with knee OA is common. Patients reporting use of CAM are more likely to be young, less educated and rural-based. Patients adopt these therapies based on self-knowledge and primarily for pain relief and use them in combination with conventional allopathic medicines at least five times

a week. Therapeutic massage is the preferred CAM but most individuals use a combination of therapies.

TA029

Effect of Home Exercise Program in Patients with Knee Osteoarthritis: a Systematic Review and Meta-Analysis

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Background: The Osteoarthritis Research Society International (OARSI) recommended non-pharmacological methods include patient education programs, weight reduction, coping strategies and exercise programs for the management of knee osteoarthritis (OA). However, neither systematic review nor meta-analysis have been published regarding the effectiveness of home exercise programs for the management of knee OA. *Purpose:* The purpose of this systematic review was to examine the evidence regarding the effect of home exercise programs with and without supervised clinic based exercises in the management of knee OA. *Methods:* We searched Pubmed, CINAHL, Embase, Scopus and PEDro from January 1995 to August 2014 using the keywords pain, exercise, home exercise program, rehabilitation, supervised exercise program and physiotherapy in combination with Medical Subject Headings “Osteoarthritis knee”. We selected randomized and case controlled trials published in English language. To verify the quality of the selected studies, we applied the PEDro Scale. Two evaluators individually selected the studies based on titles, excluding those articles that were not related to the objectives of this review. One evaluator extracted data from the included studies. A second evaluator independently verified extracted data for accuracy. *Results:* A total of 31 studies were found in the search. Of these, 19 studies met the inclusion criteria and were further analyzed. Seventeen of these 19 studies reached high methodological quality on the PEDro scale. Although the methods and home exercise programs interventions varied widely in these studies, most found significant improvements in pain, function and quality of life in patients with knee OA. *Discussions:* The analysis indicated that both home exercise programs with and without supervised clinic based exercises were beneficial in the management of knee OA patients. *Conclusions:* The large evidence of high quality trials supports the effectiveness of home exercise programs with and without supervised clinic based exercises in the rehabilitation of knee OA patients. In addition, small but growing evidence supports the effectiveness of other types of exercise such as tai chi, balance and proprioceptive training for patients with knee OA. *Keyword:* Osteoarthritis; Home exercise program; Supervised exercise Program; Rehabilitation, pain.

TA030

The Need for Information in Patients Suffering from Osteoarthritis: Results of a Focusgroup Survey

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Introduction: Patients suffering from Osteoarthritis are often faced with recurrent multiple decisions concerning their treatment. As has been shown in several studies, 90 % of German patients would like to be more fully informed about possible therapeutic approaches. In this study the following questions were examined: How are patients with osteoarthritis informed by the medical profession? How would they liked to be informed? How evolve participation and corporation between patients and doctors? For this purpose we used Methodological Triangulation. *Methods:* In order to collect varied patient perspectives with regard to current informative processes in the field of osteoarthritis therapy, the qualitative method of guided focus groups was applied. N=26 patients divided into three focus groups were interviewed. The patient population was recruited through ongoing ambulatory multimodal treatment programs and interviewed

regarding their treatment experiences since given their diagnosis. The data was analysed through qualitative content analysis. The results were compared using Methodological Triangulation with the results of a quantitative survey of N=422 osteoarthritis patients. **Results:** One of the most interesting results we found in the focus groups is the apparent dissatisfaction of the well-informed ambulatory multimodal treatment program patients with experiences - in terms of information level, interaction and communication - they had with medical doctors before they were enrolled in the ambulatory multimodal treatment program. 80–90% of N=422 osteoarthritis patients seek information independently on the internet and through other sources. There seems to be a lack of confidence in the medical profession. One reason for this is the perception of economic interests prevailing over the patient's interest. Osteoarthritis patients would like to be treated as equal partners in conversations with their doctor. This entails the inclusion of their psychological and social needs. In many patients' experience, doctors tend to be paternalistic and do not satisfy those needs. **Conclusion:** The present study shows discrepancies between the needs of the patients and reality in terms of communication with medical doctors. As a result, this study presents relevant and novel ideas for the way patient information is constructed, as well as for training of doctors in patient oriented communication with osteoarthritic patients.

TA031

Interest of Postural Rehabilitation in Knee Osteoarthritis

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Introduction: Knee osteoarthritis is a common degenerative disorder. In the knee, there is a multifactorial and intricate impaired proprioception, posture and balance which can lead to the collapse of the subject with a cascade of life-threatening complications. The aim of this study is to demonstrate the value of postural rehabilitation in subjects with knee osteoarthritis. **Methods:** Prospective study. Fifty patients in whom the diagnosis of knee osteoarthritis was confirmed according to the criteria of American College of Rheumatology (ACR). Divided into 2 groups of 25 patients each. All patients had clinical and functional examination using VSA, WOMAC scales, Lesquesne and an initial stabilometric postural assessment with win posture platform of force. Group (G2) had a conventional rehabilitation protocol with analgesic therapy, muscle strengthening and proprioceptive postural. Group (G1) had in addition to this program, ten rehabilitation sessions on win posture platform of force with visual biofeedback. Finally, all patients had a final clinical and functional evaluation with stabilometric assessment. **Results:** There were in all patients an increase of the speed of oscillation (VFY) with decrease in the Y moyen resulting on backprojection behind the center of pressure with introduction of a hip strategy equilibration. The comparison between the two groups showed that the group G1 was more clinically pained and had more joint effusion (p 0.031), in spite of that there is a significant statistically improvement compared to the other group G2, in stabilometric parameters (p 0.02). **Conclusion:** Postural rehabilitation on stabilometric platform of force with visual feedback not only allows the direct involvement of the patient in the treatment protocol but also it improves the stability of the subject with eyes closed. It could contribute to the reduced risk of fall.

TA032

Knee Osteoarthritis: Home-Based Exercise Versus Hospital-Based Exercise. a Prospective and Randomized Study

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Introduction: The therapeutic management of knee osteoarthritis is based on pharmacological treatments, physical treatments and at the ultimate stage prosthetic joint replacement. Current data on

the effectiveness of exercise in the knee give importance to those performed by the patient at home. The objective of our study is to evaluate the contribution of home-based exercises in the treatment of knee osteoarthritis, comparing the results in the short term to those of the hospital-based exercises and to analyze medium and long-term results of the home based exercises program. **Patients and Methods:** It is a prospective and controlled study (February 2012 - November 2013) which included 85 subjects with osteoarthritis of the knee. Patients were randomly allocated to either hospital-based (Group B) or a home-based (Group A) exercise program. Measured outcomes were the intensity of pain, range of movement, functional impairment by the algo-functional index of Lequesne, WOMAC index, the distance walked in 6 minutes, and quality of life by the SF-36. Patients were assessed before and after treatment for both groups, at 6 and 12 months for the group A. **Results:** Both groups showed clinically and statistically significant improvements in pain, range of movement, function and quality of life, which were better in the group B. Despite the decrease in adherence, this improvement is maintained significant at one year in the Group A compared to baseline. **Conclusion:** We can conclude that home-based exercises program reduces the perception of pain and improve functional parameters and quality of life in the short and long term.

TA033

The Relevance of Intensity and Duration of a Continuous Passive Motion Therapy for the Range of Motion after Total Knee Arthroplasty - a Systematic Review

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Introduction: Continuous passive motion machines (CPM) are an inherent part of the rehabilitation after total knee arthroplasty. Currently there is no uniform specification for the intensity and duration of the application of CPM in the treatment of knee arthroplasty. The aim of this systematic review is to evaluate the importance and adjustment of intensity and duration by treatment with a CPM for the range of motion (ROM) after total knee arthroplasty. **Methods:** A literature search was performed in the relevant databases e.g. Medline, PubMed, Embase, Cochrane Register of controlled trials, Web of Science, Cinahl, Science Direct and in bibliographies of included studies. Two independent researchers evaluated the quality of the included papers (Cochrane Risk of Bias, evidence). **Results:** After screening the articles for inclusion criteria seven RCTs with mainly medium quality were included for further evaluation. Three of the seven studies regarded mostly different duration of the CPM and the effect on the ROM. The other four studies examined variations of flexion and extension limits and amplitude of the CPM treatment. The studies showed that a high flexion (>70°) in the early postoperative period improves the ROM significantly compared to a lower flexion amplitude. No influence was found for the duration of the CPM application. **Conclusion:** Based on the results of this review, it can be assumed that a higher improvement of the ROM results from a high flexion adjustment in the early postoperative period than from a later high flexion. To verify this assumption and to give a therapy recommendation, further clinical studies are needed. **References:** 1) Bennett L, Brearley S, Hart J et al. A comparison of 2 continuous passive motion protocols after total knee arthroplasty. The Journal of Arthroplasty 2005; 20 (2): 225-233. 2) Maniar R, Baviskar R, Singhi T et al. To use or not to use of continuous passive motion post-total knee arthroplasty. The Journal of Arthroplasty 2012; 27 (2): 193-201.

TA034

Efficacy of Preoperative Progressive Resistance Training on Postoperative Functional Performance and Muscle Strength in Patients Undergoing Total Knee Arthroplasty

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Background: Reduced knee extensor muscle strength and associated impaired functional capacity is a common clinical finding in people with knee osteoarthritis. Furthermore, knee extensor muscle strength is a strong predictor of functional capacity one year after total knee arthroplasty (TKA). The present study aimed at investigating the effect of 4 weeks preoperative and 4-week postoperative progressive resistance training (PRT) on functional capacity, muscle strength and patient-reported outcomes compared to 4 weeks of postoperative PRT alone in patients undergoing total knee arthroplasty. **Material and Methods:** A single-blind, randomized, controlled trial including 59 patients were performed. Participants were randomized to 4 weeks of preoperative PRT (intervention group) or to a group who “lived as usual” (control group). All patients performed 4 weeks of PRT after TKA. The outcome measures were collected at baseline, 1 week before surgery, 1 week, 6 weeks and 12 weeks after TKA including measures of functional capacity, knee extensor and flexor muscle strength and patient-reported questionnaires. **Results:** A significant group difference was found in favor of the PRT group for the 30 s chair stand test (2.5 rep. (0.9;4.1) vs. -1.1 rep. (-2.8;0.7), $p < 0.004$), the timed-up-and-go test (-0.7 sec (-1.6;0.1) vs. 0.8 sec (-0.1;1.7), $p = 0.015$), the knee extensor muscle strength (-15.2 Nm (-24.4;-6.0) vs. -38.0 Nm (-48.3;-27.7), $p = 0.001$) and the knee flexor muscle strength (8.7 Nm (-3.6;21.0) vs. -12.1 Nm (-26.2;1.9), $p = 0.029$) when evaluated 6 weeks after TKA. No differences were found between groups on patient-reported outcomes. **Conclusion:** PRT is an effective intervention improving postoperative functional capacity and muscle strength but not patient-reported outcomes, without worsening pain or increasing medication in patients undergoing TKA.

TA035

Pre/Postsurgical Rehabilitation of Joint Replacement at Home

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Introduction/Background: It was previously shown that the rehabilitation program started before elective joint replacement operation can be effective tool in improving range of motion and patient's ambulation after surgery. It is still unclear if such program, organized in outpatient rehabilitation setting, can improve patient's independence level and walking ability at home. **Material and Methods:** 29 patients aged 72 ± 10 years were included before elective joint replacement surgery (19-Total Knee Replacement and 10 Total Hip Replacement). 4-2 weeks before the surgery they were invited to the professional meeting, included an orthopedic surgeon's explanations about the operation and the rehabilitation program. Group session by physiotherapist was also organized with giving the precise instructions list for self-home training. Shortly after the surgery individual rehabilitation program was build by home rehabilitation unit staff. Length of stay in the orthopedic ward was 5.7 ± 2.0 says and the program was started at home in 2.0 ± 1.5 days. The program lasted 32.7 ± 8.2 days and included physiotherapy as needed (11.4 ± 3.8 sessions), 1-2 visits of nurse and occupational therapist and in some cases, of rehabilitation doctor and social worker. According to the needs some help in basic living (28.5 ± 19.9 hours) was provided. The functional independence level was measured by Functional Independence Measure (FIM) and walking ability - by Time Up And Go Test (TUAG) before and after the program. The level of patient's satisfaction was measured by simple questionnaire from 1(not satisfied at all) to 10 (completely satisfied). **Results:** The functional independence level showed some tendency of improvement from FIM 103.0 ± 5.3 to 117.7 ± 5.5 . TUAG test dropped significantly from 54.4 ± 19.1 to 28.7 ± 14.0 . The patients' satisfaction level was very high - 8.8 ± 2.0 . **Conclusion:** The pre/postsurgical home rehabilitation program in outpatient setting

can be effective in improvement of patient's independence level and walking ability after joint replacement surgery.

A.2.4 LOCAL AND REGIONAL PAIN SYNDROMES

TA036

Relationship between the Ratio of the Cervical Muscles and Non-Specific Neck Pain in the School Community

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Introduction: Neck disorders appear more often associated with pain and muscle fatigue, both in young individuals and in individuals of middle age. Sustained muscle contraction needed to maintain the head in several positions and fatigue caused by muscle weakness are some of the factors for the arising of neck pain. **Objectives:** (1) Determine the prevalence of non-specific neck pain in the different agents of the school community and (2) evaluate the relationship between non-specific neck pain and flexors/extensors ratio of the cervical spine. **Methods:** This study is divided into two sections/phases. **Phase 1:** The evaluation of non-specific neck pain was conducted through a questionnaire in a sample of 285 individuals. **Phase 2:** Participants of phase 1 were subjected to inclusion and exclusion criteria for the realization of maximal isometric strength tests. Formed two groups, one consisting of individuals with non-specific neck pain ($n = 19$) and the other consisting of healthy subjects ($n = 18$). Dynamometer was used to quantify the maximal isometric strength of the cervical flexors and extensors. Subsequently, the average ratio of flexors/extensors cervical each group was calculated. **Results:** The prevalence of non-specific neck pain in this school community was 42.8%, of which 20 individuals (16.4%) are male and 102 patients (83.6%) were female. It was found that 77.9% of individuals with non-specific neck pain were students, being these the agents of the school community with the highest prevalence of pain, followed by teachers (13.9%), later by administrative (7.4%) and finally by assistants (0.8%). It has been found that there are significant differences in the maximum isometric strength of the cervical flexors, it was visible that the group of non-specific neck pain has lower muscular strength that the group of healthy individuals, 98.4 N and 112.8 N, respectively ($p = 0.029$). As for the maximum strength of the extensor and the flexors/extensors ratio no significant differences between groups was found. **Conclusion:** The agents of the school community with the highest prevalence of non-specific neck pain are the students. There is a decrease in maximal isometric strength of the cervical flexors in the group of non-specific neck pain.

TA037

The Sonographic Evaluation of Plantar Fasciitis

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Backgrounds and Objectives: There is currently no objective reliable diagnostic test for plantar fasciitis (inflammation of plantar fascia) in as much as diagnosis cannot be made on the basis of finding a heel spur on radiography (x-ray). Ultrasound is an excellent tool for evaluating common ankle problems. The aim of this study was to investigate the sonographic features of Plantar Fasciitis (PF). **Material and Methods:** This prospective study was conducted on 36 patients with heel pain and the physical characteristics of PF. In addition, 36 asymptomatic matched volunteers were recruited as a control group and were examined to provide a baseline as to the normal appearance of the plantar fascia. Sonographic examinations were performed with a commercially available scanner. The heel fat pad thickness was also measured. **Results:** The significant increase was observed in plantar fascia thickness, heel fat pad thickness, Heel pain, Morning Pain, Daily

pain severity, Morning pain severity, weight, and BMI in patients with PF comparing with the control group ($P < 0.05$). Plantar fascia thicknesses in conjunction with calcaneus were 6.24 ± 1.12 and 2.76 ± 0.88 mm in case and control groups, respectively; this difference was statistically significant ($P = 0.0001$). **Conclusion:** Since the MRI is the modality of choice in the morphologic assessment of different plantar fascia lesions, sonography can also serve as an effective tool and may substitute MRI in the diagnosis of PF.

TA038

Study of Long Term Effect of Local Progesterone Injection Versus Corticosteroid Injection in Patients with Carpal Tunnel Syndrome (CTS)

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Introduction: Carpal tunnel syndrome is a neuropathy caused by compression of the median nerve at the level of the carpal tunnel. Several surgical and nonsurgical treatments have been proposed for this syndrome, but there is no consensus regarding the prioritization of the suggested nonsurgical treatments. The goal of this study was to determine of the long term effects of local progesterone injection versus corticosteroid injection in patients with mild and moderate carpal tunnel syndrome. **Material and Methods:** This Single blind randomized clinical trial, involved 78 patients with mild to moderate CTS that randomly assigned into 2 groups. Group A was treated with a single injection of 0.5 ml of triamcinolone acetonide and group B with 0.5 ml 17 alpha hydroxiprogesterone. All participants also used prefabricated hand wrist splint for 8 weeks. Pain, function and electrophysiologic characteristic were evaluated before injection and 6 months after it by using pain visual analog scale (VAS), Bostone/Levine symptom severity scale and Bostone/Levine functional status scale and nerve conduction studies. **Results:** Pain, function, median sensory peak latencies and motor onset latencies significantly improved in both groups 6 months after treatments. There was no significant difference between two groups in pain score, nerve conduction study and patient satisfaction from treatment but functional outcome was significantly better in progesterone group. **Conclusion:** Triamcinolone acetonide and 17 alpha hydroxiprogesterone injections are effective regarding long term outcomes in the treatment of mild and moderate carpal tunnel syndrome and there is not significant statistical difference between 17 alpha hydroxiprogesterone and CS groups.

TA039

How to Optimize the Rehabilitation of Patellofemoral Pain Syndrome in 2015?

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Introduction/Background: Patellofemoral pain syndrome (PFPS) is one of the most frequent causes of anterior knee pain in adolescents and adults. Its etiology is complex, multifactorial and still poorly understood. For this reason, its management is a major challenge for the practitioner and the physiotherapist. **Material and Methods:** Review of the literature on Pubmed and Google Scholar. **Results:** The treatment is mostly conservative, focusing on rehabilitation with a targeted and personalized therapy. The rehabilitation must be adapted according to three main categories of risks factors, evaluated with a good clinical examination. First, a muscular dysfunction is very common and can be due to a strength deficit (quadriceps or vastus medialis obliquus (VMO)), a neuromuscular dysfunction or a hypoflexibility (hamstrings, quadriceps, iliotibial band and gastrocnemius). Thus the physiotherapist will focus on the strengthening of the whole quadriceps or specifically of the VMO using a biofeedback protocol. The hypoflexibility will be managed by a regular stretching of the affected muscles. Secondly,

a malalignment of the entire leg or specifically of the patellofemoral joint (muscular or non muscular origin) can be found. A deficit of hip external rotators and hip abductors is often present and it requires a targeted strengthening of gluteus medius and maximus. Foot posture problems must be evaluated by a podiatrist and adapted insoles are sometimes very useful. Thirdly, training errors are frequent in athletes, and can sometimes be the only problem involved in the PFPS. Technical advices made by a professional coach are recommended in this case. Finally, weight loss, mobilization of patellar retinaculum, patellar taping, strengthening of abdominal wall muscles and proprioceptive exercises are also recommended as appropriate. It's important to warn patients that the rehabilitation can last several month, depending how long the pain last, it must always remain below the threshold of pain, and then daily home exercises are essential, prescribed and monitored by the physiotherapist. **Conclusion:** The rehabilitation approach of the PFPS must be centered on the different risks factors of the patient, which requires a good clinical examination and then an individualized protocol that may last several month.

TA040

Musculoskeletal Disorders among Orchestra Musicians: Characteristics and Impact on Performance and Quality of Life

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Introduction/Background: Most orchestra musicians will suffer, at some time during their career, from playing related musculoskeletal disorders (PRMD). The objective of this study is to evaluate and characterize playing-related musculoskeletal disorders (PRMD) among young orchestra musicians. **Material and Methods:** All musicians members of a Youth Orchestra were invited to complete a self-administered survey, concerning biodemographics data and general physical care; player performance profile; player injury profile. Data regarding pain were collected with the Standardized Nordic Questionnaire and Visual Analogue Scale. **Results:** The overall response rate was about 94% (68 musicians, 37 men, 31 women). Eighty five percent of the participants suffered at least once PRMD and 21% reported pain in the last 7 days which was directly related to their profession. Pain severity was mostly mild (53%) and the upper limb (mainly shoulder) was the most affected region. They also reported that musculoskeletal complaint was either, in part, caused by or affected their performance. **Conclusion:** The prevalence of PRMD among young orchestra musicians was high, with the upper limb being the most affected area, what can be explained in part by instrument mechanics and repertoire requirements. This problem can have a significant negative impact on musicians quality of life and can limit their activity and participation. Better knowledge about these specific professional problems is needed, in order to define biomechanical, environmental, personal and psychosocial risk factors that could predict PRMD and to improve preventive and therapeutic measures.

TA041

Assessing Pain and Ultrasonography on Shoulder in Spinal Cord-Injured Wheelchair Basketball Players

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Introduction: Wheelchair basketball (WB) players make great shoulder efforts for wheelchair propelling and ball handling. The purpose of this study was to determine shoulder pain and shoulder ultrasonographic findings in spinal cord-injured WB players. **Materials and Methods:** Three physicians performed neurological examinations based on the International Standards for Neurological Classification of Spinal Cord Injury and interviewed WB players about shoulder pain by using Wheelchair User's Shoulder Pain Index (WUSPI), Performance-Corrected WUSPI (PC-WUSPI),

and Shoulder Pain and Disability Index (SPADI). One physician performed shoulder ultrasonography on the players. All confirmed their International Wheelchair Basketball Federation (IWBF) classifications by classifier. **Results:** Twenty-six players were enrolled in the study, with 52 shoulders evaluated. One player was tetraplegia and the rest, paraplegia. Eighteen players were motor complete (16 ASIA-A and 2 ASIA-B), and 8 players were motor incomplete (6 ASIA-C and 2 ASIA-D). Their IWBF classifications were: 7 in class 1.0, 4 in class 1.5, 9 in class 2.0, 2 in class 2.5, and 4 in class 3.5. They were 40.3 years old on average and they had been disabled for 18.3 years. They had played WB for 10.5 years and trained 10 hours a week. WUSPI and PC-WUSPI were significantly correlated with the average length of their WB careers ($p=0.025$, 0.020) and age ($p=0.041$, 0.029). SPADI was significantly correlated with the length of their careers ($p=0.023$). There were no significant differences between ASIA grades, motor functions, IWBF classifications and WUSPI, PC-WUSPI and SPADI. Abnormal shoulder ultrasonographic findings were: 10 shoulders had biceps brachii tendinopathy; 14 had subscapularis tendinopathy; 6 had subscapularis tendon tear; 15 had supraspinatus tendinopathy; 6 had supraspinatus tendon tear; 2 had infraspinatus tendinopathy; and 2 had infraspinatus tendon tear. Tendinopathy prevalence was only significantly different with the length of time since disability onset ($p=0.048$), and tendon tear prevalence was significantly different with age ($p=0.006$). **Conclusion:** Spinal cord-injured WB players suffer from shoulder pain and have various types of shoulder joint pathology. Older players and those who play basketball extensively tend to suffer from shoulder pain. Prevalence of tendinopathy and tear increase in correlation with age and the length of time since disability onset.

TA042

Comparative Efficacy of Local Steroid and Therapeutic Ultrasound for Quicker Functional Improvement in Tennis Elbow

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Background: Lateral epicondylitis or Tennis elbow is very common repetitive stress injury or cumulative trauma disorder among active professionals and tennis players. Local steroid injection can provide quick functional improvement as sought by most of the patients. Therapeutic ultrasound and eccentric exercises can also improve the function. This study was carried out to see the comparative efficacy of these two modalities of treatments in terms of quicker functional improvement. **Methods:** Eighty adult patients diagnosed as lateral epicondylitis or tennis elbow were randomly divided into two groups. Group A received local steroid injection (triamcinolone acetate) and group B received therapeutic ultrasound for two weeks. Both the groups received eccentric exercises and advised to avoid provocative activities like twisting and lifting activities. Pain, tenderness and functional improvements were measured in traditional methods like visual analogue scale (VAS) and tenderness grade 0 to 4. Data were analyzed by SPSS. **Results:** Most of the patients were female. None of them were tennis player. Younger housewives were common sufferer. Almost all patients in group A had very little or no pain or tenderness and no difficulty in lifting object at one week and two weeks. VAS were 13.62 ± 6.503 and 4.15 ± 5.517 respectively. Group B patients had mild improvement of pain and function at one week and moderate improvement at two weeks. VAS were 52.57 ± 7.80 and 25.57 ± 5.392 respectively. Similarly tenderness's were markedly improved in group A at one and two weeks. They were 0.68 ± 0.616 and 0.02 ± 0.405 respectively for group A and 1.60 ± 0.553 and 1.14 ± 0.335 respectively for group B. Results were statistically significant in both group at the end of two weeks. **Conclusion:** Local corticosteroid injection at extensor origin in tennis elbow patients are found to have better relief of pain and tenderness and quicker functional

improvement than therapeutic ultrasound treatment. None of the patients were followed up for long term efficacy in either group.

TA043

Relationships between Capsular Stiffness and Clinical Features in Adhesive Capsulitis of Shoulders

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Background: Tightening and contracture of the joint capsule is the hallmark of adhesive capsulitis of shoulder (ACS). However, quantification of capsular stiffness and its relations with clinical features have not been investigated thoroughly yet. This study aimed to quantify the capsular stiffness of ACS during intra-articular hydraulic distension (IHD) and investigate its relationships with pain severity, symptom duration, range of motion (ROM), sex, and diabetic conditions. **Methods:** Total 107 subjects with ACS who underwent IHD were reviewed. Pressure-volume (P-V) monitoring data during IHD, demographic and clinical features such as pain severity, symptom duration, shoulder ROM, and diabetic conditions were obtained by retrospective chart review. Capsular stiffness (K_{cap}) was measured by calculating the slope of the elastic phase in P-V curves. Limitations of ROM were evaluated by three directions (flexion, abduction, and external rotation) and sum of three ROMs with a goniometer. Pearson's correlation coefficient was used to analyze the relationships between K_{cap} and clinical features. **Results:** The mean K_{cap} of total subjects was 26.0 ± 14.2 mmHg/mL. Shoulder pain in both motion and rest did not correlated with K_{cap} . Duration of symptoms tended to show a negative correlation for K_{cap} ($r=-0.169$, $P=0.088$) although it was not significant. Patients with stiffer capsules had smaller sum of ROMs ($r=-0.298$, $P=0.002$) and limitations were distinct in the direction of external rotation and abduction ($r=-0.278$, $P=0.004$ and $r=-0.313$, $P=0.001$, respectively). Female patients had much stiffer capsules than male ones (29.5 ± 14.3 mmHg/mL vs. 20.2 ± 12.1 mmHg/mL, $P=0.001$). However, there was no significant difference of K_{cap} according to diabetic conditions. **Conclusions:** The capsular stiffness of the glenohumeral joint of ACS had strong correlations with limitations of shoulder ROMs, especially external rotation and abduction while it was not related either with pain or symptom duration. Female ACS patients had stiffer capsules than male patients. This is the first report to reveal the relationships between the quantitatively measured in vivo capsular stiffness and shoulder ROM limitations.

TA044

Elasticity of the Coracohumeral Ligament in Patients with Shoulder Adhesive Capsulitis

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Background: Adhesive capsulitis is characterized by gradual loss of glenohumeral motion and a tightened coracohumeral ligament (CHL) may restrict external rotation in patients with adhesive capsulitis. **Materials and Methods:** Shear-Wave Ultrasound Elastography (SWUE) was used to evaluate elasticity of the CHL in healthy people and the patients with capsulitis, in shoulder neutral position and maximal external rotation. **Results:** For healthy people, there was no significant difference of the CHL elastic modulus between dominant and non-dominant shoulders. For patients with adhesive capsulitis, the CHL elastic modulus on the lesion side (238.8 ± 81.0 kPa) was significantly greater than that on the sound side (198.9 ± 62.2 kPa) in shoulder neutral position ($p=0.007$), but not in the maximal external rotation ($p=0.25$). **Conclusion:**

SWUE showed that the CHL on the lesion side is stiffer than CHL on the sound side in patients with adhesive capsulitis.

TA045

Analysis of Shoulder Spasm and Compensation Using Wireless EMG in Supraspinatus Tendon Partial Tear

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Introduction/Background Objective: To evaluate the shoulder muscle contraction pattern in patients with partial tear of unilateral supraspinatus tendon which can provoke trapezius compensation and spasm. *Material and Method: Participants:* Total of twenty six patients (Male 18, Female 8) were included in this study. All patients were not prescribed previously of muscle relaxant, ESWT, or etc. And diagnosed as unilateral supraspinatus partial tear via MRI or Ultrasound from May 1st to July 1st 2014. Patients who have other pathologic shoulder conditions such as calcific tendinitis or previous fractures were excluded. *Monitoring:* Each patient was assessed subjective symptoms of pain via visual analogue scale (VAS) and shoulder pain and disability scale (SPADI). Shoulder muscle contraction pattern of unilateral supraspinatus tendon partial tear patients in resting stage and during performing shoulder abduction, flexion, scaption, external and internal rotation were observed by wireless EMG. EMG results to determine the differences between injured shoulder and contralateral one were compared. *Results:* In resting state, amplitude of trapezius muscle in affected side were 3.1 ± 1.2 mV (p-value=0.04) higher than the contralateral side. During overhead elevation such as abduction and scaption, significant difference of 4.1 ± 2.6 (p-value=0.02) was present. In the group with over 50% tear of Supraspinatus tendon, trapezius muscle activity was 8.7 ± 4.2 mV higher than that of the unaffected side, but the difference was not statistically significant (p-value = -0.10). Clinical symptoms were correlated with asymmetry of trapezius contraction pattern. Patients who reported as more than 50/130 in SPADI showed significantly longer muscle contraction pattern of 1.6 ± 1.4 s (p-value=0.04) than the group with lower SPADI than 50. *Conclusion:* Supraspinatus muscle partial tear is one of the most common rotator cuff injury, which can provoke difficulty of initiation of initiating abduction, performing overhead elevation, and maintaining shoulder stability. Trapezius muscle can compensate these phenomenon. However, it can produce secondary trapezius muscle spasm, and muscular pain and abnormal muscle recruitment pattern. In each case, proper therapeutic approach to correct hypertonicity should be considered.

TA046

Shoulder Adhesive Capsulitis: Interventional Rehabilitation in Early Stages

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Introduction: The main goal in treating adhesive capsulitis is to control the pain in order to improve the evolution of the disease and side effects. Our aim is to compare the effectiveness of physiotherapy and electrotherapy treatment with ultrasound-guided suprascapular nerve block and ultrasound-guided axillary nerve block added to that in phases 1 and 2 of adhesive capsulitis and also aearly treatments. *Material and Methods:* Non-randomized clinical trial of three patients groups. Each group was treated using either physiotherapy, ultrasound-guided suprascapular nerve block or ultrasound-guided suprascapular plus axillary nerve block for six months follow-up. We analysed our results according to the analogue visual scale, articular range and QuickDASH at the beginning, in the first, second, third and sixth month. The data was

analysed using the SPSS 19.0 programme. *Results:* Two-thirds of the patients were middle-age women, more frequently unilateral capsulitis and usually left arm was affected. In order of frequency, the most common previous syndromes are Diabetes Mellitus, hypertension and tendinopathy. The patients had presented symptoms for five months before treatment and previous treatments implemented were oral analgesia, exercise therapy and infiltration. The patients treated using the nerve blocks had a faster pain recovery than the group treated by cinesitherapy and electrotherapy. Moreover, this last group needed more oral pain killers, increasing health spending. Half of the patients treated using the nerve block had recovered, some of them were given a referral for surgery or to the pain clinic and the others continued with cinesiterapeutic therapy and infiltration due to their previous pathology. We found statistically significant differences between both blockade treatments in comparison with physiotherapy, improving the initial VAS with each blockade we carried out, decreasing QuickDASH score and improving articular range of the shoulder. We also found a statistically significant difference between early block and faster recovery and also a slower recovery in patients with DM. *Conclusions:* Ultrasound-guided nerve blocks (axillary nerve added or not to suprascapular nerve) might be an initial option of adhesive capsulitis treatment, by speeding up the natural evolution of the disease and reducing the pain level as well as decreasing health spending.

TA047

Therapeutic Efficacy of Corticosteroid Injection at the Glenohumeral Joint According to the Contrast Dispersion Pattern in Adhesive Capsulitis

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Introduction/Background: Corticosteroid injection has a wide range of success among patients with adhesive capsulitis. We hypothesized that this difference may be due to the distribution of the corticosteroids injected into the joint cavity. *Materials and Methods:* Seventy-two patients diagnosed as having adhesive capsulitis received a corticosteroid injection at the glenohumeral joint under the guidance of angiography. The posterior capsule and the subscapular bursa were selected as dispersion sites and the dispersion of contrast dye was expressed as a ratio (%). Two weeks and 3 months after the injection clinical improvement ('not improved', 'slightly improved', 'much improved') and passive range of motions (PROM) were evaluated. The dispersion was compared according to the clinical improvements by an analysis of variance test and PROM by Pearson correlation test. To determine whether the dispersion of the injected materials was affected by the shoulder movement and body posture 11 patients with adhesive capsulitis participated in the same protocols above, and after the injection, they moved their shoulders freely or assumed a prone posture for one minute. Dispersion patterns were analyzed before and after shoulder movement and prone posture. *Results:* The average distribution of dye was $27.6 \pm 23.0\%$ in the subscapular area and $72.4 \pm 23.0\%$ in the posterior capsule area. Other distribution was negligible. Shoulder movement and body posture after the injection affected the distribution of dye within 10% ranges. The distribution in the subscapular area was 30.0% in the 'much improved' group, 22.0% in the 'slightly improved', and 37.1% in the 'no improved' group which was not significantly different (P=0.179). However, the change of passive external rotation 3 months after the injection was significantly correlated with the distribution of dye to the subscapular area (P=0.035). *Conclusion:* Dispersion of contrast dye did not affect the therapeutic efficacy of particulate corticosteroid injection into the glenohumeral joint. However, improvement of external rotation after injection was significantly correlated with the distribution of the dye to the subscapular area. This suggests that limitation of external rotation in adhesive capsulitis can be improved by localized injection to the subscapular area.

TA048

Clinical Evaluation of Two Therapies for Chronic Shoulder Pain: Suprascapular Nerve Block Vs a Specific Physiotherapy Program

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Background: Shoulder pain due to degenerative disease is a common cause of morbidity in the community. Oral analgesics, local infiltrations and physiotherapy are the main options. Suprascapular nerve block (SNB) has shown promising results in reducing shoulder pain and improving function. However, there is limited data on the efficacy of most treatment interventions. **Objectives:** To compare the effectiveness of SNB intervention to the regular physiotherapy program, to reduce self-perceived pain (measured through visual analogue scale [VAS]) and disability (DASH scale). **Methods:** 79 patients with chronic shoulder pain from degenerative etiology with diagnostic test (ultrasound/MRI) were selected sequentially and split in two groups: SNB group I (n=39) were patients who had, in the previous 6 months, done physiotherapy but presented persistent pain, disability and limited range of movement (ROM). Physiotherapy group II (n=40) had no previous invasive treatment (only oral medication). In the first assessment appointment, physical exploration was performed, and self-perceived pain and disability scores were measured. Group I received SNB (3 cc mepivacaine), which was repeated every 8 days to complete three sessions. Group II enrolled in a shoulder-specific physiotherapy program during 15 days (45 minutes/day) Pre/post intervention measures related to disability and pain were taken. **Results:** Group I showed significantly lower scores on disability ($t(38)=4.415$, $p<0.000$, IC95% 8.50-22.89; pre M=59.92, SD=17.35, post M=44.23, SD=25.82) and self-perceived pain ($t(38)7.934$, $p<0.000$, IC95% 2.33-3.93; pre M=7.69, SD=1.28, post M=4.56, SD=2.27) after treatment. The same occurred for Group II for disability ($t(39)=3.912$, $p<0.000$, IC95% 3.89-12.21; pre M=45.62, SD=19.25, post M=37.57, SD=20.76) and pain ($t(39)=3.598$, $p=0.001$, IC 95% 0.39-1.41, pre M=4.88, SD=1.86, post M=3.98, SD=1.94). However, groups did not differ significantly between them neither in disability or pain post intervention scores. **Conclusions:** The SNB group had worse initial score in all scales, but the final score shows a great improvement, similar in both interventions. Probably, executing these two interventions sequentially could potentiate the beneficial effect of each other.

TA049

An Evaluation of the Effects of Therapeutic Continuous Ultrasound on Pain, Function, and Isokinetic Shoulder Rotator Strength in Patients with Rotator Cuff Disease: a Prospective, Randomized, Double-Blind, Placebo-Controlled Clinical Study

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Introduction/Background: The aim of this prospective, double-blind, randomized, placebo-controlled study was to evaluate the effects of therapeutic continuous ultrasound (US) in patients with rotator cuff disease. **Materials and Methods:** Twenty-two patients were included in the study, and clinical examinations and magnetic resonance imaging were used for the diagnosis. All patients were treated with a standard physiotherapy program consisting of a hot-pack, transcutaneous electrical nerve stimulation, exercises, and

US that was supervised by the same physiotherapist. The patients were randomly assigned to either a group that received true US (n=11) or one that received sham US (n=11). The outcomes were measured using the visual analog scale (VAS), UCLA Shoulder Rating Scale, and the Constant-Murley Shoulder Outcome scores. In addition, we also measured the isokinetic muscle strength of the external and internal rotators of the shoulder at constant angular velocities of 60°/second and 180°/second in the concentric/concentric mode. These variables were repeated immediately after the treatment for a total of twenty sessions by the same physiatrist, who was blinded just as the patients were. **Results:** There was a significant difference between the pre- and post-intervention UCLA Shoulder Rating Scale and Constant-Murley Shoulder Outcome scores, VAS, and external rotator peak torque 60°/second values for both the true and sham US groups. However, these differences were not statistically significant ($p>0.05$). Furthermore, there were no statistically significant differences between the pre- and post-intervention readings of the other isokinetic muscle testing parameters of the two groups ($p>0.05$). **Conclusion:** In patients with rotator cuff disease, physiotherapy interventions effectively treat the pain, improve the clinical status, and increase the muscle strength of the shoulder external rotators at a low constant angular velocity, with functional improvement being seen immediately after treatment. However, at the patients short-term follow-up appointments, we determined that the US had yielded no additional efficacy when added to the physiotherapy treatment regimen of patients with rotator cuff disease.

A.2.6 BACK PAIN

TA050

Prevalence and Etiology of Adolescent Idiopathic Scoliosis in Primary School Students in Wuxi, China

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Introduction: To estimate the prevalence and analyse the etiology of adolescent idiopathic scoliosis (AIS) in primary school students in Wuxi, Jiangsu Province, China. **Methods:** 11,024 primary school students from 11 schools of Wuxi aged 6 to 13 years were enrolled in this research. A scoliometer was applied to initially screen for AIS. Those screened positive were invited to a clinical visit. Definite diagnosis was made based on a Cobb angle above 10 degree by X-ray. Data regarding children's age, gender, distance from home to school, schoolbag weight, time performing sports and spent on the computer in hours per week, milk and calcium supplementation and annual family income were also collected. Multivariate logistic regression was used to analyze potential determinants of a definite positive diagnosis. Odds-ratios (OR) and their confidence intervals (CI) were provided. **Results:** Around one percent of the students (128) were screened positive. Fifteen students received definite positive diagnosis according to determination of Cobb angle by X-ray suggesting a prevalence rate of 0.14 percent of AIS in primary school students in Wuxi (14 in 10,000 students affected). In multivariate logistic regression (Pseudo R-squared=0.69), odds of a definite positive diagnosis were significantly increased by schoolbag weight in kg (OR=1.46, 95% CI: 1.09-2.05) and time spent on the computer in hours per week (OR=1.68, 95% CI: 1.11-2.56) and significantly decreased by time spent for extracurricular sports in hours per week (OR=0.67, CI: 0.45-0.99) as well as family annual income in 1,000 Chinese Yuan (OR=0.93, 95% CI: 0.88-0.98). **Conclusion:** Although the prevalence of AIS in primary school students in Wuxi was low, it may be further reduced by appropriate interventions, e.g. an information campaign aiming at reducing school bag weight and time spent on the computer and fostering participation in extracurricular sports.

TA051

Comparison of the Thickness of Lateral Abdominal Muscles amongst Pregnant Women with and without Low Back Pain

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Introduction/Background: To compare the thickness of the External Oblique, Internal Oblique and Transversus Abdominis muscles in pregnant subjects with and without low back pain (LBP), using ultrasound to measure thickness. **Material and Methods:** Design: A case control study. Setting: An academic and tertiary care referral spine and sports medicine center. **Participants:** Fifty pregnant women with LBP during pregnancy and 54 pregnant controls. **Methods:** Case and control subjects were matched for body Mass Index (BMI), gestational age and number of previous pregnancies. A multiple linear regression model with adjustment for the gestational age of the subjects, as the potential confounder of the primary outcomes, was used to evaluate the association between LBP appearance and abdominal muscles thickness of the subjects. **Main Outcome Measures:** The thickness of lateral abdominal muscles was measured by ultrasound (US) with the subject in hook-lying position on the examination table. **Results:** We found that there was no significant difference between pregnant subjects with and without LBP in terms of the thickness of EO, IO and TrA muscles. **Conclusion:** These findings suggest that other factors rather than the thickness of core stabilizing muscles are influential in the etiology of LBP during pregnancy. We hypothesize that enlargement of uterus during pregnancy might influence the thickness of the lateral abdominal muscles.

TA052

Clinical Usefulness of Electrodiagnostic Study to Predict Surgical Outcomes in Lumbosacral Disc Herniation or Spinal Stenosis

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Introduction/Background: Although surgeries have been performed for the treatment of lumbar disc herniation (LDH) or lumbar spinal stenosis (LSS), not all patients who undergo surgery are satisfied with the outcome. There have been studies that relate the prognostic values of radiological studies, including magnetic resonance imaging (MRI), to surgical outcomes, but results were not determined. Compared with MRI, electrodiagnostic study (EDX) can assess the physiological functions of nerve roots with higher specificity and relate better with clinical manifestations. Therefore, we hypothesize that EDX could be useful method to predict patients' prognosis after surgery. The purpose of this study was to examine how EDX can predict surgical outcomes in patients with LDH and LSS and to compare the predicted values of EDX with other clinical factors and MRI findings. **Material and Methods:** Patients (n=448) diagnosed with LDH or LSS without neurological deficits, who underwent EDX before lumbar surgery, were selected and analyzed. Patients were divided into groups of successful and unsuccessful surgical outcomes according to a modified MacNab classification. We obtained preoperative clinical data, radiological results, and EDX results. Excellent and good responses were considered as successful outcomes, and fair and poor responses as unsuccessful outcomes. **Results:** Using EDX, radiculopathy was found in 236 patients (52.7%) in the study population. Before surgery, the visual analog scales for back and leg pain as well as the Oswestry disability index were not significantly different between the successful and unsuccessful surgical outcome groups. Age, diagnosis, type of surgery, and root compression on MRI were not significantly associated with surgical outcome. Radiculopathy on EDX was significantly related only to unsuccessful surgical outcomes. The association of spon-

dylolisthesis showed the trends towards unsuccessful surgical outcome, despite statistical insignificance. **Conclusions:** EDX detected functional abnormalities of nerve roots that did not show clinical manifestation and did not appear compressed on MRI. These abnormalities are important predictive factors for surgical outcomes in patients with LDH or LSS. Therefore, preoperative EDX is a clinically useful method to predict surgical prognosis.

TA053

Is There a Relationship between Lumbar Spine Proprioception and Non-Specific Low Back Pain? a Systematic Review with Meta-Analysis

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Introduction: Non-specific low back pain (NSLBP) is a common problem. Impairment in lumbar spine proprioception has been proposed as a mechanism for the development and perpetuation of NSLBP. The aim of this study is to investigate whether there is a relationship between lumbar proprioception and the development or presence of NSLBP. **Methods:** Four electronic databases were systematically searched for studies measuring lumbar spine proprioception in NSLBP patients. To be included, studies either compared lumbar proprioception between NSLBP patients and healthy controls or prospectively evaluated the relationship between lumbar proprioception and the development of NSLBP. Two reviewers independently extracted data and assessed the quality of included studies with standardised assessment forms. Where possible, meta-analysis was performed to determine any differences in proprioceptive acuity between NSLBP patients and healthy controls. **Results:** Twenty-four studies were included in the review. The included studies were of a moderate quality. Studies measured lumbar proprioception via joint repositioning sense (JRS), threshold to detection of passive motion (TTDPM) or both methods. Active JRS was worse in NSLBP patients than in healthy controls when participants were measured in sitting (standard mean difference 0.97, 95% CI 0.43 to 1.52). Active JRS measured in standing (standard mean difference 0.41, 95% CI -0.07 to 0.89) and passive JRS measured in sitting (mean difference 0.62°, 95% CI -1.24 to 2.48) were not significantly different between groups. However, specific subgroups of NSLBP patients showed larger proprioception deficits than the whole NSLBP cohort. Meta-analysis was not possible in TTDPM studies, but no study found significant differences in TTDPM between NSLBP patients and healthy controls (p>0.05). Two prospective studies showed no significant predisposition of participants with poorer lumbar proprioception to development of NSLBP (p>0.05). **Conclusion:** Patients with NSLBP had either impaired or no significant differences in lumbar proprioception compared with healthy controls, depending on the method of measuring proprioception. Larger deficits in certain NSLBP subgroups highlight the dangers of considering NSLBP patients as a homogenous group. However, these results must be considered in light of the variability in age and pain levels of participants included in the different studies, and the inherent problems and variability with the methods of measuring proprioception.

TA054

The Evaluation of Scales for Neuropathic Pain in Patients with Low Back Pain Syndrome

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Introduction/Background: Chronic low back pain (LBP) is characterized by a combination of nociceptive and neuropathic mechanisms of pain generation. We aimed to determine whether there is a neuropathic component in LBP patients and it is related with physical disability. **Material and Methods:** 102 patients with LBP consented to participate in the study and were assessed using the dif-

ferent scales of Leeds Assessment of Neuropathic Signs and Symptoms (LANSS), PAIN/DETECT and DN4. Physical disabilities of the patients were also assessed by İstanbul Low Back Pain Disability Index. **Results:** The mean age of the patients was 44.70 ± 11.98 . Twenty-four percent demonstrated a predominantly neuropathic pain component when LANSS was used. We also found the frequency of neuropathic pain as 18.6% in PAIN/DETECT and 35.3% in DN4. The presence of neuropathic pain according to all neuropathic pain scales was significantly correlated with the scores of İstanbul Low Back Pain Disability Index ($P < 0.05$). **Conclusion:** Nociceptive pain is more prominent in acute LBP, whereas neuropathic component is more prominent in chronic conditions. It is important to identify the underlying mechanisms of chronic LBP. Chronicity of pain and disease progression in LBP patients can only be prevented with proper and early treatment methods towards the mechanisms. **References:** 1) Krismser M, Van Tulder M. Low back pain (non-specific). *Best Prac Res Clin Rheumatol* 2007; 21(1):77-91. 2) Freynhagen R, Baron R. The evaluation of neuropathic components in low back pain. *Curr Pain Headache Rep* 2009; 13: 185-90. 3) Audette JF, Emenike E, Meleger AL. Neuropathic Low Back Pain. *Current Pain and Headache Reports* 2005; 9: 168-77.

TA055

Kinematic and Kinetic Analysis of Gait in Non-Specific Low Back Pain

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Objective: low back pain (LBP) is a common health and socio-economic problem, especially the chronic one. It may affect the gait pattern of the patients. There are not enough evidences in literature on kinematic evaluation of lower limb joints, pelvic and trunk in LBP subjects. Therefore, the aim of this study was to evaluate the motions of pelvic, trunk and legs in subjects with non-specific chronic low back pain (NCLBP). Moreover, it was aimed to find the moments applied to the leg in these subjects. **Method:** This was an experimental-comparative study in which 40 subjects including 20 normal subjects and 20 NCLBP patients were recruited. The force applied on the leg, the range of motion of trunk, pelvic, lower extremity, the moments applied on the joints and spatiotemporal gait parameters were selected in this study. Difference between the mean values of all data was measured using two-sample *t*-test amongst the participants. **Results:** The mean values of walking speed of normal subjects and NCLBP patients were 0.89 ± 0.13 and 0.95 ± 0.09 m/s, respectively ($p = 0.24$). The mean value of the second peak of ground reaction force of normal and NCLBP subjects were 1.13 ± 0.045 and 1.106 ± 0.035 N/WB, respectively ($p = 0.038$). The mean value of internal/external rotation of trunk was 9.76 ± 2.66 and 15.4 ± 1.12 in NCLBP and normal subjects, respectively ($p = 0.1$). The adductor moments applied on the hip joint were $0.840.31$ and $0.890.31$ Nm/BW in the NCLBP and normal subjects, respectively ($p = 0.007$). **Conclusion:** There was a significant difference between kinematic of hip joints of the normal and NCLBP subjects. The inheriting point of current study was that those with NCLBP had a decreased in hip, knee and ankle joints moments, maybe due to muscular weakness.

TA056

Dual-Task Gait Variability Is Affected in Low Back Pain Patients

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Introduction/Background: Pain and extreme levels of gait variability in dual-task situations are associated with higher fall risk. Pain, however, is a fall risk factor which seems to be continually disregarded [1, 2]. A possible cause explaining why pain increases fall risk in an everyday dual-task situation might be that pain interferes with executive functions which would result in a diminished dual-task capability.

This study aimed at evaluating the effects of a dual task on gait variability in low back pain patients. **Material and Methods:** Twelve healthy participants and twelve chronic low back pain patients were included. The subjects were asked to perform a cognitive single-task tests (Regensburger word fluency test (RWT) [3], a walking single task and a motor-cognitive dual-task (walking while performing the RWT). Stride variability of trunk movements was calculated. A two-way ANOVA was performed to compare single-task walking with dual-task walking and the single cognitive-task performance with the motor-cognitive dual-task performance. **Results:** We did not find any differences in both the single-task performances between groups. Regarding single-task walking and dual-task walking, we observed an interaction effect indicating that pain patients show significantly higher gait variability in the dual-task condition as compared to controls. **Conclusion:** Our data shows that pain reduces motor-cognitive dual-task performance at the expense of the secondary task which in CLBP patients seems to be the motor task. We postulate that the detrimental effects are caused by central mechanisms where pain interferes with executive functions [1]. This might contribute to an increased risk of falling. We recommend clinicians to enclose pain status in their fall risk assessment procedure. **References:** 1) Leveille, S.G., et al., Chronic musculoskeletal pain and the occurrence of falls in an older population. *JAMA*, 2009. 302(20): p. 2214-2221. 2) Muraki, S., et al., Prevalence of falls and the association with knee osteoarthritis and lumbar spondylosis as well as knee and lower back pain in Japanese men and women. *Arthritis Care and Research*, 2011. 63(10): p. 1425-1431. 3) Mitrushina, M.N., K.B. Boone, and L. D'Elia, Handbook of normative data for neuropsychological assessment. 1999: Oxford University Press.

TA057

Effect of Imagery Technique on Chronic Low Back Pain: a Randomized Clinical Trial

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Introduction: Imagery technique is a type of Cognitive behavioral therapy. The purpose of this study is to assess the effectiveness of imagery therapy on chronic low back pain patients. **Materials and Methods:** This study was a randomized clinical trial. Duration of this study was 3 months. 78 participants aged 18-61, with chronic low back pain of at least one year's duration were enrolled in this study. Patients were randomized in two groups. Low back pain intensity (VAS) and disability index (Oswestry questionnaire) were assessed at admission time and 12 weeks after treatment. **Results:** Of the participants in the study 36 (46.2%) were female. The mean pain intensity changed favorably from $7.53 (\pm 1.07)$ to $4.2 (\pm 1.4)$ in the control group and from $7.45 (\pm 1.1)$ to $2.44 (\pm 1.09)$ in the case group. The estimated mean difference between the groups was in favor of imagery technic (95% CI, $P < 0.001$). The mean Oswestry disability index changed favorably from $24.54 (\pm 1.45)$ to $7.77 (\pm 2.05)$ in the control group and from $24.79 (\pm 1.52)$ to $4.51 (\pm 1.17)$ in the case group. The estimated mean difference between the groups was in favor of imagery technic (95% CI, $P < 0.001$). **Conclusion:** Regard to low cost of imagery technic and its effectiveness in our study it is recommended to add this technic to our practice for chronic low back patient.

TA058

Does a Preoperative Cognitive-Behavioural Intervention Affect Disability, Pain Behaviour, Pain and Return to Work the First Year after Lumbar Spinal Fusion

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Introduction/Background: Few published studies have looked at the potential of rehabilitation to improve outcomes following lumbar

spinal fusion surgery (LSF). Rehabilitation programmes using cognitive-behavioural therapy (CBT) are recommended. Further, initiating rehabilitation interventions already prior to surgery seems beneficial, but only limited data exists in the field of spine surgery. The aim of this study was to examine the effect of a preoperative CBT intervention for patients undergoing LSF. *Material and Methods:* The study was a randomized clinical trial including 90 patients undergoing LSF due to degenerative disc disease or spondylolisthesis. Patients were allocated to either usual care (control group) or preoperative CBT and usual care (CBT group). Primary outcome was change in Oswestry Disability Index (ODI) from baseline to 1-year follow-up. Secondary outcomes were catastrophizing, fear-avoidance belief, return to work and back and leg pain. *Results:* At 1-year follow-up there was no statistically significant difference between the CBT group and the control group in ODI reduction ($P=0.053$). However, the CBT group had achieved a significant median reduction of -15 points (interquartile range: -26; -4 points) already at 3 months (between group difference $P=0.003$). This reduction was maintained throughout the year. There were no differences between groups at 1-year follow-up with regards to any of the secondary outcomes. *Conclusion:* Participating in a preoperative CBT intervention in addition to usual care did not produce better outcomes at 1-year follow-up for patients undergoing LSF. Although the reduction in disability was achieved much faster in the CBT group, resulting in a significant difference between group already three months after surgery, it did not translate into a faster return to work. Our findings support the need for further research into the use of targeted rehabilitation interventions among patients with elevated levels of catastrophizing and fear avoidance beliefs.

TA059

Scoliosis Manager: a Free Internet Tool to Help the Realization of Specific Exercise Programs for the Conservative Treatment of Scoliotic Patients

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Background: The conservative treatment based on specific exercises is a very important therapeutic strategy widely used alone for patients affected by mild scoliosis disease and as a supporting tool in combination with brace prescription. The specific exercises are furthermore used for the treatment of scoliosis in adult patients, in order to reduce pain and to contrast the progression of the curves. A big set of specific exercises can be consulted, once the individual active self correction is applied. *Materials and Methods:* Starting in 2006, a software has been developed to manage the exercise programs prescribed for scoliotic patients. In Scoliosis Manager the exercises are organized in "groups" (505 groups) to allow the selection of the most appropriate exercises for each single patient. These exercises are structured tree-like within a database where the trunk of the tree is represented by the area of the body to be treated (spine region, shoulders, knee etc.) followed progressively by the therapeutic target (mobilization, stabilization, stretching), the direction of the movement (flexion, rotation etc.) and the position (lying, standing, sitting etc.) to be assumed by the patient during the single exercise. Actually, the program includes a database of 1,300 different exercises. The software was completed with a clinical diary and the twin-software used by the physicians for the medical examination. *Results:* Until now, the software has been used for the realization of 8,651 different exercise programs for 746 different patients treated. Actually, 62 physical therapists coming from different countries in 3 continents are using and applying it to their patients. The software is freely available in internet with a guided composition course of the exercise programs and supplied with a list of tutorials that permit to achieve the essential notions for the correct choice and teaching of the selected exercises. *Conclusion:* We are convinced of the necessity that the rehabilitation community has to contribute to the development of a working tool more and more efficient that can assist the less experienced rehabilitative professionals in the conservative treatment of this pathology.

TA060

The Effects of Transcranial Direct Current Stimulation (tDCS) Combined with Back School in Subjects with Chronic Low Back Pain. A Randomized Controlled Trial

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Introduction: Chronic low back pain involves high individual and social costs. BackSchool (BS) is a behavioural intervention designed to treat and prevent the aforementioned condition. Up to date clinical research studies have shown that transcranial direct current stimulation (tDCS) can be considered a reliable tool for chronic pain. The aim of this study is to test the feasibility of combining tDCS with a behavioural intervention (i.e. BS) in subjects with chronic low back pain. Specifically, we will test their effects on (i) low back pain intensity and (ii) participation of patients' in daily activities. *Methods:* We enrolled 30 subjects with nonspecific chronic low back pain (VAS pain >3) that were randomized in two groups: real (group 1) and sham-tDCS (group 2). Group 1 undergone M1 anodal tDCS for 20 minutes with an intensity of 2 mA for five consecutive days the week before they start BS (10 sessions). Group 2 received only 30 seconds of stimulation. Outcome measures were: VAS for pain (0-10), Roland Morris Disability Questionnaire (RMDQ), Euroqol "Eq- 5D". Through a questionnaire the presence of side effects due to stimulation (headache, neck pain, burning, redness and/or itching in the stimulated area) has been reported. The evaluations were administered pre-tDCS (T0), post-tDCS (T1) post-Back School (T2) and after one month (T3). *Results:* VAS pain was reduced in group 1 ($p<0.001$) and group 2 ($p<0.05$) after 5 tDCS sessions; these results were further increased after BS in group 1 ($p<0.001$) and fully retained at 1 month follow-up ($p<0.001$). Function and disability (RMDQ) were improved in both groups at each time. Quality of life (Eq-5D) increased after tDCS ($p<0.01$), BS ($p<0.01$) and at 1 month follow-up ($p<0.001$) in group 1. Finally, no significant side effects due to stimulation were reported. *Conclusions:* In our sample we highlighted a larger effect on pain, function, disability and participation in the activities of daily life when a behavioural intervention, such as BackSchool, is combined with tDCS.

TA061

The Efficacy of Intermittent Mechanical Lumbar Traction for Low Back Pain with or without Radiating Pain to the Lower Extremity: a Randomized Clinical Trial

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Introduction: Low back pain (LBP) is a major health and socio-economic problem in modern society that is responsible for reduced functional performance, emotional distress, work absenteeism and high economic costs for its treatment. Among the most common specific causes of LBP are disorders of the lumbar intervertebral disc resulting in irritation of the lumbar nerve roots. Traction is a widely used treatment for LBP and it is often provided in combination with other treatment modalities such as heat, manual therapy, exercises, ultrasound, electrotherapy, and advice. *Objective:* The aim of this study was to prove the efficacy of intermittent mechanical traction for LBP patients with or without radiating pain. *Methods:* Fifty six patients with subacute (4-12 weeks) or early chronic (12-16 weeks) LBP diagnosed with herniated and degenerative disc disease were recruited and randomly assigned to physiotherapy group (n=30) and physiotherapy and traction group (n=28). The first group, were treated with physiotherapy (interferential current, ultrasound, heat) and second with physiotherapy and traction. Intermittent mechanical traction was applied 2-3 times weekly for 8 weeks, ±2weeks.

Per session, traction duration was started at 12 minutes and was increased to a maximum of 30 minutes. Pain intensity and disability was evaluated with the Visual Analog Scale (VAS), Fingertip-to-Floor Distance (FTF), straight leg raise test (SLR), and Oswestry Low Back Pain Disability Questionnaire (OSW) in both groups at baseline and 4-, 8 weeks, and 6 months after. *Results:* Both groups were comparable before randomized treatment allocation ($p > 0.05$). After treatment, the group of patients treated with physiotherapy and intermittent mechanical traction showed improvement in terms of pain intensity (7 ± 2.4 vs. 2 ± 1.9 , $p < 0.001$) and disability (47.2 ± 16.8 vs. 16.7 ± 11.2 , $p < 0.001$). As well at 6 month follow-up, 25 of 28 subjects, extension traction-induced improvements remained stable. *Conclusion:* Intermittent mechanical lumbar traction in combination with physiotherapy is more effective in treating LBP than physiotherapy only treatment.

A.2.7 MUSCULOSKELETAL TRAUMA

TA062

Validity and Inter-Rater Reliability of the ICF Based Basic Mobility Score for Measuring the Mobility of Patients with Musculoskeletal Problems in the Acute Hospital Setting

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Introduction/Background: The assessment of mobility is important in the acute care setting. Existing tests suffer from limitations. The aim of the study was to examine the inter-rater reliability, internal consistency, validity and sensitivity to change of an ICF based score. *Material and Methods:* In this prospective observational study patients in an acute care hospital with musculoskeletal problems or deconditioning aged above 50 years were included. Assessment of subscales of the Functional Independence Measure (FIM), the ICF based Basic Mobility Score (BMS) and parts of the ICF Core Sets of the acute care setting were performed at admission and before discharge. *Results:* 125 patients (79 women/46 men) were included. Mean age was 67.2 years (SD: 9.2, range 50-90). The BMS showed an excellent inter-rater reliability for the overall BMS (ICC BMS: 0.85 (95%CI: 0.81-0.88)). The internal consistency was good (Cronbach's alpha 0.88) and the external validity was high to excellent (Spearman correlation coefficient: -0.91 in correlation to FIM and 0.79 in correlation to ICF Core Sets). The BMS proved to be sensitive to functional changes during the hospital stay (Wilcoxon's signed rank test: $P < 0.0001$). *Conclusion:* The BMS may be used as a valid and reliable tool for the assessment of mobility in the acute care setting. It is easily to apply and sensitive to change during the hospital stay.

TA063

Hip Fracture Rehabilitation – the Then and Now: Patient Population Characterization and Resource Availability

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Introduction: Hip fractures are associated with high incidence rates, elevated morbidity and mortality and place a great financial strain on any healthcare system. An interdisciplinary team approach between Trauma and Orthopedics (T&O) and Physical Medicine and Rehabilitation (PMR) Departments provide not only a more efficient allocation of resources, but offer a more harmonious rehabilitation program when the patient transitions from inpatient to outpatient care. The aim of this study is to characterize and compare the patient population, treatment times and offerings of patients with proximal femur fractures observed in a T&O ward in 1994 and 2013. *Mat-*

rial and Methods: This descriptive study was based on a database of hip fracture patients admitted to a T&O ward that were observed by a PMR department. The following variables were recorded: age, sex, surgical wait time, average length of stay and type of outpatient rehabilitation referral. This study analyzes data spanning from two distinct periods: 1st of July to 31st of December 1994 and the 1st of July to 31st of December 2013. *Results:* In the 1994 cohort a total of 67 patients were studied of whom 85% were women. The mean age was 80 years (SD 7.4). They presented a surgical wait time of 1.2 days (SD 2.1). Average length of stay was 6 days. After hospital discharge 52% of patients completed a rehabilitation program in an outpatient acute hospital setting and only 11% received at home rehabilitation. In the 2013 cohort a total of 110 patients were studied of whom 75% were women. The mean age was 83 years (SD 5.9). They presented a surgical wait time of 6 days (SD 3.6). Average length of stay was 10 days (SD 4.4). Home-based rehabilitation programs were responsible for the rehabilitation of 65% of patients. *Conclusion:* Nineteen years past, our patient population is now older and greater in number, which associated with a decrease in staff has resulted in increased surgical wait times and length of stay. An increase in community-based resources has resulted in the majority of patients being treated with at home rehabilitation, thus avoiding burdensome travel.

TA064

Is Depression Important in Hip Fracture Patients?

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Background: Depression is the most common of mood disorders in elderly people, and one of the most prevalent comorbidities in older people with hip fracture. While several authors have confirmed that depressive symptoms assessed at a later stage after hip fracture impact functional outcome, and mortality after hip fracture, the role of depressive symptoms identified at an earlier stage after hip fracture remains understudied. The aim of the present study was to evaluate if depressive symptoms assessed on hospital admission impact early functional outcome after hip fracture surgery. *Material and Methods:* We studied 112 patients who underwent surgery for hip fracture during a 6 month period. Depressive symptoms were assessed on admission to the acute setting using the 30-item Geriatric Depression Scale (GDS). Multidimensional assessment included sociodemographic characteristics, general health status, cognitive status, functional status prior to injury, and perioperative variables. The primary outcome measure was motor-FIM at discharge. *Results:* Adjusted multivariate regression analysis revealed that presence of moderate to severe depressive symptoms (GDS ≥ 20), older age, and female gender were independently related to motor FIM at discharge. *Conclusion:* Increasing levels of depressive symptoms in elderly hip fracture patients influence short-term functional outcome. We strongly support the introduction of routine assessment of this baseline comorbidity, especially in female patients. Failure to identify such patients is a missed opportunity for possible improvement of early functional outcome after hip fracture in elderly.

TA065

EXACT: Exercise or Advice after Ankle Fractures

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Background: Ankle fracture is a common injury that can lead to detriments on physical function lasting for as long as two years. To date, there is little evidence to support rehabilitation interventions following the immobilisation period. A pragmatic assessor-blinded randomised controlled trial was conducted to determine the effec-

tiveness of a rehabilitation program compared to brief advice following removal of immobilisation for ankle fracture and to determine if these effects differ by fracture severity (more severe or less severe) or age and gender (women aged over 50 years or others). **Material and Methods:** Adults with isolated ankle fracture that also presented with ankle stiffness and pain were recruited on the day their immobilisation was removed and randomised to receive either brief advice about exercise and return to activity (Advice) or the same advice plus a rehabilitation program (Rehabilitation), both delivered by physiotherapists. The rehabilitation was an individually tailored and progressive home exercise program (ankle mobility/strengthening, stepping, and weight-bearing/balance exercises) provided over 4 weeks. Primary outcomes were activity limitation (Lower Extremity Functional Scale (LEFS), measured on a 0 to 80 point scale) and quality of life (Assessment of Quality of Life instrument; measured on a 0 to 1 scale) assessed at 3 months. **Results:** 214 participants were randomised, 108 to Advice and 106 to Rehabilitation. There were no statistically significant or clinically worthwhile effects of intervention at 3 months for activity limitation (mean between-group difference LEFS 0.4, 95% confidence interval -3.3 to 4.1, $p=0.8$) or quality of life (mean between-group difference -0.01, 95% confidence interval -0.06 to 0.04, $p=0.6$). These effects were not significantly influenced by fracture severity (p for interaction effect on LEFS=0.57; p for interaction effect on quality of life=0.40) or by age and gender (p for interaction effect on LEFS=0.82; p for interaction effect on quality of life=0.87). **Conclusions:** A comprehensive physiotherapy program was not more effective than brief advice delivered by a physiotherapist at the time of the removal of immobilisation for isolated ankle fracture. Comprehensive physiotherapy programs should not be provided routinely after removal of immobilisation for an isolated ankle fracture.

TA066

Motor Function after Rehabilitation of Patients with Hip Fracture, Stroke and Deconditioning

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Introduction/Background: It is widely known that patients after stroke, hip fracture (HF) and deconditioning are the major group of geriatric population, transferred to rehabilitation. The biggest rehabilitation goal in those patients is an improvement of gross motor function, as locomotion and transfers. **Material and Methods:** 303 patients aged older than 65 years, after inpatient rehabilitation due to stroke (N64), HF (N122) and deconditioning (N117) were included. Age, time to admission (TA) and length of stay (LOS) were recorded and analyzed statistically in correlation with functional parameters. Motor function was assessed by Functional Independence Measure locomotion-walking (FIML 1-7) and transfer-bed/chair/wheelchair parameters (FIMT). Functional data was collected shortly after admission (FIML/FIMT1) and before discharge (FIML/FIMT2) from the inpatient rehabilitation facility. **Results:** FIML was found to be highest after HF both at admission and discharge ($4.53 \pm 1.20/5.26 \pm 1.20$). FIMT1 was higher in deconditioning group (4.54 ± 1.38), but at discharge HF patients showed better transfer ability (FIMT2- 5.47 ± 1.36 ; deconditioning- 5.10 ± 1.57). Patients in all groups showed positive tendency in motor abilities and no significant differences was found between them. While analyzing the whole patient's sample the negative statistical correlation was found between age, FIML1 (Pearson Correlation (PC)-0.234**, Sig.(2-tailed)(S)-0.000), FIML2 (PC--0.167*, S-0.032) and FIMT1 (PC-0.261**, S-0.000). Significant negative statistical correlation was also detected between TA, FIML1 (PC-0.131*, S-0.029), FIMT1 (PC-0.137*, S-0.023) and LOS, FIML2 (PC-0.187*, S-0.017), FIMT2 (PC-0.187*, S-0.017). Patients after HF showed negative correlations between age and all motor functional parameters and between LOS and FIMT2 (PC-

0.236*, S-0.027). **Conclusion:** The improvement of gross motor function during inpatient rehabilitation do not differs significantly between patients after stroke, deconditioning and hip fracture.

TA067

Mirror Therapy for Distal Radial Fractures Rehabilitation: a Pilot Study

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Introduction: The objective of this study is to investigate efficacy of mirror therapy (MT) to improve disability, pain, and wrist active dorsal flexion in patients with a distal radial fracture. **Material and Methods:** Controlled randomized pilot study including 10 participants (5 women, 5 men; mean age 49 years), randomly allocated in 2 groups: Experimental group (EG) that received occupational therapy (OT) including mirror therapy (MT) exercises performed with the unaffected wrist (30 minutes daily session, 5 days a week, 3 weeks), and control group (CG) that followed equivalent intensity of OT without MT. Two patients allocated inside each group followed a surgical procedure. Pain was assessed by visual analogue scale (VAS), Quick-Dash was used to assess upper limb disability, and active dorsal flexion was measured by using a handheld goniometer. **Results:** After finishing therapy pain diminished in 3 out of 5 EG patients (1, 3, 0, VAS scores) and in 3 out of 5 CG patients (4, 1, 1 VAS scores). Quick-Dash improved in both groups ($19.54 + 10.24$ EG; $19.08 + 11.87$ CG, $p=0.95$). Similarly wrist active dorsal flexion augmented for patients from both study groups ($54 + 8.94$ EG; $56 + 15.17$ CG, $p=0.80$). **Conclusion:** Both type of interventions increased active dorsal flexion, improved pain and diminished disability. No significant differences were found regarding superior effectiveness for one intervention over the other. However, preliminary results indicate that MT added to conventional OT could become useful for distal radial fractures rehabilitation. Further studies should be addressed to confirm these preliminary findings.

TA068

Diego Application Experience in Elderly Patients with Fracture of the Humeral Head

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The priority of the rehabilitation of elderly patients with humeral head fracture (HHF) is to restore the manipulative function of the upper extremities. The purpose of this study was to evaluate the effectiveness of «DIEGO» device in rehabilitation of patients with humeral head fracture in early posttraumatic period. **Method:** Subjects ($n=10$) with HHF were divided into basic and control groups. The basic group (5 women) – had only a standard course of rehabilitation (physiotherapy, exercises, massage in an electrostatic field) and training on «Diego» (12 sessions, each 20-30 min). Control group (5 women) received just standard course of rehabilitation (were studied retrospectively). Both groups were matched for age, sex, and period after injury (10 days). After 12 consecutive sessions all patients were re-evaluated by American Shoulder and Elbow Surgeons Assessment (ASES), Shoulder Score Index (SSI) and ROM measurements recorded using Pablo. **Results:** There was a significant increase in active movements in the shoulder on the affected side ($p < 0.03$) after finishing the rehabilitation course in the basic group. Also, there was a significant increase in the amplitude of movements in different planes in shoulder and elbow joints. Results by ASES, SSI in the study group were higher than in control. **Implications:** The introduction of «Diego» in a rehabilitation program of patients with HHF leads to significant improvement of motor function of the upper extremities.

A.2.7/A.4.6 MUSCULOSKELETAL TRAUMA AND BURNS TRAUMA

TA069

Bone Loss during the Acute Stage Following Burn Injury: Is It Local or Systemic?

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Introduction/Background: The aim of this article was to examine post-burn bone loss and determine whether it was local or diffuse. *Material and Methods:* Thirty-six patients with burn injuries were investigated, and the total body surface area of the burns and their locations were recorded. The bone mineral densities of the lumbar 1-4 vertebrae, bilateral distal forearm, and bilateral proximal femur in the patients were recorded, and these were compared with the measurements of the non-burned extremity. *Results:* No significant correlations existed between the total body surface area of the burns, their severity, and the z-scores. In addition, when comparing the z-scores of the burned extremity with the non-burned extremity, no statistically significant difference was found ($p > 0.05$). *Conclusion:* In this study, a remarkable decrease in bone mass occurred during the second month following the burn injuries. The post-burn bone loss could not be correlated with the severity of the burns, but the thermal injuries caused systemic bone loss. *References:* 1) Miller SC, Bowman BM, Siska CC, Shelby J. Effects of thermal injury on skeletal metabolism in two strains of mice. *Calcif Tissue Int* 2002; 71(5): 429-36. 2) Klein GL. Burn-induced bone loss: importance, mechanisms, and management. *J Burns Wounds* 2006; 5: 32-8. 3) Klein GL, Wimalawansa SJ, Kulkarni G, Sherrard DJ, Sanford AP, Herndon DN. The efficacy of the acute administration of pamidronate on the conservation of bone mass following severe burn injury in children: a double blind, randomized, controlled study. *Osteoporos Int* 2005; 16(6): 631-5.

TA070

The ROARI Project – Road Accident Acute Rehabilitation Initiative – a Randomised Clinical Trial of Two Targeted Early Interventions for Road-Related Trauma

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Introduction/Background: From 2009-2012 there were 3,729 patients admitted to 11 of the major trauma hospitals in NSW, Australia after sustaining an injury from a road related accident. Reports suggest that > 50% of survivors are not fully recovered at 5 years and many suffer with chronic pain, depression and Post Traumatic Stress Disorder affecting independence and quality of life. This study compared the efficacy of an Early Rehabilitation Intervention (ERI) with a Brief Education Intervention (BEI) for promoting return to work and usual activities in a multi-site single blinded randomised controlled trial. *Material and Methods:* 184 patients (92 each group) were recruited from 4 major trauma hospitals in NSW. Patients were screened at 2-4 weeks post injury, classified as either mild, moderate or severe and separated into either the ERI group with a consultation and referral to rehabilitation for eligible patients or the BEI group who received written information and advice to see their GP. Primary outcome measures included return to work or usual activities, activity limitation, pain, drug and alcohol dependence, mood and PTSD in the first 3 months post trauma. Follow up was at 12 weeks for all patients and at 24 weeks for those with major injury. Data were analysed using Cox Regression and significance was taken at $p < 0.05$. *Results:* Baseline data for all outcome measures were equal for both groups and 89.4% of participants were classified with minor injuries. Prior to the intervention (2 weeks post trauma) 46.3% of the ERI group and 39.5% of the BEI had returned to work or

usual activities. At 12 weeks 73.8% of the ERI and 69.1% of BEI groups had returned to work. The best predictors of slow return to work or usual activities were a higher Injury Severity Score and a higher Orebro pain index score at the pre-intervention assessment. *Conclusions:* A targeted ERI is as effective as a BEI in assisting those with mild/moderate trauma to return to work or usual activities. However, the lack of significance between groups may be explained by the preponderance of minor injuries which themselves may not limit activity or slow return to work.

TA071

Study on the EEG Waveform Changes in the Awakening Process with Music Therapy in Comatose Patients after Brain Trauma

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Introduction: Coma caused by traumatic brain injury is a difficult problem in neurosurgery, so early treatment in the rehabilitation of brain injured patients during coma recovery is very important. Music therapy as a sound stimulation of coma may play a certain role in promoting awareness. Quantitative EEG ($\delta + \theta / \alpha + \beta$ value) is a more sensitive indicators to evaluate the brain functional state. *Methods:* 40 comatose patients with traumatic brain injury were chosen to meet the inclusion criteria. 20 cases were selected from departments of rehabilitation and neurosurgery, families actively cooperating with, which received a long-term fixed care and a formal music therapy (music group). 20 cases were also selected from the music group except a formal music therapy (control group). Following up for a month, the difference of GCS score and $\delta + \theta / \alpha + \beta$ value of quantitative EEG between the two groups was compared. And the gender, age, injury types were matched in the two groups. *Results:* The GCS scores of music group were increased after treatment compared with the control group, and the difference was significant ($P < 0.05$). The $\delta + \theta / \alpha + \beta$ values of quantitative EEG in music group were decreased after treatment, and the difference had significance compared with the control group ($P < 0.05$). The correlative analysis indicated that the GCS score of 3 to 8 in 40 cases had negative correlation with $\delta + \theta / \alpha + \beta$ value before treatment ($r = -0.482, P = 0.002$), and 31 patients with GCS score of 9 to 15 after treatment also had negative correlation with $\delta + \theta / \alpha + \beta$ value ($r = -0.493, P = 0.005$). *Conclusion:* Through the changes of $\delta + \theta / \alpha + \beta$ value, it was objectively proved that music could improve the brain electrical activity of comatose patients with traumatic brain injury significantly. And according to the quantitative $\delta + \theta / \alpha + \beta$ value and GCS score after treatment, it was also demonstrated that music therapy has effect on promoting arousal from coma following an acquired brain injury. *References:* Hom J, Zandbergen EG, Koelman JH, et al. Prognosis for patients in a coma following cardiopulmonary resuscitation[J]. *Ned Tijdschr Geneesk*, 2008, 152(6): 308-313.

TA072

Posttraumatic Stress, Posttraumatic Growth and Resilience 10 Years Following Trauma: Israeli/American Resilience Project

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Background: In our previous studies, shortly after terror attacks took place, we have found that resilience and posttraumatic growth (PTG) hold inverse relationships, greater stress reactions were followed by greater PTG. However, the long term inter-relationship between these variables is unknown. The aim of this study is to explore the interconnections between posttraumatic stress, resilience and levels of posttraumatic growth among survivors of terror

attacks 10 years following injury. *Methods:* The survey included 182 patients of Hadassah Medical Center injured in terror attacks. Demographic variable as well as medical history and injury severity (ISS) were obtained from specific questionnaire and patients' files. PTSD, PTG, resilience and quality of life were measured by specific scales. A descriptive statistics as well as regression analysis have been used. *Results:* 41 patients (22.5%) respond to the questionnaire, among them 66% were men. The average age was 41 ± 14 years and the average severity of injury according to ISS was 20 ± 12 . Most of the patients were injured between 2000 and 2004 during the second Intifada. The correlations between the severity of the injury, resilience and stress parameters and PTG results will be presented. *Conclusions:* This is the first study of the inter-relationships between PTSD, resilience and PTG 10 years following exposure to a terror trauma in Israel. Findings are important to gain insight with regard to the inter-connections between these variables and will serve to develop a model program to enhance resilience of trauma victims in general.

TA073

Physical and Mental Health 10 Years after Multiple Trauma – a Prospective Cohort Study

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Background: People who have sustained severe multiple trauma have reduced health and functioning years after the injury. For people who have sustained severe injuries, an optimal degree of predictability in future functioning and HRQL is important. The main aim was to study the impacts of demographic- and injury-related factors and functioning at 1 and 2 years post-injury on physical and mental health 10 years post-injury. *Material and Methods:* Fifty-eight participants completed a 10-year follow-up (55.2% of all included patients). Demographic and injury severity characteristics were collected, and assessments at 1, 2, 5 and 10 years post-injury were performed. Patient-reported outcome measures were the Short Form 36 (SF-36), the Brief Approach/Avoidance Coping Questionnaire, and the COG for cognitive functioning. The SF-36 Physical and Mental Component Summaries (PCS and MCS) were the main outcome variables. We performed hierarchical multiple regression analyses to assess functioning on the PCS and MCS. *Results:* Mean age at injury was 37.8 years (SD 14.7), 74% were male. Mean New Injury Severity Score was 33.7 (SD 13.0). Mean PCS was 41.8 (SD 11.7). Mean MCS was 48.8 (SD 10.7). Predictors of the PCS were change in coping from 2–10 years ($p=0.032$), physical functioning ($p<0.001$) and cognitive functioning at 1 year ($p=0.011$), and bodily pain ($p=0.005$) at 2 years. Adjusted R^2 was 0.57. Predictors of the MCS were change in coping ($p=0.031$), vitality ($p=0.008$) at 1 year, and social functioning ($p=0.034$) and mental health ($p=0.043$) at 2 years. Adjusted R^2 was 0.64. *Conclusions:* Physical health was reduced compared with the adjusted general population at 10 years after injury. The mental health did not differ from that of the general population. In addition to physical functioning, coping strategies, vitality, social functioning, and mental health should be considered in the long-term rehabilitation perspective. A more comprehensive approach should be used for rehabilitation after multiple trauma.

A.3 MENTAL HEALTH CONDITIONS & AUDITORY HANDICAPS

TA074

Co-Morbid Substance Use Disorders in Somatic and Psychosomatic Rehabilitation in Germany

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Introduction/Background: High prevalence rates of substance use disorders (notably 2.5 million alcohol dependents, 1.4-1.9 million medication dependents in Germany) require prevention and early intervention. In Germany, rehabilitation could play an important role in the identification of substance use disorders and brief interventions, as every year nearly 1 million rehabilitation treatments are conducted by the German Pension Insurance (Deutsche Rentenversicherung). The aim of this study is to develop recommendations for the handling of substance use disorders in German rehabilitation centres. *Material and Methods:* Medical directors of 216 somatic and psychosomatic rehabilitation centres were consulted with a questionnaire covering the following subject areas: (1) general information about the rehabilitation centre, (2) relevance of substance use disorders, (3) initial examination, screening and monitoring of substance use disorders, (4) irregularities, (5) interventions and help, (6) discharge of patients and (7) personal opinion and requests of change. *Results:* 103 of 216 rehabilitation centres participated in the survey (48%). Many questionnaires were answered by the entire rehabilitation team. All centres reported substance use irregularities during the last 12 months. These included direct and indirect signs of problematic substance use as well as behavioural problems. On average 1% of all patients (with a high range between 0.03-12.66% i.e. for direct signs) exhibited noticeable irregularities. 40% of the rehabilitation centres declared controversial discussions of the issue among staff members. 95 centres indicated looking for substance use in the medical history, 90 centres asked substance specific questions, but only 8 centres use screening instruments like AUDIT. *Conclusion:* The results of the survey show, that the substance use is considered an important issue. Simultaneously uncertainties become apparent. The high range of irregularities may reflect different sensitisation towards substance use disorders. The projected recommendations for the practice may contribute to sensitise for the issue and assure the identification of substance use disorders and the selection of appropriate interventions. Cochrane reviews show good evidence that brief interventions at general hospitals lead to a medium term reduction in alcohol consumption.

TA075

The Role of Resilience in Adjusting to Life Stressors in Adults Aging with Disability

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Introduction/Background: Middle-age may be a particularly challenging time for people with physical disabilities, as life demands are higher, secondary symptoms such as fatigue increase, and many life changes may occur, thereby contributing to overall stress burden. This could potentially increase distress and risk for depression. However, data to support high levels of stressful life events in middle-age adults with disability are lacking and little is known about the effects of life stressors on emotional health in this population. Resilience is a factor that may protect against adverse effects of aging- and disability-associated life stressors and promote healthy aging in this population. *Material and Methods:* Participants ($N=541$) were community-dwelling individuals with long-term physical disability secondary to chronic medical conditions who participated in a longitudinal survey study. Primary outcome measures include the Connor-Davidson Resilience Scale, Patient Health Questionnaire (PHQ-9), and a life events impact questionnaire. Multiple regression analyses were conducted to examine resilience as a moderator for impact of life stressors and depressive symptoms from baseline (year 1) to 5-year follow-up. *Results:* 97% of participants endorsed one or more stressful life events, all of whom endorsed at least one life stressor with a negative impact (mean number of life events=8.2, SD=4.9). Variables included in the final regression model accounted for 27% of variance in depressive symptoms, $F(3, 510)=63.91, p<0.001$. Reporting greater negative impact of stressful life events ($\beta=0.41$) and having lower resilience ($\beta=-0.32$) were associated with higher depressive symptoms, $ps<0.001$. Participants higher in resilience in year 1 experienced significantly less

depressive symptoms 5 years later across all levels of reported negative impact. *Conclusion:* Findings suggest that middle-aged individuals with physical disability experience a range of stressful life events, many with negative impact. Overall study findings support resilience as a potential protective factor against negative impact of stressful life events on depressive symptoms in middle-aged adults with long-term physical disabilities. Targeted intervention to increase psychological resilience may decrease risk of depression and contribute to healthy aging.

TA076

Physical Activity and Quality of Life in People with Visual Impairments

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Introduction: Visual impairments may cause negative effects on quality of life in older people. (Seland et al., 2011). For younger adults (18–65 years) comparable studies are not yet conducted. Therefore the purpose of this study was to gather data about physical activity and quality of life in this target group to optimize upcoming physical activity based interventions in vocational rehabilitation. *Methods:* 277 former participants of four vocational rehabilitation centres answered an online questionnaire (Mage=40.13; SD-age=10.71; female=38.2%). The respondents showed an average BMI of 26.70 kg/m². Almost 50% described themselves as being physical active. The quality of life has been assessed by means of the WHOQOL-Bref-questionnaire. *Results:* Compared to a normative group of adults aged 36–45, the study group showed lower values in all domains. The MANCOVA (IV: visual acuity; DV: QoL 4 domains) produced no multivariate significant effect ($F[12, 468.59]=1.12$; Wilks' Lambda=0.93; $p=0.338$; $\eta^2 p=0.025$; covariables: age, employment, job-related satisfaction, leisure time activity) Also, the ANCOVA (IV: visual acuity; DV: QoL global) showed no significant effect for the global dimension. The MANCOVA (IV: more passive; more active; DV: QoL 4 domains) produced a multivariate significant effect ($F[4, 178]=10.17$; Wilks' Lambda=0.81; $p=0.000$; $\eta^2 p=0.186$; covariables: age, visual acuity, employment, job-related satisfaction, physical activity). Post-hoc ANCOVAs revealed significant effects (Bonferroni-adjusted $p \leq 0.0125$) for all four domains. The ANCOVA (IV: leisure time activity; DV: QoL global) analysing the global domain showed a similar significant effect as well. The active persons had higher values in all domains compared to the more passive participants. *Conclusion:* The results highlight lower values in all quality of life dimensions also for a younger adult group. Interventions in vocational rehabilitation should focus on leisure time activity to enhance quality of life. At this stage, the role of physical activity is still unclear and further studies are needed. *Reference:* Seland, J.H., Vingerling, J.R., Augood, C.A., Bentham, G., Chakravarthy, U. de Jong, V.M., Rahu, M., Soubrane, G., Tomazzoli, L., Topouzis, F. & Fletcher, A.E. (2011). Visual impairment and quality of life in the older European population. *Acta Ophthalmologica*, 89, 608–613.

TA077

Symptomatic Treatment of Unresponsive Wakefulness Syndrome with Transcranially Focused Extracorporeal Shock Waves (TESWT).

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Introduction: ESWT is upregulating endothelial growth factors for angiogenesis and neurogenesis and promotes the endothelial nitric oxide production. The results of extracorporeal shock wave therapy (ESWT) treating spastic disorders nurture the idea that this treatment stimulates neural structures. The question was, whether tran-

scranial ESWT (TESWT) may restore originally existing, but malfunctioning synaptic connections in the brain of patients with apallic syndrome. *Methods:* Between 8 and 18 years after the brain lesion 5 patients with unresponsive wakefulness syndrome of differing severity received TESWT with the device Duolith (Storz Medical) during 4-week physicomical complex therapies. All patients were treated for years at least once a year with the same complex therapy consisting of manual medicine, physiotherapy, passive movements in treadmills, vibration systems etc., ESWT on the limbs to soothe spasticity and cloni but no TESWT. The patient were assessed with the 24 points German Coma Remission Scale (KRS, which is quite similar to the JFK Coma Recovery Scale revised) and with the Glasgow Coma Scale (GCS). 4 patients had less than 9 points in the KRS, so they could not communicate. 4 patients had PEG feeding tubes. *Results:* After 2–4 years and an average of 5.2 treatment series the patients improved their abilities by 135.9% , from 7.8 to 18.4 points on the KRS and by 43.6% on the GCS. In the motor area of the KRS, the patients improved by 64.3%. Three PEG feeding tubes could be removed, nonverbal communication initiated 4 times. There were no undesirable side effects. *Discussion:* In the animal model, neurotransmitters as the endothelial nerve growth factor and the endothelial vascular growth factor are upregulated by ESWT. They promote functional and structural regeneration after experimental injuries of peripheral nerves and the spinal cord. According to the literature ESWT upregulates these neurotransmitters for more than 8 weeks. Our casuistic study shows an enduring improvement of the vigilance in patients with unresponsive wakefulness syndrome treated with TESWT. *Conclusion:* The TESWT improves the life quality of patient with apallic syndrome. Looking on the clinical results the precise neurophysiological effects, questions of treatment frequency etc. must be verified.

TA078

Memory Rehabilitation in Temporal Lobe Epilepsy: Slow-Oscillatory Transcranial Direct Current Stimulation Modulates Memory by Altering Sleep Spindle Generators

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Background: Temporal lobe epilepsy (TLE) is often associated with memory deficits. Given the putative role for sleep spindles in learning and encoding, the distribution of spindle generators skewed toward the affected lobe in TLE subjects may be a neurophysiological marker of defective memory. Slow-oscillatory transcranial direct current stimulation (sotDCS) has been shown to improve memory possibly by increasing slow-wave sleep and modulating sleep spindles. *Objective/Hypothesis:* To test if excitatory anodal sotDCS over the affected temporal lobe affects sleep spindles, thus improving memory performance. *Methods:* In this randomized controlled cross-over study 12 people with TLE underwent either sotDCS (0.75 Hz; 0–250 μ V, 30 minutes) or a sham procedure before a daytime nap. Declarative verbal and visuospatial learning were tested. Fast and slow spindle signals were recorded by 256-channel EEG during sleep. In both study arms, we used electrical source imaging (ESI) to localize cortical generators. Neuropsychological data were analyzed with general linear model statistics or the Kruskal-Wallis test (p or $Z < 0.05$), and neurophysiological data were tested with the Mann-Whitney t test and a binomial distribution test (p or $Z < 0.05$). *Results:* An improvement in declarative ($p=0.05$) and visuospatial memory performance ($p=0.048$) was noted after sotDCS. SotDCS increased the current density of slow spindle generators ($Z=0.001$), with a shift to the anterior cortical areas. *Conclusions:* Anodal sotDCS delivered over the affected temporal lobe can improve declarative and, to a lesser extent, visuospatial memory performance by modulating cortical source generators of slow sleep spindles. SotDCS appears to be a promising tool for memory rehabilitation in people with TLE.

TA312

Rehabilitation for Hearing Impaired with Automatic Articulation Error Test for Punjabi Population

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Introduction: Sound is produced when an air stream provided by lungs passes through the glottis in the larynx. This process is known as phonation. Sound produced during phonation then passes through the vocal tract. The shape of vocal tract filters the sound. Hence it determines the correctness of speech. **Materials and Methods:** All articulation errors show a systematic pattern e.g. if a person misarticulates /k/ to /t/, then every patient who has this disorder will speak/tanat/instead of the intended Punjabi word/kanak/ which means wheat. These systematic patterns can be used to create an automatic tool to detect the speech sounds a person is misarticulating. In, hearing impaired people mostly exhibit omission articulation errors. This work deals with detection of substituted and omitted forms of articulation disorders in Punjabi speech. This subsection describes different words chosen for Punjabi Articulation Test (PAT), format of the templates stored in the database and picture naming task (PNT) developed as an aid for the hearing impaired people. **Results:** The accuracy of tool is determined by comparing it with a human classifier. The percentage accuracy of the tool in detecting substitutions, omissions and normal utterances for any phoneme at a particular position in a word is calculated using. **Conclusion and Future Work:** Automatic Articulation Error Detection Tool has been developed can help for the rehabilitation of hearing impaired. Speech Recognition is used to detect the articulation errors. **Keywords:** Articulation disorders, Punjabi Articulation Test (PAT), Picture Naming Test (PNT).

TA313

Promoting Accurate Clinical Behavioral Diagnosis of the Low Conscious State Patients

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Assessing the level of awareness in patients with disorders of consciousness (DOC) following acute brain injury is made on the basis of exhibited behaviors. However, since motor signs of awareness (i.e. non-reflex movements or motor responses to command) can be very subtle, differentiating the vegetative from minimally conscious state is often challenging. Even the careful clinical assessor, therefore, may arrive at a wrong diagnosis. In accordance, results of diagnostic studies have documented high rates of misdiagnosis in patients with chronic DOC. The aim of this report is to share our experience in tackling this problem using two assessment procedures we developed in Reuth Medical and Rehabilitation Center: 1. Reuth DOC Response Assessment (RDOC-RA) The RDOC-RA is administered in addition to the standardized assessment tools, such as the Coma Recovery Scale-Revised CRS-R. It emphasizes the importance of assessing a wide range of motor responses. The problem of interpreting coincidental or reflexive responses is compounded by the fact that clinicians often choose behaviors to be monitored as signifying volitional intent by observing the movements that a patient makes spontaneously. In our experience, in some patients it may prove practically impossible to conclude if a specific movement is volitional or spontaneous, hence we use the R-DOCRA in order to explore a variety of subtle motor responses and gestures, unlike standard assessment tools. 2. Reuth DOC Periodic Intervention Model (RDOC-PIM) Current literature regarding assessment and

diagnosis in DOC refers mostly to the acute phase of up to one year post injury, with only few reports discussing late discovery or late recovery. However, we have found major changes in responsiveness occurring one year or more post injury in a great number of patients. Therefore, we conduct periodic assessments over a predetermined schedule to ensure that patients are not being misdiagnosed or that neurological changes overlooked. In the presentation we describe these two procedures and demonstrate their importance to clinical practice by reviewing current literature and two case studies.

A.3 NEUROLOGICAL HEALTH CONDITIONS

TA079

Normal Pressure Hydrocephalus and Dysphagia with Post-Operative Follow-Up Data

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Introduction/Background: To date there has been no report on whether secondary normal pressure hydrocephalus (sNPH) can cause oropharyngeal dysphagia and whether these findings can be reversible after shunt operation. The objective of this study was to identify cases in which dysphagia was related to sNPH and to document outcomes of swallowing function before and after shunt operation. **Material and Methods:** Patients who had received shunt operation in our institute from 2012 January to 2014 February were retrospectively retrieved. Those with positive medical record of swallowing complaints with dysphagia or deterioration of swallowing attributable to sNPH were identified. The level of swallowing function was documented using the functional oral intake scale (FOIS), videofluoroscopic dysphagia scale and the aspiration penetration scale before and after shunt operation. Secondary NPH was diagnosed via radiographic evidence of ventriculomegaly (Evan's index >0.3) and intraoperative opening cerebrospinal fluid pressure (under 180 mmH₂O). Those with an FOIS greater than '3' after shunt operations were defined as good responders. Their clinical data along with swallowing characteristics were compared to those with partial response; who showed an FOIS less than '3'. **Results:** All cases (n=10) had previous brain insult and the median time since onset of brain insult to sNPH diagnosis was 227 days (range 35 days to 34 years). The median (range) preoperative FOIS was 1 (1-2). The median (range) preoperative Evan's index was 0.38 (0.31-0.45). Ventriculoperitoneal shunt was performed using parietal occipital point and Kocher's point. The median (range) postoperative FOIS scores were 5 (1-7) and showed significant improvement (P=0.039). Significant differences were observed in the mean±SD opening pressure between those who showed good improvement of oropharyngeal swallowing (158.3±7.5 mmH₂O) versus those who showed minimal improvement (127±32.0 mmH₂O) (P=0.019) after shunt operation. Those with good response showed greater improvement of the VDS oral stage scores compared to those with partial response after shunt operation. **Conclusions:** Dysphagia may be attributable to sNPH, and surgical management may lead to good oropharyngeal swallowing outcomes. Our findings suggest that sNPH may be considered as possible causes of unexplained dysphagia that can show good response after shunt operation.

TA080

When a Respiratory Scale in ALS Does Not Mirror Its Respiratory Involvement

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Introduction: Respiratory insufficiency is the main cause of death in Amyotrophic lateral Sclerosis (ALS). Clinical respiratory func-

tion assessment is critical. A standardized process is to monitor the respiratory subscore (RofALSFRS-R) of the revised functional ALS rating scale (ALSFRS). We tested the utility of RofALSFRS-R and its individual questions in evaluating respiratory functionality. *Material and Methods:* Consecutive ALS patients followed in our ALS unit with at least three evaluations (at study entry – T0, three and six months later – T1 and T2, respectively) were included. We recorded in each visit the total score of RofALSFRS-R and its three respiratory questions – dyspnea (QR1), orthopnea (QR2) and ventilatory support (QR3), as well as the following subscores of ALSFRS-R: bulbar (ALSFRSb), upper limb (ALSFRSul) and lower limb (ALSFRSll). Additionally, the score of the 8th question (gait independence) of ALSFRS (Q8) was recorded. Decay between T0-T1 and T1-T2 was assessed by paired *t*-test. Pearson's correlation coefficient was used to correlate Q8 and QR1 in each period. Multi-regression analysis (stepwise method) was used to find the variable (ALSFRSb, ALSFRSul and ALSFRSll) whose decline at each interval was independently related to RofALSFRS-R decay. Values of $p < 0.05$ were considered significant. *Results:* For all patients included ($n = 357$), ALSFRS and its subscores decayed significantly ($p < 0.001$) over time. Improvement in QR1 was found in 10% of the patients in each period. Between T0 and T1 a significant negative correlation was found between decrease in Q8 and QR1 ($p = 0.021$, $r = -0.395$) in the subgroup of ALS patients who showed QR1 improvement ($n = 34$). An improvement in the other respiratory questions was noticed in 6% of the patients, related to non-invasive ventilation. *Discussion:* In our ALS population there was a progressive bulbar, limb and respiratory functional decay over time. RofALSFRS-R was independently related to the other functional components in the different assessments, favoring its value. Improvements in questions of RofALSFRS-R do occur in about 10% of the patients and therefore, do not favor the use of this scale in clinical trials. Possibly, decreased mobility and metabolic demand can cause fewer respiratory symptoms in those patients. The respiratory questions included in ALSFRS-R should be re-addressed.

TA081

Facioscapulohumeral Muscular Dystrophy: Balance and Walking Ability after Rehabilitation

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Introduction: Muscle weakness, postural instability and high risk of falls are main features of facioscapulohumeral muscular dystrophy (FSHD), the third most common muscular dystrophy. Recent studies suggest positive effects of aerobic and muscle strength training. We investigated the functional effects of a rehabilitation program in terms of balance, gait and muscle strength in patients with facioscapulohumeral muscular dystrophy. *Patients, Material and Method:* The study was conducted after the review of medical files. The patients received a rehabilitation program in the outpatient unit (Rothschild hospital, Paris, France) between 2010 and 2013. Each patient benefited of therapeutic care during two months alternating two and three half-day per week, with physiotherapy, hydrotherapy and occupation therapy. A clinical and instrumental evaluation was systematically proposed before and after the program. Balance was clinically assessed using three scales (Berg Balance Scale, Functional Reach Test, and Timed Up and Go) and instrumentally evaluated using a stabilometer. Gait parameters were analyzed with the Locometre® the muscle strength was quantified on an isokinetic dynamometer at the speed of 60°/s. *Results:* 24 patients (9 women and 15 men aged 21 to 70 years) were included on this study. After the rehabilitation program, there was a significant balance improvement validated by clinical tests: BBS (51.9 ± 5.5 to 54.3 ± 2.9 $p = 0.001$), FRT (17.9 ± 9.2 cm to 25 ± 7.6 cm $p < 0.0001$), TUG (9.5 ± 2.3 s to 7.9 ± 1.7 s, $p < 0.0001$), an improvement of the spontaneous gait speed (3.2 ± 1 to 3.4 ± 1 km/h, $p = 0.015$) and of the muscle strength (Q min 56.5 ± 34.8 to 73.3 ± 48.5 $p = 0.034$, HM min 29.9 ± 16.6 to 38.6 ± 20.5 $p < 0.01$ and HM max 46.9 ± 21.9 à 49.8 ± 21.2 $p = 0.02$). No gain was ob-

served for the stabilometric parameters, the fast gait speed and the quadriceps of the stronger limb. *Conclusion:* These results suggest that intensive rehabilitation in patients with FSHD improves their balance abilities, muscle strength and spontaneous gait speed. They need to be confirmed by a randomized placebo-controlled trial.

TA082

RCT on Exercise Therapy and Cognitive Behavioral Therapy to Reduce Fatigue in Post-Polio Syndrome

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Introduction: People with post-polio syndrome (PPS) commonly experience severe fatigue that persists over time and negatively impacts functioning and the health-related quality of life (HRQoL). This study aimed to determine the efficacy of exercise therapy (ET) and cognitive behavioral therapy (CBT) on reducing fatigue and improving activities and HRQoL in patients with PPS. *Material and Methods:* We conducted a multicenter, single-blind, randomized controlled trial (Dutch Trial Register NTR1371). Over four months, severely fatigued patients with PPS received ET, CBT, or usual care (UC). ET aimed at improving physical capacity, consisted of home-based aerobic training on a cycle ergometer (three times weekly) and supervised group training with muscle strengthening and functional exercises (once a week). CBT was aimed at changing perpetuating factors for fatigue, using individualized treatment modules. The primary endpoint (fatigue) was assessed using the subscale fatigue severity of the Checklist Individual Strength (CIS20-F, range 8–56). Secondary endpoints included activities and HRQoL, which were assessed with the Sickness Impact Profile and the 36-Item Short-Form, respectively. Endpoints were measured at baseline and at 4, 7, and 10 months. *Results:* Sixty-eight patients were randomized. Baseline CIS20-F scores were 41.4 for ET ($n = 22$), 39.6 for CBT ($n = 23$) and 38.0 for UC ($n = 22$). Following treatment, no differences were observed between the intervention groups and UC group for fatigue (mean differences in CIS20-F score: 1.47, 95%CI –2.84 to 5.79 for ET versus UC; and 1.87, 95% CI –2.24 to 5.98 for CBT versus UC), activities, or HRQoL. *Conclusions:* Our results demonstrate that neither ET nor CBT were superior to UC in reducing fatigue in severely fatigued PPS patients. Further research should investigate explanations for the lack of efficacy of these two currently advised approaches in clinical practice, which may provide clues to improve treatment aimed at reducing fatigue in PPS.

TA083

Comparison of Outpatient and Inpatient Rehabilitation Programme on Functional, Cognitive Outcomes and Quality of Life after Primary Brain Tumour Treatment

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Introduction: Brain tumours have a very high likelihood of producing long-term disabling effects owing to the tumour itself and the effects of treatment, including surgical complications, neurotoxic effects of radiation, and debility caused by chemotherapy. Evidence for effectiveness of rehabilitation is favourable in cancer patients. Despite the high incidence of neurological and functional deficits in patients affected by brain tumours, rehabilitation treatment of this population is not as well established as it is for patients with other neurological conditions. *Material and Methods:* This is a prospective cohort study. The Department of Rehabilitation Medicine database was reviewed for the period between 1 July 2013 and 31 August 2014. One hundred seven patients had complete records. The inpatient rehabilitation consisted of 3 hours

every day individual physiotherapy and one-hour individual sessions of therapist-guided cognitive training, spread over 6 weeks, combining computer exercises and meta-cognitive training. Outpatient rehabilitation was conducted 5 days (160 min physiotherapy) per week/6 wk without cognitive training. Speech therapy was included when aphasia was diagnosed. All patients were evaluated by means of a core set of clinical scales (Functional Independence Measure, Sitting Balance score, Standing Balance score, Karnofsky index, and comprehensive neuropsychological battery). Quality of life were measured using EORTC questionnaires (QI-C-30) and the Functional Assessment of Chronic Illness Therapy (FACIT-Br). **Results:** Participants were predominantly women (56%), with mean age 51 years (standard deviation 13.6) and median time since end of cancer treatment of 1.1 months. Analysis of groups showed that inpatients were achieved better results (in efficiency terms) as regards independence in activities of daily living ($P=0.02$) and mobility ($P=0.04$) compared with outpatients. We observed significant reductions in total and memory-specific cognitive complaints from pre-intervention to immediate post-intervention ($p=0.031$ and $p=0.009$) in inpatient group in contrast to not significant changes in outpatient group ($p=0.102$ and $p=0.255$). **Conclusion:** This study provided evidence suggesting that multidisciplinary rehabilitation (inpatient) may improve functional and cognitive outcomes, and outpatient programmes may improve functional measures and the quality of life.

TA084

The Effects of Exercise on Physical Functions in Cognitive Impaired Older Adults: a Systematic Review

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Background: The prevalence of dementia is expected to increase rapidly worldwide in the coming years. Cognitively impaired older people were found to have poorer balance and movement coordination, higher risk of falls and fractures, and lower physical activity level than their cognitively intact counterparts. A systematic review was conducted to evaluate the effect of exercise on physical functions and quality of life in people with cognitive impairments. **Material and Methods:** Article search was conducted using electronic databases including Medline, CINAHL, Cochrane, PsycINFO and Pubmed (last search in August 2014). The inclusion criteria were: (1) randomized controlled trials; (2) investigating the effect of exercise on people whose cognitive impairment was the primary diagnosis (e.g., dementia, mild cognitive impairment); (3) published in English. Exclusion criteria were (1) reports published as conference proceedings; (2) reports in books. The PEDro score was used to examine the methodological quality of the selected studies. The effects of exercise on various physical functioning domains were then synthesized and analyzed. Meta-analysis was performed if five or more studies measured comparable outcome. **Results:** Among 9,635 records screened, 44 papers (37 trials) fulfilled the selection criteria and were included in the review. Methodological quality was good and excellent for 29 and 2 articles respectively. Subjects in the included studies had an average age between 69 and 89 years. Most studies involved people with early stage of cognitive impairment. A wide range of physical exercise training was studied. Meta-analyses revealed that exercise can significantly improve lower limb strength ($p=0.01$), balance performance ($p<0.01$), Timed-Up-and-Go test performance ($p=0.01$), walking speed ($p=0.04$), step length ($p=0.03$), endurance ($p=0.02-0.04$), activities of daily living ($p<0.01$) and quality of life ($p=0.02-0.04$). Good-quality trials measuring flexibility, fall rate and dual-task ability are limited. Exercise adherences are generally acceptable across trials with rare adverse effects. **Conclusions:** Physical exercise training can improve various aspects of physical functions and quality of life in cognitively impaired older adults, particularly in those in early stage. Further studies are needed to examine the lasting effects of physical exercise.

TA085

Combination of Steroids with Rehabilitation Program in the Management of Multiple Sclerosis Relapses: a Randomized Controlled Trial

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Background: Administration of short-term high dose methylprednisolone (HDMP) for multiple sclerosis (MS) relapses is well established. On the other hand, outcomes of rehabilitation program (RP) associated with HDMP have rarely been investigated. The aim of our study was to evaluate the potential benefits of HDMP combined with rehabilitation in persons with MS in relapse in order to assess whether it is more beneficial than steroid therapy alone. **Methods:** This investigation was conducted as randomized controlled trial. MS patients were eligible if they had established diagnosis and relapse requiring application of HDMP. Forty-nine patients were included in the study and randomized to control and treatment groups and thirty seven completed the study. HDMP was administered to all patients. Treatment group additionally attended RP over a 3-week period. Outcome measures used were Expanded Disability Status Scale (EDSS), Multiple Sclerosis Quality of Life 54 (MSQoL54), Functional Independence Measure (FIM) and Beck Depression Inventory completed on baseline, 1 and 3 months later. **Results:** EDSS and FIM motor scores improved statistically significantly one month after HDMP, both in treatment and control groups. During study period, in the treatment group, sustained large effect size (ES) was found for both physical and mental composite scores of MSQoL-54, while in the controls, sustained moderate ES was demonstrated only for physical composite score. There was no statistically significant difference in BDI scores between groups, although ES was much higher in experimental group. **Conclusions:** Our findings suggest that RP started along with HDMP can influence significant improvement of quality of life in this group of patients.

A.3 OTHER NEUROLOGICAL AND MENTAL HEALTH CONDITIONS

TA086

Awareness in Disorders of Consciousness Patients Judged by Family Caregivers

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Introduction/Background: Family caregivers play an important role in diagnostic process of patients with Disorders of Consciousness' (DOC), since they are most often more sensitive in identifying the early signs of consciousness [1]. Moreover, caregivers' opinion about level of awareness of their relatives may impact their decision making about treatment choices [2]. On these basis we assessed family caregivers' opinion about awareness of their relatives affected by DOC, and we compared it with physicians' diagnosis. Moreover we assessed psychological features [3] associated with any bias in judging patients' awareness with respect to the clinical diagnosis. **Materials and Methods:** Forty five caregivers (female=34; mean age=47.6 years, SD=17.4) of 38 DOC inpatients admitted in a neurorehabilitation unit (16 females; mean age=51.9 years) answered two questions about level of awareness of their relatives and completed self-report questionnaires for assessment of psychophysiological disturbances, coping strategies, quality of perceived needs, and perceived social support. **Results:** Twenty-five caregivers (55.5%) did not agree with clinical staff diagnosis: 15 believed that their relatives in vegetative state were aware (5 of them also considered their relatives as communicative), and 10 reported

that their relatives in minimally conscious state could communicate in some way; no caregivers under-estimated their relative's status. These 'over-estimators' were more depressed and tended to use less positive coping strategies and showed much worries about the possible death of their relatives with DOC with respect to 'correct estimators'. **Conclusions:** The present observational study showed that a high percentage of patients' caregivers judges their relatives' conditions more positively than the professional examiners. This disagreement might hamper the relationships between the caregivers and the rehabilitative staff. In these perspective, care professionals have to consider that caregivers' opinion might be based on closer and longer observations than those possible for physicians and have to deal with caregivers' beliefs and expectations in order to build a therapeutic alliance and actively involve them in the rehabilitative program. **References:** 1) Majerus S, et al. *Prog Brain Res* 2005; 150: 397-413. 2) Fins JJ. *Arch Phys Med Rehabil.* 2013; 94: 1934-1939. 3) Moretta P, et al. *Clin Rehabil* 2014; 28: 717-725.

TA087

Non-Invasive Brain Stimulation to Enhance Arousal and Awareness in Patients with Disorders of Consciousness: a New Option?

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Introduction: Patients with severe disorders of consciousness (DOC) are a major challenge to the health care systems worldwide. The preliminary study investigated the safety and possible effect of non-invasive brain stimulation by transcranial shock wave therapy (SWT) and transcranial low level near-infrared laser therapy (LILT) on alertness and awareness. **Methods:** 16 chronic patients with traumatic brain injury, hypoxia, or stroke were randomized on the basis of the inclusion criteria either to LILT or to SWT. After a 2-week baseline they received the specific therapy (LILT or SWT) for six consecutive weeks. LILT was applied transfrontally every workday with a radiant fluent rate of 10 mW/cm². SWT was applied only 3 times per week, the probe was directed half-circle-like over both hemispheres. 2,000 stimuli were applied on each hemisphere with a radiant fluent rate of 10 mW/cm². The primary outcome parameter was the videographed revised Coma recovery Scale (rCRS, 0-23), blindly rated by an external physician experienced in intensive care medicine. The secondary not blinded parameters were FOUR (0-16) - and SMART-Scale (0-40), the vital parameters and the early Rehab-Barthel Index (FR-BI, -325-100). Re-assessment for follow-up was performed 4 weeks later. **Results:** All patients – except three after severe brain hypoxia due to cardiac arrest with an initial rCRS < 7 – improved arousal and awareness, the rCRS improved for a mean of 4.9 ± 3.9 in LILT and 4.2 ± 2.2 in SWT, relatives and care-givers confirmed the improvement. There was no significant difference between SWT and LILT. No major side effects occurred except two epileptic fits, one in each group. The dependance on external care did not change. **Conclusion:** SWT and LILT seem to be an interesting new option in the rehabilitation of patients with DOC to improve arousal and awareness. Further studies are warranted.

TA088

Mirror Neuron System Dysfunction in Stroke Patients with Ideomotor Apraxia

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Introduction: Most stroke patients are confronted with a complex mixture of sensorimotor, cognitive and behavioural problems. Apraxia is a cognitive-motor disorder that impacts the perfor-

mance of learned, skilled movements. Patients with ideomotor apraxia (IMA) exhibit difficulty imitating gestures performed by others. The mechanisms underlying IMA and its effect on rehabilitation outcome after stroke are not clear. Observation of a motor act performed by others and its execution both activate a common neural substrate called the mirror neuron system (MNS) located primarily in the fronto-parietal cortex. The human MNS (hMNS) is suggested to play a crucial role in motor learning by imitation. The aim of the current study was to explore the relationship between imitation failure in IMA and hMNS functioning, as signaled by the magnitude of mu suppression during observation of manual activity. **Material and Methods:** We examined the modulation of EEG oscillations in the lower alpha (mu) range (8-10 Hz) at central sites in first-event stroke patients with left (n=21) and right (n=15) hemisphere damage during observation of video clips showing manual movements. IMA was assessed using DeRenzi's apraxia test. Normalized lesion data were used to investigate how imitation failure in IMA is related to mu suppression in subgroups of patients with lesion in IPL and IFG (where the major components of the hMNS are assumed to reside). **Results:** Failure to properly imitate manual movements, as evidenced in performance of DeRenzi's standardized diagnostic test for IMA, correlated with diminished mu suppression in patients with left or right IPL damage and in patients with right IFG damage. **Conclusion:** The results point to a role for damage to mirror neurons in these areas, in the failure imitating manual actions in IMA. Mu suppression can be used to monitor hMNS involvement in stroke. This is important given the increasing body of evidence supporting the use of action observation (as a means to recruit the hMNS) in stroke rehabilitation.

TA089

Effect of Localised Lower Limb Warming and Cooling on Neuromuscular Impairments and Functional Ability

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Introduction: People with Multiple Sclerosis (pwMS) report a worsening of symptoms with increases in environmental temperature and an improvement in function following whole body cooling. This study investigated how localised lower limb warming and cooling affects neuromuscular impairments and functional ability. **Methods:** Thirteen pwMS (53.7 ± 15.1 yrs, 6 female, 6 relapsing remitting, 7 secondary progressive) were compared to 13 healthy controls (51.3 ± 10.8 yrs). On separate occasions water at either 7 or 37°C was pumped for 30 minutes around the shank of the clinically most affected leg. Before and after the intervention measurements were taken of (a) skin and core temperature (b) maximal walking speed and foot tap speed (c) tibial nerve conduction velocity (d) central motor conduction time (e) passive and stretch-evoked muscle stiffness of the ankle plantarflexors assessed using 150 perturbations at either 5 or 175°/s (f) rate of rise and amplitude of a maximal voluntary contraction (MVC) of the plantar- and dorsi-flexion. **Results:** Cooling produced a 11.3°C (± 3.7) decrease and warming a 10.4°C (1.9) increase in skin temperature. Core temperature did not change (+0.1°C ± 0.1). Walking speed was slower in pwMS (p < 0.05) and decreased with cooling (p < 0.005). Foot tap speed was slower in pwMS (p < 0.005); it increased slightly with warming and markedly decreased with cooling in both groups (p < 0.01). Cooling led to a 11.7% (± 15.1) reduction in nerve conduction velocity and warming led to an 8.5% (± 17) increase in nerve conduction velocity (p < 0.001). There was no change in central motor conduction time. Total ankle stiffness tended to be higher in pwMS (p = 0.06); stretch-reflex related stiffness decreased with warming but remained unchanged with cooling (p < 0.05). There was no effect of temperature on passive stiffness. The rate and amplitude of dorsi- and plantar-flexion MVC was reduced in pwMS (p < 0.05); cooling reduced the rate and size of the MVC. **Conclusion:** Localised cooling has several peripheral neuromuscular effects. When using whole body cooling

suits in pwMS there may be localised peripheral neuromuscular effects that may limit functional effects.

TA090

Swallowing Disorders and Speech Rehabilitation in Tracheostomized Difficult-to Wean Patients

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Background: Swallowing disorders often complicates long-term management of tracheostomized difficult-to wean patients (DWPs) and may represents a common drawback to the removal of the cannula. **Aim:** To evaluate the prevalence of swallowing disorders among DWPs and the restoration of proper swallowing after a weaning and pulmonary rehabilitation program including speech rehabilitation (SR). **Methods:** Dysphagia assessment including objective assessment, methylene blue test, and eventually fibroschopy swallowing evaluation was routinely performed in all tracheostomized DWPs consecutively admitted to a regional weaning centre from June 2010 to September 2014. **Results:** Moderate to severe swallowing disorders were diagnosed in 243 (140 males, age 72 ± 12.5 y) out of 562 (43.2%) admitted DWPs. Eleven subjects (6 males, age 63.3 ± 16.6 y), affected by severe neuromuscular (9) or brain injuries leading to very severe cognitive impairment (2) were not included in the SR program. Twelve out of 243 patients (4.9%) died during hospital stay, and seven (2.9%) were referred back to acute care hospital for complications. One hundred sixty two out of 213 patients who completed SR (76%), recovered swallowing function, and were able to feed orally: 19 (9%) required a semiliquid diet; 23 (10.8%) a homogeneous diet; 42 (18.9%) a semisolid diet; 78 (36.6%) a solid diet. In 10 patients compensatory postures were adopted. Thirty-five patients needed a percutaneous gastrostomy (16.4%), 1 a Jejunostomy, and 15 (7%) were discharged with a nasogastric feeding tube. One hundred thirty one of these patients (61.5%) could be decannulated. **Conclusions:** Swallowing disorders showed high prevalence among DWPs; the recovery of swallowing function was observed in a large proportion of subjects included in a specific SR program.

TA091

Critical Illness Neuromyopathy: a Rehabilitation Task Force

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Introduction: When admitted in an intensive care unit (ICU) 30-70% of patients develop critical illness polyneuropathy (CIP); this huge prevalence is due perhaps to the decreasing mortality from critical illness leading to an increasing number of ICU survivors. This condition could develop if an individual is on mechanical ventilation for as little as 4 to 7 days. CIP and myopathy (CIM) share the major clinical sign of symmetric and flaccid weakness of muscles and the absence of deep tendon reflexes. In addition, in CIP also there is a distal loss of sensitivity to pain, temperature, and vibration. Cranial nerves typically are spared. These conditions contribute to an important decrease in physical function and quality of life. **Methods:** A systematic review of literature was made using the research motor PubMed using the terms "Critical Illness Neuromyopathy" AND "rehabilitation". **Results:** It is of utmost importance the diagnosis of this condition. The physical examination provides us the suspect of diagnostic. Electromyography (EMG) and nerve conduction studies are the electrophysiological gold standards to confirm CIP or CIM. **Conclusion:** There is no specific treatment for CIP and CIM. Controlling blood sugar reduces the incidence of CIP/CIM, leading to shortening of the duration of mechanical ventilation, ICU stay and finally hospitaliza-

tion. The role of physical medicine and rehabilitation is to promote cardio-vascular re-conditioning, promote spontaneous ventilation and muscular strengthening as well as sensibility reeducation techniques.

TA092

Focused Low-Energy Extracorporeal Shock Waves with Distally Symmetric Polyneuropathy (DSPNP). A Pilot Study

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Introduction: The extracorporeal shock wave treatment (ESWT) upregulates among other growth factors the endothelial vascular growth factor and the nerve growth factor. This leads to nerve regeneration in the rat. The question is whether ESWT could alleviate the still difficult-to-improve symptoms of DSPNP in humans. **Methods:** In a pilot study out of an original 24 patients with DSPNP, 10 patients with diabetes mellitus were excluded because of their inhomogeneous performances. Of the 14 patients remaining, 6 received one sham treatment at the beginning. All 14 patients were then treated with ESWT to the soles of the feet using the Duolith® shock wave generator (Storz Medical) 3 times weekly for 2 weeks. The assessments were carried out before and after the sham treatment, the first ESWT and after 2, 4 and 8 weeks. **Results:** The placebo treatment did not influence pain or paraesthesia. After the 2 weeks of ESWT, the intensity decreased from 100% to 23.6%, rising again after 8 weeks to 45.7% of the original state ($p < 0.01$). But the placebo treatment had a great effect on walking abilities. The results of ESWT did not become significant until the 8th week. Step length improved by 14.6% ($p < 0.001$), walking speed by 24.8% ($p < 0.001$) and time of dual support during the stance phase of the gait declined by 12.2% ($p < 0.009$). There were no undesirable side effects. **Discussion:** In the beginning there was a high placebo effect on the motor parameters, which later became an enduring treatment related improvement. From the literature is known that the different growth factors upregulated by ESWT remain at least 8 weeks, up to 3 months in the blood. Nerve repair needs time. So this could be a reason for the delayed alleviation of the motor performances. On the other hand ESWT has an immediate analgesic effect. So the prompt soothing of the pain and paraesthesia may be explained. The treatment of diabetes patients with ESWT has to be undertaken with a greater number of patients. **Conclusions:** Despite the small number of cases it appears that ESWT can alleviate some symptoms of DSPNP.

A.3.1 STROKE REHABILITATION

TA093

Impact of First-Ever Mild Stroke on Participation and RTW 3 Month Post Event: the TABASCO Study

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Introduction and Background: There are few studies regarding returning to work (RTW) after a mild stroke. This population is not referred to rehabilitation services nor does it receive any kind of guidance in the process of returning to work. The aims of the study were: 1) to compare among people who worked before the event, those who RTW to those who did not, 3 month post mild stroke on cognitive, executive functions, participation and Quality of Life (QoL); 2) to explore the unique contribution of these variables to RTW. **Materials and Method:** A prospective cohort study, recruiting consecutive first-ever stroke patients from a large tertiary

hospital (n=249) as part of the TABASCO study. The inclusion criteria were first event, mild stroke (NIHSS ≤ 5), and no previous significant neurological impairment. An assessment battery was administered at home 3 months post stroke. The analysis included 163 participants who worked before the event (117 men, 71.8%) 3 months post at home. Mean age was 63.75 years (SD=7.7), years of education 13.2 (SD=3.9); NIHSS scale 2.7 (SD=2.2). Instruments included measures of cognition, executive functions (EF), participation and QoL. *Results:* 114 participants (69.9%) RTW; mean age 63.81(SD=7.48); and mean years of education 13.67 (SD=3.91). There were no age differences between the groups but there were significant differences in years of education ($t=-2.57$, $t<0.011$), and none for gender. Significant differences at ($p<0.02$ to 0.000) and high Effect Sizes were found between the groups on all cognitive, EF, participation and QoL measures. Logistic regression shows that cognitive variables contribute significantly and even more participation and QoL ($p<0.000$) to RTW. *Conclusions:* Importance of cognition and participation to RTW after a mild stroke was found which further provides the rationale for developing therapeutic interventions to enable RTW. Further studies are needed of mild stroke survivors to enhance our understanding of the variables that contribute to participation. *Reference:* Adamit, T, Maeir, A., Ben Assayag, E., Bornstein, N.M., Korczyn, A.D. & Katz, N. (2014). Impact of first-ever mild stroke on participation at 3 and 6 month post event: The TABASCO study. *Disability and Rehabilitation*. DOI: 0.3109/09638288.2014.923523.

TA094

Effects of Antidepressants on Functional Recovery after Stroke: a Retrospective Study

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Introduction/Background: Stroke remains a leading cause of adult disability, but the effective treatment options are limited and there is an urgent need for alternative interventions to improve functional outcomes and quality of life after stroke. There is an increasing number of clinical studies showing the potentially positive impact of antidepressants, particularly selective serotonin-reuptake inhibitors (SSRI), on motor and cognitive recovery in patients with recent stroke. The aim of this study was to investigate if antidepressants enhance functional recovery after stroke. *Material and Methods:* A retrospective study was conducted, in which the subjects were selected from among inpatients consecutively admitted to a rehabilitation centre from 1st January to 31st December of 2013. Inclusion and exclusion criteria were defined. The records of the patients admitted in that period with a stroke diagnosis were reviewed, and the following variables were registered: age, gender, type of stroke, vascular territory, days since stroke at admission at the rehabilitation centre, length of stay, Functional Independence Measure (FIM) at admission and discharge (total, motor and cognitive), and treatment with antidepressants. Scores between groups were compared by use of a Student's *t*-test or Mann-Whitney *U* test when appropriate. *Results:* 201 admissions were reviewed and 88 records were excluded according to predefined exclusion criteria, leaving 113 patients to be analysed. The patients were divided in two groups according to the type of stroke and analysed separately: 57% had ischemic stroke (N=64) and 43% haemorrhagic stroke (N=49). All the patients underwent a rehabilitation program. 58% (N=37) of patients with ischemic stroke and 57% (N=28) of patients with haemorrhagic stroke were treated with antidepressants (SSRI). In both groups FIM variation between admission and discharge was greater in the patients treated with antidepressants, although statistical significance was not achieved (ischemic stroke 27.08 vs 23.85 points; haemorrhagic stroke 31.50 vs 26.24 points). *Conclusion:* This was a retrospective study with its inherent limitations and larger trials are necessary to confirm the preliminary data. The adjunctive use of pharmacological therapies, such as antidepressants, could represent a major breakthrough in the care of stroke survivors, by enhancing the restorative process.

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TA095

Analysis of Daily Functioning and Quality of Life of Patients after Stroke Based on Functionalities Repty Index (WFR)

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Background: Brain stroke causes severe neurological dysfunction and the leading cause of long-term disability persons 40 years of age. Clinical consequences, leading to the formation of different degree of disability, and social and economic conditions, could cause difficulties to live independently, environmental adaptation, lead to emotional disorders and addiction from third parties. Knowledge of the quality of life and functional status of the patient may contribute to the proper selection of educational content enabling the effective continuation of the rehabilitation of their own. *Material and Methods:* The study included 60 patients after stroke (30 women, 30 men) aged from 26 to 86 years. Quality of life and functional status was based on the scale of SA SIP-30 and Functionalities Repty Index (WFR) defining independence in daily activities 5 categories - total score range: 15 (total dependence can) ÷ 105 (complete independence). *Results:* Point assessment of the independence of patients WFR was: (women - 82.1±18.6, men - 83.5±17.2; $p>0.05$). There was no statistically significant difference between the group of men and women for any category of WFR. Quality of life of patients assessed by the SIP was 17.7±7.8 (women 17.4±7.6, 17.9±8.0 men; $p>0.05$) in the physical domain, DF=10.3±4, 1 (women 10.5±4.0 10.0±4.3 men), in the domain of mental DP 7.4±4.6 (women 6.9±4.6, 7.9±4.7 men). Coefficient Spearman's rank correlation between the DP and DF=0.6021 ($p<0.0001$). In the category of "relationships" observed a statistically significant difference between men (1.9±1.9) and women (2.7±1.9). *Conclusion:* The degree of self-reliance, both women and men can be determined by the indicator WFR as a moderate dependence on third parties. In people after stroke, limitations in the physical domain are significantly higher than in the field of mental were used. The biggest limitation of the categories of patients are "self-service" and "taking care of the household." Topics of education should be aimed at activating patients in the physical domain.

TA096

Counselling of Rehabilitants after Stroke and Their Partners

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Background: In Western societies, stroke is the third most common cause of death and the most common cause of permanent impairment. Due to demographic changes, incidents of stroke will increase in the future. A stroke does not only change the rehabilitants' lives but also their partners' perceptions of everyday life. While the desire for disease-specific information has priority in the inpatient rehabilitation phase, the need for emotional support has precedence in the outpatient phase. *Aim:* Analysis of how both partners perceive facilitators and barriers in relation to the rehabilitation process and their partnership. *Research Design:* Problem-centered interviews with both partners (eight weeks [t1] and six months [t2] after inpatient hospitalization). Qualitative content analysis; Computer-aided analysis using MaxQDA and a person-environment analysis ("Person-Umfeld-Analyse" according to Gisela Schulze). *Results:* There will be presented results of three year long lasting research by a PhD thesis. A total of ten rehabilitants and nine partners were interviewed (seven partners at t2). Different perceptions of facilitators and barriers in terms of the rehabilitation process could be detected. The unaffected partners seem more restricted in their own recreational activities and their participation in social processes than the affected partners. In particular, the importance of "normality" turns out to be different.

While the rehabilitants refer normality as a promotional factor, it represents a barrier for the unaffected partners. Normality represents the achievements of therapy (for the affected partners) and stands in contrast to what the unaffected partners perceive in everyday life. Moreover, the analysis of the "alternative action space" is interesting as well. The rehabilitation use interest-based activities as an exercise room for their therapy, whereas the unaffected partners deny their alternative action space (e.g. their leisure activities) to have more free time and time for support to their affected partners. *Conclusion:* As a conclusion it was significantly that the Rehabilitants and partners perceive facilitators and barriers differently. That shows that consultation of patients and her partners takes an important value in the process of the rehabilitation.

TA097

Effect of Combination of Several Inhibitory Factors That Influence Stroke Outcome

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Introduction/Background: Stroke outcome prediction is one of the important themes of rehabilitation medicine. Several factors such as elderly, poor cognition, damaged sensation of position are known as inhibitory factors against functional recovery in stroke patients. In many cases, patients have two or more inhibitory factors, however, mutual interaction among them is almost unknown. So we tried to check the effect of combination of inhibitory factors to ADL outcome. *Material and Methods:* Subjects were 3575 stroke patients who were admitted to and discharged from our subacute rehabilitation wards from September 2004 to June 2013. There were 1,883 cerebral infarctions, 1,471 cerebral hemorrhages, and 221 subarachnoid hemorrhages. Average age was 67.3 years, days since stroke onset to admission were 38.3 and average length of stay was 65.4 days. Patients were divided into 8 groups according to the age (AL: less than 69 versus AH: 70 or more), cognitive subscore of the FIM (FIM-C) (CL: 5 - 19 versus CH: 20 - 35), and the disturbance of position sense (PL: severe versus PH: mild or none) on admission. The version 3 of the FIM was employed. Degree of position disturbance was determined as severe if the score of the lower extremity position sense item of the SIAS (Stroke Impairment Assessment Set) was 0 or 1. The average score of motor subscore of the FIM (FIM-M) at discharge and the FIM efficiency were compared among 8 groups. *Results:* The average FIM-M was 83.1, 73.5, 72.6, 58.5, 56.8, 50.7, 48.4, and 30.9 in the group of AL_CH_PH, AH_CH_PH, AL_CH_PL, AL_CL_PH, AH_CH_PL, AL_CL_PL, AH_CL_PH, and AH_CL_PL, respectively. The order of the FIM efficiency was different, that was, AL_CH_PL, AH_CH_PH, AL_CH_PH, AH_CH_PL, AL_CL_PL, AL_CL_PH, AH_CL_PH, and AH_CL_PL. *Conclusion:* Increase of the number of inhibitory factors lowered the FIM-M at discharge. Among them, the cognitive disturbance seems to have strong impact on functional outcome. However, the FIM efficiency showed different tendency. Improvement of inhibitory factors during inpatient rehabilitation may relate to this phenomenon.

TA098

Motor Cortex as Biomarker of Mood Disorder in Stroke

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Neuropsychiatric alterations, such as depression, anxiety, fatigue, and apathy are common to occur after stroke. It is estimated that depression after stroke occurs in about 33% of the patients. The causes for these changes are still unknown, however there are several possible mechanisms, being proposed. In depressed patients, without stroke, it have being described that mood disorders are associated

with interhemispheric imbalance, measured by transcranial magnetic stimulation (TMS), which is a possible mechanism involved in stroke patients. Finding a biomarker, and understand the neural mechanisms involved in mood disorder after stroke is important to develop new therapies as well as surrogate outcomes. In this context we assessed several TMS and electroencephalography (EEG) variables and their associations with "mood disorder" as indexed by "emotion domain" of the Stroke Impact Scale (SIS) in 35 subjects with chronic stroke. Neurophysiologic assessments included motor threshold (MT), intra-cortical inhibition (ICI), intra-cortical facilitation (ICF) as measured by transcranial magnetic stimulation (TMS); and intra- and interhemispheric coherence as indexed by quantitative electroencephalography (qEEG). Multiple univariate linear regression analyses were performed to assess the predictors for "mood disorder". Our results from univariate analyses showed significant main effect of intra-cortical facilitation (ICF) in the unlesioned hemisphere indicating higher ICF is associated with worse mood measure. The significant effect for the EEG, was that alpha coherence between motor area of the lesioned and unlesioned hemisphere and alpha difference between the same areas were associated with mood measure, in a way that lower coherence and higher difference are associated with worse mood measure. These EEGs results suggest that the interhemispheric imbalance in motor cortex is correlated with mood disorder in stroke patients. In conclusion, our results support the notion that motor cortex activity measured by qEEG and TMS are correlated with mood changes in stroke patients. Combining EEG and TMS data provide a better model involving both lesioned and unlesioned hemispheres that supports the importance of bi-hemispheric activity in mood disorder in stroke patients.

TA099

Pain in Stroke Patients: Characteristics and Impact on the Rehabilitation Treatment.

A Multicenter Study

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Introduction: We quantified and characterized pain in a sample of post-stroke patients undergoing rehabilitation and we investigated the impact of pain in slowing down or discontinuing the rehabilitation program. *Material and Methods:* Pain intensity was measured with the NRS or the PAINAD (if cognitive/language impairment was present); pain characteristics were assessed with the DN4, and NPSI questionnaire. Quality of life was measured with the SF-36. A semi-structured questionnaire on pain occurrence, impact, and management was administered by the physiotherapist in charge of the patients and by the physician. *Results:* We studied 106 post-stroke patients. About 1/3 of the patients (32.9%) with normal cognitive/language reported pain occurrence after stroke; 81.8% of them had NRS ≥ 3 and 31.8% DN4 ≥ 4 (meaning neuropathic origin of pain). In about 20% of the patients the PAINAD was used to measure pain; 17.4% of them presented a score ≥ 3 . In 24.5% of our sample, pain influenced rehabilitation treatment. In 16% of the whole sample, pain influenced patients' attention during rehabilitation session. *Conclusion:* Clinicians should pay more attention to pain, especially neuropathic pain, in post-stroke patients. Tailored pharmacological therapy, to treat and prevent pain, might improve patients' compliance during the rehabilitation process.

TA100

Neurophysiologic Predictors of Motor Function in Stroke

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Stroke is the leading cause of long-term disability. Functional recovery following stroke depends on multiple factors including the initial impact of the lesion and subsequent adaptive and maladaptive plastic changes. Understanding neural mechanism involved in stroke recovery is important to develop novel therapies as well as surrogate outcomes. In this context we assessed several TMS and EEG variables and their associations with motor recovery as indexed by Fugl-Meyer Assessment (FM). 35 subjects with chronic stroke were recruited. Neurophysiologic assessments included motor threshold (MT), intra-cortical inhibition (ICI), intra-cortical facilitation (ICF) as measured by transcranial magnetic stimulation (TMS); and intra- and interhemispheric coherence as indexed by quantitative electroencephalography (qEEG). Motor function was assessed by FM. Multiple univariate and multivariate linear regression analyses were performed to assess the predictors for FM. Our results from univariate analyses showed significant main effect of MT in the lesioned hemisphere indicating higher MT is associated with worse FM. In the multivariate analyses we found significant interaction effect of MT in the lesioned hemisphere and high-beta coherence in the unlesioned hemisphere. This interaction suggest that the higher beta activity (in EEG) in the unlesioned hemisphere strengthens the association between MT and FM. In conclusion, our results support the notion that MT is one of the strongest factors in predicting motor recovery after stroke where as qEEG changes appear to provide additional information as it helps to make the association between TMS findings and MT more specific. Combining EEG and TMS data provide a better model involving both lesioned and unlesioned hemispheres that supports the importance of bi-hemispheric activity in recovery.

TA101

Effects of Tibial Nerve Neurotomy on Posture and Gait in Stroke Patients

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Introduction: Equinovarus foot is a common feature in post-stroke patients. Tibial nerve neurotomy (TNN) has been shown to be effective on neuromotor deficiencies, but its functional impact remained unclear. In this open-label study, we aim to evaluate objective and subjective functional effect of TNN in post-stroke equinovarus foot. **Patients and Methods:** To date, 14 patients were assessed before and 4 months after TNN by the Lower Limb Function Assessment Scale (LL-FAS), allowing an ecological-like assessment of the main impairments and activities done when upright standing and walking, both by the patient and the examiner. We also analyzed analytical (articular, spasticity, motor strength), instrumental (baropodometry and videographic and temporospatial gait analysis) and functional parameters (New Functional Ambulation Classification (NFAC), Rivermead Mobility Index (RMI)) of posture and gait. Subjective change was also assessed by the Global Assessment Scale (GAS). **Results:** after TNN, patients reported an improvement in posture and gait impairments in the LL-FAS ($p=0.002$), mainly for distal limb deformities (equinus and varus), and a functional improvement in daily living activities ($p=0.014$). NFAC and RMI scores were not modified. Walking speed in the rapid condition ($p=0.036$) increased, the other gait spatiotemporal parameters didn't change. Ankle kinematics in stance and swing were improved, there was no indirect effect on knee kinematics. Baropodometric analysis showed a significant increase of heel bearing without any change in weightbearing on the paretic limb. The global improvement was mild to moderate but significant on upright standing ($p=0.039$) and Walking ($p=0.002$) activities. **Conclusion:** TNN leads to a patients' self-perceived improvement in daily living activities that is more important than revealed by "objective" assessments.

TA102

The Effect of the Technique of Postural Synergy Activation in Correction of Posture and Gait in Stroke Patients: a Randomized Controlled Trial

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Stroke is one of the greatest risk factors for falling. **Aim:** To investigate the effects of the technique based on anticipatory postural synergy activation, on balance and gait recovery of patients with post-stroke atactic disorders. **Methods:** This clinical trial included 80 patients (median age was 59 [52; 65]) with atactic syndromes (within 6 months after stroke). The patients were randomly assigned to an experimental (I) or a control (II) group. The participants of I group ($n=41$) received the usual comprehensive medical rehabilitation and 10-12 trainings with the technique of postural synergy activation. The patients of group II ($n=39$) received the comprehensive medical rehabilitation and balance trainings with the use of biofeedback platform. Main outcome measures were parameters of static balance (by Computer Stabilometry), dynamic balance (by Berg Balance Scale), risk of falls (by Dynamic Gait Index), kinematic gait parameters (according to 3D movement video analysis by «Vicon»). **Results:** Prior to the treatment, main parameters of the groups were comparable. After the treatment, both groups showed statistically significant ($p<0.05$) improvement in static and dynamic balance, reduced fall risk and improved kinematic walk parameters. An intergroup comparison revealed a statistically significant ($p<0.05$) difference of BBS results (46 [42; 52] vs. 48 [45; 53] in group II) and stabilogram area's values (412.05 [303.63; 767.91] vs. 424.33 [285.52; 638.74]). **Conclusions:** In our group of stroke patients, the technique based on the postural synergy activation is effective for correction of posture and gait. The effectiveness of the author's technique is comparable to the trainings on a biofeedback platform.

TA103

Efficacy of a Group Therapy Based Program of Gait Rehabilitation in Chronic Phase Post-Stroke Patients

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Introduction: The group based standardized program for gait rehabilitation in post stroke aims to improve the chronic phase for patients who are able to walk independently indoors. The program includes 2 evaluation sessions and 18 therapeutic sessions, over a period of 6 weeks. This study aims to evaluate the functional outcomes related to gait velocity and endurance. **Material and Methods:** Retrospective study based on data collected from the medical files of the patients included in the group program between 2011 and 2012. Patients were evaluated before and after the intervention with 5 meters and 6 minutes walking tests, Timed Up and Go test (TUG) and Functional Ambulatory Categories (FAC). Statistical analysis done with Paired Samples *t*-test, Pearson Correlation Test (confidence intervals were defined at 0.001). **Results:** From a total of 175 patients we obtained a sample of 168. 45.2% were female and 54.8% male, with an average age of 61 years. The majority (72%) had an ischemic stroke. 39.3% presented with left hemiparesis, 56% with right hemiparesis and 4.7% with tetraparesis. 23.2% had aphasia and 20.2% had no need for assistive devices for walking. In average patients performed 16 therapeutic sessions. The difference between initial and final scores of all scales used was significant ($p<0.001$) and the correlation between their scores was positive and significant ($p<0.001$) except for TUG. **Conclusion:** This study shows that a group therapeutic approach for stroke survivors in the chronic phase was effective in improving gait velocity and endurance. **Keywords:** Stroke, rehabilitation group, gait, outcomes.

TA104

Body Representation in Stroke Survivors with Apraxia - an Observational Study*D. Lane¹, G. Ottoboni², A. Tessari², J. Marsden³¹National Rehabilitation Hospital, Dublin, Ireland, Dublin, IE, ²University of Bologna, Bologna, IT, ³University of Plymouth, Plymouth, GB

Introduction: Apraxia is a complex impairment with a prevalence of ~25% in stroke survivors (Zwinkels et al., 2004). It is associated with reduced functional independence and participation restrictions. Reduced ability to imitate gestures is a known deficit of the praxis system. Body representation has been shown to be impaired in apraxic stroke survivors on assessment of imitation ability (Goldenberg, 1995). This mental representation of the body in the brain can be classified into online and offline representation; also known as body schema and structural body description respectively. **Material and Methods:** Ten apraxic stroke survivors and 20 non-apraxic stroke survivors were assessed in an observational cross-sectional study on assessments of meaningful and meaningless gesture imitation, online body representation (hand laterality recognition) and offline body representation (implicit processing of sidedness and body part knowledge). Other domains including attention, memory, spatial awareness, intelligence and communication ability were also assessed. **Results:** Apraxic stroke survivors were significantly less accurate with hand laterality recognition of left hand images ($p=0.004$) and right hand images ($p<0.001$) and body part knowledge ($p=0.04$). There was no significant difference in speed of reaction times on hand laterality recognition between the groups; however significant differences were found on reaction times for the implicit processing of sidedness ($p=0.02$). There was no significant group difference in age, time since stroke, stroke type or functional ability. Also no significant differences were noted in spatial awareness, attention, intelligence or memory. **Conclusion:** This research using novel assessments of body representation provides insight into how online and offline representation is affected after stroke. Both online and offline body representation is significantly impaired in apraxic stroke survivors. **References:** 1) Goldenberg, G. (1995) Imitating gestures and manipulating a manikin: the representation of the human body in ideomotor apraxia. *Neuropsychologia*, 33: 63-72. 2) Zwinkels, A., Geusgens, C., van de Sande, P. and van Heugten, C. (2004) Assessment of apraxia: inter-rater reliability of a new apraxia test, association between apraxia and other cognitive deficits and prevalence of apraxia in a rehabilitation setting. *Clinical Rehabilitation*, 18: 819-827.

TA105

Managing Dressing Apraxia after Stroke: Available Tools

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Introduction: Stroke patients may experience difficulty in dressing, despite motor and sensitive function preservation. This constitutes dressing apraxia, a failure of motor planning that impairs the patient's ability to perform this activity of daily living and therefore the functionality level. The aim of this work is to understand what tools are available to the physiatrist to manage dressing apraxia. **Material and Methods:** A search through databases MEDLINE® and PEDro® was made, comprising the last 20 years, using the **Keyword:** dressing, apraxia, dyspraxia, rehabilitation, treatment. A non-systematic review was performed. References of the selected articles and textbooks were also consulted. **Results:** Some specific therapeutic interventions for dressing apraxia in stroke patients have been described in the sources consulted. These included compensatory strategies such as alerting procedures, verbal or physical assistance, preparation of the lay-out of the clothes, establishment of a sequence of dressing and energy conservation techniques. Other strategies intended to enhance the acquisition of dressing skills and included training of gesture execution, errorless learning strategies and exploration training. Some studies mentioned

that training should aim specific activities and context similar to the usual routine of the patient. The studies found were performed in relatively small populations of patients, and the duration of the treatment varied amongst studies. Transfer of the results of treatment to everyday life as well as the persistence of results over time revealed difficult to assess. **Conclusion:** The strategies found in this work are relatively easy to access and to apply in clinical practice, but questions still remain about the efficacy, duration of treatment and durability of effect. Our results suggest that more quality research is required in this area in order to improve the quality of care provided to patients with dressing apraxia after stroke.

TA106

Timing and Intensity as Determinants for Functional Gains in Persons after Ischemic Stroke Undergoing Inpatient Rehabilitation*G. Berzina¹, R. Seske¹, A. Vetra¹¹Riga Stradins University, Riga, LV

Objective: The study was to explore how the time of beginning, duration and intensity of rehabilitation is related to the functional outcome of rehabilitation for persons after ischemic stroke in post-acute rehabilitation. **Methods:** The data of 514 patients who underwent inpatient rehabilitation after first-ever stroke in the Department of Neurorehabilitation, the National Rehabilitation Centre "Vaivari" (Latvia) between January 1, 2011 and December 31, 2013 was extracted from medical records. 50.4% of patients were female and the average age was 65.59 years (range 21 to 89 years). Patients were assessed using Functional Independence Measure (FIM) at the beginning of rehabilitation and at the discharge. Regression analysis was used to explore the effect on gain in scores during rehabilitation for FIM Motor Scale (Items A to M) and three domains of this scale: 'Self-care' (Items A to F), 'Sphincter Control' (Items G and H) and 'Mobility' (Items I to M). As independent variables was used the length of rehabilitation course, time from onset of stroke to beginning of rehabilitation, frequency of physiotherapy and occupational therapy (times per week) and number of functional specialists that worked with patients. **Results:** The total variance of score gain during rehabilitation for FIM Motor Scale, 'Self-care' and 'Mobility' domains was 12.6%, 6.8 and 5.9%, respectively ($p<0.0005$). The variance of 'Sphincter control' could not be explained by the model ($p=0.09$). The length of rehabilitation and number of occupational therapy sessions per week was factors that statistically significant influenced results of rehabilitation. FIM Motor Scale was influenced by length of rehabilitation with p -value <0.0005 and by frequency of occupational therapy with p -value 0.001. 'Self-Care' was influenced by both factors with p -value 0.001 and 'Mobility' with $p<0.0005$ and 0.004, respectively. Time since onset of stroke showed rather small but statistically significant predictive value on the gain of FIM Motor Scale and domain of 'Self-care' (p of 0.026 and 0.029, respectively). **Conclusion:** Time of beginning and duration of rehabilitation, as well as frequency of occupational therapy influences the gain of functioning for persons after stroke receiving inpatient rehabilitation.

TA107

Effect of Low-Frequency rTMS on Aphasia in Stroke Patients: a Meta-Analysis of Randomized Controlled Trials*C. Ren¹, N. Xia², J. Li², D. Cai³¹Wuxi, ²The First Affiliated Hospital of Nanjing Medical University, Nanjing, ³Wuxi Tongren International Rehabilitation Hospital of Nanjing Medical University, Wuxi, CN

Background: Some clinical trials have reported that low-frequency repetitive transcranial magnetic stimulation (rTMS) might improve language recovery in aphasic patients with stroke. However, no systematic reviews or meta-analyses studies have investigated the effect of rTMS on aphasia. The objective of this study was to perform a meta-analysis of studies that explored the effects of low-frequency

rTMS on aphasia in stroke patients. *Methods:* We searched PubMed, CENTRAL, Embase, CINAHL, ScienceDirect, and Journals@Ovid for randomized controlled trials published between January 1965 and October 2013 using the keywords “aphasia OR language disorders OR anomia OR linguistic disorders AND repetitive transcranial magnetic stimulation OR rTMS”. Eligible studies were selected according to the following inclusion criteria: the study was on the effects of rTMS on aphasic patients after stroke, and the outcome measures with continuous scales that evaluated the degree of language impairment, and was a randomized controlled trial. We used fixed- and random-effects models to estimate the standardized mean difference (SMD) and a 95% CI for the language outcomes. *Results:* Seven eligible studies involving 160 stroke patients were identified in this meta-analysis. A significant effect size of 1.26 was found for the language outcome severity of impairment (95% CI=0.80 to 1.71) without heterogeneity ($I^2=0\%$, $P=0.44$). Further analyses demonstrated prominent effects for the naming subtest (SMD=0.52, 95% CI=0.18 to 0.87), repetition (SMD=0.54, 95% CI=0.16 to 0.92), writing (SMD=0.70, 95% CI=0.19 to 1.22), and comprehension (the Token test: SMD=0.58, 95% CI=0.07 to 1.09) without heterogeneity ($I^2=0\%$). The SMD of AAT and BDAE comprehension subtests was 0.32 (95% CI=-0.08 to 0.72) with moderate heterogeneity ($I^2=32\%$, $P=0.22$). The effect size did not change significantly even when any one trial was eliminated. None of the patients from the 7 included articles reported adverse effects from rTMS. *Conclusions:* Low-frequency rTMS with a 90% resting motor threshold that targets the triangular part of the right inferior frontal gyrus (IFG) has a positive effect on language recovery in patients with aphasia following stroke. Further well-designed studies with larger populations are required to ascertain the long-term effects of rTMS in aphasia treatment.

TA108

1 Hz Rtms Combined with Physical Therapy and Occupational Therapy for Upper Limb Hemiparesis in Post-Stroke Patients

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Introduction/Background: Low-frequency repetitive transcranial magnetic stimulation (rTMS) has been reported to be effective for the post-stroke patients. Intensive occupational therapy is a traditional useful treatment for the post-stroke patients with upper limb hemiparesis. In this study, we combined physical therapy (PT), OT and low-frequency rTMS to confirm its efficiency, safety and feasibility as a protocol for such patients. *Material and Methods:* Totally 52 patients with upper limb hemiparesis suffering from ischemic or hemorrhagic stroke were randomized divided to experimental or control group. All the patients were referred to three-week PT program: posture, transfer, balance, gait training and exercises focusing on the upper limb movements. Intensive occupational therapy was also provided at the same time. Besides PT and OT, the patients of experimental group received repetitive transcranial magnetic stimulation with a frequency of 1 Hz on the hand area of the M1 of uninjured hemisphere. Fugl-Meyer assessment (FMA), Barthel index scale, maximum passive range of motion of the paretic upper limb and grip strength and tapping frequency were assessed the motor function on the day begin, end and four weeks after treatment. *Results:* All patients completed the protocol without any adverse effects. Both the experimental and control group showed improved upper limb function as the increased FMA score, Barthel index score, maximum passive range of motion and the grip strength. The experimental group exhibited more improvement than the control group, especially in the FMA score ($p<0.01$), the grip strength ($p<0.01$) and tapping frequency ($p<0.01$). These changes were persistently up to four weeks after the ending of treatment. *Conclusions:* The three-week low-frequency rTMS of 1 Hz on the uninjured motor cortex combined

with PT and OT protocol is a safe, feasible and clinically useful intervention for stroke patients with upper limb hemiparesis.

TA109

The Effect of Deep Transcranial Magnetic Stimulation in Sub Acute Stroke Patients - Preliminary Results

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Background: TMS was previously shown to improve hand function in patients with ischemic stroke. However, due to the relatively shallow penetration field induced by the existing electromagnetic coils positive effects on gait were not studied. The aim of this study is to evaluate the effects of deep transcranial magnetic stimulation (dTMS) administered via a novel specialized coil on gait after ischemic stroke. *Material and Methods:* This was a double-blind randomized controlled study of dTMS in subacute stroke patients. 12 excitatory dTMS sessions were applied for 4 weeks over the motor strip of the affected hemisphere starting 30 days after the stroke. Control patients received the same amount of sham sessions. All patients received standard rehabilitation treatments. Safety and efficacy evaluations were carried blindly to treatment. *Results:* Interim results include 18 patients (10 active dTMS and 8 sham control). There were no significant differences in age, gender or side of the stroke between groups. Two control patients dropped-out during the study. The main reported side effect was headache without difference between the groups and no serious adverse effects were noted. Modified Rankin Score improved more in the active treatment at 90 days (Repeated measured ANOVA $P=0.08$). A trend towards better performance was noted in gait parameters in the active dTMS group. No significant differences were found in FAC, NIHSS or FIM scores. *Conclusions:* dTMS treatment is safe in patients with subacute ischemic stroke and has some beneficial effects on motor and gait parameters but not on functional independency. dTMS, if proven in large controlled studies, has the potential to become an important add-on modality in the rehabilitation of severely impaired stroke patients.

TA110

Disoriented Fiber of Biceps Tendon as a Sonographic Predictors for Shoulder Subluxation in Post Stroke Patients

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Introduction/Background: Shoulder subluxation is one of frequent complications in patients with hemiplegia. It may worsen and may be associated with shoulder pain, and interfere with functional activities. The overall goal of this study was to examine the significant predictors of shoulder subluxation in stroke patients using sonographic imaging analysis. *Methods:* 84 stroke patients were recruited in this study. Sonographic imaging of shoulder tendons (biceps and supraspinatus) were analyzed by gray-level co-occurrence matrix and 2D-fast fourier transformation to determine the pathological changes of the tendons. Upper extremity function in stroke patients was evaluated by Fugl-Meyer Assessment (FMA). Principal component analysis was used to extract the relevant factors and then binary logistic regression was further tested to identify the predictors of shoulder subluxation. *Results:* The odds ratio (95% confidence interval) for hemiplegic shoulder subluxation was 2.22 (95% CI, 0.83~5.93) for male; 0.57 (95% CI, 0.34~0.96) for disoriented biceps tendon fiber; 0.43 (95% CI, 0.22~0.86) for FMA score. *Conclusion:* Disoriented biceps tendon fiber is a useful predictor of shoulder subluxation. Early preventive strategies and management of shoulder subluxation by ultrasound evaluation is recommended.

TA111

Electro-Acupuncture Improves Shoulder Pain and Range of Motion in Stroke Patients*T.-S. Wei¹, K.-L. Chuang¹, J.-G. Lin²¹Changhua Christian Hospital, Changhua, ²China Medical University, Taichung, TW

Background: Shoulder pain is a common complication after stroke. Electrical stimulation (ES) treatment in hemiplegic patients had showed positive results for pain control, and pain alleviation by acupuncture has been accepted by World Health Organization and many countries. However, there is limited study comparing the difference between electro-acupuncture (EA) and ES in pain relief. The purpose of this study is to evaluate the effect of EA and ES on hemiplegic shoulder pain. **Material and Methods:** A total of 48 first-ever stroke patients with hemiplegic shoulder pain within 6 month of onset were included. Patients receiving conventional rehabilitation were randomly divided into EA group, transcutaneous electrical acupoint stimulation (TEAS) group, and sham-acupuncture group (n=16 in each group). Electro-acupuncture and electrical stimulation on Janyu (Li15) & Jugu (Li16) for 20 minutes were done in the EA group and TEAS group, respectively, and Park's sham devices were applied in the sham group. These interventions were performed once a day, 5 times per week for 2 weeks. Evaluations of Visual Analogue Scale (VAS), shoulder pain-free range of motion (ROM), motor ability of upper extremity and Functional Independence Measurement (FIM) were evaluated before and after treatment. **Results:** The mean age of patients was 66.3 years, with 1:1 sex ratio. About 75% of them had ischemic stroke, and 20 had right hemiplegia. VAS scores reduced significantly in the EA group and TEAS group (EA: -2.6 ± 1.6 , TEAS: -1.9 ± 2.0 , sham: $+0.2 \pm 1.3$; $p < 0.001$), and the range of shoulder abduction and external rotation improved in the EA group significantly compared with the sham group (EA: $10.6^\circ \pm 10.0^\circ$, $15.0^\circ \pm 10.3^\circ$; sham: $3.1^\circ \pm 7.9^\circ$, $2.2^\circ \pm 9.1^\circ$; $p = 0.05$ and $p = 0.001$, respectively). FIM scores and upper extremity motor ability improved in all 3 groups ($p < 0.05$), but there was no significant difference between groups. **Conclusion:** Combining either EA or ES with conventional rehabilitation reduce hemiplegic shoulder pain, and EA could additionally improve shoulder ROM, though EA and ES do not promote better motor recovery. Therefore, EA could be a good choice of treatment for hemiplegic shoulder pain.

TA112

Can Clinical Assessments of Upper-Limb Body Functions during the First of Month Poststroke Predict Severe Spasticity One Year Poststroke?

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Introduction/Background: Spasticity is a common impairment that has been found to be associated with reduced muscle strength, sensorimotor function and an increased prevalence of complications poststroke. As it may be better to prevent than to treat these complications, the identification of patients at risk of developing spasticity and spasticity-related complications are important. Clinical assessments of body functions are performed by health professionals working with patients who have had a stroke. These are used both to assess the current function and plan treatment and assess progression over time, as well as to make predictions of future function. The aims of the study were to identify predictor variables from common clinical assessments performed during the first month poststroke that may be used to predict of severe spasticity in the upper limbs 12 months poststroke. **Material and Methods:** In total, 117 patients in the Gothenburg area, Sweden, who had their first stroke and with documented arm paresis day 3 poststroke were consecutively included as a part of the SALGOT study. Clinical assessments were made 10 days, 4 weeks and 12 months poststroke. Upper limb spasticity was assessed using the modified Ashworth scale (MAS,

0-5). "Severe spasticity" was regarded as $MAS \geq 2$. Sensorimotor function, sensation, pain and joint range of motion in the upper limb were assessed with the Fugl-Meyer assessment scale (FMA-UE) and, together with demographic and diagnostic information, were included in both univariate and multivariate logistic regression analysis models. Sensitivity (%) and specificity (%) of the prediction models was calculated. **Results:** Reduced sensorimotor function (OR 0.90, 95% CI 0.84-0.96) and the presence of spasticity (OR 30.6, 95% CI 2.34-401.5) 4 weeks poststroke, was the most important predictors for the presence of severe spasticity 12 months poststroke. The best prediction model was observed 4 weeks poststroke and had 91% sensitivity and 92% specificity. **Conclusion:** Reduced sensorimotor function and the presence of spasticity 4 weeks poststroke, was the most important predictors for severe spasticity 12 months poststroke. The presence of severe spasticity could be predicted using clinical assessments of body functions with high sensitivity and specificity 4 weeks poststroke.

TA113

A Neurophysiological Evaluation of the Development of Upper Limb Spasticity in Severely Impaired Stroke Patients over the First Six Months*C. Lindsay¹, B. Helliwell¹, D. Hicklin², S. Ispoglou², S. Sturman², A. Pandyan¹¹Keele University, Solihull, ²Sandwell and West Birmingham NHS Trust, Birmingham, GB

Introduction: Spasticity, a form of disordered sensorimotor control resulting from an upper motor neuron lesion¹, is common in stroke. The prevalence of this condition is likely to be underreported as most common measures of spasticity are invalid². Neurophysiological methods are valid but rarely used in practice. This study investigates the development of spasticity over a 6 month period using one such a method. **Method:** Secondary anonymised data from the control cohort of a RCT³ was used. Participants in the RCT were screened every other day until they either recovered or developed spasticity³. Screening involved passively extending the elbow and wrist whilst recording surface EMG activity of the flexors using a commercially available device consisting of an electrogoniometer, bipolar EMG preamplifier and a force transducer. The time point at which spasticity was first observed was documented. After this spasticity was measured at two, four, six, 12 and 24 weeks post baseline. **Results:** The control cohort consisted of 48 participants [Mean NIHSS = 16.4 (SD -6.3) 37-TACS, 4-PACS and 7-LACS]. Spasticity was first seen a mean of 19.6 days (SD=9.3) post stroke. Although there are limitations associated with quantifying EMG amplitude we observed the following: Elbow flexor spasticity was seen to systematically and linearly increase until the week 12 measurements [$R^2 = 0.91$] and then demonstrated a decrease. Wrist flexor spasticity showed a more variable pattern [$R^2 = 0.83$] with an increase to week 6 and then a decrease until week 24. **Conclusion:** Spasticity appears to worsen over the first 8 weeks post stroke before plateauing and decreasing slightly in both the elbow and wrist after this point. If treatment of spasticity is indicated then it should begin within the first 8 weeks. **References:** 1) Fleuren J et al (2010). JNNP, 81(1):46-52. 2) Pandyan A et al (2005). Disabil Rehabil, 27(1-2):2-6. 3. Lindsay C et al (2014). Trials. 15(12). doi:10.1186/1745-6215-15-12.

TA114

Use of Auditory Feedback Through Surface Electromyography in Patients with Chronic Dysphagia after Stroke*S. Van Kerckhoven¹, E. Goossens², S. Sambre²¹UZ Gent, Mortsel, ²St Maarten Hospital Duffel, Duffel, BE

Introduction: We evaluated the profit of surface electromyography (sEMG) as an auditory biofeedback instrument in the rehabilitation of severe swallowing dysfunction after stroke. **Objectives:** To

measure the profit on functional result of auditory biofeedback in the rehabilitation of severe swallowing dysfunction after stroke. *Methods:* Auditory biofeedback during swallowing via surface EMG in the neck during 6 weeks. Evaluation of the long term effect by the functional Oral Intake scale (FOIS), the Mann Assessment of swallowing Ability (MASA) and the DSWAL-QOL. *Results:* The number of milliseconds the Mendelsohn maneuver can be held increases as treatment progresses. The Functional Oral Intake Scale (FOIS) and also the Mann Assessment of Swallowing Ability (MASA) increased significantly. Also on DSWAL-QOL is a positive trend established. *Conclusion:* Auditory feedback through surface electromyography in patients with chronic dysphagia after stroke seems to have positive effects on the functional swallow ability and the severity of dysphagia.

TA115

The Behavioral and Electrophysiological Effects of Posterior Parietal Cortex Damage in Spatial Audio-Visual Conflict

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Introduction/Background: While conflict between instructions and distractors makes normally reactions slower, right inferior parietal lobule (IPL) damage associated with left spatial neglect leads, in a visuomotor task, to the paradoxical facilitation of rightwards movements in the presence of conflicting leftward response plans (Coulthard et al, 2008). We investigated the effects of the right IPL lesion on the interference between vision and audition in a spatial context. *Material and Methods:* Behavioral data and Event Related Potentials (ERPs) of 12 healthy adults and 12 patients with a focal right parietal post-stroke lesion, matched in age and educational level, were recorded during an audio-visual task. A pure tone through a stereo system and a white circle on a screen were presented simultaneously on the same side (left or right) in congruent trials and on opposite sides in incongruent trials. Participants had to respond to the auditory or visual target's side according to the instruction, by pressing a response-pad button with their right hand. Whereas all the patients had a left spatial neglect at the acute phase of stroke, they had recovered a normal performance on "paper-and-pencil" tests when included in our study. *Results:* Paradoxically, for right visual target with left auditory distractor, patients had a smaller reaction time "cost" than the control group. For healthy controls, two fronto-central ERPs negative components, N2 and N270, were elicited in all conflict conditions compared to congruent conditions. Whereas the amplitude of N2 and N270 wasn't different between the two groups for left targets, these components weren't generated by the presentation of a right visual or auditory target with a left distractor in patients. *Conclusion:* N2 and N270 might be elicited by the detection of two incongruent response plans by the prefrontal cortex. Their suppression for left targets in patients supports the hypothesis that the right IPL might be a crucial site for automatic activation of competing motor plans generated by cross-modal conflicting stimuli. In patients, the behavioral facilitation for right visual targets only may be due to additional effect of visual dominance over audition in spatial tasks.

TA116

Language Assessment to Predict the Clinical Outcome of Aphasia after a Stroke

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Introduction: Recently, many studies have attempted to identify prognostic factors for aphasia recovery including linguistic assessment in the acute phase. In 2011, Flamand-Roze et al. purposed a screening test for vascular aphasia, the LAST (Language Screening Test). Aim of this study: to determine if some linguistic components evaluated in acute stroke could predict aphasia recovery, and if these components could predict the clinical profile of aphasia. *Materials and Methods:* This study is a prospective pilot study, in the University Hospital of Bordeaux, France. Were included all consecutive right-handed patients with aphasia, after a first stroke, confirmed by CT or MRI, left hemisphere injured, within 14 days, non dementia. The assessment included at the acute phase LAST and the aphasia severity rating scale ASRS of the Boston Diagnostic Aphasia Examination (BDAE), and three months after, LAST, ASRS and BDAE. We considered 3 months after stroke that ASRS 4–5 indicated good functional aphasia outcome. *Results:* 28 patients (30–89 years) were included consecutively from November 2013 to February 2014. LAST Total, LAST receptive and expression index, sub score LAST order execution and LAST naming and ASRS were significantly associated to good outcome at 3 months (Mann Whitney $p < 0.05$). LAST expression index was significantly associated with good outcome (odds ratio=2.2, 95% CI 1.2, 3.8, $p < 0.001$) in a multi-variable analyse including receptive index and expression index as two explanatory variables. Naming, order execution, picture recognition, word repetition and automatic speech sub tests of LAST (acute phase) and BDAE (3 months after), were correlated (Spearman and Mann Whitney $p < 0.05$). *Discussion:* This study suggests that results of a rapid screening test for aphasia in acute stroke, validated in French and English, are associated with good aphasia recovery in 3 months. Moreover, the correlation between LAST in acute phase and BDAE three months later suggests that assessment during acute phase could predict the clinical profile of chronic aphasia. Thus, the expressive component of language seems to reflect an importance concerning aphasia recovery, more than the semantic core highlighted in the old classic models.

TA117

Visual Field Impairments in Stroke Survivors: Impact and Outcome in the National Demonstration Centre in Rehabilitation

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Introduction: The incidence of visual field impairments in stroke survivors ranges from 10% to 50%. These impairments have negative impact on rehabilitation. *Aim:* To describe the incidence of visual field impairments in stroke survivors referred for specialist rehabilitation and compare the outcomes of stroke survivors with and without visual field impairments. *Materials and Methods:* Retrospective review of stroke survivors admitted (May 2013–May 2014) to the National Demonstration Centre in Rehabilitation in Leeds. All patients had an assessment of vision on admission. Outcomes were recorded on admission and discharge using the Rehabilitation Complexity Scale (RCS) and Northwick Park Dependency Scale (NPDS). *Results:* Twenty-three patients were identified; 10 with visual field impairments. Patients with visual field impairments had greater complexity dependency and care costs at baseline. All 10 patients with visual impairment had heavy to very heavy needs on RCS, average NPDS of 41 at baseline. Improvements in complexity and dependency were greater in patients without visual field impairments (90% improvement) compared to those with visual field impairment (10%). At discharge, costs continued to be higher in patients with visual field impairments (£1,437.00 v/s £419.00). *Discussion/Conclusion:* To our knowledge there is no published literature looking at cost of community care for these patients. We will use these data to develop a prospective study of rehabilitation strategies in visual field impairment in stroke survivors.

TA118

Prediction of Rehabilitation Outcome of Right Sided Lesion and Left Sided Lesion in Stroke Patients. A Retrospective Cohort Study

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Introduction/Background: The purpose of this study was to examine the factors that can be identified on admission to a rehabilitation center which can affect and predict rehabilitation outcome of stroke patients regarding the side of the stroke lesion. *Materials and Method:* The records of 283 consecutive stroke patients admitted to a 200 bed rehabilitation center between April 2014 and August 2014 were reviewed. 181 patients met the inclusion criteria. Age, side of stroke lesion and FIM score on admission and discharge were recorded. The patients had a mean age of 74.5 years, a mean length of stay (LOS) of 89 days. Out of the total 181 patients with a first incidence of stroke 83 had right sided stroke lesion and 98 had left sided stroke lesion. Univariate and multivariate logistic regression statistical analyses were used to determine the factors associated with any statistically significant difference on rehabilitation outcome by comparing the FIM score on admission and discharge and LOS between left sided and right sided stroke patients. *Results:* Multiple logistic regression analysis showed a significant correlation between side of stroke lesion and FIM score on admission. There is a higher frequency of very low FIM values on admission regarding the left sided stroke lesions. There was no statistical correlation between side of stroke lesion and FIM on discharge, FIM difference (discharge- admission), age, gender or LOS. *Conclusion:* We found no evidence of any association between side of stroke lesion and rehabilitation outcome and between side of stroke lesion and LOS, age or gender. An unexpected finding was the higher frequency of much lower FIM score on admission in stroke patients with left sided lesion compared to right sided lesion. Studies including more variables measured at the time of admission to a rehabilitation centers should be examined.

A.3.2 TRAUMATIC BRAIN INJURY

TA119

Swallowing Disorders in Severe Traumatic Brain Injury

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Introduction: Swallowing impairment is frequent in patients with severe traumatic brain injury admitted for rehabilitation, and may be followed by pulmonary and nutritional complications. However, despite the significance of dysphagia following, limited data are available regarding the natural history of swallowing disorders or the impact of various contributing factors on prognosis and outcome in this population. The aim of our study was therefore to identify and characterize swallowing disorders in severe traumatic brain injury. *Method:* Patients were prospectively included between december 2013 and june 2014 after severe traumatic brain injury and were hospitalized in a rehabilitation unit. Swallowing evaluations was made clinically and with a functional endoscopic evaluation with a nasoendoscope. The possibility of an oral feeding was then evaluated. *Results:* 11 patients were included during the period. There were 81.9% males (40.7±14.6 y). All the patients presented swallowing disorders, with clinically alteration of the bolus transport in the oropharynx. 80% had aspirations with liquid. The nasoendoscopy showed that there was an alteration of swallowing coordination in these patients which could explained the aspirations. 7 patients were able to eat by mouth 6 weeks af-

ter admission in the rehabilitation unit. The 4 other patients could not and had a tracheostomy, salivary residue and aspiration at the nasoendoscopy. *Conclusion:* Swallowing disorders are very frequent after severe traumatic brain injury and characterized by an alteration of swallowing coordination. They should be evaluated to detect aspirations and propose an adapted rehabilitation in these patients with conscience alteration.

TA120

Transition of Care in Traumatic Brain Injury: Deficits in Communication and Information Transfer at Discharge from Acute Hospitalization

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Introduction/Background: The term “transition of care” refers to a patient moving to another setting of care as his/her condition or requirements of health care change (1). Hospital discharge is a major point of transition. Deficits in communication and information at hospital discharge between referring and receiving health care providers may affect the continuity of care and contribute to adverse events (2). However, up to date, this issue has not been addressed in the field of traumatic brain injury (TBI). The purpose of this study is to assess the prevalence of deficits in communication and information transfer at discharge from acute hospitalization after TBI. *Material and Methods:* This study is a part of the CENTER TBI (The Collaborative European NeuroTrauma Effectiveness Research study in Traumatic Brain Injury) multicenter study Work Package 14 “Transition of care and post-acute care”. Patients with TBI, admitted to the Oslo University Hospital, Oslo, Norway during the time period from January to June 2015 will be included. The presence of discharge summary, time to completion, content, and format of communications between referring and receiving care teams will be assessed. The data will be derived from the patient’s medical records and summarized with descriptive statistics. *Results:* Preliminary results will be presented at the conference. *Conclusion:* The study results may provide important information on areas that should be targeted in order to improve the transfer of communication and information between different levels of care of TBI patients. Eventual differences between various health care systems and cultures will be assessed during the CENTER-TBI study. *References:* 1) Coleman EA, Boult C. The American Geriatrics Society Health Care Systems Committee. Improving the quality of transitional care for persons with complex care needs. *J Am Geriatr Soc* 2003; 51: 556-7. 2) Kripalani S, LeFevre F, Phillips, C, Williams M, Basaviah P, Baker EA. Deficits in communication and information transfer between hospital-based and primary care physicians. *JAMA* 2007; 297: 831-41

TA121

Prevalence, Causes and Consequences of Sleep Disorders in Acquired Brain Injury

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Background: A commonly recognised yet poorly understood consequence of Acquired Brain Injury (ABI), sleep disturbances have been reported to affect up to 80% of the patient population. The consequences of sleep disturbance can be severe, with even relatively short periods of disturbance potentially resulting in major impairment of cognitive function. The presentation and aetiology of sleep disturbances in ABI are likely to be multi-factorial and in part be due to neurological factors and confounding psychological and non-neurological factors such as pain, depression, anxiety, epilepsy and the immediate environment within the respective

rehabilitation units. However, the overall picture remains incomplete and fragmented. *Method:* This cross-sectional study analysed all patients within the rehabilitation centres of the Rehabilitation Network of Merseyside and Cheshire. A total number of 52, with 30 patients with diagnosed ABI and 22 controls with non-ABI related injuries within matched rehabilitation units were sampled. Data was gathered through review of the patients' medical records and questionnaires with objective scales used to analyse the presence of sleep disturbance, depression, anxiety, pain and seizure activity. *Results:* The prevalence of sleep disturbance was significantly higher in patients with ABI, than the control ($P=0.024$). No statistically significant difference was illustrated between the varying classifications or locations of brain injury and overall sleep disturbance. Significant correlation was illustrated between the severity of depression and sleep disturbance ($P=0.049$), with no significant association seen with pain or anxiety. Patients with post-traumatic epilepsy reported an average sleep disturbance score significantly higher than the control. *Conclusion:* Our results have highlighted the prevalence and importance of evaluating sleep disturbance following ABI. In addition, we have confirmed existing research which has shown an association between sleep disturbance, depression, anxiety and for the first time, post-traumatic epilepsy. Furthermore, our results have highlighted the role of external factors on sleep disturbance such as excessive noise and frequent nursing intervention. Our results indicate the need for a comprehensive and early evaluation of sleep disorders and associated co-morbidities.

TA122

Sleep Disorders in Patients with Traumatic Brain Injury in a Neurorehabilitation Center

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Background: Traumatic brain injury (TBI) constitutes a major cause of death and disability. Complaints of sleep-wake disturbances occur in 30% to 70% of patients and can hinder the rehabilitation process and affect final outcomes for patients. We aim to describe the prevalence and characteristics of sleep disorders (SD) in inpatients with TBI sequelae and assess the determinants of functional outcome after the rehabilitation program. *Material and Methods:* Retrospective observational study in a Neurorehabilitation Center including 101 patients with TBI sequelae admitted from January 2010 to October 2013. The main outcome measures were: prevalence and type of SD and prescribed drugs, comparison of Motor, Cognitive and Total Functional Independence Measure (FIM) scores, at admission and discharge, between: "TBI sequelae" (TBI) versus "TBI sequelae plus SD" (TBISD) patients; 18-49 years vs >50 yrs and time period since TBI-TSTBI (<3 m, 3 m-1 yr and >1 yr). *Results:* 127 admissions (101 patients and 26 readmissions): 80.1% males, predominantly 18-35 years (yrs). We found a high prevalence of SD (54.5%), being insomnia the most reported (63.6%). Several pharmacological classes were prescribed and polymedication was frequent. Younger patients (<50 years) had higher prevalence of SD, but FIM scores and overall increase were similar between age groups. TBISD patients had a similar mean FIM increase, but significantly lower initial and final FIM scores, when compared to TBI patients. In all 3 TSTBI groups, increase in median FIM scores was equivalent. As in TBISD, the 3 m-1 yr group had lower overall values but also large interquartile ranges (IQR) in motor and total FIM scores. *Conclusion:* Overall, patients from all groups had improvement in motor, cognitive and total FIM scores. FIM scores were higher in younger patients. Age did not seem to influence the FIM score variation, despite differences in SD prevalence. TBISD patients had similar increase in FIM scores but large IQR, reflecting intragroup heterogeneity, may contribute for the lack of statistical difference. Our analysis does not take into account TBI severity or the effect sleep medication. Comorbidities and polymedication may have in-

terfered with functional improvement. Further, deeper, prospective studies are needed.

TA123

Factors Associated with Depression after a Traffic Accident in a Cohort of Patients with Traumatic Brain Injury and without It

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The World Health Organization (WHO) has estimated that by 2020, traffic accidents (TA) will be in second place as a cause of years of life lost; and will be the third leading cause of disability after ischemic heart disease and depression. In Medellín, Colombia there were 307 Deaths from TA and 23,835 injuries, with 411 accidents per 10,000 vehicles in 2011. The purpose of the study was to determine the factors associated with depression in patients with traumatic brain injury (TBI) and without it, in a cohort of patients with TA between 2009 and 2011. This is a prospective cohort study that evaluated 834 patients, 52 (6.24%) of them with TBI. They were assessed at baseline, 3 and 12 months. Depression was evaluated with the Patient Health Questionnaire-9 (PHQ-9), the severity of the injury with the New Injury Severity Scoring (NISS) and function with the WHO Disability Assessment Schedule 2.0 (WHO-DAS II). The association of depression with different variables was determined at 3 and 12 months using a logistic regression model. 25.8% had minor injuries, 42.4% had moderate and 31.8% had severe injuries. 81.0% of traffic accidents involved motorcycles. 10% of TBI patients had severe depression at baseline, 15% at 3 months and 20% a year after, compared with those who did not suffer TEC 9%, 8% and 7% respectively. The variables associated with the possibility of severe depression at 12 months were: having suffered TEC: OR 6.3 (95% CI 2.58-15.2), $p<0.0001$; being female OR 4.3 (95% CI 2.58-15.2), $p<0.0001$ and age: OR 1.05 (95% CI 1.02-1.07) $p<0.001$. At 12 months, differences in all domains of the WHO-DAS II were observed among the group of patients who developed depression. Depression is more common in patients with TBI secondary to TA, this is doubled after 12 months which does not occur in patients with AT without TBI. Women and age increase the likelihood of depression. The AT and TBI are becoming more frequent in countries with low and middle incomes. Depression is associated with quality of life and loss of function, it's necessary to detect it to provide timely treatment.

TA124

Sexual Functioning and Satisfaction in Female Patients with TBI

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Introduction/Background: Traumatic brain injury (TBI) is a leading cause of death and disability around the world. TBI can substantially alter many areas of a patient's life, including his or her relationships and sexual functioning. There has been very little research published regarding sexual functioning in women with TBI. *Material and Methods:* 58 women (29 with TBI and 29 healthy controls) from Neiva, Colombia participated on the study. There were no statistically significant differences between groups in socio-demographic characteristics. All 58 individuals completed the Sexual Quality of Life Questionnaire (SQOL), Female Sexual Functioning Index (FSFI), and the Sexual Satisfaction Index (ISS). *Results:* Women with TBI scored statistically significantly

lower on the SQOL (T (56)=-6.37, $p<0.001$), FSFI sub-scales of desire (U=260.00, $p=0.011$), arousal (U=227.00, $p=0.002$), lubrication (U=230.00, $p=0.006$), orgasm (U=245.50, $p=0.006$) and satisfaction (U=207.50, $p=0.001$), and the ISS (T (34)=6.12, $p<0.001$) than the healthy controls. Spearman correlations found that age negatively correlates with FSFI arousal ($p<0.005$), lubrication ($p<0.005$), satisfaction ($p<0.005$) and orgasm ($p<0.05$), while months since the incident positively correlate with FSFI arousal ($p<0.01$), lubrication ($p<0.05$), and orgasm ($p<0.05$). Multiple linear regressions revealed that age was negatively associated with sexuality measures while months since the TBI incident were positively associated with these variables. **Conclusion:** These results disclose that women with TBI do not fare as well as their controls in these measures of sexual functioning and were less sexually satisfied. Future research is required to further understand the impact of TBI on sexual function and satisfaction to inform for rehabilitation programs.

TA125

Traumatic Brain Injury Outcome: A Matter of Sex?

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Introduction: Traumatic brain injury (TBI) is one of the leading causes of injury-related death and disability worldwide. The majority of therapeutic strategies derived from experimental animal studies have failed when they are translated into the clinical setting of TBI. Progesterone is a neurosteroid that is involved in neuroprotection and repair after brain injury. Its infusion results in reduced neuronal loss, enhanced remyelination, improved functional recovery, and overall decrease in cerebral edema. **Methods:** An extensive research of literature was made in the search motor PubMed, using the MeSH terms “traumatic brain injury” AND “progesterone” and “traumatic brain injury” AND “estrogen”. **Results:** Allopregnanolone, a metabolite of progesterone that is produced in the brain, may play a role as a neurosteroid in both normal brain and in TBI. Together with progesterone, estrogen can regulate multiple non-reproductive brain functions, such as cognition and neuroprotection. Multiple regions within the central nervous system (CNS) beyond the hypothalamus are targeted by progesterone, including the hippocampus and cortex. The effects of progesterone may be attributed to mechanisms from the ‘classical’ gene transcription mediated by PRA and PRB and from alternative pathways. **Discussion/Conclusion:** Neuroprotective roles of progesterone and allopregnanolone may involve signaling through a number of non-classical receptors, in addition to the classic receptors. Elucidating these mechanisms of action is of utmost importance in the way the therapeutic possibilities of these compounds for treatment of TBI is a door yet to be opened.

A.3.3 SPINAL CORD INJURY

TA126

Transcranial Direct Current Stimulation (TDCS) of the Primary Motor Cortex Is a Promising Adjunct Modality in Improving Arm and Hand Functions in Chronic Incomplete Cervical Spinal Cord Injury

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Introduction/Background: To demonstrate that increasing excitability of the cortical motor region (M1) with anodal transcranial direct current stimulation (tDCS) combined with robot-assisted arm training will provide greater improvement in contralateral arm and hand motor functions when compared to combined sham stimulation and robot-assisted training in patients with chronic, incomplete cervical spinal cord injury (SCI). **Material and Methods:** This study was a parallel-group, double-blinded, randomized, sham-controlled trial. Eight participants with chronic, incomplete cervical SCI (AIS C and D level) were randomized to receive 10 sessions (5 daily sessions over two-consecutive weeks) of anodal tDCS (2 mA, 20 min; active group n=4) or sham stimulation (2 mA, 30s stimulation at the beginning and end of 20 minutes; control group n=4) followed by robot-assisted training of upper limb movements. Effects of tDCS were assessed with Jebsen-Taylor Hand Function Test (JTHFT), grip and pinch strength, at the beginning and end of treatment. In a subgroup of participants, corticospinal tract integrity was assessed using diffusion tensor imaging (DTI). **Results:** Anodal tDCS to M1 (contralateral to the trained arm) improved hand motor function as measured with JTHFT (active group, from 0.27 items/sec to 0.33 items/sec, vs sham group, from 0.23 items/sec to 0.24 items/sec), however changes in functional scores were not statistically significant ($p>0.05$). Pinch and grip strength also improved. DTI derived values, fractional anisotropy, axial diffusivity, mean diffusivity and radial diffusivity of the corticospinal tract from 4 subjects (active group n=2, and sham group n=2), has not shown significant changes. **Conclusion:** This study is the first of its kind in SCI to use combined central and peripheral stimulation in recovery of upper extremity function. Modulating excitatory input of the corticospinal tracts on spinal circuits has shown promising results in improving arm and hand functions in persons with incomplete tetraplegia. However, future clinical trials with larger sample size are warranted to further evaluate the clinical effect of combined treatment modalities.

TA127

Focused Extracorporeal Shock Waves Improve Pareses in 8 Cases of Spinal Cord Injury and 3 Cases of Myelomeningocele

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Introduction: Focused extracorporeal shock wave therapy (ESWT) is stimulating via the corresponding endothelial growth factors angiogenesis and neurogenesis and promotes the endothelial nitric oxide production. Investigations with rats show that ESWT of the damaged spinal cord contributes to nerve repair and improves the motor activity and the sensibility. **Method:** With 8 patients, 43 years of age, suffering for long years from different degrees of severity of posttraumatic paraparesis (PP) and 3 children from 9-12 years of age suffering from a myelomeningocele (MZ), a longitudinal observation case study was carried out. They received ESWT (“Duolith” shock wave generator, Storz Medical) to the region of the spinal cord lesion 3 times a week during a complex therapy regime with physiotherapy. The patients had received this complex therapy without ESWT several times the years before. The courses of treatment were documented using surface EMG, manual muscle test (MMT), and functional reach test (FR). **Results:** Previously non-innervated muscles that were rated subsequently showed increasing EMG activity and an average improvement in strength to about 2.45° (PP)/2.6° (MZ) in MMT. The patients improved their FR when seated to 8.9 (PP)/8 cm (MZ) on average. Superficial and deep sensibility increased below the lesion level. Examples of EMG- and video documentations before and after the treatment series will be presented. There were no undesirable side effects. **Discussion:** Suitable doses of ESWT stimulate the spinal cord directly and may lead in humans too to the release of neurotrophic substances. Questions of intensity and frequency of the ESWT are not yet answered sufficiently. **Conclusions:** ESWT enhances

muscular function and superficial sensibility in the lower adjacent region of the spinal cord lesion. The neurophysiological effects need to be verified on larger numbers of patients.

TA128

Sexuality in Korean Men with Motor Complete Spinal Cord Injury

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Introduction/Background: Spinal cord injury (SCI) often deteriorates the motor, sensory and autonomic function. Eventually SCI usually come with sexual impairment. Nevertheless current situation of sexuality after SCI and the main factors for determining the sexual activity and sexual satisfaction after SCI still remain unknown in East Asia. The purpose of this study was to elucidate the sexual activity and perceived sexual satisfaction of Korean male people with motor complete SCI and to identify factors influencing the sexuality and satisfaction. **Material and Methods:** 139 male people with motor complete SCI participants in Korea were eligible to analyze in this study. All participants completed face-to-face interview as well as structured questionnaire of 52-items including medical condition, marital status, economic status, employment, level of education, social activities and welfare services. **Results:** 65% (n=90) of participants had engaged in sexual activity. Employee (or self-employed), longer time since injury and the experience of direct education regarding sexual rehabilitation after SCI were positively associated with sexual activity. However the level of spinal cord injury (paraplegia or tetraplegia) and the presence of medical complications were not related to sexual activity. The binary logistic regression analysis showed that direct sexual rehabilitation education was the most significantly influencing factor to encourage sexual activity (odds ratio, 3.33). Among 90 sexually active male with complete SCI, the degree of post-injury sexual satisfaction was as follows: 8.9% (n=8) sexually satisfied, 28.9% (n=26) sexually neither satisfied nor dissatisfied and 62.2% (n=56) sexually not satisfied. Lower level of education and the presence of medical complication such as cystitis, sore, pain, contracture or autonomic dysreflexia were associated with sexual dissatisfaction. **Conclusion:** The present study results showed socioeconomic factors such as employment state and direct person-to-person sexual counseling service had more impact on sexual activity rather than the degree of physical impairment. Furthermore it was a noteworthy result that educational background was the most related factor on sexual satisfaction. Most influencing factors were modifiable. Therefore sexual rehabilitation intervention program such as education or counseling service could be helpful to encourage more fulfilled sexual life of people with spinal cord injury.

TA129

Spinal Cord Injury and Medications: A Double Whammy on Sexual Function?

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Introduction and Aims: Sexual dysfunction as a result of Spinal Cord Injury (SCI) is well known. The resulting physical and psychological issues from the SCI make it imperative that this group often require medications. It is possible that often these medications can cause adverse effects including on sexual function. To identify the number of SCI individuals who use medications that can affect sexual function. We also evaluated the effectiveness of discussion relating to sexual function for these patients. **Materials and Methods:** Data collected from medical-records/electronic-patient-records and drug charts of consecutive patients reviewed in outpatients (January and June 2012) in this retrospective cohort

study. Medications known to affect sexual function as described in British National Formulary 58 were reviewed. Documentation relating to sexual function noted. **Results:** We included 211 patients (n=543) after excluding neurologically intact; those attending for other than follow-up; 15% (n=32) were females. Nearly 50% (n=104) were neurologically incomplete (Frankel B/C/D). Only 63% (n=133) had dysfunction documented; 40% (n=84) with erectile and ejaculatory dysfunction; 23% (n=49) with only ejaculatory dysfunction. No documentation of dysfunction in 25% (n=46/179) males and all females. More than 50% (n=116) were on medications with adverse effect on sexual function. Almost 30% (n=63) were on one medication, 18% (n=38) on 2 medications, over 7% (n=15) on 3 or more medications. 14 % (n=30) on no medications; 31% (n=65) on medications with no known adverse effect on sexual function. 17% (n=36) were on medications for erectile dysfunction with incremental dose requirement. Almost 85% of patients had some discussion regarding sexual function at their follow up visit but this was not always complete. **Conclusion:** In addition to their SCI, a sizeable proportion of patients with SCI are on medications that can adversely affect their sexual function. Majority of the consultations were inadequate in identifying and addressing concerns regarding sexual function. Healthcare Professionals looking after SCI patients need to be more aware of this aspect and should also be more willing to enquire about their sexual dysfunction.

TA130

Effectiveness of Assisted Reproduction Techniques on Procreative Capability of Spinal Cord Injury Patients

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Introduction: Spinal cord injuries (SCI) can change people's life devastatingly. Fertility is not one of the most considered aspects but it can be affected for erectile and ejaculatory dysfunction and by bad sperm quality. Better sperm recoil and medical assisted reproduction techniques can improve births rates in SCI patients. In this way the goal of this study was to evaluate the procreative capability of SCI patients under assisted reproductive technologies (ART). **Materials and Methods:** A retrospective study of all male patients under ART program in a central hospital was done. A questionnaire was developed to record the necessary data. All patients included had agreed in participate in the study. Data related with age, type and level of lesion, urinary drainage method, years after trauma when sperm was took, method, number of cycles, technique of ART, pregnancies and births was collected. Persons without SCI and missing data were excluded. **Results:** A total of 80 men's under ART had been analyzed. Our final sample was composed by 40 SCI patients. Median age ranged from 22 to 44 years old (mean 35). Majority of them (27) had complete (AIS A) and dorsal lesions (30). Bladder management was performed mainly by intermittent catheterization (19). Collect was made from 1 to 32 years after lesion (mean of 12). A total of 17 clinical pregnancies and 17 births had been achieved. Electroejaculation combined with Intracytoplasmic sperm injection (ICSI) produced the best reproductive effectiveness (50%). Parents' age didn't seem to affect birth generation. **Conclusion:** Fertility aspects had always been very important in our society. If we consider that main affected SCI group is formed by men in reproductive age, fertility can play a crucial role on self-esteem and perfect integration of these patients. ART permitted to increase reproductive capability in all groups of SCI which is in accordance with literature. EEJ combined with ICSI seems to offer a better reproductive capability and good results to SCI comparing to other ART populations (Centers for disease control and prevention reports ART rates - 36% for pregnancy; 29% for birth). Further studies with ART on SCI are necessary to analyze this tendency and best ART combination approach.

TA131

Prevention of Osteoporotic Fractures after Spinal Cord Injury – a Retrospective Comparative Analysis**J. Pimenta¹, A. Ferreira²*¹*Hospital Garcia de Orta, Lisboa, ²Centro de Medicina de Reabilitação de Alcoitão, Alcoitão, PT*

After spinal cord injury Bone Mineral Density (BMD) is reduced below the level of lesion. The loss occurs from the early months up to more than two years after the SCI. Early bisphosphonate (BPP) administration after SCI has proven to be effective attenuating the sublesional bone loss, by inhibiting osteolysis. There are currently no guidelines available for Neurogenic Osteoporosis in SCI. Osteoporotic fractures in SCI may occur from minor trauma and easily lead to complications, in already vulnerable patients. Few studies assess BMD preservation therapies with the reduction of fractures in this specific population. We studied the incidence of fractures in SCI by reviewing clinical data of patients admitted in inpatient unit at a rehabilitation centre, from 2011 to 2013, with SCI diagnosis, discharged within 12 months of lesion. Variables recorded: sex, type of lesion, cause of lesion, fracture occurrence, bisphosphonate therapy, other bone influencing therapies, weight-bearing time and osteoporotic fracture risk factors such as age, menopause, personal and family history of fractures, steroids therapy, alcohol abuse and metabolic pathology. We further enquired patients by phone questionnaire. The minimum follow-up was 12 months. IBM-SPSS version 22 was used for statistical analysis. A sample of 49 patients was selected, of which 37 were included, 68% males, mean age 54 (± 18) years, AIS Classification was respectively 37% A, 10% B, 16% C and 35% D, most frequent cause of lesion was trauma 56%, 57% were weight-bearing at least 30min per day and fractures occurred in 10%. For analysis we classified into groups relative to treatment with BPP. Both groups were similar regarding sex, age of lesion, level of lesion, weight-bearing time and osteoporotic fracture risk factors. We searched for significance ($p < 0.05$) in fracture incidence and risk factors, however no statistical difference was present. Within two years of lesion the incidence of fractures was 10% in our sample, lower than found in literature, probably related to a short-term follow up. Treatment with BPP failed to show a positive effect in fracture incidence, nonetheless all cases were found in non-treated patients, this being consistent with clinical experience. Further studies are needed to clarify the role of BPP in fracture prevention after SCI.

TA132

Neurorehabilitation after Spinal Cord Injury: Don't Neglect the Brain**H.-L. Liu, J.-M. Hou**Third Military Medical University, Chongqing, CN*

Introduction/Background: During the past 20 years, although various therapies have been developed for restoring motor function in SCI, to date, there are no efficient clinical treatments available for SCI patients. One potential reason holding back improvements in SCI therapies is that most of previous studies of SCI mainly focus on the local changes in the spinal injury site and neglect the intimate interconnection with the brain. The aim of this study is to investigate the brain structural changes during the early stage of SCI, and the relationships between these structural changes and patients' motor recovery. **Material and Methods:** Twenty-five SCI patients were split into two groups (Good recoverers group & Poor recoverers group) according to the clinical outcome of motor recovery at 6 months follow-up. The study participants also included 25 matched healthy controls. Structural MRI was used to investigate the regions with brain structural changes among the three groups. Pearson correlation analysis was used to explore the relationships between these structural changes and patients' motor recovery. **Results:** Compared to healthy controls, both poor re-

coverers and good recoverers had significantly decreased cortical thickness in the bilateral primary motor cortex. Poor recoverers exhibited more serious and widespread structural damages, in addition to reduced cortical thickness in the primary motor cortex, poor recoverers also showed decreased cortical thickness in the right supplementary motor area and premotor cortex when compared to healthy controls. Compared to the healthy controls, poor recoverers showed white matter microstructural abnormalities in the right primary motor cortex and posterior limb of the internal capsule; good recoverers showed no significant difference in white matter microstructure. Furthermore, the structural changes at the internal capsule and supplementary motor area were associated with the motor recovery rate at 6 months follow-up. **Conclusion:** Our findings suggest that SCI causes significant anatomical changes in the human sensorimotor system in the early phase of SCI, and these structural changes directly affect the motor recovery of SCI. The more the structural integrity was in the brain the faster and better the motor recovery. Future treatment aimed at promoting neural function recovery of SCI patients should target both the injured spinal cord and the brain.

TA133

Development and Implementation of an ICF Based Patient Management Cockpit in Rehabilitation of Spinal Cord Injury**K. Schmitt¹, A. Scheel-Sailer¹, A. Jenny¹, A. Bigler², H. P. Gmünder¹*¹*Swiss Paraplegic Center, Nottwil, ²Spare, IT Company, Wolhusen, CH*

Introduction: Rehabilitation management is a complex task in health care systems and challenges clinicians, patients and their family members. Many aspects need to be considered to define rehabilitation goals and intervention. Clinical guidelines help to achieve best reintegration and participation in society. Interdisciplinary teams in rehab settings expect to manage patients individually and follow standard procedures. Clinical pathways can help to structure all tasks of professionals and therefore should be integrated in a Hospital Information System. Many software solutions were developed to document clinical information but often in separated information systems. However rehab professionals need an overview within an ICF based goal setting but complain about the lack of information for two reasons. 1) It is difficult to get an overview, looking at each single clinical expert system 2) You don't know where to look for the specific information. Therefore the Swiss Paraplegic Center (SPC) developed a Patient Management Cockpit (PMC) with the aim to - integrate the rehabilitation philosophy of ICF, - implement clinical pathways, - retrieve easily information from all clinical expert Systems, - apply standardized treatment packages due diagnosis and participation goals. **Objectives:** Description of the development of a process oriented clinical documentation system based on professional experience and the contents of clinical pathways. **Methods:** - Design of clinical pathways SCI and transfer into Business Process Modeling Notation (BPMN) - Software development and testing of practicability and usability ("proof of concept") - Implementation and training of health professionals. **Results:** Development of clinical pathways took 12 months including the process of clinical change management with the concurrent goal to achieve ISO 9001:2008 certification. After evaluation, one software company was assigned for the project using a SCRUM approach. PMC was build 2012 and implemented 2014 in incremental steps on all wards within the rehab center. **Conclusion:** The interdisciplinary development of the specific information system (PMC) allows to integrate clinical rehabilitation requirements. ICF based rehabilitation management including the definition of participation goals can be supported by PMC with visualized clinical pathways and standardized treatment packages. The improvement of rehabilitation management after implementation of PMC will be evaluated in a follow-up study.

TA134

Spinal Cord Injury and Physical Activity: Transforming Rehabilitation

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Introduction/Background: Rehabilitation after spinal cord injury (SCI) has been based on expectations regarding functional outcomes predicted by the initial level of injury and severity of impairment. Thus, in patients with clinically complete injuries, therapy has been primarily directed at activities to improve independence e.g. teaching new strategies to move in bed and transfer in and out of a wheelchair, and provision of assistive devices, rather than exercising the paralysed limbs. However this paradigm of rehabilitation is now being challenged by evidence from different sources. Inactivity following SCI may further exacerbate the neurological impairment caused by paralysis *per se* due to a decline of neural circuits with non-use. Moreover a significant proportion of patients with clinically complete lesions may retain some physiological continuity across the injury site (discomplete). **Material and Methods:** The SCIPA (Spinal Cord Injury and Physical Activity) program of research comprises four projects investigating novel rehabilitation strategies for people with spinal cord injuries. Three projects are multi-centre randomised controlled clinical trials involving all spinal units in Australia and New Zealand. They examine the effectiveness of task-specific training for the arm and hand, an intensive activity-based therapy program for the whole body including the paralysed limbs, and very early exercise for the lower limbs. In the fourth project involves the development and evaluation of an on-line educational program to improve the knowledge and confidence of fitness instructors in the community regarding exercise for people with spinal cord injury. **Results:** Recruitment for all studies has now been completed. The focus of the projects is on promoting neurological recovery, maintaining health and wellness, and optimising independence. The program will be evaluated using a comprehensive suite of outcome measures to examine the effects on multiple systems (neurological, musculoskeletal, cardiovascular), as well as quality of life, and measures of community participation. Economic analyses will be conducted to evaluate cost-effectiveness. **Conclusion:** Activity-based therapies, directed at neuromuscular activation below the level of the lesion, might allow surviving axons to contribute to functional recovery and are also likely to minimise the secondary complications associated with SCI and to promote better health and well-being.

TA135

Age-Related Variation in Mobility Independence among Wheelchair Users with Spinal Cord Injury*T. Hinrichs¹, V. Lay¹, U. Arnet¹, I. Eriks-Hoogland¹, H. G. Koch², T. Rantanen³, J. D. Reinhardt⁴, M. Brinkhof¹¹Swiss Paraplegic Research, ²Swiss Paraplegics Association, Notwil, CH, ³University of Jyväskylä, Jyväskylä, FI, ⁴Sichuan University and Hongkong Polytechnic University, Chengdu, CN

Introduction: For people with spinal cord injury (SCI), mobility independence is of great relevance for self-management and community integration. The attainment and maintenance of optimal levels of mobility independence with increasing age is a major issue, both with regards to quality of life of individuals aging with SCI as well as the burden on health care services and caregivers. The aim of this study was to evaluate age-related variation in mobility independence among community-living wheelchair users with SCI. **Material and Methods:** Individuals aged 16 years or older with traumatic or non-traumatic SCI permanently residing in Switzerland were included in a Community Survey (2011-2013) as part of the Swiss Spinal Cord Injury (SwiSCI) Cohort Study. Present analyses refer to participants who indicated using a wheelchair for moving around moderate distances (10-100 m). The Spinal Cord Independence Measure-Self Report (SCIM-SR) was used

to assess functional independence. The individual mobility-related items of the SCIM-SR were analyzed descriptively, stratified by age groups. To further evaluate the association between mobility independence and age, SCIM-SR items were matched to the three principal domains 'changing basic body position', 'transferring oneself' and 'moving around'; binary outcomes ('independence' vs. 'no independence') were created for every domain and analyzed using multivariable logistic regression (adjusted for sex, socioeconomic factors, SCI characteristics, and health conditions). **Results:** Descriptive analyses (N=949; 27% women; median age 51) revealed that for various mobility tasks age-related differences in independence were already apparent among younger and middle-aged subjects. Regression analyses showed a decline in the odds of independence with increasing age for all principal domains. Further factors associated with mobility independence included sex and SCI characteristics, revealing higher odds in males than in females for 'transferring oneself' and 'moving around', and higher odds following paraplegia as compared to tetraplegia for all domains. **Conclusions:** Mobility independence was negatively associated with age in wheelchair users with SCI. Future longitudinal analyses are required to gain further insights into the causal factors for the age-related decline.

TA136

Return to Work: Using Evidence-Based Practice Supported Employment with Spinal Cord Injury*L. Ottomanelli¹, *L. Goetz²¹Department of Veterans Affairs, Tampa, FL, ²Richmond Veterans Affairs Medical Center, Richmond, VA, US

Introduction: Meaningful employment is recognized as a hallmark of successful rehabilitation. However, employment rates for persons with physical disabilities, including spinal cord injury (SCI), are much lower than those for the general population. Supported Employment (SE), specifically Individual Placement and Support, is an evidence-based approach that integrates vocational services into clinical care to help persons with significant disabilities obtain competitive employment in the community based on their employment preferences. Multiple randomized controlled trials demonstrate effectiveness of in persons with mental illness, but the model was not previously been tested in a population of persons with physical disabilities. Here we report our experience leading two large 5-year multi-center clinical trials of SE in US Veterans with SCI. **Methods:** In the first randomized controlled trial, we followed 201 individuals with SCI who received 12 months of either SE, where vocational services were integrated with medical rehabilitation care or treatment as usual (TAU), where referrals were made to conventional vocational rehabilitation programs. **Results:** The rate of competitive employment rate was 2.5 times higher with SE than with (TAU) at interventional sites and 11.4 times higher than at observation-only sites. Employed study participants had significantly greater social participation, community mobility, and role productivity. Currently, we are completing a mixed methods study which follows a cohort of 280 individuals with SCI receiving SE for 24 months to investigate best practices for SE service delivery and cost utilization. While the trial continues through April 2015, the employment rate has already exceeded that seen in the previous study and is associated with improved quality of life. Participants indicate improvements in social inclusion and earning ability. **Conclusion:** Collectively, this research indicates that integrating vocational and medical rehabilitation care leads to improved employment and quality of life outcomes. The model is "disability neutral" and has been applied with individuals with multiple medical co-morbidities including physical, mental (e.g., depression, substance abuse), and cognitive impairments (e.g. TBI). Integrating evidence based practice employment services into medical rehabilitation provides an organizing framework to focus the team's rehabilitation efforts toward outcomes that improve community reintegration and quality of life for persons with a variety of acute or chronic disabilities.

TA137

Prevalence of Re-Hospitalizations among Persons with Spinal Cord Injury (SCI)

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Introduction/Background: Numerous studies have focused on the health conditions resulting in the re-hospitalizations of community living people with spinal cord injury (SCI), finding that common precipitating factors are spasticity, pressure ulcers, urinary tract infections and pain. Yet less attention has been paid to the personal and functional attributes that are associated with hospitalizations, particularly among those who have been living with SCI for an extended period. This study focused on collecting data of factors associated with health, comorbidities and secondary conditions among those aging with SCI. *Materials and Methods:* Longitudinal data was collected through interviews on participants with at least five years post traumatic SCI living in the community. Data was collected about demographics; health status, using both the Charlson Comorbidity Index (CCI) and the SCI Secondary Conditions Scale (SCISCS); participation, using the CHART-SF, function, using the motor component of the Functional Independence Measure (MFIM); stress using the Perceived Stress Scale (PSS) and quality of life, using the International SCI QOL Basic Dataset (ISCIQOL). Of the 100 participants in the first round of data collection, 76 also completed a second round, one year later. A logistic regression model was specified to explain factors associated with the prevalence of hospitalizations during the second year. *Results:* Participants were 80% male, 52% had Tetraplegia and 20% were hospitalized during the past year. The mean age and years since injury were 52.8 and 19.0 years. Scores on the CCI and SCISCS did not differ significantly as a function of hospitalization. The model was highly explanatory (Chi-Square=43.04; $p < 0.0005$; Nagelkerke $R^2 = 0.69$). Of the five variables included, four were independently significant predictors: prevalence of emergency room visits and scores on the MFIM, PSS, and the ISCIQOL perceived physical health item. *Conclusions:* Contrary to expectations, the prevalence of hospitalizations was not associated with comorbidities or secondary conditions. Controlling for emergency room visits, they were explained by functional status, stress and perceived health, indicating that these factors may help to explain some health outcomes, possibly including health care costs.

A.3.5 NEURODEGENERATIVE DISEASES

TA138

Botulinum Toxin Injection in Foot Dystonia Experienced by the Parkinson's Disease Patients with Deep Brain Stimulation

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Introduction: Parkinson's disease (PD) patients with deep brain stimulation (DBS) can experience intractable foot dystonia as a late effect. The patient experiences pain, difficulty in walking and poor quality of life. This problem is not well reported in the literature. This study characterizes the different foot dystonia experienced by the PD patients with DBS. This is followed by the use of botulinum toxin injection into the dystonic foot muscles and improvement of the symptoms and functional outcome. *Methods:* This is a pilot study on six PD patients with DBS who were treated with injection of botulinum toxin in to their dystonic foot muscles. Pre and post injection evaluation included identification of different types of foot dystonia and the muscles involved. The outcome measures were pain - recorded with Visual Analogue Scale (0-10), dystonia was recorded with Fahn-Marsden Dystonia rating scale, Unified Parkinson Disease Rating Scale -motor subset and Quality of life measures. Functional parameters recorded were

Timed Up and Go Test (TUG), 6 minute walk test (6MWT) and temperospatial gait and footfall parameters measured in a gait mat (gait rite). *Results:* Five out of the six patients showed significant improvement with their pain (more than 3 in VAS) and dystonia (more than 2 on dystonia scale). There was improvement in functional outcome measures such as TUG, 6MWT, Gait and footfall parameters and in the overall quality of life. *Conclusion:* This pilot study showed the Botulinum toxin is useful in Parkinson disease patients with DBS experiencing disabling foot dystonia. A double blind randomized control study is underway to further evaluate the efficacy of the toxin in a larger group of patients.

TA139

Effectiveness of Telerehabilitation Interventions in Persons with Multiple Sclerosis: a Systematic Review*F. Khan¹, B. Amatya¹, J. Kesselring², M. P. Galea³¹Royal Melbourne Hospital, Parkville, AU, ²Rehabilitation Center, Valens, CH, ³University of Melbourne, Parkville, AU

Background: Telerehabilitation, a service delivery model using telecommunications technology to provide therapy at a distance, can facilitate multifaceted, multidisciplinary management of patients beyond the clinical settings. Many telerehabilitation interventions are used in persons with multiple sclerosis (pwMS), as their care needs are complex due to cumulative disabilities, requiring long-term management. However, evidence for the effectiveness of these interventions is yet to be determined. The aim of this systematic review is to investigate the effectiveness of telerehabilitation intervention in pwMS. *Methods:* A comprehensive literature search was conducted using medical and health science electronic databases (PubMed, Medline, EMBASE, CINAHL, AMED, PsycINFO Cochrane Library) up to September 2014 for studies reporting outcomes following telerehabilitation that addressed functional restoration, improved impairments and participation. In addition, a grey literature search was conducted using different internet search engines and websites. Three reviewers applied inclusion criteria for potential studies and independently assessed the methodological quality using Grades of Recommendation, Assessment, Development and Evaluation (GRADE) methodological quality tool. A meta-analysis was not possible due to heterogeneity amongst included trials, therefore a qualitative analysis was performed for best evidence synthesis. *Results:* Ten RCTs and 2 observational studies (n=564 participants) investigated a wide variety of telerehabilitation interventions in pwMS. These included: physical activity; educational, behavioural and symptom management programs. All studies scored 'low' on the methodological quality assessment implying high risk of bias. Overall, this review found 'low' level evidence for effect of telerehabilitation on reducing short-term disability and reducing and/or improving symptoms, such as fatigue. There was low level evidence suggesting some benefit of telerehabilitation in improving functional activities, improving symptoms in the longer-term; and psychological outcomes and quality of life. There is limited data on safety, process evaluation and no data on cost-effectiveness of telerehabilitation. *Conclusion:* A wide range of telerehabilitation is used in persons with MS, however, the quality of evidence on these interventions was low. More methodologically robust trials are needed to build evidence and cost-effectiveness of these interventions.

TA140

Residual Disability in Guillain-Barré Syndrome Following Inpatient Rehabilitation*F. Anwar¹, A. Al Khayer², K. Asafu Adajay¹, R. Makhdoom¹¹Addenbrooke's Hospital, Cambridge, GB, ²Al Ahli Hospital, Doha, QA

Introduction: Guillain-Barré syndrome (GBS) is an acute inflammatory demyelinating polyneuropathy (AIDP), an autoimmune

disorder affecting the peripheral nervous system, usually triggered by an acute infectious process. It affects motor sensory and autonomic nerve fibers and is one of the most frequent causes of acute neuromuscular paralysis leading to respiratory failure. There is still some uncertainty concerning GBS outcome in literature. Most outcome studies have analyzed functional outcomes between 6 months and 2 years. This could give a very pessimistic look on long-term recovery as recovery continues even after years following GBS. **Objectives:** In this study we looked at the long-term rehabilitation outcome and residual disability following Guillain-Barré syndrome in patients who underwent rehabilitation at our unit. **Material and Methods:** Patients admitted to our rehabilitation department with a confirmed diagnosis of GBS from March 1995 to December 2005 were included in the study. **Inclusion criteria:** 1) Rapid development of muscle paralysis 2) Areflexia 3) Absence of fever, and a likely inciting event 4) Albumino-cytological dissociation on CSF analysis **Exclusion criteria:** 1) Marked persistent asymmetrical weakness 2) Poliomyelitis 3) Diabetic neuropathy 4) Alcohol related peripheral neuropathy 5) A sharp sensory level 6) Exposure to drugs and metals causing neuropathy. **Results:** A total of 30 patients were identified and met the inclusion criteria. The male to female ratio was 1:1 and a mean age of 59 years. Minimum follow up was 5 years and a maximum of 16 years with a mean follow up of 9 years. 87% of patients had residual sensory symptoms and 77% of patients had residual motor symptoms. Pain was a major symptom in 70% and spasms in 30% patients. Median Functional Independence Measure (FIM) on admission was 73.5, on discharge 118 and on review 122.5. **Conclusion:** There was high incidence of residual sensory and motor symptoms after GBS in our study. In addition pain (mainly neuropathic) was the major symptom attributable to their GBS. The study also showed that although the residual sensory and motor symptoms are common following GBS but the FIM actually improved in majority of patients even after their discharge from the rehabilitation unit.

TA141

Aerobic Exercise Training in Post-Polio Syndrome: Process Evaluation of the FACTS-2-PPS Trial

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Introduction: A recent study¹ failed to show improvements in cardiorespiratory fitness through a home-based exercise program aimed at improving the aerobic capacity through lower extremity exercise in post-polio syndrome (PPS). We performed a process evaluation to explore reasons for the lack of efficacy by quantifying actual training dose and evaluating the effect of the program on muscle function. **Materials and Methods:** Forty-four individuals with PPS were randomized to exercise therapy (n=22) or usual care (n=22). Participants exercised three times weekly for 4 months on a bicycle ergometer (>60% heart rate reserve). We determined the training time spent within the designated target heart rate range, as well as the time at or above the anaerobic threshold (AT). For muscle function, we measured muscle endurance. **Results:** The attendance rate was high (median 89%), but none of the participants trained within the target heart rate range for more than 75% of the designated time. Instead, participants exercised at lower intensities which were around the AT most of the time. We found no improvement in aerobic capacity: muscle endurance (1.6%, 95% CI -10.6 to 13.7) nor cardiorespiratory fitness (submaximal heart rate, -0.3 beats per minute, -7.8 to 7.2) increased in the exercise group, compared to usual care. **Conclusion:** Individuals with PPS were unable to adhere to a high intensity aerobic training program on a bicycle ergometer. Despite exercise intensities around the AT most of the training period, aerobic capacity did not improve. The lack of efficacy on muscle function does not support the assumption of deconditioning of lower extremity muscles in PPS. **Reference:** Koopman FS, Voorn EL, Beelen A et al. RCT on exercise therapy and cognitive behavioral therapy to reduce fatigue in post-polio syndrome. Submitted.

TA142

Distinct Characteristics of Sensor-Based Gait Analysis Linked to Postural Instability in Parkinson's Disease

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Background: Distinct gait symptoms and impaired postural control are major motor symptoms in Parkinson's disease (PD) leading to an increased risk of falls and reduced quality of life. The "pull test" item of the UPDRS (Unified-Parkinson-Disease-Rating-Scale) motor score is routinely used by movement disorder specialists to assess postural instability. It subjectively classifies postural control into five grades. Grade 1 ("recovers unaided") and 2 ("would fall if not caught") only correspond to clinically relevant postural instability and gait impairment during unassisted walking. Thus, the goal of the study was *i)* to provide objective, quantitative, and rater independent measures on postural instability in PD patients, and *ii)* define gait characteristics reflecting postural instability assessed by inertial sensor-based gait analysis (eGaIT – embedded gait analysis using intelligent technology). **Material and Methods:** The clinical pull test (gold standard) was performed by movement disorder specialists on 191 PD patients (Hoehn & Yahr stage I-III, mean age 63.7±10.6 a) and 101 healthy age-matched controls (mean age 61.2±10.6 a). Spatio-temporal gait parameters were analyzed from inertial sensors (gyroscopes and accelerometers) laterally attached to both shoes while the patients performed specific walking tests (single task = normal walking in self-chosen gait speed, dual tasks = e.g. counting backwards in steps of three while walking). **Results:** *i)* Gait parameters such as normalized stride length, cadence, gait speed, and toe clearance significantly decreased with increasing pull test impairment. Additionally, relative stance time significantly increased with pull test impairment. *ii)* Gait speed, stride length, stride time, foot clearance, and heel strike angle significantly differed between PD patients and controls, correlated to disease stages and motor symptoms, and were affected by dual task during gait tests in posturally unstable patients. **Conclusion:** Similar to the clinically performed pull test, quantitative gait parameters recorded by inertial sensors reflect postural impairment in PD. These gait changes worsened under dual task conditions. Thus, sensor-based gait analysis during defined clinical gait tests support clinicians in the assessment of postural stability. Furthermore, it may serve as objective measure to evaluate physical therapy interventions, rehabilitation programs, and long-term monitoring e.g. in the home environment.

A.4 INTERNAL MEDICINE AND OTHER CONDITIONS – MISCELLANEOUS

TA143

Implementation of Early Mobilization and Rehabilitation in the Intensive Care Unit; a Quality Improvement Project

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Background: Intensive Care Unit (ICU) survivors commonly experience neuromuscular weakness that may be severe and prolonged.¹ Bed rest and inactivity play an important role in the development of neuromuscular weakness, which is associated with impairment in ICU survivors' physical function, quality of life, and return to work. Mobilizing and early rehabilita-

tion (Mob&Rehab) of mechanically ventilated ICU patients has been demonstrated as feasible, safe, and beneficial in improving physical function. However, early mobilization and rehabilitation is not practiced on a widespread basis in ICUs. 2. **Objective:** To implement early Mob&Rehab as a multidisciplinary approach, and to increase the frequency of mobilization and rehabilitation of critically ill ventilated patients in the ICU. **Methods:** A multidisciplinary Plan-Do-Act approach to develop, execute and evaluate early Mob&Rehab in critically ill mechanically ventilated patients in a 34-bed mixed ICU in an academic hospital. A multidisciplinary project group identified facilitating factors and barriers for early Mob&Rehab. Subsequently, an evidence based set of safety criteria for early Mob&Rehab was developed, the medical data registration system was adapted, the responsibility for the execution of different tasks was discussed and assigned and education for all ICU team members was provided. With this, a cultural change and engagement towards 'mobilization and rehabilitation as early as possible' was aimed at. A before and after measurement was performed to compare the first time that ICU patients were mobilized or received rehabilitation treatment and the frequency that patients were being mobilized. **Results:** After the quality improvement project, the first time of mobilization was advanced with 1.5 day (7.0 days vs 6.5 days) and the first moment of rehabilitation was advanced with 1.7 day (4.6 days vs 2.9 days). The frequency of patients that were being mobilized in the ICU was increased with 48% (41% vs 79%). **Conclusions:** Using a structured and multidisciplinary approach we increased early mobilization and rehabilitation activities for mechanically ventilated patients. **References:** 1) Schaaf van der, M., et al. "Functional status after ICU: a challenge for rehabilitation professionals." *J.Rehabil.Med.* 2009: 360-66. 2) Needham DM, et al. Improving long-term outcomes after ICU. *Crit CareMed* 2012; 502-509.

TA144

Impact of Intensive Care Unit – Acquired Weakness on Functional Outcome in Survivors after Critical Illness

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Background: Surviving critical illness is often accompanied with undesirable and long-lasting functional disabilities. Intensive Care Unit-acquired weakness (ICU-AW) is a frequent complication of critical illness and is thought to mediate physical impairments in ICU-survivors [1]. However, evidence supporting this hypothesis is limited. The purpose of this study was to investigate differences in physical functioning and post-ICU mortality between patients with and without ICU-AW at 6 months after ICU discharge. **Materials and Methods:** ICU patients, mechanically ventilated for ≥ 2 days, were included in a single centre prospective observational study. Patients with neurological conditions or pre-existing poor functional status were excluded. ICU-AW was diagnosed when the Medical Research Council (MRC) sum score was < 48 in awake and attentive patients [3]. Six months after final ICU discharge, physical functioning was assessed by telephone interview or mail using the physical functioning (PF) domain score of the Short-Form Health Survey (SF-36). Post-ICU mortality was registered during the follow-up period. The independent effect of ICU-AW on physical functioning and on post-ICU mortality was analysed using a multivariable linear regression model and a Cox proportional Hazards model. **Results:** 156 patients were included, of whom 133 survived to ICU discharge (60 with ICU-AW). Six months after ICU discharge physical functioning (PF) domain scores were available for 98 survivors (39 patients with ICU-AW). The median PF score in patients with ICU-AW was 45 (IQR: 30–70) compared to a score of 75 (IQR: 50–90) in patients without ICU-AW. After adjusting for confounders, ICU-AW was associated with a decrease of 16.7 points on the PF domain score (95% CI: -30.1 to -3.3; $p=0.02$). Post-ICU mortality was significantly higher in patients

with ICU-AW compared to patients without ICU-AW (17 vs. 8; HR 3.5 (95% CI: 1.3 to 9.4); $p=0.01$). **Conclusions:** ICU-AW is independently associated with a clinically relevant decrease in physical functioning and with an increase in post-ICU mortality in critically ill patients, 6 months after ICU discharge. Future studies should investigate whether early rehabilitation interventions can prevent ICU-AW and improve physical functioning in ICU survivors. **References:** Kress JP, JB Hall. ICU-Acquired Weakness and Recovery from Critical Illness. *N Engl J Med* 2014; 370: 1626-1635.

TA145

Organ Transplantation Rehabilitation: Effect of Bedside Exercise Device and Activity Reinforcement

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Background: Few studies have reported the exercise benefits of heart or liver transplantation recipients during the hospitalization after transplantation. This prospective, randomized, and assessor-blinded study aims to compare the effect of high feedback versus low feedback about performance on the bedside exercise device in heart or liver transplantation recipients before discharge. **Material and Methods:** Adult patients who received heart or liver transplantation were randomized to either high or low feedback about performance on the bedside exercise device. The exercise device could give feedback about performance of leg cycling via a wireless internet connection and be used in both the intensive care unit and ward environments. The outcome measures included level of independence for walking, walking speed, 6-minute walk test, Short-Form 36 health-related quality of life questionnaire, and cardiopulmonary exercise test. **Results:** Fifty-one patients who have received a heart ($n=18$) or liver ($n=33$) transplantation participated in this study at a median of 8 days after surgery. No adverse events were reported during the median study period of 18 days. There were trends toward greater total energy expenditure and walking speed at discharge in the high feedback group ($n=28$) compared with the low feedback group ($n=23$). No significant between-group difference was detected in outcomes of interest. For patients using bedside exercise device for 25 minutes or more per day ($n=24$), they had significantly better independence for walking, walking speed, 6-min walk distance, health-related quality of life scores in physical functioning and vitality, and cardiorespiratory fitness during cardiopulmonary exercise test compared with patients using bedside exercise device for less than 25 minutes per day ($n=27$). **Conclusions:** In this first trial of bedside exercise device with remote monitoring for inpatient organ transplantation rehabilitation, augmented feedback alone did not improve outcomes of interest. Exercise training using bedside exercise device is feasible and safe in heart or liver transplantation recipients in the early postoperative period. The effect of using bedside exercise device for 25 minutes or more per day during inpatient organ transplantation rehabilitation warrants further investigation. **References:** ClinicalTrials.gov Identifier: NCT01705015.

TA146

Effectiveness of Temporary Positive Expiratory Pressure (T-PEP) at Home and at Hospital in Patients with Severe COPD

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Background: Temporary positive airway pressure (T-PEP) is a tool recently introduced in the treatment of obstructive pulmonary dis-

ases such as chronic obstructive pulmonary disease (COPD) or bronchiectasis. It demonstrated encouraging results also in severe COPD patients. The aim of this study is to verify if adding T-PEP to best bronchodilator therapy both in clinic and home administering could reduce disease exacerbations and improve lung function in patients with severe COPD. *Methods and Results:* 142 patients with severe COPD (FEV1 < 50%) were enrolled; 120 were randomized in three groups: a group treated with T-PEP at home, a group with T-PEP at hospital and a group with medical therapy only (control group). Number of exacerbations after 1 month, 3 months and 6 months was the primary outcome. Secondary outcomes were changes in respiratory function parameters (FVC, FEV1, TLC, RV), arterial blood gases analysis, dyspnea and quality of life scales (Modified Medical Research Council (MMRC), Breathlessness, Cough and Sputum scale (BCSS) and COPD Assessment Test (CAT)). The time of daily use of the T-PEP was registered as well as its acceptance using a Likert scale. *Results:* 99 patients completed the study. Both the groups who used T-PEP showed a statistical reduction in exacerbations after 3 months and 6 months ($p < 0.01$). Some respiratory functional parameters improved in the two groups treated with T-PEP (FVC, FEV1, RV) ($p < 0.02$) and dyspnea and quality of life scales (MMRC, BCSS, CAT) ($p < 0.04$; $p < 0.01$; $p < 0.009$). The time of daily using was similar in the two T-PEP groups. Patients treated at home showed a greater than those treated at hospital (Likert scale 4.7 vs 5.9) ($p < 0.01$). *Conclusions:* Treatment with T-PEP demonstrated efficacy to reduce exacerbations in patients with severe COPD. T-PEP improves functional respiratory parameters and improves dyspnea and quality of life scales. No adherence difference in hospital and home treatment was found. Patients preferred home treatment

TA147

Long Term Outcomes Following Pulmonary Rehabilitation

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Background: Pulmonary rehabilitation (PR) is an accepted non-pharmacological intervention for individuals with Chronic Obstructive Pulmonary Disease (COPD). In spite of optimal pharmacological treatment, many COPD patients experience substantial functional impairment limiting their normal activities of daily living and affect quality of life (QOL). Despite initial improvements following PR, many patients eventually return to baseline function or decline even further. The aim of this study is to look at long term (> 1 yr) outcomes following PR. *Methods:* This was a prospective cohort study of patients who had completed PR at the Royal Melbourne Hospital, Victoria, Australia. Patients who have completed PR between 2003 and 2012 were invited for an assessment. The long term assessment consisted of participant interviews and clinical assessments, including demographic, functional and Quality of Life (QoL) assessments using standardised instruments. *Results:* A total of 217 patients commenced pulmonary rehabilitation between 2003 and 2012. 129 patients actually completed rehabilitation and were eligible. 88 patients were included in the analysis. The mean time was 22 months following PR (standard deviation 16 months). The mean age was 71 years. Mean FEV1 was 46%. 94% were either a past or present smoker. 26% of patients were on Long Term Oxygen Therapy. There was a statistically significant ($p < 0.001$) increase in the Incremental Shuttle Walk Test (ISWT) distance of 29.0 m following rehabilitation but this gain was lost at the long term reassessment. Chronic Respiratory Questionnaire (CRQ) scores showed a statistically significant ($p < 0.001$) increase in all four domains but only the domains of dyspnoea and fatigue remained statistically significant ($p < 0.001$ and $p < 0.01$ respectively) at the long term reassessment. Both the anxiety and depression component of the HADS scores reduced following rehabilitation but only the anxiety component was statistically significant ($p < 0.01$). Some of these improvements persisted at the long term reassessment but was not stati-

cally significant. *Conclusion:* This study confirms that many of the functional gains achieved in pulmonary rehabilitation are lost in the longer term. To maintain these gains many patients may require another “burst” of pulmonary rehabilitation. Further studies are required to determine which factors affect the longevity of gains following pulmonary rehabilitation.

A.4.1 HEART, CARDIOVASCULAR AND LYMPH DISEASES

TA148

The Association of Pre-Operative Physical Performances with Outcome after Coronary Artery Bypass Graft Surgery

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Introduction: To determine whether physical performances were associated with postoperative in-hospital rate of complications, assist ventilation, length of stay in ICU and hospital in patients after coronary artery bypass graft surgery (CABG). *Methods:* Our study population comprised 50 subjects (mean \pm SD age: 63.0 \pm 7.3 years; 63.3% men) who undergoing CABG. All patients were told to some simple performance-based physical assessments, including muscle strength (grip), balance (functional reach test), mobility (TUGT and 4-meter walk tests) and cardiopulmonary function (6-minute walk test, 6MWT) before surgery. *Results:* In multivariate analysis, after adjust gender, age, the severity of coronary heart disease, history of other diseases, daily living activity (IPAQ), smoke status, drinking status, psychological conditions and surgery situations, we found that adequate balance (functional reach test OR 12.47, 95% CI 1.36–14.00) and cardiopulmonary function (6MWT OR 10.32, 95% CI 1.14–22.88) were independently associated with shorter length of postoperative assist ventilation. Moreover, adequate muscle strength (grip OR 5.81, 95% CI 1.96–23.60) and mobility (TUGT OR 6.58, 95% CI 1.76–20.61) were independently associated with shorter length of stay in ICU. And adequate muscle strength (grip OR 11.08, 95% CI 1.39–18.69), balance (functional reach test OR 9.43, 95% CI 1.04–25.95) and mobility (4-meter walk tests OR 9.53, 95% CI 1.37–16.38) were also independently associated with shorter length of hospital stay after CABG. However, we didn't find these performance-based physical assessments were independently associated with postoperative in-hospital rate of complications after CABG. *Conclusion:* We conclude that pre-operative performance-based physical assessments may contribute to the prediction of outcomes.

TA149

Psychosomatic and Cognitive Aspects of In-Hospital Cardiac Rehabilitation in Post-Bypass Surgery Patients

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Background: Cognitive dysfunction (CD) and affective disorders are common among coronary artery disease (CAD) and post-coronary artery bypass grafting (CABG) patients, but hypothesis that they are associated with functional limitations and may modify cardiac rehabilitation (CR) is controversial. The study goal was to assess cognitive, psychic and somatic condition in post-CABG subjects. *Material:* 65 randomly selected stable patients after CABG (72% men, age, 61 \pm 1, number of grafts from 1 to

4 (mean 2), time on cardiopulmonary bypass 82 ± 8.8 minutes, left ventricular ejection fraction $54 \pm 2.8\%$). Subjects undergoing off-pump bypass surgery were excluded. After stabilization of standard medical therapy within 9 ± 2 days after on-pump CABG patients were involved into in-hospital CR. Physical training programme comprised of session of 25 minutes supervised moderate aerobic exercises for extremities and moderate 6-20 minutes unsupervised walking 5-6 days/week. *Methods:* To assess physical performance, cognitive and mental condition at baseline and pre-discharge 6-minute walk (6MW), Mini-Mental State Examination, Montreal Cognitive Assessment (MoCA), Hamilton Depression (HDRS) and Anxiety (HARS) Rating Scales, Spielberger's Anxiety questionnaire (SAQ), Fatigue Assessment Scale (FAS-10) were used. *Results:* The baseline 6MW tolerance was rather low (358 ± 6.9 m) and was associated with cardiopulmonary bypass duration ($r = -0.49$, $p < 0.05$), personal ($r = -0.48$, $p < 0.05$) and situational anxiety ($r = -0.53$, $p < 0.02$, SAQ). At baseline patients demonstrated mild cognitive impairment, high-level fatigue, moderate personal and situational anxiety (SAQ). According to HDRS 28% subjects experienced mild depressive episode, co-morbidity of anxiety and depression was registered ($r = 0.96$, $p < 0.01$). All patients completed in-hospital physical rehabilitation programme safely and practiced 6 ± 1 training sessions. Short-term CR improved 6MW distance (397 ± 6.3 m; $p < 0.01$), despite the absence of specific intervention patients demonstrated positive changes in emotional state (HDRS and HARS, $p < 0.03$) at discharge. No benefits in fatigue (36.2 ± 1.4) and situational anxiety (37.7 ± 1.6 , SAQ) were registered, fatigue at discharge was associated with cardiopulmonary bypass duration ($r = 0.75$, $p < 0.02$). Co-morbidity of anxiety and depression ($r = 0.91$, $p < 0.01$) persisted. The standard in-hospital CR did not modify CD (26 ± 0.5 MoCA, $p > 0.05$) that may impede subsequent CR measures. *Conclusions:* Early in-hospital post-operative CR in on-pump CABG patients is beneficial not only in physical performance, but in mental state outcome. Additional specific intervention is reasonable to improve cognitive function in post-CABG subjects.

TA150

Frailty and Exercise Capacity as Meaningful Parameters for Postinterventional Care in Patients with Transcatheter Aortic Valve Implantation

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Background: For a decade, transcatheter aortic valve implantation (TAVI) has become a promising treatment modality for patients with aortic stenosis and high surgical risk. Until now, there are no sufficient data about postinterventional treatment pathways. Therefore, we aimed to evaluate predictors for referring patients to cardiac or geriatric rehabilitation (CR/GR). Additionally, the effect of the intervention and of CR on exercise capacity is investigated. *Methods:* Since 10/2013, patients with an elective TAVI are consecutively enrolled in the prospective multicentre TAVI registry. Postinterventionally, further pathways of patients are recorded. We documented sociodemographic, laboratory and echocardiographic parameters and comorbidities. Functional testing (6-Minute-Walk-Test [6MWT], exercise stress test and Frailty-Index including ADL, IADL, MMSE, MNA, TUG, and a subjective pre-clinical mobility disability) were performed preinterventionally. In addition, CR participants are tested at admission to and discharge from CR. *Results:* Up to 08/2014, 171 patients (80.7 ± 4.9 years, 52% male) with EF $52.5 \pm 11.7\%$ and NYHA III/IV 164 (95.9%) were enrolled. A pathologic Frailty-Index (≥ 3 points) emerged in 84 (49.1%) patients. After TAVI, 94 (55%) patients were referred to CR and 28 (16.4%) to GR. 25 (14.6%) patients were discharged home and 24 (14%) were either transferred into hospital, died or

couldn't be figured out. CR, GR and home group differ in pre-interventional frailty (Frailty-Index ≥ 3 in $75/38.3/44\%$, $p = 0.005$) and 6MWT ($113.5/203.1/171.3$ m, $p < 0.005$). CR patients have a significant increase in 6MWT at admission of CR compared to preinterventional measurement ($\Delta 43.4 \pm 91.2$ m (95% CI 20.6-66.2); $p < 0.001$) and during CR ($\Delta 56.2 \pm 74.4$ m (95% CI 38.2-74.2); $p < 0.001$). Exercise capacity is significantly improved by 0.15 ± 0.23 watts/body weight (95% CI 0.08-0.21; $p < 0.001$) during CR. *Conclusion:* The preliminary results of the TAVI registry provide information about treatment pathways of patients after TAVI. More than two thirds of the patients are referred to rehabilitation for preventing nursing care. In this context, 6MWT and Frailty-Index seem to be meaningful assessments for targeted assignment to aftercare. Furthermore, a benefit in exercise capacity for CR patients results in independence of long-term care.

TA151

Life after Cardiac Arrest; a Very Long Term Follow Up

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Aim: To describe survival and causes of death after cardiac arrest (CA) and the life situation of very long term survivors. *Methods:* Individuals with successful resuscitation treated at the Sahlgrenska university hospital during 1995-1999 and included in prior CA studies were assessed. Survival time and causes of death data were extracted from records of those individuals who had died. Very long term survivors were offered a follow up visit at home. Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA) was used to describe cognitive abilities and EQ-5D to assess quality of life. The life situation was also explored. *Results:* 14 out of 104 possible participants had survived to follow up. The median time to follow up among the 8 who agreed to participate was 17 years. Out of the 8 participants, 4 failed to reach the cut off score of normal cognitive abilities in the MMSE and 7/8 participants did not reach the cut off score for normal cognitive function in the MoCA. Overall the participants were content with their life situation and quality of life. However, there was a tendency with those with lower cognitive performance reporting lower quality of life. *Conclusions:* A CA may lead to permanent cognitive impairments and the risk of dementia may be higher because of the injuries sustained during the collapse. However, further studies with more participants are needed to fully determine the risk of cognitive impairment after a CA. Regarding life situation, there was a tendency of lower quality of life with lower scores on the cognitive testing. This may indicate a need for further strategies on how to minimize brain damage due to CA as well as a need for follow up to increase quality of life.

TA152

The Effect of Self-Efficacy in an Online Planning Intervention to Increase Fruit and Vegetable Consumption and Physical Activity in Cardiac Rehabilitation Aftercare

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Introduction/Background: Daily fruit and vegetable consumption (FVC) and regular physical activity (PA) are well known for its potential to reduce cardiovascular risk. However, it is difficult for many people to adopt and maintain the recommended behaviors according to national behavior guidelines. Computer tailored (CT) interventions have been shown to be effective in increasing FVC and PA. Little is known about the effectiveness of CT interventions among cardiac patients undergoing rehabilitation and transfer into daily life. *Material and Methods:* The present study is a longitudinal RCT with one intervention group (IG) and one waiting

control group (WLC). The Health Action Process Approach was used as a theoretical framework for the 8-week online intervention. Weekly sessions targeted FVC and PA via the use of behavior change methods such as providing information about risk and benefit of behavior change, increasing self-efficacy, mobilization of social support, barrier identification and planning. The IG also received weekly individualized feedback on behavior performance. Participants' personal characteristics, PA, FVC, and social cognitive variables were investigated via online self-report. At baseline N=996 study participants (58.1% male, mean age: 50.83 years) were recruited in cardiac rehabilitation facilities and heart exercise groups in Germany and the Netherlands. Follow-up measurement T2 was assessed after the 8 weeks intervention period (n=209). Besides ANOVAs with repeated measures, mediation analyses by regression methods were performed. *Results:* Participants reported increased FVC from 2.85 portions a day at baseline to 4.96 at T2 and increased PA levels from 495.63 minutes/week at baseline to 729.10 at T2. The intervention effect on behavior was mediated by self-efficacy. This was true for PA (b=53.08, CI: 4.12, 125.46) and FVC (b=0.18, CI: 0.03, 0.46) when controlling for age, gender and baseline behavior, respectively. *Conclusion:* The present findings highlight the importance of CT interventions use for FVC and PA change in the context of rehabilitation aftercare. Future research designing might want to include extra self-efficacy modules (e.g. self-efficacy boosting exercises) to ensure successful transfer of rehabilitation recommendations into daily life.

TA153

Association between Vitamin D Deficiency and Impaired Physical Fitness in Cardiac Rehabilitation

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Objective: Studying in heart diseases, the link between the concentration of 25-hydroxyvitamin D and physical performance and gain in physical performance after exercise training in cardiovascular rehabilitation (CVR) according the vitamin D deficiency. *Materials and Methods:* A dosage of 25-OH-vitamin D was made from a cohort of 131 patients admitted to CVR. Parameters of physical fitness (6 minute walking test, 6MWD), maximal power (Pmax) were collected. The threshold of vitamin D deficiency was 20ng/ml chosen according to the literature. *Results:* Compared to non-deficient, subjects deficient in vitamin D have a lower initial 6MWD and Pmax (6MWD equal to 81±17 vs 89±11% predicted, p<0.05; Pmax 103±45 vs 121±38 W, p<0.05). After CVR, this difference is maintained. The improvement in 6MWD and Pmax were significantly lower in case of deficiency. *Conclusion:* There is an association between the presence of vitamin D deficiency and impaired physical fitness at the entry into CVR, and a smaller gain in physical fitness. This is probably related to the known action of vitamin D on the muscle.

TA154

Effect of Outpatient Cardiac Rehabilitation Program on Knee Extensor Muscle Strength Among Patients with Coronary Heart Disease

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Background: The effects of cardiac rehabilitation on muscle strength in patients with coronary heart disease have not been fully elucidated. This study aims to investigate the effect of outpatient (phase II) cardiac rehabilitation on knee extensor muscle strength. *Material and Methods:* We enrolled 142 consecutive patients who completed a 3-6 months outpatient cardiac rehabilitation program after acute myocardial infarction, percutaneous coronary intervention or coronary artery bypass grafting as cardiac rehabilitation

group. Our exercise-based cardiac rehabilitation program included both aerobic training and resistance training supervised by the physical therapists. Each patient underwent cardiopulmonary exercise test and an isokinetic test (Cybex Norm dynamometer) to measure muscular strength of knee extensors at 0 degree per second at the beginning and end of cardiac rehabilitation. Thirty-one patients who only received home program instruction of cardiac rehabilitation were enrolled as control group and received similar tests at baseline and follow-up. *Results:* A total of 173 patients with coronary heart disease were recruited (age 59.2±10.2 year; male/female 159/14). No significant between-group difference was detected in peak oxygen uptake and peak torque of knee extensors at baseline. The cardiac rehabilitation program had significantly increased peak oxygen uptake (19.4±4.4 to 23.2±4.8 mL/kg/min, p<0.0001) and peak torque of knee extensor (134±39 to 149±42 Nm, p<0.0001) after training. The control group had significantly increased peak oxygen uptake (19.5±3.6 to 21.1±4.1 mL/kg/min, p=0.0051), but no significant difference in peak torque of knee extensor (140±42 to 144±34 Nm, p=0.5094) during follow-up. The peak torque of knee extensor was significantly positive associated with peak oxygen uptake among study subjects (p<0.05); however, there was no significant correlation between the difference of peak oxygen uptake and difference of knee extensor muscle strength at the beginning and end of cardiac rehabilitation. *Conclusions:* These data suggest exercise-based outpatient cardiac rehabilitation may improve knee extensor muscle strength as well as aerobic capacity among patients with coronary heart disease. The improvement of knee strength seems independent of the improvement in aerobic capacity during cardiac rehabilitation.

A.4.4 REHABILITATION OF THE PATIENT WITH CANCER

TA155

Arm and Shoulder Complaints in Sentinel Node Negative Breast Cancer Patients: a Long Term View

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Introduction: The sentinel lymph node biopsy (SLNB) is widely used as a standard procedure in breast cancer patients. SLNB prevents axillary clearance. Therefore we can expect that it results in considerable less arm and shoulder complaints; like limitations in range of motion, loss of strength, lymphedema and numbness. Despite the less invasive character of the SLNB compared to an axillary lymph node dissection, the arm and shoulder morbidity may be underestimated. The majority of studies on the morbidities after SLNB have a 1–3 year follow-up. Long term morbidity after surgery is little described in literature. *Methods:* 126 breast cancer patients who underwent a SLNB in the Breast Clinic of the University Hospital in Antwerp more than 2 years ago were included in this cross-sectional study. Arm and shoulder morbidities were assessed by means of a newly developed questionnaire. Patients were asked to report their morbidities post-surgery retrospectively and whether they still had complaints. *Results:* Many women have reported several complaints post-surgery. The incidence of the self-reported arm and shoulder complaints was 43.5% for pain, 22.4% for numbness, 12.3% for tingling, 7.1% for lymphedema, 14.6% for axillary web syndrome, 43.2% for loss of strength and 53.7% for limitations in range of motion. In the period of 2 to 7 years post-surgery, these complaints were still present in many women treated with the SLNB-procedure. *Conclusion:* Arm and shoulder complaints in sentinel node negative patients are not negligible. Some patients still suffer from these morbidities up to 7 years post-surgery. Long-term health problems related to breast cancer treatment and the quality of life are becoming more important. Therefore information on arm and shoulder complaints in sentinel node negative patients should be used to improve the rehabilitation of these patients. *References:* Verbelen H, Gebruers N,

Eeckhout FM, Verlinden K, Tjalma W: Shoulder and arm morbidity in sentinel node-negative breast cancer patients: a systematic review. *Breast Cancer Res Treat* 2014, 144(1): 21-31.

TA156

Quality of Life Evaluation in Women with Breast Cancer Undergoing BCT with Sentinel Lymph Node Biopsy

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Introduction: Breast cancer is the most common tumor among women in Poland. About 5000 women die every year because of breast cancer. The purpose of research was to determine the influence of BCT with sentinel lymph node biopsy on the change in quality of life in patients undergoing this procedure. **Materials and Methods:** The study involved 50 women (median age – 50.2 years) undergoing BCT with sentinel lymph node biopsy for breast cancer in the Department of Breast Cancer and Reconstructive Surgery, Centre for Oncology, Bydgoszcz, Poland. The assessment was carried out in patients in clinical stages I and II. Standard QLQ-C30 and QLQ-BR23 questionnaires were used. Participants filled in the QLQ-C30 and QLQ-BR23 questionnaires before (Group A) and six weeks after the procedure (Group B). **Results:** Quality of life measured with the use of EORTC QLQ-C30 and EORTC-BR 23 scales was higher in women before the procedure with respect to role functioning and global quality of life assessment ($p < 0.05$). There was an improvement in emotional functioning, feeling sick and unwell, and mental functioning after the procedure ($p < 0.05$). No statistically significant differences were noted in physical functioning, cognitive functioning, social functioning, or sexual functioning before and after the procedure ($p > 0.05$). **Conclusions:** BCT with sentinel lymph node biopsy is beneficial to women undergoing this procedure as it improves mental and emotional functioning.

TA157

Functional Needs of Working Women with Breast Cancer: Examining Participation in Daily Activities by the ICF Framework

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Introduction: Women with Breast Cancer (BC) survive thanks to early diagnosis and medical interventions. However, side effects still accompany their functioning in activities of daily living (ADL), work and social roles in their community. Few studies exist regarding occupational therapy interventions that meet their needs and enhance their participation in ADL. The International Classification of Function – ICF and Occupational Performance models were used to identify personal and environmental factors that affected return to work. **Objectives:** To describe, examine and explain functional needs and participation level of women with breast cancer in ADL and work; to identify barriers and facilitating factors to their participation at work. **Method:** Sixty working women were recruited from oncology clinics, at least three months after surgical intervention, previously healthy. **Tools:** Activity Card Sort (ACS) examined participation in activities; The Canadian Occupational Performance Measure (COPM) assessed self-satisfaction from performance level in five mostly important activities. Pearson correlations examined relations between participation measures and background factors. T-tests examined differences in participation level between past and present. Participation of women was examined by multivariate regression model. **Results:** a decrease in participation occurred during coping with BC, explained by the limitation in range of motion and educational level. Participants emphasized productivity activities as exceedingly im-

portant (work, house-keeping), although they reported a decline in participation in ADL and work. Evidence-based personal and environmental factors limiting/enabling participation will be presented and discussed (i.e.: workplace flexibility and employer/colleagues support). **Conclusions:** The ICF model contributed an integrative understanding of the relationships between level of participation in ADL and characteristics of the disease, personal and environmental factors. The study raises awareness to functional needs of women coping with BC. Combining both theoretical models showed that women have priorities and goals to improve their functioning despite the fears of future, the chronic symptoms and the decline in participation. The presentation will raise the awareness to the functional needs of working women with BC among therapists and employers. Theoretical and practical lessons will be discussed, including the requirement to establish functional interventions to help women's self-management of their daily lives, in coping with BC and its treatment.

TA158

Dysphagia in Head and Neck Cancer Patients: Treatment Options to Improve Functional Outcomes

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Introduction: Worldwide, over 550,000 new cases of head and neck (HN) cancer are diagnosed each year, with highest incidence rates in Western Europe, India, South Africa, and Australia. HN cancer account for 3% to 5% of all cancers within the United States, and affects 55,000 individuals per year; over 280,000 individuals currently live with oral cavity and pharyngeal cancer. Patients often require surgery and radiation, which can lead to anatomical changes in the base of the tongue, epiglottis, hypopharynx, larynx, and upper esophageal sphincter. As a result, dysphagia is the most common and serious consequence of treatment. The purpose of this presentation is to review the expected functional deficits from treatment for HN cancer, and how they can be addressed with a comprehensive rehabilitation program. Specific emphasis will be placed on normal swallow physiology, generalized dysphagia caused by treatment, and benefits of specific postural interventions and prophylactic swallowing exercises. **Materials and Methods:** An extensive literature review was performed regarding the epidemiology, pathophysiology, acute oncological management, treatment induced sequela, and rehabilitation for patients with head and neck cancer. Databases used included pubmed.gov and OVID, as well as individual journal and textbook articles. **Results:** Early-onset dysphagia assessment and intervention to provide swallowing safety recommendations and prophylactic exercises does improve functional outcomes and quality of life. Education and intermittent assessment of dysphagia throughout chemotherapy and radiation treatment is imperative to the HN cancer patient's ability to maintain swallowing function and adequate nutrition, with or without use of a gastrostomy tube. Swallowing maneuvers and exercises increase the safety and adequacy of patient's swallow as well as their quality of life. Prophylactic and pre-treatment swallowing exercises from a multidisciplinary head and neck cancer team can increase maintenance of an oral diet as well as optimize patients' long term swallowing outcomes. **Conclusions:** As treatment protocols improve for individuals suffering from cancer, patients continue to have improved prognoses and survival. However with longer life expectancy, the medical community has expressed concerns about identifying and addressing treatment-induced physical impairments. Evidence basis supports the use of rehabilitation techniques to improve functional outcomes and quality of life, as it relates to swallow.

TA159

Effect of Physical Exercises on the Quality of Life, Fatigue Syndrome and Cytokine Levels in Prostate Cancer Patients during Radiotherapy

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Introduction: Prostate cancer (PCa) patients often report impaired quality of life (QoL) and fatigue during radiotherapy (RT). Immunological functioning might serve as a biological pathway underlying this association physical activity as well as oncological treatment. Exercise may have a positive influence on inflammatory cytokines, such as interleukin-6 (IL-6) and IL-1beta (IL-1β), tumor necrosis factor-alpha (TNF-α). The aim of this study was to examine the association between physical exercises, QoL, fatigue and inflammatory cytokine levels at baseline and after 8 weeks radiotherapy (RT) using a prospective study design. **Material and Methods:** PCa cancer patients (n=54) beginning radiation therapy were randomized to a 8-week exercise program or no exercise arm. QoL were assessed with European Organisation for Research and Treatment Questionnaires (EORTC-C30 and PR23) and fatigue with the Functional Assessment of Chronic Illness Therapy (FACIT-F). IL-6, IL-1β, and TNF-α were measured before and after intervention. Linear regression analysis were run for the EORTC-C30, and PR23, the FACIT-F controlling for age, sex, BMI and cytokine levels. **Results:** Baseline QoL in exercises group was associated with increased levels of TNF-α after 8 weeks RT. In this group was a greater improvement in QoL and fatigue from pre- to post-intervention, and the difference were significant. Additionally, there was association between IL-6 and fatigue, suggesting that regulation of fatigue-mediating cytokines by exercise may mediate improvements in fatigue symptoms components. All significant findings were related a worse QoL (in usual care group) and deterioration over time to increased IL1β and IL-6 levels. **Conclusions:** These findings suggest that immune activation may be one of the pathways underlying the relationship between physical exercises, QoL and fatigue in PCa patients. Physical exercises were improved QoL and fatigue (decreased) in PCa patients undergoing RT. Future studies are warranted to replicate these findings in larger samples.

A.5. REHABILITATION IN CHILDREN: FOCUSING ON CEREBRAL PALSY. WHERE HAVE WE BEEN AND WHERE ARE WE GOING?

TA160

Language and Motor Speech Control in Children with Cerebral Palsy of Different Motor Severities

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Background: Language and motor speech production is often impaired and varied in children with cerebral palsy (CP) of different CP subtypes. We aim to investigate the language and motor speech control in children with CP of different motor severities. **Methods:** Forty-seven children with CP (27 boys and 20 girls), who were able to speak and cooperate with all tests were recruited. Based on the Gross Motor Function Classification System (GMFCS), they were classified into two groups: group A (GMFCS I, n=29) and group B (GMFCS II-IV, n=18) All children received Comprehensive Developmental Inventory for Infants and Toddlers (CDIIT: comprehensive, expressive and global language domains); Peabody Picture Vocabulary Test (PPVT); and the Verbal motor production assessment for children (VMPAC: global motor control, focal oro-motor control, sequence and the average main domains). **Results:** Paired *t*-test showed children with group A had higher score in comprehensive, expressive subtests and the global lan-

guage domain of CDIIT than group B ($p < 0.05$). Group A also had better score of PPVT ($p < 0.01$) and all domains of VMPAC than group B ($p < 0.05$). **Conclusion:** The language function and motor speech control in children with CP were associated with GMFCS levels. The data provided in this study can allow clinicians to plan treatment strategies for these children associated with language and speech problems. **Keyword:** cerebral palsy, language, motor speech control

TA161

Factors Associated with Respiratory Morbidity in Children, and Young Adults with Cerebral Palsy

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Introduction: Although respiratory disease is the most common cause of mortality in individuals with cerebral palsy (CP), little is known about respiratory morbidity and its causes in CP. **Aim:** To describe respiratory symptoms in individuals with CP aged from birth to 26 years and to determine which factors are associated with respiratory morbidity. **Methods:** Cross sectional survey of respiratory symptoms in people with CP aged 0-26 years, using a self or carer completed questionnaire. Questionnaires were received concerning 552 eligible participants aged 0-26 years, (mean 11 years, 1 month [SD=5 years, 11 months]), (57% of those directly solicited), with a GMFCS distribution representative of the Western Australian CP population and representation across the age range. Univariate and multivariate logistic regression were used to determine associations between self/carer-reported respiratory morbidity and respiratory-related hospitalizations and courses of antibiotics for respiratory infections over the previous 12-month period. **Results:** In univariate analysis, factors significantly associated with respiratory hospitalizations were age (inversely), GMFCS, frequency of cough, chestiness and wheeze, respiratory signs at meals, difficulty managing saliva, reflux, seizures, scoliosis and asthma but not household smoking. Multivariate analysis demonstrated that those individuals with the highest motor disability (GMFCS IV and V) were only at risk of respiratory hospitalization if they required modifications to feeding (OR 5.36 [95%CI 2.89-9.96]). Those who took nutrition only by tube had the highest risk (OR 12.63 [95% CI 5.11-31.00]). **Conclusion:** Respiratory hospitalizations are common in children and young people with CP. Feeding incoordination rather than level of motor disability is the most important predictor of respiratory illness in this group.

TA162

Clinical Research on Improving the Brain Microcirculation of Children with Cerebral Palsy by Acupuncture

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Objective: To investigate the therapeutic action and value of acupuncture in Cerebral Palsy rehabilitation. **Methods:** 150 spasm Cerebral Palsy patients from 1.5 to 7 years old are randomly divided into three groups. Acupuncture group (group A): 50 patients are treated with head acupuncture and body acupuncture; Rehabilitation-training group (group B): 50 patients are treated with physical therapy of Bobath and Vojta methods. Acupuncture add rehabilitation-training group (group C): In this group 50 patients are investigated. **Results:** The total effective rate of group A and group C are obvious higher than that in group B. After treatment the DQ value of group A and group C are higher than that in group B ($p < 0.01$). The improve rates of CT brain dysphasia and atrophy in group A and C are significantly higher than that in group

B ($P < 0.05 = 0.01$). The recovery to normal rates of ECT brain blood stream in group A and C are obviously higher than that in group B ($P < 0.01$). The results of TCD after therapy are better than those before therapy in group A [PI: 1.19 ± 0.19 and 1.10 ± 0.16 ; VP: (132.92 ± 17.14) cm/s and (139.63 ± 14.64) cm/s] and group C [PI: 1.18 ± 0.24 and 0.91 ± 0.19 ; VP: (131.84 ± 15.93) cm/s and (139.68 ± 15.66) cm/s] ($P < 0.01$). *Conclusions:* Acupuncture can obviously increase cerebral circulation, improve cerebral cell metabolism, promote partial or complete compensation of cerebral function and the restoration and function of plasticity of cerebral tissue in children with cerebral palsy.

TA163

Muscle Recruitment and Coordination of Constraint Induced Movement Therapy with Electrical Stimulation on Children with Hemiplegic Cerebral Palsy: a Randomized Controlled Trial

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Introduction/Background: The efficacy of constraint-induced movement therapy (CIMT) on muscle recruitment and activation is unclear. The objective of this study was to investigate the efficacy of muscle recruitment and coordination of CIMT, CIMT plus electrical stimulation (CIMT-ES), and occupational therapy (OT) in treating hand dysfunction in children with hemiplegic CP using surface EMG, and based on the above investigation, to analyze the relationship between hand function and surface myoelectric signals. *Material and Methods:* Children with hemiplegic cerebral palsy were randomly assigned to receive CIMT ($n=22$), CIT-ES ($n=23$), or OT ($n=23$). Three groups received a 2-week therapist-based intervention at hospital and a 6-month home-based exercise program following hospital-based intervention at home. CIMT involved intensive functional training of the involved hand during which the uninvolved hand was restrained. Electrical stimulation was applied on wrist extensors of the involved hand. OT involved functional unimanual and bimanual training. All children underwent clinical assessments and surface electromyography (EMG) at baseline, 2 weeks, 3 and 6 months after treatment. The surface myoelectric signals were integrated EMG, root mean square and cocontraction ratio. The clinical measures were grip strength and upper extremity functional test. *Results:* CIMT-ES group showed both a greater rate of improvement in integrated EMG of the involved wrist extensors and cocontraction ratio compared to the other two groups at 3 and 6 months, as well as improving in root mean square of the involved wrist extensors than OT group ($p < 0.05$). Upper extremity functional test scores correlated positively with integrated EMG of involved wrist, as well as correlating between grip strength and integrated EMG of involved wrist extensors ($p < 0.05$). *Conclusion:* CIMT-ES is likely to produce the best outcome in improving muscle recruitment and coordination in children with hemiplegic cerebral palsy.

TA164

Comparative Study of Baclofen in Combination with Intensive Rehabilitation and Only Intensive Rehabilitation in Spastic Cerebral Palsy – a Randomized Clinical Trial

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Introduction: Cerebral palsy is the most common childhood disability with a prevalence of 1.5 to 3 per 1000 live births. Spasticity is one of the common features of cerebral palsy as it contributes to limitations in body structure and function, leading to deformity. The treatment of cerebral palsy is multifactorial. In this study we

find out the combined efficacy of baclofen and intensive rehabilitation in the treatment of spastic cerebral palsy. *Material & methods:* This randomized clinical trial was conducted over 60 patients in Dhaka Medical College Hospital, Dhaka, Bangladesh from January 2011 to December 2011. The patient with cerebral palsy aged between 1 year to 12 years satisfying the inclusion and exclusion criteria was randomly enrolled into two groups; Group- A (case) included 30 patients received only intensive rehabilitation and Group- B (control) included 30 patients who received baclofen orally two times daily according to the body weight regularly in combination with intensive rehabilitation 1 hour daily five times a week for 24 weeks. All patients were followed up at 4 weeks interval and were evaluated for a total of 24 weeks. Assessment was done by Modified Ashworth Scale, Physician Rating Scale and gross Motor Functional Classification System. *Results:* Combination of Baclofen and intensive rehabilitation has superior efficacy in reducing tone in spastic cerebral palsy over only rehabilitation measured by using Modified Ashworth scale ($p < 0.05$). Combination of Baclofen and intensive rehabilitation is also superior in joint angle improvement in spastic cerebral palsy measured by physician rating scale crouch ($p < 0.05$) and foot contact, ($p < 0.05$) and also improvement in gross motor function ($p < 0.05$). *Conclusion:* For reduction of generalized spasticity regarding muscle tone, range of motion of the joint and improvement of gait in cerebral palsy patients, combination of Baclofen and intensive rehabilitation may be used.

TA165

Effect of Gait Robotic Rehabilitation on Kinematics and Ground Reaction Forces in Children with Dystonic Cerebral Palsy

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Introduction/Background: Robotic-assisted treadmill therapy has shown to improve walking performance in children with central gait impairment. In this study, we measured through 3D gait analysis the effects that the Lokomat® system, a driven gait orthosis that automates locomotion therapy in a treadmill, has over the gait parameters of patients with dystonic cerebral palsy. The specific objective for this study consisted on measuring changes in spatial and temporal gait parameters, as well as in ground reaction forces, after engagement in a therapy program using the robotic locomotion system. *Material and Methods:* The study was conducted over a sample of 5 patients (mean age 9.63 ± 2.51 , 3 males and 2 females) diagnosed with mild to moderate dystonic cerebral palsy. Each participant underwent 20 sessions of robotic-assisted treadmill therapy using the Lokomat® system during a mean period of 8.4 ± 1.53 weeks. The first 10 sessions consisted of 30-minute training at 90% body-weight support and 10-minute training at 100% support. The further 10 sessions consisted of 20-minute training with full body-weight support. The mean velocity was kept in 1.5 km/h. We analyzed changes in the kinematics data, the spatial and temporal gait parameters, and the ground reaction forces between the initial and final sessions. *Results:* The analysis on the kinematics data shows improvements for pelvic obliquity and pelvic tilt after gait robotic rehabilitation was applied. Both parameters reduced towards the normal values. The ground reaction forces also show positive changes in the vertical and antero-posterior vectors. These changes are favorably correlated with the increase in the ranges of motion observed for the psoas, the hamstrings, and the gastrocnemius. *Conclusion:* The obtained results suggest that gait robotic rehabilitation has a favorable impact on the ranges of motion in patients with dystonic cerebral palsy. It also seems to improve the functional conditions to develop the gait phases corresponding to the first and second gait rockers.

TA166

Predictors of Health Related Quality of Life in Preschool Children with Cerebral Palsy: a Follow-Up Study*C.-L. Chen¹, C.-C. Tsai², C.-Y. Chen³, A. M. Wong¹, C.-Y. Chung¹, W.-C. Tsai¹, S. F. Tang¹¹Chang Gung Memorial Hospital, Linkou, Taoyuan, ²Chang Gung University, Tao-Yuan, ³Chang Gung Memorial Hospital, Keelung, Keelung, TW

Introduction/Background: Identifying potential predictors for health related quality of life (HRQOL) can allow clinicians early anticipating the HRQOL and detecting who benefit most on HRQOL from therapy. This study aims to identify potential predictors of HRQOL for preschool children with cerebral palsy (CP). **Materials and Methods:** Seventy six children with CP (2–5 years) were enrolled in this cross-sectional study. Eight potential predictors were identified and assessed at baseline: age; sex; gross motor function classification system (GMFCS) level; manual ability classification system (MACS) level; and cognition, language, social and self-care abilities measured by Comprehensive Developmental Inventory for Infants and Toddlers (CDIIT). Six month later, HRQOL outcome was assessed by TNO-AZL Preschool children Quality of Life (TAPQOL), which consists of physical, social, cognitive and emotional domains. The motor functioning is a sub-domain of physical functioning. The total functioning is an average functioning of all domains. **Results:** Regression analyses showed GMFCS levels predicted physical, motor and emotional functioning (adjusted $r^2=0.08-0.12$, $p<0.05$). The social ability was the predictors for social and total functioning (adjusted $r^2=0.09-0.12$, $p<0.01$). The language ability predicted cognitive functioning (adjusted $r^2=0.12$, $p<0.01$). **Conclusion:** The best predictors for TAPQOL are GMFCS levels, social and language abilities in children with CP. Findings suggest that good GMFCS levels, social and language abilities in children with CP may benefit most from HRQOL therapy.

TA167

Project Save a Child's Heart

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Background: The prevalence of congenital heart defects is high in developing countries. Appropriate medical and nursing interventions are necessary to save the lives of these patients. **Procedure:** We review the activity of Save a Child's Heart (SACH), an organization officially recognized by the United Nations, since its foundation in 1995. SACH provides complex logistic support involving a multi-disciplinary team from the Edith Wolfson Medical Center, Israel, including physicians, operating room and ICU nurses, technicians, as well as logistics specialists and volunteers. While operating abroad, the teams leave Israel with all the necessary equipment. It is mainly the responsibility of the operating room nurses to select and maintain the equipment. **Results:** With the aid of SACH, more than 3,000 procedures were performed at Wolfson, on children from 44 countries, including Iran, Iraq, Jordan, the Palestinian Authority, Africa, Asia, Romania, and the former Soviet Union. Additionally, more than 250 physicians, nurses, and technicians from developing countries have been trained through the SACH program. Among many others, 36 children from Romania have been successfully operated on at Wolfson. **Conclusion:** Operating room nurses from Wolfson have a crucial role in the SACH project of improving medical and nursing surgical capabilities in the developing world.

TA168

At What Age Ends Arch Development of Children's Physiological Flat Feet?

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Introduction/Background: Flat feet (FF) are a group of clinical entities with different etiology and anatomy, with the loss or lowered of foot arch. Disagreement in podiatric circles about unique clinical definition of pediatric FF leads to prevalence estimates vary. The high frequency of children with physiological (flexible) FF decreases from birth with age, but still there is dilemma is this process finishes until first 10 yrs of life. The aim of study was to investigate influence of age on the prevalence and severity of pediatric FF and activity, occurrence of symptoms and functional disability. **Material and Methods:** In clinical cross sectional study, 236 children aged 7-12th yrs were examined using visual test FPI-6. Children with FF diagnosis, grouped by gender (two groups) and age (three groups), are systematically clinically examined for correlation of foot deformity and associated deformities, symptoms, injuries, activities, previous treatment, functional disability and joint laxity (Horan-Beighton scale). Statistical analyzes were performed according to the total number of FF (155), using SPSS version 19.0. **Results:** The prevalence of FF was 34.3%, higher in boys 36.8% than in girls 32%. The frequency, the degree of FF deformity (total score FPI-6) and the mean score FPI-6 of drooping arch are significantly reduced by the age of 12 years. However, the architectonics of the forefoot improves spontaneously only until the age of 10 yrs. There is a positive correlation between joint laxity and drooping arch. With the age increases the overall frequency of knee deformity in the frontal plane (valgus and varus knee) from 7-8th yrs 22.6% till 11-12th yrs 43.2%, and also the frequency of varus knee ($p<0.05$). With age were statistically significantly higher frequency and severity of pain in FF ($\chi^2=0.001$, $p<0.01$), and ankle pain ($p<0.05$). **Conclusion:** Unlike most other studies, this research suggests that the period of physiological forming arch of the foot is not completed in the 10th yrs of life, but continues until 12th yrs, which call for further research on the widely population of children until late adolescence, that could affect the therapeutic attitudes for pediatric FF.

TA169

Children in Guided Training: How to Best Measure the General Rehabilitation Effect in Everyday Life?

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Introduction: Attention and visuospatial impairment is frequently accompanying children with partial epilepsy (PE). Few systematically controlled neurocognitive rehabilitation techniques for children exist. Moreover, evaluation of training effectiveness is insufficient. Our aim was to evaluate computer-based attention and visuospatial functions rehabilitation for children. Also, to see if objective outcome is further supported by subjective outcome. **Methods:** 9 children (mean age=10.37 yrs, SD=0.69) with PE received individual supervised attention and visuospatial functions training using FORAMENRehab software (Sarajuuri et al., 2000*), adapted for children by authors. Waiting-list control group consisted of 7 children with PE (mean age=11.22 yrs, SD=1.89). Trainings occurred twice a week during 6-week-period throughout which waiting-list children received no active cognitive training. For objective outcome evaluation children performed baseline tasks before and after intervention period. Subjective outcome was evaluated by parents' and children's ratings. **Results:** Objective effect of rehabilitation was noticeable. At first there were no significant differences between study group and waiting-list group ($p>0.05$). After 6 weeks, the study group showed statistically significant improvements in attention and visuospatial functions ($p<0.05$). In complex attention task they made less mistakes (mean study group=15.78, SD=5.49; mean waiting-list=28.00, SD=7.11), in visuospatial attention task they were quicker in responding to stimuli (mean study group=1.21 (s), SD=0.69; mean waiting-list=2.97 (s), SD=1.68), in visuoconstructive skills task their percentage of correct answers

was higher (mean study group=94.44%, SD=8.82; mean waiting-list=60.00, SD=19.58). Subjective parents' evaluation of training effect showed positive behavioral change: children were less distracted during complicated tasks and as a generalized effect more prone to social communication. Also, skills in reading, writing, mathematics, visuomotor functions improved. Children stated that trainings improved concentration skills and overall level of functioning in school tasks. Besides, children and parents recommended the intervention to others. *Conclusion:* Our multifaceted neurorehabilitation design with FORAMENRehab is effective for children with PE. Intervention effectiveness is best described with objective assessment and well confirmed with subjective evaluations. Hence, these outcome assessment methods should be used together for describing the generalized rehabilitation effect. Intervention combines principles of holistic rehabilitation, modern computer-assisted neurocognitive rehabilitation and individual approach.

TA170

Correlation between Ergonomic Behavior and Musculoskeletal Pain on High School Students

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Introduction/Background: Ergonomics is a concern point in today's world, namely in young population. The objective of this study was to assess ergonomic behavior among high school students and to correlate it with musculoskeletal pain. *Material and Methods:* High school students were invited to participate. The ergonomic assessment was performed using a reliable tool that evaluate sitting on a chair, using a computer, reading a book, lifting a book from the floor and carrying a backpack. Students answered a questionnaire regarding pain, sociodemographic and lifestyle variables. *Results:* Ninety two students participated in the study (51 females, 41 males); average age was 17 years. Fifty six reported musculoskeletal pain (9% sought physician care, 20% took medication and 8% missed school because of pain). In overall students, 78% was considered to have bad ergonomics sitting on a chair, 72% lifting a book, 52% reading a book, 48% using a computer and 26% carrying a backpack. Out of 56 students that complained about pain, 78% was classified as having bad ergonomics in at least one activity. *Conclusion:* Bad ergonomics is a prevalent problem among high school students and it has a significant negative impact on their quality of life. Musculoskeletal pain was more prevalent among those with bad ergonomics. The study highlights the need to implement ergonomics education, in order to improve their school performance, health and quality of life.

TA171

Respiratory Rehabilitation and Ventilatory Support in Children and Adolescents with Neuromuscular Diseases, Advanced Rehabilitation Care Unit. Rehabilitation National Institute Pedro Aguirre Cerda (INRPAC), Santiago, Chile

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Background: Neuromuscular diseases represent a heterogeneous group of disorders of muscle, nerve or neuromuscular junction. The respiratory muscles are rarely spared in neuromuscular diseases even if the type of muscle involvement, severity and time course greatly varies among the different diseases. Diagnosis of respiratory muscle weakness is crucial because of the importance of respiratory morbidity and mortality. Hence, to offer respiratory rehabilitation in this situation becomes a milestone to improve quality of life, and promoting participation. *Objective:* To characterize neuromuscular patients with respiratory support requirements attending in an Advanced Rehabilitation Care Unit at a public rehabilitation

hospital. *Material and Methods:* Retrospective chart review. Patients with neuromuscular condition database discharged between July 2010 and March 2014 was obtained. Conditions like demographic data, diagnosis, rehabilitation objectives according body functions and structure and respiratory requirements before and after discharge were collected. *Results:* From all patients attended at Advanced Rehabilitation Care Unit, 42 had any neuromuscular condition (26%). 29 (69%) were male. Mean age was 6.1-year-old (range 2-month-old – 25 YO), 54.7% were younger than 5 year-old. According ICF, objectives referred to Neuromusculoskeletal and Movement related functions (31%), respiratory system (16%), self care activities (14%) and structure related to movement (10%) were more prevalent. Acute neuromuscular condition were 30.9% (13 cases), more frequent Guillain-Barré Syndrome (six patients). Chronic neuromuscular condition were 60.1% (29 cases), more often Duchenne Muscular Dystrophy. For acute neuromuscular condition, respiratory goals were to diminish and/or withdraw any support, achieved in 4 out of 9 patients. For neuromuscular conditions, respiratory goals were to evaluate this function and to prescribe any ventilatory support; at baseline 13 patients had any requirement, at discharge were 23, based on non-invasive ventilation the most common setting. According Participation, home discharge was able in 30 patients (71.4%), six of them with invasive ventilation and 11 with non-invasive ventilation (40% total). School inclusion was achieved in 19 of 23 patients. *Conclusion:* Integral rehabilitation that includes respiratory interventions achieved diminishing ventilator support complexity, increasing patient safety at home, gathering patients with their families and the society and improving quality of life in children and adolescents with neuromuscular conditions.

TA172

Conservative Treatment for Patients with Legg-Calvé-Perthes Disease: Seven Years of Follow-Up

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Introduction: Legg-Calvé-Perthes disease (LCPD) is a syndrome in which an avascular event affects the capital femoral epiphysis. The main objective of treatment is to maintain the hip joint morphology in its best possible condition in order to prevent early degeneration, while preserving joint mobility with pain relief. The purpose of the present study was to clinically and radiographically evaluate possible effects from the proposed physiotherapy, in comparison with observation, among patients with LCPD over a seven-year follow-up. *Methods:* A prospective seven-year follow-up study was conducted among 17 patients with unilateral LCPD, divided into two groups: Group A (observational) and Group B (physiotherapeutic). The patients were included in this study in accordance with the following criteria: radiographic classifications, unilateral involvement, indication for conservative treatment and no neurological disturbance. Group A underwent a 12-week observational follow-up with no therapeutic intervention. At the same time, Group B received physiotherapeutic treatment twice a week for 12 weeks. The treatment proposed included passive exercises to stretch the musculature of the hip involved and straight leg raise exercises for the hip muscles. The balance training started during the fifth session. After seven years they went over a radiographic and clinical evaluation that consisted of performing the special Trendelenburg and Thomas tests. It was ascertained whether any trunk deformities were present, specifically scoliosis, and whether the Adams test was positive. The presence and location of pain were assessed using a body diagram. Hip range of motion and muscle strength were evaluated and those two clinical evaluations, i.e. hip range of motion e hip muscle strength, were done in order to be able to use a scale that evaluate the level of joint dysfunction. *Results:* There were no significant differences between the mean scores for joint dysfunction, in group A (P=0.082). In group B, the mean before treatment was greater than the mean after treatment (P=0.036) and greater than the mean seven years after treatment (P=0.028). *Conclusion:* The results suggest that physiotherapeutic treatment for patients with LCPD was effective, in comparison

with observation, even after seven years had elapsed since the intervention.

TA314

Intelligence Profiles in the Children with Cerebral Palsy

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Introduction: The aim of this study is to investigate the intelligence profile in children with CP classified by the type of clinical features, severity of disability and MRI findings. *Methods:* The participants were assessed cognitive function using by standardized tests such as Korean-Wechsler Preschool and Primary Scale of Intelligence (K-WPPSI) or Korean-Wechsler Intelligence Scale for Children (K-WISC III). The children were classified into subgroups by gender, abnormal movement pattern, GMFCS, and MRI findings. *Results:* The mean age of taking Wechsler test was 82.2 month and their mean verbal intelligence quotient (VIQ) and performance intelligence quotient (PIQ) was 74.35 and 64.22. Children with intellectual disability (ID) were 21 (41.2%) and their VIQ and PIQ were 52.85, 45.20. The difference of VIQ and PIQ according to gender were not significant. Children accompanying with ID were 12 (48.0%) in spastic diplegia (SD), 5 (41.7%) in spastic hemiplegia (SH), 4 (50.0%) in spastic quadriplegia (SQ) while CP ataxic and CP dyskinetic group had none. No significant difference of VIQ, PIQ and PIQ/VIQ were noted among each subtype. We categorized GMFCS I–III as mild and GMFCS IV–V as severe group, in order to compare the cognitive characteristics in both groups. Mean VIQ of each group was 77.39, 67.80 and mean PIQ was 61.90, 47.50, respectively. There is a significant difference in VIQ and PIQ between mild and severe group, but there is no significant difference in VIQ-PIQ. According to MRI findings, children were sorted into two groups: the PVL group and the cortical/subcortical involvement group. The PVL group demonstrated higher score in both VIQ and PIQ but there is no statistically significant difference. *Conclusion:* There was relatively high correlation between the GMFCS level and Intelligence scales.

A.6 REHABILITATION IN PEOPLE WITH OLD AGE

TA174

Do Older Adults Alter Their Prioritization in Response to Different Motor Tasks?

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Background: Impairments in the ability to perform a cognitive task while walking, i.e., dual tasking (DT) are associated with an increased risk of falling. Traditional studies that explored the way in which older people prioritize their tasks concluded that “posture first strategy” is the most adaptive way. However, recent studies challenge this paradigm. *Aims:* To explore whether older people alter their prioritization strategy in response to different motor tasks (walking forward, backward and to the side). *Methods:* Thirty three community dwelling older adults (mean age 71.9±5.5 years) participated in the study. All walked forward, backward and to the side during one minute with and without a cognitive task (subtraction), and performed a single cognitive task while sitting. Dual-task cost (DTC) was calculated for each task. ANOVA with repeated measures was conducted to compare DTC of each task across walking types. *Results:* Significant differences were found between DTC of the distance walked in the three walking tasks with subtraction ($F(2,31)=8.55, p<0.001$). However, no significant difference was found between DTC for the cognition during the three walking

types. *Conclusions:* Task prioritization strategy was not altered with task difficulty. These findings extend the understanding regarding attention prioritization in response to different motor tasks and may inform future interventions for fall prevention. This knowledge should take into consideration during rehabilitation.

TA175

Effects of Resistance Training on Cognitive Function and Functional Performances in Mild Demented Elderly

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Background and Purpose: Evidence showed resistance training may potentially improve neuronal and thus cognitive functions. Therefore, the main purpose of this study is to investigate the effects of resistance training on cognitive function and muscle strength. *Method:* Forty mild dementia elderly were randomly assigned to two groups: resistance training (RT, N=22) and control group (CG, N=18). The inclusion criteria: (1) community-dwelling elderly aged ≥ 65 , (2) CDR score: 0.5 or 1 (3) having no functional disabilities that would restrict for exercise participation. The hydraulic resistance exercise (HRE) equipments were used 40 minutes/session, twice weekly for resistance training. CG maintained their regular daily activities. Outcome measures included cognitive ability screening instrument (CASI) and muscle strength (grip strength (GS), knee extension (KE), 30 sec chair stand (CS) and 30sec arm curl (AC)). Independent *t*-test was used to compare baseline demographic variables. Repeated measure ANOVA was used to compare the group and time effects. Wilcoxon signed rank test by using the mean differences of pre-post-test was analyzed. *Result:* There were no significant differences of baseline data among 2 groups except for the CASI ($t=2.029, p=0.049$) and GS ($t=3.127, p=0.003$). The results showed significant interaction in KE ($F=38.000, p=0.017$) and ANML in CASI ($F=5.821, p=0.021$), significant group effect in CASI ($F=8.900, p=0.005$), KE ($F=10.289, p=0.003$), GS ($F=13.216, p=0.001$), CS ($F=8.133, p=0.007$), STM ($F=14.646, p=0.000$), ATTN ($F=8.497, p=0.006$), MENMA ($F=4.937, p=0.032$) and LANG ($F=4.592, p=0.039$), significant time effect in GS ($F=4.510, p=0.04$), CS ($F=8.590, p=0.006$), and STM ($F=10.270, p=0.003$). Wilcoxon test revealed significant training effect of KE in RT compared with CG group ($z=-2.528, p=0.011$). The CASI ($z=-2.112, p=0.035$) and STM ($z=-2.605, p=0.009$) of RT showed significantly improve post-training, while, the CS ($z=-2.365, p=0.018$) in CG decreased significantly after 3 months. *Conclusion:* Mild dementia elderly people undergo 3-month resistance training showed significant improvements in cognitive function, lower extremity muscle strength/endurance, and some physical functions, however, only muscle strength reached group difference.

TA176

Effect of Progressive Muscle Strength Training with or without Dietary Supplementation on Muscle Mass in Elderly

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Introduction: Sarcopenia is a syndrome characterised by reduced skeletal muscle mass and muscle strength that leads to disability and reduced quality of life. According to the European Working Group of Sarcopenia in Older People sarcopenia is diagnosed by low muscle mass plus either low muscle strength or low physical performance. *Methods:* In this randomized, controlled, prospective and observer blind study 120 institutionalized elderly people were assigned to ei-

ther two strength training groups with or without dietary supplementation or a control group. Exclusion criteria were diseases contraindicating the participation in medical training according to the ACSM guidelines. Strength training was performed with elastic bands for 6 months twice a week under supervision. One strength training group received dietary supplementation (FortiFit, Nutricia) 9 times/week. The control group performed a supervised cognitive training twice a week. At baseline and after 6 months of intervention skeletal muscle mass was assessed by dual energy x-ray absorptiometry. **Results:** At baseline reduced gait speed (<0.8 m/s) was found in 72.2 % of the participants according to the screening algorithm for sarcopenia. Handgrip strength was reduced in 66.6 % of the participants. DXA analysis revealed that 13 % of all participants showed also a reduced muscle mass below the defined cut-off values. **Discussion:** These preliminary data revealed that at baseline although 94.4 % of the participants showed significantly reduced muscle strength and/or gait speed only 13 % of them had also a lowered muscle mass and are sarcopenic according to the diagnosis criteria.

TA177

Practicing without Instructions – Dual-Task Learning among Older Adults

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Background: Many situations in our life require us to divide our attention between two tasks (i.e. dual-task). The most common situation is walking while talking on the phone. Dual-task abilities tend to deteriorate with aging, but are modifiable after training. This topic has been studied extensively; however, there is still a lack of knowledge about the learning process of dual-tasking. The aim of this study is to explore the “natural” (i.e., without instruction) process of learning dual-task walking among older adults. **Method:** 86 community-dwelling older adults (age 74.3 ± 5.9 years; 64% females) participated in two sets of dual-tasks. Each set was comprised of five trials of dual tasks that were comprised of walking with either subtraction by three or verbal fluency. These sets were executed in random order. The participants were not instructed to focus on one task or the other during the practice. We calculated gait speed during single and dual-tasks, and the cognitive task in two situations, while sitting and during walking. Dual-task costs (DTCs) were calculated using the formula: $\text{single task-dual task/single task} * 100$. In addition, we measured cognitive abilities, executive skills and attention. Analyses included ANOVA with Repeated Measures. **Results:** During the sets, the cognitive tasks significantly improved at the expense of the walking task ($p < 0.05$). Accordingly, the walking performance significantly decreased in each trial ($p < 0.05$). Significant correlations were found between Trail Making Tests A & B to the dual-task costs of the walking tasks ($r = 0.30$, $r = 0.36$; $p < 0.05$). **Conclusions:** During the learning process, there was a negative correlation between the cognitive performance and walking tasks, such that the cognitive performance improved at the expense of the walking tasks. This pattern illuminates the need for specific instructions and feedback during the learning process in order to improve the ability to divide attention between the two tasks, rather than to prioritize one task.

TA178

Effects of Tai Chi on Neuromuscular Function of the Ankle in Elderly People

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Background: Tai Chi is a traditional Chinese medicine exercise used for improving neuromuscular function. This study aimed to investigate the effects of Tai Chi versus proprioception exercise program on neuromuscular function of the ankle in elderly people. **Material and Methods:** Sixty elderly subjects were randomly allocated into three groups of 20 subjects per group. For 16 consecutive weeks,

subjects participated in Tai Chi, proprioception exercise, or no structured exercise. Primary outcome measures included joint position sense and muscle strength of ankle. Subjects completed a satisfaction questionnaire upon study completion in Tai Chi and proprioception groups. **Results:** A total of 42 subjects completed the 16-week study program, and 18 subjects (TC n=5, PE n=10, control n=3) were lost to followup. (1) Both Tai Chi group and proprioception exercise group were significantly better than control group in joint position sense of ankle, and there were no significant differences in joint position sense of ankle between TC group and PE group. (2) There were no significant differences in muscle strength of ankle among groups. (3) Subjects expressed more satisfaction with Tai Chi than with proprioception exercise program. **Conclusions:** None of the outcome measures on neuromuscular function at the ankle showed significant change posttraining in the two structured exercise groups. However, the subjects expressed more interest in and satisfaction with Tai Chi than proprioception exercise.

TA179

Multimodal Training Intervention: an Approach to Successful Aging

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Introduction/Background: Research has confirmed that physical activity can play a meaningful role in decreasing impairment characteristics of old age. Multimodal training interventions (6-MTI) are of special interest for older individuals, because of their high rate of disability, functional dependence and use of healthcare resources. **Material and Methods:** The aim of this study was to examine effects of a 6 month multimodal training intervention and nutrition and health counseling on elderly people, 71–90 years of age. The aim was also to evaluate at 6 and 12 months follow-up the effects and sustainability of the intervention. The 6-MTI consisted of daily walking and twice-a-week strength training. The design was a randomized-controlled crossover with four 6-month phases: Baseline assessment, intervention compared with controls, crossover-phase with intervention by control group and an additional 6-month follow-up. **Results:** The main results concerning physical activity at baseline showed that most of the participants did little physical activity with regard to international recommendations. The results from the dynamic balance were similar. In both these tests the results were maintained for at least one year after the intervention. Changes in body composition, such as BMI and fat-mass changed for the better at the end of the intervention. An increase was also seen in total lean mass, but in the control phase, the lean mass decreased back to baseline and the total fat mass increased at the same time. A decrease was seen in the cardio metabolic factors, waist circumference, systolic and diastolic blood pressure, after the intervention. **Conclusion:** The study shows how important it is to pay attention to the health status of older adults. The research points to the benefit of multimodal training intervention that consists in daily physical activity in form of walking and resistance training twice a week. The research outcome shows clearly that older adults can obtain multiple benefits by participating in systematic physical training where frequency, duration and intensity are well organized. One can assume that training of this sort, as organized in the study, can prevent premature impairment of mobility, work against cardio metabolic risk factors and maintain the quality of life of older adults.

TA180

Stationary Geriatric Early Rehabilitation; a Randomised Outcomestudy of 2.025 Patients

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Introduction and aims of the study: Stationary geriatric early rehabilitation is very well implemented and sufficiently standardized in many countries. But is stationary geriatric early rehabilitation sufficiently in functional outcome for patients from all assigning specialist departments? **Purpose:** Is it possible to reach for all stationary geriatric early rehabilitation patients no matter from which department they come from a sufficient therapeutic progress in functional outcome? **Methods:** The retrospective study includes all the patients from 2008 to 2013 which our department of Geriatrics and Remobilisation took over from the neurologic, traumatologic, orthopaedic and internal/cardiological departments. The development was measured with the FIM (functional independence measure). The take over FIM was taken inside 72 hours after arriving and the discharge FIM was taken inside the last 48 hours before leaving. **Results:** The study contains 2.025 patients, 657 orthopaedic patients with an average age of 76.67 years, a residence time from 16.11 days and a FIM development from 99 to 114 points; 559 traumatological patients with an average age of 81.36 years, a residence time from 18.02 days and a FIM development from 82 to 104 points; 546 neurological patients with an average age of 77.02 years, a residence time from 20.37 days and a FIM development from 75 to 92 points as well as 263 cardiologic/internal patients with an average age of 80.78 years a residence time from 17.98 days and a FIM development from 78 to 97 points. The FIM development of all patient groups is 1.26 (\pm 0.19 points) per therapeutic day. The recommended aim value of the American Rehabilitation Counselling Association (ARCA) amounts to 1 FIM point per therapeutic day. **Conclusions:** It is possible to obtain a sufficient functional progress for all patients in stationary early geriatric rehabilitation independently from which specialist department they were overtaken from.

TA181

Deterioration Pattern of Locomotive Organ Dysfunction in Elderly People; an Important Problem in a “Super-Aged” Society

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Introduction/Background: So-called “super-aged” society is rapidly developing in Japan, and drastic increase of the number of elderly requiring help from other people is an urgent matter from medical and socioeconomic points of view. Locomotive organ dysfunction due to musculoskeletal disorders is one of the main problems for elderly. The purpose of this study was to investigate the difficulties in undertaking daily activities and to determine the factors contributing to functional deterioration of activities in those with locomotive disorders through a prospective cohort study. **Material and Methods:** A prospective cohort study of 314 patients who were aged \geq 65 years were recruited from 5 facilities. We investigated 42 items and 392 variables covering a variety of clinical manifestations (signs and symptoms, motor function tests, etc) in relation with a locomotive dysfunction measure. The main measuring scale, the Geriatric Locomotive Function Scale -25 (GLFS-25) which is recently developed, is a self-administered measure that consists of 25 items, including 4 questions regarding pain, 16 questions regarding ADL, 3 questions regarding social function, and 2 questions regarding mental health. Participants were asked to select the most suitable response answer to each question. **Results:** We identified 6 locomotor-related variables which were strongly associated with the GLFS-25 score. These traits related significantly to the GLFS-25 classes of severity. Motor function tests also significantly related to the GLFS-25 scores. The aggravation of the GLFS-25 scores was a process of the deterioration of “movement function”, and seemed to show

a consistent pattern. Locomotion requiring muscular strength and endurance gradually weakened, and then bed and transfer activities or indoor walking were impaired. On the contrary, people who complained body pain and anxiety appeared to increase from the very early stage. The personal care capability was relatively maintained until the later stage. **Conclusion:** We confirmed that the GLFS-25 reflects clinical findings related to locomotor disorders and impaired motor function in elderly people, and this score may be useful in predicting which conditions necessitate assistance from others. The consistent pattern of deterioration in the GLFS-25 can be used as an index of clinical manifestations for determining the risk of needing care and progress of motor dysfunction.

TA182

Comparison between Spatial-Temporal Gait Characteristics of Elderly Individuals Walking Backward or Forward with and without Shoes

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Introduction/Background: Backward walking is an essential function in daily activities, and is a common training tool in the rehabilitation of individuals with a variety of orthopedic and neurological conditions. Shoes have been shown to affect the spatial-temporal characteristics of forward ambulation as well as gait stability. Hence, the primary purpose of the current study was to examine the differences in spatial-temporal parameters of elderly individuals walking forward versus backward with shoes or barefooted. **Material and Methods:** Forty eight community living elderly individuals (age 76.69 \pm 7.74 years) able to walk 50 meters without an assistive device, participated in the study. Gait analysis was conducted using the GAITRite® system. The participants were requested to walk at a self-selected comfortable walking speed under four conditions: forward and backward with and without their shoes. The following gait parameters were extracted from the computerized system: velocity, cadence, stride length and double limb support percentage time (DLS%). Two way ANOVA (2X2) was used to determine the effect of gait direction and shoe wear on these variables. Significance was considered at $p=0.05$. **Results:** Gait velocity, cadence, and stride length were significantly higher in forward versus backward walking, and DLS% was significantly lower. Gait velocity was significantly higher without shoes in comparison to with shoes only during backward walking. Lower cadence and higher DLS% time were demonstrated while walking with shoes in comparison to barefooted in both forward and backward directions. Significantly longer stride length was found only during forward walking with shoes compared to forward walking barefooted. **Conclusion:** Overall, spatial-temporal gait characteristics indicate greater stability and proficiency in forward versus backward walking. Wearing shoes has a different effect on forward versus backward walking in terms of velocity and stride length. Greater stability is demonstrated walking backwards while walking barefooted as reflected in higher gait velocity and cadence along with lower DTS%. On the other hand, walking forward with shoes increases stability as reflected by higher gait velocity and larger stride length. These results may be due to different sensory feedback strategies (visual versus tactile) used to achieve a steady gait during forward versus backward ambulation.

TA183

Specific Motor-Cognitive Training Improves Trained and Non-Trained Dual-Task Performance in Patients with Dementia

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Background: Deficits in dual-task (DT) performances are early markers of dementia and are associated with an increased risk of

falling, but can be improved by specific DT-training [1]. The purpose of this study is to confirm these existing results and to evaluate whether the results are transferable to not specifically trained DT-conditions. *Methods:* Ten-week randomized, controlled trial with 91 patients with dementia. Intervention group (IG n=47) executes DT-based exercise training (walking with different challenging arithmetic tasks). Control group (CG n=44) performs unspecific low-intensity exercise. DT-performance (motor and cognitive performance) is measured under 3 different conditions: walking and counting [2 forward and 3 backward (trained)], walking and verbal fluency task (VF) [reciting ABC and plants/animals (not-trained)] and strength of leg extensors and VF (not-trained). Motor and cognitive performance is documented as single task (ST) and DT. *Results:* Specific training significantly improves motor and cognitive performance under DT in both arithmetic tasks [walking and counting: walking speed (cm/s): IG+31.0-36.0%, CG+3.9-8.1%, p=0.000; cognition (response rate/s): IG+30.0-50.0%, CG+0.0-9.1%, p=0.000], as well as motor performance (walking speed) under all DTs including the VF task and cognitive performance including the ABC and naming plants in comparison to the CG (walking and VF: walking speed (cm/s): IG+14.6-22.2%, CG+1.2-3.5%, p=0.001-0.004; cognition (response rate/s): ABC: IG+10.3%, CG+0.0%, p=0.05; plants: IG+66.7%, CG+0.0%, p=0.02). Under the DT-condition strength of leg extensors and VF, only motor performance (N) in combination with the cognitive task reciting the ABC shows significant effects (p=0.029). Further analyses are in progress. *Conclusions:* Specific motor-cognitive training can improve trained and non-trained DT-performance in patients with dementia. *Reference:* 1 Schwenk M, Zieschang T, Oster P & Hauer K (2010). Dual-task performances can be improved in patients with dementia. A randomized controlled trial. *Neurology*, 74 (24), 1961-8.

TA184

Effect of Balance Exercise Assistant Robot for Frail and Pre-Frail Elderly

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Introduction/Background: Elderlies with frailty often have impaired postural control and experience a high incidence of falls. An increased risk of hip fractures and the psychological distress caused by a fear of falling result in a decrease in functional ability and produce more frail status. The purpose of this study is to determine the efficacy to postural strategy training using a balance exercise assist robot (BEAR) for frail and pre-frail elderlies. *Material and Methods:* A randomized crossover trial was adopted in this study. Subjects were volunteer from community-dwelling elderly. Ten subjects classified to be frail (F) (4 men, 6 women; mean age, 77±6.8 y) and 16 subjects classified to be pre-frail (PF) (3 men, 13 women; mean age, 71±3.0 y) according to the criteria of national center of geriatrics and gerontology implemented in relation to the cardiovascular health study (Fried 1998). Each participant performed two exercise sessions in different phase. In the robot exercise phase, participants used BEAR for training and in the traditional balance exercise phase, they performed muscle-strengthening exercise, postural strategy training and movement exercise needed fine motor control. Each exercise was performed twice a week for 6 weeks. The initial exercise phase was randomly allocated to each participant. Evaluation tools were maximum gait velocity, Functional Reach Test (FRT), Timed Up & Go test (TUG), center of pressure (COP) and muscle strength of lower extremities. Participants were assessed before and after the each exercise phase. *Results:* In the exercise with BEAR, both group showed large improvement tendency as compared for traditional exercise and maximum gait speed (F/PF: 0.02/0.64 km/hr (p=0.030)) and knee extension muscle strength (F/PF: 0.93/5.23 kg (p=0.006)) increased significantly in PF group. *Conclusions:* From the results in this study, it was suggested that

the BEAR training would be more effective than traditional balance training both for elderlies categorized to be frail and pre-frail. The elderlies stayed at pre-frail stage would have the potential to react more to robot exercise than who had already been in frail status.

TA185

Motor-Cognitive Effects of a Computerized Training Method (Physiomat®) in People with Dementia: a Randomized Controlled Trial

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Introduction/Background: Not only memory disorders but also deficits in orientation, attention and executive functions characterize an early stage of dementia and are associated with motor deficits. There is lack of evidence whether computerized training methods can improve cognitive performances related to complex motor-functional abilities in people with dementia. The purpose of this study was to examine the effect of a computer-based training tool (Physiomat®) and to investigate the transfer of motor-cognitive effects on untrained conditions. *Material and Methods:* A sample of 99 people with dementia (mean age 82.9±5.8) took part in a 10-week randomized, controlled trial. Subjects in the intervention group (IG: n=56) completed a motor-cognitive training with Physiomat®. The control group (CG: n=43) performed low-intensity exercises. Connecting numbers appearing on the monitor of Physiomat® by doing balance displacement (PTMT=Physiomat® Trail Making Test) was examined as motor-cognitive performances. To determine if IG were able to learn more complex PTMT, a scoring was calculated to cover complexity of demands according to different task levels. Changes in duration, sway path and complexity level during trained and untrained PTMTs were defined as primary outcomes. *Results:* Compared to the CG, the IG improved significantly in speed (duration) regarding the simple (IG: -59.1%; CG: -12.6%, p=0.018), moderate (IG: -35.3%; CG: -2.2%, p<0.001) and complex (IG: -34.9%; CG: +4.1%; p<0.001) trained PTMTs. In accuracy (sway path), the IG improved in moderate (IG: -17.1%; CG: -0.6%; p=0.012) and complex (IG: -17.7%; CG: +17.9%, p=0.006) PTMTs. Participants of the IG learn to complete a larger number of PTMTs (IG: +40%; CG: +15.8%, p=0.008) after intervention. Training effects regarding speed are also obtained in simple (IG: -54.3%; CG: -11.0%, p=0.008), moderate (IG: -36.9%; CG: -4.7%, p=0.001) and complex (IG: -30.2%; CG: +0.3%, p=0.019) untrained PTMTs. Complexity level under untrained conditions also improved (IG: +35.0%; CG: +15.0%; p=0.014). *Conclusion:* Physiomat® constitutes an effective computerized training method to improve motor-cognitive abilities in patients with dementia. Results also confirm the transfer of training effects on untrained demands.

TA186

Improvement of Activity Daily Living and Walking Distance Using Combination Upper and Lower Extremity Exercise for Elderly with Chronic Obstructive Pulmonary Disease

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) is uninfected disease which is preventable and treatable, most likely happened in elderly have history of cigarette smoking. COPD caused systemic response that influence skeletal muscle endurance. COPD patient get tired easily and short of breath which caused by decreasing lung functional capacity, then they do Activity Daily Living (ADL) in longer time-duration and walked with short distance. Combination between upper and lower extremity exercise increase upper extremity muscle endurance and lung functional capacity, then we hypothesis it will improve ability to do ADL and

walking distance. *Methods:* Cross sectional study using thirty patient moderate and severe COPD (FEV1 30-80, FEV1/FVC <70) aged 60-75 years were randomly assigned to the two groups, intervention and control. The intervention group received standard pulmonary rehabilitation, unsupported upper extremity exercise and treadmill exercise 3 times a week for 6 week, while control group received standard pulmonary rehabilitation and treadmill only. The main outcome measure are decrease ADL-time using Glittre ADL test and walking distance using 6 minutes walking test (MWT). *Results:* After 6 weeks, patients in the intervention group improved in the ability to do ADL with reduce ADL-time to do Glittre ADL test compared with those patients in the control group ($p < 0.05$) also they could increase the walking distance from Minimal Important Difference. *Conclusion:* This study suggest that the combination upper and lower extremity exercise improve ability to do ADL and walking distance in elderly with moderate and severe COPD better than the lower extremity exercise only.

TA187

The Association between Anxiety at Time of Hospitalization and Future Falls among Older Adults Is Partly Mediated by Functional Decline

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Objective: Post acute hospitalization falls, among the elderly, were rarely discussed. The incidence of anxiety among the elderly is around 15%. The aim of this study is to test the association between anxiety at time of hospitalization and falls occurring within one-month post-discharge. And, to offer potential mechanism for this association. *Method:* One month prospective cohort study of 694 older adults in two Israeli medical centers. Falls, anxiety and peri hospitalization functional decline were assessed. *Results:* A total of N=87 (12.5%) participants reported at least one fall during the 30-day post-discharge period. Controlling for functional decline, cognitive status, chronic and acute illness severity, length of stay, pre-morbid mobility and sleep medication consumption; The odds of falls between discharge to 1-month follow-up were 1.73 (95% CI: 1.03-2.91) among patients with moderate to high anxiety. Among patients with functional decline by discharge, the odds of falls were 2.18 (95% CI: 1.12-4.22) for patients with moderate to high anxiety. When accounting for functional decline the relationship between falls and anxiety was reduced by 14% (from OR=2.19 to OR=1.91). *Conclusion:* Anxiety at time of hospitalization is associated with falls 30-days post discharge, controlling for several well known confounders. This relationship is partially mediated by functional decline. Identifying patients with anxiety for inclusion in targeted rehabilitation interventions may be an important component in fall prevention strategies.

A.7.2 SPASTICITY MANAGEMENT

TA188

AbobotulinumtoxinA (Dysport®): Doses Used to Treat Upper Limb Muscles of Adults with Spasticity Participating in a Phase III Randomized, Double-Blind Placebo-Controlled Study

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Introduction/Background: In a Phase III, randomized, double-blind placebo-controlled study conducted in 34 sites from 9 countries, two doses of abobotulinumtoxinA (Dysport®) 500 and 1000 units (U) were shown to be efficacious on muscle tone for the treatment of hemiparetic adults post stroke or traumatic brain injury (TBI) with a favourable safety profile. *Materials and Methods:* 243 patients received abobotulinumtoxinA 500 or 1000 U or placebo by intramuscular injection into their primary targeted muscle group (PTMG, selected from extrinsic finger flexors, wrist flexors and elbow flexors) and at least two other upper limb muscles, including shoulder muscles. Treatment was administered in a volume of 5.0 mL using electrostimulation. Doses administered to upper limb muscles are reported here. *Results:* For the abobotulinumtoxinA 500 U group, mean (SD) doses (U) administered in fingers flexors were: 93.5 (17.0) for flexor digitorum profundus (FDP), 95.4 (14.3) for flexor digitorum superficialis (FDS) and 76.9 (26.8) for other finger flexors (flexor pollicis longus, adductor pollicis); in wrist flexors: 92.2 (18.1) for flexor carpi radialis (FCR) and 89.9 (25.7) for flexor carpi ulnaris (FCU); in elbow flexors: 88.3 (28.5) for brachioradialis, 148.5 (60.2) for brachialis and 108.6 (49.5) for other elbow muscles (biceps brachii, pronator teres) and 122.2 (44.1) in shoulder muscles (triceps brachii, pectoralis major, subscapularis, latissimus dorsi). For the abobotulinumtoxinA 1000 U group, doses administered were 195.5 (25.9) for FDP, 196.8 (28.4) for FDS, 157.0 (53.3) for other finger flexors, 178.1 (45.5) for FCR, 171.2 (45.2) for FCU, 172.1 (44.8) for brachioradialis, 321.4 (103.2) for brachialis, 216.5 (92.2) for other elbow muscles and 300.0 (129.1) in shoulder muscles. *Conclusion:* In this Phase III worldwide study in hemiparetic patients with upper limb spasticity post stroke/TBI, mean doses administered were 76.9–196.8 U for muscles in the finger flexors, 89.9–178.1 U for muscles in wrist flexors, 88.3–321.4 U for muscles in the elbow flexors and 122.2–300.0 U in shoulder muscles. Total dose administered (in the PTMG and at least 2 upper limb muscles) was 500 or 1000 U, which was previously shown to improve muscle tone in this patient population. *Reference:* Gracies JM, et al. WCNR 2014; abstract OP-144.

TA189

Long Term Improvement of Facial Function after a Combined Therapy with Botulinum Toxin A Injections and Mirror Biofeedback Rehabilitation

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Background: In the last twenty-five years several studies have demonstrated the efficacy of onabotulinumtoxinA (BoNT-A) injections in reducing facial synkinesis. Another common therapeutic option that has shown an important role in both the prevention and the treatment of facial synkinesis is facial neuromuscular retraining with mirror biofeedback (BFB). Despite the great number of studies about the efficacy of BoNT-A or BFB separately, in the literature there is a paucity of studies about the long-term effects on facial function of the combined therapy with repeated BoNT-A injections in association with BFB rehabilitation. *Aim:* to explore the presence of an acquired improvement of the facial function out of the pharmacological effect of BoNT-A in subjects with established facial palsy, after repeated sessions of BoNT-A injections combined with mirror biofeedback rehabilitation. *Setting:* Outpatient Clinic of Physical Medicine and Rehabilitation Unit, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy. *Population:* 27 consecutive patients (22 females; mean age 45±16 years) with an established facial palsy were treated for facial synkinesis in association with mirror biofeedback exercises at home. A minimum of three sessions

were performed, with an interval of at least five months apart to exclude any residual pharmacological effect of onabotulinumtoxinA. *Methods:* Patients were clinically assessed before every BoNT-A injection with the Italian Version of Sunnybrook Facial Grading System (SFGS). To predict the trend of the hypothesized improvement, non linear mixed effect models were fitted to the SFGS composite and partial scores' residual increase. *Results:* The non linear mixed effect models showed an improving trend for both the composite and the three partial scores of the SFGS. This improvement was greater for the SFGS composite score and the partial score "Symmetry of voluntary movement". The model also extrapolated that the 90% of maximum forecasted improvement was reached at the fourth injection in every section of the SFGS, as confirmed by our sample data. *Conclusion:* this study suggests that in a chronic stage of facial palsy with established synkinesis, patients may benefit from a combined therapy with repeated BoNT-A injections and mirror BFB rehabilitation, gaining an improvement of the facial voluntary motility up to the fourth session.

TA190

Hemiparetic Gait Improvement after Upper Limb Spasticity Treatment with Botulinum Toxin – the Gaseous Approach

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Arm swing is essential for efficient gait, it is often impaired post stroke. Up to 80% of cases may have associated reactions (AR) during gait, interfering with safety and balance. The use of botulinum toxin type A (BTX-A) in upper limb spasticity (ULS) management has proven functional gains although very few studies focus on its effect on gait parameters. Gait parameters are best measured through 3-Dimensional gait analysis and Poli-EMG assessment. The Goal Attainment Scale (GAS) has proven to be effective in measuring the achievement of treatment goals for ULS. A fifty-six year-old female patient with left post stroke spastic hemiparesis. A 3-D gait analysis with shoulder girdle and upper limb poli-EMG during gait was performed before and after treatment. The patient was then treated with BTX-A exclusively in upper limb. The muscles were selected according to the hyperactivation pattern, and injection guided by electrical stimulation. Four weeks after each treatment, she was assessed for gait parameters and GAS Score, the treatment was repeated when effect wore off, for two more times. Total follow up time was 18 months. The first 3D-Gait analysis revealed a global velocity of 0.49 m/s and upper limb EMG indicated an unusual AR pattern with hyperactivation of deltoid and supraspinatus. At the second evaluation, velocity was 0.62 m/s, which represented a 26% increase. After a second injection, her gait velocity yet again increased to 0.79 m/s, another 27% increase. The last gait analysis showed a velocity of 0.84 m/s, a 6% increase. Between these evaluations the 10 m walk test was performed to estimate gait velocity ($x=10/\text{time}$), suggesting that the gain wasn't completely lost between interventions and globally the benefit added up. Subjectively, the patient felt safer, reporting no falls after these interventions. GAS has guided BTX-A spasticity management throughout the several steps of the intervention. Upper limb AR was successfully handled and it influenced gait parameters. Hence, suggesting that upper limb role in hemiparetic gait is underestimated. As an experimental study design, we suggest that larger systematic studies are needed to assess the influence of upper limb in gait in post stroke patients.

TA191

Using a Delphi Panel to Identify a Treatment Paradigm for Injecting Botulinum Toxin to Treat Common Postures in Post-Stroke Upper Limb Spasticity

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Introduction/Background: OnabotulinumtoxinA reduces muscle hypertonia associated with post-stroke spasticity (PSS); however, clinicians may not recognize many of the treatable common postures associated with PSS or may not be comfortable injecting onabotulinumtoxinA due to limited experience with this intervention. Our objective was to define a clinically recommended treatment paradigm using onabotulinumtoxinA for upper-limb common postures resulting from PSS. *Material and Methods:* Ten clinical experts participated in a modified Delphi panel process, which consisted of 2–3 rounds of voting using anonymous feedback until clinical consensus ($\geq 66\%$ agreement) was reached. The panel identified the most common upper-limb postures associated with PSS that would be candidates for onabotulinumtoxinA treatment and then defined a treatment paradigm particularly appropriate for inexperienced injectors for the 1) muscle selection for onabotulinumtoxinA injection, 2) dose for each muscle and overall dose for each posture, and 3) use of localization techniques (eg, EMG, electrical stimulation, ultrasound). *Results:* The panel identified 3 common aggregating upper-limb postures in PSS: 1) adducted shoulder, flexed elbow, pronated forearm, flexed wrist, and clenched fist; 2) flexed elbow, pronated forearm, flexed wrist, and clenched fist; and 3) flexed wrist and clenched fist. An onabotulinumtoxinA dilution 50 U/mL (2:1 dilution ratio [range, 1:1–4:1]) was considered most appropriate. The recommended starting doses for each aggregate were 300 U, 300 U, and 200 U, with total maximum doses of 400 U, 400 U, and 300 U, respectively. Doses for individual muscles ranged from 10 U–100 U. In collaboration with the patient, existing or desired limb function or care activity were important considerations when determining the postures and treatment doses. Localization techniques for muscle identification were considered essential for all postures. *Conclusion:* The modified Delphi panel provided consensus on 3 aggregate common upper-limb postures associated with PSS and corresponding treatment paradigms for injecting onabotulinumtoxinA. *Study Supported by:* Allergan, Inc.

TA192

Efficacy of the Neuro-Orthopaedic Surgery for Spastic Equinovarus Foot after Stroke

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Background: to assess the efficacy of the tibial neurotomy, tibialis anterior tendon transfer and/or Achille and long toe flexor tendons lengthening in association for spastic equinovarus foot (SEF) after stroke based on the 3 domains of the International Classification of Functioning, Disability and Health (ICF). *Materials and methods:* 18 stroke patients with SEF were assessed before, 2 months and 1 year after surgery. The body function and structure (SIAS, gait speed and video, walking aids, spasticity, strenght, ROM), activities (FAC, FWC, ABILOCO) and quality of life (SATISPART, SF-36) were assessed. *Results:* a decrease in spasticity and pain, an increase in ankle range of motion, an improvement in equinus and varus and in gait speed and a reduction in walking aids were observed. Activity, participation and quality of life were not significantly modified. *Conclusion:* this study confirms the efficacy of the neuro-orthopaedic surgical treatment of SEF after stroke to

reduce the impairments while the activity, participation and quality of life remain unchanged. ClinicalTrials.gov: N° NCT01265238.

TA193

The Study on Curative Effect of Upper Limb Function Trained by CIMT and HABIT in 248 Children with Spastic Hemiplegia

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Aim: The aim of this study was to probe the curative effect on constraint-induced movement therapy (CIMT) and hand-arm bimanual intensive training (HABIT) for children with spastic hemiplegia cerebral palsy. **Method:** 248 children with spastic hemiplegia aged 4-14 years were hospitalized in the Center of child neurology rehabilitation of the first hospital affiliated to Anhui Medical University during the period of Jan. 2010 to Jul. 2014. All the children with spastic hemiplegia were received the fundamental occupational therapy (OT). Test group 1 (63 cases) were added CIMT, test group 2 (61 cases) were added HABIT, test group 3 (64 cases) were added CIMT and HABIT, control group (60 cases) were only treated by OT. All cases were assessed by Manual Ability Classification System for Children with Cerebral Palsy (MACS) after treating 6 months. The curative effect of groups was analyzed by statistics. **Results:** The curative effect of all the test groups was more better than that of control group ($p < 0.05$ or 0.01), the curative effect was no difference between test group 1 and test group 2 ($p > 0.05$), the curative effect of test group 3 was more notably effective than these of test group 1 and test group 2 ($p < 0.01$). **Conclusions:** CIMT and HABIT combined respectively with occupational therapy were effect on children with spastic hemiplegia. CIMT and HABIT combined with occupational therapy were notably effect on only using CIMT or HABIT. **Keyword:** spastic hemiplegia, curative effect, Constraint-Induced Movement therapy, hand-arm bimanual intensive training.

TA194

Proposal Guidelines for the Interdisciplinary Management of the Equinovarus Spastic Foot among Hemiplegic Patients

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Introduction: The spastic equinovarus foot is a common deformity among hemiplegic patients. The reasons were shown to be varied and complex explaining why a single procedure does not exist to correct all deformities. The treatments described in the literature are physical therapy, stretching, orthosis, functional electrical stimulation, chemodenervation with botulinum toxin, phenol or alcohol, selective neurotomy, intrathecal baclofen therapy and tendon lengthening and transfer. However, no practical guidelines are available as a guide for the management of the spastic foot. **Aim:** To establish guidelines for the treatment of the spastic equinovarus foot among hemiplegic patients. **Results:** The diagnostic nerve block with anaesthetics of the motor nerve branches of the tibial nerve is mandatory to determine the cause(s) of the deformity. The spastic foot in stance phase is due to spasticity and/or contracture of the calf muscles (soleus, gastrocnemius, tibialis posterior and flexor hallucis and digitorum). The spastic foot in swing phase is also related to the lack of activation of dorsiflexors and/or to imbalance between tibialis anterior and peroneus muscles. The spasticity will be treated with botulinum toxin injections and neurotomy, the contracture by tendon lengthening, the weakness by orthosis and functional electrical stimulation and imbalance by tendon transfer. These treatments are frequently combined. **Conclusion:** We present our personal guidelines for the treatment of the spastic equinovarus foot. The diagnostic nerve block helps to determine the respective responsibility of the spasticity, of the

contracture, of the weakness and of the imbalance in the deformity allowing us to choose the most appropriate treatment(s).

A.7.3 LOWER LIMB AMPUTATION AND REHABILITATION

TA195

Influence of Type of Incision on Rehabilitation in Below Knee Amputation

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Background: Below knee amputation is required in patients with advanced critical limb ischaemia or diabetic foot sepsis in whom no other treatment option is available. Till date there is no consensus as to which surgical closure achieves the maximum rehabilitation potential. In this study we assessed the effects of different types of incision on the outcome of below knee amputation in people with lower limb ischaemia or diabetic foot sepsis, or both. The main focus was to assess the relative merits of skew flap amputation versus Burgess flap (long posterior flap) closure. **Material and methods:** This was a ten years retrospective and 2 years prospective study. A total of 144 patients were included of which 76 (53%) patients had Burgess closure while 59 (41%) had skew flap closure. 9 patients underwent atypical closure or skin grafting. These groups were compared on the basis of stump healing time, rate of infection, time for prosthetic fitting and compliance with prosthesis with either of the flaps made. **Results:** Below knee amputation using skew flaps conferred no advantage over the well established Burgess flap closure. 76% stumps after Burgess closure and 71.4% after Skew flap closure healed well in time which was insignificant ($p > 0.05$). Primary stump healing was 58% for sagittal flaps and 55% for long posterior flap. The result was not significant. Of the total 144 patients, 72.2% had prosthetic fitting. 60% of them underwent prosthetic fitting within 3 months in both the groups after closure. 66.8% of Burgess flap closure patients and 71% of Skew flap closure were happy with their prosthesis which was not significant. **Conclusions:** Stump healing time, rate of infection, time of prosthetic fitting and prosthetic compliance was similar in both the groups. We thus conclude that there is no benefit of one type of incision over another. The choice of amputation technique can, therefore, be a matter of surgeon preference taking into account factors such as previous experience of a particular technique, the extent of non-viable tissue, and the location of pre-existing surgical scars. **Reference:** Tisi PV, Callam MJ. Type of incision for below knee amputation. Cochrane Database Syst Rev. 2004;(1): CD003749.

TA196

Energy Expenditure and Walking Speed in Lower Limb Amputees: a Cross Sectional Study

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Background: Energy expenditure and walking speed are generally recommended for use as measures of status and outcome for walking. The objective of this study was to measure the physiological cost index (PCI) and comfort walking speed (CWS) at three levels of lower limb amputation: transfemoral, transtibial and Syme level, and the relationship of these physiological variables to prosthetic ambulation supported with walking aids and stump length. **Study Design:** This study was a prospective cross-sectional study. **Methods:** Eighty-nine individuals with lower limb amputation for reasons other than peripheral vascular disease (PVD) were recruited among patients at the Department of Prosthetics

and Orthotics in University Clinical Center of Kosovo. PCI was assessed by five minutes of continuous indoor walking at CWS. *Results:* Significant differences were found in PCI ($F=29.87$, $P<0.001$) and CWS ($F=19.33$, $P<0.001$) among the three amputation groups. Prosthetic ambulation supported with crutches showed an important impact on PCI ($F=35.1$, $P<0.001$) and CWS ($F=28.42$, $P<0.001$). Stump length was associated with significantly increased PCI ($r=0.53$, $P=0.02$) and reduced CWS ($r=0.58$, $P=0.004$) in transfemoral amputees. *Conclusions:* A higher level of amputation is associated with less energy-efficient walking and with lower walking speed. Prosthetic ambulation supported with crutches has significant impact on increasing of energy expenditure and decreasing walking speed. Stump length is shown to have a major impact on PCI and CWS in transfemoral amputees. *References:* 1) Waters RL, Mulroy S. The energy expenditure of normal and pathologic gait. *Gait Posture* 1999; 9: 207-31. 2) Hagberg K, Haggstrom E, Branemark R. Physiological cost index (PCI) and walking performance in individuals with transfemoral prostheses compared to healthy controls. *Disabil Rehabil*. 2007 Apr 30; 29(8): 643-9. 3) Osmani-Villasolli T, Hundozi H, Orovcanec N, Krasniqi B, Murtezani A. Rehabilitation outcome following war-related transtibial amputation in Kosovo. *Prosthet Orthot Int*. 2013 Jul 17. [Epub ahead of print].

TA197

Quantification of Function in Patients with Lower Limb Amputation

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Introduction/Background: Following a lower limb amputation, different professions are involved to get the patient back to walking. A compact assessment should be applied in every day routine to monitor improvements, long term developments and outcome their treatment. 83 subjects following lower limb amputation are included in this ongoing study (20 transtibial; 41 transfemoral/knee disarticulated; 14 hip disarticulated/ hemi-pelvectomied, 6 bilateral amputations). Patients fitted with a new prosthesis attend gait training and physical therapy. Assessment starting with the Locomotor Capability Index [1] (LCI) in the second training unit is performed. Depending on their initial LCI result and their walking abilities they answer the Patient-Specific-Functional-Scale [2] (PSFS) and perform the Two-Minute-Walk-Test and the "Timed-Up & Go"-Test. The use of walking aids is documented. Additionally patients note their perception and activities in a journal and reflect daily achievements and disappointments. The assessment is repeated after the first intensive training phase and as follow up. *Results:* Main aspects mentioned in the PSFS were in order of appearance were: walking safely, longer distances, faster, with hands free as well as finding a perfect socket fit, performing advanced activities (stairs, slopes, car- or bicycle use) and finally increasing strength and flexibility. The diary illustrates the process as seen from the patient side and highlights pain as the main disappointment and conversely improved functionality due to prosthetic handling as most appreciated achievement. *Conclusion:* LCI results are in accordance with the functional test results and the use of walking aids. Subjects starting with high scores need more sensitive tests to document their improvement. Performing standardized tests at defined points in the rehabilitation helps to document the process and serves as feedback for patients as well as the interdisciplinary caregiver team. As the outcome is affected by socket design, choice of prosthetic parts, alignment as well as physical and mental capabilities, it is difficult to single out cause and effect of specific interventions. *References:* 1) Franchignoni, F. *Arch Phys Med Rehabil*, 2002. 83(4): p. 582-3. 2) Stratford PW, *Physiother Can*. 1995; 47:258–263.

TA198

Assessment of Falls in Lower Limb Amputees

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Introduction: Lower limb amputees have an increased risk of falling. Fear of falling is a potential consequence, which may lead to decreased participation. Recently, there has been a trend to measure fear of falling using scales that assess self-efficacy or confidence, such as the Activities-specific Balance Confidence (ABC) Scale. The aim of this study was to evaluate the prevalence of falls in lower limb amputees and assessing balance confidence using ABC Scale. *Methods:* A convenience sample was selected from an outpatient rehabilitation department. Participants were asked about fallen history in the past 12 months. Other variables like age, body-mass index, gender, years since amputation, level of amputation, cause of amputation, utilization of walking aids and comorbidities were assessed. ABC Scale and Timed up-and-go (TUG) test were applied. *Results:* Of the patients included in the study ($n=32$), 78.1% were male, the mean age was 54.2 ± 12.9 years, 43.8% had unilateral transfemoral and 56.2% had transtibial amputations, primarily from traumatic causes (65.6%). The average time since amputation was 18.3 ± 13.6 years. 65.6% had one or more comorbidity. 43.8% reported having fallen in the previous 12 months. The age of fallers was higher (59.9 ± 14.7 years) than non-fallers (49.8 ± 9.6 years) ($p<0.05$). The variables related with risk of having fallen in the past 12 months were transfemoral amputation (OR=1.29; 95% CI=0.59–2.80), female gender (OR=1.43; 95% CI 0.64–3.18) and presence of comorbidity (OR=1.40; 95% CI=0.74–2.67). The ABC scale score was significantly lower among fallers (57.3 ± 19.7) than non-fallers (71.5 ± 16.7) ($p<0.05$). The TUG test average time was higher among fallers, although not significantly ($p=0.12$). There was a strong negative correlation between ABC scale scores and TUG test results ($r=-0.73$, $p<0.01$). *Conclusions:* The results suggest that ABC Scale may be useful to identify lower limb amputees who have balance issues and at risk of falling. Further research, involving large scale randomized clinical trials and investigation of the validity of the ABC scale in this population, is required.

TA199

Functional Independence during the Intermediate Stage of Rehabilitation after Lower Limb Amputation: a Randomized Controlled Trial

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Lower limb amputation (LLA) results in marked decline in functional independence and in Johannesburg South Africa amputees do poorly postoperatively. The aim of this study was to establish whether a self-administered treatment will improve quality of life and participation following LLA. A randomized controlled trial ($n=77$ per group) was conducted on participants who met the inclusion criteria. Group allocation was concealed and the assessor was blinded. The EuroQol EQ-5D and Participation Scale (P-Scale) were to collect data at baseline and after the 12 week intervention. Groups received the standard rehabilitation offered at the hospital and the intervention group an additional exercise programme from discharge to three months postoperatively. Institutional ethical approval and participant consent was obtained. Data were analysed using IBM SPSS version 22. All continuous data are presented as medians and percentiles. The two groups were compared using Fisher's exact test and the Mann Whitney U-test. Generalized Estimating Equations were used to exclude confounders. An intention to treat analysis was undertaken. The median age was 58 per group

($p=0.505$); Group 1 (Control) had 66.% males and Group 2 (Intervention) had 64% males ($p=0.433$). There were no significant differences in demographic characteristics between the two groups except that Group 2 had more BKA participants. Group 2 demonstrated ($p=0.001$) better QOL VAS (25th percentile 30; 50, median 60; 80, 75th percentile 80;80 for Group 1 and 2 respectively) and ($p=0.033$) index scores (25th percentile 0.264; 0.689, median 0.725; 0.796, 75th percentile 0.796; 0.796 for Group 1 and 2 respectively) of QOL after the 12 weeks intervention compared to Group 1. At baseline Group 2 had more participation restriction (P-Scale) ($p=0.038$) (25th percentile 0; 0, median 0; 0, 75th percentile 0;5 for group 1 and 2 respectively) (poorer participation) but Group 2 demonstrated less ($p=0.004$) participation restriction after 12 weeks compared to group 1 (25th percentile 10; 6, median 28; 18, 75th percentile 41; 27 for group 1 and 2 respectively). The level of amputation was excluded as a confounder. The intervention could be adopted as standard care for lower limb amputation patients.

A.8 SPORTS IN REHABILITATION AND SPORTS REHABILITATION

TA200

Symmetric and Asymmetric Sports - Consequences in Musculoskeletal Conditions

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Introduction: Sportsmen are likely to have pathologic consequences of high competition exercise such as, muscular contractures (MC), low back pain (LBP) and cervical pain. We made a pilot and pioneer study which involve high competition sportsmen that play symmetric or asymmetric sports. **Objective:** The aim of this work was to compare asymmetric and symmetric sports and its relation with the localization of pain and MC in high competition athletes. **Methods:** Preliminary data was obtained from 77 federated high competition athletes between 16 and 35 years old; 30 swimmers and 20 karate athletes categorized in symmetric sports (SS) and 40 tennis players and 2 water polo categorized in asymmetric sports (AS). An interview was performed to respond to a validated questionnaire by a specialized team during tournament or training performance. Qui-square tests were used to find proportions between Pathologic Consequences and AS and SS. To find associations between pathologic consequences and kind of sports a logistic regression was performed to estimate an Odds Ratio(OR) and the respective 95% confidence interval. Data was performed in SPSS 22. **Results:** Our sample is composed by 53.2% of AS athletes. Taking in account pathologic consequences 36.4% of the athletes declared LBP and 40.3% MC. Equal proportions were found between SS and AS (50%, $p=0.666$) in those with LBP. In those that declared MC, 61.3% practice AS. Statistical significant differences were found between unilateral and bilateral MC injuries and the SS or AS ($p<0.001$). Results of associations between pathologic consequences and the kind of sports showed higher chance of LBP in athletes of SS, OR=0.82 (0.32-2.07) and a higher chance of MC in those that practice AS, OR=1.73 (0.68-4.36). **Conclusion:** Regarding to MC significant difference were found between AS and SS. Athletes involved in SS more likely to have LBP, while those that are involved in AS had higher chance of MC. Athletes that practice AS showed a higher proportion of Unilateral MC. These findings revealed that a deeper investigation should be conducted and performed for a better understanding of the impact of different kinds of sports in muscular pathologic in high competition athletes.

TA201

The Comparison of Resting Scapular Posture and Scapulo-humeral Rhythm between Dominant and Non-Dominant Shoulder in Overhead Athletes with and without Impingement Syndrome

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Background: Shoulder impingement is a commonly diagnosed and treated musculoskeletal pathology described in overhead athletes. Abnormal scapulothoracic kinematics is thought to play a role in the development or progression of impingement. The aim of this study was to compare the resting scapular posture and scapulo-humeral rhythm between dominant and non-dominant shoulder in overhead athletes with and without impingement syndrome. **Material and Methods:** Thirty overhead athletes (healthy and with unilateral impingement shoulder (dominant shoulder)) participated in this study. Two inclinometers were used to measure humeral abduction and scapular upward rotation in scapular rest position, 45°, 90° and 135° shoulder abduction in frontal plane. **Results:** Findings indicated that healthy overhead athlete's dominant shoulder has more downward rotation in scapular rest position than non-dominant shoulder. Also, healthy overhead athlete's non-dominant shoulder has more scapulo-humeral rhythm ratio in 0-90° and 0-135° abduction than dominant shoulders. In contrast, dominant shoulder in overhead athletes with impingement syndrome has more scapulo-humeral rhythm ratio than non-dominant shoulder in 0-90° abduction. **Conclusion:** We suggest that clinicians should be aware that some degree of scapular asymmetry may be common in some healthy overhead athletes. It may be related to an adaptation to extensive use of upper limb. Also, clinicians must design special training protocols for scapular upward rotators in overhead athletes with impingement shoulder. **Keyword:** impingement syndrome, scapular rest position, scapulo-humeral rhythm, overhead athletes.

TA202

Functional Knee Adaptation after Anterior Cruciate Ligament Injury: Proprioceptive and Gait Analysis Studies

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Introduction/Background: The aims of this study is to evaluate the proprioceptive function and its impact on locomotor adaptation after Anterior Cruciate Ligament (ACL) injury. **Material and Methods:** Cohort study of 16 ACL injury young, active and healthy patients, divided into 4 groups: total rupture with conservative treatment (TRCT), total rupture with operative treatment (TROT), partial rupture with conservative treatment (PRCT) and partial rupture with operative treatment (PROT). Proprioceptive function and gait analysis studies were done on 6-8 weeks after injury/surgery. Proprioceptive function was evaluated with Isokinetic machine, set for joint position sense (JPS) on 30, 45 and 60 degs and time to detect passive movement (TDPM) with the speed 10/s. Gait analysis evaluate ground reaction force on vertical, anteroposterior and mediolateral parameters. **Results:** Evaluation for proprioceptive function was done on 7.3+2.7 weeks after injury/surgery and gait analysis was done on 7.7+2.9 weeks. TDPM showed the best sensitivity to detect the passive movement on groups of PRCT ($p=0.046$) and TROT ($p=0.02$). The best result for 30, 45 and 60 degs JPS evaluation were significant on PRCT group. Gait analysis evaluation showed significant differences between groups of PRCT vs PROT on vertical parameters. There were significant differences on posterior parameter of uninvolved

side between groups. They were significant correlations between JPS and gait parameters. JPS 30 degs was correlated to vertical ($r=0.51$) and posterior ($r=0.54$) gait parameters, JPS 45 degs was correlated to posterior parameter of involved side ($r=0.62$) and uninvolved side ($r=0.51$), also medial parameter of involved side ($r=-0.59$) and uninvolved side ($r=-0.71$). **Conclusion:** The changes of proprioceptive function after ACL injury affected the locomotor adaptation, as an effort to maintain stability with central strategy.

TA203

Gender Differences in Musculoskeletal Injuries in a Sports-Specialized School

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Introduction: Interscholastic athletic competition at the secondary school and high school level has grown over the last decades. Along with increase in participation there has been an increase in sport-related injuries in this population. The aim of this study is to describe the injury rate, distribution, diagnosis, type, and severity among young boys and girls in a sports-specialized school in the Olympic training facility in Puerto Rico. **Methods:** This a descriptive retrospective study. The medical records from all student-athletes evaluated in the Center of Sports Medicine and Exercise Sciences in the Olympic Training Facility during July 2007– June 2012 (five school years) were reviewed. Injury was defined as any event that occurred during participation of sport requiring medical attention from a physician. Injury rate was determined by the number of injured student-athlete divided by the total student-athlete population. Each injury was classified according to anatomic region, diagnosis, type, and severity. **Results:** A total of 851 students (410 boys and 441 girls) had documented injuries that required medical evaluations during the five year span for a total of 1,263 injuries. The average injury rate in the 5 year span was higher in girls (0.89 injuries per girl student athlete/year) than boys (0.76 injuries per boy student athlete/year). Acute sprains, strains and contusions involving the lower limbs were more frequently encountered. Most injuries were mild in severity (65%). No significant gender differences were observed in injury diagnosis, anatomic area involved, type, and severity. **Conclusion:** Injuries in the young athletic population are common. Girls showed a higher injury rate than boys in our sample of the general student-body of a sport-specialized school, but further assessment of age and sport specific differences is needed.

TA204

Injury Prevalence, Stability and Balance in Female Adolescent Soccer Players

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Background: Poor balance is a risk factor for injury in adolescent sport including soccer. There has been a rapid growth in female adolescent soccer especially in South Africa yet the association between balance and injury in this population has not been fully explored. This study determined the relationship between static balance as measured by the Sway Index (SI), dynamic balance as measured by Limits of Stability Direction Control (LOS) and injury. Injury prevalence and the relationship between Body Mass Index (BMI) and static and dynamic balance were also determined. **Materials and Methods:** Eighty adolescent female soccer players, between the ages of fourteen and eighteen, were recruited through convenience sampling from schools in the eThekweni district of KwaZulu-Natal. After obtaining fully informed consents and assents, participants completed questionnaires and were assessed for the balance and BMI. Height, weight, Sway Index (SI) and Limits of Stability Direction Control (LOS) readings, were measured

using a stadiometer, electronic scale and Biodex Biosway Portable Balance System (Biodex Medical Systems Inc., Shirley, New York) respectively. The data were analysed using SPSS version 21.0 (SPSS Inc. Chicago, Ill, USA). Independent samples t tests, and Pearsons Correlation Coefficients were used to determine significant differences between groups and relationships between variables. **Results:** Statistically significant relationships were found between static and dynamic balance and injury. A statistically significant relationship was also found between Body Mass Index and static and dynamic balance. **Conclusion:** This study revealed that poor static and dynamic balance is associated with injury in adolescent female soccer players.

TA205

Evaluation of the Postural Profile at the High-Level Sportsmen

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Background: Instrumental evaluation of the posture has been developed since about fifteen years and they take on a particular interest in the field of the sporting sciences. Our study concerning the postural profile at the high-level sportsmen aimed at estimating the postural control of the subjects according to their sports activities, to their levels of expertise and to their sexes as well as to the influence on the balance of the visual afference on a fixed target. **Methods:** Evaluative cross sectional study made in the department of Physical and Rehabilitation Medicine of the Military Tunis Hospital concerning 70 candidates during year 2013. Each candidate had a full clinical examination followed by an instrumental evaluation on a platform of static balance type “winposture”. We compared the main posturologic parameters of the handball players and karatekas between them and against sedentary people. **Results:** Concerning the surface S, there was no significant difference between the three groups but in intragroup comparison, a significant difference was noted during the condition open eyes and closed eyes evoking a possible visuo-plantar conflict. The quotient of Romberg was more decreased at the karatekas than handball players (13 candidates on 24). The projection of the center of pressure in the frontal and sagittal plan was significantly altered in karatekas ($p<0.05$). The Length according to the surface was significantly increased at the sedentary group who spent more energy to remain in balance. Handball players had a decreased Length according to the surface ($p<0.05$) evoking an inappropriate response to instability. Concerning the variation of speed of oscillation of the center of pressure, there was no significant difference between groups. However, women were significantly more stable than men ($p<0.05$). **Conclusion:** Instrumental evaluation is a useful tool allowing to understand the physiology of the posture at the sportsmen and allows postural reeducation, in order to improve stability of sportman and reduce risk of musculotendinous injuries.

TA206

Effectiveness of an Elbow Brace in the Postoperative Rehabilitation of Mosaicplasty for Osteochondritis Dissecans in Juvenile Athletes

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Introduction: Treatment for early-stage of osteochondritis dissecans (OCD) of the elbow is principally non-operative. On the other hand, treatment of large advanced OCD of the elbow in juvenile athletes is challenging. **Patients and Methods:** We retrospectively reviewed the results in 10 baseball players (mean age, 13.7 years; range, 12-15 years) who were followed up for a mean 35.1 months (range, 24-48 months). After abrasion of the lesion, cylindrical osteochondral plugs were harvested from a lateral femoral condyle and transferred to the lesion (mosaicplasty). After immobilizing the elbow by a

splint for 2 weeks, the patients were encouraged to do range of motion exercises using an elbow brace with a hinge for 2 months. These were designed to avoid excess stress to the implants on the capitellum and to the lateral collateral ligament. Patients were clinically assessed by the Japanese Orthopaedic Association (JOA) elbow score (total 100 points), which consists of items, such as pain, function, range of motion, instability, and deformity, and morphologically by radiographs as well as by magnetic resonance imaging (MRI). *Results:* Patients started playing catch at 3 months and returned to baseball at competitive level at 6 months postoperatively. The average JOA score was 68.9 points before operation and improved to 98.8 points at follow-up. Bony fusion between the implants and host bone was observed radiographically at 3 months. MRI confirmed a durable load-bearing articular surface of the capitellum at 1 year. Wearing the elbow brace protects the collateral ligament as well as the osteochondral graft from excess stress in rehabilitation. Gentle range of motion exercises with the elbow brace also promote ligament healing and remodeling of articular cartilage. *Conclusion:* Osteochondral autograft with postoperative rehabilitation using an elbow brace is a reasonable treatment for juvenile athletes with an advanced lesion of OCD of the elbow who desire a quick return to their pre-injury sports activity level.

A.9.2 VOCATIONAL REHABILITATION

TA207

Work-Related Measures in Medical Rehabilitation: Implementation of an Online Information Tool for Health Care Professionals

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Introduction: Work-related issues are important determinants of work ability and health. Therefore it is necessary to address them in medical rehabilitation. In Germany, work-related programs have been implemented in many rehabilitation centers. However, there is still a need to disseminate vocationally oriented concepts into rehabilitative care practice. This transfer should be geared towards user needs, include good practice examples, practical implementation guidelines, and a user-friendly presentation of the current state of research (Sander et al. 2013). Against this background, a website designed to provide information to health care professionals in work-related medical rehabilitation was revised and updated. *Method:* A systematic literature search was conducted. In two expert workshops including health care professionals, representatives from social security institutions, and rehabilitation researchers, starting points and contents for the update were discussed. Website usage figures were analyzed. Rehabilitation centers providing good practice examples on the website were asked to rate potential modifications and to provide an updated description of their work-related measures. Other rehabilitation clinics were approached to obtain new good practice examples. *Results:* The modified website (re-launch: December 2014) provides users with an extended database including 58 good practice examples, enhanced information on work-related assessments, health payers' requirements regarding work-related medical rehabilitation, and workplace/job descriptions as well as practical implementation aids. *Discussion:* Internet-based information media such as the website on work-related medical rehabilitation programs can be adapted to any health care setting. Their long-term practical relevance depends on whether strategies to create a sustainable platform for this tool can be established (e.g., regarding personnel, financial resources). *References:* Sander, A.M., van Veldhoven, L.M. & Backus, D. (2013). Maximizing usability of evidence in rehabilitation practice: Tips for researchers. *Archives of Physical Medicine and Rehabilitation*, 94, S43-S48.

TA208

Fit for Work and Life: Implementation and First Results of a Comprehensive Health Program for Employees at an University Hospital

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Background: In order to restore, improve or preserve the employees' work ability, the program "Fit for Work and Life" (FWaL) has been developed and implemented at the Hanover Medical School (HMS). Participants are assigned to the separate interventions using the results of medical examination and previous screening. Physical training and exercises as well as stress-management training are provided as preventive measures. Employees with severe limitations of work-related functioning are assigned either to a one-week intensive rehabilitation program in the HMS or to a medical rehabilitation in cooperating rehabilitation centres. *Material and Methods:* FWaL started in July 2013. Employees voluntarily register for participation. Data are assessed by questionnaire before (T1) and at the end (T2) of the intervention as well as three (T3), six (T4) and 12 months (T5) after beginning the intervention. Primary outcomes are duration of sick leave and the Work Ability Index (WAI) (Ilmarinen, 2007). Secondary outcomes are, among others, the scales of the Short Form Health Survey (SF-36). *Results:* 385 employees registered for participation until November 2014. 60.2 % were female (mean age 46.0 years; SD=9.1). Sick leave duration in the three months prior to the beginning of the intervention was, on average, 1.9 weeks (SD=3.5). According to the WAI, 59 % of the participants had a very low to low work ability. Two thirds (65.8 %) of the employees received a preventive measure, one quarter (25.8 %) participated in the one-week intensive rehabilitation program and 7.4 % were assigned to standardized 3-weeks medical rehabilitation. Until now, 142 employees participated in the survey three months after beginning the intervention. These participants improved their work ability (SES [1]=0.16; 95 % CI: 0.05–0.27) and duration of sick leave (SES =0.20; 95 % CI: 0.04–0.36) significantly. Additionally, participants reported positive changes on the SF-36 subscales physical role (SES=0.33; 95 % CI: 0.16–0.49), physical functioning (SES=0.14; 95 % CI: 0.02–0.25) and pain (SES=0.16; 95 % CI: 0.02–0.29). *Conclusions:* The program FWaL was successfully implemented in the HMS. Against the background of the heterogeneous sample, first evaluation results indicate a good effectiveness of the interventions. [1] SES=Standardized effect size.

TA209

Effects of Graded Return-to-Work: a Propensity Score Matched Analysis

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Background: While the effects of graded return-to-work on sustainable employment are positive in patients with chronic back pain, the effects are inconsistent in other patient samples. In Germany, graded return-to-work is possible if patients finished their rehabilitation program but are still unable to perform full duties. Returning to work then can be realized gradually. There are no costs for the employer. Employees receive sickness benefits instead of wages. Retrospective analyses demonstrated positive effects of graded return-to-work on labor participation up to one year. However, analysis of long-term follow-up effects on disability pensions and regular employment are still lacking. *Material and Methods:* Analyses were performed with longitudinal administrative data. We included patients aged 18 to 60 years who attended an orthopedic, cardiac, oncological or psychosomatic rehabilitation between January and June 2007 and were eligible for participating in a graded return-to-work attempt. The effects of graded return-to-work were analyzed by a propensity score matched comparison of patients who returned gradually to work and patients without a

graded return-to-work attempt. Outcomes were disability pension rates, regular income and length of welfare benefits until the end of 2009. *Results:* The propensity score matched sample comprised 1875 patients with a graded return-to-work attempt and 1875 patients without such an attempt. The sample was balanced regarding all baseline variables (mean age: 44.7 years; 49.8 % female). 64.2 % had musculoskeletal, 9.2 % cardiovascular, 20.9 % mental and 5.7 % oncological diseases. The risk of a disability pension was decreased by about 40 percent in patients attending a graded return-to-work attempt (5.4 % vs. 8.6 %; HR=0.62; 95 % CI: 0.49 to 0.80). Subgroup analyses showed that this effect was strongest following orthopedic (HR=0.55; 95 % CI: 0.39 to 0.79) and psychosomatic rehabilitation (HR=0.65; 95 % CI: 0.43 to 0.99). The three-year income (2007–2009) was 12,920 EUR higher (95 % CI: 10,054 EUR to 15,786 EUR) in the graded return-to-work group. The length of welfare benefits was significantly reduced. *Conclusion:* The graded return-to-work approach supports labor participation and reduces the risk of health-related early retirement especially in patients with musculoskeletal and mental disorders.

TA210

Do Rehabilitation Participants Progress from More to Less Supportive Vocational Services in Israel? A Five Year Nationwide Cohort

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Introduction: The Israeli Rehabilitation of Mentally Disabled in the Community Law was implemented in 2001 and provided housing, vocational, educational, social and leisure activity services. Vocational services include different program levels: pre-vocational training (PT) to obtain vocational skills; protective workshops (PW) to work in protective environments; and supported employment (SE) to provide a bridge to the open market. Objectives were a) to examine whether there is a progression from more to less supportive levels; b) to identify predictors of progress and drop out from vocational services. *Methods:* The study is a retrospective, longitudinal follow-up of a five year nationwide cohort. Participants were aged 20-65 with a first admission between 2005-2007 (n=3,059). Data were extracted from Israeli Ministry of Health Rehabilitation and Hospitalization registers. Different rehabilitation pathways are mapped. Statistical analyses include logistic regression for predicting progression and drop out. *Results:* Initially, 30% of participants were found in PT, 43% in PW and 27% in SE. During the 5 year follow-up, participants' last program was only 18% in PT, 49% in PW and 33% in SE. Overall, 31% progressed from PT or PW to SE. Predictors associated with progress were: being male, younger and no psychiatric hospitalization. At the end of five years, 65% of PT, 54% of PW and 58% of SE participants left the programs. Of these, only 9% dropped out due to psychiatric hospitalization. Predictors associated with drop out were: younger age (20-26), vocational level (PT and SE vs. PW); psychiatric hospitalization and not in a housing rehabilitation program. *Conclusion:* Does the rehabilitation system encourage participants to move from more to less supportive vocational services? Findings indicate only a modest gain, comparable to previous studies showing most participants remaining at same level of services. A reasonable alternative is to refer people with psychiatric disabilities to the labor market and to provide then with different levels of services in the workplace. As expressed by Boardman and Rinaldi (2013): "Instead of train and place – place and train". *Reference:* Boardman, J., & Rinaldi, M. (2013). Difficulties in implementing supported employment for people with severe mental health problems. *The British Journal of Psychiatry*, 203(4), 247-249.

TA211

A Review of Job Matching Approaches in Return to Work and Organizational Research

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Introduction: Successful and permanent return to work (RTW) requires that a person's work-related capabilities and characteristics are compatible with the demands and characteristics of his or her job. Therefore, job placement programs in vocational rehabilitation (VR) aim at matching the client's work-related skills and needs with the demands of the intended job and the characteristics of the workplace. In the present study, we wanted to synthesize conceptual and empirical research regarding job matching in the fields of RTW and organizational research in order to identify and discuss potential research gaps and their consequences for VR practice. *Material and Methods:* We conducted a comprehensive narrative literature review on research involving job matching in the contexts of RTW and organizational research by consulting literature databases from the fields of medicine, psychology and economics such as PubMed, CINAHL, PsycINFO and EconLit. *Results:* Preliminary results show that in organizational research, particularly in the areas of career selection and vocational psychology, job matching has been studied much more extensively than in the RTW context with different person-job fit approaches having been investigated. However, organizational research has dealt almost exclusively with non-disabled individuals. In the RTW context, a number of generic job matching tools have been developed which, however, have shortcomings regarding three essential requirements: (1) They are not occupation-specific and do not include the demands and characteristics of particular occupations; (2) they are not health condition-specific and do not capture work-related limitations and needs of persons with a particular health condition; and (3) they do not comprehensively address the fit between occupational and individual attributes and environmental factors influencing RTW. Furthermore, detailed descriptions of the job matching process in VR practice are missing. *Conclusion:* Approaches to job matching in RTW and organizational research have largely been developed independently so far. Integrating these approaches may be essential to develop suitable job matching tools for VR practice and to improve the outcomes of VR interventions.

TA212

Comparison of Job Types Performed before and after Sustaining a Spinal Cord Injury

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Introduction/Background: Persons with spinal cord injury (SCI) tend to work at a lower percentage and drop out of their jobs earlier than non-disabled persons. Affected persons report a lack of suitable jobs as a major barrier to employment. So far, only few studies analyzed and compared the jobs people performed before and after SCI onset. Thus, there is little scientific evidence regarding the characteristics of more or less suitable jobs for persons with SCI. Such evidence, however, is essential for devising effective vocational rehabilitation strategies. Existing job classifications provide valuable information to describe the characteristics of those job types that are more and those that are less suitable for persons with SCI. The objective of this study was to analyze and compare types of jobs performed by persons with SCI living in Switzerland before and after SCI onset. *Materials and Methods:* A cross-sectional descriptive study was conducted based on data from participants of the 2012 SwiSCI Pathway 2 community survey [1]. The International Standard Classification of Occupations (ISCO-08) and the Occupational Information Network (O*NET) were used for classifying the pre- and post-injury jobs of persons with SCI living in Switzerland. *Results:* Preliminary results imply that pre-injury jobs of persons with SCI can frequently be assigned to the crafts sector, i.e. jobs covered by the ISCO-08 major group "Craft and related workers". After SCI onset people often switch to clerical or technical jobs, i.e. jobs covered by the ISCO-08 major groups "Technicians and associate professionals" and "Clerical support workers". *Conclusion:* The findings of this study con-

tribute to an enhanced understanding of return to work pathways of persons with SCI. By providing a list of potentially suitable (and less suitable) jobs for persons with SCI, the study contributes to the development of job matching applications for vocational counseling institutes at Swiss SCI rehabilitation clinics. The study can thus serve for advancing the vocational rehabilitation process which in turn could improve the work reintegration of persons with SCI. *Reference:* Post MW, Brinkhof MW, von Elm E et al: Design of the Swiss Spinal Cord Injury Cohort Study. *Am J Phys Med Rehabil* 2011, 90 (11 Suppl 2): S5-16.

TA213

Risk of Depression Persistence after Involuntary Job Loss: Exploring an Untapped Potential for Vocational Rehabilitation

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Introduction/Background: The aim of this research was to explore whether exposures to compulsory redundancies predict depression persistence in respondents from the nationally representative Swedish Longitudinal Occupational Survey of Health. None of the previous studies examined depression persistence in an equivalently large cohort based on a nationally representative workforce sample. *Material and Methods:* Analysis included 665 respondents with “major depression” and “less severe symptoms” in 2008, assessed with a brief depression subscale from the Symptom Checklist 90. Based on self-reported exposure status covering previous two years, respondents were grouped into three categories: workers who lost their jobs through downsizing (past job loss), employees remaining in downsized organisations and employees from non-downsized organisations (reference group). We estimated the risk of later major depression assessed in 2010 in contrast to less severe symptoms or full recovery. Associations were measured using logistic regression models, with adjustment for demographic and employment variables, severity of earlier depression (major depression versus less severe symptoms in 2008), long-term sickness and the effects of recent redundancies (2008-2010). *Results:* Past job loss strongly predicted later major depression, with the adjusted odds ratio of 3.45 (95% CI 1.18 to 10.07) for symptom worsening or persistence of major depression in laid-off versus non-downsized group. By contrast, we found no evidence of depression worsening or persistence if workers remained employed after downsizing. *Conclusion:* Redundant workers with depression should be offered appropriate health and consulting services to prevent symptom worsening or persistence. Employers and occupational health professionals should support such workers during layoffs. Understanding the role of contextual factors – including policies for employment security – is crucial for planning the vocational rehabilitation.

B. BIOSCIENCES IN REHABILITATION

TB214

Molecular and Cellular Mechanisms of Physiological Ischemic Training on Remote Limbs Promotes Revascularization in Rabbits with Induced Myocardial Ischemia

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Introduction: This experimental study investigates the potential role of physiological ischemic training (PIT) of remote limbs on vascular endothelial growth factor (VEGF), nitric oxide (NO), endothelial progenitor cells (EPCs) and myocardial angiogenesis after myocardial ischemia. *Material and Methods:* Eighty-five rabbits were assigned into eight groups at random: sham-operated (SO), training only (TO), myocardial ischemia (MI), PIT, VEGF inhibitor (VEGF-), NO inhibitor (NO-), VEGF and NO inhibitor (VEGF-/NO-) and EPC inhibitor (EPC-). MI was experimentally induced by implanting a constrictor around the left ventricular branch. The PIT procedure included three 3-min cycles of cuff inflations on the hind limbs followed by a 5 min reperfusion. VEGF mRNA, protein, NO concentration and EPC numbers were measured in plasma and myocardium. Capillary density (CD), coronary blood flow (CBF) and coronary collateral blood flow (CCBF) were also determined. *Results:* Groups were compared using non-parametric statistics and associations between agents were explored with fractional polynomial regression. VEGF-mRNA and -protein levels and NO concentration were highest in PIT. PIT differed significantly from SO, TO, MI, VEGF-, NO-, VEGF-/NO-, and EPC- regarding VEGF-mRNA and -protein in plasma and VEGF-protein in myocardium. EPCs were highest in PIT followed by MI. PIT differed significantly from SO, TO, MI, VEGF-, NO-, VEGF-/NO-, and EPC- regarding plasma EPCs. CD, CCBF and CCBF/CBF were significantly increased in PIT as compared to controls. VEGF explained up to 51% of variance in NO. NO explained up to 63% of variance in EPCs. EPCs explained up to 76% of variance in CD. CD explained up to 83% of variance in CCBF and CCBF/CBF. *Conclusion:* PIT improves revascularization via VEGF and NO-mediated mobilization of EPCs and may be a new approach in the treatment of patients with coronary heart disease.

TB215

Mechanisms for the Protective Effects of 17-Beta-Estradiol: Relevance to Depressive Symptoms in Parkinson's Disease

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Parkinson's disease (PD) is a neurodegenerative disease and a movement disorder characterized by loss of dopaminergic neurons in the substantia nigra causing dopamine depletion in the striatum. Neurodegeneration in PD occurs due to multiple pathways including oxidative stress, mitochondrial damage, protein aggregation. These changes increase during menopausal condition in females when the level of estradiol is decreased. Recently, there has been a growing interest in the action and functions of the ovarian steroid hormone estradiol, particularly on whether they are neuroprotective for such age related disease and neurodegenerative conditions like stroke, PD and Alzheimer's disease. *Objective:* The objective of this study was to investigate protective potential of 17 β estradiol (E2) treatment on the activity of monoamine oxidase, calcium homeostasis, membrane polarization, genomic DNA degradation, 4-hydroxynonenal and protein oxidation levels occurring in brains of female rats of 3 months (young), 12 months (adult) and 24 months (old) age groups, and to see whether these changes are restored to normal levels after exogenous administration of estradiol. *Methods:* The aged rats (12 and 24 months old) (n=8 for each group) were given subcutaneous injection of 17 β -estradiol (0.1 μ g/g body weight) daily for one month. After 30 days of hormone treatment, experimental animals of all the groups were sacrificed and brains were isolated for further study. *Results:* The results obtained in the present work revealed that normal aging was associated with significant increases in the activity of monoamine oxidase, calcium homeostasis, genomic DNA degradation, 4-hydroxynonenal and protein oxidation levels in the brains of aging female rats, and a decrease in membrane polarization. Our data showed that exogenous administration of E2 brought these changes to near normalcy in aging female rats. *Conclusions:* It can therefore be concluded that E2's beneficial effects seemed to arise from its, antioxidant

and antilipidperoxidative effects, implying a therapeutic potential drug for age related changes. Based on our studies and others, we conclude that E2 have therapeutic potential for adjunctive therapy along with dopamine replacement in PD.

TB216

Effects of *Spilanthes Acmella* and Physical Exercise on Testosterone Levels and Osteoblast Cells in Osteoporosis Induced-Glucocorticoid Male Mice

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Introduction: Glucocorticoid-induced osteoporosis is leading cause of secondary osteoporosis. *Spilanthes acmella*, is one of Indonesia medicinal plants that contain of polyphenol and flavonoids. Previously in vitro study showed that buthanol and water fraction from this plant have increased alkaline phosphatase that known as marker of bone formation. The objective of this study to analyze the effect of *Spilanthes acmella* and physical exercise in increasing testosterone and osteoblast cells of femoral's trabecular osteoporosis induced-glucocorticoid male mice. **Material and Methods:** This study using a posttest control group design, 36 male healthy mice (5 months old) were randomized divided into 6 groups, there are: 1. healthy control group (without induction dexamethaxone), 2. osteoporosis groups (induction with dexamethaxone), 3. positive control receive suspension alendronat, 4. ethanol extract group, 5. combination group of 70% extract ethanol and exercise, and 6. exercise group (walking using mice treadmill 10m/minute, 5-12 minutes 3 times a week). All of the intervention were given for 4 weeks. The serum levels of testosterone were determined using immunoserology (ELISA) and osteoblast cells were determined histomorphology by microscope. All statistical test were carried out using SPSS 17 and statistical significance was set at $p < 0.05$ for all analysis. The testosterone levels and osteoblast cells between group were compared using Mann-Whitney test. **Results:** It showed that the alendronate group, ethanol extract group, combination group and the exercise group increasing testosterone level ($p < 0.05$) from that osteoporotic group. There were also increasing osteoblast cells ($p < 0.05$) except the exercise group ($p = 0.249$). **Conclusions:** It proved that 70% ethanol extract of *Spilanthes acmella* have an additive effect to weight bearing exercise in osteoporosis induced-dexamethasone male mice. Either *Spilanthes acmella* or physical exercise have the same effect in increasing plasma testosterone. **Keywords:** secondary osteoporosis, *Spilanthes acmella*, testosterone, osteoblast.

TB217

Medium Speed Walking Exercise Affects Stem Cell Mobilization in Postmenopausal Women – the Role of IL-6

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Introduction/Background: Medium speed walking exercise increases the osteogenic index (OI) and has been proven to promote Bone Remodelling (BR) in postmenopausal women. However, the effect of such exercise on stem cell (SC) mobilization leading to positive uncoupling in BR remain unclear. Similarly, the role of IL-6 in these process also need elucidation. The aim of this study to revealed the effect of medium speed walking exercise to SC mobilization in PBMC on postmenopausal women, and revealed the role of serum IL-6 changes in that process. **Material and Methods:** This one group pretest-posttest design study enrolled 14 postmenopausal women, which performed medium speed walking exercises for 30 minutes, 3 times a week for 3 weeks. Stem cells were taken from peripheral blood mononuclear cell (PBMC). The IL-6 and biochemical bone marker (P1NP and CTx) were taken from serum. **Results:** Post exercise PBMC examination showed increasing in mesenchymal stem cell (MSC) mobilization, reducing haematopoietic stem cell (HSC) mobilization within PBMC, but post exercise subacute sIL-6 has no effect on SC mobilization. The OI affected

sP1NP and sP1NP/CTx ratio. **Conclusion:** Medium speed walking exercise promote positive uncoupling SC mobilization within PBMC and positive uncoupling BR in serum of postmenopausal women. Post exercise subacute sIL-6 did not affect SC mobilization within PBMC, but affect mature OB activities. **Keywords:** walking exercise, stem cell, bone remodeling, IL-6.

TB218

Neural Interaction of Pain and Affect in the Pain Matrix

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Introduction: Patients with chronic pain commonly suffer from emotional symptoms exacerbating the pain perception, which is subject to significant affective modulations. We investigated the neural processing and interaction of induced negative and positive affective states as well as experimental pain in healthy adults. **Methods:** Sixteen healthy young adult subjects were exposed to pictures from the International Affective Picture System with negative, neutral or positive valence, along with laser pain stimuli. The stimuli were pseudo-randomly arranged in three 15-min experiment series comprising 49 stimuli each (picture, laser or picture & laser). The full brain blood-oxygen level dependent signal was acquired using 3.0 tesla magnetic resonance imaging. **Results:** When compared to the baseline, pain stimulus elicited significant activation in central regions of pain processing brain areas. Negative affect stimulus related to significant activation of the right insula, left ACC and visual cortex; positive affect stimulus was associated with the activation of the thalamus when compared to the neutral affect stimulus. Interaction of negative affect and laser stimuli resulted in activation of all identified regions in the pain matrix. Interaction of positive affect and pain stimuli related to bilateral activation of the insula and SII. **Conclusion:** These findings demonstrate positive widespread interaction in the pain matrix during simultaneous negative affect and physical pain. For the first time, we demonstrated the interaction of affect and pain in the secondary somatosensory cortex regardless of valence. The finding serves as a neuroscience model explaining how affects and pain sensation reinforce each other in clinical settings.

TB219

Is the Irritability of Myofascial Trigger Spot Correlated with the Activity of Rho Kinase?

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Background: The characteristics of myofascial pain syndrome (MPS), a myofascial trigger point (MTrP), is a hyperirritable spot located in the taut band of skeletal muscle. Endplate noise (EPN) can be specifically recorded from an MTrP locus, and the prevalence of EPN in an MTrP has been shown to be correlated with the irritability of an MTrP. Rho kinase appears to mediate a large proportion of the signals from Rho, and regulate dynamic reorganization of cytoskeletal proteins. Activation of focal subcellular contraction proteins (i.e., Rho kinase) could result in local hypoxia, which might be related to the "energy crisis" hypothesis for the pathogenesis of an MTrP. Therefore, the activity of Rho kinase could be correlated with the irritability of an MTrP. **Material and Methods:** An established animal model for the study of an MTrP was used. Nine adult New Zealand rabbits (3~5 Kg) were collected. Three points were located in each femoris biceps: *Point A*: a myofascial trigger spot (MTrS); equivalent to an MTrP in human), a most irritable point on the taut band; *Point B*: a point on the taut band, but was not an MTrS; *Point C*: a point outside of the taut band, and was not an MTrS. The prevalence of EPN and the activity of Rho kinase in these three points were measured and analyzed. **Results:** The results of our study re-

vealed that the prevalence of EPN in point A (14.84%) was higher than that in point B (6.47%), whereas that in point B was higher than that in point C (0.00%). The measured Rho kinase activity in point A (95.14%) was higher than that in point B (41.29%), whereas Rho kinase activity in point B was also higher than that in point C (23.71%). Correlation analysis revealed that the irritability of an MTrS was correlated with the activity of Rho kinase ($r=0.44$). **Conclusion:** Our study revealed that the irritability of an MTrP was correlated with the Rho kinase activity. The results proved our hypothesis of the pathogenesis of an MTrP and further improved our understanding about the pathophysiology of MPS.

TB220

The Osteogenesis Promoted by Low Sound Pressure Level Infrasonic

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Introduction/Background: Bone defects represents a significant health problem which calls for effective and non-invasive therapeutic agents. Infrasonic is a mechanical wave with oscillation frequency below 20 Hz. Infrasonic with low sound pressure level was found to have potential to regulate local microenvironment and tissue regeneration. Osteotropic effects in bone was also reported in cytological studies. This study aims to investigate the effects of low sound pressure level infrasonic on bone metabolism in vivo, and also to clarify its mechanisms of osteogenesis promotion. **Material and Methods:** Total 46 Sprague-Dawley rats were used for fracture model: a 2.5 mm gap between the bone fragments was created and the femoral osteotomy site was stabilized with a single-side external fixator. After osteotomy, all rats were allocated into experimental and control group randomly. The experimental group was exposed to low sound pressure level infrasonic for 30 min twice daily for 42 days, starting on the fifth postoperative day. The control group underwent the same procedure but without infrasonic exposure. On the days 7, 14, 28 and 42 after surgery, radiographs and peripheral quantitative computerized tomography (pQCT) were used to evaluate the fracture healing and callus development. Immunofluorescence staining was used to determine the expression and distribution of nerve-derived neuropeptides: calcitonin gene related peptide (CGRP) and Neuropeptide Y (NPY). **Results:** The infrasonic group had more consecutive and smoother process of fracture healing and modeling in radiographs. It also showed higher average bone mineral content and bone mineral density. Increased CGRP innervation and decreased NPY innervation was found in microenvironment. **Conclusions:** The results suggested that low sound pressure level infrasonic is beneficial for the bone fracture healing. The osteogenesis promotion effects is partly mediated by the neuro-osteogenic network in local microenvironment, which might provide new strategy to accelerate bone healing and remodeling.

B. REHABILITATION AND BIOMECHANISM IN OSTEOARTHRITIS

TB221

Cartilage Biomarker Could Be of Assistance in Assessment of Outcome of Exercise Therapy in Knee Osteoarthritis Patients

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Introduction: Guided exercise therapy (ExT) is considered to be the most effective non-pharmacological means for knee osteoar-

thritis (OA). However, it is not clear whether any ExT could affect cartilage metabolism. We aimed to investigate this aspect in relation of two common (patient-based and investigator-based) approaches to assessment. **Methods:** We investigated 42 female knee OA patients aged 36–67 (mean 56.6) years with BMI 20–41 (mean 30.9). They had mainly radiographic grade 1 or 2 OA. Gym based 8-week ExT was performed three times per week for 60 min during each session. Every session consisted of strengthening (quadriceps and hamstring muscles) and neuromuscular exercises. The effect of ExT was assessed by the KOOS questionnaire (patient's self-assessment), by 6 tests of functional abilities of the lower limb (up & go, raising from low chair, stairs-stepping, 30 and 300 m walk) and by the output of cartilage biomarker C2C. In comparison with WOMAC, the Knee Injury and Osteoarthritis Outcome Score (KOOS) includes two additional subscales (sports-recreation and quality of life). The immunoassay C2C-HUSA™ (IBEX, Canada) measures type II collagen neoepitope fragments in urine. U-C2C excretion is significantly higher in patients with degree 2 or higher tibial or femoral cartilage lesion compared with cases without structural changes (Tamm et al. 2013, 2014). **Results:** Assessment of the outcome of ExT as "improvement," "without significant change" or "worsening", revealed divergence within the KOOS 5 subscales and the 6 performance test. When the result of 3 out of the 5 KOOS scales or 4 out of the 6 tests increased/decreased it was considered a real change. Thus, according to the KOOS results, 23 patients out of 42 improved, and the outcome in 9 of them was worse. According to the tests, 20 patients improved and 8 became worse. U-C2C excretion decreased significantly ($p=0.019$) only in the ExT group with improvement according to the results of the performance tests. **Conclusions:** Different assessment methods may yield divergent results of the outcome of ExT. According to the performance tests about half of the middle-aged patients with knee OA improved after 8-week ExT. Among them the joint cartilage biomarker u-C2C indicated a positive change.

TB222

Effect of Self Assembled Peptide-Substance P Complex on the Progression of Osteoarthritis in a Rat Model

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Introduction/Background: Substance P (SP) is known as a neuropeptide to recruit intrinsic stem cells and to ameliorate arthritis via suppression of the catabolic pathway. Self assembled peptide (SAP) has a function of releasing a neuropeptide slowly and incorporating specific motifs based on desired function. We hypothesized that SAP-SP complex would inhibit the catabolic pathway caused by the osteoarthritis and enhance the cartilage regeneration by the recruitment of intrinsic mesenchymal stem cells. **Materials and Methods:** A total of 60 female Sprague Dawley rats underwent surgical procedure (anterior cruciate ligament resection and medial meniscectomy) for the osteoarthritis model. KLD-12 was used as the SAP and they were conjugated with diverse amount of SP (17.5 ug, 35 ug, 70 ug). Ten rats were used for the evaluation of biotinylated SAP-SP disappearance. Fifty rats were divided into 5 groups: SAP (n=10), SAP-SP17.5 (n=10), SAP-SP35 (n=10), SAP-SP70 (n=10), and control (n=10) groups. Total 2 ml of SAP, SAP conjugated with diverse amount of SP, and normal saline were injected into the left knee joint in each group 3 weeks postsurgery. Histologic examination, immunofluorescent staining and qRT-PCR, TUNEL assay, and micro-computed tomography were conducted 6 weeks after injections. Cell markers for the recruitment of intrinsic mesenchymal stem cells (CD90 and CD105) were evaluated by the immunofluorescent analysis. Behavioral studies were done before, 3 weeks after, and 6 weeks after treatment. **Results:** Biotinylated SAP-SP stayed within the knee joint till 6 weeks after the injection. Modified mankin scores were significantly lower in SAP-SP17.5 and SAP-SP35 groups than control group ($P=0.011$ and 0.013). Immunofluorescent

staining and gene expression of caspase-8 and TIMP was significantly lower in SAP-SP17.5, SAP-SP35, and SAP-SP70 groups than control group. Expression of CD90 and CD105 was higher in SAP-SP17.5, SAP-SP35, and SAP70 groups than other groups. TUNEL assay showed decrease of apoptosis in SAP-SP17.5 and SAP-SP35 groups. However, neither bone mineral density nor behavioral results showed any significant difference between groups. **Conclusion:** Injection of SAP-SP improved histologic changes of osteoarthritis and this might be due to the recruitment of intrinsic mesenchymal stem cells, inhibition of catabolic pathway and anti-apoptotic effect.

TB223

The Chondroprotective Effect of Botulinum Toxin Type A in Rat Knee Osteoarthritis

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Introduction: Knee osteoarthritis (OA) has an incidence rate of 25 % per year and responses to treatment are variable. The analgesic effect of intraarticular injection of BTXA (botulinum toxin type A) has been observed in patients with knee osteoarthritis. This study aims to investigate the therapeutic effect of botulinum toxin type A (BTX-A) in rat knee osteoarthritis (OA) on pathology severity and physical weight bearing degree. **Material and Method:** Thirty-two rats with surgically induced knee osteoarthritis were allocated into the experimental group (16 rats) and the control group (16 rats), respectively. Botulinum toxin type A (BTX-A) was injected into the OA knees during the initial 4 weeks in the experimental group, while normal saline in the control group. Static weight bearing test and histopathology were performed in the first, second and third month, respectively. Mankin scale was used to evaluate the degree of cartilage degradation. **Results:** From the macro- and microscopic investigation, BTX-A improved the pathologic severity of the OA knee model. The Mankin scales were significantly lower, indicating less severe pathologically in the experimental group than in the control group after both 2 months (BTX-A vs. placebo: 6 ± 5.714 vs. 9.125 ± 6.125 , $n=8$ in each group, $p=0.018$) and 3 months (5.5 ± 2.7 vs. 8.83 ± 2.97 , $n=6$ in each group, $p=0.008$), respectively. Interestingly, the static weight bearing on rat OA limbs did not physically significantly improve (BTX-A vs. placebo: 1st month: $47.2 \pm 11.2\%$ vs. $44.9 \pm 11.4\%$; 2nd month: $53.1 \pm 11.3\%$ vs. $52.2 \pm 9.4\%$; 3rd month: $57.8 \pm 7.0\%$ vs. $55.2 \pm 7.7\%$, $n=16$, 8 and 7 in 1st, 2nd and 3rd month, respectively). **Conclusion:** Intraarticular injection of BTX-A has pathologically chondroprotective effect in rat knee OA model. The underlying molecular mechanism demands further investigation.

TB224

Electroacupuncture Protects against Articular Cartilage Erosion by Inhibiting Metalloproteinases in a Rat Model of Osteoarthritis

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Introduction/Background: The therapeutic effects of electroacupuncture (EA) on osteoarthritis have been documented. However, the mechanisms of the effects of electroacupuncture on osteoarthritis remain unclear. Cartilage degradation is the most predominant pathological change during osteoarthritis. Evidences have shown that metalloproteinases (MMPs) play a key role in the breakdown of cartilage. The present study aimed to investigate the effects of electroacupuncture on cartilage in an experimental animal model of osteoarthritis induced by anterior cruciate ligament transection (ACLT),

and further investigate the effects of electroacupuncture on MMP-1, MMP-3 and MMP-13 expression. **Material and Methods:** Thirty 3-month-old female Sprague Dawley rats were randomly divided into three groups: normal control group (NC group), anterior cruciate ligament transection (ACLT) without treatment (ACLT group), and anterior cruciate ligament transection with electroacupuncture treatment (EA group). One week after anterior cruciate ligament transection, rats in the EA group received 12-week electroacupuncture treatments. The bilateral Zusanli (ST36), Yinlingquan (SP9), Yanglingquan (G34), and Sanyinjiao (SP6) acupuncture points were used, and electric stimulation was generated by the SDZ-V nerve and muscle stimulator (Huatuo, Suzhou Medical Instruments Factory) with a frequency of 3 Hz and an intensity of 1 mA. The 12-week electroacupuncture regimen included 30 min/day for 5 days/week. The effects of electroacupuncture were assessed by morphological and histological analysis. Quantitative real-time polymerase chain reaction (qPCR) was used to investigate the expression of MMP-1, MMP-3 and MMP-13. **Results:** ACLT-induced coarse articular cartilage surfaces, fibrous degeneration, and fissuring were suppressed by electroacupuncture treatment. Mankin scores in the EA group were significantly lower compared to the ACLT group ($P < 0.01$), although it was higher compared to the NC group ($P < 0.01$). Expressions of MMP-1, MMP-3 and MMP-13 genes in cartilage were significantly inhibited by electroacupuncture. No severe adverse events were observed. **Conclusion:** Electroacupuncture can prevent the degeneration of articular cartilage, at least partly, through inhibiting metalloproteinases in cartilage of anterior cruciate ligament transection rats.

TB225

Pre-Emptive, Early, and Delayed Pulsed Electromagnetic Fields Treatment in a Rat Model of Low-Dose Monosodium Iodoacetate-Induced Knee Osteoarthritis: Effect on Subchondral Trabecular Bone Microarchitecture and Cartilage Degradation

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Background: To investigate the efficacy of pre-emptive, early, and delayed pulsed electromagnetic fields (PEMFs) treatment initiation on cartilage and subchondral trabecular bone in knee osteoarthritis rats induced by low-dose monosodium iodoacetate (MIA). **Material and Methods:** Seventy-five 12-week-old male Sprague-Dawley rats were randomly assigned to three groups: OA ($n=30$), PEMFs ($n=30$), and control ($n=15$). Osteoarthritis was induced (OA and PEMFs group) by injecting 0.2 mg MIA in the rat's right knee joint. The control rats received a single sterile saline injection in the right knee. Male rats received pre-emptive ($n=10$, day 0-end of week 4), early ($n=10$, end of week 4-end of week 8), or delayed ($n=10$, end of week 8-end of week 12) PEMFs treatment (75 Hz, 1.6 mT). Micro-computed tomography (micro-CT) analysing bone mineral density (BMD), bone surface/bone volume (BS/BV), bone volume fraction (BV/TV), trabecular thickness (Tb.Th), trabecular separation (Tb.Sp), and trabecular number (Tb.N), bone histomorphometry and immunohistochemistry, serum cartilage and subchondral bone formation markers including osteocalcin (OC) and N-propeptide IIA of type II collagen (PIIANP), urine cartilage and subchondral bone resorption markers including C-terminal telopeptide of collagen type II (CTX-II) and C-terminal telopeptide of collagen type I (CTX-I) were undertaken at 4, 8, 12 weeks. **Results:** Pre-emptive PEMFs stimulation protected cartilage, preserved subchondral trabecular bone microarchitecture, and prevented bone loss. Early and delayed PEMFs treatments prevented cartilage degradation and protected subchondral trabecular bone, but no significant effect. **Conclusions:** PEMFs prevented cartilage degradation and preserved the structural integrity of subchondral bone in knee OA rats. The time point of treatment initiation is crucial for treating OA. PEMFs might become a potential biophysical treatment modality for osteoarthritis.

TB226**The I.M. Injection of Tetanustoxin (TTX) to Facilitate Centrally Paretic Muscles: Results in Paraplegic Dogs***S. Hesse¹, C. Werner¹, A. Kutchenko², M. Deutschland³, D. Liebetanz²¹Medical Park Berlin, ²Universität Göttingen, ³Tierneurologie Berlin, Berlin, DE

BTX-A is well established to inhibit muscle activity, the related TTX may be an option to facilitate centrally paretic muscles. Following intramuscular injection and retrograde axonal transport, it may desinhibit (i.e. facilitate) the alpha moto neuron activity on the corresponding spinal level. In 14 mice, three dosages of TTX (0.05, 0.10, 0.15 ng, each side) were injected into both Mm. gastrocnemius, after 3 days the mice ran tip-toe, no other muscles were affected. The maximum running wheel speed corresponded to the dosage, i.e. the wheel speed served as a bio assay to detect its biological potency in vivo. For further experiments, aliquots of accordingly tested TTX (solved in 0.1% HAS/BSA) were frozen (-20°). The chosen animal model were paraplegic dogs in a chronic stage, the operative decompression in the acute stage had not been successful. In the first dog, (6 kg) 0.1875 ng TTX each were injected into both Mm. gastrocnemius and 0.375 ng TTX each in both Mm. quadriceps, the total dosage was 1.125 ng. Three days after injection the muscle tone and the circumference of the injected muscles increased. On a treadmill, the dog initiated swinging of the hind limbs and needed less body weight support during stance, the clinical condition did not change. The EMG revealed a tetanus of the injected muscles (frequency ranging from 10–30 Hz). The activity of the thigh muscles was modulated according to the position of the knee joint, i.e. when flexing the knee the activity was on to support the BW. In the second dog (12 kg), a larger dosage was injected into three muscles of both sides (Mm. gluteus medius, quadriceps and gtx, total dosage 4.25 ng TTX), the increase in muscle tonus and circumference was more pronounced, it became able to stand itself for up to 10 s, limb swinging however was not initiated. The effects waned after eight weeks. The i.m. injection of biologically validated TTX into muscles may be an interesting option to induce focal muscle hypertrophy and tonus in centrally paretic muscles. The effects could be used functionally in rehabilitation of stance and gait.

TB227**Pulsed Electromagnetic Fields Inhibit Subchondral Bone Loss and Ameliorate Cartilage Degeneration in Ovariectomized Rats**

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Introduction/Background: Evidences have shown that an ovariectomized (OVX) rat could be used as an experimental animal model of postmenopausal osteoarthritis and osteoporosis. This study aimed to investigate the effects of pulsed electromagnetic fields (PEMFs) on subchondral bone mass and cartilage degeneration in OVX rats. *Material and Methods:* Thirty 3-month-old female Sprague Dawley rats were randomly divided into three groups: sham-operated control (SHAM), ovariectomy (OVX), and ovariectomy with PEMFs treatment (PEMFs). One week following ovariectomy surgery, rats in the PEMFs group were exposed to PEMFs for 40 min/day, 5 days/week, for 12 weeks. PEMFs were generated by the PEMFs stimulation apparatus with a frequency of 8 Hz and an intensity of 3.82 mT. After 12 weeks PEMFs exposure, all rats were killed by cervical dislocation. Enzyme linked immunosorbent assay (ELISA), micro-computed tomography and histology analysis were performed to evaluate serum CTX-I and CTX-II; subchondral bone mass and microarchitecture, and cartilage de-

generation. *Results:* The levels of CTX-I and CTX-II increased significantly after OVX. PEMFs reduced CTX-I and CTX-II levels to the levels in SHAM group. Subchondral bone mineral density (BMD) significantly decreased after OVX. However PEMFs increased BMD in OVX rats. Compared to SHAM group, trabecular bone volume ratio (BV/TV), trabecular thickness (Tb.Th), and trabecular number (Tb.N) were significantly lower, and trabecular separation (Tb.Sp) was significantly greater in OVX group. However, PEMFs significantly increased BV/TV, Tb.Th, and Tb.N and reduced Tb.Sp in OVX rats. OVX-induced coarse articular cartilage surfaces, fibrous degeneration, and fissuring were suppressed by PEMFs treatment. Mankin scores increased significantly after OVX. PEMFs significantly reduced Mankin scores in OVX group compared to SHAM group. *Conclusion:* The results demonstrated that PEMFs can inhibit subchondral bone loss and protect articular cartilage in ovariectomized rats. However, whether PEMFs protect against articular cartilage erosion by inhibiting subchondral bone loss in OVX rats need be further investigated.

C.1 PRM DIAGNOSTICS AS RELATED TO ORGAN SYSTEMS AND BODY FUNCTIONS**TC228****Assessing Risks and Resources for Long-Term Positive Outcomes after Psychosomatic Inpatient Rehabilitation**

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Background: In Germany, about 145.000 people per year receive psychosomatic inpatient rehabilitation (PIR). Treatment is based on the framework of the ICF and aims at compensating for impairments due to mental disorders with a special focus on activities and participation (Linden, 2014). However, not all patients equally benefit from PIR. According to the ICF-approach, contextual factors may have an impact on the individual's activity limitations and participation restrictions and thereby on rehabilitation outcomes. We identified risks and resources potentially influencing long-term positive outcomes after PIR by reviewing the literature, by analysing available quantitative data and by conducting qualitative focus groups. As a result a checklist of risks and resources (RiRes) was developed in a final expert workshop. The aim of this study was the evaluation of the predictive power of the RiRes. *Methods:* N=712 patients in PIR and their therapists filled in the appropriate RiRes versions (patient (RiRes-P): 20 items, therapist (RiRes-T): 10 items) at admission. In addition, data on activity limitations and participation restrictions (ICF-PsychA&P, Brütt et al., 2014) from three measurement points (admission, discharge, 6-month follow-up) was available. Linear regression analyses were performed and cut-off scores were determined using ROC analysis. *Results:* The 20 items of the patient version of the RiRes explain up to 39% of the variance in the ICF-PsychA&P total score at follow-up, the therapist version explains 13%, respectively. When a sum score (range: 0-60) of the RiRes-P is calculated, a cut-off score of 24 identifies 66% of patients with an unfavourable ICF-PsychA&P total score at follow-up (sensitivity). Nonetheless, 31% "false positives" (1-specificity) occur. This is reflected by a Youden index of 0.33. *Conclusion:* The patient and the therapist version of RiRes cover aspects related to environmental (social- and working environment, employment perspective) and personal factors (dealing with disease, treatment expectations, personal characteristics). The items of the RiRes-P can predict activity limitations and participation restrictions and cut-off scores assist with identifying patients with a less favourable PIR outcome at an early stage. This information may guide assigning specifically tailored interventions or developing special treatment options for those patients who are less likely to benefit from PIR.

TC229

The Diagnostic Value of Ultrasonography in Patients with Electrophysiologically Confirmed Carpal Tunnel Syndrome

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Objective: To evaluate the diagnostic value of ultrasonography in patients with electrophysiologically confirmed carpal tunnel syndrome. **Design:** A prospective ultrasonographic study of 70 wrists with electrophysiologically confirmed carpal tunnel syndrome and of 80 normal wrists. Receiver-operating-characteristics curves for the ultrasonographic measurements of median nerve were plotted to identify the most optimal cutoff values. **Results:** The ultrasonographic measurements of median nerves were found to be increased significantly in patients with carpal tunnel syndrome when compared with controls, particularly in terms of cross-sectional area ($P < 0.001$). According to receiver-operating-characteristics curve results, the most optimal cutoff value for the cross-sectional area of the median nerve was obtained at the level of middle carpal tunnel, which was 9.3 mm², with a sensitivity of 80% and specificity of 77.5%. **Conclusion:** Ultrasonographic examination of the median nerve seems to be a promising method in the diagnosis of carpal tunnel syndrome, evaluating the morphologic changes of the median nerve in patients with clinical signs and symptoms. Further studies with wider series are needed to confirm our preliminary results. **Keyword:** Carpal Tunnel Syndrome, Ultrasonography, Median Nerve, Electrodiagnosis.

TC230

Electroneuromyographic Results of Patients with a Pre-Diagnosis of Ulnar Neuropathy at the Elbow, Relationship with Clinical Findings and Determination of Sensitivity and Specificity of Electroneuromyographic Tests

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Introduction/Background: The aim of this study was to determine the sensitivity and specificity of nerve conduction studies recording abductor digiti minimi (ADM) and first dorsal interosseous (FDI) muscles, which are used in electroneuromyographic (ENMG) evaluation of patients with suspicion of ulnar neuropathy at the elbow (UNE). **Material and Methods:** Patients who applied to our ENMG laboratory with suspicion of UNE were evaluated. Ulnar nerve motor (ADM and FDI muscles) and sensory conduction studies were recorded. Needle EMG was performed to flexor carpi ulnaris (FCU), ADM and FDI muscles. Amplitude drops in elbow segment were recorded as conduction block. Conduction velocity slowing was accepted as focal demyelination. Abnormal needle EMG findings were considered as axonal damage. **Results:** A total of 150 patients (80 male, 70 female) between the age of 21-80 were included in this study. ENMG findings were normal in 107 patients. 19 patients were diagnosed with UNE when 4 patients had carpal tunnel syndrome (CTS), 7 patients had CTS+UNE, 1 patient had ulnar neuropathy at the wrist (UNW), 1 patient had CTS+UNW, 4 patients had polyneuropathy (PNP)+CTS+UNW, 1 patient had mononeuritis multiplex, 3 patients had PNP+CTS and 1 patient had anterior interosseous syndrome. Patients were divided into two groups as patients with normal EMG and patients with EMG findings suggesting UNE. Between the two groups demographic features, ADM motor latency, FDI motor amplitude, decrease in motor amplitudes of ADM and FDI, needle EMG results were similar ($p > 0.05$). Sensory latency, FDI motor latency, sensory velocity and amplitude, ADM motor velocity and amplitude, F latencies were found different ($p < 0.05$). In UNE group, motor focal demyelination ratio was 88.8% when recording ADM muscle and was 80% when recording FDI muscle. Conduc-

tion block of these measurements were found 47.3 %, and 78.9 respectively. Sensory conduction block was 89.6%. Sensitivity of ADM records was 98.55% and specificity 25%. In FDI group, sensitivity and specificity were 83.3%. **Conclusion:** ENMGs of these patients should be performed carefully because of inconsistency with ENMG findings and clinical suspicion. It seems like results when recording ADM muscle are more sensitive compare to FDI, in contrast with specificity.

TC231

Age Effects on Upper Limb Kinematics Assessed by the Reaplan Robot in Healthy Subjects Aged from 3 to 93 Years Old

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Introduction/Background: Kinematics is recommended for the quantitative assessment of upper limb movements. The aims of this study were to determine the age effects on upper limb kinematics and establish reference standards in healthy subjects. **Materials and Methods:** Three hundred and seventy healthy subjects, aged from 3 to 93 years, participated to the study. Twenty-eight kinematic indices were computed from two unidirectional (i.e., reaching a target and performing a back-and-forth movement) and two geometrical (i.e., drawing a circle and a square) tasks (1). Each task was performed ten consecutive times with the REAplan, a distal effector robotic device that allows upper limb displacements in the horizontal plane. **Results:** For both unidirectional tasks, the speed index showed an increase during childhood, a maturation in young adults and a decrease in the elderly. Moreover, for the back-and-forth movements, the smoothness results were more reproducible during the ten cycles of movements in young adults than in children and old subjects. Finally, the accuracy and straightness indices did not show any age effect for both unidirectional tasks. For both geometrical tasks, the speed index showed a decrease along the whole life and the smoothness index showed an improvement during childhood, a maturation in young adults and a deterioration in the elderly. Finally, the accuracy index did not show any age effect for both geometrical tasks. **Conclusion:** This study was the first to use a robotic device to assess the age effects on upper limb kinematics and establish reference standards in subjects aged from 3 to 93 years. **Reference:** (1) Gilliaux et al., J Rehab Med 2014; 46: 117-25.

TC232

Electromyographic Assessment of Shoulder Girdle Muscles during Common Rehabilitation Exercises*O. Alizadehkhayat¹, *D. Hawkes², S. Frostick²¹Liverpool Hope University, ²Liverpool University, Liverpool, GB

Introduction: Effective overhead throwing requires a balance between rotational shoulder strength and flexibility. Injuries are common and rehabilitation is central for successful treatment. This study aimed to describe shoulder muscle activation strategies during eight common rotational shoulder exercises. **Method:** EMG was recorded in 30 healthy subjects from 16 shoulder girdle muscles (surface electrodes: anterior, middle and posterior deltoid, upper, middle and lower trapezius, upper and lower latissimus dorsi, upper and lower pectoralis major; fine wire electrodes: supraspinatus, infraspinatus, subscapularis and rhomboid major) using a telemetric EMG system. Five external rotation (EXT.R.) exercises (0° and 90° of abduction, and with towel, prone external rotation, side lying internal rotation) and three internal rotation (INT.R.) exercises (0° and 90° of abduction, zero-position internal rotation) were included. Mean EMG amplitudes between exercises were compared using repeated measures ANOVA. **Results:** EXT.R. Exercises: significantly higher activation of deltoid was seen in

EXT.R. at 90° abduction compared to other exercises (73.7% vs 12.4–27.2%; $p < 0.001$). Peri-scapular muscle activation was highest in EXT.R. at 90° abduction and prone EXT.R. (76.7–83.2% vs 28.2–45.5%; $p = 0.013 - < 0.001$). Activation of latissimus dorsi and teres major was significantly higher during prone EXT.R. (64.1% vs 18.1–48.4%; $p < 0.001$). Activation of the rotator cuff muscles was similar across all exercises. INT.R. Exercises: the highest deltoid activity was seen during INT.R. at 90° abduction, followed by zero-position internal rotation and lowest during INT.R. at 0° abduction (261.6% vs 190.1% vs 40.9%; $p = 0.003 - < 0.001$). A similar activation pattern was seen for peri-scapular muscles. The highest activation of pectoralis major was in zero-position INT.R. (25.4% vs 4.9–15.7%; $p = 0.002 - < 0.001$). Significantly higher levels of rotator cuff activation were seen during INT.R. at 90° abduction (325.0% vs 94.0–188.3%; $p = 0.005 - 0.017$). **Conclusion:** This study provides a comprehensive description of muscles activation during common rotational shoulder exercises. It enables sport medicine professionals to target specific shoulder girdle muscles during rehabilitation protocols while minimising the effect of others, forming the basis for exercise prescription.

TC233

Robotic Biomarkers of Motor Recovery after Stroke

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Background/Objectives: Because robotic devices record the kinematics and kinetics of human movements with high resolution, we hypothesized that robotic measures collected longitudinally in patients after stroke would bear a significant relationship to standard clinical outcome measures and, therefore, might provide superior biomarkers. **Design:** sample of convenience, artificial neural network. **Participants and Setting:** 208 acute stroke patients. **Materials/Methods:** In patients with moderate to severe acute ischemic stroke we used clinical scales and robotic devices to measure arm movement 7, 14, 21, 30, and 90 days after the stroke. The interactive robots measured speed, position, and force, so that calculated kinematic and kinetic parameters could be compared to clinical assessments. **Results:** Among 208 patients, robot measures predicted well the clinical measures (cross-validated R^2 of modified Rankin scale=0.60; NIH Stroke Scale=0.63; Fugl-Meyer=0.73; Motor Power=0.75). When suitably scaled and combined by an artificial neural network, the robotic measures demonstrated greater sensitivity in measuring the recovery of patients from day 7 to day 90 (increased standardized effect=1.47). **Conclusions/Significance:** These results demonstrate that robotic measures of motor performance will more than adequately capture outcome and the altered effect size will reduce the required sample size. Reducing sample size will likely improve study efficiency.

TC234

Unsupervised Monitoring for the Diagnosis of Nocturnal Hypoventilation Associated with Cervical Spinal Cord Injury

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Introduction/Background: To determine the utility and relevant factors of portable, unsupervised transcutaneous partial pressure of carbon dioxide (tc-PCO₂) monitoring and oxygen saturation by pulse oximetry (SpO₂) and pulse rate (PR) for detecting nocturnal hypoventilation in individuals with cervical spinal cord injury. **Materials and Methods:** We searched medical records of patients with cervical spinal cord injury who received inpatient rehabilitation treatment from January to October 2014. We excluded the patients with thoracic spinal cord injury, cauda equina syndrome, preexisted sleep apnea disorders, old age over 80 years, and severe

neuromuscular problem. The index including tc-PCO₂, SpO₂ and PR was measured by the portable recorder known as sentec monitoring device. This portable recorder uses V-sign sensor which are applied to the right earlobe and responds quickly and accurately to changes in patient's PCO₂ and SpO₂ levels. We use this device to measure overnight transcutaneous capnography and pulse oximetry. **Results:** Nocturnal hypoventilation was detected in 10 subjects of experimental group. There was a patient whose data was remarkably impaired. Minimum SpO₂ was checked by 53%, and Maximal tcPCO₂ was checked by 66.8 mmHg. Comparison of prevent and desaturation event during sleep in cervical spinal cord injury group, there were significant change of SpO₂, tc-PCO₂, PR. Sensory injury level and cervical spinal cord injury level showed significant correlation with severity and frequency of desaturation events. **Conclusion:** Even though the data of experimental group is normal at daytime, oxygen saturation can be decreased at nighttime. We should remind this feature, because this examination will be correlated to the nocturnal hypoventilation treatment like as continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP). In conclusion, unsupervised monitoring with tc-PCO₂, SpO₂, and PR is a useful method for diagnosing nocturnal hypoventilation in cervical spinal cord injury. **References:** 1) J Clin Sleep Med. 2014 Jan 15; 10(1): 65-72, Sankari A, Bascom A, Oomman S, Badr MS. 2) Spinal Cord. 2002 Jun; 40(6): 286-94, Stockhammer E, Tobon A, Michel F, Eser P, Scheuler W.

TC235

Differences in Body Composition in Patients with Lipoedema of the Legs – a Case Control Study

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Background: Lipoedema of the legs is a chronic disorder in women characterized by enlargement of the legs due to subcutaneous deposition of fat, which can be masked by obesity. Dual-energy X-ray absorptiometry (DXA) is capable of measuring regional body composition (BC). The aim of our study was to demonstrate that the assessment of BC using DXA can differentiate lipoedema of the legs from healthy controls independent from body mass index (BMI). **Methods:** 49 females aged 18–60 years (age: 46.47±9.74; BMI: 32.25±7.77) with lipoedema of the legs were recruited from a specialized lymphology clinic. Healthy female controls (age: 43.10±10.02; BMI: 28.41±3.97) were randomly chosen from a cross-sectional study on BC and group-matched for Body mass index (normal weight NW, overweight OW, obesity OB) at a ratio of 2:1 to cases. All subjects received a whole-body composition assessment with DXA on the identical device. Differences in BC measures between the lipoedema group and the healthy reference were derived separately for each BMI category using Student-T-test or Mann Whitney-U-test for independent samples, depending on the data distribution. **Results:** Across all BMI categories, females with lipoedema showed significantly higher values in the fat mass measures of the legs (NW: $p = 0.0008$; OW: $p = 0.0003$; OB: $p = 0.0009$) and the gynoid region (NW: $p = 0.02$; OW: $p = 0.002$; OB: $p = 0.0003$). By contrast, no differences in fat mass were found for the trunk and android region. Likewise, lipoedema patients presented with a significantly higher leg-trunk-index only in normal weight subjects and overweight subjects (NW: $p = 0.001$, OW: $p = 0.004$) but not in obese subjects ($p = 0.06$). Moreover, we found a significant lower ratio of android to gynoid fat mass in patients with lipoedema compared to controls only in the normal weight and the overweight group (NW: $p = 0.02$; OW: $p = 0.02$) but not in the obesity group ($p = 0.08$). No differences between groups were found for leg lean mass. **Conclusion:** The assessment of legs fat with DXA makes it possible to differentiate lipoedema from healthy controls independent from BMI and thus might be valuable for strengthening the diagnosis of lipoedema of the legs.

TC236

Analysis of Swallowing Maneuvers by Using 3D Dynamic Computed Tomography. Mendelsohn Maneuver in Dysphagic Patients

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Introduction: In the Part 1 study of healthy subjects (Poster PC1087), we reported the Mendelsohn maneuver (MM) did not increase duration of UES opening, but increase duration of pharyngeal phase and hyolaryngeal displacement. The purpose of this study was elucidating the effect of MM in dysphagic patients. **Methods:** Seven dysphagic patients, who seemed capable in performing Mendelsohn maneuver properly by videofluoroscopy findings, underwent 320-ADCT during two swallows in 45 degree reclining position including: 1) swallow without any maneuvers (RS) and 2) Mendelsohn maneuver (MM). 3D images were created each 0.10 seconds (10 frames/s). Four parameters were measured: (1) critical events' timing, (2) hyoid and larynx displacement, (3) UES cross sectional area, and (4) volume of pharyngeal residue. **Results:** In MM, the duration of hyoid and laryngeal displacement were increased in all cases. Both hyoid and larynx were higher positions at start, at onset of hyoid movement, and at maximum displacement in 6 out of 7 subjects. The durations of velopharyngeal and laryngeal closure were increased in all. The UES cross-sectional area and duration of opening were increased in four out of seven subjects. Pharyngeal residue was reduced in five out of six who had pharyngeal residue. **Conclusions:** MM showed the longer duration of hyolaryngeal displacement and velopharyngeal closure, as was seen in healthy subjects, implying a possible effect of enhancing contraction of swallowing muscles. Also higher hyoid position at the beginning and during swallowing suggested an anticipatory movement of swallowing. In contrast with the findings in healthy subjects, increased UES opening (duration and maximum cross-sectional area), which were seen in four cases, may explain the effect of reducing pharyngeal residue in clinical usage. And this difference between patients and health subjects may come from the deficit of hypopharyngeal contraction in patients. Further studies including manometric analysis are required for confirming this mechanism. MM may enhance the safety and efficiency of pharyngeal bolus transit in patients.

TC237

Lumbar Spine Kinematics during Incline and Decline Slope Walking

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Background: To date, gait analysis research using optoelectronic motion capture has primarily focused on documenting pelvis and lower extremity movement, with scarce evidence available describing spinal motion during gait. Moreover, investigations of human gait often require participants to walk over-ground on a level surface, yet activities of daily living normally require an individual to walk up and down stairs or on slopes at varying gradients. An alteration in spinal posture as a consequence of standing on a sloped surface has been shown to reduce the perception of low back pain. However, only one study has reported lumbar spine movement information during incline slope walking, while the analysis of decline slope walking is limited to the sagittal plane. Therefore, expanding on knowledge of lumbar spine motion during incline and decline slope walking could support clinical management strategies and the design of therapeutic interventions and gait re-training for those suffering with low back pain. **Material and Methods:** Using a 3D cluster positioned over the spinous process of L3 and an optoelectronic motion capture system (Vicon, OMG, UK), three-dimensional lumbar spine kinematic data was

collected over five trials. Participants were required to walk over-ground on a level surface and on a sloped surface of 6 and 13 degrees representing an incline and decline condition. Patterns and range of motion values were investigated. **Results:** An incremental increase in lumbar range of motion (ROM) in the frontal and transverse plane was noted for inclined sloped walking as the angle of the surface increased from 6 to 13 degrees. Conversely, there was a noticeable decrease in lumbar ROM in the transverse plane for the decline walking conditions. **Conclusion:** The investigation revealed distinct differences in lumbar spine ROM values between level and slope walking. The examination of the kinematic waveforms also demonstrates the changes in movement patterns over the gait cycle between level and sloped walking across all three planes of movement. The results of this study provide a further insight into the complex nature of lumbar spine movement and that sloped walking of various degrees is an important consideration that clinicians must account for during the rehabilitation process.

TC238

Sensitivity of High Resolution Sonography in Clinically Diagnosed Carpal Tunnel Syndrome with Normal Nerve Conduction Studies

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Introduction: A combination of clinical findings and nerve conduction studies (NCS) are commonly used to diagnose carpal tunnel syndrome (CTS). This study evaluates the diagnostic sensitivity of high resolution sonography in confirming clinically diagnosed CTS when NCS are normal. **Methods:** This was a prospective controlled study between July 2011 and December 2013. Consenting patients with clinical CTS but negative NCS and a group of control subjects were enrolled. All participants underwent comprehensive clinical examination, NCS, and high resolution sonography of the median nerve. **Results:** 250 patients with clinical evidence of CTS met the inclusion criteria. Of those, 103 wrists (27.1%) had normal NCS and underwent ultrasound examination. A cutoff point of 9.4 mm² (mean + 2SD) for median nerve cross sectional area (CSA) at the carpal tunnel inlet from control group was set to detect 73% abnormality in case group. **Conclusion:** Sonography was 73% sensitive in patients with CTS and negative NCS, increasing the overall diagnostic sensitivity for clinically suspected CTS in our EDX lab setting to 92%. It highlights the complementary role of ultrasound in diagnosing CTS in conjunction with EDX.

TC239

Clinical and Genetic Study in Patients with Spinocerebellar Ataxia Type 7: Usefulness of the Ataxia Rating Scales in Rehabilitation

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Background: Spinocerebellar ataxia type 7 (SCA7) is a polyglutamine neurodegenerative disease characterized by progressive cerebellar ataxia and retinal degeneration. This disorder is caused by

expansion of the CAG trinucleotide repeats within the coding tract of the *ATXN7* gene. The low worldwide frequency of the disease has limited the number of patients available for clinical and genetic studies, however we recently described one of the largest series of patients with SCA7 that originated from a founder effect in Mexican population. In this study we performed a comprehensive neurological assessment and genetic characterization of SCA7 patients and its usefulness monitoring assessment posterior to rehabilitation program. **Material and Methods:** Fifty patients were clinically assessed using standard neurological exams and genotyped using fluorescent PCR and capillary electrophoresis. Semiquantitative analysis of ataxia-associated symptoms was carried out using the Scale for the Assessment and Rating of Ataxia (SARA) and the Brief-Ataxia-Rating Scale (BARS) scores, while extracerebellar features were measured using the Inventory of Non-Ataxia-Symptoms Scale (INAS). Finally, these ataxia-rating-scales were applied after a physical rehabilitation program to evaluate the motor and the neuro-cognitive condition of patients. **Results:** We employed different clinical scales to categorized patients with SCA7. With the use of three ataxia-rating-scales, patients were differentiated into the following three different clinical stages: Stage 1 (slight gait ataxia); Stage 2 (loss of independent gait), and Stage 3 (confinement to wheelchair or bed). Evaluation of affected individuals with the different clinical scales revealed a correlation between the size of CAG abnormal expansion and both age of onset and disease severity. These scales were applied before and after physical-motor rehabilitation that showed statistically significant differences. **Conclusion:** Examination of affected SCA7 patients with different scales confirmed the critical role of CAG repeat size on age of onset and disease severity. We validated the use of 3 ataxia-rating-scales, since these disorders progress slowly, the evaluation of clinical characteristics (cerebellar and uncerebellar features) during the natural history of the disease and the evaluation of potential treatments that might slow their course requires to use of these scales that can assess small clinical changes over short periods of time.

TC240

Disability Analysis by Using WHODAS 2.0 among Dementia Elderly in Taiwan

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Background: The WHO Disability Assessment Schedule second edition (WHODAS 2.0) has been used evaluation disability cause by chronic disease for elderly patients. It is suited for dementia evaluation with component of activities participation and cognition related functional activities. So far, there is limited information about WHODAS 2.0 for dementia patient evaluation and large scaled study data is lacking. Therefore we proposed this national wide study to investigate disability status and analysis of old dementia patients by the instrument of WHODAS 2.0 in Taiwan. **Material and Methods:** The data of this study was obtained from the disabled dementia patients from Taiwan Data bank of Persons with Disability (TDPD) during July 2012 to 2014. Only old aged patients (more than 65 years old) with diagnosis of dementia were enrolled in this study. Demographic data such as age, education status, social economic status, residence, urbanization level, and severity of impairment were presented by number and percentage. Chi-square analysis was used for comparing the category variables between male and female dementia participants. Standardized scores of six domains of WHODAS 2.0 between female and male participants were compared by independent t test. Poisson regression model was analyzed for association of the demographic variables and standardized scores of WHODAS 2.0 in all of the six domains. SAS software was applied for statistic analysis and p-value < 0.05 was defined as statistically significance. **Results:** The study population group comprising 12,126 subjects and 7,612 of them were female. Dementia patients revealed globally activities limitation and restriction of participation of all domains of WHODAS 2.0. Male patients have more disability influence of dementia in all the domains of WHODAS 2.0. Especially domains of Life activities, getting along

with people, understanding and communicating domains were more affected than other domains. Poisson regression model found the WHODAS 2.0 scores were associated with ages, gender, residence, urbanization level, and dementia severity. **Conclusions:** The large scaled population based database analysis study provided important information of disability status among elderly patients caused by dementia according to the framework of WHODAS 2.0. This could be useful in individual assessments and further rehabilitation planning for dementia patients.

TC241

Outcome Orientated Quality Management in Neurological and Geriatric Rehabilitation – The SINGER (Scores of Independence for Neurological and Geriatric Rehabilitation) as a Validated Outcome Measurement to Reliably Quantify and Compare the Improvement in Stroke Rehabilitation

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Background: Total quality management is a major challenge to all indoor and outdoor medical facilities. Concerning structural and procedural quality management many items exist but outcome related quality management hampers reliable and sophisticated measurement systems. The often used assessment algorithm „Barthel Index“, „Expanded Barthel Index“ and „FIM“ (Functional Independence Measure) are either not differentiated enough and incomplete because neuropsychological and communicative items are missing (BI, EBI) or not selective enough to separate each ranking level (FIM). **Method:** So we developed an ICF based assessment instrument with operationalised descriptions of each grade of independence in 20 items including self-care, mobility, communication, cognition and house-keeping for stroke patients. After a pilot study in 2 rehabilitation centers with 100 patients we did a multicenter evaluation in 12 German Centers including 1,758 patients. Test criteria were excellent with a very good internal consistency (Cronbach's alpha of 0.97 for the sum score and between 0.67 and 0.90 for each selective item) and inter-rater reliability (Cohen's Kappa for 5 selective items 0.7-0.89, for the other 15 items 0.90-1.00). With this assessment we could reliably establish the mean improvement of stroke patients in the participating German rehabilitation centers. In addition we undertook a multivariate factorial analysis to look for factors – like age etc. – influencing the individual result. These factors explained variance of more than 84% of the outcome score, so that we choose to select the SINGER together with these factors as an ongoing predictor controlled indicator of outcome orientated quality. **Conclusion:** With a computerised version of this new method we have a valid tool for a permanent semiautomated registration and outcome orientated quality management of stroke patients. We will discuss the influence of this new approach on the cooperation of the rehabilitation team and possible comparabilities of different clinical settings.

C.2 PRM INTERVENTIONS

TC242

Watch Your Step – from Gait Analysis to Real-Time Feedback Therapy

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Introduction: Instrumented gait analysis is a proven tool for objective measurement of lower extremity kinematics and time-distance

parameters, and for quantification of deviations from a physiological gait pattern. Progress in motion capturing technology and computational power allows for novel applications, among them provision of movement feedback (FB) in real-time. It is known that limited internal afferent FB may be compensated by external FB. In incomplete spinal cord injured (iSCI) patients such sensory and in particular proprioceptive deficits exist, which may lead to insecure gait, even in ambulatory persons with good motor function. The aim of this study was to test if individuals with iSCI can normalize their gait kinematics during FB and more importantly maintain an improvement after therapy. *Methods:* Individuals with chronic iSCI had to complete 6 days (one day per week) of treadmill-based FB training with a 2 weeks pause after the third week. Each day consisted of an initial gait analysis followed by 2 blocks with FB/no-FB. During FB the deviation of the mean knee angle during swing from a speed matched reference (norm distance, ND) was visualized by an in-house developed FB system as a number after every stride. The task consisted of lowering the ND. The FB implementation was validated first in able-bodied subjects with an artificial movement task. *Results:* Four of 5 study participants benefited from FB in the short and medium term. Decrease of mean ND was highest during the first 3 sessions (from 3.93 ± 1.54 to 2.18 ± 1.04). After the pause mean ND stayed in the same range. In the last 3 sessions the mean ND decreased slower (2.40 ± 1.18 to 2.20 ± 0.90). Direct influences of FB ranged from 60% to 15% of reduction in mean ND compared to initial gait analysis and from 20% to 1% compared to no-FB sessions. *Conclusions:* Instrumented real-time FB may serve as an effective adjunct to established gait therapies for normalizing gait after iSCI. Further studies need to prove long term learning and the successful transfer of newly acquired skills to activities of daily living.

TC243

Ultrasound-Guided Injection of the Piriformis Muscle

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Introduction: Approximately 8% of low back pain is attributed to piriformis syndrome. Piriformis syndrome is a condition in which the piriformis muscle physically irritates the sciatic nerve. Patients with this syndrome often present with ipsilateral numbness, tingling, pain in the buttocks, thigh, and leg, similar to the features of sciatica. Piriformis syndrome remains a diagnosis of exclusion. Injection treatment can be performed to the piriformis muscle. However, piriformis muscle is relatively deep in terms of anatomy. Clinicians performing the injection cannot be sure whether the injection needle is inserted correctly to the piriformis muscle unless an image guidance tool is used. Musculoskeletal ultrasound has been proven to be effective in guiding the injection needle accurately to the piriformis muscle. *Material and Methods:* The ACUSON S3000 Ultrasound System (SIEMENS Healthcare, USA) was used in our study. Real-time curvilinear-array ultrasound transducer with a bandwidth of 5.0 to 13.0 MHz was selected. Sonographic images were obtained from a physiatrist who had years of experience in handling and interpreting sonographic images. Patient was placed in a prone position with a pillow or towels placed between the bed and the patient's inguinal area to increase the pelvic tilt. The piriformis muscle is situated between the lateral edge of the sacrum and the greater trochanter. *Results:* In ultrasound-guided piriformis muscle injections, the needle was guided accurately to the piriformis muscle. The piriformis muscle appeared as a hypoechoic band lying between the lateral edge of the sacrum and the greater trochanter. An average VAS pain scale was approximately 8 prior to the injection, and significantly improved to approximately 2 after ultrasound-guided piriformis muscle injection. *Conclusion:* When ultrasound-guided injection technique is used, the injectant can be more accurately infiltrated into the piriformis muscle as compared with the conventional blind injection technique. Ultrasound guidance can ensure accurate needle placement into the piriformis muscle to increase the success rate of piriformis muscle injection.

TC244

Upper Limb Load Evaluation during Rewalk Ambulation: Different Strategies for Different Levels of Independence

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Introduction: Maintaining standing position and ambulating are important factors from a functional as well as from a social point of view in Spinal Cord Injury (SCI) subjects. Robotic wearable exoskeletons, that can help complete SCI patients to walk in natural environments, have been developed. At the moment, ReWalk is the only device that can be used at patient's home without the supervision of health personnel; patient can ambulate outdoor with the supervision of caregivers trained in ReWalk use. Crutches use is necessary to walk with ReWalk. Literature evidences underlie how a continuous crutches use can lead to an important overload on upper limbs. The aim of this study was to develop instrumented crutches to evaluate upper limb load. *Material and Methods:* ReWalk is a wearable exoskeleton, equipped with four engines able to move hip and knee joints, that allows lift, sitting, walking and up/down stairs. It is controlled by an accelerometer, fixed on the left side of subject's trunk, which measures inclination on sagittal plane obtained with simultaneous forward displacement of two crutches and by a body weight transfer. A training period is necessary to learn how to trigger each single step with an appropriate crutches movement. Two crutches, instrumented with extensometers to measure compression and shear forces, were used to evaluate upper limbs load. Data were collected on 5 complete SCI patients characterized by different levels of independence in ReWalk use. *Results:* At the beginning of training period a perfect timing of crutches, imposed by subjects, and an alternation of load applied given by the physiotherapists' support was given. In the middle of training a perfect symmetry of stance duration, but no alternation of load applied on crutches was recorded. At the end of training period, a symmetry of timing and an alternation of load applied on crutches was measured. The maximum load measured was 20% and the minimum 10% of body weight. *Conclusions:* Data reveal that ReWalk ambulation required not high load on upper limb; in fact synchronism between crutches forward advancement, body transfer and lower limb swing phase allows to decrease crutches load measure; measure on more subjects are necessary to confirm these findings.

TC245

The Mechanical and Physiological Effects of Three Dimensional Scoliosis Brace

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Introduction/Background: All the non-surgical treatment available spinal bracing is the most commonly used method for idiopathic scoliosis (IS) and is the only one that has evidence for the efficacy in halting curve progression and prevents surgery. The newly prepared three dimensional dynamic brace (3-D) fitted on the patient under sub classification of the Scoliosis research society definition. The purpose of this study was to develop an appropriate spinal orthosis in compare with regular Boston brace in the case of IS with 3-D force application, alignment of alter posture and cardio-respiratory functions (estimation of energy expenditure, heart rate (HR) and individual O₂-intake/heart rate (VO₂/HR)). *Material and Methods:* Treatment plan being done with a careful evaluation of the patient's deformity in the coronal, sagittal & transverse plane. Breathe cardio-respiratory data analysis and the metabolic data analysis done through the COS MED-Srl-Italy, K4B2 (cardio respiratory function). We measure the O₂ consumption level (ml/min/kg), PaO₂ (mmHg), PaCO₂ (mmHg), Tidal volume (TV), Heart

rate, Energy cost EE/min (Kcal/min), VO_2 , VCO_2 , O_2 expenditure. The above experiment is done in without brace, with Boston brace and with new design 3D brace. In the brace we provide two specially design flexible straps which can be use as continuous and gradual increasing force. Use of rigid concave side upright and by the flexible straps we can apply the large or small amount of the force. **Results:** Through the application of dynamic forces provide a new moment strategy that effects in curve correction with neuromuscular integration and creep force application (dynamic elongation of the spine) which is important with the brace in all posture. The cardio-respiratory analysis done and plot graph and table established a significant better result in new design 3D brace over the Boston Brace. **Conclusion:** the comparison between Boston brace and newly design 3-D dynamic brace, we found better result in terms of O_2 consumption, PaO_2 , tidal volume, O_2 expenditure, CO_2 expenditure, energy cost. Static and dynamic balance of the patient is improved with 3 dimension force application over regular Boston brace.

TC246

Extracorporeal Magnetic Stimulation Versus Sham Stimulation in Women with Urinary Incontinence

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Background: Urinary incontinence is a prevalent disease in female population that affects quality of life. The use of magnetic fields to stimulate muscular and nerve structures produces clinical effects in subjects with stress urinary incontinence, but there are few data about urge incontinence symptoms. **Objective:** To determine extracorporeal electromagnetic stimulation effects, compared to placebo, on mild to moderate stress and mixed incontinence female subjects. **Material and Methods:** Prospective, randomized, placebo-controlled study. All patients were attended as outpatient female Pelvic Floor Unit located in an urban university hospital. All subjects were randomized to receive magnetic stimulation or simulation therapy, 20-minute sessions, twice a week, for 6 weeks, using stimulation parameters suggested by the manufacturer. As Outcomes measurements, a 72-hour voiding diary, King's Health Questionnaire quality of life survey (KHQ), Sandvik Severity Index and simple cystometry at baseline, 8 weeks post-term and end of the intervention. To compare the results of the QoL questionnaire (KHQ), voiding diary and severity of the incontinence in both groups, the paired t-test was used. For the comparison between groups the Analysis of Covariance was used and Analysis of Variance with repeated measures to within treatment. The Fisher's exact was used to test when the answers were ordinal in the comparison between groups. When the differences were statistically significant, a two proportion comparison test was used. The level of significance was 0.05. All analyses were conducted with STATA software, version 12.1. **Results:** Thirty three female subjects with mild to moderate stress and/or mixed urinary incontinence met the inclusion criteria. Eighteen were randomized to active treatment and thirteen to a sham group. Mean age was 52.6 (SD 12) and control group was 52.7 (SD 11.7) Treatment group subjects improved ($p < 0.05$) on stress urinary incontinence, urgency, urge incontinence, daily use of pads, and KHQ post treatment. But when comparing the treatment group versus placebo, there was no significant difference observed. **Conclusions:** The pelvic floor electromagnetic stimulation doesn't show a significant difference with placebo in mild to moderate stress and mixed urinary incontinence symptoms.

TC247

Gait Analysis before and during Spinal Cord Stimulation in Patients with Low Back Pain

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Introduction: Epidural spinal cord stimulation is one of the therapeutic choices for chronic low back pain. The stimulation affects dorsal column of the spine to relief the pain. Few have studied whether the stimulation affects gait. **Participants and Methods:** Two patients with low back pain were included (38-year-old male and 47-year-old female). Electrodes of the stimulator (Medtronic) were implanted to the posterior epidural space by anesthesiologists. One week after the operation, the patients visited our gait laboratory. Their level gait was analyzed with 3-dimensional motion capture system (VICON) and Plug-in-gait marker set. We measured three trials without the stimulation and three trials with the stimulation. **Results:** There were no changes in walking speed, stride time and stride length before and during the stimulation. There were no changes in hip, knee and ankle angle. **Discussion:** Epidural spinal cord stimulation did not affect level gait in patients with low back pain. The stimulation may blunt not only pain but also other sensation including proprioception from lower extremities and tactile perception from plantar. However, our results showed that this therapeutic choice is safe for level walking.

TC248

Continuous Passive Motion of the Foot in Combination with Vibration in Severely Affected Patients in the Early Phase of Rehabilitation

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Long-term bed immobilization results in a limited range of lower limb joint mobilization due to muscle stiffness and contracture. Particularly the ankle joint is prone to a fixed plantarflexion rendering later verticalisation and gait rehabilitation extremely difficult. Our group therefore designed a powered device to passively move the paretic ankle joint in combination with a vibration of the footsole during plantarflexion to mimic stance phase. The maximum speed was 15°/s. The vibration ranged from 20–50 Hz. The passive motion intended to prevent ankle contracture and the vibration to lessen muscle tone, to strengthen muscle power and to prevent thrombosis. 14 subacute hemiparetic patients, severely affected, were so far randomly assigned to either conventional (30 manual ankle mobilisation and preventive positioning in bed) or experimental treatment (30 min device and preventive positioning in bed), each intervention for three weeks. The passive range of ankle motion and the ankle muscle tone were the relevant parameters. After the intervention, the ROM and the muscle tone did not differ significantly between groups, no major side effects occurred. The study highlighted the relevance of prevention of ankle contracture to the team, the device-assisted treatment was less time-consuming.

TC249

Neurocognitive Rehabilitation in Diseases

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Background: Neurocognitive rehabilitations are Complex set of techniques that are designed to enhance cognitive domains among individuals who are ill or disabled. **Method:** Neurocognitive rehabilitation therapy is science and art for restoring mental process and remediation strategies training and it improves cellular and molecular processing with integrating behavioral and cognitive changes. This method is achieved to the ability of cognitive and neurological function improvement with successful development of cell transplantation, nanotechnology and appropriate expertise in rehabilitation environments. **Results:** Advancement of this science is with effectiveness interventions that it has become a priority and it has been achieve to desire objectives of theoretical and empirical chain transfer made of neuroscience, cognitive neuroscience, psychology,

physiology, pharmacology, medical imaging and other medical disciplines with behavioral interventions and achieved success in compensatory strategies. Cognitive impairment is a health Challenge much more than common disorders related illnesses. Sub-systems affect different aspects of a person's life, such as emotions, diet, health, stress, and social performance and interference in the passive skills can lead to neurocognitive rehabilitation which includes a tailored experience based on neural structure and brain function. *Conclusion:* These methods can improve cognitive defects and abnormal brain processing based on the principles of neuroplasticity and damaged cortical reorganization by the nerve regeneration morphological and physiological Reactions. *Keyword:* Neurocognitive, Assessment, Rehabilitation, Diseases.

TC250

A Systematic Review of Unilateral Spatial Neglect Assessment Methods for Cognitive Rehabilitation Post Stroke

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Introduction/Background: Unilateral spatial neglect (USN) is a common feature in patients following stroke. The purpose of this review was to provide up-to-date evidence of the assessment of USN from a previous systematic review by identifying new standardized and non-standardized assessment tools and to evaluate the clinimetric properties of these assessments. *Material and Methods:* Papers were identified by systematic searches of electronic databases. Both authors independently assessed full texts for eligibility by completing the study selection form. The authors then independently evaluated measures from the included articles using the COSMIN (consensus-based standards for the selection of health measurement instruments) checklist. A quality assessment for the statistical outcomes was also used to interpret the measurement properties. *Results:* Based on the selection and screening process, the authors arrived at 29 articles for data analysis. A variety of measurement instruments were included of which 13 were paper and pencil, 6 were behavioural and 8 were technological-based assessments. Eight articles evaluated reliability and 16 articles evaluated criterion validity of the instruments. 9 articles studied the responsiveness of the assessment evaluated. 5 studies performed hypothesis testing. Only 2 articles measured internal consistency while only 1 study commented on structural validity. Although most of the paper and pencil and behavioural tests were found to be reliable and valid, none presented information on measurement errors. Statistical outcomes for majority of the studies spanned from fair to poor due to doubtful study designs and methodologies. *Conclusion:* In this review, most of the identified assessments presented information on their reliability and validity. Measurement properties were collectively, however, lacking for technological-based assessments. Across all assessments, important clinimetric properties such as responsiveness and measurement errors were still deficient. With the development and use of technology in USN assessment, this review has highlighted the basis for future studies to evaluate the measurement properties and suitability of such assessment methods. Further studies should also evaluate and supplement the clinimetric properties of assessment tools, especially diagnostic accuracy and responsiveness, to increase utility for clinical practice.

TC251

Protocol of Acotrain: The Effect of Acupuncture and Computer-Assisted Training on Improving Attention Deficits in Patients after Stroke

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Introduction/Background: Attention disturbance, which leads to difficulties with concentration and other reductions in cognitive functions, is strongly associated with stroke. A majority of stroke

survivors present cognitive impairments. Based on the Traditional Chinese Medicine (TCM) theory, Baihui (DU20) and Shenting (DU24) are acupoints that belong to the Du Meridian and are thought to be important for nervous system function. Acupoint Shenting (DU24) is considered to be involved in the improvement of human health and spirits, and Baihui (DU20) in the adjustment of memory function. A series of experimental studies have demonstrated that acupuncture can improve cognitive function through: 1. regulating the aging-related changes in gene profile expression of the hippocampus; 2. preventing oxidative stress; 3. Regulating the expression of apoptosis related genes in hippocampus. The main objectives are to evaluate the effect of conventional stroke rehabilitation with computer-based cognitive training compared to conventional stroke rehabilitation with acupuncture on the outcomes of attention assessments. *Material and Methods:* A multi-centre, Randomised, parallel, single blinded study. 3 countries, 3 centres are involved: A Fujian University of Traditional Chinese Medicine; B Reha Rheinfelden; C m&i Fachklinik Herzogenaurach. Number of participants: 60 Patients in total (20 per trial centre). Intervention: Acupuncture on two acupoints on the scalp and Hasomed RehaCom.5 treatments per week during a four-week intervention period. Three study arms are planned: (1) acupuncture alone; (2) computer-based cognitive training (RehaCom) alone; (3) a combination of both (ACoTrain). Each treatment will take about 30 minutes per visit. After adaption of the culture gap between 3 centers, outcome measurements are chosen as follows: Primary outcome: the test for attention performance (TAP 2.0) on: (1) alertness; (2) Go/No-Go (also interference tendency); (3) incompatibility(control of impulsive behaviour); (4) divided attention. Secondary outcomes include: The trail-making-test (TMT);The Test des Deux Barrages (T2B) to tests selective attention ;The National Institute of Health Stroke Scale (NIH-SS) for medical examination and standardised characterisation. The Modified Barthel Index (MBI) for external assessment of functional impairment of daily living. The EuroQol-Questionnaire for self-reported healthy status. Pre- and post-assessment of primary and secondary outcomes in a one-to-one assessment session.

TC252

A Comparison of Neural Mechanisms in Mirror Therapy and Movement Observation Therapy

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Introduction: For rehabilitation of deficits after stroke or pain syndromes, therapeutic strategies based on visual stimulation have been developed in recent years. These include mirror therapy (MT) and movement observation therapy (MOT, also called video therapy). There is evidence for positive effects of both of these therapies, but their neural mechanisms are poorly understood, especially with regard to the contribution of both hemispheres. The aim of this study was to test the hypothesis that lateralized cerebral activation occurs only during self-initiated movements, including movement mirroring, but not during movement observation. If this is the case, then it implies different working mechanisms for MT and MOT. An imaging study was thus performed in human subjects to directly compare movement mirroring and movement observation in an otherwise identical setting. *Material and Methods: Subjects:* A total of 15 right-handed healthy subjects, age range 22–56 years. *Methods:* Functional imaging study comparing movement mirroring with movement observation, in both hands, in an otherwise identical setting. Imaging data were analyzed using statistical parametric mapping software, with significance threshold set at $p < 0.01$ (false discovery rate) and a minimum cluster size of 20 voxels. *Results:* Movement mirroring induced additional activation in primary and higher-order visual areas strictly contralateral to the limb seen by the subject. There was no significant difference of brain activity when comparing movement observation of somebody else's right hand with left hand. *Conclusion:* Lateralized cerebral activations are elicited by inversion of visual feedback (movement mirroring), but not by movement observation.

TC253

Effects of New Robot-Assisted Gait Training on 3D Gait Analysis for Individuals after Stroke:**a Randomized Cross-Over Trial***K. Ohata¹, T. Tsuboyama², A. Watanabe³, H. Takahashi⁴¹Kyoto University, ²Kyoto University, Kyoto, JP, ³Oita Tobu Hospital, Oita, JP, ⁴HONDA R&D Co., Ltd, Wako, JP

Introduction/Background: In recent years, robotic-assisted gait training based on the concepts of repetitive, intensive and task-oriented training has been developed. “Stride Management Assist (SMA)” developed by HONDA is one of new robotic orthosis to improve the gait manner in individuals after stroke. The SMA is an automated stride assistance system which applied robotic engineering to controlling walk ratios (stride length/cadence) and adding supporting power to the thigh during walking. The SMA assists both flexion and extension of the hip joints in a ballistic manner by means of electrical actuators. Our previous study demonstrated that the gait kinematics and kinetics in individuals after stroke were improved with new robot orthosis and remained the aftereffect. However, it was still unknown that a long-term effect on 3D gait analysis using this orthosis. **Material and Methods: Methods:** 23 Participants with stroke (stroke onset < 6 months) were randomly assigned into two groups using a crossover design. One group (N=13; mean: 60.9±9.6 years) underwent conventional rehabilitation (40 minutes/time) and Gait training with the SMA (20 minutes/time, 5 times per week for 4 weeks), followed by conventional rehabilitation including a usual gait training (60 minutes/time, 5 times per week) for another 4 weeks. The other group (N=10; mean: 61.1±14.6 years) underwent the same training in reverse order. The gait kinematics and kinetics in all participants were assessed using 3D gait analysis (VIcon) at the beginning of the study, at the end of the 4(th) week, and at the end of the 8(th) week. **Results:** Eighteen participants completed the study, including the SMA training interventions and all assessments. The results showed the significant increases of peak hip internal extension during loading response in SMA training session, while no difference was shown in control phase. The timing of peak internal knee extension was delayed in control phase during SMA session. **Conclusion:** People with stroke who receive SMA training improved their gait manner in paretic side. The change using SMA was similar to the immediately aftereffect that we previously reported. The change in control phase may be compensated motion known as the buckling-knee pattern.

TC254

Develop Computer-Assisted Memory Training Software and a Randomized Single-Blind Pilot Study for Brain-Damaged Patients*L. Ao¹, F. Meng²¹Kunming, ²Kunming Medical University, Kunming, CN

Introduction: Technological development over the past decade has led to corresponding advances in the field of memory rehabilitation. Numerous computer-based memory rehabilitation programs have surfaced that purport to provide treatment at a level equivalent to or better than that of more traditional modes of intervention. The aim of present pilot study was to investigate the effect of computer-assisted memory training on cognitive function and activity of daily living in brain-damaged patients by the 2014 version memory training software, prepare the ground for further improvement of the software and for promotion of its clinical application. **Material and Methods:** Thirty two brain injury patients with memory impairment assessed by Mini-Mental-State Examination (MMSE) and Montreal Cognitive Assessment (MOCA) were randomly divided into two groups: memory software training group (TG, N=16) and control group (CG, N=16), the TG underwent 6 weeks

of computer-assisted memory training that involved in visual and auditory stimulation and experience memory task related to daily life. The CG underwent memory training proposal such as reading books, watching TV and listening music. Both groups received the same medical therapy, physical therapy and occupational therapy. Neurobehavioral Cognitive Status Examination (NCSE), the Rivermead Behavioural memory test-Second Edition (RBMT-II) and functional evaluation modify Barthel index (MBI) were performed at baseline and after 6 weeks training phase respectively. **Result:** There are two main results in this study. Analysis reveals that TG and CG showed significant improvements in NCSE score, RBMT-II score and MBI score after 6 weeks training phase (P<0.05). Secondly, in contrast all the score of training group was higher than the control group. **Conclusion:** Findings in this study support the memory training software, which was supposed to improve the overall level of cognitive especially memory function and ADL function in patients with brain injury by enhancing focused attention and perform the memory task related daily life. Since the design of the memory disorder software is reasonable and easy to operate, it can be widely utilized in clinical intervention. **Keyword:** memory training software; Brain injury; Clinical research.

TC255

Cutaneous Acupuncture Stimulations for Locomotive Pattern Modification in Gait for Volunteers and Patients with Chronic Hemiparesis

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Background: Syndrome of spastic paresis are characterized by muscle hyperexcitability and exaggerated reflexes with associated varying degrees of paresis. Complex clinical condition of hemiparesis does not only refer to spasticity, but also the effects of other associated impairments such as weakness, increased muscle stiffness and fatigue. Clinically, patients suffer from exhaustion and heaviness in affected body while rehabilitative activity. In a previous study I stated that in six patients with paresis the efficacy of gentle cutaneous stimulation reduced muscle hyperactivities in gait and increased ratio of Tibialis Anterior/Gastrocnemius in swing phase can be cause of reducing complained stumbling. These results suggest decrease exhaustion and increase the patients' activities of daily living. **Objective:** To assess the influence of cutaneous stimulations for locomotive patterns in gait for healthy volunteers and patients with chronic hemiparesis, and in the long term its consequent influence to the daily living activity for patients. **Methods:** In sixteen healthy volunteers (no cortex or spinal lesions, 9 Males/7 Females, 44.8 yrs.±15.8) and five chronic hemiparesis patients (Brunnstrom stage IV to VI, 3 Males/2 Females, 58.4 yrs.±16.7) were measured by legs muscles integral electromyographic activity during continuous walking before and after stimulations. Acupuncture points around on Gastrocnemius and Achilles tendon, BL58, BL59 KI7, and KI9 were mainly stimulated with seal type cutaneous needles, made of resin. Patients are monitored for the amount of daily physical activity time, steps, and exercise intensity for a month with cutaneous acupuncture and following further month with no stimulation. After each period, patients answered the stroke impact scale. A cycle electromyographic activity was divided into five stance and five swing phases, which made up a ten phase, then fifty arithmetic means were added and averaged for analyzed muscular balance. **Results:** Results confirmed the previous study that cutaneous stimulations to patients contribute reduction in the stimulated aspect Gastrocnemius muscle hyperactivities in midswing phase and validated interactive locomotor Tibialis Anterior activities. Physical activities and intensity were slightly increased in acupuncture stimulation term, but not significantly. **Conclusion:** These results suggest that modifying locomotive pattern may assist rehabilitative self-care strategies likely walking longer and better active lives for patients with paresis.

TC256

Effects of Specific Osteoporosis Exercise on Bone Mineral Density, Bone Metabolism, Coordination/Balance, Muscle Strength and Endurance – a 2-Year Prospective Study

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Introduction/Background: Patients with osteoporosis have a high risk of falling and thus osteoporotic fractures due to deficits in muscle strength, endurance, coordination and balance. Therefore, we aimed to evaluate the effects of specific osteoporosis exercises on these parameters. **Material/Methods:** 42 patients with osteoporosis (mean age 68 ys.) receiving adequate calcium and vitamin D supplementation and bisphosphonate therapy were included. Of these, 17 patients served as control group without exercise and 25 patients underwent specific training once a week (exercise group). Outcome parameters at baseline and after 1 and 2 years included bone mineral density (BMD) of the lumbar spine and right femur, markers of bone metabolism (osteocalcin, crosslaps), as well as assessment of coordination, balance (standing on a balancing board and cone, “tandem standing”), muscle strength and endurance (chair rising test, standing on one leg), and pain (visual analogue scale 0-100 mm). **Results:** After 2 years, the exercise group showed a significant increase in BMD of the right femur ($p < 0.02$), whereas the control group had a decrease of BMD. The exercise group showed a significant increase of osteocalcin levels after 1 and 2 years ($p < 0.01$) and a significant decrease of the crosslaps after 2 years. Both groups presented a tendency towards increased lumbar BMD as well as improved chair rising test results. Standing on one leg was significantly better after 1 year in both groups, but after 2 years only in the exercise group ($p < 0.01$). Both groups showed a tendency towards improvement in the balancing board test. However after 2 years, significantly improved results were found in the exercise group only ($p < 0.01$). The so-called cone test improved significantly after 1 ($p < 0.03$) and 2 years ($p < 0.01$) in the exercise group. Regarding “tandem standing”, no amelioration could be observed in both groups during the follow-up period. A significant reduction of pain was detected only in the exercise group after 1 year and 2 years ($p < 0.01$). **Conclusion:** A standardised osteoporosis exercise programme once weekly causes significant positive effects on bone and the risk of falling. These results support the necessity for specific osteoporosis exercise.

TC257

Correlation of Preoperative Lumbar Paraspinal Extensor Muscle Conditions with Severity of Degenerative Flat Back and Its Improvement after Corrective Fusion Surgery

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Introduction/Background: Degenerative flat back (DFB) is characterized by sagittal imbalance resulting from loss of lumbar lordosis. Extensive degeneration and weakness of lumbar paraspinal extensor muscle (PSE) are thought to be main cause of DFB. This study is to evaluate correlation between preoperative PSE conditions (atrophy and fat infiltration) on magnetic resonance image (MRI) and angular severity of DFB and to evaluate correlation between preoperative PSE conditions and degree of improvement of DFB obtained by corrective surgery in terms of static and dynamic parameters. **Material and Methods:** Forty-five patients with DFB who took MRI preoperatively and conducted simple radiography and three dimensional gait analysis before and 6 month after corrective surgery were included. To determine the severity of PSE atrophy, the ratio between cross sectional area of PSE and disc was calculated from L1-2 to L4-5 on MRI. To assess the degree of fat infiltration, the signal intensity of PSE was measured. Static parameters of spinopelvic segment were measured by simple radi-

ography. Dynamic parameters of spinopelvic and lower limb joints were obtained by three dimensional gait analysis. **Results:** In static parameters, thoracic angle were correlated with atrophy and fat infiltration of upper PSE. Thoracic angle was less improved after surgery, as atrophy of upper PSE was more severe. In dynamic parameters, thoracic angle showed correlation with upper PSE conditions, whereas lumbar angle had correlation with middle to lower PSE conditions. While thoracic kyphosis was less improved after surgery, as atrophy of upper PSE was more severe, lumbar lordosis was less improved, as atrophy and fat infiltration of PSE from L1-2 to L4-5 were more severe. In lower limb dynamic parameters, increased posterior pelvic tilt, hip and knee flexion or ankle dorsiflexion angle was sometimes correlated with PSE conditions. After surgery, hip flexion angle was less improved as PSE atrophy was more severe. **Conclusion:** The severity of atrophy or fat infiltration of PSE show correlation with degree of angular deformity in patients with DFB and with less improvement after corrective surgery. Dynamic parameters showed more prominent correlation with PSE conditions than static parameters and also showed segmental specificity between PSE and angular deformity.

TC258

Botulinum Toxin Injections Have No Added Therapeutic Value or Cost-Effectiveness for Gross Motor Function, Everyday Physical Activity Levels or Quality of Life When Combined with Intensive Functional Physiotherapy*F. Schasfoort¹, *R. Pangalila², J. Becher³, A. Dallmeijer³, C. Catsman¹, E. Steyerberg¹, H. Stam¹, J. Bussmann¹¹Erasmus Medical Center, ²Rijndam Rehabilitation, Rotterdam, ³VU Medical Center, Amsterdam, NL

Since 20 years, children with spastic cerebral palsy (CP) are increasingly treated with botulinum toxin typeA injections (BtA) followed by intensive physiotherapy (iPT) as treatment combination. Despite previous research, the added value of BtA remained unclear. We therefore compared (cost-)effectiveness of BtA+iPT versus only iPT treatment in a (partly) randomized controlled trial, including economic evaluation. Sixty-five children aged 4 to 12 years participated. Forty-one received BtA+iPT and twentyfour only iPT (guidelines best available evidence, 2010). Measurements were performed after the 12-week iPT period ended (primary endpoint) and 12 weeks thereafter (24 week followup). Primary outcome measures were: actual everyday physical activity levels measured with ambulatory monitoring devices (Actigraph-AG, 7day monitoring), (health related) quality of life measured with several questionnaires (Health Utility Index, Child Health Questionnaire, several DISAB-KIDS-questionnaires), and gross motor function measured with the gross motor function measure (GMFM). Economic evaluation was performed according to Dutch guidelines (societal perspective, including health care costs and patient costs for time and travel). No statistically significant evidence was found for added value of BtA injections in BtA+iPT treatment for primary outcomes. At primary endpoint, we found trends towards an intervention effect in favor of only iPT for improving gross motor function (GMFMitemsets; $p = 0.095$, $ES = 1.12$, 95% CI [-0.20: 2.44]) and decreasing the % sedentary behavior during everyday physical activity (AG%sed; $p = 0.087$, $ES = -2.59$, 95% CI [-5.58: 0.39]). At 24 week followup, we found a trend - also in favor of iPT - towards improving quality of life (DISABKIDS-smileysproxyversion; $p = 0.066$, $ES = 5.9$, 95% CI [-0.40: 12.20]). We found one trend in favor of BtA for improving everyday physical activity counts per minute (AGcpm; $p = 0.064$, $ES = 91$, 95% CI [-6: 188]). Average treatment costs (including plaster and AFO) were significantly higher in BtA+iPT than in iPT (8.963 euro versus 6.182 euro, $p = 0.001$). We conclude that adding BtA to iPT in combined BtA+iPT treatment does not improve effectiveness (at the group level) and that adding BtA is also not costeffective when treatment is aimed at improving gross motor function, everyday physical activity levels or quality of life.

TC259

Quantitative Importance of Exercise Therapy in German Medical Rehabilitation

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Introduction/Background: The German Pension Insurance is one of the major rehabilitation carriers in Germany carrying out over 1,000,000 medical rehabilitations annually. Exercise therapy is one of the central treatment forms ranging from sport therapy and physiotherapy to active recreational therapy. This study aims to assess the quantitative importance of exercise therapy based on routine data. *Material and Methods:* In rehabilitation discharge letters each treatment carried out during rehabilitation is documented using a special classification system called KTL (Classification of Treatments). Exercise treatment is classified as sport therapy, physiotherapy and recreational therapy. For eight central indications KTL data were analysed descriptively looking closely at duration per week, proportions of treatment forms as well as their distribution. *Results:* 79,416,903 treatments from 684,741 discharge letters were analysed. Overall 30,358,919 treatments (38.2%) were counted as exercise therapy. The average duration was 12.1 hours per week and patient. A wide range was noted between the indications and treatment forms: in oncology only 91% received sport therapy compared to 99% in cardiology and psychosomatics. The difference in physiotherapy was even wider ranging from 64% in cardiology to 98% in orthopaedics. Significantly less patients received recreational therapy with 22% in neurology to 44% in psychosomatics. Similarly, the proportion of exercise therapy compared to all treatments varied with a range of 54% in psychosomatics to 77% in oncology with an average of 69%. Lastly, the distribution of the different treatment forms varied between the indications with cardiology having the highest proportion of sport therapy (81%) and neurology and orthopaedics having the highest proportion of physiotherapy (42%). *Conclusions:* Our data show the great quantitative emphasis that German medical rehabilitation puts on exercise therapy. The differences in absolute and relative duration, distribution of treatments show different treatment concepts that relate to the demands of different medical problems. The results support the assumption that exercise therapy in German medical rehabilitation is planned and carried out sensibly as well as specific to indications and diseases. However, more research is needed to assess treatment quality including correct indication, content, organisation and selection of treatment forms.

TC260

Treatment of Primary Palmar Hyperhidrosis with Incobotulinumtoxin A: a Randomized Controlled Trial Comparing Subdermal Injection with Iontophoresis*M. Reis e Silva¹, A. Camões Barbosa², F. Pisa²¹Lisboa, ²Centro Hospitalar Lisboa Central, Lisboa, PT

Introduction: Hyperhidrosis is the term applied when sweat production exceeds what is necessary for thermoregulation and has a prevalence of 2.8%, affecting the palms in 24% of individuals. The main goal of our study was to compare the efficacy of incobotulinumtoxin A in the treatment of primary palmar hyperhidrosis by two delivery techniques: subdermal injection and iontophoresis. *Methods:* We recruited 4 patients with primary palmar hyperhidrosis refractory to conventional treatment. We evaluated them at baseline, 4 weeks and 12 weeks. The measured outcomes were sweat production by gravimetry, the pain associated with the procedure in a pain numerical scale graded from 0 to 10, palmar grip and thumb-index pinch tests results, the answers to the HDSS (hyperhidrosis disease severity scale) questionnaire and the overall patient satisfaction by a Likert-like scale. *Results:* Pain associated with the injection was much higher in the injected hand (average pain of 6.5/10), when compared to the iontophoretic hand (average pain of 2/10). Iontophoresis-treated hands had an average sweat reduction at 4 weeks of 64.56% (13.3% at 12 weeks) and

injected-treated hands had an average sweat reduction of 67.35% at 4 weeks (50.3% at 12 weeks). The average decrease in the HDSS was 2 in the injected hand and 0.5 (0.75 at 12 week) in the iontophoretic hand. There were no significant decrease in intrinsic or extrinsic hand muscle strength, when using iontophoresis or injection, both at 4 and 12 weeks. Three patients reported being 'satisfied' with the result in the injected hand (75%), both at 4 and 12 weeks. In the iontophoretic hand, only 1 patient reported being 'satisfied' (25%) in both evaluations. *Conclusion:* Botulinum toxin injection is a safe and effective treatment to palmar hyperhidrosis refractory to conventional treatment. Iontophoresis is less painful and provides an almost similar decrease in the basal sweat production at 4 weeks. However, it is less effective at 12 weeks and patients are less satisfied with this way of administration. We risk to deduce that iontophoresis isn't as effective in decreasing the sweat production reactive to a stimulus.

TC261

Virtual Reality Training with the Nintendo Wii Balance Board to Improve Balance and Gait in Women with Relapsing-Remitting Multiple Sclerosis: a Prospective Cohort Study

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Background: Multiple Sclerosis (MS) patients usually present, among the other symptoms, an impairment in balance. This impairment is associated with an increased risk of falling and requires a targeted rehabilitative treatment. Recently, the Virtual Reality (VR) training has been considered useful to improve functions in several neurological disorders, including MS. The aim of this prospective cohort study is to assess the improvement in balance and gait in women with relapsing-remitting MS undergoing a rehabilitative treatment using a virtual reality training, with Nintendo Wii Balance Board. *Material and Methods:* We included women aged from 18 to 60 years, with a diagnosis of relapsing remitting MS, able to walk for at least 25 meters. All the participants underwent an additional rehabilitative program, using the Nintendo Wii Balance Board, lasting 5 weeks. The primary outcome measure was the Performance Oriented Mobility Assessment (POMA). Secondary outcome measures were: the Fatigue Severity Scale (FSS), the Timed 25-Foot Walk (T25FW), and Barthel Index (BI). We administered these evaluation tools at the baseline (T0) and at the end of treatment (T1). *Results:* We assessed 21 women, mean aged 48.95 years \pm 6.92 SD. The primary outcome of the study, POMA, changed from a mean value of 14.52 \pm 1.54 SD at T0 to a mean value of 15.24 \pm 1.30 SD at T1. At the T0 the mean values of secondary outcome measures were: FSS = 4.40 \pm 0.36 SD, T25FW = 24.70 seconds \pm 4.57 SD, and BI = 78.10 \pm 8.29 SD. At T1, the mean FSS was 4.13 \pm 0.27 SD, the mean T25FW was 23.64 seconds \pm 4.43 SD, and the mean BI was = 78.81 \pm 7.73 SD. *Conclusion:* The results of our study suggest that a rehabilitative treatment using a VR training, with Nintendo Wii Balance Board, might be useful in improving balance and gait.

TC262

Treatment of Lateral Epicondylitis Using Allogeneic Adipose-Derived Mesenchymal Stem Cells (Allo-ASC): a Phase I/II Clinical Trial*S. Chung¹, S. Y. Lee², W. Kim³, C. Lim¹, S. Chun¹, H. Bang¹¹Seoul National University College of Medicine, ²Chung-Ang University College of Medicine, ³Asan Medical Center, Seoul, KR

Introduction/Background: Allogeneic preparation of stem cells provides certain advantages of being readily available and not requiring invasive procedures, which would facilitate applica-

tion of stem cell therapy on intractable but non-life threatening conditions such as recalcitrant lateral epicondylitis (LE). This study aimed to evaluate safety and efficacy of allogeneic adipose-derived mesenchymal stem cells (allo-ASC) in treatment of LE. **Material and Methods:** A total of 12 participants with clinical and ultrasonographic diagnosis of chronic LE were recruited. Under ultrasound guidance, 106 cells/mL of allo-ASC mixed with fibrin glue were injected at the largest hypo-echoic lesion of the common extensor tendon in 6 subjects (Group 1). After monitoring safety for 2 weeks, the other 6 ones (Group 2) were administered with 107 cells/mL of allo-ASC. After 3 days, 2, 6, 12 weeks, 6, and 12 months from injection, safety was evaluated by determining local and systemic tolerances and efficacy by visual analog scale of elbow pain, modified Mayo clinic performance index for elbow function, and tendon defects measured by the largest lesion in ultrasonography. **Results:** Neither serious nor clinically significant adverse effects were observed until 12 months. Comparing VAS at day 0 (66.8 ± 14.5 mm), VAS at 6 weeks after injection (42.1 ± 23.2 mm, $P=0.004$) was significantly decreased and maintained after 12 weeks (31.1 ± 20.6 mm, $P=0.002$), 6 months (15.3 ± 13.7 mm, $P=0.002$), and 12 months (14.8 ± 13.1 mm, $P=0.002$). Elbow functions (64.0 ± 13.5 at day 0) were also improved at 6 weeks (87.1 ± 11.6 , $P=0.002$), 12 weeks (89.2 ± 6.8 , $P=0.002$), 6 months (92.1 ± 6.1 , $P=0.002$) and 12 months (90.6 ± 5.8 , $P=0.002$). Defects of the largest hypo-echoic lesions in the tendon by ultrasonography were significantly decreased in both longitudinal and transverse axes ($P<0.001$ in both) through all observing periods. **Conclusion:** Treatment of chronic LE using allo-ASC was safe and efficacious in improving elbow pain, performance, and ultrasonographic structure for 12 months, suggesting potential therapeutic value of allo-ASC in chronic tendinopathy.

TC263

Transcranial Magnetic Stimulation in a Complex Therapy of Epilepsy

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Introduction/Background: The safety, tolerance and side-effects of anticonvulsants (AEP) used remain a significant problem in treating epilepsy. Thereby it is necessary to search for contemporary strategies using AEP combinations with other non-drug means such as repetitive transcranial magnetic stimulation (rTMS). **Material and Methods:** The results of clinic, anamnestic, encephalographic and neuroimaging investigations of 48 epileptic patients (27.6±0.99 years old) were studied. The disease duration was 15.1±1.4 years. It should be stressed that AEP was prescribed at subtherapeutic doses as patients had side-effects due to high drug doses. A brain temporal lobe zone was exposed to impulse magnetic field using a circular inductor of magnetic stimulator Neuro-MS. TMS was carried out with impulse magnetic field used the stimulation frequency of 1 Hz. The exposure time was 10 minutes; the in-patient course comprised 10 procedures. **Results:** All examined patients had attacks which were combinations of simple, complex partial and generalized attacks. During the basic period one observed 1.91 ± 0.11 attacks per week in patients. At the complex therapy, the average frequency of attacks went down to 0.6 ± 0.14 /week ($P=0.003$), at the end of a rTMS course – 0.29 ± 0.09 /week ($P=0.0009$). Within 1–3 months after finishing an rTMS course, the frequency of epilepsy remained significantly lower in comparison with the basic period ($P<0.05$). Before rTMS, 95.8% patients had epileptiform activity. After ten rTMS procedures the number of patients with interictal epileptic EEG-phenomena decreased ($P=0.0001$). This result remained within a 3 months after a combined therapy. After 10 rTMS procedures, alpha-rhythm index increased in all patients ($P=0.004$). In 18.8% of the examined one noted the phenomenon of “migration” of theta-rhythm in an opposite hemisphere. In case of maintaining theta-rhythm focus (15.4%), its sizes considerably decreased. **Conclusion:** The appli-

cation of the proposed rTMS method which we suggested led to a marked reduction of attack frequency not only at a stimulation course but 3 months later after the termination of a combined therapy. Moreover, the selected intensity of impulse magnetic field and the inductor position let carry out a therapy without side-effects which occur at the rTMS close to a motor threshold in intensity.

TC264

Neuro-Cognitive Rehabilitation with Music Therapy after Surgery among Patients with Glioma

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Discovery of the potential use of neuro-cognitive rehabilitation (NCR) in neural repair and regeneration is a noteworthy development in the neurosciences. Patients with glioma have cognitive problems such as attention, memory and executive function disorders. NCR is a group of designed techniques that is for the promotion of cognitive domains in people with disease or disability. Music therapy is widely used in many areas of health care. NCR is the science of restoring cognitive processing and learning compensatory strategies and it affects the molecular and cellular recovery rehabilitation by integration of behavioral and cognitive changes. The promotion of rehabilitation science of cognitive neuroscience has made it a priority by the help of full range of effected interventional procedures. The pilot study among 8 patients with glioma showed that music therapy can reduce pain and increase comfort as supportive therapy in individuals with cognitive problems. Automatic nervous system variables are associated with relaxation and activation as well as the treatment of choice points. Scales of conclusion were finger temperature, heart rate and respiration rate. In patients with glioma Cognitive impairment is huge health challenges and intervention in the passive skills can lead to NCR that includes designed experience on the basis of nerve and brain function and structure. A failure of cognitive or brain processing with tumor is an abnormal result and these impairments are treated better with rehabilitation. This method on the basis of neuroplasticity, reorganization of damaged cortical through morphological and physiological responses of nerve reconstruction ways by techniques in neuro-cognitive disorders due to illness or disability which are affected by environment, the complexity of stimulation, repeated tasks and motivation. **Keywords:** Neuro-cognitive, rehabilitation, music therapy, glioma.

TC265

Brain Plasticity Induced by the Electromyography-Controlled Functional Electrical Stimulation – Near-Infrared Spectroscopy (NIRS) Study

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Introduction: Electromyography (EMG)-triggered functional electrical stimulation (FES) is usually more effective than non-triggered electrical stimulation in facilitating upper extremity motor recovery. Integrated volitional controlled electrical stimulation (IVES) which induces greater muscle contraction by electrical stimulation in proportion to the integrated EMG signal picked up is a novel EMG-controlled FES therapy. Near-infrared spectroscopy (NIRS) is a recently developed neuroimaging methodology that is not influenced by electrical stimulation, and thus can be used to assess brain activity during FES at anywhere. This study was designed to investigate hemiparetic arm function and brain function before, during and after IVES in chronic stroke patients. **Materials and Methods:** Sixteen chronic stroke patients with moderate to severe residual hemiparesis underwent 5 months of task-orientated rehabilitation therapy with IVES. Before and after treatment, arm function was clinically evaluated with the Fugl-Meyer (FM) assessment, cortical activation patterns with oxygenated hemoglobin (Oxy-Hb) concentration changes

during voluntary muscle contraction (VOL), simple electrical muscle stimulation (ES) and combined voluntary muscle contraction and functional electrical muscle stimulation (EMG-FES) were assessed using multi-channel NIRS. **Results:** Prior to EMG-FES treatment, most subjects showed dominant perfusion in the contralateral sensory-motor cortex (SMC). After EMG-FES treatment, SMC with dominant perfusion tended to change to the ipsilesional side. Cerebral blood flow in the ipsilesional SMC was greater during EMG-FES than during VOL or ES; therefore, EMG-FES caused a shift in the dominant brain perfusion from the contralateral SMC to the ipsilesional SMC. After EMG-FES therapy, arm function improved in most patients, with some individual variability, and there was significant improvement in FM score. Clinical improvement was accompanied by an increase in ipsilesional SMC activation during VOL and EMG-FES condition. The increase in ipsilesional SMC activation was moderately correlated with the change in FM score. **Conclusion:** These results suggest that the EMG-FES may have more influence on cortical perfusion than voluntary movement or electrical stimulation alone. The results indicate that the sensory motor integration due to EMG-FES may facilitate the perfusion of the ipsilesional SMC and result in functional improvement of hemiparetic upper extremity.

TC266

The Effects of Common Peroneal Nerve Stimulation with Implanted Electrodes (ACTIGAIT®) on the Gait in Chronic Hemiparetic Patients

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Background: Weakness of the forefoot dorsiflexion in hemiparesis after stroke impairs the gait and stability. By electrical stimulation of the common peroneal nerve the forefoot is raised during the swing phase of the leg, and the patients gait can be thus improved. This can be performed with superficial electrodes (Functional electrical stimulation - FES) or with implanted electrodes (ACTIGAIT®-device). The effects of the ACTIGAIT®-device compared to FES and no stimulation on the gait pattern of chronic stroke patients are investigated in this study. **Material and Methods:** Six chronic hemiparetic stroke patients (4 m, 2 w, 27–69 y) with weakness of foot dorsiflexion were investigated. To quantify changes in gait a Vicon gait analysis system® was used and spatial and temporal data were collected. A comparison with FES and no stimulation was performed before the implantation and a comparison with ACTIGAIT® and no stimulation was performed 6 months after the implantation. **Results:** Walking speed increased (compared to no stimulation) to 108.1±6.2% (ACTIGAIT®), respectively to 112.8±29.3% (FES); step length of the affected side increased to 108.8±8.3% (ACTIGAIT®), respectively to 111.5±20% (FES), and the double support decreased to 91.9±13% (ACTIGAIT®), respectively to 96.4±31.4% (FES), indicating an increased gait stability. **Conclusion:** Initial data from the gait analysis show that the stimulation with implanted electrodes (ACTIGAIT®) of the common peroneal nerve results in a faster, more symmetrical and stable gait. The lower variability of the data of ACTIGAIT® compared to FES might be caused by the more stable effect on gait through stimulation by implanted electrodes than by surface electrodes. To confirm this a higher number of patients has to be investigated.

TC267

Musculoskeletal Ultrasound Use for Interventions in Physiatry: a Single-Center One-Year Analysis

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Background: Aside from its well-established role in diagnostics, ultrasound (US) imaging is also used to guide several interventions in the daily practice of physical and rehabilitation medicine. However, the relevant literature lacks analysis regarding this important issue. Accordingly, the purpose of this study was to document our experience pertaining to a single center (of excellence) during one year. **Material Method:** One hundred fifty six subjects who underwent US-guided interventions during the year 2014 were prospectively followed/reviewed. The following data were recorded; demographics of the subjects, the injection site/tissue/technique/material or whether the subject wanted to follow the intervention (from the US screen). Pain (baseline, post-procedure, 1st week, 4th week) was assessed using the numeric pain rating scale (NPRS). The difficulty of the procedure was also rated by the patient and the physician using the visual analogue scale (VAS). **Results:** Mean age of the patients (60 M, 96 F) was 49.71±16.81 years (range 5-87). The diagnoses of the patients are will be shown. Characteristics of the interventional procedures are summarized. 56 (35.9%) subjects preferred to follow the US screen during the procedure and 100 (64.1%) did not. Majority of the procedures (N=151, 96.8%) were performed using direct in-plane and only 5 (3.2%) with direct out-plane technique. Mean NPRS scores were 6.55±2.61 in the initial assessment, 3.14±3.07 one week after the procedure and 2.75±3.09 on the 4th week (p<0.001). The decrease was similar between subjects following or not following the US screen. **Conclusion:** We believe that our findings will provide an insight into better understanding the paramount role of US-guidance for interventional procedures in the daily clinical practice of physiatrists.

TC268

Ankle Sprains at a Military Male School: Taping Versus Bracing

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Background: Functional treatments are widely used and are generally the accepted treatment for ankle sprains. Regarding effectiveness, comparing different functional treatment options could not make definitive conclusions. **Objectives:** The objective of this article was to compare Taping Versus Bracing for Ankle Sprains injuries. **Patients and Methods:** All injured individuals with acute ankle sprains received standard advice (rest, ice compression with a compressive bandage, and elevation) at the clinic. After a week, 150 injured individuals with grade II and III sprains were categorized randomly into two groups: one group was treated with tape and the other with a brace for four weeks. Post injury training (proprioceptive and physical) was performed for the two groups. As first outcome parameters patient satisfaction and skin complications were assessed with an organized questionnaire and quantitative scale. As late outcome parameters, the function of ankle joint was evaluated with Karlsson quantitative scale and range of motion (ROM). **Results:** The study group indicated that satisfaction and comfort during brace treatment increased significantly. A cutaneous complication in the brace group was significantly lower in comparison to the other group (16.4% versus 51.9%). The ankle joint function outcome and perceived pain was the same for both groups. **Conclusions:** Treating acute ankle sprain with a brace was accompanied with greater satisfaction and less pain with a similarly acceptable outcome when compared to taping. **Keywords:** Military Personnel; Ankle Sprain; Athletic Tape.

TC269

Neuromuscular Training, a Potential Therapeutic Strategy for Knee Osteoarthritis

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It is considered that destruction of knee joint biomechanics participates in onset and progression of knee osteoarthritis (KOA). Com-

pared to conventional strength training, neuromuscular training (NT), which is typically performed in functional weight-bearing positions and emphasizes quality of movement and alignment of trunk and lower limb, may be a potential therapeutic strategy to prevent or slow KOA. Studies have demonstrated NT can improve symptom and function of knee joint in athletes who suffer knee injuries. Existing researches were reviewed to discover the impact of NT on KOA patients. In these studies, balance/disturbance training was involved in supervised exercise program as the main part. It was found that NT can improve pain and function in patients with KOA, but it was not clear that NT is better than conventional strength training. Furthermore, limited by insufficient quantity of studies and poor validity of evaluation method, it cannot be confirmed that NT can contribute to proprioception, joint stability and biomechanics, despite theoretically NT stands a good change to be effective. Consideration that NT aims at higher level functional activities, NT may provide better effect for severe osteoarthritis, and also be potential in help patients with higher level activities, such as recreational activities. NT will be a beneficial supplement to conventional treatments. In future, more studies are need to demonstrate effect of NT on pain, function, proprioception, joint stability and biomechanics in patients with KOA. When designing a next study, difference of study people, formulating exercise prescription and choosing outcome measurement should be took into considerations and attached more importance to.

TC270

Exercise and Therapeutic Ultrasound Compared with Corticosteroid Injection for Chronic Lateral Epicondylitis: a Randomized Controlled Trial

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Introduction: Lateral epicondylitis, or tennis elbow, is a common overuse syndrome of the extensor tendons of the forearm causing pain in the elbow and forearm and lack of strength and function of the elbow and wrist. Initially, lateral epicondylitis can be treated with rest, ice, brace, and non-steroidal anti-inflammatory drugs (NSAIDs). However, when the condition is chronic or not responding to initial treatment, physical therapy is initiated. **Objective:** To compare the effectiveness of corticosteroid injections with physiotherapeutic interventions: ultrasound and exercise for the treatment of chronic lateral epicondylitis. **Material and methods:** We performed a randomized, double-blind, controlled trial for 12 weeks in patients with chronic lateral epicondylitis. The study population consisted of subjects with a clinical diagnosis of lateral epicondylitis. Recruitment for the study was performed for 9 months, and 60 patients referred from general health practitioners, orthopedist, and rheumatologist were finally included. On the initial visit, subjects were assessed for their suitability including demographic information and baseline measurements. Subjects assigned to the corticosteroid injection group (n=24) were treated by orthopedist with local infiltration of 1 mL triamcinolone acetone (10 mg/mL) and 1 mL lidocaine 2%. Subjects assigned to the physiotherapy group (n=25) received: ultrasound and an exercise programme over 6 weeks. To evaluate the subjects, three instruments were used: pain intensity measured by the Visual Analogue Scale (VAS), functional disability by the Patient-Rated Tennis Elbow Evaluation (PRTEE) questionnaire, and pain-free grip strength. All subjects were evaluated before treatment at the 6 and 12 week. **Results:** Forty nine of 58 subject randomized (84.5%) completed the study. There were no significant differences amongst the two groups at baseline for any variable (p>0.05). In the exercise groups significant improvements was demonstrated for VAS, PRTEE pain score, PRTEE function score and pain free grip strength compared to the control group. Exercise group reported a significantly greater increase in all variables at 6, and 12 week than did control group (p<0.001). **Conclusion:** Our results suggest that

ultrasound therapy and exercise are beneficial in the treatment of tennis elbow. **Keyword:** lateral epicondylitis, ultrasound therapy, exercise, corticosteroid injection, treatment.

TC271

Underlying Mechanisms Mediating the Clinical Outcome of Manual Therapy in Patients with Nonspecific Neck Pain: a Systematic Review

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Background: Clinical trials and systematic reviews regarding manual therapy for non-specific neck pain support its effectiveness on pain reduction, improvement of function and quality of life. Little is known however about the underlying mechanisms that may contribute to these effects. Consequently, our aim was to identify current literature concerning the underlying mechanisms that mediate the clinical effect of manual therapy in patients with non-specific neck pain and to assess its methodological quality. **Materials and Methods:** A computerized search was performed in two electronic medical databases, PubMed and Web of Science. The search results were screened for eligibility based on a priori defined selection criteria. The Dutch Cochrane Form II for RCTs was used to give a quality score to the included studies. **Results:** After screening, six out of 46 articles met our inclusion criteria. The overall quality was high (average 6/9). We found consistent results of pain reduction and influence on the autonomic nervous system, suggesting the involvement of the descending inhibitory pathways from the periaqueductal gray (PAG). Cortical adaptations and modulated neuropeptide production were described as well. Research on long-term effects is currently lacking. **Conclusion:** This review supports previous speculations that manual therapy initiates a series of complex neurophysiological effects with interplay on spinal and supraspinal levels. However, contradictory findings make identifying a conclusive mechanism not yet possible. Further high-quality research on a multidisciplinary basis, including long-term effects and larger sample sizes, is required. **Keywords:** Neck Pain, Manual Therapy, Spinal Manipulations, Underlying Mechanisms, Systematic Review.

TC272

The Post-Operative Analgesia of the Virtual Reality Using a Mirror Therapy after Total Knee Arthroplasty

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Introduction: Mirror therapy has been tried for analgesia against phantom pain and CRPS using visual capture, rubber hand illusion, mirror neuron system, or embodiment phenomenon. It is, however, debatable whether it can handle the pure kind of musculoskeletal disease with no neurological nature. Authors planned to evaluate dose-dependent analgesic and functional effects of mirror therapy using virtual reality after total knee arthroplasty (TKA). **Methods:** The prospective, single-blind, randomized, clinical trial has been performing August, 2013 to July, 2014. 72 patients undertaking uni-lateral TKA was to be included. Patient who could not freely move contralateral leg due to neurologic or musculoskeletal problems, were not enough clear to indicate VAS, or could not look at virtual reality monitor due to eye problems were excluded. Mirror therapy was provided over two weeks to full term intervention group (FT) or one week to half term one (HT) with identical physiotherapy. Data were collected at post-operative 2nd, 3rd, and 7th week. **Results:** 18 patients were assessed, 12 patients excluded, and 6 patients recruited. Pre-interventional evaluations showed that VAS while at resting was 33, VAS while

moving 58, active ROM of flexion 78°, active ROM of extension -11°, WOMAC index 37, 6 minute walk test 226M, timed-stands test 24 seconds. A validation (-5 to 5) of mirrored virtual reality 4.2. VAS while at resting was 40, VAS while moving 52, active ROM of flexion 100°, active ROM of extension -3°, WOMAC index 31, 6 minute walk test 281M, timed-stands test 24 seconds, the mean time of requested Tridol intravenous injection of 3 at 1st follow-up. VAS while at resting was 9, VAS while moving 30, active ROM of flexion 105°, active ROM of extension 0°, WOMAC index 18, 6 minute walk test 327M, timed-stands test 21 seconds, the mean time of requested Tridol intravenous injection of 1 at 2nd follow-up. VAS while at resting was 8, VAS while moving 21, active ROM of flexion 135°, active ROM of extension 0°, WOMAC index 11, 6 minute walk test 351M, timed-stands test 19 seconds at 3rd one. *Conclusions:* Authors are to keep this trial going.

TC273

Submental Sensitive Transcutaneous Electrical Stimulation Reverses Virtual Lesion of the Oropharyngeal Cortex

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Background: Oropharyngeal dysphagia is frequent in stroke patients and alters outcome. Since several years, we observe the development of facilitation techniques based on cortical reorganization, like peripheral electrical stimulation. Even if transcutaneous electrical stimulation is attractive because of its simplicity, mechanisms of action are poorly understood. It is actually suggested that it could modify pharyngeal cortical representation. Our objective was to assess submental sensitive transcutaneous electrical stimulation (SSTES) effect on pharyngeal cortical representation after a virtual pharyngeal lesion in healthy subjects. *Methods:* Motor evoked potentials of the mylohyoid muscles and videofluoroscopic parameters were measured before and after SSTES performed after the creation of the virtual lesion, at the end of SSTES (T0), at 30 min (T30) and 60 min (T60). *Results:* Nine subjects completed the study. After 20 min of SSTES, there was an increase of motor evoked potential amplitude at 0 and 30 min ($p < 0.05$). There was no significant modification of videofluoroscopic measurements. Regarding the cortical mapping after SSTES, there was an increase in the number of points with a cortical response in the dominant hemisphere and also in both hemispheres when taken together, effect which remained constant at 60 min ($p < 0.05$). *Conclusion:* SSTES is effective on cortical plasticity for the mylohyoid muscles and reverse pharyngeal cortical inhibition in healthy subjects. It could therefore be a simple non-invasive way to treat post stroke dysphagia.

TC274

Transcranial Direct Current Stimulation as a Rehabilitation Method in Post Stroke Patients

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Introduction and Background: Transcranial direct current stimulation (TDCS) is a promising rehabilitation method to improve motor and cognitive deficits in post stroke patients by promoting neuronal plasticity. *Materials and Methods:* We performed a study in our stroke unit to investigate safety and efficacy of anodal TDCS of the affected hemisphere in non-acute stroke patients. Each patient (n=18) received fifteen sessions with TDCS to the ipsilesional M1 followed by a physiotherapy session within the next hour. Motor ability and cognition were evaluated with FIM scale, Motricity index scale and the MMSE. *Results:* The majority of the patients

had improvement of the clinical outcome in both motor ability and cognition. The patients that followed the procedure reduced the hospitalization days at the rehabilitation center ($p < 0.01$). No side effects were detected during TDCS. *Conclusions:* Fifteen sessions of anodal TDCS to the ipsilesional M1 appear to be safe in non-acute stroke patients and improve the clinical outcome and reduce the days of hospitalization.

C.2.18 ROBOTICS IN REHABILITATION

TC275

The Hybrid Assistive Limb Exoskeleton (Hal®) in the Rehabilitation of Chronic and Acute Spinal Cord Injury

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Introduction/Background: Robotic driven gait orthosis emerge increasingly into the field of rehabilitation of walking impaired patients and treadmill training under body weight support (BWSTT) after spinal cord injury (SCI) has become an established part of the therapy. The hybrid assistive limb (HAL®) exoskeleton enables SCI-patients to effectively perform a locomotion training [1] based on a close loop biofeedback by supporting motor functions synchronously to the wearers voluntary drive [2]. Recent clinical trials provide preliminary evidence concerning functional outcome subsequent to the treatment of acute [3] and chronic SCI [1]. *Objective:* To investigate whether HAL®-BWSTT is capable of inducing neurologic and/or functional improvements in acute and chronic SCI. *Material and Methods:* Twenty one patients with chronic SCI (years post injury > 1 year) and 6 patients with acute SCI performed 60 sessions of daily (5/week) HAL®-BWSTT. Inclusion criteria were defined as follows: Chronic or acute SCI (ASIA A-D). Assessment of functional mobility using standardized assessment tools (10MWT/WISCI-II-Score, 6 MinWT, TUG) completed by neurological testing (ASIA-Impairment Scale) at baseline, after 6 and 12 weeks of the intervention. *Results:* All participating subjects improved significantly subsequent to 12 weeks of HAL®-Locomotion training in terms of functional mobility (e.g. 10MWT) and neurological assessment (AIS). *Conclusion:* The HAL® exoskeleton enables effective treadmill training and induces neurological and functional improvements. Therefore HAL®-BWSTT emerges to be a useful and effective adjunct in the rehabilitation of SCI patients. *References:* 1) Aach M, Cuciger O, et al. Voluntary driven exoskeleton as a new tool for rehabilitation in chronic spinal cord injury: a pilot study. *Spine J.* 2014 Apr 4. 2) Kawamoto H, Taal S, et al. Voluntary motion support control of Robot Suit HAL triggered by bioelectrical signal for hemiplegia. *Conf Proc IEEE Eng Med Biol Soc.* 2010; 2010: 462-6. 3) Cruciger O, et al. Locomotion training using voluntary driven exoskeleton (HAL) in acute incomplete SCI. *Neurology.* 2014 Jul 29; 83(5): 474.

TC276

The Effectiveness of Reconstruction of the Stereotype by Motorized Foot Orthotics External Exoskeleton Paretic Leg in Patients with Spastic Hemiparesis

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Achievements of the last decades in the field of hardware rehabilitation techniques allow for more efficient recovery of lost functions, in particular the rehabilitation and training of the stereotype

walk in patients with spastic hemiparesis after suffering a stroke. **Purpose:** Determine the effectiveness of the recovery distance by motorized orthosis external exoskeleton (MOVE) paretic leg in patients with spastic hemiparesis. **Materials:** The study included 94 patients after suffering a stroke, disease duration from 2 weeks to 5 years, in the lower limb paresis at least 2.0 points. Of these, 50 patients constituted the main group and the comparison was obtained by the method of training MOVE. 44 patients included in the control group, in which the exercise was carried away while traditional occupations gymnastics instructor. **Methods:** Patients of the main group received a course of training in 15 MOVE lasting 30 minutes each, were conducted 6 times a week. Patients in the control group engaged in daily physiotherapy with an exercise physiologist, during training sessions held stereotype of walking on a routine procedure. Evaluating the effectiveness of training conducted by the results Podometry, which was conducted at the beginning and end of treatment. The degree of recovery of mobility of patients was evaluated by the test 10 - meter walk. **Results:** On podography main group in comparison with the results in the control of locomotion, a decrease of asymmetry, increased smoothness of rolling of the foot, the normalization of the depreciation function, physiological load increase and participation in the support structures of the foot in the dynamics of ongoing training, a decrease of pathological peregruzkok inner arch of the foot paretic lower limb. On the effectiveness of increasing the axial load on the paretic lower limb trajectory analysis indicates migration of center of pressure (TMTSD) under the soles: In the study group $698.99+572.44$ g/cm at the beginning of the course and $988.06+1,102.41$ g/sq. see ($p<0.05$), whereas in the control group indicator TMTSD increase was not statistically significant. Estimates of the rate of overcoming a 10 - meter distance was also higher in the study group patients and amounted to $38.65+15.87$ seconds in the control group $63.12+16.45$ seconds ($p<0.05$). **Conclusion:** Conducting training stereotype walk to MOVE in patients with mild hemiparesis as a result of suffering a stroke is an effective method of recovery of walking.

TC277

Hand Glove 200: Advancing Technology to Improve Hand Function in SCI & TBI Tetraplegia

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Background: Effective rehabilitation of functional loss from SCI & TBI requires thousands of repetitions. Applying sufficient repetitions manually, whether actively (FES), passively, or through vibratory stimulation is impractical and usually not feasible. Custom robotics is a possible means to better achieve this. An advanced prototype in robotic technology, the Hand Glove FES 200, was developed which allows for thousands of repetitions of active (FES) and passive ROM for individual fingers and the thumb over several weeks. This technology was studied in 14 patients with severe tetraplegia from SCI. **Methods:** In the phase I study, the safety and feasibility of the Hand Glove FES 200 was studied in 14 subjects with tetraplegia from SCI (C4–C7) of at least one-month duration. Customized fitting was performed. Treatment protocol included a 1-hour session of 30 minutes of continuous passive motion, followed by 30 minutes of functional electrical stimulation. Twenty-four 1-hour sessions were performed over a 6-week period. Initial and final evaluations included questionnaires, measurements of passive and active range of motions of all upper extremity joints; wrist, hand and digit circumference, pain and skin assessments, hand and pinch strength, manual muscle testing, Jebson-Taylor, 9-hole peg test, DASH and FIM scores. **Results:** Of 14 subjects enrolling, 11 completed the 6-week course. All tolerated the treatments, and there were no serious adverse effects. Those who dropped out did so because of medical co-morbidities interfering with the treatments. There were improvements noted in

active range of motion, strength and functional skills. **Conclusion/Summary:** The FES Hand Glove 200 is a new technology designed to provide a high intensity of repetitions optimal for enhancing hand function in tetraplegia, from SCI or TBI. This data indicates that the system and protocol is safe and feasible. Although this data suggested efficacy, the number of subjects was not sufficient to provide definitive conclusions about efficacy. A phase II study of 30 additional subjects with both SCI and TBI is currently underway and we can present up-to-date data from phase II at this conference.

TC278

Does the Robot-Assisted Gait Training Improve Balance in Hemiplegic Stroke: a Randomized Control Trial

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Introduction/Background: Robot-assisted gait training (RAGT) has become an important part of modern rehabilitation after stroke. There exists numerous evidence that end-effector type RGAT does significantly improve ambulation function of stroke patients. However, the effect of RGAT on balance is less well demonstrated. This study aims to explore the improved balance ability of subacute stroke which is measured with the Berg Balance Scale (BBS). **Material and Methods:** 60 first-ever, non ambulatory subacute stroke patients were randomized into experiment and control groups. The experiment group received 30 minutes RAGT plus 30 minutes conventional physical therapy while the control group received 60 minutes conventional physical therapy every working day for 4 weeks. The outcome measurements were assessed before, after four weeks treatment, and three months follow up period, using the BBS to determine if the treatment was effective for increasing the patient's balance ability. **Results:** After four weeks treatment, both groups revealed significant improvement in balance scores measured by the BBS. The mean change after four weeks of the BBS of the experiment groups is 25.6 (17.6), 95% CI=14.8-29.7 while in the control group is 9.8 (12.6), 95% CI=5.2-14.4, $P=0.001$, after three months is 33.2 (17.4), 95% CI=22.3-37.2 of the experiment group and 15.7 (18.0), 95% CI=9.1-22.3 of the control group, $P=0.001$. There are 23/30 responders (who demonstrate a difference of more than 7 BBS points) from the experiment and 13/30 from the control group ($P=0.008$). **Conclusion:** RAGT plus conventional physical therapy can better improve balance ability of subacute stroke patients than solely conventional physical therapy. **References:** 1) Swinnen E, Beckwée D, Meeusen R, Baeyens JP, Kerckhofs E. Does robot-assisted gait rehabilitation improve balance in stroke patients? A systematic review. *Top Stroke Rehabil.* 2014 Mar-Apr; 21(2): 87-100. 2) Mehrholz J, Pohl M. Electromechanical-assisted gait training after stroke: a systematic review comparing end-effector and exoskeleton devices. *J Rehabil Med* 2012; 44(3): 193-9.

TC279

Robot-Assisted Stair Climbing Training and Conventional Physiotherapy in Chronic Stroke Patients. A Preliminary Comparison

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Introduction: Stair-climbing up and down is an essential part of everyday's mobility. Physiotherapy focuses on strengthening, real floor walking and stairs climbing, but these methods do not stress in terms of intensity stair-climbing practice. The present work aims

at a comparison whether an intensive robot-assisted stair climbing training (RASCT) is more effective than conventional physiotherapy (CP) for improving stair climbing ability and gait in stroke patients. *Material and Methods:* Ten patients were randomly assigned to RASCT (n=5) or CP (n=5) group. Patients underwent ten sessions of 45-minute treatment, five days a week, for two consecutive weeks either RASCT or CP. The primary outcome was the stair climbing up and down time to accomplish a flight of 9 stairs, Berg Balance Scale (BBS), Time Up and Go Test (TUG), 10-Meter Walking Test (10MWT), 6-Minute Walking Test (6MWT), Modified Ashworth Scale, and the electromyography of eight lower limb muscles were also assessed before and after treatment. *Results:* At enrolment no differences were found between RASCT and CP for all outcomes. After the intervention improvements were found for the time required to climb up (P=0.06) and down (P=0.06) stairs in the RASCT group, but not for the CP group. Improvements were found in the RASCT and CP for TUG (P=0.04; P=0.04), 10MWT (P=0.04; P=0.04) and in 6MWT (P=0.04). After intervention, a more physiological muscle activation in RASCT group (5 lower limb muscles) and in CP group (6 lower limb muscles) was observed. *Conclusion:* RASCT may reduce the time required to climbing up and down the stairs. A larger sample is required to reveal the superiority of one approach rather than another one.

D.1 REHABILITATION SYSTEMS AND SERVICES - MONITORING AND REPORTING

TD280

Improving the Quality of Rehabilitation Research through the Use of Reporting Guidelines

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Introduction/Background: Reporting guidelines, such as CONSORT and PRISMA, are structured outlines for authors to use when describing their methods. Over the past few years, it has become clear that the use of reporting guidelines by authors improves the quality of research. Recently, the editors of more than 30 international rehabilitation journals agreed to simultaneously require the use of reporting guidelines by all authors. This is an unprecedented effort by the field and has been a model for other disciplines. *Material and Methods:* This initiative will begin on January 1, 2015, and will coincide with the Equator Network's 2015 "Year of the Guideline." The rehabilitation journals involved includes a broad range of publications, including those focused on physical therapy, occupational therapy, rehabilitation nursing, speech pathology, as well as many multidisciplinary journals. *Results:* The presenters will discuss the implementation of guidelines, including challenges encountered and resolutions. In addition, presenters will describe efforts to informing editors, authors, and reviewers on how best to apply these guidelines. *Conclusion:* This project represents one of the largest initiatives ever in the field of rehabilitation research, and has the potential to vastly improve not only the reporting of methods, but also, over time, the quality of the rehabilitation research itself. We plan on monitoring article quality from before to after guidelines implementation to evaluate the effectiveness of this collaboration. *References:* 1) Chan L, Heinneman AW, Roberts J. Elevating the quality of disability and rehabilitation research: mandatory use of the reporting guidelines. *Arch Phys Med Rehabil.* 2014; 95(3): 415-417. 2) Turner L, Shamseer L, Altman DG, et al. Does use of the CONSORT Statement impact the completeness of reporting of randomised controlled trials published in medical journals? *Cochrane Rev Syst Rev* 2012; 1: 60. 3) Cobo E, Cortés J, Ribera JM, et al. Effect of using reporting guidelines during peer review on quality of final manuscripts submitted to a biomedical journal: masked randomised trial. *BMJ* 2011; 343: d6783.

TD281

Toward a Minimum Standard for Reporting of Functioning Information in Clinical and Rehabilitation along the Continuum of Care

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Introduction: Functioning, as described in the International Classification of Functioning, Disability and Health (ICF), is a primary health outcome in health and rehabilitation practice. The ICF serves as a standard for describing functioning across all levels of the health system. One of the biggest challenges is to ensure that the most relevant aspects for a particular patient are captured while maintaining standards so that information can be compared across patients and settings. This paper outlines the steps toward the development of a minimum set of domains most relevant along the continuum of care to facilitate a standardized documentation of functioning in routine clinical and rehabilitation practice. *Materials and Methods:* Over the last decade, more than 25 ICF Core Sets, that is, shortlists of ICF categories most relevant for a patient with a specified health condition, have been developed based on a multi-phase international consensus process. These sets served as a foundation for an empirical study to examine which ICF categories explain functioning in the general population and across patients with varying health conditions. As the empirical study focused mainly on adults in long-term, out-patient or community settings, we reviewed additionally existing ICF Core Sets for health condition groups specifically for acute, early-post acute, and geriatric settings. *Results:* Based on this comprehensive process, there is now a minimum set of 7 ICF Categories available that is most relevant to describe functioning across the general and clinical population – ICF Generic Set – and a selection of further 23 ICF categories most relevant across clinical populations along the continuum of care – ICF Disability Set. The ICF Generic Set is included in the ICF Disability Set. *Conclusion:* The ICF Generic Set serves as the minimum standard for reporting functioning in clinical and rehabilitation practice. For the system-wide implementation of this minimum standard for reporting functioning, relevant information on these ICF categories is recommended to be recorded for any patient. It is only once this information is available in a structured manner in all health records that functioning information can be systematically used for health service planning and health resource allocation, as well as policy development and evaluation.

TD282

Variation in Rehabilitation Outcome between German Rehabilitation Inpatient Facilities – a Quality Assurance Data Based Study

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Introduction/Background: Variation in outcomes is a popular theme in medical care and there is some, but limited evidence of considerable variation in medical rehabilitation outcomes, too. Quality of care and outcomes are not the same in every facility and thus the amount of this variation needs to be analyzed and explained. The purpose of this study was to determine the amount of variation between German rehabilitation facilities in an outcome-index developed for this purpose. This was done as a preparatory phase for a qualitative study part in a large mixed-methods study. *Material and Methods:* Quality assurance data of the German statutory pension fund scheme was used. The outcome measure was an index comprised of subjective changes in relevant domains,

such as pain or ability to work. A total of 112,895 orthopaedic patients from 273 clinics and 30,441 cardiologic patients from 86 clinics were included. Using hierarchical linear models, we calculated intraclass-correlation-coefficients (ICC) as a measure for variation. League tables were created for both raw and risk-adjusted comparisons. Additionally, the distance between the highest and lowest scoring facility in the adjusted comparison was calculated. **Results:** The raw comparison yielded ICCs of 4.8% for orthopaedic facilities and 5.7% for cardiologic facilities. Adjusting for patient characteristics reduced the amount of variation to 1.4% and 1.7% respectively. The differences in means between the highest and lowest scoring facility were 1.06 SD and 1.2 SD respectively. **Conclusion:** A big part of variation between facilities can be explained by patient characteristics, but not all of it. After adjusting for those variables, variation among facilities still exists. Although the ICCs were relatively low, the differences in outcome between the most and least successful facilities were quite considerable. Due to large amount of facilities in the middle area, the differences in the extreme ends of the distribution seemed to have gotten blurred. A thorough quality assurance program can yield data to compare outcomes between facilities and to connect these outcomes with an array of variables. Combining outcomes on the facility level with data of structure, processes, costs or therapeutic concepts can result in new knowledge about rehabilitation.

TD283

Comparative Effectiveness of Stroke Rehabilitation in the U.S. and Global Applicability

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Introduction: Stroke is a leading cause of acquired disability among adults. Rehabilitation care is recommended after an acute stroke to reduce stroke-related disability and improve health outcomes. However, evidence for the comparative effectiveness of different rehabilitation service options in the United States (U.S.) is limited. Further, the applicability of evidence of effectiveness in the U.S. may be limited for other developed and developing nations due to how rehabilitation services are organized and delivered. **Methods:** The provision of rehabilitation care after an acute ischemic stroke (AIS) was described using data from a national cohort of stroke survivors. Mortality and all-cause rehospitalization at 14, 90, and 365 days were compared for stroke survivors who received the most common service options. The provision and effectiveness of rehabilitation care in the U.S. were compared to published reports identified in a systematic review of rehabilitation services and effectiveness, with a targeted focus on low and middle income countries. **Results:** More than half of adults who experienced an AIS in the U.S. were discharged from the hospital to a short-term inpatient care setting (24.1% to inpatient rehabilitation, 27.0% to skilled nursing facilities) and 48.9% were discharged to the community to receive either care in the home (14.9%) or rehabilitation in an outpatient clinic (7.1%). It was not uncommon to receive stroke care in two or more settings and evidence of benefit for rehabilitation care attenuated over time. Although 1 in 4 patients did not receive any post-acute care (26.9%), the comparison of any rehabilitation vs. none was not possible due to the imbalance in patient characteristics. This limits the applicability of findings beyond the U.S. as the organization and availability of rehabilitation services is somewhat unique. Health services research of rehabilitation care particularly in low and middle income countries is extremely limited. The majority of research, predominantly in developed countries, examines acute stroke units that include rehabilitation or early supported discharge models. Few low and middle income countries had research of multidisciplinary inpatient rehabilitation or home and community based programs. **Conclusions:** There is a tremendous opportunity to examine the availability, provision and effectiveness of post-acute stroke rehabilitation globally.

TD284

Quality Assurance of Medical Decision Making about Applications for Disability Pension in the German Pension Insurance

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Background: Applications for disability pensions have to be reviewed by medical experts. To ensure a high quality standard of these medical expertises, the German Pension Insurance has developed a specific quality assurance system. It comprises hierarchically structured requirements which are composed of six basic criteria (e.g., formal quality, sufficiency) and one general criterion (general transparency of the review). The latter refers to the degree to which another expert is able to reconstruct the process of medical decision making. Furthermore, the quality assurance concept consists of a peer review system in which anonymised medical expertises are re-evaluated by specially trained medical experts. These peers evaluate the degree of compliance with the requirement criteria in every single case in a three- or four-stage rating process (VDR 2004; DRV 2009). **Methods:** Objective of the pilot study was to consider the suitability of the proposed quality assurance system for daily use and to analyse the reliability of the peer review. We used 260 anonymised expertises on disability pension applications delivered by 12 regional pension insurance funds. 20 of the expertises were randomised and reviewed by each of the 19 peers involved. All the other expertises were reviewed each by two of the 19 trained peers. **Results:** The peer review was conducted between July and November 2011, assisted by an online-tool for distribution of expertises and recording of rating data. The realised peer review system proved to be practicable, confirmed by the feedback of the participants. Interrater reliability (Kendall's W) was 0.37 (overall coefficient for the general criterion). **Conclusion:** Reliability of our peer review of medical expertises regarding disability pension applications is moderate but appears sufficient for implementation. Various suggestions are used to revise the formulation of the criteria in order to further improve quality measures. Implementation of the peer review system requires periodical training of all peers involved. **References:** 1) [DRV] Deutsche Rentenversicherung Bund (2009). Qualitätssicherung der sozialmedizinischen Begutachtung - Aktueller Sachstand. Berlin. 2) [VDR] Verband Deutscher Rentenversicherungsträger (Hrsg.) (2004). Abschlussbericht der Kommission zur Weiterentwicklung der Sozialmedizin in der gesetzlichen Rentenversicherung (SOMEKO). DRV-Schriften, 53.

TD285

The Fiscal Impact of an Electronic Neurorehabilitation Census Board: Cost Reduction Estimates from a Multidisciplinary Solution to Throughput and Care Coordination

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Introduction: Hospital efficiency is a critical challenge to effective stroke care. This study presents a unique solution to avoidable barriers to discharge. **Methods:** We developed a novel system of multidisciplinary communication and systems planning. It is implemented on our de novo Neurorehabilitation Census Board (NRCB), a bipartite electronic communication system combined with protocolled multidisciplinary communication to address various barriers to discharge. The system concomitantly targets medical, rehabilitation, case management, social services, and care coordination barriers to expedite hospital discharge. We implemented this system over 2 neurology floors in a 953-bed teaching

hospital over 3 months as a pilot. We calculated the approximate fiscal benefits from delays to care, length of stay, and avoidable hospitalization days to develop cost reduction estimates for the time period. *Results:* Implementation of the NRCB system quickly resulted in higher throughput, decreased imaging delays, improvement in communication, timely performance of procedures, and transition to hospitalization post-acute settings. Calculations of financial cost savings approximated to \$427,223.02 on the first floor and to \$1.42 million on the second floor, totaling \$1.84 million. Yearly projections were 7,371,792.39 for the localized pilot implementation. Throughout the inception of the specialty service alone, benefits ranged from \$19,662,984 to \$22,026,840 at its lowest approximation. Hospital wide impact with this model reached 47.98 million to 53.75 million (44 to 49 million when using compensations of hospital-adjusted expenses), translating to 61.53 to 68.93 million in adjusted-model equivalents in similar US hospitals. Fiscal trends were maintained when considered by service, ownership, and annual percent growth in healthcare expenditures. *Conclusions:* The NRCB multidisciplinary model demonstrated financial benefits in cost savings due to increased communication and tracking, an impact ranging up to 59 to 116 million in a non-profit hospital setting.

D.2 COMPREHENSIVE REHABILITATION INTERVENTION RESEARCH

TD286

Rehabilitation as an Epidemiological Determinant for Leprosy Elimination in Cameroon

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Background: Rehabilitation in leprosy is the physical and mental restoration of treated patients to normal activity, so that they may be able to resume their place in the home and community. This must be accompanied by health education. *Objectives:* This study was carried out to assess the role of rehabilitation as an epidemiological determinant for leprosy elimination in an endemic region. *Methods:* Focus group discussions, in-depth interviews and a structured questionnaire were used to investigate leprosy rehabilitation among lepers, their contacts and a control group comprised of patients attending hospital for reasons other than leprosy. Informed consent was sought and gained from all study participants before the commencement of the study. Data was analysed using EPI-Info at 95% confidence. *Results:* A total of 480 people comprised of 138 leprosy patients, 180 contacts and 162 controls took part in the study. The proportion of the study sample with correct knowledge of leprosy rehabilitation was 65.6% (95% confidence interval: 61.4-69.8%). A statistically significant relationship between knowledge of leprosy rehabilitation and the study subjects was established with 97.1% lepers, (58.3%) contacts and (46.9%) controls having correct knowledge ($p=0.00$). There was a statistically significant relationship in correct knowledge of leprosy rehabilitation among active and discharged lepers ($p=0.01$). Among leprosy contacts, 78 (73.6%) intra-familial and 27 (36.5%) extra-familial contacts cited the correct meaning of leprosy rehabilitation ($p=0.00$). The commonest rehabilitation trade stated by the leprosy patients were farming (35.5%), unskilled labour (28.3%), security services (7.0%), basket weaving (7.9%) and hospital ward auxiliary staff (7.2%). Among the 480 participants, 315 (65.6%) [95% CI: 61.8-70.2%] cited the correct meaning of leprosy rehabilitating ($p<0.05$). The summary statistics on rehabilitation as an epidemiological determinant of leprosy show that there was a statistically significant relationship within and between the various categories of lepers, contacts and controls ($p=0.00$). *Conclusion:* Rehabilitation has improved the quality of life of lepers in the leprosarium but the community needs more education on rehabilitation, vocational trades taught to leprosy patients and the positive contribution debilitated individuals could bring to the develop-

ment of society. There is a need for the development of a Leprosy Rehabilitation Score.

TD287

“Protective Edge”: a Ward during War

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Introduction: “Protective Edge” operation took place from July 8th to August 26th 2014. During this period 67 soldiers and 5 civilians were killed, and 1,620 soldiers were injured. The majority of the injuries were orthopedic. The orthopedic rehabilitation ward at Sheba Medical Center traditionally admits wounded soldiers, so it was almost obvious that the majority of the wounded soldiers will be admitted at our ward. During routine times the ward treats patients with diabetes and a variety of orthopedic injuries, and so the need to admit the wounded soldiers required fast discharge of almost all the patients to alternative treatment facilities. The ward discharged civilian patients and admitted wounded soldiers at a rate of 5 soldiers per day. During only 5 days the ward has changed its nature. *Material and Methods:* During “Protective Edge” operation 53 wounded soldiers were admitted at the orthopedic rehabilitation ward at Sheba Medical Center. The age range was 19-37, and the median was 20 years old. The ward was at 110% occupancy and totally changed rapidly: Locations for military unit office were assigned in the ward to provide quick response for soldiers and their families; physical appearance adjustments were made as response to the soldier’s requirements; an outstanding number of visitors flowed constantly. *Results:* 53 wounded soldiers with a range of orthopedic injuries were admitted at the orthopedic rehabilitation ward at Sheba Medical Center. From the very first day they started receiving interdisciplinary treatment which included medical treatment (including pain treatment) as well as physical therapy, occupational therapy, psychotherapy and psychiatric treatment. We adjusted to keep continuity of psychological treatment by following the patients from the acute wards to the rehabilitation ward and thereafter to the ambulatory service. *Conclusions:* The implications of “Protective Edge” operation forced the orthopedic rehabilitation ward at Sheba Medical Center to adapt to a changing reality concerning the patients admitted. The ward has changed dramatically rapidly. Mapping and understanding the processes that took place during this unique period of time may have a major contribution to determining future treatment plans for medical rehabilitation systems, as well as for the treatment teams composing those medical systems.

TD288

Developing a Cancer Rehabilitation Continuum of Care... Connecting Acute and Post Acute Cancer Rehabilitation

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Around the world individuals are surviving from cancer but without rehabilitation services may not have full return to participation in life roles. The role of rehabilitation professionals should be an active team member throughout the trajectory of cancer care. In 2015 all comprehensive cancer centers in the USA must have rehabilitation as part of their continuum of services. CARF international has developed, with the assistance of international cancer rehabilitation specialists, the first set of international cancer rehab standards. Utilizing the Dietz model of care focusing on preventive, restorative, supportive and palliative care these programs may be delivered in a variety of settings, including hospitals, healthcare systems, outpatient clinics, or community-based programs. Cancer rehabilitation is an integral component of quality cancer care. These programs focus on strategies to optimize outcomes from the time of diagnosis through the trajectory of cancer in an effort to prevent or minimize the impact of impairments, reduce activity

limitations and maximize participation for the persons served. The program communicates and collaborates with healthcare providers to deliver coordinated care and promotes seamless transitions in care. Participants will learn from the first two accredited cancer rehabilitation program medical directors how they have developed the continuum of services; established meaningful relationships with acute care team; and continue to measure the outcomes of services delivered. Learn from those doing the actual development and implementation of quality rehabilitation cancer care services. *Resources:* Dietz Model of Cancer Care; 2015 CARF Medical Rehabilitation Standards.

TD289

Experiences of Providing Prosthetic and Orthotic Services in Sierra Leone – the Local Staff’s Perspective

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Introduction: In Sierra Leone, West Africa, there are many people with disabilities in need of rehabilitation services after a long civil war. Sierra Leone is among the ten least developed countries in the world and half of the population live under the absolute poverty line with an income less than \$1.25 a day. *Aim:* The aim of this qualitative study was to explore the experiences of prosthetic and orthotic service delivery in Sierra Leone from the local staff’s perspective. *Method:* Fifteen prosthetic and orthotic technicians working at all the rehabilitation centres providing prosthetic and orthotic services in Sierra Leone were interviewed. The interviews were transcribed and subjected to latent content analysis. *Results:* One main theme emerged: sense of inability to deliver high quality prosthetic and orthotic services. This main theme was generated from eight sub-themes: Desire for professional development; appraisals of work satisfaction and norms; patients neglected by family; limited access to the prosthetic and orthotic services available; problems with materials and machines; low public awareness concerning disabilities; marginalisation in society and low priority on the part of government. *Conclusions:* The findings illustrated traditional beliefs about the causes of disability and that the public’s attitude needs to change to include and value people with disabilities. Support from international organisations was considered necessary as well as educating more prosthetic and orthotic staff to a higher level. People with a disability needed to be included to a greater extent and supported at different levels within families, communities, government, international organisations, and society in general. *Reference:* Magnusson L, Ahlström G, Experiences of providing prosthetic and orthotic services in Sierra Leone – the local staff’s perspective. *Disability and Rehabilitation* 2012; 34: 2111-8.

TD290

Development of a Rehabilitation Prescription for Patients with Major Trauma

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Background: Measurement of rehabilitation need and rehabilitation outcome after trauma remains non-standardised and ambiguous limiting national and international comparison of burden of injuries. The World Health Organisation (WHO) has recommended the application of the International Classification of Function, Disability and Health (ICF) in rehabilitation. This study aims to identify a minimum ICF data set of important rehabilitation categories for measurement and prescription after major trauma. *Methods:* Mixed methods were used to investigate 35 patients and 329 health care professionals (HCPs) perspectives of important rehabilitation needs after trauma. Qualitative patient data and quantitative HCP survey data were linked to the ICF to identify important rehabilitation categories. *Results:* Patient identified 234 (64%) from a possible 363 ICF categories. 66% (n=217) international trauma

experts completed an on-line questionnaire identifying 121 (33%) ICF rehabilitation categories. Patients and HCPs strongly agreed on items related to body structures and body functions which include temperament, energy and drive, memory, emotions, pain and repair function of the skin. Patients prioritised rehabilitation tasks related to domestic tasks, recreation and work compared to HCPs that prioritised self-care and mobility. Environmental is an important concept not previously considered in trauma rehabilitation and 26 environmental categories were identified. Data was compared and reduced to propose 109 candidate categories for an ICF trauma rehabilitation prescription. *Conclusions:* The comprehensive assessment of rehabilitation needs after trauma is important to enable accurate rehabilitation prescription of patient important priorities. This will enable comparison between individuals, regions and international trauma systems to identify important rehabilitation gaps and needs amongst trauma populations. An internationally applied ICF trauma rehabilitation data set will standardise the language used and concepts measured after major trauma to enable international comparison of outcome data.

TD291

Short- and Long-Term Improvement in Mental and Physical Functioning after Rehabilitation among Individuals with Disabilities

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Background: The present study was undertaken in order to evaluate the trajectories of physical and mental functioning in subjects with chronic disabilities receiving adapted physical activity based rehabilitation. Secondly we wanted to determine whether demographic factors, disability group, pain, fatigue and self-efficacy at baseline influenced the trajectories. *Research Design:* A prospective intervention study. *Materials and Methods:* 175 patients admitted to rehabilitation at Beitostølen Healthports Centre answered questionnaires eight and four weeks before rehabilitation, at admission, discharge, four weeks after and 12 months after rehabilitation. Multilevel models were performed to examine trajectories of SF-12 PCS and MCS and if significant predictors interacted with time. Significant predictors were dichotomized around their mean level, paired sample *t*-tests were conducted evaluating changes in physical and mental scores on high and low predictor subgroup. *Results:* Time yielded a significant effect on both physical and mental functioning ($p < 0.001$). Low age ($p = 0.03$), being employed ($p = 0.03$), low pain level ($p = 0.01$), high exercise-efficacy ($p = 0.04$) and high chronic disease-efficacy ($p = 0.04$) predicted higher physical functioning. A significant interaction between chronic disease-efficacy and time showed a larger improvement in physical functioning for subjects with low self-efficacy at baseline ($p = 0.01$). *t*-tests showed that low chronic disease-efficacy predicted higher improvement in physical functioning at 12-month follow up ($p < 0.001$) while high chronic disease-efficacy predicted no improvement ($p = 0.52$). Low fatigue ($p = 0.002$) and high chronic disease-efficacy ($p = 0.02$) predicted higher mental functioning. A significant interaction with time for both of these predictors showed a larger improvement for subjects with high fatigue and low chronic disease-efficacy ($p = 0.02$ and 0.03). *t*-tests showed that low chronic disease-efficacy or high fatigue predicted higher improvement in mental functioning at 12-month follow up ($p < 0.001$ and $p = 0.002$) while high chronic disease-efficacy or low fatigue predicted no improvement ($p = 0.1$ and 0.06). *Conclusion:* This study shows the trajectories of physical and mental functioning. An adapted physical activity based intervention improves both physical and mental functioning, the improvement is statistically significant 12 months after intervention. Demographic factors, pain, fatigue, exercise-efficacy and chronic disease-efficacy predict higher levels of functioning,

whereas fatigue and chronic disease-efficacy predict the trajectories' variation over time.

TD292

Determinants Influencing the Implementation of Home-Based Stroke Rehabilitation: a Systematic Review

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Purpose: Home-based rehabilitation is a promising alternative to regular center-based stroke rehabilitation. The objective of this study was to identify what is currently known about determinants that influence the implementation of home-based stroke rehabilitation (HBSR) in clinical practice. *Methods:* A systematic review of determinants of HBSR was conducted, using a framework for innovation (including determinants related to the innovation, the user, the organisation, and the socio-political context) Reviews, meta analyses, and qualitative studies were included. Studies were selected if they concerned: home-based rehabilitation of stroke patient's (motor) function, changes in in-person service delivery (>24h to 12 months post-stroke) and determinants of implementation. *Results:* A total of 88 studies were identified, of which 7 studies met the inclusion criteria. Identified determinants of implementation of HBSR were: intervention effectiveness, the exact nature of the medical condition, satisfaction with services, coordination of services, inter-professional collaborations, availability of appropriate training equipment, and costs. However, none of the studies had the primary aim to identify determinants of implementation. *Conclusion:* A more complete and detailed overview of existing determinants of HBSR is needed to assist professionals and organizations in decision-making on HBSR implementation and development of suitable strategies for implementation.

D.3 EDUCATION AND TRAINING IN REHABILITATION

TD293

Knowledge of PRM in Medical Students and Non-PRM Specialists

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Study Purpose: evaluation of knowledge of physical and rehabilitation medicine (PRM) in medical students and physicians representing specialities other than PRM. *Method:* anonymous questionnaire elaborated in PRM Department of Semmelweis University, Budapest, Hungary and modified in Medical University of Warsaw, Poland aimed to assess the knowledge of a role of PRM specialist in health system. *Material:* A group of 500 randomly selected respondents including 214 medical students assessed immediately after accomplishment of PRM classes (MS), 225 non-PRM specialists (NPRMS) 61 PRM trainees (PRMT). *Main Results:* 404 (80.8%) respondents including 88.3% MS, 68.9% NPRMS, 98.3% PRMT) perceived PRM as a basic medical specialty. Among all 49.1% MS, 47.1% NPRMS and 73.4% PRMT confirmed a leading role of PRM physician in a comprehensive treatment aimed towards improvement of functional abilities in persons with exemplary disabilities. Entitlement of referring to a PRM physician was recognized by 408 (81.6%) respondents (77.6% MS, 82.2% NPRMS, 93.4% PRMT). Proper rate of disabled persons in Poland was reported by 330 (66%) of respondents (63.1% MS, 69.3% NPRMS, 63.9% PRMT). 256 (51.2%) participants (65% MS, 33.8% NPRMS and 67.2% PRMT) were able to provide a proper definition of disability. PRM definition was given by 200 (40%) respondents (43.5% MS, 31.1% NPRMS

and 60.7% PRMT). *Conclusions:* Low awareness of cardinal PRM issues in the studied group (particularly PRMT) reflects inadequate pre- and postgraduate education in rehabilitation, disadvantageous healthcare system solutions and misleading information in mass media. Education on PRM role in a contemporary healthcare should be urgently improved.

TD294

Development of a Bank of Critically Appraised Topics as a Training Tool for Medical Internal Resident of Physical and Rehabilitation Medicine

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Introduction: Medicine based on evidence (MBE) can be a good methodology to encourage medical internal resident (MIR) to face the scientific and new technological evidences. One of the tools in which the MBE is applied is on the Critically Appraised Topics (CATs): 1) Develop a clinical question properly formed. 2) Search of the best current scientific evidence. 3) Criticise and summarize the found evidence: Write CAT. 4) Apply the evidence on our clinical area. 5) Evaluation of the evidence application: Check CAT. 6) Results broadcasting: CATs bank. The objective of this project is to develop a CATs bank in a web setting, which enables the storage and consulting of the CATs, worked out by MIR in Physical and Rehabilitation Medicine (PRM). *Materials and Methods:* Three different parts must be distinguished to gain the final goal of the project: 1) Selection of the content forming the CATs Bank: Areas to introduce, functionalities to include at the CATs Bank and quality measures to ensure good methodology CATs. Creation of a group of experts (1 teaching unit director, 5 MIR's tutors on PRM). 2) Development of the software necessary to support the CATs Bank by computers experts with experience creating medicina database. 3) Pilotage of the CATs' Bank development and description of the preliminary results. *Results:* A CATs' bank has been elaborated on a web setting (<http://www.eulate.net/cats/>). Thirteen sessions type CATs have been included in the application. Thematic areas: 6 musculo-skeletal system, 3 Neurorehabilitation, 1 children's rehabilitation and 3 miscellany sessions. 7 of them have finished the quality procedure, reviewed by the referent tutor and the supervisor in charge of the thematic area of the session, published and able to be consulted at the CATs bank freely. Different filters can be used to consult: thematic areas, diagnostic and procedures codes CIE-9, etc. *Conclusion:* 1) CATs clinical sessions are optimal tools to teach the MIR in the use of the methodology of medicine based on evidence. 2) The CATs bank is an innovation within physical and rehabilitation medicine, helping to broadcast the CATs results for the use of other professionals interested on the topic.

TD295

Barriers and Facilitators in Teaching EBP: Perspective of Non-Medical Health Professional Teachers

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Background: Non-medical health professionals such as physical therapists are stimulated to implement EBP in practice and education. However, EBP is a complex and dynamic process including various different steps. So far studies have explored the barriers and facilitators of implementing EBP in clinical practice. Studies focused on the implementation of EBP in non-medical bachelor education are scarce. The aim of this study was to explore the barriers and facilitators for implementing EBP in current bachelor education among various health professional groups among which physical therapists. *Method:* A multidisciplinary qualitative study by means of 7 focus groups among teachers was performed. The following

health professional groups were represented in this study: physical therapists, nurses, occupational therapists, speech/language therapists, midwives, orthoptics, radiological technologists and dietitians. Participants were recruited from the University of Applied Science, FH Campus Wien, Vienna, Austria. Teaching health professionals were asked to participate in this study. Teachers willing to participate received information about the whole study and gave informed consent. All focus groups were audio-recorded and transcribed. Then meaning full units were identified by two independent researchers and eventually a final concept was created. **Results:** In total 30 teachers participated in this qualitative study. Age ranged from 35 years to 59 years, and experiences in teaching ranged from 5 years to 25 years. Based on the focus groups, seven themes could be identified with regard to barriers and six for facilitators. For barriers, the following themes were identified: perspective of medical health professionals, perspective of students, perspective of non-medical health professional practice, current practice of non-medical health professionals, perspective and skills of teachers, external factors and available scientific studies. For facilitators, the following themes were identified: perspective of medical health professionals, perspective of students and non-medical health professional practice, current practice of non-medical health professionals, perspective and EBP skill of teachers, external factors and available scientific studies. **Conclusion:** This qualitative study among non-medical health professional teachers shows that EBP is difficult because of many factors on different levels. Furthermore, our results show that a clear structure for EBP and a system for updating are wanted by teachers.

TD296

Tailored GCP Course for Rehabilitation Science

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According to the Declaration of Helsinki (2013), “medical research involving human subjects must be conducted only by individuals with the appropriate ethics and scientific education, training and qualifications”. Courses in Good Clinical Practice (GCP) are an important means for training staff in research protocols and research ethics in general but with a particular focus on pharmaceutical trial design and issues. The European Union directive on Clinical Trials requires the local research ethics committee (REC) to evaluate the suitability of the principal investigator based on a GCP certificate (2001/20/EC). Rehabilitation science focusses more on complex research interventions than on pharmacological phase 1-3 trials. The UK Medical Research Council (2008) defines complex interventions as those with several components that interact in non-linear fashion and that present a number of special problems or challenges for evaluators, in addition to the practical and methodological difficulties that any successful evaluation has to overcome. However, the common GCP courses in Germany focus on clinical trials with pharmacological intervention. It is questionable whether the general GCP courses address the needs of rehabilitation science sufficiently. We argue that there should be a GCP course that addresses the characteristics and challenges in evaluating complex interventions in particular. As far as the authors know there is no such GCP course in Germany. In addition to unique challenges around complex interventions, in rehabilitation sciences, a second challenge in Germany is that GCP courses are tailored for physicians. We argue that there ought to be a course that targets allied health professions more explicitly. We are currently developing a curriculum for a GCP course for rehabilitation science, which will be presented on our poster in detail. Furthermore we will report challenges we faced during the tailoring process.

TD297

Physical and Rehabilitation Medicine Training Center in Split, Croatia: Striving to Achieve Excellence in Education of a Rehabilitation Team

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Background: The aim of this manuscript is to describe recent changes in the rehabilitation medicine education in Croatia, and to highlight the efforts that were made at University of Split School of Medicine, as well as at University Hospital Split in order to improve training in rehabilitation medicine. **Materials and Methods:** Critical collection and study of pertinent data on evolvement and present state of physical and rehabilitation medicine education in Croatia. **Results:** Education in physical medicine and rehabilitation in Croatia was mainly focused on rheumatology rather than rehabilitation. In order to satisfy the new standards set for quality of rehabilitation medicine national curriculum reform was made for medical students, specialist and physiotherapists and new rehabilitation medicine training centers were established throughout the country. **Conclusion:** In order to achieve high quality rehabilitation it is necessary to make education accessible to all rehabilitation team members. Implementation of rehabilitation principles in undergraduate education sets a good foundation for the development of postgraduate and specialty training in rehabilitation medicine. Academic setting such as Physical and Rehabilitation Medicine training centre Split enables education for different health professionals at the same place and time, which provides opportunities for learning about competencies of other team members and development of future collaboration. Also, a uniform approach to education in Rehabilitation Medicine is provided for all health professionals. All of this sets a solid foundation for education of integrated rehabilitation team and achieving excellence in contemporary Croatian Physical and Rehabilitation Medicine.

E. HUMAN FUNCTIONING SCIENCES

TE298

Content Analysis of the Modified Rankin Scale Using Concepts of the International Classification of Functioning, Disability and Health

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Background: The World Health Organization (WHO) suggests the use of The International Classification of Functioning, Disability and Health (ICF) as a conceptual framework for defining health and health-related outcomes. The WHO also suggests using the modified Rankin Scale as an outcome measure. The aim of this study was to analyse the content of the modified Rankin Scale (mRS) and the modified Rankin Scale – Systematic Interview (mRS-SI) by linking them to the ICF and to explore the association between the mRS and the ICF Core Set for Stroke. **Methods:** Both scales were independently linked to ICF by two of the authors based on the updated ICF linking rules followed by consensus. The correlations between the mRS and the sum of problems in functioning deriving from 266 stroke patients, were assessed under the components of the ICF Core Set for Stroke, the domains of ICF component ‘Activities and Participation’ and 15 second level categories that have been linked to the mRS. **Results:** Twelve meaningful concepts in the mRS and 40 meaningful concepts in the mRS-SI were identified and linked to different categories of ICF, therefore covering 9% and 32% of the ICF Core Set for stroke, respectively. The highest statistically significant correlation of the mRS was with the number of problems in ‘Activities and Participation’ (Spearman’s rho 0.694, $p < 0.0005$). The strongest relationships with the mRS were noted in the ‘Self-care’, ‘Mobility’ and ‘Domestic life’ domains with Spearman’s rho correlation coefficient 0.766 ($p < 0.0005$), 0.748 ($p < 0.0005$) and 0.532 ($p < 0.0005$), respectively. The analysis of the associations between mRS and single ICF categories showed that the highest

correlation coefficients were with categories of ‘moving around using equipment’, ‘changing basic body position’, ‘walking’ and ‘carrying out daily routine’, where Kendall’s tau correlation coefficient was 0.602 ($p < 0.0005$), 0.583 ($p < 0.0005$), 0.444 ($p < 0.0005$) and 0.380 ($p < 0.0005$), respectively. **Conclusions:** The content of the mRS and the mRS-SI can be linked to a framework of the ICF, but the content may not be related to a specific outcome that would be in accordance with the disability terminology suggested by the World Health Organization.

TE299

Model of Categorization in Neonatology: Diagnostic and Functional Evaluation Tool in Preterm Patients

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Introduction: In preterm patients, a simple evaluation of functionality is essential to establish an integral therapeutic approach and to determine the appropriate amount of interventions required to suit the needs and risks of each minor. This evaluation must include motor elements such as posture, general movements, capacity to feed per mouth and signs of stress that each preterm has/presents. We present an innovative way to evaluate preterm patients by categorizing their therapeutic needs according to different levels of complexity. **Methods and Materials:** From January 2013 to October 2014, 300 patients hospitalized at the Neonatal Care Unit of the Clínica Alemana in Santiago, were evaluated with the Neuro-motor Categorization Model created by the authors. Patients were categorized by age and by specific characteristics into three levels of therapeutic complexity (Low, Medium and High Complexity), assigning them to a specific daily physical therapy load (1, 2 or 3, respectively). The neonates’ level of complexity was reevaluated upon hospital discharge. **Results:** 74% of the patients were classified as low complexity, with 99% of these patients remaining in this category at discharge. Only 1% of preterm infants in this group were reclassified into Medium complexity category at discharge and none left the hospital in the High complexity category. 22% of preterm newborns were classified as medium complexity initially. At discharge, 55% were in the low complexity category, 45% remained in the medium complexity category and none were in the High complexity category. Finally, 4% of preterm newborns were initially classified as high complexity. At discharge, 42% were in the low complexity category, 25% were in the medium complexity category and 33% remained in the high complexity category. **Conclusions:** The evaluation of preterm newborns with a Categorization Model allows an allotment of therapeutic interventions according to individual functional condition, delivering less interventions to those who have lower motor development risks, whereas higher complexity cases require prompt intensive interventions in order to try to lower their therapeutic complexity at discharge, as was demonstrated in this study.

TE300

Measuring Neurobehavioral Functioning in People with Traumatic Brain Injury: Rasch Analysis of the Neurobehavioral Functioning Inventory

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Background: The consequences of traumatic brain injury (TBI) are wide ranging with the everyday impacts of cognitive impairment being common and frequently difficult for the person with TBI and their family. In order to improve the effectiveness and efficiency of health care delivery to its recipients, there are increasing calls for research and clinical practice to use Patient Reported Outcome

Measures. One such measure for people with TBI is the Neurobehavioral Functioning Inventory (NFI). The NFI consists of six subscales. There is mixed evidence that the NFI is structurally valid. The aim of this study was to apply Rasch analysis to investigate the internal construct validity of each NFI subscale in people with TBI. **Method:** Data from a three-arm randomised controlled trial of goal setting intervention in people with TBI were used. Participants ($n = 108$, mean age = 46, 73% male) were between six months and 5 years post TBI. Data from each NFI subscale were fitted to the partial credit Rasch model to investigate their fit, using RUMM2030 software. Rasch analysis is a confirmatory approach and investigates if scales fit the strict mathematical Rasch model, including: examining if the response options are truly hierarchical, if scores on individual items are unbiased (i.e. not showing differential item functioning), if items are locally independent, if all items fit the subscale construct and if the subscales are unidimensional. **Results:** Between four to six items in each of the subscales had disordered response categories. Rescoring of these items resulted in ordered categories. Across the six subscales 5 contained items that were locally dependent; combining such sets of items into subtests resolved this problem and improved fit to the model. Two items showed non-uniform differential item functioning by age, one item by educational attainment and two items were found to misfit the overall construct. These items were deleted from the scales. The revised six subscales fit the Rasch model. **Conclusions:** The response format of the NFI subscales does not meet the requirements of the Rasch model. The revised version of NFI can improve the interpretation of scores, but should be further tested with people with traumatic brain injury.

TE301

Measuring Disability in Patients with Cervical Dystonia by Applying the International Classification of Functioning and Health

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Introduction: The impact of Cervical Dystonia on quality of life is well documented. Numerous disease specific rating scales can be applied to measure its severity. It is however unclear how severe disability is perceived by patients with Cervical Dystonia and to what extent a patients’ functioning is limited. Therefore, the purpose was to describe the health status and severity of disability in Cervical Dystonia, using the International Classification of Functioning (ICF) as a neutral framework, proposed by the World Health Organization in 2001. **Material and Methods:** The Toronto Western Spasmodic Rating Scale (TWSTRS) and Cervical Impact Profile (CDIP-58) were administered to a sample of 30 patients with Cervical Dystonia. By linking the individual answers to the ICF model, the frequency and severity of reported impairments and restrictions was estimated using a count based method. This to calculate to what extent and how severe impairments and restrictions were present. **Results:** Patients most frequently reported impairments linked to ‘neuromusculoskeletal and movement-related functions’ and ‘mental functions’, representing the characteristics of CD and the mental burden which is often accompanied. Most restrictions in activities were related to ‘interpersonal interactions and relations’, ‘major life areas’ and ‘community, social and civic life’. For example, all patients reported limitations in walking and more than 80% of the patients reported limitations of engaging recreational activities, socializing with other individuals or enjoying arts and culture. 60 to 86.7% of the patients reported problems in carrying out daily routine, personal hygiene or eating. Of the reported limitations in activities or participation, one third can be labeled as severe disability. Implying that one third of the activities can no longer be executed due to CD, or that CD has a severe negative impact on the ability to execute functional routines or engage interpersonal relationships. No information on contextual factors is recorded in the TWSTRS and CDIP-58. **Conclusion:** Notwith-

standing that CD is a focal dystonia, impairments and restrictions on multiple levels of a patients' functioning in life appear to be highly prevalent. Since contextual factors are not incorporated in the TWSTRS and CDIP-58, these need to be evaluated separately.

TE302

Evaluating Health Promotion Interventions in People with Diabetes Mellitus Type 1: Patient-Reported Outcome Measures and Their Coverage of Determinants of Health Meaningful to Patients

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Introduction: Diabetes mellitus is a chronic autoimmune disease which can have a limiting impact on functioning, health and well-being. Given the effectiveness of the new functional insulin therapies, health promotion (HP) in people with diabetes mellitus type one (T1D) is increasingly important. Diabetes disease management already focuses on determinants of health (DHs) others than disease activity. We aimed to explore patients' perspectives of DHs which are already targets of HP and/or health care interventions in T1D and to determine whether these DHs are covered by patient-reported outcome measures (PROMs) used in the clinical practice and research of T1D. **Material and Methods:** A structured analysis of empirical qualitative data of patients diagnosed with T1D was conducted to identify meaningful concepts. One systematic literature search was employed to ascertain meaningful concepts which were already targets of HP or health care interventions in patients with T1D (=meaningful DHs). A second systematic literature search was performed to elicit PROMs specifically developed for the use in T1D. DHs and PROMs' items were compared by using the International Classification of Functioning, Disability and Health (ICF) as a common framework. **Results:** Based on the qualitative data of 15 patients, 63 concepts were important to the patients, of which 13 were DHs. The definitions of these DHs were assigned to a total of 22 ICF categories, including 7 of "body functions", 11 of "activities and participation", two of "environmental factors" and two "personal factors". A balance of activities of daily living, social support, coping and physical activity were mentioned most frequently. All DHs were covered by at least one of the 22 explored PROMs. Physical activity was covered most often by a total of 18 PROMs, followed by diabetes self-management and self-efficacy covered by 17 PROMs each. A balance of activities was covered by two PROMs and job satisfaction by only one PROM. **Conclusion:** This research project provides information about which DHs are important to patients with T1D and can be assessed with PROMs, and for which DHs nearly no PROMs exist. The results of this study can support health professionals in their selection of PROMs when evaluating their health care or HP interventions.

TE303

Measuring and Comparing Disability in a Large Database in Taiwan Using the World Health Organization Disability Assessment Schedule 2.0

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Background: The International Classification of Functioning, Disability, and Health was promulgated in 2001 by the World Health Organization (WHO). With the help of the ICF, disability is better defined and studied. However, there are several types of disability, it is difficult to compare and measure the severity among them.

We conducted this study to measure disabilities by using the WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) and compare three types of disability (physical, mental and sensory) and identify difficulties people with disabilities have in six domains of WHODAS 2.0. **Methods:** We obtained and analyzed the data on people who applied to Taiwan's disability registration system between September 2012 and August 2013. Disability was measured using WHODAS 2.0 and the data were analyzed using a Poisson regression model that included age, sex, education level, types of impairment, and other factors associated with disability. **Results:** We selected a total of 57,589 cases from the registration system for this study (24,602 with mental disability, 17,361 with sensory disability, and 15,626 with physical disability). Among them, 53% were male, and the females were on average 3 years older than the males. Nearly half the participants lived in urban areas. More males than females were of a low socioeconomic status, but the rate of employment was higher among the males than among the females. After adjusted for age, sex, place of residence, and types and severity of impairment by using a Poisson regression model, the summary scores of WHODAS 2.0 is 1.513 times higher for mental disability and 1.798 for physical disability as compared to sensory disability (reference group). **Conclusions:** This study has demonstrated that disability can be measured and compared using WHODAS 2.0. With identifying the factors associated with disability can promote independence in people with disabilities and could enhance their activity levels and social participation.

TE304

Psychometric Properties of Greek Version of Stroke Specific Quality of Life (SSQOL) Questionnaire

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Introduction/Background: The purpose of this study was to test the reliability, validity and responsiveness of the Greek version of Stroke-Specific Quality of Life Questionnaire (SSQOL) in patients with stroke in Greece. **Material and Methods:** A sample of 26 patients with stroke (14 males, 12 females; mean age: 62.8, SD: 14.6) was included for the validity study. The time since initial stroke ranged from one month to 10 years. 19 patients had ischemic stroke and 7 patients hemorrhagic stroke. Subjects completed 4 questionnaires; the SSQOL as developed in its final Greek version and the Barthel Index, the SF-36v2 and the Beck Depression Inventory. 18 of these patients completed the SSQOL-GR in two occasions with 7-15 days apart for the reliability study. For the responsiveness pilot study a further sample of 10 patients with stroke received treatment in a rehabilitation centre including physiotherapy, speech therapy, occupational therapy and psychological support for an average of three months (2-4 months). **Results:** Concurrent validity of SSQOL with Barthel Index demonstrated a non-significant moderate correlation with upper extremity function domain ($r^2=0.43$, $p=0.12$) and a strong correlation with self-care domain ($r^2=0.78$, $p<0.001$). The questionnaire demonstrated also moderate to strong correlations (r^2 ranging between 0.38-0.77) with two of the SF-36 physical scales (Physical Function and Role Physical) and poor to moderate correlation with BDI ($r^2=0.06-0.44$). No significant ceiling and floor effect were presented in the study. Test-retest of SS-QOL-GR showed moderate to excellent stability for the different domains, Spearman's $r=0.46-0.97$. Internal consistency for all domains showed Cronbach's $\alpha=0.55-0.96$. Most of the SSQOL-GR domains demonstrated moderately responsiveness, with SES and SRM scores >0.5 . SES and SRM scores for the BDI, BI and SF-36 were >0.8 showing strong responsiveness. The language, vision and personality domains of SSQOL-GR were noticeably less responsive. **Conclusion:** The Greek version of the SSQOL questionnaire has proven to be valid, reliable and sensitive in changes when it is applied in patient with stroke. **Reference:** Williams, S.L., et al (1999). Development of a Stroke-Specific Quality of Life Scale. *Stroke*, 30(7), p.1362-1369.

TE305

Structuration of Evaluation of Visually Impaired Patient Based on the Process of Production of Handicap

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Introduction: A patient with visual impairment should benefit from a multidisciplinary assessment to establish rehabilitation goals. The understanding and explanation of the phenomenon of handicap are based on the interaction between three conceptual fields: lifestyle habits, assessed on a scale going from «optimal social participation» to «complete disability situation», environmental factors going from major facilitator to major obstacle, and personal factors, including organic systems, assessed on a scale going from «integrity» to «main impairment», and abilities, assessed on a scale going from «limitless skill» to «inability». A social participation situation means the full achievement of life habits, and a disability situation a decrease of them, this two situations resulting from the interaction between the personal factors and the environmental factors. *Material and Methods:* Mr G, aged of 32, was admitted for rehabilitation of blind retinitis pigmentosa. It was a patient with an infantile psychosis. At the admission, the objectives were broad, imprecise and some very utopian. His abilities were a perception of light and some shapes, a good tactile readiness, a weathering of the attentional and learning abilities. Some of his environmental factors were facilitator (early and continue care in specialized establishments, entourage present) but others were obstacles (no social link, parental overprotection). Concerning his lifestyle habits, he endangered himself during his movements, was autonomous for basic ADL, knew braille and stopped leisure activities. *Results:* To help us organize his care and thus optimize it, we used a rehabilitation project based on the PPH. The rehabilitation goals were a daily life role-playing, an improvement of his daily life organization, a home visit, assessments of his braille reading abilities, his handwriting and his understanding of language, and a psychomotor education. This structured analysis generated goals more balanced with the elements to which the team had to face up. *Conclusion:* The contribution of PPH enables the multidisciplinary team to structure the rehabilitative care of patients with visual impairment and enables to target the goals the closest to their needs.

TE306

A Model of Classification According to Rehabilitation Complexity in Acutely Ill Hospitalized PatientsP. Riffo¹, *T. Gutierrez¹, V. Hidalgo¹, A. Figueroa¹, M. I. Vielva², G. Hidalgo¹, J. M. Navarrete¹, C. Zucker³¹Clinica Alemana, ²Universidad de los Andes, Santiago, CL, ³Columbia University, New York, NY, US

Introduction: The major challenge that rehabilitation teams face is to determine which patients are at most risk of losing functionality, so that therapeutic resources are allocated accordingly, focusing on those who require greater interventions in order to achieve functional goals. The objective of this study is to present a Model of Classification according to Rehabilitation Complexity (MCRC) that can be implemented in acutely ill hospitalized patients, which categorizes patients according to their degree of functional complexity so as to deliver a systematic and functional goal oriented attention. *Methods and Materials:* The model was designed based on a matrix of complexity that interrelates 2 conceptual domains in rehabilitation: the clinical domain (variables related to functionality) and the sanitary domain (risk associated to a health condition). This model is translated into a score that permits individualized classification of each patients' rehabilitation complexity into High, Medium and Low categories, allotting specific therapeutic regimes accordingly. Nine facilities offering rehabilitation services to acute patients participated in this study and each physical therapy team applied the model of complexity categorization at their respective centers. The doctor in charge of each unit oversaw the adherence to the rehabili-

tation work plan established by complexity categorization after the patient discharge. *Results:* The adherence to the model of categorization, both globally and at each unit was high (above 70%) which suggests that its implementation as a tool in the clinical/health setting is plausible. The model allowed the differentiation of rehabilitation complexity that guided therapeutic intervention regimes and created a language shared across clinical teams. *Conclusion:* The creation of the MCRC permitted the differentiation of patients based upon their rehabilitation complexity, in juxtaposition to their medical severity. Upon evaluation of the implementation of the model in different clinical settings, we feel that it could be a useful tool to incorporate gradually in the evaluation process of hospitalized patients. In addition, the use of this model allows a systematic approach that classifies rehabilitation needs according to complexity and reflects the diverse functional goals at different clinical stages.

TE307

Towards a Standardized Reporting of Functioning of People Living with Spinal Cord Injury in Switzerland*B. Prodinger¹, C. Ballert¹, A. Tennant¹, M. Brinkhof¹, A. Cieza², G. Stucki³¹Swiss Paraplegic Research, Nottwil, CH, ²University of Southampton, Southampton, GB, ³University of Lucerne, Lucerne, CH

Introduction: For health and its related systems to respond most adequately to the health and related needs of individuals and populations, the availability of the relevant information is crucial. While the integrative model upon which the International Classification of Functioning, Disability and Health (ICF) builds has been widely taken up, its utility as a standard for reporting functioning has not yet been exploited to its fullest. The aim of this study is to describe comprehensively the functioning of people with spinal cord injury (SCI) in Switzerland by introducing a method to create a population-based functioning profile. *Materials and Methods:* This study used data from the community survey of the SwiSCI national cohort study. Individuals with traumatic or non-traumatic SCI living in Switzerland were included. The process of determining what to assess in the SwiSCI community survey was guided by ICF Core Sets for SCI. Items from existing and commonly used instruments in SCI mapping on to the respective ICF categories were identified to assess the extent of a problem in respect to a certain ICF category. Based on the identified items, ICF-based interval scales were created using the Rasch measurement model. The person estimates derived from these scales were used to generate a population-based functioning profile, which is a cross-sectional representation of the current level of functioning in people with SCI across functioning domains. An overall profile as well as stratified profiles by age and gender, and relevant SCI characteristics were created. *Results:* In total, 1,549 individuals participated in the community survey. Five ICF-based interval scales (body functions: b1 Mental functions; b2-b8 Functions of body systems; *Activities and Participation:* d4 Mobility, d5 Self care, d6-d9 Involvement in life situations) resulted. The functioning profiles revealed variability across SCI-specific groups in particular with regard to levels of functioning in Activities and Participation domains. *Conclusion:* Population-based functioning profiles facilitate the reporting of epidemiologic studies in a comprehensive and comparable manner. They open up an understanding where people with SCI in Switzerland experience most problems, which in turn, is relevant information for the planning and development of interventions and policies to optimize functioning.

TE308

Are There Relevant Factors Influencing ICF-Based In-Patient Rehabilitation after Hip and Knee Endoprosthesis

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Introduction: For rehabilitation programs after implantation of elective endoprostheses, one question is how far one should differentiate

according to operation and gender, ie how important the operation and/or the gender specification is for an ICF-based rehabilitation. There is not much literature comparing hip and knee operations. We analysed our patient data of the last year looking for any differences. We combined the international, standardised WOMAC with the TUG function test for assessment upon admission. Pain was assessed by a visual analog scale. *Methods:* From May 2013 until April 2014 we investigated 671 patients after elective joint replacement of hip or knee. These included 385 knee-patients (149 m, 236 w) and 286 hip-patients (145 m, 141 w). In-patient rehabilitation began on average three weeks post-operation. During the first two days, the patients filled out the WOMAC, the pain level was assessed and the TUG conducted. *Results:* We do not find the significant age-differences clinically relevant: No differences showed up in the TUG. Significant differences only appeared in the pain parameters, both in the VAS-score and in the WOMAC. We did not find any difference in the overall WOMAC score or in the sub-groups stiffness and everyday function. Secondly, we examined whether our data revealed any gender-specificity that would ultimately lead to gender-specific rehabilitation planning. Patients after hip-TEP: The TUG was significantly shorter for men. The VAS-scale showed no significant differences. Neither was there a difference in overall WOMAC-score. Patients after knee-TEP: The male patients needed significantly shorter for the TUG. The pain level and overall WOMAC-score at rehabilitation start showed no statistically significant differences. *Discussion:* It is known that besides walking-speed the TUG also tests in part muscular strength. From this perspective, the difference in this test is unsurprising. We could not find gender-specific differences for WOMAC and VAS. Thus, it seems more important to differentiate according to these function and activity parameters than gender when planning rehabilitation. When differentiating between hip and knee total-endoprosthesis, pain symptoms appeared as a main difference. Therefore, when planning rehabilitation programs, above all pain symptoms should be considered since these largely also influence all other program aspects.

TE309

Disabilities Prevalence and the Variables Related to Recovery: Result from a Household Random Sampling Health Survey in Macao

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Background: Disabilities was defined in our study as an activity limitation, or a difficulty encountered by individuals in executing a task or action. Based on the data from Macao Health Survey 2006 (MHS2006), this report will present the prevalence of disability and explore the relationship between various variables and the recovery of the disabilities. *Methods:* MHS2006 is a random household sampling survey. A total of 3119 adults aged 18+ were recruited. The disabilities was defined by answering "yes" to the question that "In the last one year, did you experience any difficulties in daily living caused by diseases or injuries?" Other data was collected by health assessment, laboratory tests and face to face questionnaire interview. SPSS (17.0) was used for data analysis. *Results:* The crude prevalence of disabilities was 9.2% and the age/sex adjusted rate was 8.8%. The main causes of disabilities were diseases (43.5%) and accident (45.2%). The people who helped to recovery were doctors (63.3%), nurses (29.9%), Traditional Chinese medical practitioners (23.7%) and physical therapists (9%). The median time for recovery was 15 days. We then divided recovery days into two groups based 15 and tried to explore its relationship to other variables. We found that people had higher recover days had higher mean value of age, fasting blood glucose and LDH. This group also had higher proportion of diabetes (5.0% vs. 0%), lower education (40% vs. 22.1%), under the help of physical therapists (13.8 vs. 1.3%) and sleep less than 6 hours daily (25.3% vs. 9.1%). In a logistic regression using recovery group (<15 vs. 15+) as dependent variable and all significant variables listed above as independent variables, we finally got age

and sleep hours significantly related to the recovery. The older age and less sleep hours would have more chance to get longer time to recover. The OR was 1.03 for age and 2.86 for less than 6 hour sleep. *Conclusion:* Prevalence of disabilities was 9.2% (8.8 age/sex adjusted) in Macao adults, the median recovery time was 15 days. Longer recovery people were more need the help of physical therapists. Age and sleep hours may be important factors affect the recovery time.

TE310

Developing the Item Bank of a Computerized Adaptive Testing System for Measuring Self-Care Performance (CAT-SC) in Children with Developmental Disabilities

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Introduction/Background: Independent self-care is the ultimate goal of pediatric rehabilitation for children with developmental disabilities (DD). However, current pediatric self-care measures cannot achieve both assessment breadth and precision while also saving time. This limitation threatens their utility to detect self-care deficits and evaluate intervention effectiveness. Therefore, to overcome the aforementioned limitations, it is warranted to develop a computerized adaptive testing (CAT) system for measuring self-care performance (CAT-SC) in children with DD in a precise and quick-to-administer manner. The CAT-SC is being developed in 6 steps: (1) construction of the item bank; (2) field testing; (3) examination of model fitting and item calibration; (4) determination of the stopping rules; (5) construction of a web-based assessment platform; and (6) validation of the efficiency and psychometric properties. The current study presents the results of step 1: construction of the item bank. *Materials and Methods:* The initial item bank was developed with the following resources: (1) related theoretical frameworks: definition and scope of "self-care" of the International Classification of Functioning, Disability and Health-Children and Youth (ICF-CY), supplemented with a literature review; (2) current pediatric self-care assessments; (3) caregivers' reports; and (4) expert review with a web-based platform constructed for experts to scrutinize the items. *Results:* The initial item bank had 47 items based on the ICF-CY, the literature review, and current pediatric self-care assessments. After adjustments based on caregivers' reports and expert review, the final bank of the CAT-SC grew to 73 items scored on a 4-point scale: 0-Total assistance, 1-Partial assistance, 2-Supervision, and 3-No assistance. The suggestions from expert review included the following: (1) Provide examples to make descriptions specific; (2) revise complex sentences; (3) divide certain items into two to evaluate unique characteristics; (4) combine two items into one for comprehensive evaluation; and (5) delete items with rare circumstances. *Conclusion:* The 73-item CAT-SC item bank has been constructed for measuring self-care performance in children with DD. The CAT-SC is expected to be precise, comprehensive, and efficient for pediatric clinicians and researchers to determine the strengths and limitations of, and evaluate the outcomes for children with DD. *Keywords:* developmental disabilities, self-care, computerized adaptive testing.

TE311

Development and Validation of 'The Advanced Activities of Daily Living Tool' Allowing the Evaluation of Subtle Functional Decline in Geriatrics

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In Geriatrics, Mild Cognitive Impairment is of foremost importance given its high conversion rate to dementia. Evaluation of ad-

vanced Activities of Daily Living, which are the most complex and cognitive demanding activities within the whole ADL spectrum might be a discriminativ to distinguish between MCI and dementia, but there is no consensus on its evaluation in MCI. Therefore a new, innovative tool was developed and validated. First, in a qualitative design (n=38), content and face validity was tested. Secondly, in a quantitative study, feasibility, reliability (inter-rater, patient-proxy report), construct validity (correlations and expected differences between groups) and discriminating validity (ROC) were tested. Fifty-three MCI patients (diagnostic criteria of the Working Group on MCI, 2004), 52 patient with mild Alzheimer's Disease (AD) (DSM IV, ICD 10) and 50 Healthy controls (HC) were included. All were evaluated with a comprehensive set of standard cognitive, emotional and functional assessments and additionally with the a-ADL tool. The qualitative study resulted in

the a-ADL tool, which comprises 49 activities organized in 15 clusters based on the ICF with an operationalization of the ICF scoring system from 0 to 4. The evaluation, taking each person as his own reference, is based on the total number of activities performed by the person and the severity of the problems occurring. It distinguish a Disability Index (a-ADL-DI) taking into account all activities and the severity of the impairment, a Cognitive Disability Index (a-ADL-CDI) and a Physical Disability Index (a-ADL-PDI) taking into account only those activities impaired due to or cognitive or physical problems. Inter-rater reliability was excellent (ICC ranging from 0.975 to 0.996, $p < 0.001$). Overall agreement between patient proxy was excellent (ICC 0.998, $p < 0.001$). Correlations between a-ADL DI/CDI and cognitive measures (MMSE and CamCog) ranged from 0.688 to 0.714 ($p > 0.001$). Significant differences between groups were as expected (HC)

E-POSTER (JUNE 19–23, 2015)

A.1 PAIN

PA001

Interesting Reaction to Combination of Physical Therapy with Tramadol in Treating of Knee Osteoarthritis – Three Case Reports*A. Karadzov Nikolic¹, S. Milicevic², A. Sekulic², V. Pejic³¹Institute of Rheumatology, ²Clinic for Rehabilitation Dr M. Zoticovic, ³DZ Zvezdara, Belgrade, RS

Introduction: Low Level Laser (LLL) and Interferential Current (IFC) are used, apart from other indications, in the treatment of painful knee conditions. These two agents modulate the pain through gate control system while stimulating discharging of endogenous opioids. The endogenous opioids, such as endorphin and enkephalin, are substances produced by the body. Tramadol is an opioid analgesic used as the hydrochloride salt for the treatment of severe pain in different conditions. **Material and Methods:** Three patients, two female and one male, average age 64.6, with severe knee pain caused by osteoarthritis, were treated with LLL and IFC. We used a common modality in physiotherapy for the management of pain. All of them were regularly taking tramadol, 50 mg per day, for pain relief. After 3 days, all patients reported loss of concentration, drowsiness, decreased alertness and gait disturbance, along with analgesia, for 4-6 hours after each treatment. We stopped the treatments with tramadol and the following day, the patients lost described symptoms. They continued treatment only with physical therapy without any unpleasant reaction. Loss of concentration, drowsiness, decreased alertness and gait disturbance were not reported. **Conclusion:** Endogenous opioids produced in response to interferential current and laser therapy may be excessive or may interact with tramadol and potentiate its effect. There is one published report of similar symptoms induced by interferential current therapy. A clinician using a different physical therapy with gate-control mechanism of action in combination with tramadol or other opioids should be aware of this possible effect.

PA002

Tramadol's Influence on Exercise Capacity in Subjects with Chronic Nonspecific Low Back Pain*A. M. Ionescu¹, B. N. Manolescu², R. Popa³, R. Badea⁴, S. E. Savulescu¹, L. Dumitru¹, H. Dinu¹, S. Tache⁴, M. Berteanu¹¹Elias University Emergency Hospital, Ramnicu-Valcea, ²University Politehnica, ³IbM Romania, Bucharest ⁴"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, RO

Background: Low back pain (LBP) affects millions of people around the world and it causes more disability than any other condition. Evidence suggests that for 15% of patients with LBP it is possible to assign a specific cause. In the majority of patients LBP is nonspecific (1). National Institute for Health and Care Excellence recommended Tramadol for the people with chronic nonspecific LBP (CNSLBP) as a second line treatment option. The present pilot study was aimed to assess the effects of tramadol administration on exercise capacity and oxidants/antioxidants balance in subjects with CNSLBP. **Methods:** 26 subjects suffering from CNSLBP were randomly divided into Tramadol group (+T), and Placebo group (-T). The medication consisted of tramadol 50 mg capsules, and placebo respectively. Both were administered orally twice a day, for a period of 7 days. All subjects under-

went cardiopulmonary exercise test using cycle ergometer with progressively increasing work-rate until the exercise was symptom limited, at the baseline and at the end of study period. For each subject were investigated VO_2 at rest, peak oxygen uptake ($\text{VO}_{2\text{max}}$), aerobic contribution to exercise (VO_2/WR), ventilatory efficiency (VE/VCO_2). Blood samples were taken right after the exercise test to assess antioxidant capacity. **Results:** It was found that in (+T) group VO_2 at rest ($p=0.004$), $\text{VO}_{2\text{max}}$ ($p=0.002$) and VO_2/WR ($p=0.002$) significantly increased. On the other hand, the ventilatory efficiency improved, the VE/VCO_2 values significantly decreased in (+T) group ($p=0.007$). Total antioxidant capacity and residual antioxidant capacity were significantly higher in (+T) group ($p=0.002$ and $p=0.001$). Regression analysis supports also the effect of tramadol treatment on the evaluated parameters. **Conclusion:** In chronic nonspecific low back pain subjects, tramadol improves exercise capacity, effort tolerance and has antioxidant properties leading to a better effort adaptation. **Reference:** Kool J, de Bie R et al. Exercise reduces sick leave in patients with non-acute non-specific low back pain: a meta-analysis. *J Rehabil Med*, 2004; 36: 49-62.

PA003

Suprascapular Nerve Block for Shoulder Pain Post-Stroke*M. Linares Gago, C. Falcón Rodríguez, M. González Toro, L. E. Alarcón Mora, B. Rendón Fernández, B. Ferrer González, M. Zarco Perrián, M. Barrera Chacón
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Case Diagnosis: Suprascapular Nerve Block For Shoulder Pain Post-stroke **Case Description:** A 57 years old man that one year ago suffered ischemic stroke in right middle cerebral artery's territory that presented left hemiparesis and left hypalgesia brachial predominance. He was assessed by physiatrist specialist initiating rehabilitation treatment in early 48 hours post stroke. Rehabilitation treatment continued after hospital discharge on an outpatient basis. Three months later, he was reviewed by a physiatrist in neurorehabilitation service. It was observed a mild left hemiparesis brachial predominance and an intense shoulder pain increased with movement. It did not subside with opioid treatment and his activities of daily living was limited. He presented a Visual Analogue Scale (VAS) of 7/10. We decided to do a suprascapular nerve block with ultrasound guidance with 6 mL of mepivacaine. Two weeks later, the patient reported subjective improvement in pain VAS score featuring 5/10 with no changes examination in the left upper limb. Then a new nerve block was performed. After two weeks the patient was asymptomatic and had a complete shoulder mobility. Because of the favorable clinical outcome, the patient was discharged. **Discussion:** The results obtained in our patient are similar to the reported in literature. As a result, we found that suprascapular nerve block is an effective, safe and easy treatment to do in the treatment of shoulder pain after stroke. **Conclusions:** The suprascapular nerve block is easily reproducible in the clinical setting and offers a advancement for clinical practice in this patient. **References:** 1) Boonsong P, Jaroenarpornwatana A, Boonhong J. Preliminary study of suprascapular nerve block (SSNB) in hemiplegic shoulder pain. *J Med Assoc Thai*. 2009 Dec. 2) Yasar E, Vural D, Safaz I, Balaban B, Yilmaz B, Goktepe AS, Alaca R. Which treatment approach is better for hemiplegic shoulder pain in stroke patients: intra-articular steroid or suprascapular nerve block? A randomized controlled trial. *Clin Rehabil*. 2011 Jan. 3) Adey-Wakeling Z, Crotty M, Shanahan EM. Suprascapular Nerve Block for Shoulder Pain in the First Year After Stroke: A Randomized Controlled Trial. *Stroke*. 2013 Aug; 22.

PA004**Recording Outcomes Following Pain Interventions – a Pilot Study***F. Anwar¹, A. Al Khayer²¹Addenbrookes Hospital, Cambridge, GB, ²Al Ahli Hospital, Doha, QA

Introduction: Pain management for chronic pain suffers can be difficult and time consuming. Patients tend to shuffle back and forth between primary care physicians and various specialists and therapists of all kind in search of a solution for their pain problem. Interventional pain procedures are common practice in managing chronic pain and provide a solution for carefully selected patients. Recording outcomes following such procedures is important and gives an idea to the pain physicians as to continue with the procedure or think of some other solution. **Material and Methods:** This is a pilot study carried out between September 2011 to February 2012. An outcome performa was devised which consisted of 8 questions. All patients attending the interventional pain procedures were given the performa and asked to fill it and post back in 8 weeks time. Forms received then seen by the treating consultant and follow-up arranged accordingly. **Results:** Total procedures performed during the period were 117 and 90 patients returned the forms. Facet joint injections were the commonest pain procedure performed. 34% of patients reported more than 60% of pain relief and 26% of patients had sustained pain relief of more than 8 weeks. 46% of patients reported improvement in the sleep and 33% of patients reported improvement in their mobility following the intervention. 28% of patients were able to reduce their pain medications following the procedure and 42% reported their quality of life either a bit better or a lot better following the interventional procedure. It is interesting to note that 70% of patients thought that it is worth repeating the procedure. Side effects from these procedures were rare and mainly self-limiting. Only 3% of patients reported severe side effects. **Conclusion:** The goals of interventional pain management are to relieve, reduce, or manage pain and improve a patient's overall quality of life through minimally invasive techniques specifically designed to diagnose and treat painful conditions. Interventional pain management also strives to help patients return to their everyday activities quickly and without heavy reliance on medications. Recording outcomes following these interventions is important in the overall management of such patients.

PA005**Low-Level Laser Therapy to Treat Fibromyalgia***J. Ruaro¹, A. Fréz¹, M. Ruaro¹, R. Nicolau²¹Unicentro, Guarapuava, ²Univap, São José dos Campos, BR

Background: Several clinical treatments have been proposed to manage symptoms of fibromyalgia. Low-level laser therapy (LLLT) may be a useful tool to treat this dysfunction. The aim of this study was to evaluate the effects of LLLT in patients with fibromyalgia. **Material and Methods:** A placebo-controlled, randomized clinical trial was carried out with 20 patients divided randomly into either an LLLT group (n=10) or a placebo group (n=10). The LLLT group was treated with an GaAlAs laser (670 nm, 4 J/cm² on 18 tender points) 3 times a week over 4 weeks. Before and after treatment, patients were evaluated with the Fibromyalgia Impact Questionnaire (FIQ), McGill Pain Questionnaire, and Visual Analogue Scale (VAS). Data from the FIQ and McGill questionnaire for the treated and control groups were analyzed by paired *t*-tests, and Wilcoxon tests were used to analyze data from the VAS. **Results:** After LLLT or sham treatment, the number of tender points was significantly reduced in both groups (LLLT, *p*<0.0001; placebo, *p*=0.0001). However, all other fibromyalgia symptoms showed significant improvements after LLLT compared to placebo (FIQ, *p*=0.0003; McGill, *p*=0.0078; and VAS *p*=0.0020). **Conclusion:** LLLT provided relief from fibromyalgia symptoms in patients and could be an important therapeutic tool to

lessen the impact of the disease, decrease pain, and improve quality of life for patients.

PA006**Lateral Femoral Cutaneous Nerve Block with Ultrasound-Guided for the Treatment of Meralgia Paresthetica**

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Introduction: The lateral femoral cutaneous nerve is only sensitive and is derived from the second and third lumbar root and supplies the upper and outer part of the skin. Blocking femoral cutaneous nerve can be elected to treat cases of meralgia paresthetica when patients do not respond to conservative measures. The main objective of this study was to treat patients with chronic pain in unilateral lower limb with refractory symptoms to oral treatments that were diagnosed of meralgia paresthetica using a nerve block's technique with ultrasound guidance and to report the results. **Material and Methods:** Three patients (P1, P2, P3) with meralgia paresthetica diagnosed by a physiatrist with 8 years of experience were treated with perineural injection of 4 mL of bupivacaine, under direct sonographic guidance. Our measures were (before and after infiltration): a methodic physical examination for the lateral femoral cutaneous nerve and visual analog scale score. The procedures were done to the three patients with no complications reported. The patients were reviewed at one and two months after procedure. **Results:** The three infiltrations were done by the same physiatrist. The anaesthetic medication was spread and followed by ultrasound in the perineural of the lateral femoral cutaneous nerve distribution in the three patients. None patient felt pain during the needle injection. The symptoms in the first patient decreased promptly after infiltration, in the second and in the third patient decreased in the second week. None of patients required a second infiltration. The symptoms disappeared in all patients at 2 months after the injection and the mean visual analog scale scored decreased in all patients (VAS previous infiltration: P1:8, P2:7, P3: 8. VAS after infiltration: P1:1, P2:0, P3:2). **Conclusions:** Treatment of meralgia paresthetica with ultrasound-guided nerve is a promising and safe method. Our results are in accordance as described in the literature, and we know that further studies are required to assert that this technique is effectively to treat patients who suffer from lateral femoral cutaneous nerve neuropathy. We are including more patients to perform a clinical trial with purpose to affirm the efficacy of this treatment.

PA007**Pain Neural Network Analysis Using Cerebral Blood Volume in Patients with Phantom-Limb Pain***S. Jang¹, K.-I. Jung¹, W.-K. Yoo¹, C. H. Seo², Y. S. Cho², C.-H. Park³, Y. Kang², M. K. Park², *S. H. Ohn¹¹Hallym University Sacred Heart Hospital, Anyang-si, Gyeonggi-do, ²Hallym University Hangang Sacred Heart Hospital, Seoul, ³Samsung Medical Center, Seoul, KR

Introduction: High voltage electrical injury (HVEI) above 1,000 V causes burn on bones as well as on skin. The 35% patients go through amputation and most of them suffer from phantom-limb pain. Because, the amputation following HVEI happens mostly in young or middle-aged people in Korea, the patients have a strong desire for rehabilitation and the phantom-limb pain should be controlled for the successful rehabilitation. In this study, authors analyzed the change of pain neural network as a cause of phantom-limb pain using cerebral blood volume (CBV) MRI. **Material and Methods:** Ten patients (one woman, age: 43.8±3.4 years) with phantom-limb pain following unilateral upper limb amputation by HVEI more than 1,000 volts participated in this study. The phantom-limb pain continued for more than 12 months and not con-

trolled by several medications. Sixteen people (six women, age: 41.1±2.1 years) participated as control group. The phantom-limb pain was assessed using VAS and S-LANSS. The mood and cognitive function were assessed using Hamilton depression rating scale (HDRS) and MMSE respectively. All subjects underwent imaging with a 1.5-Tesla scanner (Magnetom Sonata, Siemens, USA). For each subject, 2 sets of T1-weighted images were acquired 5 minutes before and after IV administration of Gadolinium (0.1 mmol/kg). To generate CBV maps, the precontrast image was subtracted from the postcontrast image, and the difference in the sagittal sinus was recorded. The subtracted image was then divided by the difference measured from the sagittal sinus and multiplied by 100, yielding relative CBV maps. The CBV map was set to the left side by flipping the map from right to left about the midsagittal line for patients with amputation on left arm. **Results:** CBV increased in the patients' bilateral anterior cingulate cortex and orbitofrontal cortex compared to control (uncorrected $p < 0.001$). **Conclusion:** After the patients got amputation on their arm, the pain network was reorganized particularly in the emotional dimension. This change is thought to cause phantom-limb pain. (This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (2014R1A1A1006893) and Hallym University Research Fund 2013 (HURF-2013-29)).

PA008

Pain Assessment Scale Adapted to Visually Impaired Patients

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Introduction/Background: A survey about pain assessment by the nursing staff, regarding adult patients with visual impairment had been carried out in our department, pointing that an assessment of the pain during the caring of patients was realized in two-thirds of the cases, but using the reference tools for people without visual impairments (visual analog scale, numeric scale), due to a lack of a suitable tool for this kind of patients. **Material and Methods:** This is a 63 years old patient, with severe visual impairment, due to a diabetic retinopathy, hospitalized for vision rehabilitation and having a hyperalgesic sciatica. The pain assessment had to be accurate, rigorous and regular in order to adjust the analgesic treatment. **Results:** We chose a validated assessment scale that allows visually impaired patients to perform a self-assessment of pain in conditions of sighted patients. It is similar to the VAS ruler graduated from 0 to 10. The side designed to the patient visually impaired has an embossed triangle. The tip of the triangle is located on the left hand side (no pain) and the base is on the right hand side (worst pain imaginable). Two embossed symbols are placed at the ends to replace the written particulars. It should be noted that the lack of important troubles of the superficial sensibility must be sought before using this VAS ruler (especially for diabetic patients). **Conclusion:** This scale is a validated tool that has enabled the evaluation of pain for this patient with visual impairment and suffering from chronic pain requiring an adaptation of his analgesic treatment during acute pain occurrence. **Reference:** Giniès P, et al. Provision of an analog pain scale touch for patients blind Senscale TM. Dou 2003; 4-6: 311-7.

PA009

Explore a New Clinical Therapy of Two Combined Rehabilitation Therapy to Rotator Cuff Injury

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Introduction: To explore the improvement of new clinical treatment to rotator cuff injury pain. **Methods:** 250 patients were divided into 4 groups randomly (the two combined rehabilitation

therapy group and the other 3 groups). According to compare the two combined rehabilitation therapy group- the improvement methods (relaxation Tuina Shoufa treatment with traction affected side upper limb over head), which combine physiotherapy to treat patients suffering from rotator cuff injury- with the other 3 groups (relaxation Tuina Shoufa treatment group, physiotherapy group and blocking group). Visual Analogue Scale and ROM table are used to evaluate treatment. **Results:** Compared with the other 3 groups, the two combined rehabilitation therapy is significant effective. **Conclusion:** The two combined rehabilitation therapy is a new effective treatment to rotator cuff injury, with quicker effect advantages, and shorter treatment course, save medical costs.

PA010

Is It Necessary to Strictly Diagnose Fibromyalgia Syndrome in Patients with Chronic Widespread Pain?

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Introduction: The aim of this study is to determine applicability of ACR 1990 and 2010 criteria for the diagnosis of fibromyalgia (FM) in patients representing with chronic widespread pain [CWP], including those with regional and systemic painful disorders. **Material and Methods:** 284 patients with CWP were included. On the basis of initial evaluation, patients were classified into three groups. Group 1: those without any comorbid disease [N=105], Group 2: those having regional non-inflammatory painful disorders [N=104], Group 3: those with a diagnosis of an inflammatory rheumatic disease [N=75]. ACR 1990 and 2010 criteria were applied to all patients. **Results:** Overall, 65% of the patients fulfilled the 1990 criteria, while 94% fulfilled the 2010 criteria. 97% of the patients did meet at least one of the criteria set. Widespread Pain Index (WPI), Symptom Severity Scale (SS) and Fibromyalgia Impact Questionnaire (FIQ) scores were found to be significantly higher in the patients who satisfied the 1990 criteria than those who did not [$P=0.000$ for all]. Tender point counts were found to be significantly correlated with WPI, SS and Beck Depression Inventory [BDI] scores [$P=0.000$]. **Conclusion:** Our findings show that, almost all patients with CWP may be diagnosed as FM by using the clinical criteria, regardless of whether they have accompanying painful disorder. The findings support the suggestion that, FM is just a continuum of CWP, rather than a distinct diagnostic entity. As treatment of FM is usually identical with that of CWP, strict diagnose of FM may provide little or no significance from the viewpoint of clinical practice.

PA011

The Effect of Lumbar Traction on Pain in Patients with Symptomatic Radiculopathy Due to MRI-Verified Herniated Lumbar Intervertebral Disc

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Introduction: In literature we found controversial results on the efficacy of lumbar traction in patients with low back pain. The aim of this study was to evaluate its efficacy on pain in patient with unilateral lumbosacral radiculopathy due to L4L5 or L5S1 disc herniation. **Material and Methods:** In this retrospective study we identified 30 patients, 10 men (age 52.9±19.9 years) and 20 women (age 55.0±25.0 years) with unilateral lumbosacral radiculopathy and L4L5 or L5S1 disc herniation verified by magnetic resonance imaging who were submitted to lumbar traction (10 minutes). Control group consisted of 30 patient, 11 men (age of 53.0±20.0 years) and 19 women (age of 60.0±20.0 years) who were treated by conventional physical therapy (electrotherapy, ultrasound or laser). Both groups of patients were performing an equal program of therapeutic exercises. Treatment duration was 2 weeks. The outcome of interest was the level of pain, measured on 100 mm

visual analog scale, obtained before and immediately after the therapy (14 days). **Results:** The average pain in the traction group was 7.15 and in the conventional group was 7.28. After the completion of treatment level of pain was 4.92 in the group that underwent lumbar traction (31.2% reduction) and 4.98 in the group treated with conventional therapy (31.6% reduction). There was no statistically significant differences in pain reduction between the groups ($P < 0.05$). **Conclusion:** In our sample of patients with unilateral symptomatic lumbosacral radiculopathy due to verified L4L5 or L5S1 disc herniation lumbar traction reduced level of pain in a comparable way with other conventional physical therapy modalities (electrotherapy, ultrasound, laser), both in conjunction with therapeutic exercise. Further studies on larger sample are needed to elucidate this topic. **References:** 1) Wegner I, Widyahening IS, van Tulder MW, Blomberg SE, de Vet HC, Brønfort G et al. Traction for low-back pain with or without sciatica. *Cochrane Database Syst Rev.* 2013.19; 8: CD003010. 2) Moustafa IM, Diab AA. Extension traction treatment for patients with discogenic lumbosacral radiculopathy: a randomized controlled trial. *Clin Rehabil.* 2013; 27(1): 51-62. 3) Marcic A. Traction. In Grazio S, Buljan D, ed. *Low Back Pain, Jastrebarsko, Naklada Slap; 2009, 413-419.*

PA012

Effects of Exercise & Activities Modification on Pain in Patients with Osteoarthritis of Knee Joint

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Introduction: Osteoarthritis of knee (OA) is strongly associated with ageing and is a major cause of pain and disability in older people. The disability related to pain and mobility is a great disadvantage for this group of patients performing daily living activities. An attempt has been made in this study to see the effects of exercises & activities modification in reducing pain on patient with OA Knee. **Objectives:** To observe the effects of exercise & activities modification on pain in patients with OA knee. **Methodology:** This prospective randomized controlled study was done in the Department of Physical Medicine and Rehabilitation, BSMMU, Dhaka, during the period January to July 2009. A total of 115 patients were enrolled in the study, with 56 patients in case group (A)-treated with NSAID plus Exercise with activities modification and 59 patients in control group (B)-treated with NSAID only. The improvements have been assessed with VAS and WOMAC scoring system. Statistical analysis was done using Student's *t* test. **Results:** 106 patients were completed the study. In respect to time point improvement was started to occur in group A after one week ($p = 0.001\%$, $CI = 6.94$ to 13.34) and the improvement gradually increased day by day. Significant improvement seen in patients received therapeutic exercise with activities modification ($p = 0.001$). **Conclusion:** Isometric quadriceps muscle strengthening exercises with activities modification are effective to reduce pain in the patients with OA knee. **Keywords:** Osteoarthritis, Isometric exercise, Activities modification.

PA013

Quantitative Sensory Testing in Fabry Disease

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Background: Fabry disease is a rare condition X-linked inherited caused by a deficiency of Alpha-Galactosidase A enzyme, displaying multisystemic involvement accompanied by painful neuropathy. Although it has been classically considered as a disease which affects males, recent studies have proven female carriers can exhibit peripheral nerve involvement. The aim of the study is to describe our findings in quantitative sensory testing and neuropathic symptom score applied in a group of heterozygote women. **Materials and Methods:** We studied 31 women with Fabry disease confirmed

by genetic tests. In order to exclude uremic neuropathy cases the individuals with creatinine clearance rate lower than 50 ml/min were excluded. Neuropathic Symptom Score (minimum score 0, maximum score 45) and Quantitative Sensory Testing (QST) were applied to all women included in the study. Warming and cooling thresholds were estimated on dorsal surfaces of hand and foot with CASE IV SYSTEM using 4,2,1 Stepping Algorithm. Thresholds to warming and cooling detection were considered markers for disturbance in small diameter fiber. Thresholds for vibration detection were considered markers for disturbance in large nerve fibers. Highest temperature used was 45 degrees C. For data analysis we used JND (Just Noticeable Difference) which have possible values from 1 to 25. For pain answers results were dichotomized between normal and abnormal. **Results:** We studied 31 women with mean age 31.3 years (Minimum 6, maximum 70; $SD = 17.1$). Neuropathic Symptom score was 3.5 (minimum=0, maximum=27; $SD = 5.7$). The score didn't show any correlation with age. Mean JND values in foot for vibration, cooling and warming modalities was 13 ($SD = 4.1$; Abnormal 61%), 7.5 ($SD = 2.3$; abnormal 22.6%) and 10 ($SD = 4.8$; Abnormal 41%) respectively. Values for heat pain algorithm were abnormal in 74.2%. Abnormalities seen in QST were correlated with age. **Conclusion:** Our results suggest heterozygote women exhibit abnormalities in Quantitative Sensory Testing and in neuropathic symptoms which can be confirmed through Quantitative Sensory Testing studies. This abnormal findings are more common in lower limbs suggesting small fiber neuropathy which is length dependent and progresses through time.

PA014

Perceived Exercise Effort in Graded Exercise Testing among Fibromyalgia Patients

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Background: Exercise intolerance and reduced functional status in the patients with fibromyalgia has been reported. The mechanism regarding reduced exercise capacity are multi-factorial in fibromyalgia patients. The study aims to compare the perceived effort during graded exercise in fibromyalgia patients and normal subjects. **Material and Methods:** There were 23 patients with fibromyalgia and 30 normal subjects included in present study. The symptoms-limited based treadmill Bruce protocol was conducted in each person. Breath-to-breath gas analysis via face mask was recorded simultaneously. The workload, maximal heart rate, peak oxygen uptake, heart rate at ventilation threshold (VT), rating of perceived exercise effort (RPE) were obtained in exercise test. **Results:** We found the patients with fibromyalgia had significantly lower peak work-load (139.4 ± 34.4 W vs. 186.4 ± 41.7 ; $p < 0.001$), lower peak HR (142.6 ± 36.9 vs. 169.1 ± 16.4 bpm $p = 0.0011$), lower peak oxygen uptake (25.34 ± 4.22 vs. 30.74 ± 5.53 c.c./kg/min, $p = 0.001$), and lower HR at VT (103.8 ± 20.6 vs. 121.4 ± 12.4 ; $p < 0.001$). The RPE at peak exercise had no significant difference (17.5 ± 2.2 vs. 17.0 ± 1.5 ; $p = 0.152$). Nevertheless, the ratio of HR/RPE was significantly lower in patients with fibromyalgia. **Conclusions:** Our study confirm the patients with fibromyalgia may suffer from reduced exercise capacity and lower cardiopulmonary profile compared to normal controls. Furthermore, the fibromyalgia patients may have exaggerated perceived exercise effort during exercise. This finding may indicate some central mechanism participating in exercise intolerance of fibromyalgia.

PA015

Intravenous Injection with Procaine (Neural Therapy) for the Treatment of Neuropathic Pain. A Case Report

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Introduction: To observe the efficacy of the intravenous procaine infusion according to methodology of *neural therapy*, in treatment of neuropathic pain in patients with spinal cord injury. **Material and Methods:** A 30 years old, male patient with O3 fracture, due to motorbike accident, that was surgically treated with spinal fusion and instrumentation O2-O5 (Revere), was admitted in our clinic with clinical picture of Cauda equina syndrome in order to participate in a program of functional rehabilitation. During hospitalization he was presented with neuropathic pain at both thighs (allodynia, hyperalgesia) and an "electric sock like" pain below the knees also bilateral. He was treated with Gabapentin 300 mg 1X3 for 25 days per os without any improvement. After stopping the medication we started the infusions. Our protocol was 10 series of intravenous infusions once a week every Friday with procaine 1% and bicarbonates 4% (gradually increased doses) in 500 ml N/S 0.9% through the cephalic vein in the right arm for 45 minutes (225 drops per minute) with the patient in supine position. During the infusion the patient was monitored (arterial pressure, heart rate, SpO₂). The pain was evaluated with the VAS method prior and 30 minutes after the infusion so to see the immediate and long term affects. **Result:** The patient accepted the treatment without any side effects and responded showing dramatic improvement, VAS from 7 to 2. **Conclusion:** The intravenous infusion of procaine relieves the neuropathic pain of central etiology.

PA016

Education Effects for Patients with Lumbar Disc Herniation after Micro Endoscopic Discectomy in Terms of Sitting Position

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Introduction/Background: Micro Endoscopic Discectomy (MED) is a minimally invasive surgery for patients with lumbar disc herniation (LDH); however some patients show residual chronic pain after MED. It has been reported that anxiety and depression related with chronic pain. Our previous research has also revealed that pre-operative LDH patients show anxiety and depression associated with the sitting position. The purpose of this study was to examine an efficacy of sitting position management education using a leaflet for post-MED patients. **Material/Method:** 147 patients who underwent MED were recruited in this study. Patients were divided into two groups: 97 patients (mean age 47.7 years) received educational intervention for sitting position during their hospitalization by verbal one-on-one format and a leaflet (Education group; E) and 47 patients (mean age 46.1 years) didn't receive this intervention (Control group; C). The leaflet contained advices on the correct sitting posture and recommended duration of sitting. Hospital Anxiety and Depression scale (HADS) were measured at 6 days (it is time of ENT) after surgery, and we defined patients with anxiety and depression as HADS's score ≥ 11 points. Numeric Rating Scale with rest and motion (R-NRS and M-NRS) and Oswestry Disability Index (ODI) were measured at 3 months after operation. The differences in the anxiety and depression rate, R-NRS, M-NRS, ODI and the time until return to work between groups were compared using Fisher's exact test and Mann-Whitney U test assuming significance at $P < 0.05$. **Results:** The rate of patients with anxiety and depression was significantly lower in the Education group ($P = 0.04$). There were no significant differences in R-NRS (C:0 [0-1] vs E:0 [0-6], $P = 0.77$), M-NRS (C:0 [0-5] vs E:0 [0-5], $P = 0.44$), ODI (C: 2% [0-29%] vs E:2% [0-31%], $P = 0.57$) and the time until return to work (C: 41 days [7-104] vs E: 36 days [6-156], $P = 0.48$). **Conclusion:** Our study demonstrated that the use of the educational leaflet on the sitting position may decrease the anxiety and depression after surgery. However, this intervention did not affect post-surgical chronic pain and disability or the duration for returning to work.

PA017

Sono-Guided Stellate Ganglion Block

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Benefit: Stellate ganglion block is a short, minimally invasive procedure that can effectively treat a wide array of conditions that have failed optimal medical management. These include providing relief for sympathetic-related pain in face, chest, and upper extremities, improving circulation in upper extremities and face, decreasing perspiration in upper extremities and face, decreasing hot flashes and associated sleep disturbances, and showing promise as a novel treatment for PTSD. **Ultrasound Technique:** At the level of C6 transverse process (bones not well visualized in this image), slowly scan the neck from medial to lateral in a transverse view. Using an in-plane approach, insert a (preferably blunt) 21-g needle from lateral to medial. Be sure to avoid the brachial plexus (near the inter scalene location -usually anterior to the needle), and the exiting cervical nerve roots (usually hypoechoic). Your needle will wind up anterior to the longus colli muscle, and posterior to the carotid artery. Bupivacaine 0.25% 3 ml, lidocaine 2% 2 ml, \pm depomedrol/kenalog 40-80 mg. **Outcomes:** After the block is performed one of three things may occur: Your pain is gone or greatly improved and stays that way for longer than the life of the anesthetic. This shows your physician that the block has therapeutic value for you and he or she can come up with a treatment plan that maximizes your pain control. Your pain is unchanged but, there is evidence of a sympathetic blockade. This is of diagnostic value to your physician and tells him or her that your pain is not responsive to a sympathetic block and he or she can try other treatment modalities to treat your pain. Your pain is unchanged but there is no evidence of a sympathetic blockade. This indicates that the block was a technical failure.

PA018

The Ultrasound Guided Ganglion Impar Block

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Procedure: A ganglion impar block involves injection of anesthetic, phenol, botox, or other medications with a fine needle into the ganglion impar through the low back. In order to ensure injection accuracy, fluoroscopy, CT, or ultrasound guidance is often used. Also, depending on the preference of the physician, a range of needle types and technical approaches such as paramedian, transcoccygeal joint, and paracoccygeal corkscrew; may be chosen to perform the injection. During the procedure, the lower back and intergluteal cleft are prepped and draped in a sterile fashion, and local anesthesia is used to numb the injection area. Using fluoroscopic (x-ray) or other guidance, the physician places the needle into the ganglion impar and confirms correct placement with contrast dye. Once accurate position is established, a diagnostic block or a therapeutic block is executed. Infiltration of the ganglion impar with local anesthetic provides pain relief for the duration of action of the medication in two thirds of patients. Once pain relief from a ganglion impar block is documented in a patient, he or she may receive additional therapeutic blocks in the future. Alternatively, he or she may be eligible for more permanent pain relief through procedures such as radiofrequency ablation, chemical destruction with alcohol, or surgical section to achieve longer-lasting results. **Outcome:** Impar ganglion block has been shown to provide pain relief in patients who suffer from sympathetically mediated pain arising from disorders of viscera and somatic structures within the pelvis and perineum. Although ganglion impar block is considered safe and effective in general, it may not be efficacious in all people. This is because the location, shape, and size of the ganglion impar have been shown to be variable, making it challenging to target. After performing anatomical dissections on 50 subjects, researchers found that the location of the ganglion impar can range from the sacrococcygeal junction to approximately 10mm in front of the

tip of the coccyx. Such anatomical variation may contribute to the possible inefficacy of this nerve block in some patients.

PA019

US and CT Guided Peripheral Nerve Blocks

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Greater and Lesser Occipital Nerve Block: Technique: The most effective patient position for the greater or lesser occipital block is sitting with the neck in a flex position. Avoid foramen magnum which is located medially. The occipital artery is the most useful landmark for locating the GON, immediately medial to oc. A **Superior Hypogastric Block: Technique:** The patient will be in prone position. Needle is introduced 6 cm lateral to spine of L4. Directed 45 degrees medial and caudal until its tip comes anterior to vertebral body of L5 under fluoroscopic guidance. **Ganglion Impar Block: Technique:** The patient in the prone position. Needle is inserted in the dorsal sacrococcygeal ligament at the midline. The needle is then advanced to pierce the ventral sacrococcygeal ligament, felt as a loss of resistance. **Celiac Plexus Block:** Classic retrocrural technique (deep splanchnic approach): Triangle is made between 3 points: spine between T12 & L1 and lower edges of 12th rib on both sides. Needle is inserted just caudal to 12th rib 7 cm lateral to midline, 45 degree from horizontal plane & 15 degree cephalad until bony contact with L1 vertebral body is made. Needle is withdrawn & redirected laterally about 1-2 cm, at this point aortic pulsations may be felt and the local anesthetic is injected retroaortic.

PA020

Family Members' Observations and Perceptions of Their Older Relatives' Knee Osteoarthritis Pain and Pain Management

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Background: Osteoarthritis is one of the most common joint disorders in older people. Studies have mainly focused on spouses' or partners' perceptions of older individuals' osteoarthritis pain. This qualitative study explored family members' observations and perceptions of their older relatives' knee osteoarthritis pain and pain management in Taiwan. **Methods:** Family members of older outpatients with osteoarthritis (N=28) were recruited by convenience from one medical center in northern Taiwan, and two regional hospitals in northern and eastern Taiwan. Data were collected in individual interviews using a semi-structured guide and analyzed by content analysis. **Results:** Family members observed that their older relatives commonly mentioned that osteoarthritis pain interfered with their walking ability, daily activities, moods, sleep, and social activities. Older people commonly shared their pain with their children and other family members. Participants observed that their older relatives with osteoarthritis used limited pain-management strategies to relieve pain, but provided few pain-management strategies to help them. Most participants had limited knowledge about osteoarthritis pain. Some participants and their older relatives held negative attitudes toward using pain medicines. Most participants suggested that other families should bring their older relatives with osteoarthritis pain to see a doctor as soon as possible. **Conclusion:** Our results show that adult children were the main support for older people with osteoarthritis. Since most participants affirmed physicians' important role in treating and caring for osteoarthritis patients, clinic visits become essential to providing osteoarthritis interventions. Interventions should incorporate osteoarthritis causes, common misconceptions about osteoarthritis, osteoarthritis pain medicines and treatment, and family members' support.

PA021

The Epidural Contrast Dispersal Pattern as a Predictor on Clinical Outcome after Lumbar Transforaminal Steroid Injection

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Objective: To investigate the relationship between epidural contrast dispersal patterns from in transforaminal epidural steroid injections (TFESIs) and pain relief. **Materials-Methods:** 64 patients who underwent single-level lumbar TFESI for unilateral lumbar radicular pain were included. Digital database of patients were scanned. Type of contrast pattern was analyzed by 1 physiatrist and contrast dispersal patterns were defined as follows: type I (tubular appearance); type II (nerve root visible as a filling defect); or type III (cloudlike appearance). Numeric Pain Rating Scale (NPRS) and patient's satisfaction at 2 days after injection (T1), 2 weeks after injection (T2), and 3 months after injection (T3) were recorded. **Results:** The mean age was 45.9±13.5 years (range: 22-80 years) and the mean duration of the symptoms was 5.7±4.2 months. Contrast pattern distribution was as follows: type I in 33 patients (51.6%), type II in 18 patients (28.1%), Type III in 13 patients (20.3%). Mean decrease in NPRS scores at all-time points was statistically significant in three types of contrast dispersal patterns (p<0.05). When the patients were split into groups according to contrast dispersal patterns, differences in improvements of NPRS scores obtained at any assessment period were not statistically significant between the groups. **Conclusion:** We found that TFESIs have a beneficial effect in managing lumbar radicular pain regardless of type of contrast dispersal pattern.

PA022

Comparison of Suprascapular Nerve Block Vs. TENS in Post Stroke Shoulder Pain

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Introduction: Shoulder pain is agonizing after stroke. The patients remain dependant due to pain thus adding to disability. Suprascapular nerve block (SSNB) and Transcutaneous electrical nerve stimulation (TENS) are effective means of pain reduction. This study compares SSNB and TENS in reduction of post stroke shoulder pain as interdisciplinary rehabilitation approaches for shoulder pain in stroke patients. **Material and Methods:** The study was carried out at pain clinic at Armed Forces Institute of Rehabilitation Medicine Rawalpindi Pakistan. This is a Randomized Control Trial recruiting 20 male stroke patients, being divided into two groups A and B, ten in each group. Group A patients received SSNB 2 ml bupivacaine and group B was applied TENS at painful shoulder. Baseline Numeric Rating Scale (NRS) for pain noted before start of intervention and at 04 weeks post intervention. **Results:** Mean age was 58.54±12.30 years. Time since injury was 7.60±11.32 months. NRS pain score before the procedure was 7.2±1.2; which turned to 3.0±0.9 at 4 weeks in group A. The NRS pain score was 7.7±1.3 which was 5.0±0.5 at 4 weeks in group B. There were important differences in repeated measures of pain intensity levels (P<0.05). Comparative study was in favor of group A in terms of NRS (P<0.05). **Conclusions:** Suprascapular nerve block was more effective at 4 weeks in pain reduction than TENS for shoulder pain in stroke patients. Complications are less and efficacy is more with nerve locator for Suprascapular nerve. **References:** 1) Allen ZA, Shanahan EM, Crotty M. Does Suprascapular nerve block reduce shoulder pain following stroke: a double-blind randomized controlled trial with masked outcome assessment. BMC Neurol. 2010 Sep 21; 10: 83. doi:10.1186/1471-2377-10-83. 2) Ekim A, Armağan O, Oner C. [Efficiency of TENS treatment in

hemiplegic shoulder pain: a placebo controlled study]. *Agri*. 2008 Jan; 20(1): 41-6.

PA023

Neurostimulation for Treatment of Intractable Coccydynia

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Introduction: Coccydynia is a painful condition localized in the region of the coccyx. In most cases a traumatic etiology is present. Treatment options include anti-inflammatory agents, antidepressants, physical therapy, local or caudal epidural steroid and local anesthetic injections, ganglion impar blocks, intrarectal manipulation, radiofrequency treatment, and coccygectomy. We report the successful treatment of chronic intractable coccydynia following a traumatic closed fracture of coccyx with spinal cord stimulation (SCS). **Case Report:** A 59-year old female, with a four-year history of falling from a roof and double closed coccyx fracture, was admitted because of persistent coccydynia not relieved by the usual conservative treatment. The patient had already received anti-inflammatories, antidepressants, physical therapy and local injections without significant therapeutic effect. Although the possibility of coccygectomy was extensively discussed with her, she strongly denied and finally she underwent a successful trial of percutaneous placement of two 8-electrode epidural leads. During SCS trial she reported a significant improvement (pain reduction greater than 60% in VAS scale) and two weeks later underwent a permanent epidural surgical paddle 2 x 8 placed at Th8 - Th10 connected to a Restore ULTRA rechargeable generator. **Results:** After final implantation of permanent leads and generator, the patient had an excellent pain relief. She gradually discontinued all oral pain medications, returned to normal daily and social activities, and improved family relationships. There were no postoperative complications or neurostimulation device failure throughout the whole duration of the follow-up time. **Conclusions:** Few case reports suggest a possible beneficial effect for SCS on persistent coccydynia. However, given the paucity of experience and reports, this treatment modality may be considered only after other established therapies have failed. Thus, SCS may be a reliable therapeutic alternative for selected patients with intractable post-traumatic coccydynia who exhausted other treatment options.

PA024

Ultrasound-Guided Peripheral Nerve Block as Adjuvant in Rehabilitation Treatment

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Introduction/Background: Ultrasound-guided peripheral nerve blocks have well recognized benefits in orthopaedic patients. Nowadays, these techniques are spreading in the rehabilitation field. In this study we examined the efficacy and safety of peripheral nerve blocks in relieving pain in patients with different kind of neuropathic pain refractory to other treatments as a prior step to the physical therapy. **Material and Methods:** A prospective cases series. 3 Patients who could not tolerate the physical therapy (VAS) due to high level of neuropathic pain: a neuropathy of tibial posterior nerve secondary to Haglund's deformity surgery, a frozen shoulder and median neuropathy post-traumatic. A physiatrist conducted two ultrasound guided peripheral nerve block of tibial, suprascapular and median nerve respectively, with 4 ml of mepivacaine with a period of time of 15 days between them. **Outcomes:** pain level (VAS) after two weeks, adverse effect and capability to return to physical therapy. **Results:** All subjects experienced a sustained improvement in pain VAS between baseline

and post block. **Subject 1:** initial VAS 9/10, decrease 2 point after the first each block. **Subject 2:** initial VAS 9/10, decrease 4 points after the first one and pain disappeared totally after the second one. **Subject 3:** initial VAS 8/10, after 6/10 and pain disappeared totally after the second one. No adverse effects were reported. All of them were able to re-start physical therapy within the next week after the second block. **Conclusion:** Patients with neuropathic pain that keep them out of the treatment may benefit from ultrasound-guided peripheral nerve blocks in order to decrease the pain and be able to undergo a treatment. **References:** 1) Climent JM, Fenollosa P, Martín del Rosario FM. Rehabilitación Intervencionista. Fundamentos y Técnicas. Madrid: Ergon; 2012. 2) Redborg KE, Antonakakis JG, Beach ML, Chinn CD, Sites BD. Ultrasound improves the success rate of a tibial nerve block at the ankle. *Reg Anesth Pain Med*. 2009 May-Jun; 34(3): 256-60. 3) Karatas GK, Meray J. Suprascapular nerve block for pain relief in adhesive capsulitis: comparison of 2 different techniques. *Arch Phys Med Rehabil*. 2002; 83: 593-7.

PA025

Our Experience with Laser Acupuncture for Treatment of Patients with Chronic Low Back Pain and Sciatica

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Background: Use of laser acupuncture has increased in patients with chronic low back pain. However the evidence supporting its efficacy remains unclear. The aim of this prospective cohort study is to determine the effectiveness of laser acupuncture in reducing pain and disability in adults with chronic low back pain and sciatica. **Material and Methods:** 35 patients were included in the study, being selected from OPD- Physical Medicine & Rehabilitation hospital Kuwait, who met the inclusion criteria: 1) low back pain lasting for at least six months, 2) a documented >4 points on a 10 cm visual analog scale intensity of pain at the time of the screening, 3) between 18 and 65 years of age, 4) unilateral sciatica. All patients were evaluated by full neurological examination, MRI lumbar spine. They received only treatment with laser acupuncture at trigger points and acupuncture points, suggested by an expert/ red and infrared laser/, combined with laser mouth shower/2 red, 1 infrared and 1 green laser/. Treatment course lasted 6 weeks- 10 sessions, once weekly with duration 20 minutes using Weber laser needle system. The following outcome measures were used: VAS for pain intensity, algometry for measuring the tenderness at trigger points, Oswestry Disability Index/ODI/, Health-related quality of life score- EQ-5D. **Results:** Statistical analysis proved significant reduction of pain on VAS/p<0.01/and tenderness, significant decrease of disability index and non-significant improvement of QoL. **Conclusion:** Laser acupuncture appear to be an effective treatment of patients with chronic low back pain and sciatica.

PA026

Intravenous Paracetamol Versus Intramuscular Pethidine in Relief of Labor Pain in Primigravid Women

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Introduction/Background: Intramuscular pethidine is one of the most common opioids used for labor analgesia. There are a number of concerns in the literature regarding the use of pethidine. We want to compare analgesic efficacy of paracetamol with pethidine for labor pain in normal vaginal delivery. **Material and Methods:** In this single-blinded, randomized control trial, 60 primigravid singleton women with full term pregnancy candidate for normal vaginal delivery, were entered the trial and divided in to pethidine (A) and paracetamol (B) group. At the time of admission, age and body mass index of mother and gestational age based on last day of period were recorded. In both groups, intravenous promethazine and hyosine were administered to each patient at the first stage of

delivery. Since beginning of active phase of delivery (50 mm of cervical dilatation and 100% effacement), patients in group A received 50mg intramuscular pethidine injection. At the same time patients in group B, received an intravenous solution infusion containing 1000 mg paracetamol and 300 cc of normal saline. After child birth, average labor pain was assessed using Visual Analogue Scale (VAS) by direct questioning from patient in both groups. Apgar score of neonate, duration of labor and incidence of drug complications in 24 hours after delivery were recorded in each group. **Results:** The average VAS pain score was significantly lower in paracetamol comparing to pethidine group (8.366 out of 10, 9.612 out of 10 respectively, $p < 0.000$). **Conclusion:** We concluded that intravenous paracetamol is more effective than intramuscular pethidine for relief of labor pain in normal vaginal delivery.

PA027

Pain Assessment in Communicative and Non-Communicative Patients in an Adult Rehabilitation Center – an Ethical and Clinical Challenge

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Introduction/Background: The assessment of pain and nociception, especially in non-communicative patients with disorders of consciousness is a challenge for physicians, particularly in persistent vegetative state (PVS) and minimally conscious state (MCS). Likewise, self-report may become challenging in post-stroke population due to aphasia and neglect. Because of the ethical implications, clinicians should not assume the absence of suffering, thus pain assessment and its treatment is crucial. **Material and Methods:** Cross-sectional study performed at Adults Rehabilitation inpatient ward. Two groups with brain injury were defined: A – Non-communicative patients; B – Communicative patients. Pain assessment scales used were: A - Nociception Coma Scale - Revised (NCS-R); B - Numerical Rating Scale (NRS). Medications used primarily for pain management was recorded. **Results:** Were studied 34 patients (18-74 years) with the following description: • A – Four patients, all recovering TBI. Three were in PVS with NCS-R scores between 6 and 7, indicating pain, only two were treated with pain related medications (PM). One was in MCS, scored 5 and was treated with non-opioid analgesics. • B – 30 patients (8 TBI, 21 stroke, 2 anoxic brain injury) with mean NRS score of 2.63. From this, 22 patients were in pain with mean score of 3.60, 54% were using PM. A NRS pain score of 10 was recorded, in a patient with “locked-in” syndrome, not treated with PM. **Discussion:** The assessments were performed after daily rehabilitation program and the use of physical agents and other medications with effect in pain cannot be neglected. On group A, some patients appear to be painless at rest, but revealed NCS-R > 4 with simple mobilization or tap. Group of non-communicative patients were in pain and inadequately treated. Even in communicative patients, almost three quarters were in pain (n=22), although only 30% had NRS ≥ 4. In patients with moderate to severe pain, 44.4% had no PM and the remaining were undertreated. **Conclusion:** Pain is probably underdiagnosed and undertreated, particularly in non-communicative patients. Use of validated scales for monitoring pain on a routinely basis is mandatory, as well as a proper PM. Team work is essential in pain management, being particularly important the communication between rehabilitation technicians and physicians.

PA028

Efficacy of Lemod Solu Iontophoresis and Laser Therapy as Conservative Treatment Modality in Patient with Gonarthrosis

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Introduction: Osteoarthritis of the knee is most common joint disease. The aim of this study was to investigate the analgetic and anti-inflammatory efficacy of Lemod solu iontophoresis and laser therapy as conservative therapy in patients with knee osteoarthritis. The use of therapeutic low-level laser therapy (LLLT) has become widespread in human medicine. A number of physical conditions are reported to respond to laser therapy. Taking into account the available evidence about the electrical properties we hypothesized that the iontophoretic application of methylprednisolone formulation could exert valuable clinical utility in knee arthrosis. **Patients and Methods:** The 37 patients with diagnosis of acute gonarthrosis based on anamnesis and clinical findings (pain worsening in last month; all patients had grade II or III knee OA confirmed radiologically according to the Kellgren-Lawrence grading system) were included and randomly assigned to treatment with laser or iontophoresis. 18 patients was treated with iontophoresis by using Lemod solu amp 40 mg at intensity level 2mA for 20 minutes, five times weekly for 3 weeks. 19 patients received the laser treatment (IC laser wavelength 780 nm const., power output 10 mW, with dosage of 1.2-2 J J/cm²). The treatment was applied to five points of skin overlying inflammatory joint capsule/15 treatment in all. **Results:** In the post-therapy period compared to pre-therapy period in both groups was observed statistically significant improvement in respect to all parameters. The clinical assessment included the intensity of pain (pain at rest and pain at movement was evaluated on a visual analogue scale -VAS), degree of knee extension and flexion, and knee functional capacity as assessed by the Lequesne Functional index (10 questions on pain, duration of morning stiffness, walking distance and duration and limitation of everyday activity.). No systematic or local side effects were reported during or after the treatment period. **Conclusion:** This study revealed that application of LLLT and iontophoresis is same effective and safe method in pain relief and in the improvement of functional ability in patients with knee OA.

PA029

Late Efficacy on the Reduction of Phantom Limb Pain Using a Combined Protocol of Progressive Muscle Relaxation, Mental Imagery and Phantom Exercise

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Introduction: Phantom limb pain (PLP) is a painful sensation perceived in the missing portion of the amputated limb. The PLP can severely limit quality of life in about 14% of lower limb amputees (LLAs). Pharmacological treatments are often unsuccessful and lead to collateral effects. Mental Imagery (MI) and Phantom Exercises (PhE) are mind-body therapies that were recently suggested attempting to fool the brain into thinking that the missing limb is still there and to modify and reverse cortical reorganization, exploiting the neural plasticity. We have conceived a protocol, where each therapy session consisted as follow: 1) a progressive muscle relaxation with the aim to decrease stress and anxiety and to prepare the patient for subsequent mental commitments; 2) imagined “phantom” movements without real movement of the residual limb (MI); and 3) a series of actual movements with the sound and phantom limbs (PhE). If the side or characteristics of the PLP changed after the first series of exercises, we started again with a new series of PhE. Each session lasted about 50 minutes. The aim of the study was to evaluate the efficacy of our protocol on PLP reduction. **Material and Methods:** Fifty unilateral LLAs with PLP were randomized in two groups. Experimental group performed our protocol 2 times a week for 4 weeks, while the control group had the same amount of physical therapy dedicated to the residual limb. No pharmacological intervention was initiated during the trial period. The Brief Pain Inventory (BPI) was administered pre and post treatment and after one month follow-up to evaluate the PLP intensity perceived in the last week before evaluation. **Results:** Experimental

group showed a significant decrement over time in all the BPI questions (the worst, least and average PLP, $p < 0.03$). No statistically significant changes were observed in the control group. Between group analyses showed a significant reduction of the worst and average PLP at follow-up evaluation ($p < 0.02$). **Conclusions:** Our experimental protocol was effective in reducing intensity of PLP one month post-intervention. This result could be due to an "after-effect" of the intervention, suggesting the need to complete the treatment despite possible small effects in the first sessions.

PA030

Quantitative Sensory Testing in Fabry Disease

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Background: Fabry disease is a rare condition X-linked inherited caused by a deficiency of ALPHA-GALACTOSIDASE A enzyme, displaying multisystemic involvement accompanied by painful neuropathy. Although it has been classically considered as a disease which affects males recent studies have proven female carriers can exhibit peripheral nerve involvement. The aim of the study is to describe our findings in quantitative sensory testing and Positive Neuropathic Sensory Symptom Score (P-NSS) applied in a group of heterozygote women. **Materials and Methods:** We studied 31 women with fabry disease confirmed by genetic tests. In order to exclude uremic neuropathy cases the individuals with creatinine clearance rate lower than 50 ml/min were excluded. P-NSS (minimum score 0, maximum score 45) and Quantitative Sensory Testing (QST) were applied to all women included in the study. Warming and cooling thresholds were estimated on dorsal surfaces of hand and foot with CASE IV SYSTEM using 4,2,1 Stepping Algorithm. Thresholds to warming and cooling detection were considered markers for disturbance in small diameter fiber. Thresholds for vibration detection were considered markers for disturbance in large nerve fibers. Highest temperature used was 45 degrees C. For data analysis we used JND (Just Noticeable Difference) which have possible values from 1 to 25. For pain answers results were dichotomized between normal and abnormal. **Results:** We studied 31 women with average age 31.3 years (minimum 6, maximum 70; ED=17.1). P-NSS average score was 3.5 (minimum=0, maximum=27; ED=5.7). The score didn't show any correlation with age. Average JND values in foot for vibration, cooling and warming modalities was 13 (ED=4.1; abnormal 61%), 7.5 (ED=2.3; abnormal 22.6%) and 10 (ED=4.8; abnormal 41%) respectively. Values for heat pain algorithm were abnormal in 74.2%. Thresholds recorded at hand were not correlated with age. **Conclusion:** Our results suggest heterozygote women exhibit abnormalities in Quantitative Sensory Testing and in neuropathic symptoms which can be confirmed through Quantitative Sensory Testing studies. This abnormal findings are more common in lower limbs suggesting small fiber neuropathy which is length dependent and progresses through time.

PA031

Takayasu's Arteritis as a Differential Diagnosis of Thoracic Outlet Syndrome

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Introduction: Takayasu's arteritis (TA) is an uncommon vasculitis of young woman that affects predominantly the aorta and aortic trunk above. Because of the non specific initial clinical presentation, this disease remains undiagnosed for a long period of time. We report a case of TA who was initially diagnosed as Thoracic outlet syndrome (TOS). **Material and Methods:** This is a 26 year-

old patient with a history of juvenile rheumatoid arthritis since the age of 4 years. She was addressed to us initially for chronic neck and left shoulder pain. **Results:** The initial physical examination showed left cervicobrachial pain, left syndromerotorator cuff, intermittent claudication of left upper limb and lower radial pulses. Radiological exploration objectified the presence of calcification in the supraspinatus and a prolonged transverse process of the seventh cervical vertebra. she was diagnosed as TOS associated with calcific supraspinatus tendinitis. She received physical therapy without any improvement. A blood test done revealed inflammatory syndrome with VS at 120 and inflammatory anemia at 7 g/dl. In front of this results and the development of hypertension with syncope, we address the patient in internal medicine for suspected Takayasu arteritis. This diagnosis was made in front of the existence of five ACR criteria: age <40 years, vascular claudication in the left upper limb, bilateral lower humeral and radial pulses, the systolic murmur at the subclavian artery, parietal thickening of common carotid arteries right and left, and the achievement of common carotid, subclavian, vertebral and thoracic aorta in the chest CT angiography. The patient was put under high-dose of corticosteroid (1 mg/Kg/day) initiated by a bolus of solumedrol in combination with methotrexate 7.5 mg/week. Despite this treatment, it was noticed the persistence of the left upper limb claudication, left shoulder pain for which the patient received two sub-acromial injections framed by an appropriate rehabilitation program with a significant improvement. **Conclusion:** In rehabilitation medicine, the diagnosis of Takayasu arteritis is difficult and probably underestimated, it must be evoked in case of associated cervicobrachial pain, claudication in the upper limb and inflammatory syndrome for a young woman.

PA033

Assessment of Psycho-Behavioral Parameters in Tunisian Chronic Low Back Pain

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Objective: To study the psychological, social and behavioral dimensions in a Tunisian population of chronic low back pain (LBP). **Materials and Methods:** A descriptive cross-sectional study. We conducted a collection of demographic, professional data, clinical examination and questionnaires: the Quebec scale, the Hospital Anxiety and Depression (HAD) Scale and the Fear-Avoidance Beliefs Questionnaire (FABQ) and the Coping Strategies Questionnaire (CSQ). **Results:** The median duration of LBP was 24 months with inter quartile intervals [25-75] of 14.0 and 72.5 months and extremes from 3 to 288 months. The mean visual analogic scale (VAS) back pain was 5.9 mm and the pain intensity was associated with high Quebec score and high HAD depression score. The mean FABQ work was 33.4/42. Associated factors with a high FABQ work, high FABQ 2, lower educational level and a significant strain at work. The average FABQ physical activity was 21.32/24. Factors associated with a high FABQ were: high scores of Quebec scale, high HAD anxiety score and high FABQ work score. Averages prayer and dramatization CSQ were 11.9/12 and 17.3/20. **Conclusion:** The poor prognosis of low back pain is related to personal, disease-specific, professional, socio-economic and psychological factors. **Keywords:** Low back pain; Back beliefs; Outcome measures; Disability.

PA034

Temporomandibular Dysfunction and Risk Factors for Anxiety and Depression

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Introduction/Background: Psychiatric conditions such as anxiety and depression that may cause temporomandibular joint (TMJ)

complaints or TMJ disorders may trigger some of psychiatric problems. The aim of this study was to determine risk factors of anxiety and depression in patients with TMJ dysfunction. **Material and Methods:** A total of 273 patients who presented to the multi-disciplinary outpatient clinic of TMJ diseases and were followed up for temporomandibular dysfunction (TMD) pre-diagnosis, were included in this trial. Patients were classified in three sub-groups: patients with myofascial pain alone (group-1), patients with TMJ disorder alone (group-2), and patients with TMJ disorder and also myofascial pain (group-3). All patients were examined using the standard TMJ examination and were evaluated against the Hospital Anxiety Depression (HAD) scale in order to determine their risk of anxiety and depression. **Results:** According to the univariate analysis, risk factors for patients with confirmed anxiety and/or depression were being female ($p=0.005$), existence of myofascial pain ($p=0.01$), effects of stress on complaints ($p=0.005$) and insufficient social support. **Conclusion:** Among the patients with TMD, the patient groups who were considered to have anxiety and depression risks were female patients, patients with deficient social support system, and patients with myofascial pain alone or patients with myofascial pain accompanying an existing TMJ disorder. The existence of anxiety and depression should be considered in addition to musculoskeletal pathologies during the treatment plan of patients with TMJ who have these risk factors.

PA035

Huge Primary Hepatic Hydatid Cyst: a Rare Cause of Lower Back Pain. Case Report along with Literature Review

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Introduction: Lower back pain (LBP) is a common health disorder causing a deprivation in quality of life along with direct and indirect economical loss causing a big burden on society (1). Lifelong prevalence is estimated to be 60-85% (1-2). Cross sectional studies of the adult population revealed a prevalence of 15% (1-3). There are many factors which had a bulging at L5-S1 intervertebral discin lumbar MRI, however, the back pain was continuous and did not change with resting so, the pain cannot be explained by the bulging disc. Since, her pain disappeared completely after the surgical excision of the cyst we concluded that the pain symptom was solely related with the mass effect of the cyst. Our patient had lived in both Turkey and Africa where echinococcosis is endemic (11). As an atypical presentation of hydatid disease, low back pain should be kept in mind in differential diagnosis.

PA036

Long-Term Sick-Listed Patients Experiencing Difficulties in Returning to Work: The Relationship between Sleep Disturbance, Pain, Depression and Functioning

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Objectives: In patients on long-term sick-leave, how do they report problems regarding the frequency and severity of sleeping disturbances, depression and pain? What is the degree of self-estimated difficulties in mental functions and activities in relation to sleeping problems and pain categories in these patients? **Methods:** 1,206 patients experiencing difficulties in returning to work were examined by specialists in psychiatry, orthopedic surgery and rehabilitation medicine. Prior to the examinations the patients completed validated questionnaires regarding depression, sleep, pain and functioning. **Results:** The prevalence of sleep disturbance was 83%. Three of four patients with severe/moderate sleep disturbance had severe/moderate pain. One of four had no/mild pain.

57% of the patients with no/mild sleep disturbance and 83% of the patients with severe/moderate sleep disturbance also fulfilled the DSM-IV criteria for major depression. The degree of difficulty in performing selected ICF activities and mental functions was higher for the category with severe/moderate sleep problems, compared with those with no/mild sleep problems. **Implications/Impact on Rehabilitation:** The results indicate a need to focus attention on sleep problems in patients on long-term sick-leave with difficulties in returning to work, and not only on pain and depression. Rehabilitation programmes may need to include measures to improve decision-making, ability to concentrate, and to reduce the impact of lassitude, fatigability, sadness and pessimistic thoughts.

PA037

Vitamin C Prevents Complex Regional Pain Syndrome, but It Also Could Treat It?

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Introduction and Background: Complex regional pain syndrome I (CRPS-I) is a common, disabling and poorly understood disorder. The syndrome is characterized by pain and various combinations of autonomic, sensory, motor, and trophic changes. The precise causes of CRPS-I are unknown; it often develops after a trauma, such as an injury or surgery. It is recommended the administration of 500 mg of vitamin C daily for fifty days after a wrist fracture because that treatment prevent complex regional pain syndrome. Whether vitamin C can also be used as a treatment for complex regional pain syndrome is the subject of our study. **Material and Methods:** We have selected 20 patients that have suffered a trauma on his wrist or hand, that on the first Rehabilitation examination have showed symptoms of CRPS-I (according to IASP). We have randomized them into two groups, both of them treated with Physiotherapy and oral analgesia, but only one group also with Vitamin C (500 mg, 50 days). The follow-up lasted 4 months. **Results:** Both groups improve the symptoms, but the Vitamin-Group reduces it faster and has less consequences. **Conclusion:** Vitamin C prevents CPRS I but it also may treat it when it appears. Further investigations are needed into the use of vitamin C in relation to the therapy of CPRS I. **References:** 1) Complex Regional Pain Syndrome Type I: Incidence and Risk Factors in Patients With Fracture of the Distal Radius. Jellad A, Salah S, Salah Frih ZB. Arch Phys Med Rehabil. 2014; 95(3): 487-92. 2) Can Vitamin C Prevent Complex Regional Pain Syndrome in Patients with Wrist Fractures? A Randomized, Controlled, Multicenter Dose-Response Study. Zollinger PE, Tuinebreijer WE, Breederveld RS and Kreis RW. J Bone Joint Surg 2007; 89: 1424-31.

PA038

Multifactorial Approach in Chronic Pain: a Retrospective Study

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Introduction: Pain is a subjective and emotional experience. The aim of this study was to analyze the several factors that may affect and influence chronic pain. **Material and Methods:** A retrospective study was conducted in which the subjects were selected from among patients attending to the Multidisciplinary Chronic Pain Consult of the Pain Unit of a central hospital, from 1st January to 31st December of 2014. The following variables were analysed: age, gender, diagnose and the results of the screening tools PainDETECT, *Douleur Neuropathique en 4 Questions* (DN4), Brief Pain Inventory (BPI), Hospital Anxiety and Depression Scale (HADS) and Visual Analogue Scale (VAS). Scores between groups were compared by use of a Student's *t*-test or one-way ANOVA when appropriate, and Pearson correlation was used to investigate associations between variables. **Results:** The records of 72 patients were analysed. DN4 questionnaire identified 70% of the patients

as having pain with a likely neuropathic component, against 29% by painDETECT. This value increased to 63% when we included patients with an ambiguous score. Most of the patients had abnormal values in HADS. The patients who were classified as having neuropathic pain had significantly higher values in the VAS score (pain DETECT 5.85 vs 3.87 $p=0.002$; DN4 5.02 vs 3.41 $p=0.017$). There was a moderate, positive correlation between VAS and HADS scores, which was statistically significant (anxiety $r=0.54$ $p<0.001$; depression $r=0.50$ $p<0.001$). The fibromyalgia patients were the group with the highest percentage of patients with neuropathic pain according to the screening tools used in this study (83.3% with DN4 and 46.2% with pain DETECT). It was the group with more severe cases in both dimensions of the HADS scale (50% in anxiety and 16.7% in depression) and with the highest mean value in VAS score. **Conclusion:** A global approach to the patient with chronic pain is the key to achieve an effective treatment. This can be accomplished by assessing the nature of pain, its impact in quality of life, and its relation with emotional disturbances.

PA039

Biological Rhythms Are Impaired in Fibromyalgia Syndrome

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Introduction: The aetiopathogenesis of fibromyalgia syndrome (FMS) is not understood fully, but includes dysfunction of the central and autonomic nervous systems, neurotransmitters, hormones, external stress factors, and psychiatric conditions. The levels and daily release rhythms of hormones and neurotransmitters such as serotonin, epinephrine, dopamine, and substance P are abnormal in FMS. The purpose of this study is to evaluate biological rhythm disorders in patients with FMS. **Material and Methods:** The study enrolled 82 patients with FMS and 82 controls. Pain intensity was evaluated using a visual analogue scale (VAS). The psychological conditions of the patients were evaluated using the Beck Depression Inventory (BDI). The Biological Rhythms Interview of Assessment in Neuropsychiatry (BRIAN) was used to assess disturbances in biological rhythms (i.e. sleep, activity, social, and eating patterns). **Results:** There was no difference between the two groups regarding age, gender, body mass index, and education level at baseline ($p>0.05$ for all). The BDI, BRIAN total, sleep, activity, social, and eating scores were significantly higher in patients with FMS compared to the controls ($p<0.001$ for all). BDI score was significantly correlated with all BRIAN subscales ($r<0.502$ for BRIAN total score, $r: 0.458$ for sleep, $r: 0.443$ for activity, 0.308 for social, and 0.450 for eating and $p<0.001$ for all). **Conclusion:** There are marked biological rhythm disturbances in FMS. We think that the disruptions in these rhythms are caused by abnormalities in biological factors (e.g. hormones and metabolism). Biological rhythm regulation might be an important target for interventions to treat symptoms, prevent relapses, and improve functioning in FMS. This implies the need for a multidisciplinary approach to treat patients with FMS.

PA040

Effect of Multiple Cervical Facet Joint Intra-Articular Steroid Injection for Early Mobilization of Cervical Spine in Early Cervical Predominant Ankylosing Spondylitis – a Case Report

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Ankylosing spondylitis (AS) have also been described as causes of facet joint pain. Image-guided intra-articular facet joint steroid injection aims to stop the inflammation. Here a 23 old male nonsmoker with the complaints of acute inflammatory type neck

pain for 2 months with severely restricted neck movement in all direction with grade-III tenderness in all cervical facet joints was reported. He took Ultrasono-guided cervical facet joint Intra-articular steroid injections successfully followed by physical therapy for acute relief of pain & early mobilization of cervical spine. After 7 days of extensive rehabilitation program, his Range of motion in all direction was dramatically improved with significant improvement of pain. Multiple Cervical facet joint Intra-articular steroid injection in early cervical predominant AS for short-term early mobilization of cervical spine may be an effective treatment of choice. **Keyword:** Ankylosing Spondylitis, Facet joint, Intra-articular steroid, Range of Motion.

PA041

A Rare Cause of Shoulder Pain: Axillary Web Syndrome

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Introduction: Axillary web syndrome (AWS) may cause shoulder pain and movement restriction in the individuals who underwent an axillary surgery or had a folliculitis in most cases. We present a case of AWS without any known underlying etiology. **Observations:** A 40-year-old man with right shoulder pain and limitation admitted to our clinic. The patient who had no surgical history, complained of shoulder pain accompanied shoulder movement restriction for two days. Physical examination revealed restriction in shoulder abduction and flexion. A palpable subcutaneous cord that extended from axillary crease down to the ipsilateral arm was inspected. **Neurological examination, laboratory tests and axillary magnetic resonance imaging findings were normal.** He was diagnosed as AWS and administered nonsteroidal anti-inflammatory drug for pain relieving and arranged 15 sessions of physical therapy. One month later shoulder pain reduced, and patient had no problem attaining the full range of motion and cord got smaller. **Discussion:** Physical examination is crucial in its diagnosis and inspection of the axillary region should not be ignored in the patients presented with shoulder pain. The patients with AWS may benefit from medical treatment and physical therapy.

PA042

The Effect of Two Different Physical Therapy Methods on Shoulder Joint Function Recovery after Arthroscopic Surgery

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Aim of the Study: Compare the effect of two different methods of treatment on shoulder joint function recovery after arthroscopic surgery. **Goals of the Study:** 1) To evaluate changes of pain intensity, the shoulder's range of motion and muscle strength through electrical stimulation during physical therapy procedure. 2) To evaluate changes of pain intensity, the shoulder's range of motion and muscle strength through electrical stimulation after the physical therapy procedure. 3) Compare the effect of two different methods of treatment on shoulder joint function recovery after arthroscopic surgery. **Methods:** Shoulder's range of motion was measured by goniometry method, the upper arm muscle strength was assessed using Medical Research Council scale. Visual analogue pain scale (VAS) was used to evaluate pain intensity. **Participants:** The study involved 25 subjects (48 pct. men and 52 pct. women) who had arthroscopic shoulder joint surgery after a rotator cuff tear. Subjects were randomly divided into two groups: the research group consisted of 10 individuals (50 pct. men and 50 pct. women), NMES was applied to them during physical therapy pro-

cedure, and the control group consisted of 15 individuals (46.7 pct. men, 53.3 pct. women), NMES was applied to them after physical therapy procedure. 14 procedures were adjusted to all patients. The evaluation was performed twice: before and after procedures. **Conclusions:** 1) After the physical therapy program the shoulder's range of motion and muscle strength increased and pain intensity decreased by using NMES during the physical therapy procedure ($p < 0.05$). 2) After the physical therapy program the shoulder's range of motion and muscle strength increased and pain intensity decreased by using NMES after the physical therapy procedure. ($p < 0.05$). 3) Shoulder's range of motion were higher and the intensity of pain lower in the the research group ($p < 0.05$). Muscle strength did not differ between groups ($p > 0.05$). We recommend to apply NMES during the physical therapy procedure for patients after arthroscopic rotator cuff repair.

A.1.2. CHRONIC GENERALISED PAIN SYNDROMES (INCLUDING FIBROMYALGIA)

PA043

The Importance of Treating Myofascial Pain Predisposing Factors

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Introduction: In modern society, myofascial pain syndrome is a common diagnosis and a great generator of morbidity. It is more complex than usually thought and its etiology is very important for the adequate treatment. It is defined as an overuse syndrome characterized by the presence of trigger points in muscle. More important than its diagnosis is the identification of the factors that predispose and perpetuate this syndrome. It is mostly associated to sedentary lifestyles, repetitive gestures, poor posture and many times there are degenerative osteoarticular processes and neurovascular alterations. However, there are other less known factors that influence this syndrome and with this review we intend to explore this studied factors. **Material and Methods:** The authors did a bibliographic research for the most recent scientific literature on PUBMED. **Results:** The etiological factors of myofascial pain can be subdivided in two groups, mechanical and medical. In the mechanical group we include structural, postural and ergonomic factors, such as degenerative articular processes, muscular micro and macrotrauma, skeletal deviations and chronic muscular imbalance. This factors may act in a chain reaction and may cause other imbalances and the development of trigger points in other sites. The medical factors may be chronic viral or parasitic infections and inflammatory or allergic alterations. Lately there has been given some emphasis on nutritional and hormonal factors. Cobalamin and iron deficiency, even if not associated to anemia may trigger myofascial pain. Vitamin D deficit, very frequent in countries with a lower sun exposure may also contribute to the etiology. Recently other hypothesis for the etiology of myofascial pain have appeared. These hypothesis focus on peripheral neural alterations, with nerve inflammation and the release of inflammatory factors usually associated to myofascial trigger points. But even considering these hypothesis, the identification and correction of the previously described predisposing factors is the most important approach. **Conclusion:** In this review we intend to highlight the importance of treating the myofascial predisposing factors instead of treating the patients only symptomatically.

PA044

Interference of Cognitive Functions in Gait of Women with Fibromyalgia

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Introduction: Fibromyalgia (FM) is a disorder of chronic, widespread pain and tenderness. Patients have significant symptoms of fatigue, non-refreshed sleep, and cognitive dysfunction. These abnormalities are collectively known as fibro fog. Research has demonstrated important interdependence between gait and cognition. Since a seminal study demonstrated that the inability to maintain a conversation while walking is an early marker for people with mild cognitive impairment, walking while performing a secondary task has become a classic way to assess the relationship between cognition and gait. Our purpose was to assess gait variations using the Gait Laboratory (GL) in female adults with fibromyalgia under single and dual-task conditions, compared with control subjects. **Material and Methods:** A cross-sectional prospective controlled study with female subjects, selected at random, with a diagnosis of fibromyalgia. Gait was assessed under single (usual walking) and dual tasking (counting) in the GL. Inclusion criteria were: diagnosis of FM according to the 2010 ACR criteria, age 50-69 years old (yo). The control group, were patients followed in the muscle-skeletal out clinic, without a diagnosis of FM and without pathology of the lower limbs, aged 50-69 yo. In the GL we used 3D motion analysis Vicon® Nexus 1.8.5 with 6 IR cameras T-series (1.0 MPx) and 4 force plates AMTI OR.6-7-2000, for spatio-temporal, kinematic and kinetic analysis. The parameters assessed were velocity, cadence and ankle power. The results were statistically analyzed with Paired Samples T-test, Pearson Correlation Test (confidence intervals were defined at 0.001). **Results:** The final sample was 15 FM patients, and 15 controls, average age was 60.6 yo for FM and 61.8 yo for controls. The difference of gait variability between the groups for simple gait and dual task gait was not significant ($p > 0.001$) in the parameters compared. **Conclusion:** Fibromyalgia did not preclude performance of dual-tasking gait in our present samples. This is an ongoing study, and we hope to have stronger data and sub-analysis, including other concomitant variables that might enlighten this issue. Depression, anxiety, fatigue, pain, likely contribute to the subjective perception of cognitive dysfunction. Further objective studies are needed to identify the relation between discognition and FM.

PA045

Outcome of a Sequenced Multidisciplinary Rehabilitation Protocol for Fibromyalgia – 5 Year Follow Up

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Background: Fibromyalgia syndrome (FMS) is characterized by pain, fatigue and sleep disruption. A study was conducted in 2009 to assess outcome of a sequenced, multidisciplinary rehabilitation at a follow up of 1 year. The aim of the study was to evaluate the long term effects of a multidisciplinary rehabilitation protocol among the patients with FMS after 5 years. **Methods:** A 5-year follow-up study in which records of 30 samples (male 18, female 12) diagnosed to have FMS were collected retrospectively from a tertiary level rehabilitation centre. All the subjects had participated in a one year follow up study earlier. The same samples were contacted again after 5 years. All the samples were diagnosed by an experienced orthopedic and rehabilitation physician and were treated with a sequenced multidisciplinary rehabilitation protocol. The outcome measured included Visual Analog Scale (VAS) for pain and sleep, Fatigue using Borg CR 10 scale, Depression with help of Beck Depression Inventory (BDI), Fibromyalgia Impact Questionnaire (FIQ) and SF-36. **Results:** Out of the samples 26 were software professionals, 3 were house wives and 1 was a teacher. 19 subjects (male 12, female 7) participated in the 5 years follow up study. 11 subjects had changed their contact details and could not be contacted. Mean scores during first visit, at 1 year and 5 year follow up were 6.56, 2.1 and 1.2 for pain, 5.36, 1.53 and 1 for fatigue, 5.7, 1.56 and 1 for sleeplessness, 10.6, 4.7 and 2.64 for BDI. Results of paired t-test showed a signifi-

cant difference ($P>0.05$) between FIQ and SF 36 scores of first visit, 1 year and 5 year follow up. Significant improvement ($P>0.05$) in pain reduction, sleep and fatigue was noticed after 5 year follow up. The subjects were not taking any specific treatment for FMS other than home based exercises at the time of the last follow up. **Conclusions:** This study emphasizes the need for a comprehensive, sequenced, multidisciplinary approach for effective treatment of FMS. There was a significant improvement in pain, sleep, fatigue, depression and general quality of life, and the effects were maintained at a follow up of 5 years.

PA046

Fibromyalgia Symptoms in Patients with Haemodialysis

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Introduction/Background: The aim of this study was evaluation of fibromyalgia syndrome (FMS) in haemodialysis (HD) patients. **Material and Methods:** 99 chronic HD patients (48 female, 51 male) were enrolled in this study. Age, gender, education level, time on HD, number of tender points, widespread pain index (WPI), symptom severity (SS) scores were recorded for all patients. FMS was diagnosed according to the 2010 American College of Rheumatology (ACR) criteria. Based on this criteria, patients were diagnosed with FMS when WPI score is >6 and SS score is >4 or when WPI score is between 3 and 6 and SS score is >8 , symptoms are present at a similar level for at least 3 months, there is no disorder that would otherwise explain the pain. In addition, all patients diagnosed with FMS answered Fibromyalgia Impact Questionnaire (FIQ). **Results:** 9 patients fulfilled FMS diagnostic criteria (10%). The mean ages of FMS and non-FMS groups were similar ($p>0.05$). FMS group had longer HD duration compared to on FMS group ($p<0.05$). Mean duration for HD was 6.8 years (range 0.2-36) for non-FMS group and 5.6 years (range 0.5-16) for FMS group. Tender point count, WPI, SS scores were higher in FMS group ($p<0.05$). Mean WPI score was 9.66 in FMS group and 1.8 in non-FMS group. Mean SS score was 8.22 in FMS group and 3.02 in non-FMS group. Mean FIQ score of patients diagnosed with FMS was 54.5. **Conclusion:** FMS is characterized by widespread musculoskeletal chronic pain, poor sleep and cognitive impairments on physical examination. It can be difficult to determinate FMS for haemodialysis patients. Because these symptoms can be present in patients with HD without FMS. As of our best knowledge, this was the first study that evaluated FMS according to 2010 ACR criteria in Turkish HD population. **References:** 1) Yuceturk TE, Yucel AE, Yuceturk H, et al. Fibromyalgia: its prevalence in haemodialysis patients and its relationships with clinical and laboratory parameters. *Nephrol Dial Transplant.* 2005;20:2485-8. 2) Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthritis Care Res (Hoboken).* 2010;62(5):600-10.

PA047

Underdiagnosis of Fibromyalgia in Men: Review of the Literature and Report of a Case

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Background: Fibromyalgia (FM) is an idiopathic, chronic musculoskeletal pain syndrome with low prevalence in the general population, affecting more women than men in a ratio of 9:1 respectively, however the incidence in males is increasing and the clinical presentation is characterized more by sleep disorders than classical generalized pain, therefore clinical suspicion in this genre is very low. This syndrome is often associated with fatigue, depressive symptoms and sexual dysfunction; however there is insufficient evidence to correlate this entity with a history

of testicular trauma and disruption of ratio free testosterone/sex hormone binding globulin (SHBG). Case presentation: We present the case of a 40 years old man with a history of a 6 month fatigue, weakness, generalized pain, progressive weight loss, depressive symptoms and sexual dysfunction with a history of vasectomy, which was assessed by multiple specialties, being treated with antidepressants and benzodiazepines with partial improvement of symptoms, then according to recent criteria of the American College of Rheumatology (ACR) he was diagnosed with fibromyalgia, associated with low serum levels of Free Testosterone and SHBG. **Conclusions:** There is insufficient evidence in the literature that correlates testicular trauma or post-vasectomy trauma with onset of sexual dysfunction, decrease in ratio free testosterone/SHBG, and subsequent development of fibromyalgia in men; in the same way due to the gradual emergence of this syndrome in men is necessary to increase the diagnostic suspicion, always ruling out other diseases by clinical and laboratory examinations, making it imperative that these patients have a multidisciplinary approach by rheumatologists, psychiatrists, urologists and psychiatrists.

PA048

Dosage of Pain Rehabilitation Programs for Patients with Chronic Musculoskeletal Pain; a Noninferiority Randomized Controlled Trial

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Introduction: Effects of dosage, including duration, of multidisciplinary pain rehabilitation programs (PRPs) are largely unknown and seldom investigated. The aim of this study was to analyze effects of PRP with different dosages; care as usual (CAU) and care as usual short form (CAU-SF). **Methods:** A single blinded, 2 armed, randomized controlled trial, with a non-inferiority design was performed. All patients with chronic musculoskeletal pain referred to an outpatient multidisciplinary PRP were eligible for this study. Only dosage in weeks differed between the 2 groups of PRP, content was similar. The pain disability index (PDI) was primary outcome measure. Four points difference on PDI was applied as non-inferiority margin between CAU and CAU-SF. Treatment effects within groups were expressed in standardized mean difference (SMD) and effect sizes (ES) were calculated between groups. **Results:** A total of 153 patients completed the trial. Both groups improved significantly over time on PDI (CAU: -10.8, CAU-SF: -8.3). The 2.5 points difference on PDI falls within the non-inferiority margin but the confidence interval (CI) (-1.6 to 6.7) exceeded it. SMDs of CAU and CAU-SF were 0.8 and 0.7 respectively. ES was 0.2. **Conclusion:** Reduction of dosage of PRP did not lead to non-inferior mean results. The difference in means showed non-inferiority but the CI exceeded both the upper and the lower border of the non-inferiority margin. The results of this trial are inconclusive.

PA049

Positive and Negative Affect as a Moderator of the Effects of Pain on Patient Functioning

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Background: Chronic pain is a significant problem worldwide that can have profound negative effects on patients' functioning and quality of life, including on their psychological functioning, physical functioning, and sleep quality. A better understanding of the factors that might moderate the effects of pain on patient quality of life could inform the development of innovative treatments that might benefit individuals with chronic pain. Previous research suggests that the ratio between positive and negative affect – specifically, a ratio greater than or equal to 2.9 between measures of

positive and negative affect – could potentially buffer the negative impact of pain on patient functioning. The purpose of this study was to test this possibility. **Materials and Methods:** 81 patients with chronic pain were administered measures of positive and negative affect (PANAS scale), average pain intensity (0-10 Numerical Rating Scale), sleep quality (MOS Sleep Index), depressive symptoms (PHQ-9), and pain interference (PROMIS pain interference scale) during screening for possible participation in a treatment trial. The criterion variables assessing sleep quality, depressive symptoms, and pain interference were regressed on the measures of (1) pain intensity, (2) having a positive/negative affect ratio of ≥ 2.9 , and (3) their interaction in a series of regression analyses. We planned to compute correlation coefficients between pain intensity and the criterion variables separately for low and high positive/negative affect ratio participants if any significant interactions emerged. **Results:** A moderating influence of having a high positive/negative affect ratio emerged for the prediction of sleep quality (correlation between sleep quality and pain intensity among participants with a high ratio, $r=-0.08$; low ratio $r=0.45$) and depressive symptoms (correlation between depressive symptoms and pain intensity among participants high ratio $r=0.48$; low ratio $r=0.62$). **Conclusion:** The findings indicate that having a high positive affect to negative affect ratio may buffer the impact of pain intensity on sleep quality and depressive symptoms. The findings suggest that treatments that effectively target an increase positive affect and a decrease negative affect have the potential to decrease the negative impact of pain on functioning. Research to explore this possibility is warranted.

PA050

The Evaluation of the Effects of Amitriptyline, Escitalopram and Physiotherapy on Pain, Quality of Life and Sleep in Patients with Fibromyalgia: a Prospective Clinical Study

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Introduction/Background: In this study, patients with fibromyalgia have been explored whether differences concerning pain, quality of life, severity of fibromyalgia, and quality of sleep between groups which were given physical treatment group and the other treatment protocols, and its advantage. **Materials and Methods:** This study have been consisted total 60 women patients who fibromyalgia has diagnosed with ACR 1990 criteria, 25 to 50 years-old, admitted to Department of Physical Medicine and Rehabilitation polyclinics in Blacksea Technical University Medical School and in Trabzon Yavuz Selim Osteopathic Hospital. During the 12 weeks period, 3 treatment protocols have been implied. Group 1 is determined as the patients who have been given only amitriptyline treatment; group 2, has been medicated with amitriptyline plus escitalopram; and group 3, has been given physical therapy and exercise. The measurements have been evaluated baseline and the end of the 12th week. We evaluated the pain, quality of life, sleep quality, the severe of fibromyalgia and also sensible points at the beginning and the end of the trial. For the assessment we implicated Visual Analogue Scale (VAS), Short Form 36 (SF-36), Pittsburgh Sleep Quality Index (PSQI) and Fibromyalgia Impact Questionnaire (FIQ). **Results:** All of amitriptyline, amitriptyline plus escitalopram and physical treatment and exercises treatments have been found as effective on pain, quality of life, quality of sleep, and reducing of the fibromyalgia severity in patients with fibromyalgia. Among the groups, no differences regarding the treatment protocol. **Conclusion:** In patients with fibromyalgia, the decision of the treatment protocol should not be standart but according to the individual characteristics. It is important to focus on the patients' clinical features, and their quality of life, so the right choice may be risen the success of treatment.

PA051

Intravenous Paracetamol Versus Intramuscular Pethidine in Relief of Labor Pain in Primigravid Women

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Introduction/Background: Intramuscular pethidine is one of the most common opioids used for labor analgesia. There are a number of concerns in the literature regarding the use of pethidine. We want to compare analgesic efficacy of paracetamol with pethidine for labor pain in normal vaginal delivery. **Material and Methods:** In this single-blinded, randomized control trial, 60 primigravid singleton women with full term pregnancy candidate for normal vaginal delivery, were entered the trial and divided in to pethidine (A) and paracetamol (B) group. At the time of admission, age and body mass index of mother and gestational age based on last day of period were recorded. In both groups, intravenous promethasine and hyosine were administered to each patient at the first stage of delivery. Since beginning of active phase of delivery (50 mm of cervical dilatation and 100% effacement), patients in group A received 50 mg intramuscular pethidine injection. At the same time patients in group B, received an intravenous solution infusion containing 1000 mg paracetamol and 300 cc of normal saline. After child birth, average labor pain was assessed using Visual Analogue Scale (VAS) by direct questioning from patient in both groups. Apgar score of neonate, duration of labor and incidence of drug complications in 24 hours after delivery were recorded in each group. **Results:** The average VAS pain score was significantly lower in paracetamol comparing to pethidine group (8.366 out of 10, 9.612 out of 10 respectively, $p<0.000$). **Conclusion:** We concluded that intravenous paracetamol is more effective than intramuscular pethidine for relief of labor pain in normal vaginal delivery.

PA052

Dry-Needling Reduces Pain and Alters Status of Active Trigger Point in Subjects with Chronic Myofascial Pain: a Prospective Trial

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Introduction: Myofascial pain is a common, often chronic pain condition. Its relationship to the trigger point (MTrP) is not entirely understood. We studied the effects of dry-needling the MTrP in an attempt to determine if this approach changes the MTrP status (alteration from active to latent or no palpable trigger point), assess post-treatment pain and identify a relationship, if any between the two. **Materials/Methods:** Prospective, controlled trial comparing pain and trigger point status pre-post 3 weekly treatments of dry-needling. 51 adults subjects with >3 months of neck/shoulder girdle pain and an a-MTrPs. Comparison of baseline and post-treatment verbal analogue score 1-10 (VAS), score of the Brief Pain Inventory (BPI) and status change of MTrP from active to latent (l-MTrPs) or normal. Secondary outcomes include ultrasound measure of MTrP size, cervical range of motion, algometry, self-reports of disability, mood (POMS), health status (SF36). **Results:** Differences between baseline measures for a-MTrPs compared with post-dry needling demonstrated statistically significant findings for: VAS with change from >3 to 0.9 whether bilateral or unilateral a-MTrPs $p<0.0001$; BPI 3.4 to 2.3 $p<0.0001$. Change in MTrP status showed 41 responders and 11 non-responders ($p<0.0001$). Baseline and post-treatment scores for secondary outcomes demonstrated: Significantly lower relative size of a-MTrPs at follow-up ($p<0.008$) compared to baseline. Significant change in cervical ROM asymmetry rotation $p<0.02$ and side bending for unilateral MTrPs only ($p 0.001$); significant increase in pain

threshold ($p=0.005$ for unilateral MTrP; and 0.01 for bilateral). There was significant improvement in: POMS scores for tension and mood ($p=0.01$); SF36 mental health and emotional health and physical function ($p<0.05$), and disability ($p=0.003$). **Conclusions:** Dry needling effectively reduces soft-tissue pain, changes the a-MTrP status to l-MTrP or normal and reduces its size in subjects undergoing 3 weekly dry needling treatments. Cervical asymmetry in side-bending and rotation is reduced, suggesting improvement in cervical range of motion, possibly secondary to pain reduction. Clinically meaningful improvements are reported in some aspects of the self-reports of mood, physical and mental function and disability following treatment.

A.1.3. COMPLEX REGIONAL PAIN SYNDROMES

PA053

Bilateral CRPS in Upper Extremities after a Minor Surgery

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Introduction: Complex regional pain syndrome (CRPS) can be seen anywhere, especially limbs, in the body. Rarely, it affects multiple limbs. In the majority of cases (89-97%) CRPS develops as a result of a noxious stimulus like trauma, fracture, surgery while in the remaining cases (3-11%) the etiology is unknown. Here we presented a CRPS patient with bilateral upper extremity involvement developing after a minor surgery. **Case:** Forty one years old male patient who has pain and limitation of motion at bilateral hand for six months was admitted to our clinic. There was no trauma history of the patient. He had an operation for inguinal hernia with spinal anesthesia 9 months ago. He did not have any chronic illness, and did not use a long term medication. There was skin flaking, sweating and skin color changes and edema bilateral hand and wrist in physical examination. The range of motion was limited in finger and wrist joints bilaterally. He had hyperalgesia, and allodynia. There were no abnormalities in laboratory tests. Radiography was detected significant patchy osteopenia around joints. **Conclusion:** The definite pathophysiology of the CRPS is not well known. The initiator event is usually trauma or other harmful stimuli but it may start result of stroke, myocardial infarction and infection sporadically. Symptoms usually begin from one extremity but may rarely two or more limbs. To the best of our knowledge, a bilateral CRPS syndrome involving both upper extremities after a minor surgery has not been introduced in the literature previously. **Keyword:** bilateral, complex regional pain syndrome, surgery.

PA054

Mirror Therapy and Graded Motor Imagery in Complex Regional Pain Syndrome: a Successful Experience

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Background: Mirror Therapy, combined with Graded motor imagery, is a Rehabilitation therapy technique where the non-affected limb is reflected as the affected one. This therapy is been used in patients with Complex regional pain syndrome. **Objective:** To demonstrate Mirror Therapy (MT) plus Graded Motor Imagery (GMI) is a non-pharmacological option within Occupational Therapy as pain treatment alternative and adjuvant, in adults with complex regional pain syndrome (CRPS). **Materials and Method:**

Retrospective chart review. After Ethics Committee approval, data about patients with CRPS-type I diagnosis referred to Occupational Therapy Unit were collected. The intervention consisted in 10 session-set, 45 minutes per session, every two days, 30 days total, where MT+GMI reflecting healthy limb movements with purposeful activities and therapeutic elements were performed. FIM questionnaire, Numeric Rating Scale (NRS), and the Canadian Occupational Performance Measure (COPM) at baseline and at the end of the intervention were applied. Measures of central tendency and two-paired t-test were obtained. **Results:** 30 patients (20 female), age range 20-64 year-old, with CRPS type I, two months after the original injury that originated pain occurred were referred. Main NRS was 7.1 (0-10 scale). Motor FIM score was 65/91, considered as daily living activity as semi-dependant, and COPM was 40% in all patients. At the end, NRS was 3.66 ($p<0.01$). mFIM was 87/91, (independent) and COPM was 86%. **Conclusion:** Developing Mirror Therapy techniques, diminished pain in patients with CRPS, improving occupational performance, taking back lost roles and recovering the overall functionality. Mirror therapy is a non-pharmacologist innovating treatment, low-economic cost, with good acceptance and able to be applied in outpatients and inpatients as well.

PA055

Neglect or «Anti Neglect» in Complex Regional Pain Syndrome?

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Introduction: CRPS is a common condition which pathophysiology is not mastered. A well-spread interpretation of the affected limb reduction in mobility is related to a kind of motor neglect and the CRPS has been repeatedly compared to spatial neglect. Here we investigate whether CRPS is endowed with spatial biases similar to those described in motor and spatial neglect. Patient, **Material and Methods:** One patient with left hand, type 2 CRPS, chronically evolving for 2 years (pain rating around 8/10). Spatial manifestations of neglect were assessed by line bisection and visual and manual subjective midline assessment. In search for motor neglect, movement was recorded during a finger tapping task with eyes closed. **Results:** Perceived visual body midline was slightly deviated to the left (-3.1°). Straight ahead demonstration was deviated by 6° to the left with the left hand and by 2° to the right with the right hand. Line bisection was deviated to the left by 11% with left hand and by 6.5% with the right hand. In the unimanual tapping condition, the left finger (76 bpm, 37 mm) was slower than the right hand (98 bpm, 30 mm) but its movement amplitude was larger. In the crucial bimanual condition, the two hands remained synchronized (on average to the ms). Average right hand frequency (75 bpm) tended to synchronize with the left hand frequency (76 bpm) by reducing its frequency by 26.5%. The right hand amplitude (34mm) became closer to the left hand (34.5 mm) via an increase of about 13%. In addition, a moderate increase, rather than a decrease, of left finger tapping frequency was observed during the recording time. **Conclusion:** The left deviation of line bisection and subjective midline appreciations and the pattern of bimanual tapping (no decrease in frequency and amplitude for the left hand in the bimanual condition, and a tendency for the right hand to behave like the left hand) provide converging arguments for an absence of true neglect sign in CRPS. In contrast to the accepted idea, it seems that CRPS does not resemble motor or spatial neglect. On the contrary, we observed manifestations of hyper-attention toward the pathological side.

A.2. MUSCULOSKELETAL CONDITIONS

PA056

Transient Osteoporosis of the Ankle and Foot – a Clinical Case

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Transient osteoporosis (TO) is a rare, self-limited disease, of unknown etiology, commonly seen in middle aged males and women in the third trimester of pregnancy. It mainly affects the joints of the lower extremities and manifests as pain on loading and functional limitation. The best instrumental method for the diagnosis of TO is magnetic resonance imaging (MRI), which enables an early assessment of any bone marrow edema. The most important condition to consider in the differential diagnosis is early aseptic osteonecrosis, since the treatment and prognosis are considerably different. There is no strong evidence to suggest that one treatment is better than another in this condition, and hence conservative treatment with watchful expectancy of a normal recovery is still the best preferred option. Most patients improve clinically and radiologically within a period of 2 years. The authors present a case of a 61-year-old male, with sudden onset of mechanical pain of the right ankle and foot, without previous trauma, with five months of evolution and various ineffective previous treatment options. Physical examination revealed edema of the ankle, normal range active and passive movements of the ankle and foot with pain at the end of plantarflexion, and inability to bear weight on the affected limb. Radiographs of foot and ankle showed in-specific multifocal bone density changes. The MRI showed a pattern of multifocal inflammatory bone disease with multiple areas of bone edema, particularly in the tibial plafond, talus and lateral cuneiform bone, without associated osteochondral or articular pathology. Conservative treatment was pursued with weightbearing reduction and analgesic medication followed by gradual clinical improvement. The authors intend to raise awareness regarding this clinical entity whose diagnosis is challenging and of exclusion, with a favourable prognosis with conservative management.

PA057

Shoulder Pain Management: Cost in a Tunisian Outpatient Physical Medicine and Rehabilitation Department

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Introduction: Shoulder pain is commonly managed in physical medicine and rehabilitation departments. Functional results were analyzed by several studies but not cost of rehabilitation management. The aim of this study was to calculate the cost of the management of the shoulder pain in an outpatient physical medicine and rehabilitation department. *Patients and Methods:* We retrospectively studied 453 cases of shoulder pain. We calculated the costs related to the rehabilitation sessions, consultations and treatment (general and local) administered during the follow-up in the rehabilitation department. The costs are expressed in Tunisian dinar (TND) and Euro (€). *Results:* There were 159 men and 294 women with an average age of 51.43 years. 150 (33.1%) patients were diabetic. Conditions were rotator cuff diseases in 346 cases (76.3%), adhesive capsulitis in 97 cases (21.5%) and other in 10 cases (2.2%). The average number of therapy sessions was 20.5 with an average cost per patient (CPP) of 369 DT (€200). The average number of medical consultations was 2.3 with an average CPP of 23.2 DT (€12.6). The CPP of treatment administered by general route was 3.5 DT (€1.9) and that of the local treatment of 13.8 DT (€7.4). The total CPP was of 409.5 DT (€221.9) and the total CPP per year was of 359.9 DT (€195). This last was of 443.2 DT (€240.2) in the case of adhesive capsulitis and of 337.2

DT (€182.7) for rotator cuff diseases. It is correlated to the age ($r=0.126$, $p<0.01$) and significantly higher in women ($p=0.044$). *Conclusion:* In addition to its functional impact, shoulder pain has a significant rehabilitation cost.

PA058

Functional Outcome after Arthrolysis for Posttraumatic Stiff Elbow

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Introduction: Stiffness is a frequent complication after a traumatism of the elbow. Arthrolysis followed by a specific rehabilitation program are an adequate management. The aim of this study was to assess the functional outcome in patients treated for posttraumatic stiff elbow. *Material and Methods:* Transversal study including patients managed in an outpatient Physical Medicine and Rehabilitation Department after arthrolysis of a posttraumatic stiff elbow. We evaluated the elbow range of motion (ROM) and the functional status (Mayo Elbow Performance Score: MEPS) course. The quality of life was evaluated thanks to the SF-12. *Results:* Twenty five patients (18 men and 7 women, mean age of 31 ± 14 years) were evaluated at a mean postoperative delay of 8 months. 64% were manual laborers. ROM (Flexion, extension, pronation and supination) and MEPS were significantly improved compared to preoperative figures. SF-12 MCS subscore was correlated to the final flexion ROM. Twenty patients resumed their work. *Conclusion:* After arthrolysis for posttraumatic stiff elbow, the restoration of an upper limb function compatible with daily and professional activities remains a challenge for the rehabilitation team.

PA059

Indirect Relation between Kinesiophobia and Cardiovascular Endurance Using the Personal Evaluation of Activity

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Introduction: It is known that fear of movement is an important factor in the prognostic of chronic pain. Kinesiophobia is the variable of the fear-avoidance model that is involved. Assessment of perceived functional ability for work-related activities is made with the PACT-questionnaire in chronic low back pain (CLBP). Our objective was to investigate the relation between an increased perceived functional capacity and the cardiac endurance test. We investigated the relationship between kinesiophobia and perceived functional ability comparing the Tampa Scale of Kinesiophobia (TSK) and the Performance Assessment and Capacity Testing (PACT) with the Bruce-Test (cardiac endurance test, assessment of the $\dot{V}O_2$ max). *Material and Methods:* 536 patients integrating an intensive 3 week multidisciplinary functional rehabilitation program for CLBP completed the above mentioned questionnaires and the Bruce test. *Results:* There was on one side a clear relationship between the Tampa Scale scores and the PACT-score. A high apprehension score was followed by a low PACT-score. On the other hand, the cardiac endurance and $\dot{V}O_2$ max were clearly increased in those patients who improved their PACT score. *Conclusion:* We conclude that there is a strong relation between fear of movement and self-perception of functional capacities and an increased cardiac endurance is associated with a better functional ability score. Cardiovascular training should be part of the rehabilitation program of patients with CLBP. *References:* 1) Waddell G et coll. Pain 1993; 52: 157-68. Matheson LN, Matheson M (1989) Spinal function sort: Performance Assessment and Capacity Testing PACT, Trabuco Canyon, California. 2) Roitman J, Kelsey M, et al. ACSM's Resource Manual For Guidelines for Exercise Testing and Prescription. 3rd ed. Baltimore, MD: Williams and Wilkins, 1998, 349-353.

PA060

A Politician's Musculoskeletal Disease: Labral Tear of Shoulder Joint Due to Cumulative Trauma of Hand Shaking

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Case Diagnosis: Labral tear of shoulder joint due to cumulative trauma of hand shaking. *Case Description:* 65 year-old male politician applied to our physiatry clinic complaining of right shoulder pain. His pain started after he shook hands –in his statement- with ten thousand people in one day during his election campaign. In physical examination, shoulder range of motion was fully completed but painful at all directions. Supraspinatus isolation, hawkins and neer tests were positive. Magnetic resonance imaging (MRI) of his right shoulder showed superior labral anteroposterior (SLAP) tear. Since he had no previous history of shoulder pain before, his SLAP tear was considered to be associated with excessive hand shaking, which resulted a cumulative trauma to the shoulder. After labral tear had been repaired by an orthopedic surgeon, he was prescribed a home exercise program including range of motion and progressive muscle strengthening. *Discussion:* SLAP tears are usually common within throwing athletes after traction on the arm as a result of a sudden pull or repetitive motion, In this case, trauma that caused traction on the arm was this politician's repetitive hand-shaking action, which was a job-related activity. *Conclusions:* Cumulative traumatic disorders are well-known to be associated with occupation. The association between job type and the specific activities within jobs predispose to the risk of developing such disorders. Clinicians must be aware of these conditions and all people with any suspected work-related pain should be fully reviewed with detailed history and physical examination.

PA061

A Case of Cervical Radiculopathy Related to Cervical Manual Therapy Training Interventions: Is It Safe for Trainees?

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Case Diagnosis: Left C5 radiculopathy due to traction effect of cervical manipulation. *Case Description:* A 36-year-old female admitted to our clinic complaining of perscapular numbness for six months. She is a physiatrist herself and had participated in a cervical manipulation training 6 months ago. In this training, she had acute mechanical neck pain complaint and then the trainer of the course applied cervical manipulation maneuvers to her. Although she had transient relief immediately after the manipulation, after two days she started to feel radicular pain and numbness radiating to her left arm. Physical and electroneuromyographic evaluations of her were consistent with C5 radiculopathy. *Discussion:* Although spinal manipulation has arising popularity among the health personnel, it can lead some neuromuscular complications such as radiculopathy as in our case. These complications can be seen in the training courses of spinal manipulation. Nowadays, the manual therapy trainings are commonly organized around the world. The aim of these trainings is to teach the basic principals and applications of these interventions to the physicians. In these courses, trainees are frequently used as patients for applications of manipulation by the trainers. But, the experience and the practice of accurate techniques of trainers of these courses can be questioned. Lack of experience, inaccurate evaluations and applications can increase the risk of complications. For this reason, before considering this treatment option, a careful evaluation of the safety profile has vital importance. *Conclusions:* Physicians should ask patients' medical history, make careful neuromuscular system evaluation and be aware of potential adverse effects of manipulation. This treatment should be explained clearly to the patients before the intervention. Also, the trainees should be aware

of the experience of the trainers in the manipulation courses. *References:* 1) Struwer J, Frangen TM, Ziring E, Hinterseher U, Kiriazidiz I. Massive hemothorax after thoracic spinal manipulation for acute thoracolumbar pain. *Orthop Rev (Pavia)*. 2013; 5(3): e27. 2) Paanalahti K, Holm LW, Nordin M, Asker M, Lyander J, Skillgate E. Adverse events after manual therapy among patients seeking care for neck and/or back pain: a randomized controlled trial. *BMC Musculoskelet Disord*.2014; 15: 77.

PA062

Contralateral Humerus Avascular Necrosis Diagnosed Immediately after Radiotherapy in a Breast Cancer Patient

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Case Diagnosis: Contralateral humerus avascular necrosis diagnosed immediately after radiotherapy in a breast cancer patient. *Case Description:* A 55-year old female admitted to our clinic with a complaint of pain and swelling of right shoulder for two weeks. She had diagnosis of mixed breast cancer (infiltrative intraductal carcinoma and invasive micropapillary carcinoma) on the left side. She had modified radical mastectomy and axillary dissection and treated with postoperative chemotherapy and curative radiotherapy (200 cGy). Two months after she received radiotherapy, she started to feel pain in her right shoulder. Magnetic resonance imaging was consistent with avascular necrosis (AVN) in the humeral head. She was prescribed anti-inflammatory medications. Eight months later, she was underwent total shoulder arthroplasty. In the follow-up appointment of the patient, her shoulder pain was proceeding in the same features. Additionally, she had leakage from the surgical region to the skin, which was consistent of fistula. Upon these findings, soft tissue debridement was performed. Pathological evaluation of the debrided material showed active chronic inflammation, granulation and also presence of staphylococcus aureus. Proper antibiotics were prescribed for treatment. *Discussion:* Recently, radiotherapy has become an integral part of cancer treatment. However, early and late effects of irradiation still constitute a significant issue in clinical practice. One of the most severe and challenging complication in radiotherapy is AVN. Although the humeral head is the second most commonly affected area, AVN is often unrecognized and initial symptoms are generally not specific to AVN. Medical management is nonsteroidal anti-inflammatory agents in early stages and avoidance of weight bearing is recommended. These treatments are often very limited and unsuccessful although physiotherapy has a significant role in improvement of range of motion and pain. Primary treatment of AVN is surgical. *Conclusions:* Although AVN seems to be a very rare side effect of radiotherapy, it must be kept in mind by clinicians, as it may lead to severe functional impairment in patients who often have been cured of cancer. An early diagnosis and proper treatment may prevent patients from long-term morbidities. AVN can be seen on short term follow-up period after radiotherapy.

PA063

The Effectiveness of Botulinum Toxin Injection under Sonographic and Electrical Muscle Stimulation Guidance into Upper Limb Muscles for Focal Spasticity Treatment in Patients with Chronic Stroke

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Introduction: Stroke is one of the health problem that causes most deaths and disease burden in adults. One of the causes of disability in stroke patients is the development of spasticity. Botulinum toxin injection is a safe and effective method in treatment of focal and multifocal spasticity. Intramuscular injections of botulinum toxin

can be applied with manual palpation technique or with guidance such as ultrasonography, electromyography, electrical muscle stimulator, magnetic resonance imaging, computerized tomography. In this study, the effectiveness of botulinum toxin injection under sonographic and electrical muscle stimulation guidance into upper limb muscles for focal spasticity treatment in chronic stroke was assessed by measuring before and after treatment. **Material and Methods:** Twenty-two patients with chronic stroke and upper limb spasticity were included in this study. All patients were treated with the same method. Each patients received botulinum toxin type A in all of these muscles: biceps brachii, pronator teres, flexor carpi radialis and ulnaris, flexor digitorum superficialis and profundus. All patients were injected both under sonographic guidance and electrical stimulation guidance, and were evaluated at baseline, two weeks after injection and two months after injection. Spasticity was assessed by Modified Ashworth and Tardieu scales. Functional improvements were assessed by the Barthel index and Fugl Meyer scale. **Results:** Compared to pretreatment, statistically significant improvement was observed in terms of spasticity and functional improvement both two weeks and two months later ($p < 0.05$). There was no statistically significant difference in terms of functional improvement between post-treatment two weeks and post-treatment two months evaluations ($p > 0.05$). We observe any complication in patients during practices. **Conclusion:** It was considered that combined use of sonographic and electrical muscle stimulation guidance into upper limb muscles for focal spasticity treatment in patients with chronic stroke may be effective and safe treatment option.

PA064

An Atypical Complex Regional Pain Syndrome Type 1 after Diphtheria-Tetanus Vaccination

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Introduction: Complex regional pain syndrome is a complex disorder of extremities characterized by pain, swelling, limited range of motion, increased sensitivity, autonomic dysfunction and trophic changes in the skin. Two types of complex regional pain syndrome have been known. **Case:** We present a case of Complex regional pain syndrome type-1 affecting the left upper extremity, following an injection with diphtheria and tetanus vaccine in the left deltoid muscle in a 20-year-old man. His medical history did not disclose any previous trauma of the shoulder or systemic disease. About ten hours after diphtheria and tetanus vaccine injection, pain in the form of burning and swelling developed in the injection area. During the next few hours the other symptoms developed; spreading pain from the shoulder to the elbow, limited range of motion of the left shoulder and discoloration of the skin. At first he had visited a neurologist and a physiatrist. He had been given non-steroidal anti-inflammatory drug and two days of antibiotic treatment. His symptoms did not resolve with this therapy. At the time of admission to our department, the patient was in his twenty sixth day of vaccination. On physical examination, his left arm was edematous, warm and had limited range of motion of the left shoulder joint. The arm circumference was two centimeters increased at the affected side. Tenderness was maximal at the left shoulder and elbow joint and minimal at the wrist. Sensation of the arm was increased and there was allodynia. His left shoulder was dropped because of pain. Biochemical tests, x-rays of the left shoulder, arm and hand, nerve conduction study, three phase bone scintigraphy was normal. Magnetic resonance imaging showed muscular strain of the left deltoid muscle. Complex regional pain syndrome type-1 **Conclusion:** We thought that, in patients who developed swelling, skin changes, severe pain and limited range of motion on shoulder joint after a vaccination, the diagnosis of Complex regional pain syndrome type-1 should be kept in mind and medical therapy should be started as soon as possible, even the wrist and hand joints are normal.

PA065

Effects of Pulsed Electromagnetic Field and Swimming Exercise on Rats with Experimental Sciatic Nerve Injury

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Introduction/Background: The current study aimed to reveal the therapeutic effects of pulsed electromagnetic field and swimming exercises on rats with experimental sciatic nerve injury, which was induced with crush type neuropathy model damage, using electrophysiological methods. In the current study, the sample consisted of 28 adult male Wistar albino rats. **Material and Methods:** The rats were randomized into four groups ($n=7$). Swimming exercise and PEMF (2 Hz and 0.3 MT) was applied one hour a day, five days a week and during four weeks. Electroneuromyographic (ENMG) measurements were made on Day 7. **Results:** When data was evaluated, it was found that 4-week PEMF and swimming exercises led to an increase in motor conduction rates and a decrease in latency values, but the changes were not significant in comparison with the control and injury groups ($p > 0.05$). Compound muscle action potential (CMAP) values of the left leg were lower in weeks 2, 3 and 4 in the swimming exercise group in comparison with the control group ($p < 0.05$), although for PEMF group, CMAP values of the left leg reached the level observed in the control group as of week 3 ($p > 0.05$). **Conclusion:** PEMF and swimming exercise made positive contributions to nerve regeneration as of week 1, and regeneration was enhanced. **Keyword:** Pulsed electromagnetic field, swimming exercise, nerve regeneration.

PA066

Modern Approaches in the Conservative Treatment of Heel Pain: Evidence Based Medicine Literature Review

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Introduction: The heel pain syndrome represents a condition of great importance, considering not only its frequency and distribution, but also the invalidating involvement that creates in day life and work. The purpose of this study is to evaluate the efficacy of non invasive therapies in the treatment of heel pain, in comparison with the surgical approach. **Materials and Methods:** This study shows an analysis of the scientific literature; the aim of the study was to examine the efficacy of main groups of possible treatments (physical therapy, orthosis, corticosteroid infiltration, surgical therapy). The confrontation has gradually been extended to single therapies, belonging to each of major groups. The research has been accomplished using key words: heel pain, conservative treatment of heel pain, plantar fasciitis. **Results:** The data obtained evidence the major percentage of success of corticosteroid infiltration in short term follow up (beneath one month) in comparison with a long term period (more than six months). The physical therapy has shown a greater variability of results. The major inconstancy of outcomes was due to operator conditioned therapy administration, such as dose, method and period of treatment. Among orthosis, the improvement was noticed after using the personalized and prefabricated orthosis, the silicon insertion and night splint, in medium term follow up. It can be noticed that, in long term follow up, surgical therapy presents improved results in comparison with non invasive treatments. **Conclusions:** The invasive therapies seem to provide a greater number of positive outcomes; nevertheless, in the process of decision making, as well as an efficacy, possible risks and complications, especially in surgical and infiltrative treatment should be considered. The major number of physical therapies, even though they present more important variability of results, guarantee the absence of complications. Furthermore, the physical therapies such as orthosis and

stretching seem to show good results in medium and long follow ups, respectively. Therefore, the surgical therapy could be used in cases non initially (within first 6-12 months of treatment) solved with non invasive therapies. In addition, the surgical, invasive approach should be reserved for the anatomical abnormalities, not solvable with conservative treatment.

PA067

Analysing the Relationship between Balance Ability and Performance Level of Lower Limbs in Healthy Young Males

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Introduction/Background: Lower extremity functions must be sufficient for a good balance ability. The aim of this study was to analyse the relationship between balance ability and performance level of lower limbs in healthy young males. *Material and Methods:* In this study, 55 healthy young males (mean age =19.38±0.73 yr; mean height =176±5.86 cm; mean weight =71.21±12.52 kg) were evaluated. The Flamingo Balance Test, the Functional Reach Test, and Portable Computerized Kinesthetic Ability Trainer (SportKAT 550) were used to test balance ability. Lower limbs performance level of the participants was evaluated using by the two following tests: (1) half squat and (2) decline squat. *Results:* The results of this study indicate that there were no any significant relationships between balance ability and performance level of the lower limbs in healthy young males ($p>0.05$). *Conclusion:* Further studies comparing balance ability and performance level of the lower limbs in different age groups, different genders and different groups of patients are needed. *Keywords:* Balance, Performance, Healthy young males.

PA068

Clinical Case: Stiff Person Syndrome

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Case Diagnosis: A female patient aged 50 years and diagnosed with Stiff Person Syndrome (SPS) was admitted to our department. The diagnosis was made in a Neurology Department three months before the admission. *Case Description:* The first symptoms were numbness of left upper and lower limb, pain of left shoulder with cervical stiffness and dizziness. During the first months the syndrome was misdiagnosed and the patient was recommended to have physical therapy sessions with no benefit. Five months after the occurrence of symptoms she made more specific lab exams that revealed the existence of anti-amphiphysin antibodies, which are correlated with SPS and paraneoplastic syndrome. The anti-GAD test was negative. At that time the EMG test indicated peripheral polyneuropathy with continuous firing of MUAPs in deltoid muscles bilaterally. The patient was first treated with immunoglobulin G with no improvement. During all these months the symptoms tended to deteriorate with the occurrence of trapezoid and sternocleidomastoid muscles' dystonia, balance's disorders, causalgia and hypoesthesia of the left lower limb. At admission, the patient maintained mobility of the upper and lower limbs, excellent communication level, but exhibited dystonia of trapezoid muscle, deep sensation disorders (mainly graphesthesia and palloesthesia), gait ataxia and no reflexes. She could walk a few steps with the use of a walker under assistance. Recently the patient started therapy with diazepam, gabapentin and baclofen. The rehabilitation program included ROM exercises, stretching and education of balance in parallel bars. Two months after the initiation of the program neurologists added corticosteroids. The combination of physical therapy and medication improved the level of stiffness. This helped her to be more independent in activities of daily life. *Discussion:* In the case of this patient the rehabilitation

program did not achieve its goals because of balance deficits. She was discharged as a wheelchair patient. *Conclusions:* The complexity of neurologic deficits caused by SPS hinder severely the attainment of rehabilitation's goals despite the simultaneous medication. However, it is difficult to determine how much of the clinical progress of this patient can be attributable to physical therapy.

PA069

Obesity: a Risk Factor for Worsening of Health Self-Evaluation in Patients with Gonarthrosis

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Modern way of living, irregular consumption of food and obesity could lead to the arthrosis lesions in main joints, most of all in knees. The aim of the study was to establish how obesity can influence on the health self-evaluation of the patients with gonarthrosis. *Material and Methods:* We examined 80 patients (20 male and 60 female), age 40-75, with the diagnosis of gonarthrosis (grade II and III of Kellgren & Lawrence radiographic scale). Analysis of body composition was performed with Tanita BC 540 Innerscan Body Composition Monitor. We used scale Body Mass Index (BMI), National Health Center Statistic Criteria and self-evaluation of health by patients. *Results:* Average body mass was 83.9 kg, (SD±14.51) for male and 79.9 (SD±17.34) for female, but no statistically significant difference was established between the genders. Average BMI=31.52 kg/m² (SD±5.58), [31.84 (SD±4.26) for male and 31.96 (SD±4.79) for female] and no statistically significant difference was found, although 93% of patients had problems with overweight, (38.3% of them belong to the intermediary group between the obese and those with normal BMI, while 35.2% suffer from first grade of obesity). Patients self-evaluated their state of health with average grade of 55.76. Even though male patients self-evaluated their health worse (48.33) and female better (57.73), no statistically significant difference was found ($p=0.22$). We noticed the influence of obesity on patient's health self-evaluation, which suggests that patients with normal weight evaluated their health as better (74.78). Patients with obesity grade III evaluated their health as worst (42.31). *Conclusion:* Obesity is one of the main problems in patients with gonarthrosis, it influences negatively the patient's health self-evaluation, which is worsening according to the gravity of obesity.

PA070

Sciatic Pain - Minimal Invasive Techniques - Fluoroscopy Guided Injection

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Case Diagnosis: Female patient, 47 years of age. History of pain sciatica on the right with 3 years of evolution. Magnetic Resonance revealed lumbar disc herniation L3-L4 and L4-L5. *Case Description:* Pain scale in The Back Pain Index Score was 78% and in The Oswestry Low back pain Score of 66%. Initially treated with NSAIDs (oral and topical) and subsequently with pregabalin, the pain never has fallen from 58% in scale The Back Pain Index Score and of 44% in The Oswestry Low back pain Score. Affected your daily life and can not work in the last six months. After completion transforaminal injection guided by fluoroscopy the roots L3 and L4-L4-L4 with 14 mg/ml Betamethasone 2 + 2 + 4 cc of lidocaine cc of ropivacaine pain after one week was 10% in The scale back Pain Index Score and 8% on the scale The Back Pain Index Score. *Discussion:* In the case of an active patient, young one sciatic pain can be very disabling, and even undermine social and work life. When conservative treatment fails or is not as effective as desired, we must think in minimally invasive image-guided techniques as an alternative. In this case, the steroid-anesthetic injection guided by fluoroscopy proved very effective, significantly improving their

quality of life, translated in The Back Pain Index Score and The Oswestry Low Back Pain Score. **Conclusions:** The sciatic pain can be very limiting in young and active patients. When it comes from a well-studied hernia imagiologicamente and resistant to conservative treatment, minimally invasive image-guided techniques, including Fluoroscopy, should be considered as a treatment.

PA071

Effect of Ultrasound-Guided Versus Blind Pes Anserinus Bursa Injections

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Introduction/Background: Recently, several studies reported that despite its superficial location, blind pes anserinus bursa (PAB) injections rarely place the injectate within the PAB. The aim of this study was to compare the effect of US-guided versus blind PAB injections in patients with pes anserinus tendinitis or bursitis (PATB). **Material and Methods:** We prospectively studied 22 patients with clinically diagnosed PATB syndrome. Patients were randomly assigned to US-guided group and blind group. In the US-guided group, the transducer was positioned in a longitudinal orientation relative to the pes anserinus. When the needle tip was visualized between the pes anserinus and the medial collateral ligament (MCL), injectate was delivered under direct sonographic visualization. In the blind group, a needle is inserted perpendicular to the skin and advanced until the medial tibia is contacted, at which time the needle is withdrawn approximately 2-3 mm and injected. Injection materials contained 0.5mL of 1% lidocaine and 0.5 mL of triamcinolone (5 mg). After PAB injection, the place of injectate was identified by using US. Treatment effects were assessed using the visual analogue scale (VAS) while examiner pressed at pes anserinus by using pressure algometry. Outcomes were measured before, 1 minute and 2 weeks after injection. **Results:** The US-guided group showed more improvement than the blind group at 1 minute (Mean change of VAS 5.3 ± 0.8 vs. 2.2 ± 0.6 , $p < 0.05$) and 2 weeks after injection (Mean change of VAS 3.8 ± 0.3 vs. 2.4 ± 0.2 , $p < 0.05$). In US scan after injection, all of the US-guided group injectate was delivered in the intra-pes anserinus bursa (11 of 11 patients), but most of the blind group injectate was delivered above the pes anserinus tendon (PAT) (10 of 11 patients). When comparing the effect depending on place of injectate, intra-PAB injection is more effective than above the PAB injection at 1 minute (Mean change of VAS 5.0 ± 0.8 vs. 2.0 ± 0.7 , $p < 0.05$) and 2 weeks after injection (Mean change of VAS 3.7 ± 0.3 vs. 2.3 ± 0.3 , $p < 0.05$). **Conclusion:** Our results suggest that US-guided pes anserinus bursa injection is more effective than blind injection in the patients with pes anserinus tendinitis or bursitis.

PA072

The Relation of MR Findings to Electrodiagnostic Features in Paraplegics with Thoracolumbar Fracture

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Introduction/Background: If neurologic insults are occurred at thoracolumbar junction, injury of cord and nerve root can occur respectively, however, it is difficult to differentiate nerve root injury from cord injury by clinical or electrodiagnostic findings. In this study we plan to investigate the correlation between MRI findings (the nerve root sedimentation sign, the root aggregation sign) and clinical, electrodiagnostic features. **Material and Methods:** We retrospectively reviewed 30 patients who have paraplegia with thoracolumbar junctional fracture. Using axial MR images of the lumbar spine, the nerve root sedimentation sign and the root aggregation sign were assessed by 2 raters independently, without knowledge of clinical history or diagnosis. Inter-rater reliability of these signs was calculated. A positive sedimentation sign was defined as the absence of nerve root sedimentation. And positive root aggrega-

tion sign was defined as the presence of root aggregation in at least 1 transverse MRI scan. Clinical features such as American Spinal Injury Association Impairment Scale, the degree of functional outcome (ambulatory capacity), and electrodiagnostic findings were analyzed. **Results:** Of the 30 patients, positive sedimentation signs were 16 (53.3%), and positive root aggregation signs were 20 (66.7%). Inter-rater reliability of the nerve root sedimentation sign and the root aggregation sign were $\kappa = 0.67$ ($P = 0.001$) and $\kappa = 0.78$ ($P = 0.000$), respectively. A positive root aggregation sign correlates with reduced compound muscle action potentials (CMAP) amplitude of bilateral common peroneal nerves and tibial nerves in nerve conduction studies ($\chi^2 = 5.026$, $p = 0.025$). The nerve root sedimentation sign was significantly related to recovery of ambulatory capacity in follow-up measurements ($\chi^2 = 4.854$, $p = 0.028$). **Conclusion:** The root aggregation sign had a positive correlation with reduced CMAP amplitude of common peroneal nerves and tibial nerves in paraplegic patients with thoracolumbar junctional fracture. And positive sedimentation sign was significantly related to improvement of ambulatory capacity in this study.

PA073

Extracorporeal Shock Wave Therapy in Calcific Rotator Cuff Tendinosis

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Introduction: Extracorporeal shock-wave therapy (ESWT) is suggested as a treatment alternative for calcific and non-calcific rotator cuff tendinosis. The objective is to study the effectiveness, tolerance and satisfaction of ESWT. **Material and Methods:** A prospective descriptive study was performed on treatment with ESWT, to 180 consecutive adults subjects with calcific RC tendinosis. All were treated by ESWT, 1 session for week, 4 weeks. All were assessed before each treatment and one month, after completion of therapy. The frequency analysis was conducted. The level of evidence is 3. **Results:** The mean flux density and number of pulses applied were 0.59 ± 0.17 mJ/mm² and 2213.3 ± 756.2 , respectively. One month after completion of therapy, the evaluation resulted in significant improvement in pain (64.8% less in activity) and in active articulation range measurement ($29.5^\circ \pm 16.4^\circ$ more in active abduction). The limitations in daily living activity, sporting or working activity that initially existed in 180 (100%), persisted at two months in 20 (11.1%) and 28 (15.6%), respectively. The calcifications that existed in 108 (100%), persisted in 67 (37.2%). The tolerance was good without important pain in 131 (72.8%), and without secondary effects of interest. Mean flux density, number of pulses applied, and improvement in pain compared with other studies are respectively: 0.99 mJmm²/ 0.60 mJmm², $2,213.3/2,000$, and $64.8\%/21\%-84\%$. **Conclusions:** ESWT in calcific RC-tendinosis are well tolerated, and shows a significant effectiveness for pain relief, functional restoration and calcifications lithotripsy, with a mean satisfaction of 8.53 ± 1.80 (VAS 0-10).

PA074

Extracorporeal Shock Wave Therapy in Lateral Epicondylitis

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Introduction: Further research with well designed randomised control trials is needed to establish the absolute and relative effectiveness of extracorporeal shock wave therapy (ESWT) in lateral epicondylitis. The objective is to study the effectiveness, tolerance and satisfaction of ESWT, in lateral epicondylitis. **Material and Methods:** Design of prospective descriptive study, with implementation of treatment with ESWT in lateral epicondylitis with 97 consecutive adults subjects with lateral epicondylitis. All

were treated by ESWT, 1 session for week, 4 weeks; and were assessed before each treatment and one month, after completion of therapy. The frequency analysis was conducted and the level of evidence is 3. The main outcome measures, are: pain, tolerance and satisfaction through visual analog scale 0-10 (VAS), energy used, number of shots, limitations (in daily living activity, sporting activity or working activity), and articular range measurement of the elbow. **Results:** The mean flux density applied was 0.23 ± 0.09 mJ/mm², and the mean number of pulses applied $1,168.03 \pm 311.2$. Within two months of the implementation of the first ESWT session, the evaluation resulted in significant improvement in pain (79.2% less in activity) and in active articulation range measurement ($8.7^\circ \pm 10.3^\circ$), more in flexion-extension of the elbow. The limitations in daily living activity, sporting or working activity that initially existed in 93 (100%), persisted at two months in 2 (2.1%) and 2 (2.1%), respectively. The tolerance was good without important pain in 76 (78.3%), and without secondary effects of interest. Mean flux density and number of pulses applied, and improvement in pain compared with other studies are respectively: 0.23 mJ/mm²/ 0.27 mJmm², $1,168.03/1,000$, and $79.2\%/48\%-92\%$. **Conclusion:** ESWT in lateral epicondylitis is well tolerated, and shows a significant effectiveness for pain and relief, functional restoration, with a mean satisfaction of 8.38 ± 2.18 (VAS 0-10).

PA075

Extracorporeal Shock Waves Therapy in Plantar Fasciitis

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Introduction: The short-term pain relief and functional outcomes of the extracorporeal shock wave therapy (ECSWT) are satisfactory. However, owing to the lack of a long-term follow-up, its long-term efficacy remains unknown. The objective is to study the effectiveness, tolerance and satisfaction of ECSWT. **Material and Methods:** Is a prospective descriptive study of the implementation of treatment with ESWT, in 196 consecutive adults subjects with plantar fasciitis. All were treated by ESWT, 1 session for week, 4 weeks. All were assessed before each treatment and one month, after completion of therapy. The frequency analysis was conducted. The level of evidence is 3. The main outcome measures were pain, and satisfaction through visual analog scale 0-10 (VAS), tolerance, energy used, number of shots, limitations (in daily living activity, sporting activity or working activity), and active articular range measurement in the flexion-extension of the ankle. **Results:** The mean flux density applied was 0.32 ± 0.11 mJ/mm², and the mean number of pulses applied 1451.3 ± 559.8 . One month, after completion of therapy with ESWT, the evaluation resulted in significant improvement in pain (88% less in walking) and in articulation range measurement in the flexion-extension of the ankle ($4.37^\circ \pm 6.2^\circ$ more). The limitations in daily living activity, sporting or working activity that initially existed in 196 (100%), persisted at two months in 11 (7.6%) and 14 (7.1%), respectively. The fasciitis that existed in 15 (7.5%) and calcification in 9 (4.6%) disappeared. The spur that existed in 87 (44.4%) persisted. The tolerance was good without important pain in 156 (79.6%) and without secondary effects of interest. Mean flux density and number of pulses applied, and improvement in pain compared with other studies are respectively: 0.32 mJmm²/ 0.45 mJmm², $1451.3/2000$, and $80\%/21\%-84\%$. **Conclusion:** ECSWT in plantar fasciitis, are well tolerated, and shows a significant effectiveness for pain relief and functional restoration, with a mean satisfaction of 8.3 ± 2 (VAS 0-10).

PA076

Serum Levels of RDW and MPV in Ankylosing Spondylitis: Can They Show the Disease Activity?

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Introduction: RDW (Red Cell Distribution Width) and MPV (Mean Platelet Volume) are parameters of complete blood count (CBC). RDW for the differential diagnosis of anemia, MPV as an indicator of platelet activation are used. Previous studies have demonstrated that RDW and MPV related with inflammatory diseases and acute phase reactants (APRs). As two novel index for inflammation, RDW and MPV may be useful to estimate the activity of inflammatory diseases. Our aim was to determine RDW and MPV levels in Ankylosing Spondylitis (AS) and investigate their relations with APR and disease activity index. **Material and Methods:** It was planned a retrospective, case-control study. One hundred thirty-three patients with AS (male: 80, female: 53) and age and gender-matched 133 controls (male: 79, female: 54) were enrolled into the study. CBC of both groups, and ESR, CRP, Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) of the patients were recorded. **Results:** The mean ages of patients and controls were 41.9 ± 11.2 and 39.7 ± 14.2 years, respectively ($p=0.16$). RDW and MPV levels of the patients were significantly higher than controls, (14.5 ± 1.6 , 13.2 ± 0.8 , $p<0.0001$ and 10.1 ± 0.8 , 9.9 ± 0.7 , $p=0.03$, respectively). We detected that the cutoff levels of RDW and MPV were 14.8 (area under curve [AUC] 0.76, $p<0.0001$) and 10.4 ([AUC] 0.58, $p=0.016$ graphic 1-2), respectively. While in the patients with RDW >14.8 levels compared with <14.8 , ESR (25.8 ± 18.0 , 10.7 ± 8.8 , $p<0.0001$), CRP (19.2 ± 15.7 , 6.9 ± 10.6 , $p<0.0001$), PLT (308.5 ± 74.3 , 275.8 ± 55.6 $p=0.006$) and BASDAI score (4.6 ± 2.1 , 3.1 ± 2.1 , $p<0.0001$) were significantly higher ($p<0.0001$). In addition, RDW was positively correlated with BASDAI ($r=0.33$ ve $p<0.0001$), ESR ($r=0.45$ ve $p<0.0001$), CRP ($r=0.42$ ve $p<0.0001$) and PLT ($r=0.24$ ve $p=0.004$). In AS patients with MPV >10.4 levels compared with <10.4 , PLT (271.3 ± 54.8 , 300.1 ± 67.3 , $p=0.019$) and CPR (7.3 ± 6.7 , 13.6 ± 15.6 , $p=0.003$) were significantly lower. BASDAI score was not different between patients with lower and high MPV levels (3.60 ± 2.27 , 3.80 ± 2.16 , $p=0.63$). MPV was negatively correlated with ESH ($r=-0.19$, $p=0.032$), CRP ($r=-0.26$, $p=0.004$) and PLT ($r=-0.32$, $p<0.0001$). But, it wasn't associated with BASDAI. **Conclusion:** We detected that RDW and MPV levels were higher in AS than controls. While in AS patients, RDW was positively correlated with BASDAI and APRs, MPV was negatively correlated with only APRs.

PA077

May Serum RDW (Red Cell Distribution Width) and MPV (Mean Platelet Volume) Levels Show the Disease Activity in Rheumatoid Arthritis?

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Introduction: RDW (Red Cell Distribution Width) and MPV (Mean Platelet Volume) are parameters of complete blood count (CBC). RDW for the differential diagnosis of anemia, MPV as indicator of platelet activation are used. Previous studies have demonstrated that RDW and MPV related with inflammatory diseases and acute phase reactants. As two novel index RDW and MPV may be useful to estimate the inflammatory activity. Our aim was to investigate RDW and MPV levels in the Rheumatoid Arthritis (RA), and their relations with disease activity. **Material and Methods:** It was planned a retrospective, case-control study. The study was included 100 (male/female: 5/95) RA and age and gender-matched 100 (male/female: 5/95) controls. The Complete Blood Count (CBC), Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP) measures of two groups, the Disease Activity Score-28 ESR (DAS-28ESR) and pain of patients were recorded. **Result:** The mean ages of patients and controls were 57.5 ± 8.4 and 57.5 ± 8.5 years, respectively ($p=1.00$). RDW and MPV levels were higher in RA than controls (15.34 ± 1.96 , 13.40 ± 0.82 and 10.48 ± 0.95 ,

9.77±0.46, $p<0.0001$, respectively). The cutoff levels of RDW and MPV were 14.8 (sensitivity 58%, specificity 100%, $p<0.0001$) and 10.4 (sensitivity 53.4%, specificity 100%, $p<0.0001$), respectively. The area under curves (AUCs) of RDW, MPV, ESR and CRP were 0.85, 0.73, 0.81, and 0.75, respectively. While, there was a significant difference between AUCs of RDW and CRP ($p=0.023$), others were similar ($p>0.05$). The patients with RDW levels >14.8 had higher DAS-28 (4.56±1.50 $p=0.002$) and pain score (53.73±26.32, $p=0.0007$). Moreover, RDW was positively correlated with DAS-28 ($r=0.28$, $p=0.004$) and pain score ($r=0.28$, $p=0.004$). But, DAS-28 and pain scores weren't different between patients with MPV levels >10.4 and <10.4 . In addition, MPV was not associated with pain and DAS-28. **Conclusion:** RDW and MPV were significantly higher in RA than controls. The ROC curves showed that MPV was similar to ESR and CRP, but, RDW was better than CRP to indicate inflammatory activity. Also, RDW was correlated with pain and DAS-28 in RA, but MPV wasn't associated with them.

PA078

Osteoporosis: Diagnosis after a Bone Fracture

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Introduction: Osteoporosis is a multifactorial disease characterized by a reduction in bone mass with deterioration of its micro architectural structure, leading to an increased risk of fracture. This condition may have a primary or secondary cause, or in some cases both. The first one, describes post-menopausal, age-related, and idiopathic disease. It is also important to exclude secondary disease before start any medication. Osteoporosis often does not become clinically apparent until a fracture occurs, and is associated with high disability, morbidity and mortality. The diagnosis is defined by the World Health Organization based on the results of dual energy x-ray absorptiometry (DEXA). **Material and Methods:** We are analysing patients who were admitted to our Physical and Rehabilitation Medicine consult for rehabilitation after a bone fracture, since January 2014 and we are going to continue this study till the end of December 2014. During observation, we asked patients with clinical indication if they ever had done a DEXA or had ever taken any type of treatment for osteoporosis. **Results:** At the moment we have 99 patients, 75 with more than 65 years old, and 79 being woman. The most frequent fracture until the moment is hip fracture with a total of 32. We evaluated the bone mineral density with DEXA of 51 patients, and 6 had osteopenia and 26 osteoporosis. The most frequent symptoms and signs in our patients were vertebral pain, and limited ROM/muscular strength of wrist and hip. Until now 69 patients were treated with Physical and Rehabilitation Medicine techniques to ROM, strength and function recover, and 32 patients started medication for osteoporosis/osteopenia. **Conclusion:** A significant number of patients had osteoporosis but didn't know until the fracture had occurred. In Portugal, National Health Authorities have very well defined who should do a DEXA and start pharmacologic therapy. The aim of pharmacological management is primary prevention of osteoporotic fractures in patients with high risk, or secondary prevention in patients who have already sustained a fracture. Physical and Rehabilitation Medicine is very important not only in managing osteoporotic patients and treating patients with osteoporotic morbidity, but also in osteoporosis prevention.

PA079

Marfan's Syndrome: a Diagnosis after the Age of 40

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Introduction: Marfan's Syndrome is an autosomal dominant condition with an estimated prevalence of one in 10,000 to 20,000 individuals. It is a rare hereditary connective tissue disorder with no geographic ethnic or gender predilection and affects multiple

organs and systems. The genetic basis is related to chromosome 15 that encodes fibrillin-1 and 2. Diagnosis relies on a set of defined criteria (Ghent criteria). **Material and Methods:** We have a clinical case of a 40 years old white woman, with more than 25 years of musculoskeletal symptoms, like frequent ankle sprains and vertebral pain. She doesn't have significant history of family disorders. Throughout the years she was observed by several doctors but only on January 2014 was sent to the genetic consult of our hospital and on July 2014 to our consult. **Results:** She has already been observed by ophthalmology and cardiology and was diagnosed with crystalline lens dislocation and myopia but without cardiovascular problems. She was sent to our consult because of vertebral and feet pain. We observed a tall and thin body type, long arms, legs and fingers, pectus carinatum and ogival palate. Podoscope visualization and feet X-ray revealed flat feet. We also saw dorso-lumbar scoliosis in full spine X-ray. Lumbar MRI showed dural ectasia between S1 and S2. She was treated with PRM techniques to improve her vertebral pain, paravertebral muscular strength and posture. She began to use custom-made insoles, and nowadays she lives with less feet pain. **Conclusion:** There are a lot of mutations that give different subtypes of connective tissue abnormalities and are responsible for diverse phenotype which, sometimes can make a difficult diagnosis. Usually, clinical manifestations of Marfan's Syndrome become more evident with age. Our patient have some characteristic signs, like joint laxity, tall and thin body type, long arms and legs, and arachnodactyly, and also the referred musculoskeletal symptoms. She also has ophthalmology problems. In spite of all this characteristics she was only diagnosed in her 40 years old. Marfan's Syndrome is not curable but, with Physical and Rehabilitation Medicine intervention, our patient improved her quality of life, having less joints and vertebral pain.

PA080

Limb Neuro-Orthopedic Contractures and Myopathy

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Introduction: Hereditary myopathies are a group of diseases of major clinical diversity with especially muscles weakness and hypotonia. Neuro-orthopedic complications in limbs are common in these patients especially at teenage. The management in physical medicine and rehabilitation of these patients aims to prevent and to limit their impacts. The aim of our study was to objectify the importance of these complications and their management in our patients. **Material and Methods:** It is a retrospective study conducted in Department of Physical Medicine and Rehabilitation at National Institute of Orthopedics, Tunisia from January 2008 to December 2014. Patients who had limb neuro-orthopedic contractures and myopathy were included in our study. For each patient we defined the age, sex, type of associated cardio respiratory troubles, type of wandering, type of spinal deformation, type of the equipment and the fate of these deformations. **Results:** 54 patients were included in the study, 33 male and 21 female. The mean age was 13.55 years. 42% of patients were walking. 51% of patients had pulmonary involvement; 3 patients had respiratory failure. 22.2% of patients had cardiac involvement with impaired systolic function in 5 patients. Neuro-orthopedic contractures were an equinus in 91% of patients, a knee flossum in 75% of patients, a hip flexum in 62% (unilateral or bilateral dislocated hips in 4 patients) and an elbow flossum in 18% of patients. These deformities were irreducible and needed surgery in 29% of patients. The majority of patients were receiving a motor physiotherapy and occupational therapy. In parallel, they had splints and technical aids according to the reducibility of the contractures and their motor skills. Their condition was better than patients without rehabilitation treatment. **Conclusion:** The fate of these pathologies is inevitable. A support in physical medicine should be early to establish a strategy for the rescue of muscle mass, prevention of secondary contractures and improving the function.

PA081

Spinal Deformities and Myopathy Experience of National Institute of Orthopedics Mohamed Kassab

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Introduction: The risk of kyphoscoliosis in myopathy is major from 75 to 90%. It is accentuated during puberty. A multidisciplinary approach, early implemented, will help to reduce disability and ensure a better social insertion. The aim of this study is to report our experience in management of these troubles. **Material and Methods:** It is a retrospective study. Were included in this study any patient who have myopathy and spinal deformation and followed at outpatient Department of Physical Medicine and Rehabilitation in National Institute of Orthopedics Mohamed Kassab, Tunisia from January 2008 to December 2014. For each patient we defined the age, sex, type of associated cardio respiratory trouble, type of wandering, the type of spinal deformation, the type of the equipment and the fate of these deformations. **Results:** Sixty nine patients were included in our study with a male predominance of 59.1%. the mean age of our population was 15.4 years. 43.6% of our patients were walking to their first consultation in our department. Scoliosis was present in 57.7% of our patients and lumbar hyperlordosis was observed in 22.5% in our population. 49.2% of our patients had respiratory repercussions, and 14.7% had cardiac consequences (especially an impaired systolic function). All patients had rehabilitation with an adapted program. The Garchois brace was the most prescribed equipment (30.9% of our patients). Surgical treatment was prescribed in 12 patients. Evolution is better among patients regularly monitored. **Conclusion:** The early implementation of rehabilitation with suitable program, adequate equipment and ergonomic advices, will help to improve the patient's quality of life of with myopathy as well as his family. However, we must educate health professionals to implement this multidisciplinary care as soon as possible, and educate the patient so that he will follow the program of treatment.

PA082

Effect of Different Time Ratio of Therapeutic Contrast Bath on Blood Pressure, Heart Rate and Rate Pressure Product.

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Introduction: Therapeutic contrast bath has been widely used for peripheral parts of the body, such as hands and feet in order to stimulate peripheral blood circulation through an alteration of blood vessel tone. However, ratio of immersion is still varied due to an uncertain response. To indicate its effect on simple cardiovascular parameters, the purpose of this study was to examine and compare the effect of contrast bath at the hot to cold ratio of 3:1 and 4:1 on blood pressure (BP), heart rate (HR) and rate pressure product (RPP) in normal subjects. **Material and Methods:** Twenty-seven subjects, 17-25 years old, were asked to perform two different ratios of contrast bath. They immersed their left hands in 40-42°C for the hot and 10-11°C for the cold bath for 5 consecutive times. Then, they were randomized into either ratio of immersion followed by the other with rest period of one day apart. BP and HR were measured at rest and during immersion periods. After that, RPP, the indication of energy demand of the heart that induced by immersion was calculated by HR multiply by systolic blood pressure. **Results:** This study showed that the BP and HR did not differ significantly between resting and immersion periods. In addition, a similar pattern of HR increase during cold immersion was found in both ratios. To be observed that the higher HR response during cold immersion showed in the ratio of 4:1, although it did not reach the statistical significance (at rest=77±10 beats, a

ratio of 3:1=80±10 and 4:1=85±9 beats, respectively). However, the different finding showed in the RPP. It produced a statistical difference compared between hot and cold immersion periods only in the ratio of 4:1 (RPPH4:1 vs RPPC4:1=8,089.68±1,088.90 vs 8,808.65±1,158.79, p<0.05). **Conclusion:** Base on the present findings, our result suggested that contrast bath at the ratio of 4:1 could significantly affect RPP with no changes in BP and HR.

PA083

Influence of Proprioceptive Training on Knee Function in Patients with Knee Osteoarthritis

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Background: There is a prominent loss in proprioceptive sensation in patients with knee osteoarthritis compared with control subjects of the same age and gender. **Purposes:** To investigate the influence of proprioceptive training on knee function in patients with knee osteoarthritis. **Study Design:** A pre test post test control group design. **Materials and methods:** Thirty patients with knee osteoarthritis from both sexes were involved, aged between 40–60 years. They were divided into two equal groups, fifteen patients each. Patients in the first group received a traditional exercise program in the form of stretching and strengthening exercises. Patients in the second group received a proprioceptive training program in addition to stretching and strengthening exercises. Training was done 3 times a week for 8 weeks. Pain level, functional performance and proprioceptive accuracy were measured before and after treatment. **Results:** there were significant differences between the two groups in pain (p=0.007) and (p=0.009) for the right and left knees respectively, functional performance (p=0.008) and proprioceptive accuracy (p=0.037) and (p=0.014) for the right and left knees respectively. **Conclusion:** Proprioceptive training proved to be beneficial in improving functional performance, perceived knee pain and proprioceptive accuracy in patients with knee osteoarthritis as compared with traditional exercise program.

PA084

Rupture of the Serratus Anterior Muscle: a Case Report

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Case Diagnosis: Traumatism involving the serratus anterior muscle (SA) is usually due to a lesion of the long thoracic nerve. The rupture of the muscle itself is rare. **Case Description:** A 57-year-old right-handed woman, retired, reported a story of a fall on her left side three months before. Her left shoulder had been painful since that time and she was unable to raise her arm above the level of the scapula leading to great difficulties performing activities of daily living. Physical examination, with the patient viewed from the rear showed a moderate drooping of the left shoulder. A winged scapula on left was seen as the arms were raised. There was slight tenderness when the patient was asked to elevate her arm above a right angle. A soft mass was palpable at the level of the lower half of the vertebral border of the left scapula. The mass was not painful and was easily reducible by the pressure. The findings from the neurologic examination were normal. The Ultrasound and the CT scan showed a hernia of the SA along the vertebral border of the left scapula with a fatty degeneration of the muscle. A course of rehabilitative treatment aiming to relieve pain, to improve the shoulder's range of motion and to strengthen the trapezius, the levator scapulae and the rhomboids was established and followed carefully for a period of twelve weeks leading to a definite functional improvement. **Discussion:** In the present case, the diagnosis was helped according to the ultrasonography and the CT scan which showed the fatty degeneration of the muscle. Although there was a history of a fall followed by pain, disability and local tenderness, the direction and the

mechanism of the traumatism remained unknown. It may probably be an abrupt contraction of the serratus anterior when the scapula was strongly fixed against the floor. **Conclusion:** The rupture of the SA is much less common than injuries of the long thoracic nerve. A winging scapula and a soft mass palpable at the level of the lower half of the spinal border of the scapula are consistent with the diagnosis of a rupture of the SA.

PA085

Idiopathic Meralgia Paresthetica: a Case Report

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Case Diagnosis: Meralgia paresthetica (MP) is a rare sensory mononeuropathy characterized by paresthesia, pain or sensory impairment along the distribution of the lateral femoral cutaneous nerve (LFCN) caused by entrapment or compression of the nerve as it crosses the anterior superior iliac spine and runs beneath the inguinal ligament to enter the thigh. **Case Description:** A 46 year-old woman with no medical history was referred to our outpatient clinic complaining of a painful paresthesia in the anterolateral right thigh. She reported the insidious onset of the tingling pain 12 months before. The pain was intermittent at first, then permanent, both diurnal and nocturnal and has worsened two months before the evaluation. The patient was obese (BMI=37.1 kg/m²) with a fatty abdomen covering the inguinal area. Neurologic examination found a hypoesthesia in the anterolateral region of the right thigh along the distribution of the LFCN. There was no motor impairment and no signs of compression of the LFCN at the inguinal ligament and no pain in the lumbar region. Radiographs of the lumbar spine showed degenerative disc disease at the L3-L4 and L4-L5 levels and an inter-apophyseal osteoarthritis. The Erythrocyte Sedimentation Rate and the blood sugar level were normal. MP was suspected based on the medical history and the clinical findings. Conservative treatment modalities (dietary modifications, weight loss), and the administration of Carbamazepine (600 mg/d) have led to improve the symptoms by 75%. **Discussion:** In most cases, the symptoms of MP are relieved thanks to conservative treatment, such as lifestyle changes, weight loss, and the administration of analgesic, NSAID, and neuroleptic drugs or from local anesthetic nerve blocks. However, in some patients, the pain remains refractory to these treatments. Then, more aggressive interventions may be considered, including radiofrequency and surgical decompression (neurolysis) or transection of the LFCN. **Conclusion:** MP is frequently overlooked or misdiagnosed. Therapists should be aware of this pathology and of its therapeutic possibilities.

PA086

Complex Regional Pain Syndrome Type I (CRPS-I). What Treatment to Use?

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Introduction: Complex regional pain syndrome type I (CRPS-I), is a chronic neurological disorder characterized by disabling pain, swelling, vasomotor instability, sudomotor abnormality, and impairment of motor function. So far, the treatment of CRPS-I remains controversial and there are no treatments that are totally efficacious. The aim of this study was to evaluate retrospectively the efficacy of 3 treatment modalities in the management of CRPS-I. **Material and Methods:** The records of 60 patients (21 men and 39 women) treated for CRPS-I were used. Three groups were identified according to the treatment modalities: functional rehabilitation (FR) (16 patients), calcitonin combined to FR (15 patients) and Bisphosphonates (BP) (Risedronate Sodium, 1 tablet

per week for 1 month) associated with FR (29 patients). The outcome was judged on the reduction of pain and vasomotor signs and on functional improvement. **Results:** The patients mean age was 51 years±16.5 years. The mean period of treatment was 2 months with a mean follow-up of 7 months. In most cases (88.3%), CRPS-I was post-traumatic. Fractures of the distal radius (FDR) were the most incriminated event (40% of cases). When comparing the groups, no statistically significant difference was found between the different therapeutic modalities (p=0.462). Regarding the CRPS-I complicating FDR, positive improvement was noted in the group of patients treated by BP associated with FR in 85.7% of cases with no statistically significant difference with the other groups. **Conclusion:** The objectives of the treatment of the CRPS-I are to overcome the pain, to improve the function and to allow a fast social and professional integration. Unfortunately there is no gold standard in the management of this pathology. Nevertheless, Risedronate Sodium per os for one month can be proposed as a treatment of CRPS-I. It seems to be as effective as the calcitonin.

PA087

The Amputation Is a Fatal Outcome for an Uncommon Disease: Thevenard Neuroacropathy

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Case Diagnosis: Thevenard's neuroacropathy is a rare familial disease with autosomal dominant transmission. Its pathogenesis is poorly understood. A disorder of the peripheral nervous system, causing skin ulcers and evolving slowly to bone deformities and to joint and bone destruction is suggested. We report two family cases: a father and a son suffering from the same disease. **Case Description:** The symptoms began at the age of sixteen for the father and nineteen for the son by repeated episodes of thermoalgesic pain and plantar tactile anesthesia. A treatment involving local care, antibiotic therapy and orthopedic shoes allowed to slow down the evolution of the father's disease for 40 years. The occurrence of septic arthritis of the right ankle led to a trans-tibial amputation. The evolution was faster for the son as the extension of ulcerative lesions and bone loss at the left lower limb resulted in a trans-tibial amputation after 5 years (at the age of 24). The 2 patients were given tibial prosthesis. The autonomy recovery after rehabilitation was complete. **Discussion:** Thevenard's disease begins around puberty by paresthesias, and vasomotor symptoms before the onset of skin lesions. It is responsible for alterations of the microcirculation leading to bone destruction. The sensory disturbances are the major semiotic symptoms. **Conclusion:** Although its scarcity, Thevenard's disease must be evoked in case of a chronic ulceration of the foot associated with a decrease of the thermoalgesic sensibility. Therapeutic education is crucial in the management of this pathology, it should take place earlier to avoid ulcers and osteitis leading to amputations. The research for other family cases is imperative. Rehabilitation after amputation is very important and aims to recover the autonomy.

PA088

Hip Osteoarthrosis - Fluoroscopy Guided Injection – Case Study

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Case Diagnosis: Male patient, 77 years. History of pain in the right hip with 5 years of evolution. Hip X-Ray showed hip osteoarthrosis grade 3. **Case Description:** His pain was 9.6% in the scale Hip disability and Osteoarthritis Outcome Score (Hoos) and 15.6% on the WOMAC scale score. Initially treated with 1,000 mg paracetamol, NSAIDs (oral and topical) and glucosamine 1,500 mg, the pain never came down from 34% in Hoos scale and 39.1% in Womac

scale. He was treated with hyaluronic acid fluoroscopy guided intra-articular injection. The pain after one month was 63.1% in HOOK scale and 67.2% in the WOMAC scale. *Discussion:* In the case of a patient with hip arthrosis grade 3, when conservative treatment fails or is not as effective as desired, we must think in minimally invasive image-guided techniques as an alternative. In this case, the injection of hyaluronic acid guided by fluoroscopy proved quite effective, significantly improving their quality of life, translated in HOOS and WOMAC scale. *Conclusions:* The Hip osteoarthritis can be very limiting in gait and activities of daily living primarily in patients with various underlying pathologies. As a patient has a hip osteoarthritis resistant to conservative treatment, minimally invasive image-guided techniques, including injection of hyaluronic acid guided by fluoroscopy, should be considered as a treatment.

PA089

Correlation of the Pain and Physical Function in the Patients with Rheumatoid Arthritis and Total Knee Arthroplasty

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Background: Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease of unknown cause that primarily affects the peripheral joints including knee joint causing disability. Total knee arthroplasty has been shown to be an effective procedure in improving quality of life of these patients. The assessment of the pain and physical function in these patients is important for creating the program of rehabilitation and in assessment of its results. *Objectives:* The aim of this study was to study correlation between the pain and physical function before and after knee arthroplasty in the patients with rheumatoid arthritis in early stage after arthroplasty. *Material and Methods:* Prospective research includes 33 patients (average age 56.4±13.9 years), aged 32 to 73 years, of both sexes that underwent knee arthroplasty after preoperative rehabilitation on the Orthopedic department. Early program of therapy exercises and occupational therapy were performed. Instrument used for assessment of quality of life was a modified version of Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). All patients completed the WOMAC questionnaires preoperatively and at discharge (2 weeks postoperatively). Pearson correlation test was used to analyze numerical data. *Results:* Modified version of Womac Index Score shows significant correlation between the pain at discharge and physical function before knee arthroplasty ($r=0.867$, $p<0.001$) as well as between the pain and physical function at discharge (0.895 , $p<0.000$) in the patients with RA. *Conclusion:* Results of our research show that the pain at discharge was significantly associated with physical function preoperatively and at discharge after knee arthroplasty in patients with RA. These results suggest that RA patients have lower degree of the pain if physical function before and after knee arthroplasty was higher. *Keyword:* pain, physical function, knee arthroplasty, Womac Index Score, rheumatoid arthritis. *References:* 1) Bellamy N. Outcome measurement in osteoarthritis clinical trials. *J Rheumatol* 1995; 22 (suppl 43) :49–51. 2) Ritter MA, Lutgring JD, Davis KE, Faris PM, Berend ME. Total knee arthroplasty effectiveness in patients 55 years old and younger: osteoarthritis vs. rheumatoid arthritis. *Knee*. 2007; 14 (1): 9-11.

PA090

How Dose the Angle of Rigid Foot Orthosis Affect the Foot Pressure in Severe Flexible Flat Foot?

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Introduction: To assess the effect of angle of rigid foot orthosis (RFO) made by inverted technique on plantar pressure distribution

in subjects with severe flexible flatfoot. *Material and Methods:* In total, 16 flatfeet were recruited for this study. Rigid foot orthosis was made by Blake's inverted technique to control excessive subtalar joint pronation. In-shoe plantar pressure in walking was measured by Pedar-X system (Novel, Germany) under four conditions including wearing the shoe only, wearing the shoe with a rigid foot orthosis of inverted angle 0, 15, 30 degrees. According to the output of Pedar system, the following four variables were calculated and analyzed for each mask: peak pressure (kPa), mean pressure (kPa), maximum force (N/kg), and contact area (cm²). There are 6 masks (rearfoot, medial midfoot, lateral midfoot, 1st toe, 2nd & 3rd toes, 4th & 5th toes). The paired *t*-test and repeated ANOVA with Bonferroni adjustment using SPSS 18.0, Korean version was used for statistical analysis. *Results:* Foot all rigid foot orthoses (0, 15, 30 inverted angles), peak pressures of foot were statistically significant decreased in rearfoot, 1st toe, 2nd-3rd toes and increased in medial side of midfoot. There are no difference between 15 and 30 degree and slight increase of peak pressure in rearfoot in 30 degree. The contact areas of foot were statistically increased in rearfoot and medial side of midfoot after using all rigid foot orthosis but decreased in 1st toe according to inverted angles. The maximal force of foot showed the significant increase in medial side of midfoot and 1st toe using 15, 30 inverted angles ($p<0.05$). *Conclusions:* The Rigid foot orthoses by inverted technique have an effect on redistribution of plantar pressure in flatfoot by increasing the contact area of the foot to shift of the plantar pressure of the foot. The greatest effect is revealed at inverted angle 15 degrees in present study while significantly reducing the peak pressure and area of the 1st toe and rearfoot. Further studies with larger sample size need to be conducted to validate our results.

PA091

Severe Dysphagia during a Recurrence of Juvenile Dermatomyositis: a Case Report

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Background: Juvenile dermatomyositis (JDS) is a rare autoimmune inflammatory myositis with onset during childhood. The predominant clinical symptoms are symmetrical proximal muscle weakness, a skin manifestation, and constitutional symptoms. Especially, weakness of the pharyngeal muscles causes a various degree of swallowing difficulty. We report a case of severe pharyngeal dysphagia during a recurrence of JDS. *Case Description:* The patient was a 12-year-old girl who showed symptoms of proximal muscle weakness in the upper and lower limbs, skin manifestation and mild rhinolalia aperta. She was diagnosed as JDS by a close examination at our hospital. She was discharged from the hospital within two months, because the data of blood examination and clinical symptoms were improved by drug therapy and rehabilitation. However, muscle pain, skin manifestation, and general malaise appeared about one year later, and muscle leaking enzymes were markedly elevated (CK; 11,733 IU/l, myoglobin; 1,426 ng/ml). She was diagnosed as a recurrence of JDS. At the 26th day from a recurrence, she realized difficulty of swallowing even a tiny amount of saliva, and stopped oral intake. Severe dysphagia was pointed out by videofluorography (VFG) at the same time. This symptom also continued for a while after the muscle leaking enzyme was normalized. At the 97th day from a recurrence, she regained a capacity for adequate oral intake during all of the three meals. *Discussion and Conclusions:* JDS is a rare disorder, and dysphagia in JDS is uncommon as an early symptom. Although some researchers have reported about swallowing disorders in JDS, they did not describe the degree of dysphagia in detail. We could diagnose severe dysphagia in JDS patient appropriately by VFG. VFG was useful diagnostics for follow-up of detailed swallowing function in JDS patient.

PA092

Capsular Thickening between Adhesive Capsulitis and Spastic Hemiplegic Shoulder Using Ultrasound*S. Yun¹, K. J. Lee¹¹Presbyterian Medical Center, Jeonju, KR

Introduction: To compare the capsular thickening at the rotator cuff interval between affected and unaffected shoulder in patients with adhesive capsulitis (AC) and spastic hemiplegic shoulder (HS) using ultrasound. **Methods:** 16 patients with AC and 18 patients with HS having less than poor grade of shoulder muscle power and more than grade 1 of modified Ashworth scale (MAS) at the affected upper limb and more than 1 month duration after stroke were enrolled. The thickness of the rotator cuff interval (RCI) was measured on RCI of the both shoulder of all enrolled patients using ultrasound and independent *t*-test was used to evaluate the statistical significance. **Results:** Mean age was 54 years in AC and 69 years in HS. Shoulder passive external rotation (ER) and glenohumeral abduction (ABD) range of motion of the affected side were 30.94±8.80 and 58.44±9.10 in AC and 29.72±16.49 and 58.33±11.25 in HS. The thickness of capsule at the RCI was markedly increased on affected side in AC (2.06±0.36 mm vs 1.33±0.36 mm) ($P<0.05$, independent *t*-test), but that was no significant difference between both sides in HS (1.36±0.40 mm vs 1.25±0.40 mm) ($P=0.41$, independent *t*-test). **Conclusions:** (1) Capsular thickening can be a main cause of limitation of range of motion (LOM) of the shoulder in AC. (2) ROM of the shoulder was not related to the capsular thickening in HS. (3) Ultrasound can be useful to evaluate the capsular thickening at the RCI.

PA093

Lumbar Facets Arthrosis - Minimal Invasive Procedures - Fluoroscopy Guided Injection

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Case Diagnosis: Male patient, 48 years. History of low back pain left with 2 years of evolution. X-ray revealed lumbar facets arthrosis essentially the L2-L3. **Case Description:** His pain was 80% in the scale The Back Pain Index Score and Oswestry scale The Score Low back pain. Initially treated with 1,000 mg Paracetamol and NSAIDs (oral and topical), the pain never came down from 60% in the respective scales. Interfacets injection guided by fluoroscopy the roots L2-L3 with 14 mg/ml Betamethasone 2 + 2 + 4 cc of lidocaine cc of ropivacaine was performed. Pain at the end of a week was 16% on the scale The Back Pain Index Score and 18% on the scale The Back Pain Index Score. **Discussion:** In the case of a young active patient and a low back facet of nature can undermine social and work life. When conservative treatment fails or is not as effective as desired, we must think in minimally invasive image-guided techniques as an alternative. In this case, the steroid-anesthetic injection guided by fluoroscopy proved quite effective, significantly improving their quality of life, reflected in the scale The Back Pain Index Score and scale The Oswestry Low Back Pain Score. **Conclusions:** The Low back pain nature of facet can be very limiting in any patient. When it comes from a facet arthrosis visible in imaging and resistant to conservative treatment, minimally invasive image-guided techniques, including Fluoroscopy, should be considered as a treatment.

PA094

Melatonin, a Protective Factor in Osteoporosis

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Background: Melatonin is the major secretory product of the pineal gland. The main function of melatonin is to control the sleep-wake mechanism and the circadian rhythm. Melatonin may affect bone metabolism through bone anabolic as well as antiresorptive effects. An age-related decrease in peak melatonin levels at nighttime is well documented, which may increase bone resorption and bone loss in the elderly. In vitro, melatonin reduces oxidative stress on bone cells by acting as an antioxidant. Furthermore, melatonin improves bone formation by promoting differentiation of human mesenchymal stem cell into the osteoblastic cell lineage. The three principal mechanisms of melatonin effects on bone function could be: the promotion of the osteoblast differentiation and activity; an increase in the osteoprotegerin expression by osteoblasts, thereby preventing the differentiation of osteoclasts; scavenging of free radicals generated by osteoclast activity and responsible for bone resorption. **Material and Methods:** This study proposes to identify bone effects of melatonin and of melatonin administered in association with estrogen in female rats with surgically induced menopause. Research will be conducted on a total of 40 white female Wistar rats. Animals will be kept in standardised hygiene vivarium conditions: 22±1°C temperature, standardised food and 'ad libitum' water, with a 12-hours light-dark cycle. These animals will be exposed to bilateral surgical ovariectomy through abdominal approach. 14 days following ovariectomy, we introduce an estrogenic substitutive drug treatment (estrogenic monotherapy) and a combined treatment with estrogen and melatonin; this period of time is necessary for the postoperative validation of ovarian failure, with the experimental induction of artificial menopause in the animals included in the study. The duration of the treatment with the products and dosage recommended for veterinarian use is of 12 consecutive weeks. We will determine the plasmatic level of osteocalcin by the sandwich ELISA technique, using the osteocalcin-2/NGAL Immunoassay DLN20 kit, R&D Systems USA. **Results:** Melatonin at pharmacological doses in ovariectomized rats increased in a dose-dependent manner the serum osteocalcin concentration (marker for bone formation), without toxic side effects (statistical significance threshold $\alpha=0.05$). **Conclusion:** This hormone may play an essential role in regulating bone growth. **Keyword:** melatonin, osteoporosis, osteocalcin.

PA095

Botulinum Toxin A Application in Child with Legg Calve Perthes: a Case Report

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Location: Toluca México. Patient: 8 year old boy with Legg Calve Perthes (LCP) disease X-rays were Catterall III on left hip 3 months of diagnosis. **Case Description:** A total dosage of 50 IU of botulinum toxin A (BTA) was injected on a patient with LCP disease, 20 IU in motor point of the left rectus femoris and 30 IU in left adductor longus and brevis; with the immediate **Purpose:** optimize range of motion and for contain femoral head in the acetabulum and maximize a spherical shape of it, for good joint congruency. We evaluated pain using Oucher Pain Scale, lower extremity (LE) passive range of motion (PROM) and active range of motion (AROM), lower extremity strength, gait characteristics, and balance (Pediatric Balance Scale) before (ITA) application, and 4 and 8 weeks later in accordance with evidence-based care guideline for management of LCP disease. Additional support with twenty physical therapy sessions where carry out. Classification Instrument in Perthes (CLIPer) was used to evaluate the treatment. **Results:** Initial CLIPer before BTA was: severe involvement (16 points), at week 4: mild involvement (2 points), and finally at week 8: mild involvement (0 points). The Patient progressed from ambulation with crutches, to achieve independent walking with reciprocal pattern on stairs. **Discussion:** We decided to apply BTA to weak selected muscles in order to: facilitate physical therapy, improve the containment of the hip, restore muscular balance, re-

gain hip motion, and relieve pressure on the affected hip. *Conclusions:* The application of BTA is a promising, effective, safe, and low cost alternative in LCP rehabilitation treatment.

PA096

Coexistence of Altered Corticospinal Excitability and Neuromuscular Performance of the Scapula in Individuals with Shoulder Impingement Syndrome

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Background: Overarm athletes are susceptible to shoulder impingement syndrome. However, the central control mechanism for these changes is still unknown. Therefore, we designed the protocol to examine the corticospinal control characteristics and the kinematics and muscle performance of the scapula in overarm athletes with shoulder impingement syndrome. *Material and Methods:* We recruited 12 shoulder impinged athletes and 12 controls to compare the cortical excitability of the scapular muscles (serratus anterior and upper and lower trapezius), and the scapular kinematics and muscle performance during arm elevation. Kinematic data were collected using an electromagnetic tracking system, LibertyTM, while muscle activation was recorded using TeleMyo 2400 G2 Telemetry Electromyography System. Transcranial magnetic stimulation (MagStim 200 stimulator, MagStim Company, UK) was used to examine the corticospinal excitability (motor threshold and evoked potentials, and mapping area) of the serratus anterior and trapezius muscles. *Results:* The results showed that the active motor threshold (AMT) for the serratus anterior was significantly higher in patients with shoulder impingement ($p=0.045$), and the mapping area of the lower trapezius was significantly larger in control subjects ($p=0.04$). In addition, the scapula significantly increased posterior tilt during the course of arm elevation. *Conclusion:* Altered corticospinal excitability co-existed with deficits in scapular kinematics, and muscle performance. Researchers and clinicians should take this into consideration when assessing and treating overarm athletes with shoulder impingement. *Acknowledgement:* This study was funded by the National Science Council, Taiwan (NSC 102-2314-B-010-054).

PA097

Effect of Extracorporeal Shock Wave Therapy in Greater Trochanteric Pain Syndrome Confirmed by MRI

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Introduction: Greater trochanteric pain syndrome (GTPS) is a clinical condition characterized by chronic buttock and thigh pain with tenderness located at or around the greater trochanter. MRI has become the imaging study of choice in GTPS and can provide accurate detail of gluteal tendinopathy, such as peritendinitis, tendinosis, calcification and tears. Primary management is standard conservative treatment. In refractory case, however, extracorporeal shock wave therapy (ESWT) could be a treatment option as it has been found to be effective for other chronic refractory musculo-skeletal conditions. The aim of this study was to investigate the effect of ESWT in GTPS confirmed by MRI. *Material and Methods:* Twenty-three patients who underwent ESWT with clinical diagnosis of GTPS and MRI findings of gluteal tendinopathy were enrolled in our study. Inclusion criteria were as follows: (1) symptom >6 months, (2) failure of standard conservative treatments (3) poor or acceptable grade in the Roles-Maudsley score (RMS). RMS is a subjective 4-point (excellent, good, acceptable and poor) patient assessment of pain and limitation of activity. Exclusion criteria included previous steroid injection, surgery of hip joint, rheumatic disease, hip joint abnormalities on imaging studies, and neurologic abnormalities. ESWT (0.10 – 0.14 mJ/mm², 300 – 800 shocks) was given once a week for 1 to 11 times, according to patient's response. Numeric rating scale (NRS) and RMS

were evaluated before ESWT, at short-term follow-up (mean 10 days after all ESWT sessions) and long-term telephone follow-up (at least 6 months after last ESWT session). We calculated the success rate of ESWT at short-term and long-term follow-up, respectively. "Good" and "Excellent" grade in RMS was considered as treatment success. *Results:* A total of 17 patients were included in this study. Two were not available for telephone interview. Three underwent steroid injection during or after ESWT and regarded as treatment failure. NRS score were significantly decreased at short-term follow-up and long-term follow-up after ESWT ($p<0.05$). The success rate was 70.6% (short-term follow-up) and 66.7% (long-term follow-up). *Conclusion:* If other causes of buttock and lower extremity pain are ruled out, low-energy ESWT could be a effective treatment option for patients with chronic intractable GTPS.

PA098

Comparison between Corticosteroid and Two Different Ways of Botulinum Toxin Injection in the Treatment of Tennis Elbow

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Introduction/Background: Tennis elbow is a common painful disorder. Previous studies on the effectiveness of botulinum toxin for tennis elbow showed inconsistent results. Our aim was to compare two different ways of botulinum toxin type A injection with corticosteroid injection in treating tennis elbow. *Material and Methods:* We recruited 26 affected elbows of 19 patients in this prospective, randomized, double-blind, drug-controlled trial. They were randomly assigned to three groups: 1. steroid group with triamcinolone acetonide 40 mg, 2. epicondyle group with botulinum toxin type A (Botox, 20 U) into lateral epicondyle of elbow, 3. tender point group with Botox 20 U into tender point of extensors of wrist or fingers. Outcome measures were done before and at 4, 8, 12 and 16 weeks after the treatment. We introduced the visual analogue scale (VAS), dynamometer, the Patient-rated Tennis Elbow Evaluation (PRTEE), and the Disabilities of the Arm Shoulder and Hand (DASH) to assess the perception of pain, maximal grip strength, and function, respectively. *Results:* The three groups had similar duration of disease, pain scores, grip force and upper limbs function before the treatment. At 4 weeks after injection, steroid group had significant change than tender point group in VAS (-41.6±25.4 vs -12.4±14.5, $p=0.041$), grip strength (4.1±5.9 kg vs -2.7±5.6 kg, $p=0.044$), improvement in PRTEE (-27.6±21.7 vs -5.1±10.1, $p=0.033$) and DASH (-19.9±12.0 vs 4.2±7.7, $p=0.003$). The between-group differences in pain, grip power and function did not last to the 8, 12 and 16 weeks follow-up. There was no statistically significant difference between steroid and epicondyle groups. *Conclusion:* Injection with botulinum toxin type A and corticosteroid are effective in reduction of pain and in improvement of function in patients with tennis elbow for at least 16 weeks. The onset of pain-relieving was faster in corticosteroid group as compared to the tender point group. Botox 20 U injection had analgesic effect without paralyzing the muscles. The weakness caused by botulinum toxin injection is unlikely to be the sole mechanism of the pain reduction and the response might be influenced by the injection locations.

PA099

Effect of Ossification of Ligamenta Flava (OLF) Patients on the Ability to Restore Life by Spinal Rotation Rehabilitation Therapy

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Objective: We introduce Spinal Rotation Rehabilitation Therapy (SRRT)-the ingenuity and vitodynamics principles of Modified

traditional Chinese shadowboxing, which is a traditional Chinese bodybuilding movement into the treatment convalescent care of Ossification of Ligamenta Flava (OLF) patients in the base of applying modern rehabilitation technology, carry out refinement and we summarized a method of rehabilitation training with Chinese traditional character. This study majors in description of SRRT rehabilitation treatment and its effect on WSI rehabilitative treatment. *Methods:* 60 OLF patients were randomly divided into two sets. One set with 30 patients which is called SRRT set applied with SRRT rehabilitation treatment and the other set with 30 patients which is called movement group introduced movement therapy. After average 2 months' rehabilitative training, we contrast motor function, sensory function and activity of daily living in the two sets. Applying the marking standard of ADL, Modified Barthel index, and make statistic analysis with evaluated consequence. *Results:* 1) The patients' score of ADL index in SRRT set is obviously higher than that of motor index in movement group ($P < 0.05$). 2) The Modified Barthel index in SRRT set is obviously higher than that of movement group ($P < 0.01$). *Conclusion:* SRRT method is an effective rehabilitation method can significantly improve the patient's motor function and daily living. *Keyword:* Spinal Rotation Rehabilitation Therapy; OLF; Rehabilitation.

PA100

Neuromuscular System Effect on Hands Due to Gadgets Use

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Injuries have been reported associated with new technologies, such as Black Berry thumb, text message tendonitis "WhatsAppitis". Portable handheld devices, called gadgets (gds) are increasingly used such as small computers with keyboards. What is the effect on neuromuscular system using gds?. *Objective:* To determine if the use of gds in adults has any effect on the neuromuscular system of hand. *Methods:* Cross-sectional study. Universe: 102 hands (age 18-40 years). Predictor: years of using gds; hours of use per day of gds; number of posts per day; number of calls per day, each with 4 answer choices by assigning an ordinal value 0 - 3 (score range 0 - 12, ≥ 6 considered frequent user) and outcome variable: flick sign, palpitation of the pad, switch hands, paresthesias, symptomatic with 2 present or 1 always (daily). A medical examination: pain in thumb, Durkan, Finkelstein, abductor pollicis brevis strength, alteration with 2 on 1 hand; sensory and motor nerve conduction was performed, abnormal represents a significant difference between side. Divided into 2 groups: sintomatic and asintomatic and subdivided in to subgroups, Common user group gds and frequent user group gds, was analyzed with Chi-square test (χ^2); confidence interval at 95% for the combination of variables between symptomatic gds users. *Results:* Universe 65% women, 35% men, 57% reported symptoms of hand exploration, left hand predominate 33.3% vs 23.5% right, 37.2% of the total of nerve conduction were abnormal; 20.5% median nerve, ulnar 8.8%, 7.8% Radial. The risk estimates in symptomatic vs asymptomatic participants is 0.772, is within the confidence interval (0.213-2.797). χ^2 value in the group of regular users vs infrequent users both symptomatic value χ^2 : calls day χ^2 0.587, messaging day χ^2 0.156, hours of use day χ^2 0.875, while in years of using gds χ^2 0.156, which indicates that the variables are independent and that there is no statistically significant relationship. *Conclusions:* Adaptation pattern is observed with the use of gds effect on neuromuscular system in hand during skill acquisition. However frequent use of gds does not act as a risk factor for symptoms and/or clinical changes on the hand.

PA101

Ultrasound Guided Hydrodistension for Adhesive Capsulitis – a Randomized Controlled Trial on a Group of

Patients in Romania

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Introduction/Background: Adhesive capsulitis, also known as frozen shoulder, is a condition characterized by pain and reduced active range of motion (AROM) and passive range of motion (PROM) in the affected shoulder, as well as by capsular contraction. The objective of the study is to demonstrate the efficiency of ultrasound guided hydrodistension in the treatment of adhesive capsulitis. *Materials and Methods:* The study was held from February to October 2014 and included 36 patients from the Clinic IV of the National Institute of Physical Medicine and Rehabilitation, Bucharest, Romania, that were diagnosed with unilateral adhesive capsulitis. They were divided into two groups: the patients in the first group (n=18) were injected with cortisone, local anaesthetic and normal saline in the glenohumeral joint in the affected shoulder under ultrasound (US) guidance and underwent physiotherapeutic procedures according to our protocol and the patients in the second group (n=18) underwent only the physiotherapeutic procedures. Beside the fact that the patients in the first group have had ultrasound guided hydrodistension in the affected shoulder, they all followed the same supervised physical therapy protocol. The patients were evaluated using the Shoulder Pain and Disability Index (SPADI) before the procedure, two weeks and 3 months after. *Results:* Two weeks after the injection 17/18 patients that had ultrasound guided GH joint hydrodistension showed an increased PROM, as well as an increased AROM: 1 patient had <50% improvement in his SPADI score, 5 patients had 50-60% improvement, 6 patients had 60-70% improvement and 6 patients had more than 70% improvement in their SPADI score. In the second group, 2 patients had <50% improvement in their SPADI score, 8 patients had 50-60% improvement, 5 patients had 60-70% improvement and 3 patients had more than 70% improvement in their SPADI score. These differences were maintained at the 3 months check-up. *Conclusion:* We found that US guided GH joint hydrodistension is very effective in the treatment of adhesive capsulitis. Taking into consideration its swift effects on reducing the pain and improving the ROM, it should be included as a complementary procedure to the standard physiotherapeutic protocol.

PA102

Measurement Reliability and Function of Pelvic Floor Muscle with a Diagnostic Ultrasonic Imaging Device

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Introduction: Urinary incontinence (UI) is known to adversely impact the quality of life of affected women. We examined of the PFMs with a diagnostic ultrasonic imaging device and measured various muscle parameters during different motion tasks to determine the contribution and function of PFM exercises. The purpose of this study was examined the measurement reliability of the amount of motion of pelvic floor elevation and measured various muscle parameters during different motion tasks to determine the contribution and function of PFM exercises with diagnostic ultrasonic imaging device. *Material and Methods:* Subjects were 45 elderly women who participated in the preventive care seminar that did not have UI. The pelvic floor elevation was measured with a diagnostic ultrasonic imaging device. Measurements were evaluated during (1) rest, (2) maximal contraction of the transverse abdominis (TrA), (3) maximal contraction of the PFMs, (4) maximal co-contraction of the TrA and lumbar multifidus, and (5) maximal co-contraction of the TrA and PFM with knee resistance. The interclass correlation coefficient was calculated to determine the measurement reliability. One-way repeated measures analysis of variance was performed

to compare the muscle parameters during the motion tasks. A significance level of 0.05 was used for all measurements. The study protocol and purpose were explained to all subjects, and written informed consent was obtained. The study was conducted in accordance with the Helsinki Declaration. **Results:** The interclass correlation coefficient (1, 1) of each measurement was >0.98 for the PFMs. The pelvic floor elevation was significantly higher with the (4) and (5) ($p < 0.05$). **Conclusion:** The measurement reliability for PFMs during each motion task was >0.98, indicating a high level of credibility. These results suggest that indirect assessment of the PFMs is possible by examination of the inner unit. Additionally, contraction of a single muscle of the inner unit resulted in simultaneous contraction of the other muscles comprising the unit, and higher muscle activity was obtained by adding resistance. While conventional UI exercises contraction of the PFMs only, a greater training effect is expected by coordinated contraction of the inner unit. This work was supported by Japan Society for the Promotion of Science KAKENHI Grant Numbers 26870537.

PA103

The Effect of Platelet-Rich Plasma Injection in Plantar Fat Pad Atrophy: a Case Report

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Introduction: Fat pad atrophy refers to the breakdown or thinning of the protective cushioning fat pad that sits under the heads of the metatarsal bones and heels. This is commonly seen in elderly people and can cause significant pain while walking. We present a case of plantar fat pad atrophy treatment with platelet-rich plasma (PRP) injection. **Case Report:** An 82-year-old man presented to our outpatient clinic with a history of left plantar pain for the last 7 months. He had a history of stepping strongly on a hard wooden board with his left foot 7 months previous, at which time the pain started. He had received treatment at a local hospital prior to our visit but did not experience significant improvement. The x-ray revealed no structural deformities, arthritis, or stress fractures. An ultrasonography examination showed that the left foot had a prominently decreased plantar fat pad thickness of 1.12/0.45 cm (neutral/compressed) compared to 1.32/0.66 cm (neutral/compressed) of the right foot. To relieve the patient's pain, we decided to inject PRP in the area of atrophied fat pad. PRP was injected 4 times at near-monthly intervals. The patient initially complained of intense left sole pain (Visual Analog Scale [VAS] 7) but progressively improved and eventually reached a nearly symptom-free state (VAS 2). The patient was able to ambulate without plantar pain in daily life. In follow-up examination, the fat pad thickness progressively improved after 1 and 2 months and measurements were 1.24/0.64 cm and 1.28/0.66 cm, respectively. However, after 3 months, we were able to find the thickness slightly decreased to 1.15/0.62 cm, but after the 4th PRP injection the thickness recovered to 1.30/0.68 cm. **Conclusion:** Fat pad atrophy was treated successfully with PRP injection as evidenced by improved pain and recovery of the plantar fat pad. To the best of our knowledge, this is the first case report of successfully treating plantar fat pad atrophy using a PRP injection. We believe our findings can support the use of PRP injection treatment for plantar fat pad atrophy and other soft-tissue regeneration treatments.

PA104

Pregnancy and Lactation-Associated Osteoporosis Presenting Severe Vertebral Fracture Combined with Post-Partum Subclinical Hypothyroidism Treated with L-Thyroxine

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Pregnancy and lactation-associated osteoporosis is rare disorder which occurs in late pregnancy or early post-partum period lead-

ing to fragility fractures, most commonly in the vertebral bodies. And post-partum thyroid dysfunction is found in 5-10% of women within one year after delivery. Post-partum hypothyroidism is often treated with L-thyroxine supplementation therapy. There has been several studies that treatment with L-thyroxine increases bone turnover and leads to bone mass loss. So we observed clinical course of the patient who have pregnancy and lactation-associated osteoporosis, treated with L-thyroxine due to post-partum subclinical hypothyroidism. In conclusion, there has been no deteriorating effect of L-thyroxine therapy in pregnancy and lactation-associated osteoporosis.

PA105

Ultrasound Anatomy of the Phrenic Nerve in the Cervical Portion: Which Position Is More Safe in the Ultrasound Guided Intervention?

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Purpose: Stellate ganglion block (SGB) has been used for the diagnosis and treatment of sympathetic-induced upper extremity pain. Concomitant phrenic nerve block can occur during SGB. The objective of this study is to evaluate the risk of phrenic nerve injury in ultrasound guided SGB by investigating the sonoanatomy of the phrenic nerve in the cervical region. In addition, to establish a safe procedure posture, we have examined the variations of the phrenic nerve according to the position. **Methods:** A total of 27 healthy volunteers were recruited, including 19 males and 8 females (mean age 49.0±18.7, BMI 23.0±2.3). The volunteers were performed ultrasound in 2 postures; supine position with neck extension and lateral rotation, and lateral decubitus position. The transducer was placed at the anterior tubercle of C6 level with a short-axis view, and the phrenic nerve was identified. We measured the distance from skin, and distance between the phrenic nerve and anterior tubercle of the transverse process. We also measured the angle which is formed by anterior tubercle (A), posterior tubercle (B) and phrenic nerve (C) (<BAC). **Results:** The phrenic nerve was identified in the intermuscular fascia layer between the anterior scalene muscle and sternocleidomastoid muscle. The mean CSA of phrenic nerve was 0.7±0.3 mm². The distance between the phrenic nerve and anterior tubercle with the supine position was 10.7±2.8 mm and 9.3±2.8 mm with the lateral decubitus position, respectively. The angle with the supine position was 47.9±18.4° and 59.5±20.9° with the lateral decubitus position. There was statistically significant difference in both distance and angle. **Conclusion:** Ultrasound may improve safety by identifying the phrenic nerve. And Lateral decubitus position seems to be more safe because the angle was larger than in the supine position.

PA106

Rehabilitation of a Patient with Adult-Onset Still's Disease: a Case Study

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Case Diagnosis: Adult-onset Still's disease. **Case Description:** An 80-year-old woman who lived independently prior to hospitalization developed adult-onset Still's disease in July 2013. She was admitted to our hospital in July 2013, and was administered steroids until November 2013. She underwent physical therapy from August to November 2013. The rehabilitation program primarily included standing motion practice and muscle strengthening exercise, and the patient could stand within 10 days. However, her strength did not improve until the steroid dose was lowered to below 40 mg/day. At the time of discharge, her muscle strength improved and she could walk unaided. In May 2014, she experienced a relapse of adult-onset Still's disease. From May to July 2014, she was admitted to our hospital once more and underwent physical therapy until

she was discharged. The rehabilitation program primarily included stretching and aerobic exercises. We noted that her muscle strength decreased when a steroid dose of ≥ 60 mg/day was given, but improved when a steroid dose of ≤ 40 mg/day was given. *Discussion:* Steroid myopathy is a side effect that is often encountered when treating collagen diseases. The pathogenesis of steroid myopathy reportedly includes a decrease in muscle function and atrophy. In the present case, the patient exhibited the failure to stand due to impaired muscle function, which improved following standing motion practice. Moreover, muscle recovery was observed 1–4 months after reduction in the steroid dose to 10–30 mg/day. Thus, muscle weakness was observed, which was associated with the steroid dose. *Conclusion:* The steroid dose should be maintained under below 40 mg/day, and active muscle strengthening exercises should be performed. Such cases often receive large doses of steroids in our hospital, as in the present case. Hence, physical therapy should be considered to prevent a decrease in muscle function, muscle mass, muscle strength, and activities of daily living due to steroid use. I shall assess the steroid dose, as well as changes in muscle function, muscle mass, and muscle strength in several patients.

PA107

Investigation of Mechanical Motion Pattern in Patients Afflicted with Knee Osteoarthritis

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Introduction: The onset of knee osteoarthritis (OA) is accompanied with changes in the kinematic of motion. The load is transmitted to parts of knee which are not ready to tolerate it. One method to investigate knee OA is using prostheses with some sensors installed on it to measure force. In this study we investigated the knee joint resultant forces and moments for healthy, mild OA and severe OA subjects. *Materials and Method:* In this study, 26 women were studied. 23 have not gone through menopause and the knee orientation in all the participants were varus or neutral. All were between 36 and 53 years old. After referring to a specialist, their height and weight were measured and they filled a WOMAC questionnaire. Another part of data collection is related to the kinematic and synthetic data. Data was analyzed using SPSS 20. P value less than 0.05 was considered as statistically significant. *Results:* Separate analyses conducted on healthy and patient subjects indicated that for knee adduction torque in healthy people, there are two different and distinct peaks, while this tends to reduce in other groups with the severity of the disease. The gait cycles for these two groups are distinctly different in shape and magnitude with regard to their knee flexion torque. *Conclusion:* There were no significant differences between three groups regarding their pace and BMI. Patients with mild and moderate OA employ different methods to delay the onset and slow the progression of osteoarthritis of knee joint. Considering these results, it is possible to say that our findings are closely associated with level of osteoarthritis. *Keyword:* Mechanical motion, Patients, Knee, Osteoarthritis.

PA108

Effects of Low Level Laser Therapy in Knee Osteoarthritis

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Degenerative rheumatic diseases are the most common chronic diseases, affecting over 50% of persons older than 60 years,

while knee osteoarthritis (OA) is one of the most common localisation. The aim of this study was to evaluate the effect Low Level Laser Therapy (LLLT) for treatment of knee OA. Thirty patients with X-ray and clinical evidence of knee OA, randomly divided into two groups: experimental (EG) and control group (CG) were treated. EG was composed of 15 patients, mean age 62 years, of which 8 had unilateral and 7 bilateral changes in the knees. CG was composed of 15 patients, mean age 60 years, of whom 10 had unilateral and 5 bilateral changes in the knees. The patients in the EG were treated with a GalAIA diode laser device with a wavelength of 780 nm, the average power 30 mW in continuous mode, 1 cm diameter laser probe with contact method at 5 points perpendicularly on the skin, with energy dose 4J per point was applied. The patients in the control group were treated with placebo (sham laser). A total of 15 therapies were carried out once a day (Monday-Friday), for a period of 3 weeks. Visual analogue scale (VAS) (0-condition without symptoms, 100 problems at the upper limit of tolerance), and the knee joint range of motion was evaluated at the beginning and after 1, 2 and 3 week of therapy. Results of our research show that after 1 week of therapy in either group there was no statistically significant change in the intensity of pain or the range of movement of the knee joint. Statistically significant improvement, ie reduction of pain and increase in range of motion in the knee joint was determined in both groups after 2 and 3 weeks of therapy. There was a statistically significant difference in the degree of reduction of pain in patients treated with LLLT in comparison to the control group. From the presented results we can conclude that LLLT helps reduce subjective discomfort and improve mobility of the knee joint in patients with knee OA.

PA109

The Effect of Early Initiation of Rehabilitation Treatment after Total Knee Arthroplasty

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Introduction/Background: Total knee arthroplasty (TKA) provides demonstrable pain relief, functional recovery and improved quality of life. Recently, some studies have reported early starting of rehabilitation after surgery might reduce hospital stay, and increase joint range of motion and muscle strength, and which is considered important for gaining the maximum benefit from TKA. However, there have been few studies starting at very early stage (within 4 hours after surgery). Therefore, the purpose of this study was to clarify the effect of early initiation of rehabilitation within 4 hours after TKA. *Methods:* Patients undergoing primary TKA for osteoarthritis were randomly assigned to experimental (n=33, 74.4±8.3 years old) and control (n=31 72.7±7.2 years old) groups. Rehabilitation was started within 4 hours after surgery in the experimental group and about 48 hours after surgery in the control group. Measurement variables included joint range of motion of extension and flexion at every just prior to rehabilitation sessions, and muscle strength (60 degree/sec isokinetic maximum contraction force), pain (numerical rating scale; NRS), Knee Society Score (KSS), and gait at discharge. The study was approved by the local Ethics Committee. *Results:* There were no significant differences between groups in hospital stay (experimental group was 20.6±3.9 days, control group was 21.5±4.7 days), NRS of pain, muscle strength of quadriceps and hamstrings, and KSS objective score at discharge. In comparison with the controls, range of motion in flexion and extension at discharge was greater in the experimental group. Postoperative flexion contracture in the experimental group was improved earlier than control group. *Conclusion:* This study suggested that initiation of rehabilitation within 4 hours after total knee arthroplasty might help to improve range of motion of knee.

PA110

Surgical Corrections for Spastic Equinovarus Deformities and Postoperative Problems

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Introduction: Anterior or posterior tibial tendon transfer with elongation of the Achilles tendon is effective for spastic equinovarus deformities, but postoperative calcaneovalgus and hammer toe deformities can sometimes occur. The present study examined postoperative problems and differentiated the proper surgical procedures for spastic equinovarus deformities. **Material and Methods:** We studied 12 feet of 10 patients with severe equinovarus deformities, due to stroke or brain injury, that were corrected surgically. Four patients had severe gait disturbance, and 6 patients were unable to walk. The Achilles tendon was elongated after Z plasty (n=6) or fractional tendinous elongation (n=6). Tendon transfers were performed using the anterior (n=5) or posterior (n=7) tibial tendon. Flexor tenotomies or elongations were also performed using FHL, FDL, or FDB for 8 feet with hammer toes. We examined the postoperative results and problems for a period ranging from 2 to 10 years. **Results:** Five patients achieved independent gait using a brace, cane or walker, and four patients achieved an assisted gait. One patient, who was unable to walk, achieved easier transfer. Calcaneovalgus deformities occurred in 4 patients using a combination of Achilles tendon Z plasty and posterior tibial tendon transfer, and required reoperation. Of the 8 feet that underwent flexor elongations for hammer toe, 5 required additional flexor tenotomies. **Conclusion:** Although elongation of the Achilles tendon following Z plasty is appropriate, the procedure often causes overcorrection of the calcaneovalgus when the transferred posterior tibial tendon works too strongly. In contrast, overcorrection does not seem to occur when fractional tendinous elongation and anterior tibial tendon transfer are combined. When flexor elongations for hammer toe are performed during the first surgery, multiple subsequent operations are often required. Therefore, when the potential for hammer toes is suspected, surgeons should consider performing flexor tenotomies during the first surgery. **Reference:** Walter R, Perry J, Garland D.: Surgical correction of gait abnormalities following stroke. Clin. Orthop 1978; 131: 54-63.

PA111

Education and Related Support from Medical Specialists for Japanese Patients with Achondroplasia/Hypochondroplasia and Osteogenesis Imperfecta

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Background: Achondroplasia and osteogenesis imperfecta (OI) are most common forms of skeletal dysplasias. Achondroplasia and hypochondroplasia (A/HCH) manifest short-limbed short stature, leg deformity, spinal deformity, and spinal canal stenosis. Patients with OI are characterized by fragile bones, limb deformity, spinal shortening/deformity, and hearing loss. Severity and progression of symptoms differ even among individuals with the same diagnosis. Though necessary support in education is presumed to differ among patients with different disorders, few articles report on education in patients with skeletal dysplasias. **Objective:** To clarify what types of schools children with A/HCH and OI attend, what kind of support they needed at schools, and how the advice on such support was conveyed from medical specialists to schools. **Methods:** Questionnaire study was performed on patients age six years or older with A/HCH and OI in Japan. This study was approved by the ethics committee of our institution. **Results:** In A/HCH childhood locomotion ability was high and most patients had received general education, irrespective of their generation. Children with OI showed a lower level of locomotion ability; only about half of them had received general education. In selecting schools, the patients received advice from pediatricians, physiatrists, and or-

thopedic surgeons. The degree of necessity and content of support at the schools differed between A/HCH and OI. Remodeling of the lavatory, washbasin, and chair and support during swimming lessons were common in A/HCH patients. Support in school for OI patients was more frequent and included propelling wheelchairs, assisting in the use of the bathroom, and remodeling the lavatory. Most children were restricted from participating in physical education classes. **Conclusions:** Locomotion ability and the necessary support at school differed between A/HCH and OI. Support and advice from medical specialists who recognize disability of patients with skeletal dysplasias may improve patients' participation and education in schools. **Reference:** Haga N, Kosaki K, Takikawa K, Tanaka H, Okada K, Nakahara Y, Ogata N: Education and related support from medical specialists for Japanese patients with major skeletal dysplasias. Disabil Health J 6: 399-404, 2013.

PA112

Effect of Breast Cancer Surgery on Pectoralis Muscle Tightness and Shoulder Range of Motion

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Objectives: This study is to verify effect of breast cancer operation on pectoralis tightness and shoulder range of motion. **Introduction:** After the breast cancer surgery, upper limb dysfunction (ULD) is commonly observed. The recent study reported common musculo-skeletal disorder after breast surgery within 1 year was due to pectoralis tightness. However, an absence of objective findings concerning pectoralis tightness of survivors of breast cancer operating surgery was not suggested. **Methods:** We evaluate pectoralis muscle tightness using pectoralis minor length before surgery and about 1-week after surgery. Pectoralis minor length was measured using two methods. One is length from coracoid process to anterior inferior edge of the 4th rib 1 finger apart from lateral to the sternum and the other is linear distance from the table to the posterior acromion when patient is supine posture. Shoulder range of motion was measured before and surgery and 1 week after surgery. **Results:** Fifty patients were included for this study. Mean age of patients was 53.3±10.7, and average BMI is 23.97±4.27. Eight patients underwent mastectomy and 42 patients underwent breast conserving surgery. Twenty-two patients underwent axillary lymphadenectomy and 28 patients sentinel lymph node biopsy. Preoperative and postoperative pectoralis minor length measured from coracoid process to 4th rib is 15.04±1.54 and 15.17±1.47, respectively. There is no statistically significant difference between preoperative and postoperative status. Using the other method, the distance from the table to the posterior acromion is 4.96±1.32 and 5.52±1.22, respectively. There is statistically significant length difference between pre-operative and post-operative status (p=0.005). By the operation method, significant difference was not existed in pectoralis minor length. Full range of motion of shoulder was not significant difference between preoperative and postoperative status. However, statistically significant decrease was observed in shoulder flexion (pre-operation: 179.70, post-operation: 174.30, p=0.05) **Conclusion:** Breast cancer operation caused decreased pectoralis minor length and caused pectoralis muscle tightness. Also, limitation of shoulder range of motion was observed in shoulder flexion motion after breast cancer surgery.

PA113

Acute Rehabilitation in Patients with Humerus Fracture Followed by Radial Nerve Palsy

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Introduction: Humerus fracture are followed by radial nerve palsy in 2–12%. Radial nerve palsy in the arm most commonly is caused

by fracture of the humerus, especially in the middle third or at the junction of the middle and distal thirds. This palsy may occur actually at the time of the injury, secondary to fracture manipulation, or from a healing callus. *Aim:* The aim of study is to show the results of early rehabilitation in patients with humerus fracture followed by radial nerve palsy. *Materials and Methods:* In this prospective study we have followed 30 patients who were treated nonoperatively. All patients we performed the methods of acute rehabilitation. We recorded the time of recovery, degree of muscle recovery and intensity of pain. The results were evaluated by descriptive measures. *Results:* Fracture are caused in 18 patient by falling from the own high, in 8 patients in traffic accident and in 4 patients by direct force in the humerus region. We recorded the first sign of recovery after 7–8 weeks by all patients. After four months, 23 patients came to full recovery of radial nerve. By 5 patients we didn't achieved a full recovery. *Conclusion:* By humerus fracture with radial nerve damage we strongly suggest to start with early rehabilitation methods, which means correct position of the arm, passive and active exercises and electrotherapy. If nerve function does not return in 3–4 months then nerve should be surgically explored.

PA114

Correlation between Joint Reaction Force and Gait Speed in Osteoarthritis of the Knee

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Introduction/Background: Osteoarthritis of the knee (KOA) is a degenerative joint disease that is strongly linked to aging. It is therefore important to prevent it in Japan. Studies that have compared the external knee adduction moment (KAM) during the gait cycle in KOA patients versus normal subjects showed that increased KAM is highly associated with KOA development. The joint reaction force (JRF), a mechanical stress in the knee joint, reflects muscle tension around the joint. JRFs consist of anterior share force, side share force, and compression force. Although we previously clarified JFR and its relation to joint moments and the femoral tibia angle by analyzing JRFs in KOA patients, the correlation between gait speed and JRF is still unclear. The aim of the present study was to obtain information about the correlation between gait speed outcomes and JRFs. *Material and Methods:* Ten women with KOA ($n=9$, mean±SD age 73±5.1 years) were recruited from the local community. They were assessed during comfortable walking using a three-dimensional motion analysis system (Vicon Nexus; Oxford Metrics, London, UK) with eight cameras operating at a sampling rate of 100 Hz. Fourteen 140-mm infrared retroreflective markers were attached to anatomical locations (plug-in-gait model). The ground reaction force was captured using four Kistler force plates (Kistler Japan, Tokyo, Japan) with a threshold of 20 N for collecting the analog data. The data were then imported into Software for Interactive Musculoskeletal Modeling (SIMM; MusculoGraphics, Santa Rosa, CA, USA) to calculate JRFs. Correlations between gait speed and JRFs were determined using Spearman's rho correlation coefficient. Significance level was set at $p \leq 0.05$. Ethical approval was granted by Tokyo Metropolitan University. Each subject consented to participate. *Results:* Average±SD participants' walking speed was 1.03±0.087 m/s. There was no significant correlation between gait speed and the JRFs (anterior share force $p=0.35$; side share force $p=0.26$; compression force $p=0.40$). *Conclusion:* Although previous studies have reported that muscle activity and joint moments increase with increased walking speed, there was no significant correlation between gait speed and JRFs in this study. We therefore concluded that JRF is independent from gait speed.

PA115

Comparison of Foot Kinetics during Gait Initiation between Young and Elderly Subjects

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Introduction/Background: Previous studies comparing young and elderly subjects during walking showed that the elderly walk with a smaller ankle range of motion (ROM), smaller ankle angle peak, and less positive power. Those studies, however, used single-segment foot models, which neglects the importance of foot functions. More recent studies using multisegment foot models indicated that older adults walk with a smaller peak angle during calcaneus plantarflexion, smaller ROM of the midfoot, and smaller coronal plane ROM of the metatarsus. The differences in foot kinetics, however, have not been clarified. The purpose of this study was to investigate the differences in foot kinetics between young and elderly subjects using a multisegment foot model. *Material and Methods:* Altogether, 12 young participants (23.3±2.4 years, mean±SD), and 12 elderly participants (73.3±3.9 years) were recruited. We recorded gait initiation using 10 infrared cameras and a three-dimensional motion analysis system (Vicon Nexus; Oxford Metrics, London, UK). A total of 33 infrared retroreflective markers were attached to anatomical locations. The major reaction forces were captured using four Kistler force plates (Kistler Japan, Tokyo, Japan). The forces were measured using two adjacent force plates on a leg to analyze midfoot and toe joint kinetics. The collected data were imported into Software for Interactive Musculoskeletal Modeling (SIMM; MusculoGraphics, Santa Rosa, CA, USA). The parameters for foot kinetics were calculated using SIMM. These parameters were then compared using an unpaired *t*-test. Significance level was set at $p \leq 0.05$. Tokyo Metropolitan University granted ethical approval. Each subject consented to participate. *Results:* The elderly exhibited lower torque values for each measurement: ankle plantar (1.20 vs. 1.45 Nm/kg, $p=0.02$), midfoot plantar (0.60 vs. 0.76 Nm/kg, $p \leq 0.01$), toe plantar (0.07 vs. 0.12 Nm/kg, $p=0.002$). The elderly also exhibited lower values for ankle and midfoot positive power measurements—ankle (1.02 vs. 2.07 watts/kg, $p \leq 0.01$), midfoot (0.54 vs. 0.90 watts/kg, $p=0.01$)—and for toe negative power (0.27 vs. 0.42 watts/kg, $p=0.013$). *Conclusion:* This study indicated that the elderly have smaller ankle, midfoot, and toe moments and power than their younger counterparts during gait initiation.

PA116

Clinical Case: Piriformis Syndrome

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Introduction: Piriformis syndrome is produced by sciatic nerve compression or impingement due to hypertrophy or contraction of piriformis muscle. It consists in a group of signs and symptoms that are characterized by sensitives, motors and trophics alterations in the sciatic nerve innervation area. It can be confused with radiculopathy low back or sacral spine dysfunction. *Material and Methods:* We describe a clinical case attended in Rehabilitation Service of Morales Meseguer University Hospital in period of time from December, 2013 to June, 2014. *Results:* Our patient was a 24-year-old woman who refers pain and paresthesias in right gluteal region radiated to right leg (posterolateral zone to 5th toe). She relates it with an intramuscular local injection to treat a toothache pain one year ago. The pain had mechanical characteristics: it was increasing with gate and prolonged sedestation in spite of analgesic treatment with tizanidine and dexketoprofen. Since personal precedents the patient refers hypercolesterolemic and anemia due to low iron. In physical exploration we objectified pain to the right gluteal palpation, and it was radiated to right leg close to injection area. The muscular balance, hip, spine and sacroiliac exploration were not affected. Complementary tests (magnetic resonance, ultrasound scan gluteal and electromyography) were normal. She was diagnosed of piriformis syndrome ovenproof to conservative treatment, so we have to realized a corticosteroids and anesthetic local infiltration. *Conclusion:* Piriformis syndrome is a clinical entity underdiagnosed and its diagnoses is realized by exclusion

other process like sciatica, facet arthrosis, local bursitis or sacroiliac pathology. The selective infiltration of the muscle allows us to confirm the diagnosis depending on the therapeutic response.

PA117

A Rare Cause of Anterior Knee Pain: Bipartite Patella

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Case Report: A 20-year-old military recruit was seen due to bilateral anterior knee pain over the last two months. There was no history of trauma. But he declared that he was doing strenuous exercise. On physical examination, his knees were tender, especially around the lateral patella. There were no swelling, increase in temperature or limitation on range of motion in the knees. Knee stress and ligament laxity tests were negative. X-ray imaging revealed bilateral bipartite patella (BP). The patient was prescribed rest, non-steroidal anti-inflammatory drug and quadriceps exercises. After 1 month his complaints resolved completely. **Discussion:** Patella is the largest sesamoid bone in the human body and it is one of the main components for the extensor mechanism of the knee. BP is generally an asymptomatic condition and is an incidental finding in knee radiographs. In the adult population, the incidence is between 0.2 and 6%, and less than 2% of these cases are symptomatic. The causes for this developmental disorder are still unclear. The ossification of the patella begins approximately at the age of 4 years around several ossification centers that unite in the growing period and continues until between ages 9 and 10 years. It is hypothesized that if this fusion does not occur, two or more ossification centers remain. For a proper treatment approach, it is important to distinguish the normal variant BP from other pathologies of the patella. In some cases the radiographic findings and differentiation may be challenging and further imaging may be necessary. Accessory ossicles are normally well corticated and have smooth margins. However, especially in younger patients the margins may be irregular, and on radiographs, this irregularity can be mistaken for a fracture. In symptomatic BP, the pain mostly resolves with conservative treatment including rest, limitation of sports activities and strenuous activities, physical therapy with isometric stretching exercises of the quadriceps muscle and nonsteroidal anti-inflammatory drugs. **Conclusion:** Previously, it has been reported that ultrasonography enables the diagnosis, but without plain radiographs, care must be given for not to mistaken it for a fracture, as it has similar features with a fracture in ultrasonographic evaluation.

PA118

Sesamoid Ossicle of the Nuchal Ligament

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Case Report: A 43-year-old woman was seen due to chronic neck pain over the last two years. On detailed questioning, she declared that heat was relieving the pain. The medical and family histories were otherwise noncontributory. There was no history of particular previous cervical trauma. On physical examination, there was no limitation in cervical range of motion, but there was mild pain on cervical extension. Local tenderness was absent on palpation. Neurological examination was normal. Lateral view X-ray imaging of the cervical spine showed the existence of an ossicle within the nuchal ligament at the level of C5 vertebral spinous process. The ossicle had smooth borders in the upper part, whereas the lower part had irregular borders. Avulsion fracture of the spinal processes was excluded due to absence of tenderness at the cervical spine processes and the tips of the corresponding spinous processes also showed no defects. The chronic neck pain was attributed to the co-existence of cervical spondylosis. The patient was prescribed non-steroidal

anti-inflammatory drug and physical therapy. After three weeks, his symptoms resolved completely. The patient was called for a control visit six months later. **Discussion:** Although the pertinent underlying pathogenesis is not exactly known, sesamoid ossicles within the nuchal ligament is an incidental finding on lateral radiographs or other imaging of the neck. In a study, the mechanical pressure of the nuchal ligament against the apex of the spinous processes during forward flexion of the neck was blamed as the cause. These small bodies are mostly seen in the sixth decade and are always found at the posterior margin of the shadow of the nuchal ligament, most frequently at C5-C6 level where the mobility is greatest (80% of cases). Their shape is mostly ovoid or round, with regular contours. The long axis is parallel to that of the cervical spine, but can change with movements. Controls have been done after several years in many cases and no alteration was detected in the majority of the patients. Sesamoid ossicles are usually painless; they do not cause any symptoms and require no treatment.

PA119

Effects of Botulinum Toxin Type A Injection into Vastus Lateralis in Patients with Patellar Lateral Subluxation

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Introduction/Background: Patella lateral subluxation (PLS) is a common source of anterior knee pain. It has mostly been seen in athletes and young females. The main etiology of patella lateral subluxation are: abnormal bony structure and muscle imbalance of the lower extremity. Femur bone with flattened trochlear groove, forward tilting or pronation are the possible abnormal bony structure issues, while muscle tone imbalance between vastus medialis obliquus (VMO) and vastus lateralis (VL) is the leading cause for muscle imbalance of the lower extremity. Without appropriate treatment, osteoarthritis of the knee joint will develop eventually. In recent years, Botulinum toxin type A (BTA) injection showed great benefit not only on spastic disease, but also weaken selected muscle antagonist or agonist. In this study, we applied BTA for the treatment of patella lateral subluxation through the blockage of vastus lateralis. **Material and Methods:** Fifteen bilateral PFPS patients, aged between 18 to 60, presented with anterior knee pain were recruited from outpatient clinic. We use Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) to assess pain, stiffness, and functional status of the knees. We evaluated the subjects with WOMAC before and 4, 8, 12 weeks after BTA injection. Isokinetic assessment with surface EMG placed over VMO and VL to assess muscle power and sEMG change between VMO and VL before BTA injection, and 4, 8, 12 weeks after injection. The subjects were tested under angular velocity 60 degree per second, 120 degree per second, and 180 degree per second, and VMO, VL's ratio of maximal muscle activity and torque were recorded. **Results:** Twelve weeks after BTA injection, there were significant improvement of the ratio between VMO and VL during angular velocity 60 degree per second, 120 degree per second and 180 degree per second, while there were no significant change of torque during the three angular velocity tests. **Conclusion:** The patients presented remarkable improvement after receiving BTA injection not only in the questionnaire of WOMAC, but also in the ratio between VMO and VL in EMG study. Therefore, BTA injection was recommended for patellar lateral subluxation treatment.

PA120

Characterization of Neuromuscular Diseases in Adolescents and Adults Served in the Physical Therapy Services

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Introduction: The neuromuscular diseases are events important for the negative implications in the functional capacities and levels

of independence of the person with this problems that reduce the social participation levels and the quality of life of the persons and your families. *Objective:* To characterize the presentation of neuro-muscular diseases in adolescents and adults served in the physical therapy services. *Methodology:* This is a cross – sectional study, the population of study was the subjects served in the Centers of Practice of the Physical Therapy Program of the Manuela Beltran University in 2012 over 15 years old with neurological diseases. In the analysis of results are general and specific prevalences with levels of standard error. *Results:* In the year of 2012 was served 1,062 persons adolescents and adults for different problems of the nervous system and between this persons 1.50% (n=16, Standard Error=0.02) had neuromuscular diseases and between this pathologies the more prevalents was the muscular dystrophies with the 93.75% (n=15, Standard Error=0.01). 62.5% of the persons with neuromuscular diseases was of male gender (n=10, Standard Error=0.08) *Conclusions:* The muscular dystrophies are events more prevalents between the neuromuscular diseases with higher involvement in persons of male gender in the population adolescent and adult.

PA121

Functional Independence of People with Intertrochanteric Fractures at Home, One Year after Their Rehabilitation

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Introduction: Intertrochanteric femur fractures may occur at any age, but they are most common in the elderly population. They are usually treated surgically and the primary goal of rehabilitation program, that is typically followed, is to reduce disability and allow the patients to return to their prior activity level. *Material/Methods:* The subjects of the study were 46 patients, (6 males/40 females), suffering from Intertrochanteric fracture (25 right/21 left), undergone surgical treatment (internal fixation) and no accompanying diseases, with average age 85 years. The average duration of stay in the rehabilitation center, was 270 days. A questionnaire was used, to collect information about the previous state in daily living activities, before the fracture, as well as the present levels of Activities of Daily Living (ADL) at home, one year after discharge. Functional Independent Measurement (FIM) scale, was used for evaluation and comparison in eating, walking, toileting, bathing, dressing and grooming. Their independence level was categorized according to their FIM score: I=1-2 (totally depended), II=3-5 (partially depended), III=6-7 (independent). *Results:* Patients showed most of their progress in grooming (FIM III: admission 19.57%, discharge 69.57%, present 71.74%). In bathing, only 6.52% reached total independence during their rehabilitation stay, but 43.48% became independent at home. 40.30% became independent in toileting, 30.44% in dressing of the upper body and 28.26% in dressing of the lower body. As far as walking is concerned, 95.65% of the patients were independent prior to the fracture, whereas 65.22% were independent post-discharge. 76.09% need help in household activities (35 out of 46 patients gave a positive answer to the relative question, included in the questionnaire). *Conclusions:* This study showed that a small percentage of the elderly patients following intertrochanteric fracture of the hip become eventually independent at home, one year post their discharge from the rehabilitation center, even if they become totally independent in walking. Walking, grooming, eating and dressing of the upper body, were the activities most improved, (but not bathing, toileting and dressing the lower body).

PA122

Rehabilitation of Multidirectional Shoulder Instability – Case Report

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Diagnosis: Multidirectional shoulder instability. *Case Description:* 17 year-old patient, student, *Taekwondo* athlete for several years. Complaints of mechanical recurrent right antero-superior shoulder pain with multiple shoulder subluxation (no dislocations) episodes for >2 years and important limitation for overhead ADLs. No history of previous trauma. On examination: ectomorph biotype, no changes on inspection, mild antero-superior shoulder pain on palpation. Range-of-motion 0-100° (anterior elevation) and 0-90° (abduction) and scapular dyskinesia. Slight increase with passive mobilization due to pain and apprehension. External rotation 95°. Elbow hyperlaxity and positive shoulder sulcus. Shoulder anterior and posterior apprehension and subluxation on conjugated movements: abduction+external rotation, extension+internal rotation, forward flexion+internal rotation. Jerk test positive, other special tests negative. Multidirectional instability (MDI) diagnosis was established. No abnormal findings on left shoulder. MRI showed no bone, articular, ligamentous or muscle lesions, namely Bankart or labral lesions. Patient underwent a rehabilitation program including pain control, progressive mobilization and strengthening of rotator cuff, deltoid and scapulo-thoracic muscles avoiding instability or apprehension positions. Physical agents included ultrasound, excitomotor currents and TENS. Scapulo-humeral reprogramming, proprioceptive training and open chain/plyometric exercises progressively introduced. Improvement was slow but steadily: at 9 months a full ROM and satisfactory functional status (Constant Shoulder Score<11) was obtained. *Discussion:* MDI consists of subluxation (eventually dislocation) in more than one direction (anterior, posterior, inferior). A lax joint capsule, sometimes in context of connective tissue disorders (CTD), may be stressed by repetitive microtrauma (as in overhead sports) or, less commonly, major trauma. Patients may present shoulder pain or symptomatic displacement of the joint, with causative positions and tests providing clues about instability direction. Imaging studies can rule out associated lesions but MDI diagnosis is clinically based. The patient had joint hiperlaxity but no established CTD and no previous major trauma. Exercise progression was limited by pain and apprehension complaints/subluxation in numerous glenohumeral positions. *Conclusion:* MDI treatment consists of prolonged physiotherapy (6-12 months), with emphasis on glenohumeral stabilization and scapulo-umeral rhythm reprogramming. Surgery (eg. capsular shift) is indicated if conservative treatment fails or to repair associated lesions. Education and lifelong specific exercises may reduce the significant recurrence levels.

PA123

Mirror Therapy for Improving Hand Function after Distal Radial Fractures: a Pilot Study

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Introduction: The aim of this pilot study is to investigate efficacy of mirror therapy (MT) to improve disability, pain, and wrist active dorsal flexion in patients after a distal radial fracture. *Material and Methods:* A controlled randomized pilot study included 16 participants (10 women, 6 men; mean age 58 years), that were randomly allocated in 2 groups: Experimental group (EG) that received occupational therapy (OT) including MT exercises performed with the unaffected wrist (30 minutes daily session, 5 days a week, 3 weeks), and control group (CG) that followed equivalent intensity of OT without MT. Patients with unstable medical condition, open fracture, musculoskeletal disorders on the affected upper limb or cognitive impairment were excluded. Four patients allocated inside each group followed surgical treatment. Pain was assessed by visual analogue scale (VAS). Quick-DASH was used to assess upper limb disability, and active dorsal flexion was measured by using a handheld goniometer. *Results:* After finishing therapy pain diminished in 12 patients (6 from EG, 6 from CG) but no significant differences between groups were found. Quick-DASH mean

score improved for both groups (30.38±27.09 EG; 29.28±13.78 CG. Mean difference 1.10. P=0.919). Similarly mean scores for wrist active dorsal flexion augmented for both groups, with a higher increase for patients that followed mirror therapy (48.38±15.48 EG; 41.25±14.33 CG. Mean difference 7.13. P=0.35). **Conclusion:** Both type of therapeutic interventions determined a non significant reduction on pain and disability. A moderate increase in wrist active dorsal flexion was observed in patients that followed mirror therapy compared to control group. However no significant differences were found regarding superior effectiveness for one intervention over the other.

PA124

Plantar Fasciitis: Ultrasound-Guided Versus Non-Ultrasound-Guided Injection

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Background: Plantar fasciitis (PF) is an inflammatory disorder that starts as a mechanical and progressive heel pain. Pain is worse at the beginning of the day, in standing position, with reperussion in life quality. It is self-limited in 80-90% cases. It is more common in female between 40 and 70 years old. Predisposing factors: cavus or flat foot, pronated foot subjects, shortened triceps surae, improper footwear, overage. The first step of treatment is the conservative therapy, including the corticosteroids injection as a good option. **Material and Methods:** Randomized prospective trial. **Aim:** To determine efficacy of ultrasound-guided corticosteroid injection versus non ultrasound-guided in patients with PF attended in July 2014 at Rehabilitation Department in MoralesMeseguer Hospital. **Inclusion criteria:** PF subacute-chronic in adults. Exclusion criteria: allergy to any component, uncontrolled diabetes, coagulopathies, local tissue disorders, refused treatment, corticosteroids injection 3 months before or more than 3 injections in the last year. **Sample:** 30 patients distributed into 2 groups: ultrasound-guided (group A) and non ultrasound-guided (group B). **Epidemiological variables:** age, sex, profession. **Clinical variables:** BMI, chronicity, etiology, VAS, and additional tests, plantar fascia thickness, plantar fat thickness, and previous treatments. **Post-infiltration assessment:** 1, 4 and 8 weeks. Complications were registered. **Results:** Homogeneous sample in terms of age and physical examination, with the percent of female higher in the Group A. The cause more usual of PF was degenerative etiology. The average period of evolution of plantar fasciitis in the majority of patients was between 6 and 12 months. Additional test more used was the simple radiography. Calcaneal spur was the more common finding. **Conclusions:** VAS scale, plantar fascia thickness and plantar fat thickness are useful to detect modifications in the assessment of patients infiltrated with corticosteroids. Corticosteroids injection is an effective technique in PF treatment. The security increases when the technique is ultrasound-guided. This trial did not find differences between ultrasound-guided and non ultrasound-guided injection, in any of the studied variables. The improvement of the technique and increase of sample size should be considered for future studies.

PA125

Extensor Pollicis Longus Tendon Rupture after Unknown Wrist Fracture – a Case Report and a Brief Literature Review

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Case Diagnosis: Extensor Pollicis Longus tendon rupture. **Case Description:** A 43-year-old woman, with no previous medical his-

tory presented to the emergency department. She complaint of inability to perform active extension to thumb after hearing a snap in the wrist a few hours before. She denied trauma or overstrain. On physical examination she presented with residual swelling in the right wrist accompanied by pain in all range of motion and loss of full active extension of the right thumb interphalangeal joint. After deeper anamnesis, she reported a fall over the right wrist four weeks before. She gave no relevance despite the pain, taking oral nonsteroidal anti-inflammatory drugs (NSAIDs) and applying topical NSAIDs on the wrist. We decided to do a wrist radiograph and dorsal wrist ultrasound. The radiography revealed a nondisplaced fracture of the distal radius in consolidation without deviation and ultrasound showed complete rupture of the Extensor Pollicis Longus (EPL) tendon. She was submitted to Extensor Indicis Proprius to Extensor Pollicis Longus tendon transfer. **Discussion:** Spontaneous rupture of the EPL tendon at the wrist is uncommon and mainly associated with rheumatoid arthritis, fractures of the wrist, systemic or local steroids and repetitive/excessive abnormal motion of the wrist joint. It is a disabling complication occurring with an estimated frequency <1% following fracture of the distal radius and occurs during the first 4 to 10 weeks following injury. There is a controversy regarding the pathogenesis of the rupture. Vascular and mechanical theories have been described. Usually it doesn't lead to pain and manifests with sudden loss of active extension of the thumb interphalangeal joint. Management of EPL tendon ruptures generally fall under three categories: primary repair, tendon graft, or tendon transfer. **Conclusion:** In patients with sudden loss of extension of the thumb interphalangeal joint, a thorough history is crucial. Functional limitations as writing and manipulation of small objects can be problematic.

PA126

The Optimal Treatment Number of Extracorporeal Shock Wave Therapy in Myofascial Pain Syndrome

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Introduction: Myofascial pain syndrome (MPS) is a clinically common syndrome occurring in shoulder, cervical and lumbar portion. Variable methods of treatment for MPS have been reported. Extracorporeal shock wave therapy (ESWT) has been expanded as one of the treatment methods for musculoskeletal pain. The aim of this study is to verify the optimal treatment number of ESWT in MPS. **Material and Methods:** Thirty-two patients diagnosed with myofascial pain syndrome in shoulder girdle muscle were enrolled. They were assigned to a short term treatment group (S group) and a long term treatment group (L group) balanced by age and sex. S group had done three sessions of ESWT (0.056 mJ/mm², 1,000 impulses, weekly) while L group was treated by the same protocol but with six sessions. The visual analogue scale (VAS), McGill pain questionnaire and pressure pain threshold were measured four times (before, after 3, 6 sessions and 3 months after last session) **Results:** There were four withdrawals and remaining 28 patients finished the whole sessions. There were no statistically significant difference between two groups in terms of age, sex, disease duration, the location of affected site, pretreatment VAS, McGill pain questionnaire and pretreatment pressure pain threshold. The VAS, McGill pain questionnaire and pressure pain threshold significantly improved in both S group and L group after treatment compared with baseline values (p<0.05). Also, there was a significant difference in VAS, McGill pain questionnaire and pressure pain threshold between two groups (p<0.05). After 3 months, the difference of treatment effect was maintained (p<0.05). **Conclusion:** In myofascial pain syndrome in shoulder girdle muscle, 6 sessions of ESWT was more effective than 3 sessions. But further study will be required in more patients.

PA127

Lumbar Intervertebral Disc Extrusion Developed after Vaginal Delivery*S. Kesikburun¹, B. Aras², Y. Demin², E. Yaşar², A. K. Tan²¹Ankara, ²Gülhane Military Medical Academy, Turkish Armed Forces Rehabilitation Center, Ankara, TR

Case Diagnosis: Lumbar disc herniation during pregnancy or in the postpartum period is uncommon. Here we report a patient who had extruded lumbar herniated disc developed secondary to vaginal delivery. **Case Description:** A 33-year-old female (gravida 2, para 2) presented with low back pain for 2.5 months after a normal vaginal delivery. The pain first occurred with delivery and continued throughout the postpartum period. There were no obstetric or anaesthetic events of note at delivery. At first, her symptoms were attributed to the delivery and she was managed with bed rest. When symptoms did not diminish she was referred to the hospital. Her pain was described as sharp and radiated down to the right leg. On examination, there was 4/5 motor function at the plantar flexion and dorsiflexion for the right ankle. Sensory deficit was detected on the right L5 and S1 dermatome and the Achilles tendon reflex was hypoactive. No sphincter abnormality was noticed. MRI showed an extruded fragment at the L4-5 level causing of narrowing spinal canal with a 4.4 mm of diameter. Because of breastfeeding, the patient refused surgery and got a physical therapy program. Her pain relieved slightly, however motor dysfunction did not improve. **Discussion:** Lumbar disc herniation during pregnancy or in the postpartum period is uncommon. An extruded lumbar herniated disc after normal vaginal delivery should be taken into account in assessment of low back pain in postpartum period. **Conclusions:** Intraabdominal pressure increased in labour may cause severe lumbar disk herniation in postpartum period.

PA128

Electrical Stimulation Versus Electromyographic Biofeedback on the Quadriceps Muscle Strength and Functional Recovery after Total Knee Arthroplasty

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Background: Both electrical stimulation and electromyographic biofeedback have been shown to be more effective than voluntary isometric exercise alone in the recovery of quadriceps muscle force after total knee arthroplasty (TKA). The purpose of this study was to compare the effects of two different methods on the quadriceps muscle strength and functional recovery after TKA. **Material and Methods:** Forty patients after TKA were randomly assigned to either a group receiving electrical stimulation or a group receiving biofeedback, while all patients also received standard physiotherapy and voluntary isometric exercise about 6 weeks. Recovery of quadriceps muscle strength and knee function was assessed by 1) the knee injury and osteoarthritis outcome score (KOOS), 2) the number of days that elapsed between surgery and the recovery of full active knee extension and 3) the maximal quadriceps muscle cross-sectional area assessed with ultrasonography. All patients were assessed with these clinical scales at weeks 0, 1, 2, 4, and 6 of the exercise program. **Result:** The patients in the biofeedback group achieved full active extension significantly sooner (33.4±7.8 days) than those in the electrical stimulation group (41.2±8.5 days) (p<0.05). At 2 weeks after the exercise program, significant improvements with biofeedback were found for quadriceps muscle cross-sectional area and KOOS. At 6 weeks, the differences between groups were attenuated, but improvements with biofeedback were still significantly effective for quadriceps muscle cross-sectional area and KOOS than those with electrical stimulation. **Conclusion:** Electromyographic biofeedback is more effective than electrical stimulation in attenuating loss of quadriceps muscle strength and improving functional performance after TKA.

PA129

Using Mobilisation Techniques for Stretching in Patients with Chronic Cervical Syndrome

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Introduction/Background: Chronic cervical syndrome is associated with pain, disability and quality of life of patients. The goal of this research is the objective evaluation of the therapeutic effect of mobilization techniques for stretching (MTS), in comparison with medicamentous therapy and classic physical procedures, in treating of patients with chronic cervical syndrome. **Material and Methods:** This study was made as experimental, randomized, controlled clinical trial, opened type. The examination included 90 patients (65 females and 25 males), with chronic cervical syndrome. All patients were divided in three groups. The first, control group of 30 persons, composed of patients treated with medicamentous therapy (Diclofenac of 100 mg, 1 tablet per day). The second group consisted of 30 patients treated with MTS and the third group consisted of 30 patients treated by classic physical procedures (manual massage and therapeutic exercises). All procedures were implemented during 20 days. As observing parameter was used: Lattinen test for the evaluation of the pain sensitivity and the range of motion in cervical spine, before and after therapy. For the statistical analysis of the acquired data, was used Student's *t*-test. **Results:** After therapy the pain was considerably reduced or disappeared in each group, cervical mobility was increased, but these effects were the most significant in the II group of the examinees, treated by MTS (p<0.001), than the effects in other groups of patients: I group (p<0.05) and the III group (p<0.01). **Conclusion:** According to the results of this study it can be concluded that using mobilization techniques for stretching is very effective therapeutic procedure in treatment of patients with chronic cervical syndrome.

PA130

Therapeutic Effectiveness of Ultrasound-Guided Versus Blind Intra-Articular Injections of Hyaluronic Acid in Patients with Moderate Knee Osteoarthritis*F. Eslamian¹, S. K. Shakouri², R. Javadi²¹Tabriz University of Medical Sciences, Physical Medicine and Rehabilitation Research Center, ²Tabriz University of Medical Sciences, Tabriz, IR

Introduction: Viscosupplementation with materials such as hyaluronic acid is an injection-based complementary therapy, which has shown promising results in the treatment of osteoarthritis (OA) in different joints. **Aims:** The aim of this study was comparison between clinical efficacy of hyaluronic acid intra-articular injection using two methods of ultrasound (US)-guided versus blind injection for knee osteoarthritis. **Methods:** In this randomized clinical trial, a total of 40 eligible patients with moderate knee osteoarthritis referring to physical medicine clinic were selected and randomly divided into two groups of US-guided injection and blind injection using surface landmarks. Patients underwent 3 intra-articular injections of hyaluronic acid in the beginning, 2th and 3th weeks later. Pain severity at rest and after activity according to visual analogue scale (VAS), joint range of motion (ROM) using goniometry and functional status with Western Ontario McMaster Universities Arthritis Index (WOMAC) and timed up and go (TUG) were measured at baseline, third week and 3 months after treatment. **Results:** In both groups, statistically significant improvement was detected in all outcome measurements compared to baseline (P<0.05). Comparison between two groups revealed better result for decreasing VAS average at rest immediately after treatment in US group (2.2±1.6 vs 3.7±2.9, P<0.01). Inversely better improvement for knee range of motion in blind group was obtained at third week (114.47±12.3 vs 108.05±11.8, P<0.01). Post treatment mean changes in relation to baseline WOMAC, VAS, ROM and TUG scores did not differ significantly between the two groups 3 months after treatment

($P > 0.05$). **Conclusion:** Both of ultrasound-guided and blind injections of hyaluronic acid can cause improvement of pain, range of motion and daily functional abilities in patients with knee OA within 3 months after treatment without significant difference between two groups, but US guided injection because of better accuracy of injected material into joint space is mostly recommended.

PA131

Treatment of the Exertional Compartment Syndrome by Botulinum Toxin

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Background: Botulinum toxin A (BoNT-A) is used in the treatment of muscle hypertrophy but has never been used in chronic exertional compartment syndrome (CECS). The objective diagnostic criterion in this condition is an abnormally elevated intramuscular pressure (IMP) in the compartment. In this study, we measured IMP 1 minute (P1) and 5 minutes (P5) after the exercise was stopped before and after BoNT-A injection. Hypothesis: BoNT-A reduces the IMP (P1 and P5) and eliminates the pain associated with CECS. Study Design: Retrospective Case series. **Methods:** Injection of BoNT-A (Dysport®) in the muscles of moderately trained subjects with an anterior or anterolateral exertional compartment syndrome of the leg. The BoNT-A dose ranged from 76±7 to 108±10 Units per muscle, depending on which of the five muscles in the two compartments were injected. Primary endpoint: IMP (P1, P5). Secondary endpoints: exertional pain, muscle strength, and safety. Follow-up: up to 9 months. **Results:** 25 anterior compartments and 17 lateral compartments were injected in 16 subjects. The average interval time between the BoNT-A injection and post BoNT-A injection IMP measurement was 4.4±1.6 (3-9) months. In the anterior compartment, P1 and P5 fell by 63±17% ($p < 0.00001$) and 59±24% ($p < 0.0001$), respectively; in the lateral compartment, P1 and P5 fell by 68±21% ($p < 0.001$) and 63±21% ($p < 0.01$), respectively. Exertional pain and muscle strength were monitored, based on the Medical Research Council score. The exertional pain was totally eliminated in 15 subjects (94%). In 5 subjects (31%), the strength of the injected muscles remained normal. In 11 subjects (69%), it dropped from 4.5/5 to 3.5/5 ($p < 0.0.01$), although without functional consequences. In the conditions of this study, BoNT-A showed a good safety profile in those subjects with CECS. **Conclusions:** In this case series, BoNT-A reduced the IMP and eliminated exertional pain in anterolateral CECS of the leg for up to 9 months after the intervention. The mode of action of BoNT-A is still unclear. A randomised controlled study should be carried out to determine whether BoNT-A can be used as a medical alternative to surgical treatment.

PA132

Gender Differences in Physical and Mental HRQOL over the Course of One Year after Musculoskeletal Rehabilitation in Germany

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Background: Medical rehabilitation funded by the German Pension Insurance aims to increase and to stabilize the health of persons with impaired work-ability who often suffer from chronic illnesses. During their rehabilitation, patients take part in exercise and physical therapies, patient education, and counseling in order to increase their health-related quality of life (HRQOL) and promote their return to work. Prior studies reported higher values of HRQOL for men compared to women at rehabilitation onset, but higher increases for women over time. Aims: To investigate gender differences and additional influencing factors in the one-year-course of the physical and mental HRQOL after rehabilitation of patients with inflammatory rheumatic diseases or back pain.

Methods: Participants of an intervention study during musculoskeletal rehabilitation answered questionnaires at four points in time (t1=rehabilitation onset, t2=discharge, t3=6-months-follow-up, t4=12-months-follow-up). In a first step, gender differences in the one-year-course of the physical (PCS) and mental component summary (MCS) of the SF-12 were analyzed by analyses of variance with repeated measures. Secondly, other influencing factors of the one-year-course of HRQOL in addition to gender were identified in bivariate analyses. Finally, gender differences were tested in multivariate analyses, controlling for age, diagnosis and other covariates. **Results:** Physical and mental HRQOL showed different courses over time: whereas the gains during rehabilitation were lost for mental HRQOL during the 12-months-follow-up, the positive effects of rehabilitation could be maintained for physical HRQOL (time effect: $p < 0.001$). Men (n=188) showed a higher mental ($p < 0.01$) and physical HRQOL ($p = 0.055$) compared to women (n=167) in the univariate analyses. In the multivariate analyses, the gender effect for PCS became more apparent ($p < 0.01$), whereas the gender effect for MCS disappeared. Controlling for gender and other covariates, influences over time were found for age (PCS), indicators of physical health (PCS, MCS), work-related factors (PCS) and exercise motivation (MCS, PCS). **Conclusions:** Male and female inpatients with musculoskeletal diseases differed substantially in their HRQOL in the course of one year after discharge. Influences on physical and mental HRQOL in addition to gender were found for age, health impairments, work-related factors and aspects of exercise motivation.

PA133

Spinal Accessory Nerve Injury after Neck Surgery – a Case Report

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Case Diagnosis: Spinal accessory nerve injury. **Case Description:** We report a case of a 24 year-old woman, who underwent to surgical resection of cavernous angioma on left sternocleidomastoid muscle. Six years earlier she underwent the same surgery with sub-total excision of the lesion and lymphadenectomy of the lateral cervical compartment. She recovered well from this first surgery, without pain complaints or motor sequelae. After the last surgery, in postoperative recovery, she reported pain and difficulty in mobility of the shoulder. She was evaluated in our Physical and Rehabilitation Medicine (PRM) consult 7 days after hospital discharge. She referred slight improvement of pain complaints, located on the trapezius and shoulder area, but appearance of sporadic paresthesias in the left arm and decreased sensation in the chest region, neck and lateral aspect of the left shoulder. Yet, her main concern was the inability of moving the shoulder, especially abduction. Objectively, her active shoulder range of motion (ROM) was, abduction 55°, flexion 105°, external/internal rotation 50°, painful in all ROM. Passively ROM was preserved. She began a rehabilitation program and an electromyography and nerve conduction study (EMG/NCS) performed 2 months later, revealed an incomplete axonal injury of the spinal accessory nerve branch to the trapezius muscle. After weeks of treatment, she repeated the EMG/NCS that showed favorable evolution with signs of reinnervation in progress of the upper and lower fibers of the trapezius muscle. **Discussion:** The spinal accessory nerve (SAN) provides motor innervation to the sternocleidomastoid and the trapezius muscle. The integrity of SAN is fundamental to the thoracoscapular function and scapulohumeral rhythm. The most common cause of SAN injury is iatrogenic, after invasive medical procedures in the neck, and manifests clinically as painful loss of shoulder function. **Conclusion:** Diagnosing patients with SAN injury can be challenging. In this case, some of the signs and symptoms presented by the patient clouded the clinical diagnosis. If a SAN injury is suspected a comprehensive EMG/NCS should be performed. Until this moment, she presented a favorable evolution with conservative treatment.

PA134

Limbus Vertebra Presenting with Inflammatory Low Back Pain: Case Report

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Introduction: Limbus vertebra is marginal interosseous herniation of nucleus pulposus from a defect under ring apophysis or in vertebral end plate during skeletal development stage. It usually causes low back pain and is frequently confused with vertebral fracture, infection, Schmorl nodule or tumor. We reported a patient presented with inflammatory low back pain and diagnosed with anterior limbus vertebra because it is rare and the patient has atypical clinical presentation. **Case Report:** A 29-year-old woman had worsening and buttock spreading low back pain for four months. She also describes one and half hour long morning stiffness and night pain which awakes her from sleep. She had a traffic accident when she was 6 and she has had relapsing low back pain periods since she had carried a heavy thing when she was 14. Her low back motions were painful and her lumbar flexion was limited on physical examination. She had pain on right sacroiliac joint compression. Laboratory findings were in normal range. ESR, CRP, RF etc.) Chlamydia trachomatis IgG and IgM and brucella tube agglutination test were negative. There was a sclerotic bone fragment placed anterosuperior of the 4th lumbar vertebra on plain lumbar graphy. Lumbosacral MR revealed hyperintense area placed anterosuperior portion of the 4th lumbar vertebra. Her sacroiliac MR was normal. **Conclusion:** Limbus vertebra causes non specific symptoms like low back pain, back pain, muscle spasms and radiculopathy and it is often misdiagnosed as a fracture, infection or tumor which may result in unnecessary invasive procedures. Limbus vertebra can be diagnosed by triangular bone fragment image seen on the plain radiography but it may be confused with vertebral fracture frequently. It should not be forgotten that limbus vertebra can be present with inflammatory low back pain symptoms and may be confused with spondyloarthropathy or malignancy. It is important to investigate patient for trauma history and to remember limbus vertebra possibility to avoid unnecessary diagnostic procedures and quickly reaching the right diagnosis.

PA135

Spondyloepiphyseal Dysplasia: Prognosis in an Adult. Case Report

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Introduction: Spondyloepiphyseal dysplasia (SED) is an infrequent genetic disease affecting the vertebrae and epiphyses. It is often diagnosed at a young age. It can cause deformities, polyarthrosis and an important functional handicap. **Material and Methods:** We report a case of a 31 year old woman with SED diagnosed since the young age, consulted for lumbar radicular pain. **Results:** Physical examination revealed Heberden and Bouchard's nodes, limited hips with especially 50° flexion, 50° knee flexion, exaggerated lumbar lordosis with pelvis anteversion, gait with triple flexion and a FIM score 116/126. Simple X rays showed platyspondyly, epiphyseal involvement and bilateral coxa plana. In lumbar CT scan, we found lumbar spinal stenosis and radicular conflict. The patient benefited from a medical treatment, one infiltration by the coxigen hiatus and an adapted reeducation but she is always algic. **Conclusion:** SED is an infrequent cause of arthrosis. In this case; SED caused polyarthrosis with an important functional handicap. Treatment is difficult and prognosis is serious.

PA136

Comparative Clinical Outcomes of Conservative Treatment with Arthroscopic Repair in Rotator Cuff Tears: a Retrospective Observational Study

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Introduction/Background: To compare the clinical outcomes following conservative treatment (CT) and arthroscopic repair (AR) in patients with high grade partial and small- to medium-sized rotator cuff tear. **Material and Methods:** Patients who were diagnosed with high grade partial thickness or small- to medium-sized full thickness tear were reviewed from 2008 to 2013. The rotator cuff tendons were evaluated by ultrasonography, shoulder MRI or MR. The patients with adhesive capsulitis, neuropathy or more than large sized tear (>3 cm) were excluded. The CT and AR groups were compared during 1-year-follow-up period with regard to clinical outcomes including pain assessment and range of motion (ROM). We investigated the occurrence of re-tear or tear progression. The data from patients who were not followed-up during 1-year period were obtained by telephone interviews. **Results:** Total 140 patients with high grade partial thickness or small- to medium-sized full thickness tear were included. Sixty nine patients received CT including pain medication (n=57, 82.6%), corticosteroid (n=32, 46.4%), shoulder exercises (n=9, 13.0%), and therapeutic modalities (n=3, 4.3%), and the other 71 patients underwent AR. After CT or AR, pain assessment scales ($p<0.001$) and ROM ($p<0.001$) were significantly improved in both groups. After the CT and AR, no significant differences were seen in the pain assessment scales and the forward flexion in ROM. The internal rotation in CT group was still limited significantly (T5 vs T6, $p<0.001$), but difference before and after treatment between 2 groups was not significant. Seven cases of re-tear were identified in AR group and 2 cases of tear aggravation from high grade partial thickness to small-sized full thickness tear in CT group. **Conclusions:** Both CT and AR could improve pain and ROM significantly for patients with rotator cuff tear. Pain was not significantly different between each group. The difference of ROM might be below clinical importance. Disease progression could not be prevented in some cases of both groups in terms of re-tear or tear aggravation. These results suggest that conservative treatment is not inferior than arthroscopic repair in one-year follow-up period and that conservative treatment should be considered as the primary method of treatment.

PA137

Effect of Subacromial Sodium Hyaluronate Injection on Rotator Cuff Disease

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Background: Rotator cuff disease is a common cause of shoulder pain. There are studies about the effectiveness of sodium hyaluronate injection on shoulder and knee pain, but few studies demonstrating the efficacy of sodium hyaluronate ultrasonography guided injection for rotator cuff disease. This study evaluates effectiveness of ultrasonography guided subacromial sodium hyaluronate injection in patients with impingement syndrome without rotator cuff complete tear. **Materials and Methods:** This prospective, double-blind, placebo controlled clinical trial study was performed among 40 patients with subacromial impingement syndrome without complete tear of rotator cuff. Patients randomly injected ultrasonography guided in 2 groups: Case group by 20 mg of sodium hyaluronate (Fermatron™) and control group by 0.9% normal saline. Both groups received 3 weekly injections. The pain score (100 mm visual analogue score [VAS]) was evaluated before first

injection and one week after each injection. The constant score was evaluated before first and 12 week after last injection. Data was analyzed statistically by Independent *t*-test. **Results:** In both groups mean VAS has decreased, but more significantly in case group ($P<0.001$). Mean constant score was significantly higher in case group 12 weeks after last injection ($P<0.001$). The constant score improved 12 weeks after the last injection in both groups with a significantly better result in case group ($P<0.001$). **Conclusion:** Subacromial injections of sodium hyaluronate are effective in treating rotator cuff disease without complete tears.

PA138

Cumulative Effects Study of Ultrasounds, Diadynamic Current and Physical Therapy in the Treatment of Inflammatory Painful Conditions or with Motor Limitations at Hand Level

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Abstract: This paper summarizes the results of a study conducted in order to evaluate the benefit of the combination therapy DDC-physical therapy versus Ultrasound-DDC-physical therapy in the treatment of inflammatory painful conditions or with motor limitations at hand level. **Introduction:** The method used in this survey was the Rocher method with 6 stages, rated from 0-5. For testing the isometric force, dynamometry was used. It is an objective method which assesses the static force, the values being given in kg/F. The main inflammatory painful conditions or with motor limitations at hand level are recorded in cervical spondylosis. **Material and Method:** We studied a group of 50 patients with pain and stiffness at hand level, selected on the basis of diagnosis, age and gender, in order to form two comparable groups. To assess the clinical and functional status of the selected persons, the muscle balance was applied, and also hand-held dynamometry, global test of functional independence (GIF) modified in order to test the functions of the affected upper limb. **Evaluation Methodology:** The clinical and functional parameters assessed in all patients in the studied groups were: pain, physical dysfunctions, general index. The following have been examined: muscle tone and segmental force. Therapy methods with physical factors: US applications (high frequency mechanical oscillations), Diadynamic current applications, pharmacologic therapy, physical therapy. **Results:** In G1, after 2 weeks of treatment with applied therapy DDC-ultrasound-physical therapy, the results indicate a significantly greater improvement in all clinical and functional parameters evaluated, namely in pain and physical dysfunction compared to G2, in which DDC-physical therapy was applied. **Conclusions:** The results of the treatment with DDC-ultrasound-physical therapy recorded after two weeks of treatment indicates an improvement in all clinical and functional parameters evaluated, which is statistically significant and comparatively higher than that seen in the group who only benefited from DDC-physical therapy treatment. **Keywords:** pain, motor limitation, ultrasound, study.

PA139

Electrodiagnostic Studies for Prediction of Outcome after Transforaminal Epidural Steroid Injection for Lumbar Radiculopathy

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Introduction/Background: We investigated the predictive value of components of electrodiagnostic studies for outcome after lumbar transforaminal epidural steroid injection in patients with clinically diagnosed lumbosacral radiculopathy. **Material and Methods:** In 38 patients with clinical lumbosacral radiculopathy, visual analog scale (VAS) for pain, functional outcome by Roland Morris Disability Questionnaire (RMDQ), and Oswestry Disability Index (ODI) were evaluated after lumbar transforaminal epidural steroid

injection in a retrospective study. **Results:** Subjects with clinical lumbar radiculopathy showed significant improvements of VAS. Of 38 patients tested with electrodiagnostic studies before injection, 28 patients were positive for lumbar radiculopathy and 10 patients had negative examination. There were significantly greater improvements of VAS and ODI for patients with a positive lumbar radiculopathy confirmed by the electrodiagnostic study. Each component of electrodiagnostic studies was not significant regarding VAS, RMDQ and ODI. **Conclusion:** Electrodiagnostic study of lumbar radiculopathy is a predictor of improvement in pain and functional outcome after transforaminal epidural steroid injection for lumbar radiculopathy. But component of electrodiagnostic studies, respectively, did not predict the improvement of pain and functional outcome in patients with clinical lumbar radiculopathy.

PA140

How Many Times Should We Have BoNT-A Treatments to Improve the Severe Upper Limb Paralysis Due to the Stroke?

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Introduction: We reported that BoNT-A treatment combined with home-based functional training improved passive and active motor function in post-stroke patients with upper limb spasticity. The aim of this study to judge how many times we should have BoNT-A treatments to improve the severe upper limb paralysis due to the stroke. **Material and Methods:** We studied 25 patients with at least 9-month period in post-stroke patients with upper limb spasticity. The severity of hemiparesis was categorized as Brunnstrom stage 3 in all patients. They received four repeated BoNT-A injections and detailed one-to-one instructions for home-based functional training. At approximately four months after BoNT-A injections, we had clinical evaluation each other using the modified Ashworth scale (MAS), range of motion (ROM) and Fugl-Meyer Assessment (FMA). Friedman's test was used for analysis of paired data. Bonferroni correction was used for multiple comparison. **Result:** A significant improvement was found in the MAS at approximately four months after BoNT-A injections, compared with baseline. The total score for upper limb and scores of categories A and B of the FMA increased significantly, compared with baseline. Categories C (finger function) did not have significantly change, compared with baseline. **Conclusion:** We should perform BoNT-A treatment four times and properly training during at least 1.5 years, to patients to improve the severe upper limb paralysis due to the stroke. **References:** 1) Takekawa T, Abo M (CA), Ebihara K, Taguchi K, Sase Y, Kakuda W. Long-term effects of injection of botulinum toxin type A combined with home-based functional training for post-stroke patients with spastic upper limb hemiparesis. *Acta Neurol Belg.* 2013 Dec;113(4):469-7. 2) Takekawa T, Kakuda W, Taguchi K, Ishikawa A, Sase Y, Abo M (CA). Botulinum toxin type A injection, followed by home-based functional training for upper limb hemiparesis after stroke. *Int J Rehabil Res.* 2012 Jun; 35(2): 146-52.

PA141

Measurements of Chest Wall Volume During Quiet Breathing and Deep Breathing in Supine Position in Patients with Cervical Spinal Cord Injury

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Purpose: To non-invasively measure respiratory motions in patients with cervical spinal cord injury. **Introduction:** In patients with cervical spinal cord injury, voluntary movements of the thorax are poor, and respiratory motions are limited. We therefore considered that the expense of diaphragm movement is high, and informa-

tion on the ratio-degrees unclear. We examined this hypothesis by observing the respiratory motions of patients with cervical spinal cord injury in the present investigation. **Methods:** We analyzed the respiratory motions of 5 patients with cervical spinal cord injury. Chest wall volume changes were measured by opto-electronic plethysmography in the prone position during quiet breathing, using 45 markers and 6 cameras on the chest wall surface. Subjects were measured for 3 quiet breaths and 3 deep breaths at rest in the supine position. **Results:** Compared to mean end-inspiratory volume during quiet breathing, mean end-inspiratory volume during deep breathing was 107.23% higher. To achieve this, ribcage volume increased 103.11%, and abdominal volume increased 115.38%. Compared to mean end-expiratory volume during quiet breathing, end-expiratory volume during deep breathing was reduced to 98.87%. While ribcage volume was decreased to 98.88%, abdominal volume was any change in the same degree and 100.35%. For tidal volume, abdominal volume accounted for 0.80% during quiet breathing and 82.3% during deep breathing. **Conclusion:** In patients with cervical spinal cord injury, the contribution of the abdomen to changes in end-expiratory volume was large.

PA142

Correlation between Selenium Existing in Nails with Grade of Knee Osteoarthritis and Severity of Pain

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Introduction: Osteoarthritis is one of the most common disorders in the world which its diagnosis and treatment cost too much for the countries. Therefore, using preventive procedures could reduce the costs considerably. Scientists assessed the impact of adding selenium to the diet of animals to prevent arthritis. The aim of this study was to assess the correlation between the selenium existing in nails with the grade of the knee osteoarthritis and severity of the pain. **Methods:** We included 30 patients referring to Firoozgar center of health and education. Radiography was performed and the photos were analyzed by a radiologist to determine the class of osteoarthritis. We identified the severity of pain in our patients using a visual analytical scale. Selenium content of nails was determined by an atomic absorption method. **Results:** On the other hand, age was not correlated to the severity of the disease. Finally, we did not observe any correlation between the content of nail selenium and the grade of osteoarthritis or pain severity. **Conclusion:** In spite of some findings demonstrating selenium as a preventive environmental factor, due to controversial results we suggest more studies are required to determine the role of selenium in the incidence of the disease and the severity of that. **Keywords:** Osteoarthritis, selenium.

PA143

Overuse Tendonitis of Flexor Digitorum Due to Writing with a Chalk in a Teacher

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Case Diagnosis: Overuse Tendonitis. **Case Description:** A 47 years old male admitted to outpatient clinic with pain and swelling at the palmar side of the right index finger. He has been working as a teacher for 16 years and writing with a chalk frequently with a flexed position of proximal interphalangeal joint. On the physical examination, there was tenderness, warmth and swelling on the flexor digitorum tendon of index finger and flexion was painful. There was no redness. Laboratory investigation and plain x-ray graphics were normal. Ultrasonographic examination revealed edema around the flexor tendon. He was diagnosed as flexor tendonitis. Acemetacin and a splint for resting was prescribed. On his second week follow up, pain and swelling was significantly

improved. **Discussion:** Overuse injuries occur when the tendons can't adopt repetitive forces. To our knowledge, flexor digitorum tendonitis of the hand due to overuse has not been reported in the literature before. **Conclusion:** Although tendons are resistant to repetitive forces, several intrinsic and extrinsic factor may be predisposing to injuries.

PA144

Do Postural Changes Affect Balance in Patients with Ankylosing Spondylitis?

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Introduction: Ankylosing spondylitis (AS) is a chronic, inflammatory rheumatic disease which leads to limitation in spinal mobility and structural deformity by affecting axial skeleton in the first place. In advanced phases of the disease, flexibility decreases and the typical posture develops due to the increase in dorsal kyphosis and limitation of movements. The aim of this study was to investigate the effect of AS related postural changes on balance. **Material and Methods:** Thirty-four patients with AS (25 men, 9 women) and 34 healthy individuals (23 men, 11 women) as control group were enrolled in the study. A detailed locomotor system examination had been done. Spinal mobility was assessed by hand to ground distance, Schober test, tragus to wall distance, occiput to wall distance and Bath Ankylosing Spondylitis Metrology Index (BASMI). Balance was evaluated by Berg Balance Scale (BBS), functional reach test (FRT), lateral reach test (LRT), and static balance index (SBI). Postural sway during quite standing was assessed by centre of pressure (COP) displacement on two conditions with eyes open and closed. **Results:** BBS, FRT and bilateral LRTs were found significantly lower in the AS patients ($p < 0.05$). SBI, anteroposterior COP sway with eyes open and closed were significantly higher at the patient group ($p < 0.05$). When patients with and without contracture of knee and/or hip were compared; Schober test score, tragus to wall distance, occiput to wall distance, and BASMI scores were found significantly higher in patients with contracture ($p < 0.05$). Correlation analyses had demonstrated that BBS, FRT and LRTs were negatively correlated with occiput to wall distance, tragus to wall distance and positively correlated with Schober test. SBI score was positively correlated with BASMI and hand to ground distance, but negatively correlated with Schober test. Anteroposterior COP sways with eyes open and closed were positively correlated with tragus to wall distance, occiput to wall distance, and BASMI scores. Mediolateral and anteroposterior COP sways with eyes closed were negatively correlated with BBS. **Conclusion:** The results have shown that ankylosing spondylitis leads to balance deterioration due to the postural changes. Thus, balance exercises should be an essential component of the rehabilitation programs prescribed to AS patients.

PA145

Radial Nerve Palsy Caused by Compression Garment for Lymphedema

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Introduction: Upper extremity lymphedema is common complication in breast cancer patients. Complex decongestive physical therapy is a primary tool in lymphedema management consisting of manual lymphatic drainage, compression bandaging and therapeutic exercise. Complex decongestive physical therapy is comfortable therapeutic methods for lymphedema, however we experienced side effect after application compression garment. **Case:** A 66 years old woman diagnosed with left breast cancer and she

underwent a modified radical mastectomy. 2 months after the surgery, the patient visited outpatient clinic in department of Physical Medicine and Rehabilitation with complaint of left upper extremity edema and swelling. The swelling and pitting edema in left upper extremity, considering lymphedema after surgery, was observed and circumferential difference between right and left upper extremities were 3 cm, 2 cm, 2 cm and 1 cm from the elbow crease to above 10 cm, above 5 cm, below 5 cm and below 10 cm. The patient was treated for lymphedema with complex decongestive physical therapy. Follow-up measurement of arm circumference was carried after 2 weeks, circumferential difference between right and left arm were 2 cm, 1.5 cm, 2 cm and 0.5 cm from the elbow crease to above 10 cm, above 5 cm, below 5 cm and below 10 cm. After 2 weeks, circumferential difference between right and left upper extremities were decreased, but she complained of weakness of left elbow and wrist extension power. The grade of left elbow and wrist extension were poor grade in manual muscle test, she underwent electromyography to confirm radial nerve compression. In the EMG study, it showed abnormal spontaneous activities in left brachioradialis, extensor digitorum communis, extensor carpi radialis, extensor carpi ulnaris and extensor indicis proprius muscles so she was diagnosed with left radial nerve injury. After that, she discontinued application of compression garment and was taken strengthening exercise for weakness of left elbow and wrist extension with manual lymphatic drainage and therapeutic exercise. **Conclusion:** The compression garment is common therapeutic method for lymphedema in patients underwent operation of breast cancer. However we need to consider the possibility of radial nerve palsy caused by application of compression garment.

PA146

Comparison of Focus vs. Radial ESWT Instead of High VS Low Dose in Treatment of the Patients with Lateral Epicondylitis

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Introduction: One of the most common reasons of elbow and forearm pain is lateral epicondylitis diagnosed based on clinical examination. The Extra corporal Shock Wave is applied for less invasive treatments with different dosages. This study aimed to investigate the effects of high and low dose ESW in treating the lateral epicondylitis. **Materials and Methods:** This clinical trial was done in Al Zahra medical center on 40 patients who were selected randomly and divided in to two groups. After VAS, the first group was treated by Duolith SD1 shock wave, energy of 0.25 mj/mm², 1,000 shocks; the second was treated by focus with the energy of 0.10 mj/mm², 1,000 shocks per session for 15 minutes with weekly intervals in 3 sessions. The patients were also treated with drugs (NSAIDs) and the VAS was reassessed one week after the last session and 12 weeks after finishing the treatment. **Results:** The mean of Pain intensity during study was decreased in the two groups but pain intensity in the low dose groups was higher than the high dose groups (P=0.001). Changes in other parameters including wrist extension test, middle finger extension test and PG was also similar. **Conclusion:** Extra corporal shock wave therapy can be effective in treating lateral epicondylitis, but its effects usually appear in after two or three months and using the low dose of this treating method has more desirable therapeutic effects.

PA147

Efficacy and Safety of Fish Oil in Treatment of Knee Osteoarthritis

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Thammasat, Pathumthani, TH

Introduction: Hundreds of studies suggest that omega-3 may provide some benefits to a wide range of diseases which have a com-

mon genesis in inflammation. Researchers were also found that fish oil helps relieve joint pain in rheumatoid arthritis. These help reduce complications or adverse reactions from the use of anti-inflammatory drug (NSAIDs). But we have little research on the effects of fish oil to reduce inflammation in patients with osteoarthritis. This was the reason for this research to study the efficacy and safety of fish oil in knee osteoarthritis. The results may useful to prevent osteoarthritic pain and promote joint health. Fish oil may be another safety choice for knee osteoarthritis patients. **Objective:** To study efficacy and safety of fish oil in treatment of knee osteoarthritis. **Material and Method:** 75 participants had divided into 3 groups of 25 people to study efficacy results after take fish oil 1,000 mg and 2,000 mg once a day for 8 weeks. In 1,000 mg of fish oil have EPA 400 mg and DHA 200 mg. All participants had complete visual analog scale for measure knee pain, WOMAC functional subscale for assess knee function, measure 100 meters walking velocity and 3 steps walking time before take fish oil and re-measured all parameters at 8 -12 weeks after take fish oil to compare the result. **Results:** All parameters had statistically significant better difference in the group of participants who had taken fish oil when compared to control group. The average score of patient's satisfaction was 9.06 from 10. One participant had hematuria from silent CA bladder at 10th week but the other 49 participants were safe without any complications from fish oil. **Conclusion:** Fish oil 1,000-2,000 mg daily supplementation had significant efficacy to improve knee performance and also had safety in mild to moderate stage of knee osteoarthritis patients. But 2,000 mg of fish oil the higher dose had not significant higher efficacy than 1,000 mg of fish oil.

PA148

Educational Needs of Patients with Ankylosing Spondylitis Correlates with the Quality of Life, Disease Activity and the Physical Functioning

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Background: Ankylosing spondylitis (AS) is a chronic inflammatory disease that usually affects the sacroiliac joints and the axial skeleton, causing significant pain, disability, and social burden around the world. The aim of this study is to describe the educational needs, evaluate quality of life in patients with AS and explore relationships between educational needs, quality of life, gender, disease activity and physical function. **Materials and Methods:** 76 patients diagnosed with AS were evaluated using as main outcome measures the Educational Needs Assessment Tool (ENAT), Health Assessment Questionnaire (HAQ), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) and the Bath Ankylosing Spondylitis Functional Index (BASFI). Educational needs across diagnostic group and subgroups of patients with AS were evaluated using the ENAT and summarized descriptively. Relationships with disease activity and physical functioning were explored using Pearson Correlations. **Results:** Mean ages of the study group were 47+9.4 years and disease duration was 12+7 years. 79% of patients showed interest in receiving education about their disease. Patients with longer disease duration (>5 years), expressed higher educational needs in "movements", (p=0.005); "managing pain" (p=0.004). Older patients scored higher in the "pain" domain (p=0.05). All the seven ENAT domains correlated with the disease activity score, BASDAI, highest on the "pain" domain (p<0.001). Physical functioning measured by the BASFI score correlated with all ENAT domains, highly significant correlation being noticed between the "pain" (p<0.001) and "movements" (p<0.001) domains, patients with altered physical functioning expressing higher educational needs on this particular domains. The HAQ score, evaluating quality of life, also correlated with all the ENAT domains, showing high correlations with the "movements", "feelings" and "treatment" domains (p<0.001). **Conclusion:** The ENAT is a reliable tool

in assessing educational needs among patients suffering from AS, being useful in enabling physicians and health professionals to plan patient education strategies effectively and guiding them in elaborating individualized and target-centered treatment programs.

PA149

Interpretation and Explanation of Commonly Requested Laboratory Tests for Patients with Muscular and Skeletal Complaints

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Introduction: In order to correctly and efficiently diagnose patients and select the best diagnostic methods, physicians are often relying on information gathered through clinical findings, laboratory and imaging tests and other paraclinical data. Laboratory findings play a vital role in diagnosis and also in monitoring and evaluating the effectiveness of the treatment options particularly for patients with inflammatory or infectious diseases. Inflammatory or infectious diseases are critical differential diagnosis of musculoskeletal patients of Physical Medicine and Rehabilitation services. **Materials and Methods:** It is extremely essential to have a good understating of the appropriate tests required for these patients to properly reach diagnostic and therapeutic decisions as well as distinguishing patients with systemic diseases from those with ordinary musculoskeletal complaints. **Results:** Although a target specific and clinically related laboratory assessment is of a huge diagnostic value to help triage these patients, the big dilemma facing doctors who practice physical medicine is interpretation of the borderline and scattered results of these tests, especially where variables such as age, gender, pregnancy, exercise, occupation and history of medications or other diseases may affect the results of these tests and produce false positive or false negative. **Conclusion:** This study reviews proper interpretation of an array of laboratory tests such as ESR, CRP, RF, ANA, autoantibodies, Complements, Uric Acid, Serum Protein Electrophoresis, Coombs Wright, 2ME, CPK, LDH and Aldolase, etc. that are commonly used by a physiatrist.

PA150

Is It Adequate to Evaluating the Reduction of Femoral Neck Fracture Merely Using Two-Dimensional Images?

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Objective: Proposing a three-dimensional measuring method to evaluating the reduction quality of displaced or undisplaced femoral neck fracture with closed reduction and internal fixated surgery. Then, summarizing up the displacement tendency of femoral head provides a theoretical basis for better fracture treatment using an appropriate manual reduction. **Methods:** 1,300 patients with femoral neck fracture were treated with surgery of close reduction. 91 among them who scanned postoperative CT examination were recruited in this research. All patients were categorized into two groups, undisplaced fracture, displaced fracture groups. Based on CT files, three-dimensional models were constructed. Some parameters should be measured: spatial distance displacement of femoral head center, deflection angle of femoral head; self-rotation angle of femoral head, shorten values of femoral neck. Before measuring manipulation, make sure that healthy and mirror image of fractured femur were made perfect registration, based on characteristic point coincidence, greater trochanter, lesser trochanter and femoral shaft. Finally, using the index of residual-total fracture's displacement carried on an evaluation about the reduction quality of femoral head. **Results:** there was no significant difference between undisplaced and displaced group of the distance displacement of femoral head's center ($P=0.62$), flexion angle (α angle) ($P=0.70$) and self-rotation angle ($P=0.547$). The numerical

values of center's displacement of two groups were 6.06 ± 2.91 mm and 6.62 ± 3.89 mm. The flexion angle were $17.68\pm 7.88^\circ$ and $18.59\pm 11.48^\circ$, in undisplaced and displaced group. The self-rotation angle was $12.70\pm 9.69^\circ$ (-39° – 44°) in the undisplaced group. For the displaced group, the self-rotation angle was 10.42 ± 5.53 (-23° – 27°). There was significant difference between two groups in shortage of femoral neck ($P=0.019$). There was 6.00 ± 3.52 mm of shortage in displaced group, 8.43 ± 3.98 mm of femoral neck shortage in undisplaced group. **Conclusion:** It is not adequate to evaluating the reduction quality of femoral neck fracture merely using 2-dimensional method. X-ray radiographs had some limitations in accurate descriptions in spatial displacement, especially rotation displacement of femoral head, while three-dimensional method, such as Spiral CT seems a better choice.

PA151

Prevalence of Fibromyalgia Syndrome in Physical Therapy and Rehabilitation Practice

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Introduction: Fibromyalgia syndrome (FMS) is a disorder characterized by widespread musculoskeletal pain accompanied by cognitive dysfunction, fatigue, sleep disorders, memory and mood issues. FMS is considered to be under-diagnosed in general population due to difficulties in distinguishing it from other more understood conditions, such as rheumatism or muscle condition. FMS is more common in women than in men (9:1). It typically affects population between age 30 and 50 with its prevalence rising with age. Multinational study which was conducted in five European countries reported the prevalence of 4.7%. In Germany the prevalence of FMS is 3.8%, with similar rates in men and women. Yet, in the area of the Balkans, there is a little understanding this syndrome, it is largely underdiagnosed, and its impact on care and quality of life of patients, and consequently the healthcare costs in general is unknown. As a first step in understanding the impact of FMS in the area of Balkans in general and Bosnia and Herzegovina in particular, we conducted a screening study with patients who visited regional physical therapy practices, which represent the sample of patient population who are more likely to represent the sample with undiagnosed FMS. **Material and Methods:** This cross sectional study was conducted in physical therapy and rehabilitation practice. The study was conducted among patients who visited physical therapy practice in one month period. They were evaluated for FMS with questionnaire and physical examination. The questionnaire was based on American College of Reumatology 2010 preliminary diagnostic criteria. **Results:** The questionnaire was given to every patient who visited the previous mentioned practice. Of 63 patients, 54 (85.7%) were women and 9 (14.3%) were man. The prevalence of FMS in all sample was 17.5%. 90.9% of all patients with FMS were women and 9.1% were men. **Conclusion:** The prevalence of FMS in our study is very high compared to other studies. The possible reason is patients sample selection. Other studies were conducted in general population, but our study was conducted among patients in physical therapy practice.

PA152

Ultrasonographic Findings of Posterior Interosseous Neuropathy without Entrapment: a Case Report

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Background: Posterior interosseous nerve (PIN) syndrome is a compression neuropathy at the deep branch of the radial nerve in the region of the supinator muscle, most commonly occurred

by the arcade of Frose. There was only one case report of PIN palsy without space-occupying lesions or entrapment in 2007. We describe the case of PIN syndrome without entrapment and ultrasonographic findings. *Case Report:* A 30-year old female referred for electrodiagnostic evaluation to rule out radial neuropathy. She had a sudden onset left elbow pain 7 months ago. After pain improved, the patient was unable to extend thumb and fingers. Also, she had difficulty in wrist extension. She denied any loss of sensation, numbness, or tingling sense. On physical examination, strengths of shoulder abduction, elbow flexion and extension were all grade 5/5, but strength of wrist extension was grade 4/5, and finger extension was grade 3/5. Sensation was intact to light touch and pinprick throughout the upper extremities. Electrodiagnostic study was performed 7 months after the onset of symptoms. Motor nerve conduction studies showed reduced left radial motor conduction velocity across the elbow, prolonged distal latency, and reduced amplitude at the forearm and the spiral groove when compared to the right side. Needle examination revealed severe denervation, decreased recruitment pattern, and discrete interferential pattern in posterior interosseous innervated muscles. Ultrasonographic examination was performed with a 10-13 MHz linear array transducer (Accuvix V20, Samsung Medison, Seoul, Korea). Ultrasonographic examination revealed the swollen PIN as a hypoechoic round structure with a 2.9mm diameter at the level of the capitellum. There were no findings suggestive of nerve compression by the supinator muscle or mass. The patient showed clinical improvement after two months without surgical intervention. *Conclusion:* Although the common etiology of PIN syndrome is an entrapment of the nerve, it is important to differentiate other cause such as isolated neuritis. Therefore, ultrasonography should be considered to investigate this type of palsy.

PA153

The Effect of Hyperlipidemia on Treatment of Rotator Cuff Tear/Tendinopathy

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Introduction: It was reported that patients with rotator cuff tears were more likely to have hyperlipidemia when compared with patients with non-tendon related shoulder problem. The purpose of the study was to investigate the effect of hyperlipidemia on treatment of rotator cuff tear/tendinopathy. *Material and Methods:* We retrospectively reviewed the data of patients who were diagnosed as rotator cuff tear or tendinopathy, and then treated with ultrasound-guided intra-articular injections of corticosteroid and self exercise protocol. A total of 59 patients was analyzed in this study. On the serum lipid profiles (Total cholesterol, HDL, LDL, Triglyceride), the patients were divided to hyperlipidemia group and non-hyperlipidemia group. By analyzing their visual analog scale in preinjection, and 2 weeks and 8 weeks postinjection, we compared the difference of treatment effect among the two groups. *Results:* Among 59 patients, 31 patients were included in non-hyperlipidemia group, and the rest 28 patients in hyperlipidemia group. Initial VAS did not show any significant difference between the groups ($P=0.282$). Two weeks after the injection, the decreases in VAS comparing with initial visit were no statistically significant difference between the groups ($P=0.239$). But Eight weeks after the injection, the decreases in VAS comparing with initial visit were much less in the hyperlipidemia group ($P=0.020$). *Conclusion:* We found that the hyperlipidemia may have a negative effect on the treatment of rotator cuff tear/tendinopathy.

PA154

The Effects of Self-Management Intervention on Symptoms and Physical Function of Knee, Healthcare Outcomes and Quality of Life among Middle-Age Adults with Knee Osteoarthritis

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Background: The aim of this research was to explore the effects of self-management intervention on symptoms and physical function of knee, healthcare and quality of life of middle-age adults with knee osteoarthritis. *Material and Methods:* A quasi-experimental design was used in this study. Data were collected at four points (baseline, 5th week, 11th week, and 19th week) in the orthopaedic clinics of a medical centre in northern Taiwan. After the 5th week measurement, all participants received guidance and instructions on self-management of care. They were interviewed during the home visit or follow-up clinic visit in 1 week and 2 weeks after the care guidance was given. The Numerical Rating Scale (NRS), Knee Osteoarthritis Self-Management-Needs (KOASMN) Scale, Knee Injury and Osteoarthritis Outcome Score (KOOS), Health care questionnaire and Short-Form Health Survey (SF-36) were used for data collection. Generalized estimating equation was used to analysis the data. *Results:* A total of 116 participants was recruited. The results of the generalized estimating equation analysis showed that the participants' knee symptoms and physical function had improved significantly at 11th week ($p<0.001$) and 19th week ($p<0.001$) as compared to that at the 5th week after receiving the care guidance. Their body mass index ($p<0.001$), number of unplanned medical consultations ($p<0.001$) and doses of pain relief medication ($p<0.001$) were significantly reduced from those of the 5th week while the quality of life scores significantly increased at 11th week and 19th week ($p<0.001$). After the adjustment of the main factors, only participants' knee symptoms and physical function ($p<0.001$), body mass index ($p<0.001$), and quality of life ($p<0.001$) showed significantly more improvement at 11th week and 19th week than at the 5th week. *Conclusion:* The self-management intervention for patients with knee osteoarthritis can help to improve their knee symptoms and physical function, body mass index as well as enhance their quality of life. Self-management intervention can be applied for patients with knee osteoarthritis in clinical practice. Improvement in self-management skills and competencies would enhance the quality of life of patients with knee osteoarthritis.

PA155

Orthopaedic Manifestations of Neurofibromatosis Type-1 (NF-1): a Case Report

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Case Diagnosis: Neurofibromatosis is one of the most common genetic disorders affecting mankind. Despite extensive basic science research, the diagnosis still is based largely on well-defined clinical criteria, which often present gradually during childhood. Approximately 50% of patients have significant musculoskeletal manifestations, with scoliosis and congenital pseudarthrosis of the tibia most common. *Case Description:* B.M a young 9 years old child, issued from a father with a history of NF-1, was addressed to our rehabilitation unit for a deformation of the trunk. Clinical examination found. Cafe'-au-lait spots, a hollow back and a left dorsal gibbosity, a rotational disorder lower limbs (exaggeration of femoral anteversion) and hollow feet. Neurological examination shows a pyramidal irritation. Radiological assessment concluded the presence of scoliosis double major with 40° in left dorsal and 36° in right lumbar and a scalloping of the posterior wall. That was no pseudarthrosis of the tibia. The diagnosis of NF-1 was confirmed on the existence of familial case, end cutaneous manifestations associated with spinal signs. Spinal cord MRI is requested in search of tumor nervous lesion. The patient benefited to the prescription of a brace trunk, orthopedic pair of soles and adapted rehabilitation protocol. *Discussion:* The orthopaedic manifestations of neuro-fibromatosis are frequent, varied and have a diffi-

cult management. Approximately 20% of children with NF-1 present with scoliosis with or without the classic dystrophic features, such as vertebral scalloping and rib penciling. The functional and sometimes vital prognoses are challenging. *Conclusion:* NF-1 is a multisystemic disease. It may manifest as abnormalities of the nervous tissue, bones, soft tissue, and skin. The manifestations of NF-1 vary from person to person and range from subclinical to severe. Individuals who carry the gene eventually exhibit some clinical feature of the disease.

PA156

Impacts of Conservative Therapies on Health-Related Quality of Life in Patients with Adolescent Idiopathic Scoliosis: a Single-Center, Comparative, Prospective Clinical Study in China

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Introduction: Brace therapy is the most common conservative therapy for the management of adolescent idiopathic scoliosis (AIS). There is not much research about the impact of comprehensive therapy using brace therapy plus exercise therapy on HRQoL of AIS patients. To explore the impact of conservative therapy using brace therapy plus exercise therapy on HRQoL of AIS patients, and correlations of HRQoL with sex, age, the angle of trunk rotation (ATR), and the type and severity of scoliosis. *Material and Methods:* Sixty-five AIS patients were divided into two groups: 20 patients in group A receiving simple brace therapy, and 45 patients in group B receiving brace therapy+exercise therapy. The ATR and Cobb angle were measured in all included AIS patients before and 6 months after treatment, and at the same time all patients were required to complete the Chinese version of Scoliosis Research Society-22 questionnaire (SRS-22) independently. Differences in ATR, Cobb angles and SRS-22 scores between the two groups, different sexes and different types of scoliosis were analyzed by SPSS19.0. *Results:* The ATR in group B became smaller after 6-month treatment. Cobb angle in both group A and B became smaller after 6-month treatment. Self image and mental health scores after treatment were higher than those before treatment in group B. The scores of self image in patients with thoracic type AIS were lower than those in patients with single thoracolumbar type AIS. There was a negative correlation between the patient's age and pain before treatment. After treatment, age was negatively correlated with functional activity, pain and mental health. The pre-treatment maximum Cobb angle of AIS patients had a moderately negative correlation with after-treatment self image. There was no significant correlation between ATR and SRS-22 score. *Conclusion:* Both brace therapy and comprehensive therapy can halt the progression of spinal scoliosis within a short period, but the latter has a more positive impact on HRQoL of AIS patients. Patient's age, the type and severity of scoliosis are correlated with HRQoL of AIS patients, while sex and ATR are not significantly correlated with HRQoL of AIS patients.

PA157

In Vitro, High Resolution NMR (Nuclear Magnetic Resonance) Spectroscopy Based Study of Lipid Metabolism in Collagen Induced Arthritis Rat Model.

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Analysis of disturbed lipid metabolism in plasma and joint tissue of arthritis-induced rat model has been performed by NMR spectroscopic analysis. Female wistar rat models which have a proven track record of predictability for efficacy in humans were

selected for the study. Arthritis was induced in the rat models by intradermal injection of porcine type-II collagen. Histopathological studies, biochemical assays and radiological observation along with inflammatory status were used to monitor arthritis parameters. NMR spectroscopy based comparative analysis of lipid components showed the significant reduction in the quantity of phospholipids (PL) in plasma of CIA vs. control rats. There was a significant quantitative elevation of PL observed in joint tissue of CIA rats. Induction of arthritis also resulted in reduced levels of total cholesterol (T.CHOL) in plasma contrary to its elevated levels in joint tissues. A decreased level of triglycerides (TG) in plasma was also evident, whereas no compelling variations were observed in the joint tissues. Further analysis of the strength of correlation between PL and T.CHOL showed high values (Pearson correlation coefficient=0.71) in plasma of CIA rats. Phospholipids/total cholesterol (PL/T.CHOL) ratio was found to be significantly reduced ($p<0.05$) in both plasma and joint tissues of CIA rats as compared to control ones. Our study concludes the arthritis induced perturbations in lipid metabolism and may be useful in the development of NMR based diagnostic method as well as developing novel therapeutic approaches for curing arthritis.

PA158

Effects of Laser Therapy and Laser Acupuncture in Coxarthrosis Treatment

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Introduction: Coxarthrosis is chronic degenerative progressive disease. *Object:* The purpose of the study is to compare therapy with laser application on painful areas of the affected ankles with laser application on acupunctural points on pain relief and ankle flexion amplitude in patients with coxarthrosis. *Patients and Methods:* 36 patients aged 60 to 74 average years are included and prospectively followed during coxarthrosis the treatment at Institute of Rheumatology. For evaluating the efficacy of treatment were measured: Pain was measured by VAS scale before and after therapy. Movement amplitude before and after therapy expressed in degrees. Patients were randomly assigned in two groups: First group with 14 man and 6 women and second group with 12 man and 4 women. Both groups were comparable in age gender distribution and coxarthrosis duration. First group of patients was treated with Laser beam applied on painful areas with 70 mW frequency of 2,500 Hz in 60 seconds and energy absorption of 2.1 J/cm^2 3 times a week in 10 consecutive doses. Patients in second group were treated with Laser applied on acupunctural points i.e. VU62, VF41, VF29, VF30, VU40, VF34 R3 with frequency of 70 Hz, power of 40 mW, 0.6 J/cm^2 energy absorption in 30 seconds 3 times a week with 10 consecutive applications. *Results:* 1) Analyzing the VAS scale data we found in group I significant decrease in pain before 81.66 ± 8.34 and after therapy 26.66 ± 7.88 . In group II VAS scale pain before therapy 86 ± 5.16 and after therapy 41.0 ± 8.75 It estimated high statistical significance in both groups Wilcoxon test, $p<0.001$. 2) In measuring ankle movement amplitude mean rotation angle before therapy for the first group was 30.041 ± 7.79 and 40.5 ± 5.67 after treatment. In a second group the amplitude was 25.09 ± 9.61 before therapy and 41.5 ± 3.25 after treatment High statistical significance was achieved also in improvement of ankle rotation amplitude in both groups Wilcoxon test $p<0.001$. 3) By comparing VAS lower values and sudden increase of movement volume (rotation) between trial groups it has been determined that there are many statistically important differences (Mann-Whitney $p<0.05$). Significantly better pain relief and increased hip rotation was detected in group II - Laser acupuncture application *Conclusion:* Analysis clearly shows positive impact of Laser therapy in pain relief and ankle movement amplitude with better results of laser applications on acupunctural points during treatment.

A.2.1. INFLAMMATORY JOINT DISEASES

PA159

Effect of Laser Power and Interference in Functional Status of Patients with Rheumatoid Arthritis

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Background: Rheumatoid arthritis is a chronic, progressive, inflammatory rheumatic disease whose cause is still not fully known. **Objective:** Evaluation of the functional status of patients with rheumatoid arthritis (RA). **Materials and Methods:** The study included 52 patients, with an average age of 56 + -8.5 years. In all patients the diagnosis of rheumatoid arthritis. They were on medical therapy for more than 6 months before Inclusion in the study. The first group sačinjavalo 30 patients and the other 22. In the first group was applied laserotherapy low level laser therapy and individual kinesis. In the second group of interference currents and individual kinetic therapy. In both groups of patients, the pain was measured on a visual analogue scale (VAS) from 0 to 10, the size of edema was measured by determining the volume centimeter strip joint, measure the range of motion was measured with a goniometer and expressed in degrees. Muscle strength of muscles of the lower leg and forearm was measured by manual muscle test. Measurements were performed before and after treatment for 3 weeks. The obtained results were analyzed using the Pearson (Pearson) X2 test, Student's t-test. **Results:** After 3 weeks of intensive rehabilitation treatment in both groups there was a statistically significant difference in the intensity of pain in group I VAS=5 + -1.5 (p<0.001); Group II VAS=4 + -2.25 (p<0.001). A statistically significant reduction of edema was in both groups: group I=4 + 0.5 (p<0.001); in group II O=2+-1.75 (p<0.05). No statistically significant difference in the reduction of the island was in the first group. In both groups the sick there was an increase range of motion: in group I 30 + -3.75 degrees (p<0.001); in group II 27 + -2.5 degrees (p<0.001). In both groups, there were no statistically significant differences in increasing muscle strength (p> 0.05). **Conclusion:** An intensive rehabilitation treatment has a beneficial therapeutic effect on the functional status of patients with rheumatoid arthritis.

PA160

A Rare Cause of Knee Pain in Gout Patients: Tophi of Patella

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Case Diagnosis: Herein a patient with bilateral knee and patellar pain due to intra-osseous gouty tophus in patellae was presented. **Case Description:** A 60-year-old male patient was admitted to our clinic with three months history of bilateral knee pain. Medical history revealed prostatic hyperplasia and a twenty years history of gout. He was taking colchicine 1 mg daily. On physical examination, there was increased warmth and tenderness in both knees, and bilateral joint deformities and tophi were present on first metatarsophalangeal joints. The passive range-of-motion was normal, but painful in both knees. Laboratory tests were normal except for uric acid value of 7.9 mg/dl and CRP value of 2.1 mg/dl. Roentgenogram revealed lobulated, well-defined expansive osteolytic lesion with sclerotic rim at the anterior border of both patellae. Subsequent knee MRI showed well-defined expansive soft tissue lesions with low signal intensity on T1-weighted and high signal intensity on T2-weighted images in the anterior segments of the both patellae. The diagnosis of gouty involvement of the patella and patellar tendon was established according to the clinical, laboratory and radiological findings. The patient was treated with colchicine 1

mg/day, methylprednisolone 8 mg/day. Pain was decreased in two weeks and he was able to resume his daily living activities more easily. Allopurinol 300 mg/day was started as urate-lowering therapy. Patient is under follow-up for five months and serum uric acid is 5.9 mg/dl. **Discussion:** Gout is an inflammatory arthritis precipitated by an inflammatory reaction to monosodium urate crystals in the joint. Palpable deposits of crystals known as tophi form in the chronic phase of gout and may appear in ears, fingertips, forearms, Achilles tendons, knee joints, patellar tendons, and olecranon bursae. Several cases with solitary gouty tophus of patella have been reported previously, but involvement of bilateral patellae without pathological fracture or malalignment is underreported in the literature. **Conclusions:** It is important to bear in mind that tophus of the patella can cause knee pain in patients with gouty arthritis. Early diagnosis and treatment are essential since tophus deposition urges adequate hypo-uricaemic medical treatment. Patients with tophaceous gout require strict disease control and close follow-up.

PA161

Palindromic Rheumatism-Like None-Erosive Migratory Seronegative Polyarthritis in a Patient with Metastatic Conjunctival Malign Melanoma

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Case Diagnosis: Palindromic rheumatism-like none- erosive migratory seronegative polyarthritis in a patient with metastatic conjunctival malign melanoma. **Case Description:** A 51-year old female admitted to our clinic with a complaint of pain and swelling of left upper extremity for three years. She had diagnosis of metastatic malign melanoma of her left conjunctiva. She had the tumor removed and received postoperative chemotherapy and curative radiotherapy. Immediately after the chemotherapy, she started to feel pain and swelling in her left shoulder. These symptoms were radiated to the entire joints of the left upper extremity in form of migratory recurrent attacks. The symptoms developed quickly and reached their peaks in a few days. The duration of the attacks varied from three days to one week. When the attacks had subsided, the symptoms cleared completely without residual disability. In her examination, active polyarthritis were determined in her left upper extremity. Erythrocyte sedimentation rate (ESR) was 84 mm/h, C-reactive protein (CRP) was 38.8 mg/l. The serum levels of RF and the anti-CCP, and the radiographs were normal. She was prescribed non-steroidal anti-inflammatory drugs (NSAID) and prednisone 5 mg/per day. In the follow-up appointment, her attacks of the polyarthritis were resolved and the serum levels of ESR and CRP were decreased. **Discussion:** Palindromic rheumatism(PR) is characterized by recurrent attacks of acute arthritis lasting from a few hours to several days with variable symptom-free intervals and no residual articular damage. The diagnosis of PR is currently based on clinical features and exclusion of other forms of episodic arthritis. The clinic and laboratory characteristics of our case were consistent with these features. Therefore, we accepted our case as palindromic rheumatism-like none- erosive migratory polyarthritis. Since the treatment of PR includes NSAID and anti-rheumatoid agents, we prescribed NSAID and prednisone to her. In the follow-up appointment, patient had clinical relief with this medication. **Conclusions:** As of our best knowledge, this was the first case that palindromic rheumatism-like none- erosive migratory seronegative polyarthritis in a patient with metastatic conjunctival malign melanoma. But, we are not sure that this was the paraneoplastic syndrome or incidental cooccurrence.

PA162

Frequency of Various Symptoms in Patients with Rheumatoid Arthritis and Their Impact on Quality of Life

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Introduction: The treatment of rheumatoid arthritis (RA) aims at clinical remission or low disease activity by the means of early diagnosis, aggressive treatment and frequent monitoring. The updated EULAR and DGRh guidelines recommend individual assessment of health related quality of life (QoL) in patients with RA. **Methods:** A total of 120 community-dwelling out-patients with RA, aged 22 to 83 years, 82.5% female, who were drug-treated at least for three months were included in the study. Various symptoms were recorded with means of the German version of the revised Illness Perception Questionnaire (IPQ-R). For each symptom, patients were asked, if the symptom were related to their illness. QoL was measured with the Short Form (36) Health Survey (SF-36) questionnaire. For this analysis, means for the summary scores for physical and mental QoL were used and adjusted for age, sex, family situation, level of education, and presence of other diseases. **Results:** The most common reported symptoms, related to rheumatoid arthritis were pain (97.5%), and stiff joints (95.8%), followed by fatigue (60.8%), loss of strength (59.2%), exhaustion (49.2%), and sleep difficulties (35.8%). All symptoms were associated with lower estimates in the summary scores in physical and mental quality of life. Regarding physical QoL, the highest differences were found in patients with or without pain (38.1 vs. 49.4, $P=0.048$) and with or without breathlessness (29.9 vs. 39.3, $P=0.001$). Regarding mental QoL, the highest differences were found in patients with or without nausea (38.0 vs. 48.7, $P<0.001$), with and without breathlessness (38.8 vs. 47.9, $P=0.012$), and with or without dizziness (39.0 vs. 48.0, $P=0.013$). **Conclusions:** Besides the typical RA-associated symptoms pain and stiff joints, symptoms related to muscle mass or muscle function are very common in RA patients. Symptoms, not usually attributed to RA are associated with deteriorated QoL in the same or even higher amount as typical RA symptoms. This can either mean that RA-typical symptoms are quite well controlled, or that more attention should be drawn to non-typical symptoms in RA patients, however, further research is required.

PA163

Adherence with Medication in Patients with Rheumatoid Arthritis and Association of Socio-Economic Variables with Adherence

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Introduction: Rheumatoid Arthritis (RA) is a chronic disease which, despite the progress made in recent years, still requires regular intake of medication by the patients. Medication adherence is, therefore, an important factor in disease management, but dependent on patient reliability. **Methods:** 120 consecutive patients with RA were examined in a hospital-based outpatient clinic specialised on rheumatology. Age ranged between 22 and 83 years, 82.5% were female. For the assessment of adherence the Medication Adherence Report Scale (MARS) was used, which contains 5 questions regarding forgetting, changing dosage, pausing, skipping or reducing intake of prescribed medication. Each item was valued by the patients in the categories “always”, “often”, “sometimes”, “seldom”, and “never”. For this analysis the items were dichotomised, and patients who ticked of “never” in all items were classified as adherent, and all other patients were classified as non-adherent. Cross tabs with various socio-economic and socio-demographic variables were undertaken and the Chi² Test applied. **Results:** 52.5% of the patients were classified as adherent. The proportion of adherent patients was significantly higher in women (57.6% vs. 28.6%, $P=0.016$) and in subjects older than 55 years (43.3% vs. 64.2%, $P=0.023$). The proportion of adherence in patients with primary, secondary and

tertiary education was 52.0%, 51.2%, and 66.7%, respectively ($P=0.674$). Patients with an income of less or more than 2,000 Euro per month showed an adherence proportion of 57.1% and 37.9%, respectively ($P=0.071$). 42.9% of currently gainfully employed and 59.2% of currently not gainfully employed patients were adherent ($P=0.079$). **Conclusions:** There is room for improvement of adherence with prescribed medications in RA patients. A striking difference exists between men and women, with less than one third of men being classified as adherent. In addition age also plays an important role as older patients are significantly more adherent than younger ones. Additionally, there are hints for socio-economic gradients in drug adherence with an increase of adherence in higher education. Consideration of these variations in future patient management is advised.

PA164

Pigmented Villo Nodular Synovitis (PVN) of Knee in Rheumatoid Arthritis(RA) Patient: a Case Report

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Case Description: A 21 year old male presented to our clinic for a stiff knee right after undergoing surgery for PVN synovitis. The patient had severe pain and gradually increasing swelling of the right knee joint that didn't respond to conservative treatment and had to undergo an open synovectomy to relieve symptoms and disability. The patient had a two year history of RA with irregular compliance to medication and disease modifying drugs. RA and associated PVN synovectomy led to suspicion of possibly rheumatoid synovitis of the knee but the MRI and histopathology report of his biopsy in the coming days revealed a confirmation of initial diagnosis of PVN synovitis. There was no history of tuberculosis or chronic granulomatous disease. His base line investigations including blood complete picture, blood sugar random, renal and liver function tests, urine RE and lipid profile were within normal limits. His RA factor was positive and Erythrocyte sedimentation rate was 65 mm. His C reactive proteins were also positive. He was started with tablet methotrexate 7.5 mg weekly along with folic acid and Non steroidal anti inflammatory drugs for pain relief along with physical therapy including modalities and therapeutic exercises and gait training for his knee stiffness. The patient gradually improved and achieved a functional range of motion of 90-180 degree with 3 weeks outdoor rehabilitation management and achieved clinical remission of RA in the next 02 months. He was advised regular follow up with rheumatologist for his RA. **Discussion:** PVN synovitis is a disease of unknown etiology. It mostly affects the knee. Association of PVN has been reported with SLE for the first time in 2011 but association of PVN synovitis with rheumatoid arthritis has never been reported in literature. This case report may prove to be the tip of the iceberg in identifying the pathogenesis and association of these two diseases **Conclusions:** RA is associated with different musculoskeletal manifestations including synovitis and arthritis. PVN synovitis has not been previously reported in a patient with RA. As the etiologies are not clearly known and such association is rare, it leaves many questions unanswered about the causal relationship between PVN synovitis and RA.

A.2.2. DEGENERATIVE JOINT DISEASES

PA165

Is the Functional Outcome of Patients after Total Knee Replacement Influenced by Obesity?

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Background: Obesity is recognized as one of the pathogenic factors for the development of osteoarthritis, but there is no a common agreement regarding whether it has an influence or not on the functional outcome after total knee replacement (TKR). The aim of this prospective case-control study is to compare the differences in the functional outcome (pain, stiffness, and functional limitation) of two groups of patients undergoing TKR, obese and non-obese. **Material and Methods:** We included men and women aged 50 years or older, who underwent TKR, from January 2014 to July 2014. Patients were classified as obese if they had a BMI >30 kg/m². All the participants underwent the same rehabilitative treatment, starting the day after surgery. The primary outcome measure was the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Secondary outcome measures were: the 12-Item Short Form Health Survey (SF-12), the Numeric Rating Scale (NRS), the Modified Rankin Scale (MRS), and the Functional Ambulation Categories (FAC). Follow up evaluations were done at 1 week (T1), 1 month (T2), and 3 months (T3) after surgery. **Results:** We assessed 30 patients, 12 male and 18 female, mean aged 72.03 years±7.10 SD. Thirteen patients (43.33%), 7 male and 6 female, mean aged 71.31 years±5.96 SD were obese (mean BMI 34.22 kg/m²±3.49 SD) and had a WOMAC score of 70.85±9.04 at T0 and of 37.15±9.67 at T3. Seventeen patients (56.67%), 11 male and 6 female, mean aged 72.59 years±7.99 SD weren't obese (mean BMI 26.78 kg/m²±2.15 SD) and had a WOMAC score of 72.00±9.04 at T0 and of 28.94±3.65 at T3. At T3, there was a statistical significant difference between obese and non obese for the WOMAC score and all the secondary outcome measures, except SF-12 MCS. **Conclusion:** In conclusion, the results of our study suggest that obesity is not only a risk factor of knee osteoarthritis, but might also negatively influence the outcome in patients after TKR in terms of pain, stiffness and functional limitation.

PA166

Ultrasound Guided Treatment of Carpal Tunnel Syndrome: a Pilot Clinical Trial

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Introduction/Background: Carpal Tunnel Syndrome has numerous nonsurgical treatments including splint, physical therapy and corticosteroid injections. The purpose of this study was to evaluate the effectiveness of an ultrasound guided treatment procedure, for individuals with severe carpal tunnel syndrome. **Material and Methods:** 12 patients with an electrodiagnostic evidence of severe carpal tunnel syndrome were treated by an office-based ultrasound guided procedure (combination of percutaneous needle release of carpal tunnel and corticosteroid injection). Electrodiagnostic (nerve conduction study), clinical (Boston Carpal Tunnel questionnaire, grip strength) and sonographic (median nerve and carpal tunnel cross-sectional area) measurements were recorded at baseline and one month after intervention. **Results:** Our data analysis showed that in one month follow up, patients had a significantly smaller cross-sectional area of the median nerve compared to pretreatment values (mean difference 0.06; 95% CI: 0.02-0.1; p<0.001). In addition, patients had significantly less functional impairment (mean difference 35; 95% CI: 28.7-43.4 ; p<0.001), and an improved hand grip strength in one month follow up (mean difference 5.4; 95% CI: 3.1-7.8; p<0.001). There were no significant complications. **Conclusion:** Patients with severe carpal tunnel syndrome, who are candidate for surgical intervention, can consider office-based ultrasound guided needle release of carpal tunnel as an alternative safe treatment.

PA167

A Prospective Case-Control Study Comparing Health Related Quality of Life of Patients Undergoing Total Knee Replacement Vs Total Hip Replacement

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Background: Our prospective case-control study aims to compare the influence of a rehabilitative program in patients with total hip replacement (THR) and total knee replacement (TKR) in terms of Health Related Quality of Life (HRQoL). **Material and Methods:** We included men and women aged 50 years or older, with a severe OA, who underwent THR and TKR, from January 2014 to July 2014. They were divided into two groups, depending on the surgical intervention: THR and TKR. All the participants in each group underwent the same rehabilitative treatment, starting the day after surgery, and were treated by the same rehabilitative team. The primary outcome measure was the 12-Item Short Form Health Survey (SF-12). Secondary outcome measures assessed were: the Numeric Rating Scale (NRS), the Modified Rankin Scale (MRS), and the Functional Ambulation Categories (FAC). Follow up evaluations were done at 1 week (T1), 1 month (T2), and 3 months (T3) after surgery. **Results:** We assessed 52 patients with total joint replacement, 21 male and 31 female, mean aged 71.35 years with a mean BMI of 28.44 kg/m². Twenty-two patients with THR (42.31%), 9 male and 13 female, mean aged 70.41 years with a mean BMI of 26.32 kg/m², had a SF-12 PCS of 27.57±5.70 and a SF-12 MCS of 53.73±5.59 at T0 and had a SF-12 PCS of 48.90±2.74 and a SF-12 MCS of 55.12±3.25 at T3. Thirty patients with TKR (57.69%), 12 male and 18 female, mean aged 72.03 years, with a mean BMI of 30.00 kg/m², had a SF-12 PCS of 25.18±2.95 and a SF-12 MCS of 39.01±6.51 at T0 and had a SF-12 PCS of 31.75±3.97 and a SF-12 MCS of 48.43±4.15 at T3. There was a statistical significant difference between patients with THR and patients with TKR for all outcome measures, except FAC, at T3. **Conclusion:** In conclusion, the results of our study suggest that patients with TKR had a worse functional outcome than patients with THR, in terms of quality of life, pain, and disability or dependence.

PA190

Chondroprotectors on Osteoarthritis Management – What Evidence?

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Introduction: Osteoarthritis (OA) is an articular degenerative condition most prevalent in older adults with significant impact on functionality and quality of life. Nowadays treatment focuses on symptomatic control with analgesics and non-steroidal anti-inflammatory drugs. The use of glucosamine and chondroitin as pharmacological modifiers of OA has been contested. This work aimed to review the available evidence on the use of these substances for OA treatment. **Material and Methods:** A systematic search was performed on Pubmed using the MeSH terms “osteoarthritis/drug therapy”, “glucosamine/therapeutic use” and “chondroitin/therapeutic use”, limited to studies in humans published during the last five years in English. **Results:** Eighteen articles were included: seven reviews (four meta-analysis) and eleven original studies. **In vitro**, glucosamine and chondroitin have effects on cartilage, synovial membrane and subchondral bone by anabolic and anti-catabolic actions. The included studies evaluated variables such as pain perception, functionality, imagiological findings, laboratorial parameters and cost-effectiveness. Independent studies were unable to find evidence supporting systematic recommendation for the use of glucosamine and/or chondroitin considering pain and functional outcomes. Non-pharmacological modalities such as exercise, weight loss or education appear to be at least as effective as glucosamine with regards to pain and function. Considering imagiological findings, both glucosamine and chondroitin seem to delay disease progression, but all the studies included were commercially funded. The positive evaluation on cost-effectiveness was also provided by a sponsored trial. Most studies found

similar (or superior without statistical significance) positive effects comparing the experimental and placebo group. No important secondary effects were reported. *Discussion and Conclusion:* Globally, there is insufficient clinical evidence to recommend such substances to OA treatment. However, considering the absence of significant adverse effects and the benefit of placebo effect, its use is acceptable but its administration should be discontinued if no significant response is reported by the patient. The use of *in vitro* concentrations unlikely to be achieved in plasma with oral doses restricts extrapolations to clinical situations. Differences between sponsored and independent trials, heterogeneity regarding methods, doses and formulations and publications bias limit analysis of the available studies.

PA169

Arthrofibrosis of The Knee – the Postoperative Rehabilitation Approach

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Introduction: Arthrofibrosis is an abnormal proliferation of fibrous tissue in and around a joint, which may lead to loss of range of motion (ROM), pain, stiffness, muscle weakness, swelling and limited activities of daily living. It can occur after an injury, infection or, most commonly, after surgery. An early recognition and prevention program is of utmost importance. If conservative measures fail, surgical intervention is warranted followed by an intensive rehabilitation program. The purpose of this study is to present and discuss the results of our postoperative rehabilitation program, so as to contribute towards the treatment of the arthrofibrotic knee. *Material and Methods:* Detailed description of all cases observed between January 2013 and October 2014 of patients with an intra-operative diagnosis of knee arthrofibrosis, submitted to arthroscopic arthrolysis, which participated in a postoperative rehabilitation program in an outpatient hospital setting of a Physical Medicine and Rehabilitation (PMR) Department. Data was collected from a PMR Department database based on the patient's clinical records. *Results:* A total of 7 (5 male, 2 female) patients were admitted with knee arthrofibrosis. The mean age at surgery was 36 years (18-54) with the following prior diagnoses: 2 medial meniscus injuries, 2 intra-articular knee fractures, 1 anterior cruciate ligament injury, 1 patellar tendon rupture and 1 medial collateral ligament injury. Six patients began an immediate postoperative rehabilitation program comprising of pain and edema control, continuous passive motion and the use of an extension brace, when indicated, for alternate periods, which was maintained after inpatient discharge. At this date, 4 patients concluded rehabilitation with a mean time of treatment of 3 months. ROM results are as follows: mean pre-surgical ROM of 10° extension deficit (0°-20°) and a limitation of flexion of 49° (20°-95°). The end results of rehabilitation were a mean ROM of 1° extension deficit (0°-5°) and limitation of flexion of 9° (0°-20°). *Conclusion:* Prevention is the most effective measure against arthrofibrosis. Rehabilitation of an arthrofibrotic knee is a challenging endeavor, however individualized treatment associated with immediate postoperative rehabilitation followed by an intensive rehabilitation program proved indispensable in obtaining a generalized improvement of knee ROM.

PA170

Legg-Calvé-Perthes Disease: a Rehabilitation Approach to a Former Surgical Condition

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Introduction: Legg-Calvé-Perthes disease (LCPD) is a medical/surgical condition which occurs between 5-8 years of age and is more common in boys. It is characterized by an avascular event

in the capital physis of the femur. Its aetiology remains unclear. The treatment for LCPD focuses on mechanical protection of the femoral head to prevent hip deformity and future joint degeneration. Despite this aggressive treatment many cases fail to respond resulting in a non-congruent hip. There is although few evidence if physiotherapy should be used in LCPD. *Methods:* A systematic literature review was made using the search motor PubMed using the terms "Legg-Calvé-Perthes disease" and "rehabilitation". *Results:* Scarcely is there any data comprising the efficiency of a conservative treatment in LCPD. The groups studied are short, although a positive co-relation between a rehabilitation program associated with surgical treatment and the functional outcome. *Conclusion:* It is for us clear that the role of Physical Medicine and Rehabilitation in LCPD is still to be discussed. Promoting a conservative approach to a former surgical condition can be a risky option. The role of Physical Medicine and Rehabilitation is to promote a better cardio-respiratory conditioning, better gait pattern and improved performance in activities of daily living.

PA171

Peroneal Injury in Non-Traumatic Knee Dislocation

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Knee dislocations are uncommon (0.02-0.2% of orthopedic injuries), involving neurovascular compromise with serious functional disability. This is a 43 years old male recreational-competitive mountain bike cyclist with left knee pain and giving away sensation for one week prior to our evaluation. During the initial step of a recreational 50 meters running track event he sustained a left knee varus injury with immediate knee swelling, pain and giving away with inability to dorsiflex his toes. Initial plain films of the knee were unrevealing but further MRI showed multiligament injury. Physical exam showed body Mass index=28, moderate knee effusion, no discoloration of the leg, dorsalis pedis and anterior tibial pulses +2. Range of motion showed no active dorsiflexion, eversion or inversion of the ankle; impaired sensation at dorsal and lateral foot; manual muscle testing 0/5 at extensor hallucis, extensor digitorum communis and peroneus longus muscles, with 5/5 at the remaining muscles. Anterior/posterior drawer tests, varus and valgus tests were positive for instability. Nerve conduction study and electromyography were remarkable for axonal loss at left common peroneal nerve. He underwent a posterolateral corner and lateral collateral ligament repair with reconstruction and common peroneal nerve exploration with delayed anterior cruciate ligament reconstruction eight months after initial surgery. After eight months, physical exam was unchanged and there was persistent axonal loss at his left common peroneal nerve. He was unable to return to work and cycling, but was able to walk with an ankle foot orthosis one mile every day. Our case is an unusual case and belongs to the 50% of cases where severity of knee injury is underestimated due to spontaneous reduction. It is also part of the 45% of cases resulting in peroneal nerve injury, however with no vascular lesion (seen in 7.5-14%vs 4.8-64%of cases after a knee dislocation). Possible risk factors for his knee dislocation include the type of shoe and the surface, ligamentous laxity and neuromuscular deficiencies.

PA172

Impact of Body Mass Index on the Quality of Life after Treatment in Patients with a Total Knee Prosthesis

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Introduction: Replacing the diseased knee joint is one of the most frequently performed and most successful orthopedic surgery, which reduces pain and restores the functionality of the patient.

Surgical treatment and procedures of physical medicine and rehabilitation leading to maximum physical, psychological and social recovery. The aim is to determine the influence of Body Mass Index on the quality of life in patients after implantation of total prosthesis in knee joint, and therefore the health economic justification same during rehabilitation treatment. *Materials and Methods:* The study included 85 patients who underwent operative treatment after rehabilitation of the treatment. Rehabilitation treatment is on average lasted three weeks. According to the Body Mass Index, patients were divided into a group with saline or elevated body mass. To determine the quality of life is used the modified Oxford knee questionnaire which is completed by the patients themselves or with the help of a doctor. *Results:* The majority of respondents were female and were older ($x=64.22$ years). Half of the patients had a physiological body weight, while the other half were obese. The average body mass index of all subjects were obesity I degree. The average value of the Oxford questionnaire all patients at baseline was poor outcome, while at the end of the period of early rehabilitation treatment was satisfactory, but no statistically significant difference between these two values. The study did not prove a significant correlation between Body Mass Index and quality of life for patients with total prosthesis in the knee joint. *Conclusion:* All patients, regardless of the value of their Body Mass Index, in which there are indications for implantation of total prosthesis in knee joint, deserve the health and economic aspects of the same law proposed operating and rehabilitation vision care. In this way, the improvement in quality of life showed no significant difference between obese and patients with physiological body mass.

PA173

Multifocal Osteonecrosis – Report of a Rare Case

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Case Diagnosis: Multifocal aseptic osteonecrosis. *Case Description:* A 39 year-old man, developed gradual right shoulder and left hip pain, over one and a half year, associated with progressive limitation of range of motion of the shoulder, shortening of the left leg and claudication. He denied previous trauma, infections or use of injected drugs. He reported smoking and alcoholic habits and a short term high dose corticotherapy 5 years ago. The physical examination revealed painful limited active and passive abduction and flexion of the right shoulder and flexion and internal rotation of both hip joints, swelling of the right knee and limping gait with shortening of the left lower limb. Laboratory tests showed SR 35 mm/h, CRP 1.32 mg/dl and ferritin 434 ng/ml, and MRI studies revealed the presence of necrosis in shoulders, hips and knees, all bilaterally. Etiologic investigation did not revealed changes in coagulation tests, autoimmunity, lipid profile, hemoglobin tests, viral serology and Gaucher's disease test. The patient underwent left hip prosthetic replacement. The microbiological study was negative, and biopsy of the femoral head removed confirmed the diagnosis of aseptic necrosis. *Discussion:* Osteonecrosis (ON) is the cellular death of bone components due to the interruption of bone supply, resulting in pain, bone destruction and loss of function. ON has an association with various systemic conditions, including autoimmune rheumatic diseases, alcoholism, Gaucher's disease, Sickle-cell anemia and the use of cytotoxic drugs. Several factors such as vascular thrombosis mechanical defects, embolization, changes in intraosseous pressure and trauma were reported. Idiopathic forms have also been described. Multifocal ON is defined as the presence of osteonecrotic lesions in three or more separate anatomic sites. ON in multiple sites is rare, being reported in 3.3% of patients with ON. *Conclusions:* Although the case suggested the presence of a secondary cause of multifocal osteonecrosis, it was not possible to establish an underlying medical condition. To our knowledge, such an extensive idiopathic multifocal ON has not been reported

in the literature before. As joint involvement is already advanced in this case, the mainstay of treatment will involve prosthetic joint replacement associated with rehabilitation program.

PA174

Determining Moderately Important Change in 6-Minute Walk Test (6MWT) Following a Total Knee Arthroplasty (TKA)

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Background: The 6MWT plays a key role in assessing ambulation capacity and evaluating effectiveness of surgery in people undergoing a TKA. However, no study has been published which outlines the clinically relevant change in 6MWT distance following a TKA, by incorporating the patient's perspective regarding change in their status with functional outcome measures. *Methods:* Preliminary data from a randomised controlled trial investigating the effects of inpatient rehabilitation on recovery following a TKA were used, with a cohort of 114. Patients who had undergone a TKA were assessed pre-surgery and 10 weeks post-surgery. We measured change in 6MWT as well as patient reported perception of change on a 7-point global transition scale ranging from -3 (a lot worse) to +3 (a lot better). This scale was dichotomised into "Success" $\geq +2$ and "Not Success" < 2 , meaning that those who indicated a moderate improvement or above were considered to have achieved a clinically relevant improvement in walking distance. *Results:* At 10-weeks post TKA, 90 participants were classified as success and 24 as non-success. A receiver operating characteristic curve was applied to the dichotomised data using the 6MWT as a continuous predictive variable. The resulting area under the curve was 0.702 ($p=0.002$), indicating that changes in the 6MWT are a fair predictor of success following TKA. A cut point of a 20.5 m improvement in 6MWT was determined as the most appropriate value to discriminate between those who reported success and not success, with a sensitivity of 70% and specificity of 70.83%. The positive likelihood ratio was 2.4 *Conclusion:* The 6MWT proved to be a fair predictor of TKA treatment success in our cohort. An increase in the 6MWT of ≥ 20.5 m at 10 weeks after surgery is associated with a reported moderate or greater perceived improvement by patients who have undergone a TKA. Individuals who improved their 6MWT ≥ 20.5 m were 2.4 times more likely to report treatment success compared with those who did not.

PA175

Understanding Patient and Carer Preferences for Inpatient Rehabilitation after Joint Arthroplasty

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Background: This project aims to understand consumer preferences for inpatient rehabilitation after knee and hip replacement surgeries, and to identify potential, alternative rehabilitation models. The volume of these surgeries is increasing annually. Consequently, the demand on inpatient and outpatient rehabilitation services is also increasing. It is unclear which rehabilitation mode is the most effective, yet variation in the cost of provision is close to the point where some approaches may not be sustainable in their current form. *Methods:* A sample of private total hip and knee arthroplasty patients and their carers from New South Wales, Australia, participated in semi-structured interviews six-weeks post-surgery.

Consecutive eligible patients were recruited, and then serially interviewed to ensure a broad representation of the population. The interview had two components. First, preferences for rehabilitation were elicited, and reasons for their preference were explored. Second, participants were presented with alternative models of rehabilitation and asked to rate their acceptability. These models were based on models provided in other countries and those constructed by the investigators based on current knowledge of patient preference for rehabilitation. Carers were also interviewed, covering similar themes. Preliminary surface analysis included data reduction and data display to organise subject matter into thematic categories. Further analysis culminated in the drawing and verification of conclusions. All researchers took part in the final data analysis, with the original objectives and emerging themes guiding this process. **Results:** A number of key themes influencing the decision to attend inpatient rehabilitation post surgery were identified, including: clinical status post surgery; the presence of professional support and motivation from healthcare professionals; social situation and support networks; convenience; physical home environment; past experience; and external influences from clinicians, family and friends. There was a spread of preferences for mode of rehabilitation provision post surgery, with several factors having a clear influence on choices made. **Conclusion:** An understanding of consumer preferences for rehabilitation, particularly inpatient rehabilitation, will inform future models of care delivery hand-in-hand with new evidence of effectiveness as it emerges.

PA176

Rate of Recovery of Strength and Function after Total Knee Arthroplasty

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Background: Current studies report that patients with total knee arthroplasty (TKA) reach their preoperative level of strength and function only three to six months after surgery. **Aim:** To evaluate the rate of recovery of strength and function in a rehabilitation setting according to Austrian rehabilitation standards. **Design:** prospective cohort study. **Setting:** primary healthcare center with outpatient department. **Population:** Patients (n=76) with no confounding factors scheduled for total primary, unilateral knee arthroplasty. **Methods:** Standardised rehabilitation after TKA with immediately adjacent physical therapy. Main Outcome measures: Maximum isometric leg-extension strength, the Timed Up-and-Go Test, the Stair-Climb Test and the Six-Minute Walk Test were assessed on the day before the operation and follow-up assessments were performed on the day of discharge, as well as one, three and six months postoperatively. **Results:** Patients reached or exceeded their preoperative level one month after the operation and experienced a significant gain in strength by the final evaluation. **Conclusion:** Patients with no confounding factors can reach their preoperative level of strength and function earlier than previously reported. Regional or national differences in “dosage” of physical therapy after TKA, especially time of inpatient stay and onset time of outpatient rehabilitation may have a vast impact on the recovery rate. **Clinical Impact:** Within the national reimbursement schemes rehabilitation standards can be adjusted to provide optimal care in the early phase after TKA.

PA177

Validity and Reliability of the Turkish Version of the MOS Sleep Questionnaire in Patients with Knee Osteoarthritis

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Introduction/Background: Sleep disturbance is common in adults experiencing knee pain or knee pain with radiographic evidence of osteoarthritis. Problems with sleep onset, sleep maintenance,

and early morning awakenings have been demonstrated among OA. In this study, we aimed to investigate the validity and reliability of the Turkish version of the MOS sleep scale in patients with knee osteoarthritis. **Materials/Methods:** One hundred patients with knee osteoarthritis and age and gender-matched 75 healthy controls were enrolled into the study. Demographic characteristics of the participants were recorded. All patients was examined by a single physician, the findings were recorded. Knee radiographs of the patients were staged according to the Kellgren-Lawrence grading. In addition, before and after treatment, to evaluate the clinical and quality of life of patients was performed Western Ontario ve McMaster Universities Osteoarthritis Index (WOMAC) and Nottingham Health Profile (NHP). MOS sleep scale was performed with 3 days interval to 25 patients and 25 controls as inter-reader and intra-reader. Reliability of the scale was assessed by internal consistency (Cronbach's alpha correlation) and reproducibility. Validity of the scale was examined by correlating NHP and WOMAC. **Results:** MOS sleep scale scores were significantly lower in patients than controls. After the treatment, a significant improvement was observed in MOS sleep scores of the patients with the WOMAC and NHP scores. Turkish version of the MOS sleep scale had a good level of internal consistency (Cronbach alpha: 0.81) and reproducibility (intra-reader correlation: 0.47-0.83, inter-reader correlation: 0.43-0.84). This was consistent with the original English version. When assessing the validity of the scale, it was determined that its correlations with WOMAC and NHP scores were middle and good levels, before (r:-0.21-0.50, p=0.03-0.0001) and after (r:-0.20-0.47, p=0.04-0.0001) the treatment. **Conclusion:** As a result, our study has showed that Turkish version of the MOS sleep scale was a good level valid and reliable in patients with knee osteoarthritis. **Reference:** Wilcox S, Brenes GA, Levine D, et al. Factors related to sleep disturbance in older adults experiencing knee pain or knee pain with radiographic evidence of knee osteoarthritis. *J Am Geriatr Soc* 2000; 48: 1241.

PA179

Relative Risk of Knee Osteoarthritis in Women Bread Bakers and Non-Bread Bakers

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Introduction: Osteoarthritis of the knee is a common disease that presents with knee pain, morning stiffness and limited knee joint motions. The aim of this study was to evaluate the relationship between occupation of bread baking with the traditional method and the incidence of the knee osteoarthritis. **Methods:** In this historical cohort study, we compared 35 females with a history of traditional bread bakers (exposed group) and 35 females with no history of bread bakers (unexposed group). The diagnostic criteria of the American College of Rheumatology were used for the final diagnosis of osteoarthritis. **Results:** The incidence proportion of knee osteoarthritis was 51.43% in bread bakers and 22.86% in non-bread bakers group, respectively. There was a significant relationship between the incidence of knee osteoarthritis and the kind of occupation ($\chi^2=6.2$, p=0.013, RR=2.25 and 95% CI=1.13-4.48). In multivariate logistic regression models duration of occupation, age and tobacco smoking are significant predictors for osteoarthritis incidence. **Conclusion:** Bread baker's women with recurrent stress to knee (kneeling) are prone to develop knee osteoarthritis. According to the result of the study it was seen that changes in the type of occupation can effectively prevent or reduce the severity and signs of osteoarthritis.

PA180

Is There a Relationship between Knee Osteoarthritis and Venous Insufficiency?

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Introduction/Background: The aim of this study is to evaluate whether there is a relationship between venous insufficiency and knee osteoarthritis (OA) or not. **Methods:** 103 people (59 patients with OA and 44 volunteers as the control group) were included in the study. Age, gender, height, weight etc. of all the participants were recorded. Pain severity of the patients with OA was assessed by Likert Pain Scores and the functionality was evaluated by WOMAC. 206 knees were evaluated by conventional radiography (Kellgren & Lawrence grading scale (K&L)) and ultrasonography (cartilage thickness). Lower extremity venous system was evaluated by doppler ultrasonography. **Results:** The mean age was 52.5±7.4 years in OA group and 43.3±6.9 years in control group. The mean BMI was 30±4.7 in OA group and 26.7±4.7 in control group. In OA group, mean of K&L scores was 1.89±0.95, the mean of total WOMAC scores was 36.94±19.56 and the mean Likert pain scores was 2.94±1.01. Venous insufficiency was seen 30% of people in OA group and there was not any statistically significant difference in terms of cartilage thickness regarding to the existence of venous insufficiency ($p>0.05$). But the percentage of the radiographic medial tibial sclerosis was higher in patients with venous insufficiency (60%) ($p>0.05$). In OA group, the WOMAC total scores were similar whether the subjects have venous insufficiency or not ($p>0.05$). The WOMAC pain scores were higher in the individuals who have deep venous insufficiency ($p>0.05$). **Conclusion:** There was no statistically significant difference, in terms of cartilage thickness, regarding to the existence of venous insufficiency in OA group but the percentage of radiographic medial tibial sclerosis was higher in the patients with deep venous system involvement ($p>0.05$). Also WOMAC pain scores were higher in patients with deep venous insufficiency ($p>0.05$) which may lead to ideas that support venous system pathologies can affect the intraosseous microenvironment of the bone and this involvement can result in an increase of pain and sclerosis. This might show subchondral bone involvement starts earlier than articular cartilage involvement.

PA181

Effects of Medical Rehabilitation for Degenerative Arthritis of the Hand

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Introduction: Hand represents a preferential site for osteoarthritis, its articulations being among the most affected by this degenerative disease, with direct implications in decreasing of functional independency in daily life. Thumb base osteoarthritis (rizarthritis) is a pathological condition which mostly causes various degrees of invalidity. The aim of our study is to evaluate the efficacy of a rehabilitation programme for preserving the functionality of hand. **Methods and Subjects:** We evaluated 52 patients observed in our hospital, diagnosed with rizarthritis based on clinical and radiological findings. The age was between 45-65 years old, 40 women and 12 men, all of them having in common a repeated mechanical stress in daily work. Treatment methodology included orthosis and electrotherapy for relieving pain, exercise therapy for increasing range of motion, occupational therapy for promoting hand dexterity and functional activities. The patients followed the rehabilitation programme for two weeks, and they repeated it after three months. **Results:** The rehabilitation programme outcomes were assessed using Dreiser Index and AUSCAN. Pain and range of motion of the thumb have been significantly reduced during the therapy. The global functionality of the hand was progressively improving during the following three months after the rehabilitative treatment. **Discussions/Conclusion:** Hand osteoarthritis may be asymptomatic for quite a long period of time and therefore undiagnosed, however the progression of the degenerative process leads to a clinical manifested disease evolving to a major disability. In this respect thumb base osteoarthritis (mainly in right-handed people) needs to be early diagnosed and treated using the

diverse possibilities offered by the medical rehabilitation.

PA182

The Effect of Hidrothermotherapy in Radon Thermal Waters in Spinal Osteoarthritis

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Introduction: The most common indication for Radon thermal waters is the inflammatory and degenerative pathology of the locomotors system. The antalgic and decontractant effects of thermal waters is reinforced by the anti-inflammatory effect of Radon (similar with topical steroid application), which adds the antioxidant action at cellular level. **Method and Subjects:** Our study included 200 patients with chronic degenerative diseases of spine, who performed a medical rehabilitation program in Felix Spa. The patients were randomized in 2 groups. The first group followed 18 sessions of hidrothermotherapy (36°C thermal water with Radon) for 20 minutes twice daily. The second group followed only one session daily. The duration of our study was 6 months, meanwhile the patients were assessed at baseline, at the end of the treatment, at 3 months and at 6 months. We evaluated the intensity pain on a visual analogue scale (10 mm VAS) and the quality of life (HAQ) **Results:** Both groups presented identical results at the end of the treatment meaning a significant clinical improvement comparing with baseline. The assessment after 3 months showed the persistency of the benefic effects only in the first group. The second group experienced a regression towards baseline. After 6 months we noticed a statistically significant difference between the two groups regarding both pain and quality of life. **Discussion:** The statistical analysis of the data revealed a positive effect of Radon both on short and long term. The results of our study are similar with the data found in bibliography, which underlines the beneficial effects of Radon thermal waters on pain and mobility. **Conclusions:** Our study conducted in Felix Spa (Romania) confirms evidence-based Radon as a therapeutical agent useful in degenerative pathology of the spine. The effect of Radon correlates with the thermal water effects. Felix Spa represents one of the most important spa in Central Europe, which successfully uses these two natural resources as therapeutical agents.

PA183

The Effects of Hydrothermotherapy after Lumbar Laminectomy

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Introduction: Low back pain with or without sciatica represents a major health problem in developed countries. Among patients with positive anamnesis for low back pain only one percent needs surgical intervention for lumbar herniated disc. The aim of our study is to analyse the possible advantages of a rehabilitation treatment which was done using thermal water with radon in Felix Spa (Romania) for patients with recent laminectomy. **Method and Subjects:** We present a prospective study one year long, including 60 patients with herniated disc at levels L4-L5-S1. The age of the subjects was between 35-55 years. The time interval between the surgical intervention and the thermal therapy was 4-12 weeks. The patients attended a 20 minutes session of hidrothermotherapy in water with radon in a quantity of 0.36 mm μ Currie at 36°C. The assessment was done in the beginning, at the end of the treatment and after 6 months. The parameters that we measured were pain and spine functionality using visual analogue scale (VAS), Oswestry index and HAQ. **Results:** Among the whole group, at the end of the treatment, 40 patients did not show any pain and presented a significant improving of functionality, 15 patients presented a reduction of pain and improving functionality, for 5 patients the clinical status showed no improvement. None of them experienced any worsening of simptomatology regarding pain or functional-

ity. *Discussion:* The rigidity of lumbar spine before surgery and the immobilization after surgery predispose for local adhesions, which determine a consequently limitation in range of motion and the pain perception. Hydro-thermotherapy with radon contributes to reeducate the mobility of lumbar spine because its anti-inflammatory effect. *Conclusions:* We consider that the rehabilitation program of operated herniated lumbar disc which focused on hydro-thermotherapy in thermal water with radon, must begin early after surgery and be done carefully. The results obtained during the initial hydro-thermotherapy must be maintained by help of a daily kinetic program exercised at home. The kinetherapeutic program has to be reevaluated at 6 months and has to be followed by another hydro-thermotherapy cure. *Keyword:* radon, thermal water, rehabilitation, herniated lumbar disc.

PA184

Relation between Clinical and Radiographic Findings in Osteoarthritis Knee: a Cross-Sectional Study

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Introduction: Knee osteoarthritis (OA) is highly prevalent, and a major leading cause of disability. Despite the development of newer imaging techniques, the radiograph remains the most accessible tool in the evaluation of the OA. Several studies have suggested that there is a high discordance between clinical and radiographic knee osteoarthritis. Our study objectives were to examine association between radiographic classification and clinical manifestations of knee osteoarthritis and to determine if the assessment of individual radiographic features was superior to the general radiographic scale in establishing such a relation. *Material and Method:* A total of 125 patients with knee osteoarthritis were included in this study. Beside the demographic and anthropometric measures of the patients, radiographic features were assessed by two separate physiatrists who were blind to the clinical data of the patients using the Kellgren-Lawrence (K-L) scale for general grading of the OA severity and a line drawing atlas for the detailed radiographic changes in the 3 knee joint compartments including degree and location of both joint space narrowing, and osteophyte formation. The severity of knee pain, stiffness, and disability were measured using the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index. *Results:* Patients' body mass index (BMI) was found to correlate significantly with knee pain, stiffness, and disability, all p-values of <0.05. A statistically significant correlation between pain duration and knee stiffness was also found. Significant correlation between the K-L grading scale and each parameter of the detailed radiographic study was found; all with p value of <0.05. No association between general radiographic grading scale and clinical manifestations was found. However in detailed radiographic analysis, osteophyte site at the patellofemoral Joint was found to correlate with the knee stiffness, $F=3.459$, $p<0.05$. *Conclusion:* Radiographic score was not found to be closely associated with the clinical features of knee osteoarthritis. The results of knee X-rays should not be used in isolation when a management decision is to be taken for patients with knee osteoarthritis.

PA185

The Impact of Early Rehabilitation on Reducing Kinesiophobia and Improving the Quality of Life in TKR Patients

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Background: Total knee replacement (TKR) revolutionized management of patients with advanced knee osteoarthritis, with very

good long term results, considering pain relief and improvement of function. Kinesiophobia (fear of movement) can be debilitating for those patients. Its influence on functional recovery and quality of life remains unexplored. *Material and Methods:* Prospective clinical study included 42 female patients (average age 66.8) assigned for TKR due to the advanced knee arthritis. After the surgery all patients received early rehabilitation treatment that included kinesy and occupational therapy, low frequency pulsed magnetic field (3.5 mT, 50 Hz, 30 min.), low-level laser and electro therapy (IFS 0-100 Hz, 15 min.) procedures for three weeks. BMI, ROM and self-reported Questionnaires-WOMAC, SF-36 and Tampa scale of kinesiophobia were used for evaluation. SPSS software was used for statistical analysis. *Results:* Based on the level of kinesiophobia, patients were divided into two groups. 6 months after the surgery the significant improvement was observed in every category of WOMAC and SF-36 for both categories of patients, but those with the lower level of kinesiophobia achieved more improvement due to the physical function, vitality and active participation in daily living activities. There were no significant differences in pain intensity between the groups. Even though the Tampa score decreased, statistically significant difference remained between the groups. *Conclusion:* Early physical therapy and rehabilitation program safely and effectively helps TKR patients to overcome pain and functional limitation and restore former quality of life. Kinesiophobia doesn't have to be as debilitating as it can be. Pain and fear of movement after TKR can be addressed successfully with the team approach and patients' education that they can gain control over it and choose not to be the victims of the movement avoidance behavior. *Reference:* Doury-Panchout F, Metivier JC, Fouquet B. Kinesiophobia negatively influences recovery of joint function following total knee arthroplasty. Eur J Phys Rehabil Med. 2014 Nov 13. [Epub ahead print].

PA186

Relationship of Knee Specific Lifelong Daily Activities with Radiographic Grading and Functional Disability in Patients Suffering from Osteoarthritis of Knee

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Background: Osteoarthritis (OA) of knee is a chronic degenerative disorder. Population based studies have been carried out elsewhere to identify the specific occupational, sports and certain lifelong daily activities as risk factors for development of OA knee. 1.2 Squatting, kneeling, sitting on floor cross legs, climbing up and down the slopes in hilly terrain etc are the main activities involved in day to day activities with the people living in this part of the country. The study attempts to find out the relationship of knee specific lifelong daily activities with radiographic grading and the functional disability in patients suffering from primary osteoarthritis of the knee. *Materials and Methods:* Design: Cross sectional study carried out in patients suffering from OA knee, who fulfilled American College of Rheumatology (ACR) criteria for classification of idiopathic OA knee, who attended the department during the study period. Functional disability of the patients was assessed using a WOMAC questionnaire besides complete clinical examination, Kellgren and Lawrence radiological grades was used for radiographic grading. Life-long daily activities involving the knee in regards to the job, occupation, leisure activities were recorded using a pre-structured, validated format. *Results:* A total of 80 patients were studied. The mean WOMAC score was 38.74 ± 14.36 . Majority of the patients (52.5%) had a grade II OA. There was statistically significant association between WOMAC score and squatting ($P<0.01$), WOMAC and kneeling/knee bending activities ($P<0.05$), WOMAC and VAS pain ($P<0.01$). Multivariate regression showed significant association of WOMAC score with squatting (OR 0.09, 95% CI 0.01-0.83) and knee bending activities (OR 0.25, 95% CI 0.05-1.27). None of the knee activities were found to be associated with radiographic grades. *Conclusion:* Time spent for knee activities such as squatting and kneeling or

knee bending activities in a day caused higher functional disability in OA knee patients. No direct association could be established between knee specific activities and radiographic grades. **Keyword:** Knee specific lifelong daily activities, Osteoarthritis, WOMAC, Kellgren and Lawrence radiological grades.

PA187

The Influence of Life Style Risk Factors on BMD in Women of Rs

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Introduction: Up to now there has no been statistical data about the risk factors for the osteoporosis in the female population of our region. **Purpose:** to find out the relationship between life style factors and bone mineral density (BMD) in women of this region. **Materials and Method:** The study included 582 Caucasian women (age 33 – 81; mean age 57.6) free of medications affecting bones. BMD was measured at lumbar spine and left hip by DXA (Hologic QDR 4500). According to the WHO definition of osteoporosis, the participants were divided into three (3) groups: normal BMD (N): 72 (12.37%); osteopenia (Opn): 178 (30.58%) and osteoporosis (Opz): 332 (57.04%). Data about lifestyle factors were collected by standardized numerical questionnaires. The accepted level of significance was set at $p < 0.05$. **Results:** In total sample correlation analyses indicated significant association between low BMD and: increased caffeine intake ($c2gr=9.210$; $p < 0.01$), low calcium intake ($c2gr=5.991$; $p < 0.05$) and inadequate physical activity ($c2gr=9.210$; $p < 0.01$). In comparison between N and Opz groups, the significant association was found but at greater significance. **Conclusion:** The results show the specifics of our population regarding the life style factors causing the changes in BMD. Low BMD was not significantly associated with smoking and alcohol consumption (only 6 women in the Opz group consumed alcohol regularly). **Implications:** This could be useful in screening the patients for DXA.

PA188

Physical Function, Pelvic Movement and Patient-Reported Outcome in Patients with Hip Dysplasia One Year after Joint Preserving Surgery

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Introduction: Patients with symptomatic hip dysplasia experience pain and reduced physical function. Periacetabular osteotomy (PAO) is a joint preserving procedure and has become the treatment of choice for hip dysplasia. Good clinical and radiological outcome have been reported after PAO but little is known about objectively measured physical function after the procedure. Muscle power and pelvic movement have not previously been investigated in these patients. We hypothesized that 1) muscle power in the affected leg would reach the level of the unaffected leg one year after PAO, 2) that pelvic compensatory movement would decrease one year after PAO compared to preoperatively and 3) that patient-reported hip function, pain and quality of life would increase compared to preoperatively. **Material and Methods:** Forty-one patients (7 males) with a mean age of 28.8 years scheduled for PAO were included consecutively. Patients were tested before PAO, and 4 and 12 months. Muscle power was tested in a leg extension power rig and pelvic movement was measured with an inertia-based measurement unit. Patient-reported 1) Pain, 2) Symptoms, 3) Physical function in daily living, 4) Physical function in Sport and Recreation, 5) Participation in Physical Activities and 6) hip and/or groin-related Quality of Life were assessed with the Copenhagen Hip and Groin Outcome Score (HAGOS). **Results:** One year after PAO, muscle power 200+65 Watt in the affected leg was comparable with the unaffected leg 187+65 Watt ($p=0.45$).

There was no significant differences ($p < 0.10$) in measured pelvic roll rotation or pelvic pitch rotation after PAO compared to before. Significantly, higher mean scores 1 year after PAO were found in all six HAGOS subscales ($p < 0.02$). **Conclusion:** Patients regain muscle power after PAO whereas pelvic movement compensatory movements are still present one year after PAO. Patient-reported hip function, pain and quality of life increase substantially after PAO. These improvement are probably results of reduced pain and hence the possibility of a more physically active life style.

PA189

Rehabilitation after Total Knee Arthroplasty: Effect of Computer-Assisted Cryotherapy Versus Cold Packs

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Introduction/Background: The aim of this prospective, randomized and single blinded study was to evaluate the efficiency and safety, of a new cryotherapeutic device, the cTreatment® System, in patients undergoing primary and unilateral TKA surgery compared to the standard cold therapy regimen. **Material and Methods:** 97 patients were randomized into two groups receiving the cTreatment® or the standard cold therapy protocol with cold pack application until six days after the surgical intervention. Objectives consisting of joint mobility, pain intensity and knee girth were measured on admission day and second, fourth and sixth postoperative day (POD). Additionally potential occurrence of adverse effects were recorded. **Results:** Statistically significant divergences to the benefit of the cTreatment® were detected regarding the knee mobility on POD six concerning both flexion, reaching averaged 6,6 degrees more (86.2 ± 7 ; $P=0.021$), and extension, reducing the deficiency to -1.05 degrees ± 2.33 ($P=0.022$). Pain in the numeric rating scale (NRS) score in motion was significantly lower in the cTreatment® group on POD two ($P=0.034$). There were no statistically significant differences between groups regarding the NRS in rest and girth measurements. No adverse effects were found in both study groups. **Conclusion:** Computer-controlled cooling therapy seems to have significant benefits in terms of postoperative remobilisation and pain, which might be attributed to a reduced inflammatory response, secretion and bleeding. The cTreatment® System appears to be a safe procedure.

PA192

Evaluation of the Loads Applied on the Hip Joints in Walking with and without Scottish Rite Orthosis in Subjects with Perthes Disease

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Background: Although the main aims of treatment in Legg-Calve Perthes disease are to increase the containment of femoral head within the acetabulum, and to decrease the loads applied to the hip joint, none of the treatment approaches were successful. There was no research evaluate the effect of using orthosis on joint contact forces in subjects with Perthes disease. Therefore the aim of this study was to evaluate the joint reaction force in subject with this disease while walking with and without an orthosis. **Case Description and Methods:** Two subjects with Perthes disease participated in this study. They were asked to walk with and without Scottish rite orthosis. Open SIMM software was used to extract the joint contact forces in both conditions. The difference between kinetic and kinematic parameters for each subject was evaluated by two sample *t*-test. **Findings and Outcomes:** The results of this study showed that the ground reaction force applied on the leg increased while walking with Scottish rite orthosis, however joint contact forces seems to decrease follow the use of the orthosis. Use of or-

thosis influences the kinematic of hip joint and pelvic. *Conclusion:* Since joint contact force is one of the main parameters influence hip joint deformation, use of Scottish rite orthosis may influence the final deformation. It is recommended to do a research with more number of subjects.

PA193

A Comparative Study on Effectiveness of Intra-Articular Injection of High Molecular Weight Hyaluronate, Intra-Articular Injection of Steroid and Intra-Articular Injection of High Molecular Weight Hyaluronate Plus Steroid in Osteoarthritis

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Objective: To compare the effectiveness of: i) intra-articular (IA) H HMW hyaluronate; ii) IA steroid; iii) IA HMW hyaluronate plus steroid. *Sample and Study Design:* Single blind randomized controlled parallel group study. *Sample Size:* 27 in each group. *Place of Study:* Department of Physical Medicine and Rehabilitation, IPGME & R, SSKM Hospital, Kolkata. *Duration of Study:* 18 Months. *Inclusion Criteria:* 1) All primary OA knee; 2) Grade two or grade three OA. *Exclusion Criteria:* 1) Unwilling patients; 2) Secondary OA; 3) Grade one or grade four osteoarthritis knee; 4) Gross knee instability; 5) Patients with contraindications of intra-articular injections, intra-articular injection of steroid; 6) Allergy to a viscosupplementation. *Parameters Studied:* WOMAC pain, stiffness and functional subscales, VAS pain, ROM of knee joint, 50 feet walk time, Patients global assessment scale, Physicians global assessment scale. *Methodology:* After taking clearance from the institutional ethical committee selected patients have been divided into three groups randomly. Written informed consent was taken. One group received IA injection of methylprednisolone, second group received IA injection of HMW hyaluronate, and third group received both. Follow up was done at 6 weeks (visit-2) and 12 weeks (visit-3). The results have been analysed according to the standard statistical methods. *Results:* Majority of patients were female and more than 50 yrs of age with K-L radiological grade of 3. There was statistically significant improvement in all the parameters at the 2nd and 3rd visit from the baseline in all groups. Improvement from the 2nd visit onwards in all groups was not statistically significant. *Conclusion:* Steroid, HMW Hyaluronate and steroid plus HMW Hyaluronate all are effective in osteoarthritis knee in terms of reduction of pain, stiffness, range of motion of knee joint, reduction of 50 feet walking time, patients and physicians global assessment score. No treatment regime is statistically significantly better than the other. Adverse effects were negligible.

PA194

Clinical CT-Based Finite Element Analysis of Necrotic Femoral Head during Daily Activities

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Objective: Finite-element-analysis based approach to evaluate the tolerability of necrotic femoral head against daily activities, so that can guide patients taking appropriate motions for better rehabilitation. *Methods:* patients with ONFH and healthy volunteers were included in this research. The whole people were divided into two groups: control and disease group. DICOM-format imaging files were imported to ScanIP software to forming a newly mask. After that, a newly finite element model of femoral head were constructed by some techniques, including mask manual editing, region growing, flood-fill, Gaussian filter, material assignment and mesh-generating. At the same time, digital daily activities' simulation was formulated with the help of Orthoload database. Then, the constructed model was imported to Abaqus to receiving an

analysis. At last, making a contrast of elastic modulus and strain of bilateral proximal femurs under different postures between control and disease group. *Results:* A total of 14 volunteers participated in this research. 7 volunteers had the disease of lateral ONFH; other 7 volunteers had no disease. There is no significant difference in age, weight, height among these two groups. There is a good symmetry in E-modulus and micro strain between bilateral femoral head of healthy volunteers (125±745 Pa, 7,112±751 Pa.) (P=0.595); 952 microstrain, 954 microstrain) (P=0.585). But, the symmetry was lost in patients with ONFH, the E-modulus of necrotic femur was significantly lower than normal side in patients (5,781±1,040 Pa, 6,683±866 Pa) (P=0.000); (1,273 microstrain, 1,019 microstrain) (P=0.000*). Moreover, the E-modulus of affected femur under all sorts of daily postures was significantly lower than healthy side, and micro strain is also different within lateral femur in different posture. *Conclusion:* FEA based approach can be a suitable method to evaluate the tolerability against specific daily activities for ONFH patients. It demonstrated that change of mechanical property of femoral head after necrotizing can be detected clearly in vivo by FEA. Perfect symmetry of mechanical property was existed among healthy volunteers' femurs, while, the suffered volunteers lost the feature. General speaking, up/down stairs and standing with 1-leg had bad effect on necrotic femoral head than other postures.

PA195

Musculoskeletal Ultrasound in Assessing Luschka's Joint and Vertebral Artery

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Introduction: Luschka's joint locates in the cervical region of the vertebral column between C3 and C7, and its osteophytes could partly result in foraminal stenosis and nerve compression. Previous research demonstrated that decompression of Luschka's joint osteophytes relieved the symptoms of vertebral-basilar insufficiency. Here, we explored musculoskeletal ultrasound (MSUS) on human skeletal specimens and cadaver to identify Luschka's joint and vertebral artery (VA), then on patients with or without cervical vertigo to investigate Luschka's joint osteophytes and its relationship with VA. *Material and Methods:* Firstly, skeletal specimens and cadaver (cervical specimens) were observed by MSUS (Philips iU22). Then, 160 patients enrolled were divided into three groups. Group A: cervical spondylosis without cervical vertigo, 60 subjects; Group B: cervical spondylosis with cervical vertigo, 60 subjects; Group C: healthy controls, 40 subjects. All subjects underwent MSUS, were explored whether there were osteophytes on Luschka's joints. Furthermore, subjects with osteophytes were measured peak systolic velocity, end diastolic velocity, and resistance index by Doppler ultrasonography to identify the VA compression from osteophytes. *Results:* MSUS could clearly demonstrate the size, shape, characteristic of Luschka's joint, VA and the surrounding structures. The Luschka's joint osteophytes were not uniformly distributed, but the predilection sites were C4/5 (50.5%) and C5/6 (32.3%). Luschka's joints with small osteophytes (T<3 mm) mainly caused the Grade 1 VA tortuosity, while the medium or big osteophytes (T>3 mm) potentially brought out the Grade 2/3 VA tortuosity. Interestingly, we found the osteophytes from C4/5 and C5/6 Luschka's joints took the major responsibility of the Grade 2/3 VA tortuosity (83%). Moreover, a significant correlation of VA compression from Luschka's joint osteophytes and the cervical vertigo has been proved. Those patients who suffered compressed VA had a 2.94 times higher risk to endure cervical vertigo (OR=2.94, $\chi^2=6.562$, 95% CI=1.29~6.72, P=0.01). *Conclusions:* MSUS is a real-time dynamical, noninvasive and repeatable approach to show Luschka's joint osteophytes and the adjacent VA changes. Therefore, in future practices, MSUS could be used as an early detection screening method for cervical vertigo.

A.2.3. BONE DISEASES (E.G. OSTEOPOROSIS)

PA196

The Effect of Exercise on Body Composition of Type 2 Diabetic Postmenopausal Women

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Background and Objectives: Diabetes is a world-wide problem. Exercise and diet are usually recommended for diabetes. Although dieting has been the major fat loss method, aerobic exercise programs have been shown to preserve fat-free mass. And resistance exercise is positive effect to build up muscle mass, so that is good for glucose control. So we investigate the effects of aerobic and resistance exercise-based intervention in postmenopausal women patients with diabetes. **Methods:** This study design is the pilot randomized controlled trial (Sept 2013–April 2014) to evaluate effects of aerobic and resistance exercises on body composition. Type 2 diabetic postmenopausal women (51–74 years) were recruited from Busan, and surrounding communities. For all the patients, diet consultation was carried out. For the exercise group, 12-week aerobic and resistance exercise program was applied. To determine the effect of a 12-week combination exercise intervention on total body fat (g), total lean mass (g), appendicular skeletal muscle mass (ASM, kg), weight adjusted ASM (%), height adjusted ASM (kg/m²). **Results:** Total 36 community dwelling diabetic females (61.3±8.8 years) in Korea were enrolled in this study. Mean duration of diabetes were 9.5±7.9 years and BMI was 24.9±2.8 kg/m². Participants were randomly assigned to 2 groups based on computer-generated random sequencing. Baseline characteristics were not different. After 12 weeks, total fat mass was decreased in both diet only group and diet with exercise group (p=0.015 Vs p=0.009, respectively) from baseline. Weight adjusted ASM was significantly increased in diet with exercise group (p=0.002), but not in diet only group (p=0.0951). **Conclusion:** Aerobic and resistance exercise with diet resulted in significant increase in ASM index in diabetic postmenopausal women.

PA197

A Rare Cause of Hip Pain; Pelvic Osteochondroma

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Introduction: Osteochondromas are the most common benign bone tumors. Majority of the patients present within the second decade or earlier with a male: female ratio of 2:1. The most frequent locations are the long bones of the limbs (distal femur, proximal humerus, and proximal tibia). Pelvis is a rare site for osteochondroma. We present a case of pelvic osteochondroma with low back and hip pain. **Case:** A 38-year-old male patient applied to the outpatient clinic of neurosurgery for several times, with complaints of low back and hip pain lasting for two months. The pain worsened when he was sitting and with activities. Lumbar CT with normal findings was obtained and he received nonsteroidal anti-inflammatory and myorelaxant drugs. Then, because his pain did not decrease, he was referred to our outpatient clinic. In the physical examination, Fabere and Laseque test was positive on the left side. Neurologic examination of the lower extremity was normal. Laboratory tests (hemogram, erythrocyte sedimentation rate (ESR), C reactive protein were) within the normal limits and brucellosis was negative. Anteroposterior radiograph of the pelvis revealed a sessile bony prominence arising from the left iliac wing without any cortical destruction. Then, he was referred to the orthopedic clinic for surgical excision. **Conclusion:** Osteochondromas tend to occur commonly near the ends of long bones but they may arise from any bone (e.g. pelvis). These tumors may be single or multiple. Development of osteochondromas occur during skeletal growth and they arise within the first three decades of life. Secondary malignant

chondrosarcoma may develop. On imaging studies, the lesion appears as a bony prominence off the surface of the bone. Excision is needed if the tumor is compressing a large nerve; causes pain (especially when impinging on muscle and creating an inflammatory bursa); disturbs growth; or on imaging study has a destructive appearance. An enlarging tumor in an adult should raise concern of chondrosarcoma and the possible need for excision or biopsy. In conclusion, some tumoral conditions may arise from pelvis and although pelvic osteochondroma is very rare, it must be kept in mind in the differential diagnosis of low back and hip pain.

PA198

Referred Pain: Knee Pain Has a Clinical Presentation of Femoral Neck's Bone Tumor

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Case Diagnosis: We report a case of a 14 years old girl with knee referred pain for 2 years, with an Osteoma osteoid (OO) located in the hip. **Case Description:** She had a limitation of the knee passive range of motion (ROM) and started rehabilitation. After 10 sessions, she didn't refer any improvement and needed to take ibuprofen each night. She had a normal knee MRI. When we explored her for second time, she had a hip ROM limitation too. We did a hip MRI and it showed a hip injury inner right femoral neck that looks like an OO. We confirmed the diagnosis with CT. **Discussion:** The referred pain is one that is perceived in a different location than the painful stimulus is produced. OO is a benign bone tumor that was described for the first time in 1935 by Jaffe. It can appear in any location but the most common is in long bones of young people, as a small calcified lesion less than 2 cm in the x-ray, which causes a disproportionate pain to the size. The pain worsens at night and calm with NSAID's, probably by excess of prostaglandins production in the nidus. Usually the pain appears before being perceptible in radiology. This discrepancy between the clinical and radiological findings can make a delayed diagnosis. **Conclusions:** In front of a joint pain, you must evaluate the nearby affected joints, especially in children. The OO should be considered in the differential diagnosis of joint pain with unknown cause in young people.

PA199

SD Amplitude and Velocity of COP in Different Static Standing Position in Healthy, Osteopenic and Osteoporotic Postmenopausal Women

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Background and Aim: According to the further tendency of osteoporotic people to use the hip strategy to maintain stability, in this study, we compared the static stability parameters in healthy, osteopenic and osteoporotic postmenopausal women. **Material and Method:** Seventy-one volunteer postmenopausal women aged 48-65 years were divided into three Normal (n=15), Osteopenic (n=26) and Osteoporotic (n=30) groups according to their bone mineral density of lumbar spine. The strength of hip muscle groups and back extensor muscle were assessed. Static balance was evaluated using force plate, in two positions, double leg standing (DLS) and Romberg standing, with eyes open, for 20 s. Standard deviation of velocity (SD velocity) and standard deviation of amplitude (SD amplitude) for COP displacement in A-P and M-L direction and path length were evaluated. **Results:** In osteoporotic group, all hip muscle groups and back extensor were significantly weaker than osteopenic and normal groups. SD velocity and amplitude of dis-

placement in A-P direction, in DLS position, showed a significant increase in osteoporotic and osteopenic groups compared with normal group ($P < 0.05$). In Romberg position, SD amplitude for A-P direction showed a significant increase in osteoporotic group compared with normal group ($P = 0.03$). Path length of COP displacement in DLS position in osteoporotic and osteopenic groups was significantly more than normal group ($P = 0.05$). In osteoporotic group, decrease of hip adductor strength was accompanied with increase of SD amplitude and velocity in M-L direction. *Conclusion:* Increase of SD velocity and amplitude, and also path length of COP in A-P direction may be due to control strategy changes in osteopenic and osteoporotic women. Strength training for hip muscles may be effective to better static stability in postmenopausal women, especially in osteoporotic patients to prevent of falling.

PA200

The Effect of Spinal Bracing on Stability in Patients with Adolescent Idiopathic Scoliosis

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Background: Adolescent idiopathic scoliosis (AIS) may result to change in physical orientation of body segments and affecting balance in individuals. Spinal/trunk brace is commonly used for the management of idiopathic scoliosis. The aim of this study was to compare standing stability of AIS patients in with and without brace, and with healthy subjects. *Methods:* Twenty subjects (10 healthy subjects and 10 AIS with thoracolumbar/lumbar curve) were recruited into the study. Stability of the scoliotic subjects was evaluated while standing with and without orthosis. A Kistler force plate was employed to estimate the mediolateral and anteroposterior displacements of center of pressure. *Results:* The results of this study indicated that there was no significant difference between center of pressure variables in healthy subjects and scoliotic patients. Moreover, trunk bracing only influenced the CoP excursion in mediolateral direction ($p < 0.05$). *Conclusion:* Although further research studies are needed, results showed that there was no difference between stability of scoliotic and normal subjects. Moreover the use of orthosis did not improve their standing stability.

PA201

Scoliosis Revealing Intra Dural Tumor: a Case Report

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Introduction: The discovery of scoliosis in children must lead to a good clinical examination. The presence of neurological abnormalities impose the realization of a spinal magnetic resonance imaging (MRI). We report the case of scoliosis discovered incidentally in a girl and MRI revealed an intra dural tumor. *Observation:* A 10-year-old otherwise healthy girl, with normal medical history, is addressed to our unity for a podiatric examination given the presence of plantar calluses. The podoscope examination found valgus flat feet first degree. The physical examination showed a posture abnormality, deviation of the occipital axis on the left and a left dorsal gibbosity. The neurological examination showed no sensorimotor disorders, deep tendon reflexes were strongest at right and the cutaneous plantar reflex was indifferent on both sides. Spinal X-rays showed lumbar scoliosis to the left side and spinal MRI revealed scoliosis and intradural intra dural tumor that can fit with a neuronoma. The patient is referred for neurosurgical care. *Discussion:* Scoliosis may be due to an organic abnormality, its association with a malformation of the occipital hinge and/or spinal disease has been frequently reported in the literature. *Conclusion:* Faced with juvenile scoliosis is important to look anamnestic and semiological data suggestive of a secondary cause. Scoliosis may indeed be a sign of an underlying disease process.

A.2.4. REGIONAL PAIN SYNDROMES OF THE NECK AND UPPER EXTREMITY (INCLUDING ENTHESTOPATHY, TENDINITIS AND OTHERS)

PA202

Frequency, Severity and Predictors of Playing-Related Musculoskeletal Pain in Professional Orchestral Musicians in Germany

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Introduction/Background: The aim of the study was to evaluate the frequency of musculoskeletal pain in professional orchestral musicians. Of special interest were pain intensity and its association with predictors such as gender, instrument group, age or stage fright. *Material and Methods:* A self-report questionnaire to assess playing-related musculoskeletal pain and its frequency and intensity in various body regions on a Numeric Rating Scale (NRS). *Results:* 408 professional were included in the sample; overall, 89.5% had been affected by current or past playing-related musculoskeletal pain, 62.7% reported pain in the previous three months, and 8.6% reported current pain. For all instrument groups the neck was the most common pain region. About 43% of musicians presented more than five pain regions, in particular violin players. Approximately 40% of musicians indicated frequent or permanent pain. Average pain intensities increased from NRS 3.8 up to a range of 5.9 and 7.4 for frequent and permanent pain, respectively. Female gender and stage fright were proven to be predictors for musculoskeletal pain. *Conclusion:* Professional orchestral musicians are greatly affected by PRMD, often experiencing frequent or permanent pain, high pain levels and pain in various body regions. This study highlights the necessity for tailored therapeutic and preventive strategies in performing arts medicine.

PA203

The Effects of Electrical Stimulation in the Management of Lateral Epicondylitis

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Introduction/Background: Lateral epicondylitis is a frequent, chronic, painful musculoskeletal disorder. Physical therapy and exercises are commonly used in the management of lateral epicondylitis. One of the objectives of the therapy is to strengthen wrist extensor muscles. Electrical stimulation (ES) can be used for muscle strengthening as an adjunct to active exercises. The aim of this randomized, controlled, open study was to investigate the effects of ES prescribed as an adjunct to classical physical therapy and exercise program. *Material and Methods:* Fifty patients (mean age 50 years, 92% female, median symptom duration 120 days) with lateral epicondylitis participated. Patients were randomized into ES ($n = 25$) and control ($n = 25$) groups. Hot pack, therapeutic ultrasound and stretching/strengthening exercises were given to both groups. While control group received only this therapy, Russian current stimulation to wrist extensor muscles was applied to ES group as add-on therapy. All patients received 15 therapy sessions (5 sessions per week, total 3 weeks), and were assessed before and at the first week after the therapy. Assessment parameters were pain intensity by VAS, grip and pinch strength, hand activities by Durou Hand Index and daily living activities by Health Assessment Questionnaire. *Results:* Both groups showed significant improvements in all assessment parameters ($p < 0.01$) after the therapy. When 2 groups were compared regarding the improvements (percentage of change), ES group was found to be superior to control group in terms of decrease in pain intensity ($p < 0.05$) and in-

crease in pinch ($p<0.05$) and grip strength ($p<0.01$). Improvements in hand activities and daily living activities did not differ among the groups ($p>0.05$). **Conclusion:** Positive effects of ES in terms of pain intensity and grip and pinch strength were documented as an adjunct to classical physical therapy and exercise program in patients with lateral epicondylitis.

PA204

Average Cartilage Thickness and Cyst Volume is Unchanged over a 10-Year Period after Periacetabular Osteotomy

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Background: Periacetabular osteotomy (PAO) may affect cartilage thickness and cyst volume in patients with hip dysplasia. We investigated 1) changes of the cartilage thickness in the hip joint after periacetabular osteotomy (PAO), 2) how many patients had acetabular or femoral head cysts, 3) changes in the cysts volume and 4) changes in hip function and pain. **Patients and Methods:** 22 females and 4 males with hip dysplasia had the hip magnetic resonance imaged (MRI) before PAO and at 1, 2½ and 10 years after PAO. The thickness of the acetabular and femoral cartilage and the volume of bone cysts were estimated. 4 and 10 years postoperative, the Hip disability and Osteoarthritis Outcome Score (HOOS) was collected. **Results:** Preoperative, the mean thickness of the acetabular cartilage was 1.40 mm compared to 1.43 mm 10 years postoperative ($p=0.73$). The mean thickness for the femoral cartilage preoperative was 1.38 mm compared to 1.30 mm 10 years postoperative ($p=0.24$). Preoperative, 12 patients had acetabular or femoral head cysts (22 cysts) and 10 years after PAO 9 patients had cyst (9 cysts). Preoperative, median total cyst volume per cyst-patient was 6.0 cm³ compared to 2.9 cm³ at 10 year follow-up ($p=0.18$). At 4 and 10 years, the mean sub scores for HOOS were Pain 75/79, Symptoms 75/73, ADL 83/85, Sport/recreation 63/68 and Quality Of Life 62/61. **Conclusions:** Ten years after PAO, cartilage thickness, cyst volume and hip function was unchanged indicating that osteoarthritis had not progressed after PAO for those patients who completed 10 year MRI.

PA205

Immediate Effect of Acupuncture on Pain and Electromyographic Activity of the Upper Trapezius Muscle in Patients with Nonspecific Neck Pain: a Randomized, Single-Blinded, Sham-Controlled, Crossover Study

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Background: Nonspecific neck pain can cause considerable suffering, with possible disability as well as reductions in quality of life and productivity. **Objective:** The aim of the study was evaluate the immediate effect of acupuncture (ACP) on pain and electromyographic activity of the upper trapezius muscle in patients with nonspecific neck pain. **Material and Methods:** Twelve patients with nonspecific neck pain (PNP Group) and 12 healthy subjects (HS group) were enrolled in a randomized, single-blind, crossover study. Each subject received two forms of treatment in random order: a single session of traditional ACP (acupoints: triple energizer 5 “Wai-guan” and large intestine 11, “Qu-chi”) and sham ACP. To eliminate carry-over treatment effects, a one-week wash-out period was respected between sessions. Surface electromyography (EMG) was used to verify activity in the upper trapezius muscle at different “step contraction” of isometric shoulder elevation (15, 20, 25 and 30% MVC). The outcome measure in patients with nonspecific neck pain was a Numerical Pain Rating Scale (NPRS) (range: 0 to 10). EMG evaluations were performed before (EMG1) and after 30 minutes ACP treatment (EMG2) and NPRS was performed before and after (pre-ACP treatment) EMG1 evaluation and before and after (post-ACP treatment) EMG2 evaluation. **Results:** Traditional ACP treatment demonstrated a significant decrease in EMG activity for both groups treated with traditional ACP (PNP group: $p=0.0001$; SH group: $p<0.0001$ - ANOVA test). These differences were not observed in sham ACP treatment (PNP group: $p=0.71$; SH group: $p<0.54$). Friedman’s test revealed significant decreases in NPRS for the PNP group treated with traditional ACP ($p<0.0001$) and sham ACP no statistical difference was found ($p>0.05$). **Conclusions:** Subjective changes in the pain intensity and objective changes of the EMG amplitude in the upper trapezius muscle were found after immediate acupuncture treatment at the remote ipsilateral acupuncture points. This study may further clarify the physiological basis of the remote effect of acupuncture on neck pain and the activity of the upper trapezius muscle.

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PA206

Rehabilitation Exercise Improves the Functional Recovery of the Shoulder Joint of Patients with Sports Rotator Cuff Injury

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Introduction/Background: To explore the effect of rehabilitation exercise on the recovery of the shoulder joint of patients with rotator cuff injury due to sports activity. **Materials and Methods:** Sixty-four patients with rotator cuff injury due to sports activity were randomly categorized into the rehabilitation group ($n=34$) and the control group ($n=30$). Both groups received conventional non-steroidal anti-inflammatory drugs. The rehabilitation exercise group received additional rehabilitation exercise according to the rehabilitation plan for rotator cuff injury due to sports activities. Outcomes were evaluated using surface electromyography, isokinetic muscle strength test and UCLA (University of California at Los Angeles) shoulder scores. **Results:** There were 18 males and 16 females in the rehabilitation group with a mean age of 38.4 ± 2.9 years and there were 18 males and 12 females in the control group. There was no difference in the UCLA shoulder scores between the two groups at week 4 and 8 of rehabilitation exercise ($P>0.05$). However, there was a significant improvement in the UCLA shoulder scores at week 12 and 16 of rehabilitation exercise for patients in the rehabilitation group ($P<0.05$, or <0.01). **Conclusion:** Systemic rehabilitation exercise improves the recovery of shoulder joint function of patients with rotator cuff injury due to sports activities. A safe and effective rehabilitation plan should be implemented according to the characteristics of rotator cuff injury from sports activities.

PA207

Ultrasound-Guided Hydrodistension in Adhesive Capsulitis: a Prospective Study

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Introduction: Adhesive Capsulitis (AdC) is an extremely painful and disabling condition that leads to an important functional impairment of the shoulder. Its pathogenesis depends on a mechanism of soft tissue fibrosis based on inflammatory mediators, not an “articular adhesivity” phenomenon. The typical clinical presentation includes shoulder pain, stiffness and loss of passive motion with insidious onset. Some authors consider AdC a self limited condi-

tion, but a considerable percentage of patients (7 to 15%) do not recover full range of motion. Currently there is no consensus regarding the treatment of AdC. The Ultrasound Guided Hydrodistension (USGH) appears as one of the most recent and promising therapeutic modalities. *Objectives:* The objective of this paper is to demonstrate the results of the USGH on a population of patients with AdC diagnosis, with pain and function evaluation at 1, 4, 12 and 24 weeks. *Material and Methods:* Initial stage of a 12 months prospective study. At the date of presentation of this paper, there will be demonstrated results of USGH in the treatment of AdC at 1, 4, 12 and 24 weeks of follow up, regarding pain (VAS) and functional scale (UCLA shoulder scale). The population of study are 20 patients with AdC diagnosis, treated with this technique in the PMR Department of Hospital da Prelada. *Results:* It was demonstrated range of motion immediate benefit after USGH, and pain and function benefit at 1, 4 and 12 weeks of follow up, regarding VAS decrease and UCLA increase. *Conclusions:* At the time of submission of this paper, USGH appears to be a viable option in the treatment of AdC. This study is designed for 12 months, so it is necessary to continue the follow-up to obtain more relevant information regarding the true value of this therapeutic modality in AdC.

PA208

Management of Chronic Shoulder Pain after Breast Cancer Surgery with Botulinum Toxin

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Introduction: Pain is the most frequent symptom after the surgical treatment of breast cancer. Its prevalence may vary depending on the series (20% - 60%). Retraction of the pectoralis major muscle (RPM) is the most frequent cause of the upper limb dysfunction. Our aim is to evaluate if the infiltration with Botulinum toxin A is an effective treatment of this pathology. *Materials and Methods:* 6 women diagnosed of RPM one year after breast cancer surgery. They were infiltrated and included in a physiotherapeutic treatment program. The protocol included a 2nd visit 1 month after infiltration and a 3rd visit 4 months post-infiltration. *Scales:* Pain (EVA), Shoulder functionality (Constant), Quality of life in cancer patients (SF-36). *Results:* Age average: 51. Two in six received mastectomy, three in six patients received lumpectomy. Axillary dissection was required in all of them. Four in six were treated with radiotherapy and chemotherapy. Lymphedema was present in 5 women.

	1 st visit Examination pre-infiltration	2 nd visit First month after infiltration
Constant Scale	49.14/100	67.14/100
EVA	6.8/10	3.2/10
SF-36 Physical	57.74/100	54.49/100
SF-36 Mental	49/100	61.83/100

Punctuations in EVA scale diminished around 3-4 points post-infiltration. Shoulder functionality improved in all cases. Punctuations in mental range of SF-36 scale were higher one month after infiltration in every patient. Punctuations were invariable in 3rd visit. Only one infiltration was required. No side effects detected. Limitations: statistical significance is not calculated due to the little number of the sample. *Conclusions:* Differential diagnosis of the most frequent pathologies in upper limb after breast surgery should be taken in consideration. Botulinum toxin tipe A in RPM is revealed as an effective option of treatment. The infiltration in major pectoralis has not lead to any complication to patients affected by upper limb lymphedema. *References:* 1) Yang et al. Longitudinal Change of Treatment-Related Upper Limb Dysfunction and Its Impact on Late Dysfunction in Breast Cancer Survivors: A Prospective Cohort Study. *J.Surg.Oncol.* 2010;101:84–91. 2) Casey J. O’Donnell. Pectoral Muscle Spasms After Mastectomy Successfully Treated With Botulinum Toxin Injections. *American Academy of Physical Medicine and Rehabilitation.* 2011; 3:781-782.

PA209

Abnormal Shoulder Muscle Activity During Three Functional Movement Tasks in Patients with Chronic Frozen Shoulder

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Background: Frozen shoulder is a common shoulder disorder with chronic pain, mobility deficit and functional disability. Previous studies have shown the non-contractile tissue inflammation and adhesion in frozen shoulder. In addition to non-contractile tissue component, recent studies also showed the contractile tissue plays an important role in shoulder mobility deficits. However, the muscle activity of frozen shoulder has not been fully explored. So the purpose of this study is to compare the differences of shoulder muscle activity between the patients with frozen shoulder and the healthy subjects during three functional movement tasks. *Materials and Methods:* 4 patients with unilateral frozen shoulder and 5 asymptomatic subjects were recruited. All subjects received electromyography examination on pectoralis major, infraspinatus, teres major, upper trapezius, and lower trapezius. The data of shoulder muscle activity were recorded during three functional tasks, including shoulder elevation in scapular plane, hand to neck, and thumb to waist (T12). Mann-Whitney *U* test was used to examine the differences in shoulder muscle activity between the patient group and the healthy group. *Results:* The subjects with frozen shoulder revealed significantly decreased lower trapezius muscle activity (81%±20) than the healthy group (151%±49) during shoulder elevation in scapular plane (p=0.027). And the patient group also showed significantly higher muscle activity of pectoralis major (19.8%±4.7) and teres major (16.3%±7.7) than the healthy group (5.7%±2.7; 5.7%±0.9) during thumb to waist (both p=0.014). *Discussion and Conclusion:* Findings of this study indicated that insufficient lower trapezius muscle activity, and higher pectoralis major, and teres major muscle activity may contribute to abnormal scapular and glenohumeral joint dynamic control in patients with frozen shoulder and may influence their functional movements in their daily life.

PA210

The Effectiveness of Laser Therapy and Supervised Exercise Program for the Treatment of Temporomandibular Joint Arthrosis

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Introduction: Temporomandibular joint arthrosis (TMJA) is associated with pain, functional disability and poor life quality, with predisposition for increased pain levels and loss of mobility. Clinical manifestation of pain is related to the use of the joint stiffness during first motions after prolonged rest and limited joint range of motion. *Objective:* To compare the effect of laser therapy and exercise with only supervised exercise program in patients with TMJA. *Materials and Methods:* A prospective comparative study with a 3-month follow-up period was conducted between April 2014 and June 2014 at the Physical Medicine and Rehabilitation Clinic in Prishtina. Forty one patients with TMJA, (with more than three months duration of symptoms) were randomized into two groups: the laser therapy and exercise group (n=19), and only exercise group, (n=22). The treatment period of both groups was 4 weeks at the outpatient clinic. Clinical outcomes (pain intensity, range of motion, and disability) were obtained at follow-up appointments at the end of the treatment period, 2 and 3 months. *Results:* The combination of laser therapy and supervised exercise program is more effective compare to single use of exercise program. We have gained significant improvement in the values of the mobility of the joint, pain, and functional disability, in both groups, but the results have shown that the improvement has been

greater in the laser therapy and exercise group ($p < 0.05$). *Conclusion:* Our data show that the combination of supervised exercise program and laser therapy was superior compared to exercise program alone in the treatment of TMJ arthrosis. *Keyword:* temporomandibular joint, arthrosis, laser therapy, exercise.

PA211

Prevalence of Cervical Pain and Functional Disability in the School Community

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Background: The school community is exposed to numerous risk factors for the occurrence of neck pain. These symptoms may cause restrictions on their functional capacity and there's a need to make a proper measurement of this phenomenon, in a valid and reproducible manner. For this, the most recommended instrument is the Neck Disability Index (NDI); however its use in Portugal requires an analysis of its psychometric properties. *Aim(s):* To contribute to the validation of the NDI-PT applying this instrument in a school community to establish the levels of prevalence of neck pain and associated disability. *Methods:* On the first phase we used the SF-36 and twice the NDI-PT with an interval of 48 hours to 160 individuals ($n=160$) with chronic neck pain with no specific cause. Criterion validity was assessed using the Pearson correlation coefficient, to the construct validity, we proceeded to a factor analysis, internal consistency was made with Cronbach's α coefficient and test-retest reproducibility with ICC. In the second phase, there was the application of NDI-PT in 110 individuals ($n=110$), resorting to the frequency analysis, the measures of association such as chi-square test and Fisher exact test and Odds Ratio. *Results:* correlation between the subscales of the SF-36 and NDI-PT varies between 0.41 and 0.73, the factor analysis extracted two factors and no variable was lower absolute value to 0.40, so the items are related. The Cronbach's $\alpha=0.92$ and ICC=0.85. Regarding prevalence, 63.2% reported symptoms; the most affected group was the masculine, teachers and those who are between 46 and 65. The score of NDI-PT is higher in females, the auxiliary and between 46 and 65. *Conclusion:* the NDI-PT is considered adequate and there is a high prevalence of neck pain in ESTSP.

PA212

A Strong Lie: Clenched Fist Syndrome

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Introduction: Clenched Fist Syndrome is a type of factitious disorder in which the patients present with flexion contractures of the fingers without an organic pathology. Although the origin of this table is psychiatric, patients mostly apply to branches related with muscle and skeleton system. *Case:* We report here a case of 26 year-old male admitted to our hospital due to the pain and frequently repeated tightly clenched fist in his right hand. He did not bring his finger extension actively and passive movements of hand was not possible by reason of the fact that the pain. Allodynia was present on his sensory examination. Gabapentine for allodynia and rehabilitation programme consisting of whirlpool, TENS and ROM exercises for getting hand function again was begun. Somatoform scores were higher in his MMPI evaluation. His EMG findings were normal. He was diagnosed with clenched fist syndrome and psychotherapy sessions added in his treatment. After a 3- week follow-up period showed pain decrement and hand functions improvement. *Conclusion:* Besides the difficulty of diagnosis, treatment is quite hard in clenched fist syndrome. An early recognition and treatment is important in this syndrome, particularly for prevention of unnecessary diagnostic studies and therapies.

PA213

Effect of Subacromial Sodium Hyaluronate Injection on Rotator Cuff Disease

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Background: Rotator cuff disease is a common cause of shoulder pain. There are studies about the effectiveness of sodium hyaluronate injection on shoulder and knee pain, but few studies demonstrating the efficacy of sodium hyaluronate ultrasonography guided injection for rotator cuff disease. This study evaluates effectiveness of ultrasonography guided subacromial sodium hyaluronate injection in patients with impingement syndrome without rotator cuff complete tear. *Materials and Methods:* This prospective, double-blind, placebo controlled clinical trial study was performed among 40 patients with subacromial impingement syndrome without complete tear of rotator cuff. Patients randomly injected ultrasonography guided in 2 groups: Case group by 20 mg of sodium hyaluronate (Fermathron™) and control group by 0.9% normal saline. Both groups received 3 weekly injections. The pain score (100 mm visual analogue score [VAS]) was evaluated before first injection and one week after each injection. The constant score was evaluated before first and 12 week after last injection. Data was analyzed statistically by Independent *t*-test. *Results:* In both groups mean VAS has decreased, but more significantly in case group ($P < 0.001$). Mean constant score was significantly higher in case group 12 weeks after last injection ($P < 0.001$). The constant score improved 12 weeks after the last injection in both groups with a significantly better result in case group ($P < 0.001$). *Conclusion:* Subacromial injections of sodium hyaluronate are effective in treating rotator cuff disease without complete tears.

PA214

Comparative Efficiency of Osteopathic and Orthodontic Treatment in Facial Pain Patients Associated with Temporomandibular Joint Disorders

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Introduction: According to WHO data 40% of people from 20 to 50 years old have temporomandibular joint disorder (TMJ). In most cases this pathology don't manifest itself due to wide compensatory possibilities of jaw muscles. Although, they don't pay sufficient attention to TMJ disorders in patients with facial pain. Etiological factors provoking development of given pathology is malocclusion, teeth extraction, whiplash injury, bruxism. It's necessary to take into account all significant factors to play a part in facial pain generation in patient with TMJ disorders. Therefore, multidisciplinary medical assistance for successful treatment needed. *Material and Methods:* This study includes patients with TMJ disorders confirms clinical data. All patients divided in three groups: first group in number 8 patients had osteopathic treatment (1 procedure twice in a week during two weeks); second group in number 7 patients had orthodontic therapy by individual occlusal splint during two weeks; third group in number 8 patients had both osteopathic and orthodontic treatment also in two weeks. Superficial electromyography and stabilometry made before and after treatment. Activity of m. masseter, m. temporalis, m. sternocleidomastoideus, m. trapezius measured in both side in resting state and maximal clutch. Assessment of postural state made in european stand with opened and closed eyes, resting jaw muscles and maximal clutch. *Results:* Positive changes exists in all three groups. Although, in second and third groups stabilometry data significantly changed in comparison to first group. It means more centered position of total pressure center, less square and length of statokinesiogram. This changes suggest that orthodontic treatment

can influence in posture more significant, than osteopathic treatment alone. In first and third groups total activity jaw muscles in left and right sides after treatment was similar (45.7% to 54.3% and 48.4% to 51.6% accordingly). In second group muscles activity before and after treatment was not difference. We suppose that this fact associated with more lasting time to muscle adaptation in orthodontic treatment only. **Conclusion:** Interdisciplinary treatment in patients with facial pain associated with TMJ disorders more preferably than osteopathic or orthodontic treatment alone.

PA215

Restoring Range of Motion Via JAS Orthosis in Elbow Contractures

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Introduction: To examine the orthosis named Joint Active System (JAS) that used the principles of static progressive stress to improve elbow range of motion in patients who had posttraumatic elbow contractures. **Material and Methods:** Forty patients who had chronic flexion contractures were randomly divided into two groups. One group received exercise therapy, and another used the JAS for 30 minutes each time and 2 times per day. Mean treatment time was 3 months. Range-of motion (ROM) were assessed before and after the treatment every month. **Results:** After three months, The ROM of JAS group was improved $95.6^{\circ} \pm 11.82^{\circ}$, and the exercise group improved $84.0^{\circ} \pm 17.5^{\circ}$. Compared with the exercise group, the JAS group had a significant statistical improvement ($p=0.049$). In the first month, both the JAS group and the exercise group were significantly improved than the next two months ($p<0.01$). **Conclusion:** Compared with the common rehabilitation therapy, this JAS orthosis is a useful treatment for patients who had limitation of elbow flexion. **References:** 1) Chinchalkar SJ, Szekeres M. Rehabilitation of elbow trauma [J]. *Hand Clin*, 2004, 20(4):363-374. 2) Marinelli A, Bettelli G, Guerra E, Nigrisoli M. Mobilization brace in post-traumatic elbow stiffness [J]. *Musculoskelet Surg*, 2010, (94):S37–S45. 3) Costa CR, McElroy MJ, Johnson AJ, et al. Use of a static progressive stretch orthosis to treat post-traumatic ankle stiffness [J]. *BMC Res Notes*, 2012, 4(5):348.

A.2.5. REGIONAL PAIN SYNDROMES OF THE PELVIS AND LOWER EXTREMITY (INCLUDING ENTHESOPATHY, TENDINITIS AND OTHERS)

PA216

Extracorporeal Shock Wave Therapy of Gastrocnemius-Soleus Trigger Points in Patients with Plantar Fasciitis

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Background: Plantar fasciitis is the most common cause of heel pain. Extracorporeal shock wave therapy (ESWT) is an alternative treatment for refractory cases of plantar fasciitis. Studies also demonstrated that ESWT may be an appropriate treatment for myofascial trigger points. This study was designed to evaluate its effectiveness by comparing the ESWT of Gastrocnemius/Soleus (gastroc-soleus) trigger points and heel region with the ESWT of the heel region alone. **Materials and Methods:** The study was carried out among 40 patients with a clinical diagnosis of plantar fasciitis, divided randomly to case ($n=20$) and control ($n=20$) groups. The case group received ESWT for the heel region and for the gastroc-soleus trigger points. The control group received ESWT just for the heel region. The protocol was the same in both groups and they were treated for three sessions every week. The pain score (100 mm visual analog score [VAS]) and the modified Roles and

Maudsley score was evaluated before the first session and eight weeks after the last session. **Results:** Eight weeks after the last session, although the mean VAS had decreased significantly in both groups, this decrement was more significant in the case group. ($P=0.04$). According to the modified Roles and Maudsley score, there was a significant improvement in both the case ($P<0.001$) and control ($P=0.01$) groups, eight weeks after treatment, but there were significantly better results in the case group. **Conclusion:** The combination of ESWT for both plantar fasciitis and gastroc-soleus trigger points in treating patients with plantar fasciitis is more effective than utilizing it solely for plantar fasciitis.

PA217

Calcaneal Bone Marrow Oedema; a Case Report and Review of the Literature

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Case Diagnosis: Bone marrow oedema in the calcaneum. **Case Description:** A 23 year old male attended the pain management clinic with a 6 months history of ankle pain. This followed a history of trivial trauma. Two MRIs (6 months apart) showed resolving bone marrow oedema in the poster-medial part of the calcaneum. The patient responded well to conservative management (physiotherapy and pain medications). At one year follow up, his pain completely resolved and he was able to return to full activities. **Discussion:** Bone marrow oedema is a well documented syndrome especially in the head of the femur and the knee. Bone marrow oedema in the calcaneum is rarely reported despite being an important cause of prolonged ankle pain. Conservative treatment and gradual resolving of the bone marrow oedema are well described in the established academia. **Conclusion:** Bone marrow oedema of the calcaneum may cause prolonged pain in the ankle with or without any history of trauma. MRI is the gold standard investigation to confirm the diagnosis. Bone oedema has favourable prognosis and may respond well to conservative management.

PA219

High-Intensity Laser Therapy Versus Ultrasound Therapy in Symptomatic Calcaneal Exostoses Treatment

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Background: Symptomatic calcaneal exostoses are associated with plantar fasciitis. **Objective:** The aim of this study was to evaluate the effectiveness of high-intensity laser therapy (HILT) versus ultrasound (US) therapy in the treatment of symptomatic calcaneal exostosis. **Materials and Methods:** Eighty patients (60 females and 20 males) with symptomatic calcaneal exostosis were randomly assigned into two equal groups each of 40 patients. The patients age was ranged from 35 and 75 years, with mean age 55.2 years. The two groups were homogeneous in terms of demographics indicators and initial subjective and objective evaluation. Group A received 10 treatment sessions of HILT over a period of 2 consecutive weeks (5 days/week). Group B received US therapy 1 MHz, continuous mode, 1.5 w/cm², 5 sessions/week, for 2 weeks. Methods used for evaluation: Visual Analogic Scale for Pain (VAS), Roles and Maudsley score, QOL scale for assessing quality of life and ultrasound examination to assess the thickness of the plantar fascia. Evaluations were performed at the beginning and the end of the treatment and after 3 months of follow-up. **Results:** The results revealed at the majority of patients from group A significant improvement in symptoms, functional parameters, quality of life compared to group B ($p \leq 0.001$). Painful complaints and comfort

able walking period were significantly improved in patients from group A at the end of treatment and were maintained at 3 months after treatment. Plantar fascia thickness reduction was significantly higher in patients from group A than in patients from group B at the end of the treatment. Roles and Maudsley score revealed a significantly higher satisfaction level regarding treatment in patients from group A at the end of treatment and after 3 months follow-up. **Conclusions:** High-intensity laser therapy was more effective in treating patients with symptomatic calcaneal exostoses compared to ultrasound therapy.

PA220

Femoral Neuropathy Due to Spontaneous Iliopsoas Muscle Haematoma

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Case Diagnosis: We report a clinical case of femoral neuropathy as prime manifestation of spontaneous iliopsoas muscle haematoma in an anticoagulated patient who presented to the Emergency Department of our Hospital. We discuss the diagnostic approach and the distinct therapeutic options in light of the evidence presently available in literature. **Case Description:** A 67 year-old woman, with previous medical history of atrial fibrillation, chronic venous insufficiency of the lower limbs and surgical history of mitral valvuloplasty, anticoagulated with warfarin, presented to the emergency department. She complaints with right groin and tight pain which started 4 days before. She also claimed progressive difficulty on walking in the past days. The patient denied previous trauma. On physical examination she presented with pain in the groin and tight with passive mobilization of the right hip. While walking she couldn't do extension of the knee and flexion of the hip due to pain and muscle weakness. We also found right patellar hyporeflexia. No sensitive alterations were reported at this time. An X-ray of the hip was performed, which showed no alterations. We decided to do a CT which revealed an extensive iliopsoas haematoma, involving mainly the iliac component. We choose to treat this patient conservatively, with bed rest, withdrawing the anticoagulation, and monitoring the evolution of the haematoma with abdominal-pelvic CT for which she was admitted in an Internal Medicine ward. **Discussion:** Bleeding complications associated with anticoagulant therapy have been reported in 1-7% of all patients taking this medication. Iliopsoas haematoma is among those complications and poses as a rare but potentially serious disorder. Compression of the femoral nerve leading to neuropathy may happen due to the long course of the nerve as it arises from the lumbar plexus and travels through the iliopsoas groove. The treatment of this entity is often controversial. **Conclusion:** Diagnosis is difficult in the majority of the cases and clinical suspicion is essential. The preferred treatment in the majority of the cases is conservative, due to the difficulty of surgical approach and morbidity associated, however surgical treatment may be necessary essentially when the patient presents with profound neurological deficits.

PA221

Treatment of Chronic Plantar Fasciitis with Extracorporeal Shock Wave: a Prospective Study

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Introduction/Background: Plantar fasciitis causes heel pain in active as well as sedentary adults of all ages. The condition is more likely to occur in obese people or in those who are on their feet most of the day. Extracorporeal shock waves therapy is a non-invasive treatment option for chronic plantar fasciitis non responsive to other non-surgical treatment. The main objective of this study is to determine the benefit of extracorporeal shock wave therapy of patients reported pain. **Material and Methods:** We performed

an analytical prospective study on a group of 23 patients with heel pain from chronic plantar fasciitis, for at least 6 months, with a total of 29 feet treated. The treatment was applied according to the patient's symptoms and tolerance. Of the 23 patients included in the study 18 (78.26%) were females and the remaining 5 (21.74%) were male, ranging from 30 years to 68 years of age, with a mean of 46 years of age. All patients completed a VAS scale, before each session and four to six weeks after the last treatment. Descriptive statistics were used to examine the distribution for key variables. The multiple linear regression model was adjusted to provide the improvement in heel pain perceived by the patients using the step wise method of data entry. **Results:** From the 29 feet treated, there was an improvement in the heel pain in 93% (n=27), and 76% (n=22) were pain free. The mean pre-treatment VAS for the entire group was 6.4±2.5 and the mean four to six weeks after treatment VAS was 1.6±3.2. There was an improvement measured by the decrease of VAS of about 4.8±3.78, which was statistically significant (P<0.000). The mean of treatments applied was 2.86±1.13. **Discussion and Conclusion:** The results reveal significant beneficial effects of extracorporeal shock waves therapy in patients with chronic plantar fasciitis. However the sample of patients was relatively small and a longer follow-up would be needed to assess the long-term benefits. Further prospective work is needed to better define this rising technology.

PA222

Platelet-Rich Plasma and Chronic Plantar Fasciitis: Should We Consider It?

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Background: Chronic plantar fasciitis is a common orthopaedic problem characterized by heel pain, which conduces to moderate/severe activity limitations both in athletes and the general population. The condition is an enthesopathy at the plantar fascia attachment to the medial plantar tuberosity of the calcaneus that can prove difficult to successfully treat. Normally this is a self-limited pathology and in 10% of patients there's a lack of response to the conventional treatments, necessitating invasive procedures such as platelet-rich plasma (PRP). **Objective:** To determine the efficiency and security of PRP treatment and compare it to other therapeutic modalities. **Methods:** We conduct a literature review in the MEDLINE database for articles published between 01-01-2012 and 31-12-2014, with the terms "chronic plantar fasciitis", "treatment" and "platelet-rich plasma". **Results:** We found 22 articles from which 8 were eliminated: 1 case study, 4 systematic reviews and 3 letters to the editor; from the remaining 14 studies, access to the complete article was only granted in 9. From the studies analyzed, there were 4 case series with a total of 106 patients, 2 prospective non-randomized studies with a total of 120 patients, and 3 randomized studies with a total of 115 patients. All case series studies concluded that PRP treatment shows a good level of effectiveness, security and satisfaction; on the prospective non-randomized studies, Akashin et al (2012) found that PRP was a successful treatment for chronic plantar fasciitis but there was no significant difference when compared to the steroid group and Shetty et al (2014) observed a significant clinical improvement when compared to the steroid group; on the randomized studies, Kim et al (2014) observed a significant improvement in the PRP and the Dextrose Prolotherapy groups, though with no significant difference between them; Chew et al (2013) observed a significant improvement in the PRP and the shockwave therapy groups, with no significant difference between them; Monto (2014) reports a significantly more effective result from the PRP when compared with the steroid therapy. **Conclusions:** PRP seems to be an effective and secure therapy to address chronic plantar fasciitis however, to establish its superiority over other treatments, more studies are required.

A.2.6. BACK PAIN AND SPINE DISORDERS

PA223

High Quality Lower Limbs Edx Could Decrease the Risk of Failed Back Surgery Syndrome by Two Times.

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Background: Failed back surgery syndrome (FBSS) is one of the important complications of spine surgical interventions involving spine surgeons & PRM specialists. Although it is believed that only 10 percent of all lumbar disk herniation cases are candidates for surgery, it seems that surgery is recommended for more Iranian patients without reasonable indications. There are many patients that spine surgical intervention is performed for them without any pre-surgical Edx. The aim of this study are to comparison the incidence of FBSS among patients with and without pre-surgical lower limbs Edx which have enough compatibility. **Material and Method:** In a cohort study all the patients with lumbar disk herniation, admitted in one of Mashhad University medical science's hospital for surgical intervention between Jan 2014 to Jun 2014 followed 3 month to know whether they would experience FBSS or not. If the patient have pre-surgical Edx, its compatibility (considering clinical feature, MRI, reliability of the operator & presence the signs of ongoing axonal damage) was analyzed by an expert physiatrist just before the operation. **Results:** Surgical intervention (usually laminectomy) was performed for 83 patients with disk herniation during the above 6 month. 35 patients didn't have any edx of lower limbs; 21 had an Edx which was not enough convincing for Sx & 27 patients have at least one compatible electrodiagnosis for surgery. The incidence of FBSS was 45%, 38% and 22% respectively. If the first & second group is considered as one group, then patients without convincing pre-surgical lower limbs electrodiagnosis would be about 2 times as likely as the patients whom Edx was performed by an expert physician to develop FBSS. **Conclusion:** The failed back Surgery Syndrome remains a challenge for spine surgeon. It seems that a high quality pre-surgical lower limbs Edx could decrease the incidence of FBSS near 2 times.

PA224

Risk Factors for Low Back Pain among Kosovo Power Plant Workers

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Introduction: Low back pain (LBP) is one of the most significant medical and socioeconomic problems in modern society. Work-related physical exposures, especially heavy lifting and manual materials handling, working in awkward postures, and whole-body vibration, are well established risk factors for LBP. **Objective:** The purpose of this study was to assess occupational risk factors related to the presence of LBP among industrial workers. **Material and Methods:** A cross-sectional study design was utilized. Self-administered questionnaires were distributed among 430 industrial workers over the previous 12 months. The job titles were categorized into blue-collar workers (production workers) and white-collar workers (office workers and managers). Physical load was assessed by detailed observations at the workplace among a random sample of workers within each occupational group. The categories of trunk flexion that were observed were defined as neutral (<30°), mild flexion (30-60°), extreme flexion (60-90°), and very extreme flexion (>90°). **Results:** The main risk factors for occurrence of LBP among production workers were extreme trunk flexion (OR=3.5, 95% CI 1.7-7.3), as well as lifting of loads (OR=3.5, 95% CI 1.9-6.2), pushing or pulling heavy loads (OR=3.5, 95% CI 1.9-6.2) and exposure to whole body vibration (OR=1.7, 95% CI 1.0 -3.0). Among white collar workers trunk flexion, lifting of

loads, pushing or pulling heavy loads, exposure to whole body vibration, and ability to change posture regularly increase odds for LBP but not significantly ($p>0.05$). **Conclusion:** Flexion of the trunk and lifting at work are moderate risk factors for LBP. An ergonomics interventions program in the workplace should focus on eliminating awkward postures, manual handling of heavy loads and designing sitting-standing workstations on the production line. **Keyword:** low back pain, work-related, physical risk factors.

PA225

Multidisciplinary Biopsychosocial Rehabilitation for Low Back Pain – Is It Effective in Patients Older Than 65 Years?

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Background: In spite of Low Back Pain (LBP) being a frequent health problem in the elderly, this group of patients is largely underrepresented in clinical trials (1). Systematic reviews support the effectiveness of multidisciplinary biopsychosocial rehabilitation (MBR) for LBP, but it remains unknown if MBR is also effective in patients older than 65 years. The objective of this study was to compare the effects of MBR in patients older than 65 years to younger patients. **Materials and Methods:** In this prospective observational study at the day care clinic of the University Hospital Munich, department of Orthopedics, Physical Medicine and Rehabilitation, patients who completed a 3-week MBR for LBP between 2001 and 2012 were included. The MBR comprised exercise therapy, hydrotherapy, occupational therapy, psychological interventions, patient education and instructions to home exercise programs. At the beginning (T1) and after 3 months (T2) bodily pain (BP) and physical functioning (PF) were assessed by the Short-Form 36 (SF-36). Participants were grouped into "Old" or "Young" with the cut-off 65 years. Standardized effect sizes (ES) were calculated. Significance was tested by paired *t*-tests. **Results:** In the groups old/young 75/76 patients were included. Baseline characteristics for old/young were female 64%/70%, mean age 72y (range: 66-82 y)/57 y (range: 38-64 y) and high school graduates 37%/35%. SF-36 baseline scores for old/young: BP 37.5/35.7, PF 56.8/58.2, Mental Health 67.6/67.1. BP and PF improved statistically significant in both groups with smaller ES in the older patients. Old: BP $p<0.001$, ES=0.57. PF $p=0.048$, ES=0.19. Young: BP $p<0.001$, ES=0.83. PF $p=0.01$, ES=0.38. **Conclusion:** This study suggests that MBR is also effective in patients older than 65 years but with smaller effects compared to younger patients. Adaptation of the treatment to the older age may increase the benefit in this patient group. **Reference:** Paeck T, Ferreira ML, Sun C, Lin C-WC, Tiedemann A, Maher CG. Are Older Adults Missing From Low Back Pain Clinical Trials? A Systematic Review and Meta-Analysis. *Arthritis Care & Research.* 2014;66(8):1220-6.

PA226

Marfan Syndrome and Spinal Deformities

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Introduction: Marfan syndrome, in its typical form, includes morphological, ocular, cardiovascular and genetic abnormalities. 70% of cases can develop spinal deformities. This raises a problem of etiologic diagnosis and therapeutic management. The objective of our study was to report our experience at the National Orthopaedic Institute Kassab in the diagnosis and treatment of these spinal deformities in Marfan's disease. **Materials and Methods:** This is a retrospective study of patients followed and treated for scoliosis in Marfan disease at the National Orthopaedic Kassab Institute between 1990 and 2011 for at least one year service. For each patient we specified data from the clinical examination and radiological device specifying the characteristics of these strains and the means

of support (type of corset, rehabilitation and surgery). *Results:* 33 patients (11 male and 21 female), mean age 11.7 years were included this study. Marfan's disease was diagnosed at the age of 8 years 3 months by a pediatrician (8 cases), a cardiologist (3 cases), internal medicine (1 case) and a dermatologist (1 case). For the remaining cases the disease has been diagnosed with Marfan because of their spinal deformities. On the sagittal plane we found a chest kyphosis (21 cases), thoracic lordosis (5 cases) and junctional kyphosis (6 cases). Scoliosis were lumbar (5 cases), double (right thoracic and left lumbar, 17 cases), thoracic (10 cases). The corset has been tried for first-line in 16 cases. Before the clinical and radiological aggravation, we opted for surgery to all our patients. We found a significant improvement in the Cobb angle from 62 to 38.7 for thoracic scoliosis from 38 to 24.58 for lumbar scoliosis and 49.75 to 40 for thoraco lumbar scoliosis after surgery. *Conclusion:* Faced with rapid worsening of spinal deformities in young patients, it is necessary to seek a morphotype resembling a Marfan syndrome to ensure a multidisciplinary approach and to optimize the functional and vital prognosis of these patients.

PA227

Effect of Back Exercise on Strength of Back Extensors and Attitudes Toward Exercise and Back Health

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Objective: The objective of this study was to evaluate the efficacy of back-strengthening exercise on strength of the back extensors and attitudes toward exercise and back health in a community setting. *Methods:* Seventy-nine healthy women volunteer (aged 42 to 76 years) were assigned to a control group (n=39) or an exercise group (n=40). Subjects were screened to exclude those with significant back pain in VAS score of 6 or more. Exercise group performed a supervised back strengthening exercise, 3 sessions per week for 8 weeks. Lectures for general health care were provided to control group at the day of each outcome measurement. Outcomes were measured at baseline, 1 month, and 2 months for isometric back extensor strength, back pain related disability, and personal attitudes toward exercise and back health. Isometric back extensor strength was measured by portable dynamometer (Power Track II Commander Muscle Tester, JTECH Medical, Utah, US) in sitting posture; back pain related disability was assessed by Oswestry Disability Index (ODI: 0-100); personal attitudes toward exercise and back health was assessed using questionnaire composed of 11 items and 3 subcategories: attitude toward exercise (4 items), perceived risk of back disorder (3 items), and self-efficacy of exercise (4 items). *Result:* Six subjects were dropped out (2 were exercise group; 4 were control group). There was no significant difference between 2 groups in age and other sociodemographic characters. At 2 months, back extensor strength in the exercise group significantly increased ($p < 0.001$); but not in control group. Back pain related disability significantly decreased only in the exercise group. Attitude toward exercise, and perceived risk of back disorder increased in the exercise group ($p < 0.001$), whereas those remained unchanged in the control group. Though self-efficacy of exercise significantly increased both in the exercise group ($p < 0.001$) and in the control group ($p = 0.005$), there was significant difference between groups. *Conclusion:* This study indicates that the community based back-strengthening exercise has positive effects on the strength of the back extensors, back pain related disability, and the attitude to exercise and back health in adult women.

PA228

Muscular Involvement in Behçet's Disease

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Background: Behçet's disease (BD) is a systemic vasculitis with protean manifestation. In BD, muscular involvement is very rare. We report four cases of myositis was a prominent feature of BD, leading to hospitalization for pain in the lower extremity. *Case 1:* A 20-year-old male patient presented with progressive left calf pain and tenderness. We observed oral ulcer and indurated erythema nodosum on his left anterior shin. Whereas creatine kinase (CK) level were normal range, electromyography (EMG) showed localized abnormal spontaneous activity in both gastrocnemius medial (GCM) head and magnetic resonance imaging (MRI) revealed extensive inflammatory changes of calf muscles including both GCM. Biopsy of left GCM demonstrated leukocytoclastic and necrotizing vasculitis, interstitial infiltration of lymphocytes and perimysial fibrosis which is consistent with BD associated myositis. Treatment with prednisolone gives a rapid improvement of the pain. *Case 2:* A 41-year-old man with a history of BD complained of pain on left anterior thigh for 2 weeks that causing progressive difficulty walking. His CK were raised (CK=773 IU/dl) and HLA-B51 test was positive. Empirical colchicine therapy was given with immediate symptomatic relief. *Case 3:* A 41-year-old man presented with acute myalgia on left anterior thigh. The patient had oral ulcer, multiple arthralgia and a pustular skin lesion (positive pathergy test, clinically) on examination. EMG showed localized denervation activity in left vastus lateralis (VL) and MRI demonstrated focal myositis of several thigh muscles. Biopsy of left VL showed extremely atrophic myofibers, focal mild interstitial fibrosis. *Case 4:* A 31-year-old female patient was visited with right calf pain that causes refusal to walk and two painful erythema nodosum. On EMG, denervation potential on the right peroneus longus was seen. Increased signal intensity in multiple left calf muscles including right TA and PL on T2-weighted MRI. Muscle pathology showed a multifocal lymphoplasmacytic infiltration and perimysial fibrosis. *Conclusion:* Our four cases shared a similar clinical features with calf or thigh pain with ambulation and treatment with corticosteroids and colchicine leads to a faster symptomatic relief. High index of suspicion of the diagnosis can lead to earlier treatment and prevention of the irreversible fibrotic change.

PA229

The Prevalence and Characteristics of Low Back Pain among Japanese Care-Workers

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Background: Low back pain (LBP) is a major public health problem and the most common cause of workers' disability, resulting in substantial economic burden in terms of workers' compensation and medical costs. Caregiving and nursing are a recognized potential risk factor for developing LBP, especially in aging population. Therefore, eliminating risk factors associated with working conditions and individual work capacity may be beneficial in preventing LBP in care services or nursing services. The purpose of this prospective cross-sectional study is to investigate the prevalence of LBP and examine risk factors that contribute to the development of LBP in care staff and nurse. *Methods:* A cross-sectional survey was administered to all subjects to assess the prevalence of LBP persisting for at least 72 hr and numerical rating scale $> 4/10$ during the recent week. Data on demographic characteristics and potential risk factors for LBP were collected at routine check-ups according to healthy people 2012 recommended by the Japanese health, labour and Welfare Ministry. Patients with LBP completed the Roland-Morris Disability Questionnaire (RDQ), which provided information on the attributes of LBP and sf36 as of health-related QOL. Univariate and multivariate regression analyses examined the association between LBP and potential risk factors. *Results:* Of the 649 workers, 230 (35.4%) acknowledged experiencing LBP during the recent week. Health-related QOL of those person who have LBP reduced statistically significant. Univariate analyses identified prior history of LBP, dental caries and mental stress as significant risk fac-

tors of LBP. Multivariate logistic regression analyses identified prior history of LBP and mental stress as significant risk factors of LBP.

PA230

Is Spinal Traction a Spinal Decompression?

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Introduction: Although the controversy surrounding the association between spinal traction and its effect on pain relieve is longstanding, spinal traction is still a common treatment option for mechanical spinal pain. More recently, spinal traction is often referred as nonsurgical spinal decompression, in contrast to surgical decompression, and also often described to generate negative intradiscal pressure based on some radiographic evidences on vertebral bodies, facet joints, IV foramina, curvature, or soft tissue evidences on ligaments and muscles after traction; however, whether spinal traction really produces negative intradiscal pressure is not fully resolved, partly because it is difficult to obtain conclusive evidences on human body clinically. The purpose of the study was to assess the current scientific literature related to spinal traction and spinal decompression to understand if the spinal traction was correlated to decompression and the production of negative intradiscal pressure. **Materials and Methods:** Literature searches were performed in Medline, CINAHL and MANTIS databases from January 1990 through September 2013. Search terms included decompression therapy, traction, treatment outcome, outcome assessment and evaluation studies. Additionally, keyword searches were performed using brand names of specific manufacturers. **Results:** There were 28 relevant papers selected for analysis. These papers included 23 clinical studies, 2 human cadaveric studies, 1 animal cadaveric study and 2 computer models. All these studies suggested the spinal decompression after linear traction/distraction. Most of the clinical evidences of decompression were radiographic evidences based on returning of protruded discs and widening of IV foramen. There was only one clinical study showed negative intradiscal pressure (-160 mmHg) by applying logarithmic distraction force. Human and animal cadaveric studies and computer models also showed decrease in the intradiscal pressure from previous high pressure status; however, none of these reports showed negative pressure. **Conclusion:** Spinal traction may lengthen muscles and widen intradiscal space, possibly and temporarily decrease the intradiscal pressure. Logarithmic traction results from rate-independent (limiting stress) behavior might be more favorable to reduce intradiscal pressure and promote molecular transportation in degenerated intervertebral disc. Further study required to investigate the effects of different traction modalities on intradiscal pressure.

PA231

The Effect of Lumbar Support on the Ultrasound Measurements of Trunk Muscles: a Single-Blinded Randomized Controlled Trial

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Introduction/Background: To evaluate the effect of lumbopelvic belts on the thickness of lateral abdominal muscles and the cross-sectional area (CSA) of lumbar multifidus (LM) muscles. **Material and Methods:** Design: A single-blinded randomized controlled trial. **Setting:** An academic and tertiary care referral spine and sports medicine center. **Participants:** Sixty healthy volunteers with no history of low back pain in the previous year. **Methods:** The subjects were allocated into belt and control groups. Lumbar belts were given to the subjects in the belt group, and they were asked to use the belts during the study period except during sleeping hours. The subjects were assessed at baseline and at 4 and 8 weeks. **Main Outcome Measures:** The thickness of lateral abdominal muscles and the CSA of the LM

muscles were measured by ultrasound with the patient in the hook-lying position on an examination table. **Results:** The thickness of lateral abdominal muscles and the CSA of LM muscles on both sides decreased significantly among healthy subjects in the belt group after 8 weeks. **Conclusion:** The results of this study show that lumbopelvic belts might influence the ultrasonographic measurements of lateral abdominal and LM muscles and thereby spine stability.

PA232

The Connection between the Inflammatory Syndrome and Clinical Symptoms in Patients with Low Back Pain

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Introduction: Low back pain is the most common pathology treated in our out-patient clinic. Due to prolonged static posture in many of nowadays jobs associated to older static pathologies of the spine, lumbar and sacral pain has an increased incidence and prevalence. **Material and Methods:** we studied a group of 21 out-patients treated in our rehabilitation clinic during the month of October 2014. They had low back pain for 1 to 4 weeks, first or recurrent episode, disregarding age or other pathologies (except for neurological ones). We measured the biological markers of inflammation and noted the clinical symptoms: bipolar pain, muscle contracture, range of motion and dural signs. **Results:** there is a small direct correlation between the inflammatory syndrome and the clinical symptoms, only higher when the dural signs are present. **Conclusions:** low back pain has not a big impact on the markers of inflammation, although the symptoms, especially pain, can be very variable.

PA233

Effect of Stabilization Exercise on Cross-Sectional Area of Lumbar Multifidus Muscle in Patients with Chronic Low Back Pain

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Background: Low back pain (LBP) is a highly prevalent problem and one of the main causes of disability in the society. Although the aetiology is diverse, many causes have been related to weakness or injury of the soft tissue in the lumbar area. This study sought to investigate the effect of stabilization exercise on cross-sectional area of lumbar Multifidus (LM) in patients with Chronic LBP. **Material and Methods:** A total of 122 individuals (44 males, 78 females) with non-specific chronic low pain back (NCLBP) participated in this study. They were recruited from Orthopaedic Clinic of Lagos University Teaching Hospital (LUTH), Idi-Araba, Lagos and National Orthopaedic Hospital Igbobi, Lagos, Nigeria. They were assigned to four different groups (1, 2, 3 & 4). Group 1 received stabilization exercise only. In addition to stabilization exercise, Groups 2 and 3 received Transcutaneous Electrical Nerve Stimulation (TENS), and massage therapy respectively. Group 4 was the control who received drug therapy only. Participant went through this protocol twice weekly for 8 consecutive weeks. Measurement of Cross-Sectional Area (CSA) using Ultrasound scanning machine was done at baseline and end of 8th week. Analysis of variance was used to determine significant difference at P<0.05. **Results:** There was predominant increase in the CSA at 4th and 5th lumbar vertebrae, with more increment in group 1 with a mean and standard deviation of 11.85±1.99 at 4th lumbar vertebrae and 12.10±2.19 at 5th lumbar vertebrae within three groups (1, 2, 3) except the control. **Conclusion:** The study established that stabilization exercise only and in combination with TENS and massage is effective in increasing the CSA of LM muscle. The assessment of CSA can therefore be used as a measure of treatment improvement or progression in patients with NCLBP.

PA234

Work-Related Fear Avoidance During Back Pain Rehabilitation

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Introduction: Work related fears are a well known phenomenon in patients with back pain. In the year 2013/2014 we evaluated the fear avoidance belief questionnaire during the course of an outpatient rehabilitation- programme. **Materials and Methods:** 165 patients with back pain completed the 6-week programme. Data of the FABQ, RM and a modified GOAL-Score were available for analysis. **Results:** Results showed a high correlation between work-related fear items of the FABQ with the occupational status. The analysis will be presented in detail **Conclusion:** Work related fears have to be addressed in patients with uncertainty about their future work status and will potentially influence the outcome of rehabilitation programmes.

PA235

Conventional Rehabilitation Program Versus Isokinetic Program in Chronic Low Back PainA. Mrabet¹, A. Yahyaoui¹, I. Ksibi¹, R. Maaoui¹, *H. Rahal²¹Military Tunis Hospital, ²Tunis, TN

Introduction: Many rehabilitation programs were developed to improve patients in chronic low back pain. The aim of this study is to compare the effectiveness of an isokinetic exercise programme with a standard exercise programme in patients with chronic low back pain **Methods:** Comparative study about Two groups of 25 patients, treated in department of physical and rehabilitation medicine of Tunis Military Hospital, from Marche to December 2013. Patients were allocated into groupe 1 (G1) (n=25, isokinetic exercises) and groupe 2 (G2) (n=25, standard exercise). Clinical assessment of pain by VAS, flexibility and endurance of muscles of the trunk and functional evaluation using DALLAS, QUEBEC and HAD scores, were carried out, before (T1) and after rehabilitation (T2) with instrumental assessment by isokinetic. **Results:** We observed an improvement in each parameter after rehabilitation, in each group. Pain intensity, and flexibility were significantly reduced (VSA:G1: p=0.01, G2: p=0.002, and for Schober index, the finger-ground distance test, Shirado and Sorensen indexes, G1: p=0.01, G2=0.02), the strength isokinetic muscles of trunk was improved (abdominal muscles: +34%, paraspinal muscles:+30%), DALLAS, QUEBEC and HAD scores were significantly decreased: DALLAS (G1: p=0.14, G2: p=0.02), QUEBEC (p=0.001 for G1 and G2)and HAD score (G1: p=0.015, G2=0.01). **Conclusion:** Isokinetic and standard exercise programs have an equal effect in the treatment of chronic low back pain.

PA236

Comparison of Clinical Efficacy between Interlaminar and Transforaminal Epidural Injection in Patients with Axial Pain Due to Cervical Disc Herniation

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Introduction/Background: Transforaminal epidural injection (TF) has advantages over interlaminar approach (IL) in patients with radiating pain due to cervical disc herniation because it can deliver medications closer to dorsal root ganglion. TF is also preferred than IL in patients with axial low back pain due to lumbosacral disc herniation because it allows for delivery of injectate directly in ventral epidural spaces, from which axial pain is originated. But it is questionable that TF is more effective than IL in axial pain due

to cervical disc herniation because TF is performed in supine position and needle is advanced into posterior aspect of neural foramen to avoid vascular penetration, therefore, even TF has the limitation in direct administration of injectate into ventral epidural space. This study was to compare the clinical outcomes between TF and IL in axial neck pain. **Methods:** Fifty-six and 52 patients who underwent IL and TF for axial neck/interscapular pain due to central or paramedian cervical disc herniation were included. Numeric Rating Scale (NRS) and Neck Disability Index (NDI) at 2 and 8 weeks after treatment were compared between both groups. Successful pain relief was defined as a 50% or more reduction in the NRS compared with pretreatment one. Successful functional improvement was defined as at least a 40% reduction in NDI **Results:** Overall, 79 (73.1%) and 57 (52.8%) among 108 patients showed successful pain relief at 2 and 8 weeks, respectively. Seventy-six (70.4%) and 52 (48.1%) had successful functional improvement at 2 and 8 weeks. The IL and TF groups showed no significant difference in proportion of successful NRS at 2 (73.2% vs 67.3%) and 8 weeks (48.2% vs 48.1%). Also, no significant difference was obtained in proportion of successful NDI between two groups at 2 (75.0% vs 71.2%) and 8 weeks (53.6% vs 51.9%). **Conclusions:** Cervical epidural injection showed favorable results in 2 weeks and moderate results at 8 weeks after treatment in patients with axial pain due to cervical disc herniation. The IL and TF groups showed no significant difference in clinical efficacy. Considering that TF was relevant to more serious complications than IL, IL was more recommended in these patients.

PA237

Effects of Infra Red Radiation and Short Wave Diathermy on Chronic Low Back Pain

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Introduction: Low Back Pain (LBP) is a common cause of disability. It is very common, 80% of the people experience LBP at some times in their life¹. It is an uncomfortable sensation in the lumbar and buttock region originating from neurons near or around the spinal canal that are injured or irritated by one or more pathologic processes². LBP affects the area between the lower rib cage and gluteal folds and often radiates into the thighs. Despite its high prevalence, low back pain remains poorly understood and inadequately treated and this may be due to the heterogeneity of the patients' population, and the lack of a simple and easy to apply, clinically useful system for characterization of patients. **Material and Methods:** A randomized clinical trial was done from March 01, 2010 to March 15, 2014. A total of 153 patients with chronic low back pain were selected for the study. Patients were divided into three groups who were provided with three different treatments approaches:-50 patients in group A (NSAID + ADL + SWD), another 48 patients in group-B (NSAID + ADL + IRR) and 55 patients in group C-(NSAID +ADL). In all of the groups patients were treated for six weeks. The data was analyzed statistically and student's 't' test was done to see the level of significance. **Results:** All of the three treatment groups benefited immediately from treatment. Significant improvement was observed in the three groups after one week treatment. Improvement was gradually increased from first week to sixth week. We found both SWD and IRR is effective in the treatment of chronic LBP (p=0.001). But statistically significant improvement was found in SWD group than IRR group (p=0.001). **Conclusion:** SWD has better effect than IRR to reduce the symptoms of the patients with chronic LBP. **References:** 1) Hellmann DB, Stone JH. Arthritis & Musculoskeletal Disorders. In: Tierney Jr. L M., McPhee S J, Papadakis M A, Editors. Current Medical Diagnosis & Treatment. McGraw -Hill, 2002; 20: 833-889. 2) Casey PJ, Weinstein JN. Low back pain. In: Ruddy S, Jr EDH, Sledge CB. Editors. Kelley's Textbook of Rheumatology. Philadelphia- London. W.B. Saunders, 2001; 36: 509-523.

PA238**Effect of a Preoperative Cognitive-Behavioural Intervention on In-Hospital Pain, Mobility, Analgesic Intake and Discharge in Lumbar Spinal Fusion Patients***N. Rolving¹, C. V. Nielsen², F. B. Christensen¹, R. Holm³, C. Bünger⁴, L. G. Oestergaard¹¹Aarhus University Hospital, ²Aarhus University, Aarhus, DK, ³Regional Hospital Silkeborg, Aarhus, DK

Introduction/Background: Acute post-surgical pain, causing delayed ambulation and discharge and potentially impeding subsequent rehabilitation, is negatively influenced by certain psychological characteristics. Rehabilitation interventions using cognitive-behavioural therapy (CBT) seem efficient in modifying these characteristics, but the effect of initiating a CBT intervention already before surgery has not been investigated for lumbar spinal fusion (LSF) patients. The aim of this study was to examine if a preoperative CBT intervention could positively influence acute post-surgical pain and analgesic intake, facilitate mobilisation and decrease length of hospitalisation. *Material and Methods:* The study was a randomised clinical trial. Ninety patients undergoing LSF due to degenerative disease or spondylolisthesis were randomly allocated to either the control group or the CBT group. Both groups received surgery and standard physical rehabilitation. In addition, the CBT group received a preoperative patient education consisting of four sessions focussed on pain coping using a CBT approach. The primary outcome was back and leg pain during the first week (0-10 scale). Secondary outcomes included analgesic consumption, mobility, and length of hospitalisation. Data were retrieved using self-report (pain) and assessments made by physical therapists (mobility) and obtained from medical records (analgesics and length of hospitalisation). *Results:* There was no difference between the groups' back pain ($p=0.89$) and leg pain ($p=0.83$). Analgesic consumption was lower in the CBT group. Independent mobility was reached by a significantly larger number of patients in the CBT group during the first three postoperative days. Length of hospitalisation was unaffected by the intervention (4 versus 5 days). *Conclusion:* Although no effect was evident for pain and length of hospitalisation, participation in a preoperative CBT intervention may still have had a positive effect on the patients' ability to cope with pain as evidenced by a lower use of analgesics and an earlier achievement of independent mobility in the CBT group.

PA239**Facet Joint Tropism: Association with Lumbar Disc Herniation***W. X. Yang¹, Z. Zou²¹The First Affiliated Hospital of Soochow University, ²The First People's Hospital of Wujiang, Suzhou, CN

Introduction/Background: Facet tropism is defined as asymmetry in both the facet joint angles of the lumbar and lumbosacral regions. It has been suggested as being one of the possible causes of herniation of the lumbar disc. The relationship between facet tropism and lumbar disc herniation is highly controversial. In the current study, we attempted to evaluate the effect of facet tropism on disc herniation. *Methods:* ninety-six patients (17–57 years) with single level disc herniation (L3–L4, L4–L5, or L5–S1) were included in the study. Facet joint morphology was measured using CT. Normal disc adjacent to the herniated level was used as control. We also examined if disc herniated towards the side of more coronally oriented facet. *Results:* Fifty-six disc herniations were at L4-5 level (58.33%) and 40 at L5-S1 (41.66%). Herniation on the left side was 59 cases (61.46%) and on the right side was 37 cases (38.54%). At L4–L5 level, 8/56 cases had tropism compared to 2/40 controls ($P>0.05$). At L5–S1 level, 12/40 cases had tropism as compared to 4/56 controls ($P>0.05$). The overall association of facet tropism with lumbar disc herniation was found to be highly

significant by Fisher exact test ($P<0.01$). The association was not significant at L4–L5 ($P>0.05$), while it was highly significant at L5–S1 by Fishers exact test ($P<0.05$). *Conclusion:* The results suggest that an overall association of facet tropism with lumbar disc herniation. We did not find any significant difference in the distribution of the more coronally or sagittally facing facet joint with respect to the side of disc herniation.

PA240**Abnormal Flexor Carpi Radialis H-Reflex as a Specific Indicator**

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Objective: The FCR H-reflex has not been commonly used for the diagnosis of cervical radiculopathy when compared with the routinely tested soleus H-reflex. Although both S1 and S2 roots innervate the soleus, the H-reflex is selectively related to S1 nerve root function clinically. Flexor carpi radialis is also innervated by two nerve roots which are C6 and C7. Although they are among the most common roots involved in cervical radiculopathy, few studies reported if the attenuation of the FCR H-reflex is caused by lesions affecting C7 or C6 nerve roots, or both. We aimed to identify whether an abnormal FCR H-reflex was attributed to the C7 or C6 nerve root lesion, or both. The sensitivities of needle electromyography, FCR H-reflex, and provocative tests in unilateral C7 or C6 radiculopathy were also compared in this study. *Methods:* A concentric needle electrode recorded bilateral FCR H-reflexes in 41 normal subjects (control group), 51 patients with C7 radiculopathy, and 54 patients with C6 radiculopathy. Clinical, radiological, and surgical approaches identified the precise single cervical nerve root involved in all patient groups. The H-reflex and M-wave latencies were measured and compared bilaterally. Abnormal FCR H-reflex was defined as the absence of the H-reflex or a side-to-side difference over 1.5 milliseconds which was based on the normal side-to-side difference of the H-reflex latency of 16.9 milliseconds (SD $\frac{1}{4}$ 1.7 milliseconds) from the control group. We also determined standard median and ulnar conduction and needle electromyography. The provocative tests included bilateral determination of the Shoulder Abduction and Spurling's tests in all radiculopathy group patients. *Results:* Abnormal FCR H-reflexes were recorded in 45 (88.2%) of C7 radiculopathy group patients, and 2 (3.7%) of C6 radiculopathy group patients ($P=0.05$). Needle electromyography was abnormal in 41 (80.4%) of C7 radiculopathy patients and 43 (79.6%) of C6 radiculopathy patients. Provocative tests were positive in 15 (29.4%) of C7 radiculopathy patients and 25 (46.3%) of C6 radiculopathy patients. *Conclusions:* Flexor carpi radialis H-Reflex provides a sensitive assessment of evaluating the C7 spinal reflex pathway. Clinically, a combination of the FCR H-reflex with needle electromyography may yield the highest level of diagnostic information for C7 radiculopathy.

PA241**A Systematic Review of the Evidence Linking Atherosclerosis and Low Back Pain***M. Longacre¹, A. Shcherbina²¹Harvard, Cambridge, ²Boston University, Jamaica Plain, MA, US

Background: Originally based on Finish epidemiological data, the Atherosclerosis Hypothesis has emerged in the medical literature as a frequently cited etiology of the low back pain. It posits that insufficient nutrient supply to the intervertebral disc predisposes it to early degeneration thereby leading to pain. In this work, we reviewed the available evidence with respect to vascular insufficiency of the low back, lumbar disc degeneration, and low back pain. *Methods:* We performed a systematic review of articles published in PubMed, Web of Science, EMBASE and CINAHL using the key terms "low back pain" and "atherosclerosis." A preliminary query was performed and relevant articles were reviewed for

additional key MeSH terms. Two articles of highest applicability were used to perform an additional subject search. Abstracts were reviewed and relevant articles were analyzed and rigorously assessed for content and bias. Only articles published in English January 1, 2003- April 30, 2013 were considered. 29 articles met these inclusion criteria. **Results:** Although some investigators have argued that aortic atherosclerosis promotes premature degeneration of the intervertebral disc, the evidence supporting this theory remains weak. Furthermore, there is some evidence supporting the presence of robust collateral circulation in the low back. Large observational studies have failed to obtain a uniform sample of subjects to serve as a good model of vascular back pain and meets rigorous inclusion criteria such as clinically confirmed symptoms and exclusion of subjects with spinal stenosis. **Conclusions:** Low back pain is a complex entity associated with certain cardiovascular risk factors such as smoking, psychosocial factors, and a variety of disorders. Observational studies on correlation of low back pain with cardiovascular risk factors have failed to produce a convincing pathophysiologic narrative linking arterial insufficiency with lumbar disc degeneration and low back pain. Further research of alternative pathophysiologic mechanisms is warranted, including the role of inflammation.

PA242

Treatment of the Idiopathic Scoliosis with Brace and Physiotherapy

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Objective: Many conservative treatments are available for adolescents with idiopathic scoliosis, but the evidence for their effectiveness is still questioned. The objective of this study was to define the effectiveness of braces and individual physiotherapy for the comprehensive treatment of idiopathic scoliosis in adolescents. **Design:** retrospective analysis methodology. **Setting:** Orthopedic and Physiatrist Clinic as well as National Ortho-prosthetic Center within University Clinical Center of Kosovo in Prishtina, **Participants:** 68 children with idiopathic thoracic dextroscoliosis with the magnitude of the thoracic curve between 20°-35°, treated during the period of 2010-2013. **Main Outcome Measures:** A specially designed questionnaire gathered: general data, and clinical examination. The evaluation of the scoliosis magnitude was done in 4 levels: high improvement (50% of the scoliotic curve according to Cobb); low improvement (10-30%); no improvement and at last the worsening of magnitude of the curve. The evaluation of the muscle strength and endurance was measured by chronometer (seconds) and it was categorized in 5 levels: satisfactory (more than 50% of improvement, 10-15 seconds more comparing with the first examination); moderate (30-50%, 5-10 seconds more), low (10-30%, till 5 seconds more), without improvement and finally worsening (presence of pain). **Results:** Inclusion of kinesitherapy in the comprehensive management of idiopathic scoliosis varied in the improvement of the muscle strength (satisfied and moderate) in almost 80% of the children while the correction of the curve was small in approximately 42.1% of cases. **Conclusions:** For children with idiopathic scoliosis, who require braces, an exercise program helps chest mobility, muscle strength, proper breathing flexibility in the spine, correct posture and keeps muscles in tone so that the transition period after brace removal is easier.

PA243

The Comparative Study of Diclofenac Na/Hilterapia Effects Versus Diclofenac Na in Pain Relief of Acute Herniated Lumbar Disk

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Background: Acute low back pain is a common pathology that can cause pain and disability. Therefore, acute low back pain can be

treated with the use of drugs, physical therapy with therapeutic medical equipment, psychological therapy, life style improvement and surgery. The aim of this study was to compare the efficacy of Diclofenac Na with a combination of Diclofenac Na and treatment by pulsed Nd: YAG laser (Hilterapia) in order to evaluate the intensity of pain relief in lumbar disc herniation improved by MRI. **Methods:** this study is a randomized clinical study that performed between 56 patients who had acute low back pain due to discopathy. At first, patients – according to the McGill pain questionnaire – were divided in two groups: First group (A) was treated exclusively with Diclofenac Na; conversely, the second group (B) received a combined therapy of Diclofenac Na and Hilterapia for two weeks, and then after 2 and 4 weeks pain evaluated with the McGill questionnaire, again. (42.9% male and 57.1% female) and average of 34.9 years old in first group and 39.6 years old in second group. The most pain intensity related to the (L4-L5) disc herniation was 35.7%. **Results:** In patients in group (A) according to McGill pain questionnaire, the average of pain degree before treatment was 3.4±0.9 and after 2 weeks was 2.4±0.7 and after 4 weeks was 1.2±0.7. In patients group (B) the average of pain degree before treatment was 3.8±0.8 and after 2 weeks was 1.2±0.7 and after 4 weeks was 1.1±0.8. At the end, according to the Mann-Whitney results, before treatment (P-value >0.05) both two groups was similar for pain intensity and the average of pain intensity after 2 and 4 weeks in (A) and (B) was significantly different (P-value >0.05). **Discussion:** the results of this study clearly show that both therapies used are effective in management of acute low back pain, especially when Hilterapia is combined with drugs. **Conclusion:** Hilterapia induced better clinical effects with respect to another methods being compared, with a good long lasting therapeutic effects as long as two weeks after the end of treatment.

PA244

Persistent Low Back Pain in a Patient with Several Lumbar Spine and Heart Surgeries – Clinical Case

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Case Diagnosis: Persistent low back pain and left lower limb paresis after repeated surgery for L4-L5 disc hernia and L3/L4 spondylolisthesis. Hypertension. Dacron graft surgery for thoracic aortic aneurysm. Aortic valvuloplasty for aortic regurgitation. Chronic heart failure II-III NYHA. **Case Description:** A 60 year old male patient, with repeated lumbar spine surgery for L4-L5 disc hernia (2002) and spondylolisthesis L3/L4 (2010), suffered in 2012 a surgical intervention for thoracic aortic aneurysm and aortic valve insufficiency. The evolution was with progressive cardiac dysfunction and limited activity; after that he retired and became depressive and isolated from his friends and family. After 1 year he presented with severe lumbar complaints and distal paresis of left sciatic external popliteal nerve. The clinical, imaging and functional assessment identified posterior lumbar instability and left L4 disc hernia. The patient refused a new spine surgery; his daily activity was even more limited and he used NSAIDs despite his cardiac disease and medical advice. In our setting he came 6 months ago with loss of lumbar lordosis, very limited lumbar mobility, severe paraspinal muscles contracture, left anterior calf muscles hypotrophy, MMT 3/5 for left leg extensors, 4/5 for femoral quadriceps, abnormal gait, fatigability. **Discussion:** The rehabilitation program had to face some issues: 1. to limit the posterior lumbar instability in order to control the pain and to prevent the progress of disc hernia. 2. to limit the increased energetic costs of the ambulation and of the daily activity due to abnormal gait. 3. to prevent the cardiac insufficiency progression, with cardiac rehabilitation for activity of daily living. We identified the goals and the expectations of the patient and the factors being facilitators or barriers of his rehabilitation. The rehabilitation program was built based on these items. Also, the progression of the treatment was adapted

to the patient. **Conclusions:** A progressive intensive rehabilitation program, based on oriented-task solutions and trunk stabilization exercises, together with adequate orthosis and psychotherapy helped this patient to increase the level of daily activity and the participation in an active social life. The pain was controlled without medication and he returned to his professional work.

PA245

The Posture Changes and Back Pain in Young Computer Workers

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The potential health risks of video display terminals (VDT) were recognized 40 years ago. One of health disorders is muscle pain. The aim of our study was to use standard clinical measurements to assess the posture changes with correlation of level of pain in long daily use of VDT. **Material and method:** We have examined with tests and measure pain in spine with NAS, on 300 young computer workers 25-35 years old. One of including criteria was work on computer at last 6 years, more than 6 hours a day. **Results:** The most of them were male, and they used VDT 60%, 6 hours, and more than 8 hours 23%, only 17% have used ergonomic chair. The pain was with great intensity in the middle of the work, time, and with localization of neck 80%, but it was most intensive in arm. They have not used medicaments, physical therapy or orthoses to prevent pain. Tests for posture are showing increase in positive test by Mathia's in 47%, elevated shoulder was positive by 21%, and 95% have had changes in position of head and neck. **Discussion:** Changes of musculoskeletal system in computer workers and their problems can be treated and prevent, it also may include physical therapy. Early changes on posture can increase functional problems like fatlike, pain and muscles hypotrophy. **Conclusion:** Our group of young workers had health problems because they didn't prevent it. In them it can be develop structural changes on bones especially in spine. **Keyword:** young computer workers, pain, posture changes.

PA246

Spiral Stabilisation of the Spine

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Descriptive and functional anatomy of muscle chains. Intervertebral disc herniation and scoliosis therapy with muscle chains training. Therm muscle chains is used according to muscle groups, that have anatomical connections and are activated together during movement, mainly in gait. Muscle chains are divided into two groups: dynamic, that stabilize body in movement, and static, that stabilize body in rest. Dynamic muscle chains are localized superficially and organized in a shape of descending spirals - spiral stabilization of movement. Force of each particular muscle in chain connects with the force of the following muscle and thus a muscle corset is created. Static muscle chains are localized deeper and have more vertical course. Muscle chains can be trained and assessed through palpation and EMG. Spiral muscle chains narrow the waist and elevate intervertebral discs. This phenomenon of spine traction can be used as highly effective treatment of intervertebral disc herniation. Treatment effects have been confirmed with MRI on multiple patients. Spirally stabilized muscle corset aligns and stretches the spine up, which is the main principle for the treatment of scoliotic curve. In between muscle chains, the phenomenon of reciprocal inhibition occurs. Spiral muscle chains inhibit the activity of vertical muscle chains. E.g. Muscle chain LD - latissimus dorsi inhibits the activity of ES - erector spinae chain. Currently we have described and pictured 50 muscle chains, with the mechanism of their activation through exercise and their function in gait. We have created clear and logical system of muscle chain

anatomy, which is presented in the book and teaching DVDs with the muscle chains pictures and descriptions. E.g. LD-B - latissimus dorsi muscle chain. Arm extension in aligned body position activates the following sequence of muscles: m. latissimus dorsi, processus spinosus, mm. rotatores beves, mm. levatores costarum, mm. intercostales exteni, costae, m. obliquus externus abdominis, m. obliquus internus abdominis, m. gluteus maximus, fascia lata, epicondylus lateralis, m. tibialis anterior. More details can be found at www.spiralstabilization.com.

PA248

The Effect of Chronic Low Back Pain on Trunk Motor Control During Complex Motion Tracking Tasks

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Introduction: Evaluation and rehabilitation of impaired trunk motor control are key components in management of chronic low back pain (CLBP). The role of complex motion tracking tasks in finding control impairments and identifying subgroups of people with CLBP is not fully understood. **Materials and Methods:** Twenty-five people with CLBP (mean age and pain duration; 27.6 years and 45 months, respectively) and 40 healthy controls (mean age; 24.2 years) participated in a motion tracking study. The tracking system included 1) a Fastrak sensor placed on 12th thoracic spinous process to provide real-time visual feedback of trunk position (flexion and rotation angles), 2) a target object that moved along 44 randomly-ordered parabolic and circular trajectories with different amplitudes, directions and speeds. Participants were required to move their trunks as accurately as possible to match the target object and follow its movement. All tests started and ended in trunk flexion and the range of extension was constant during all tasks. The sequence of trunk movements during a circular task was as follows: 1) pure trunk flexion from the neutral posture to reach target starting position, 2) combining trunk extension and right rotation to reach pure trunk right rotation, 3) increasing extension combined with left rotation to reach pure trunk extension, 4) flexion combined with left rotation to reach a pure left rotation posture, and 5) increasing flexion combined with right rotation to finish the task at the starting position. Trunk accuracy and precision were quantified by computing constant error and variable error during each trial, respectively. A mixed model repeated measure analysis of variance was conducted to assess statistical analysis. **Results:** People with CLBP displayed less accuracy and precision with the tracking task than healthy controls across many of the target tracking conditions ($p < 0.05$). Trunk accuracy and precision decreased significantly in higher level of rotation magnitudes ($p < 0.05$). **Conclusion:** The result shows potential changes in trunk control strategies in people with CLBP and warrants future research to utilize tracking tasks as objective outcome measures in rehabilitation of CLBP. Impaired motor control during rotational movement tasks may be associated with higher risk of low back injuries in these activities.

PA249

The Effects of Thrust Joint Manipulation on the Resting and Contraction Thickness of Transversus Abdominis in Patients with Low Back Pain

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Introduction/Background: Transversus abdominis (TrA) is a deep spinal stabilizer that is found to be important in protecting the spine from injury and subsequent pain. Current literature has

indicated that individuals with low back pain (LBP) experience a reduced ability to contract TrA during various activities. The purpose of this study was to examine whether TrA contraction would increase after manipulation in individuals currently experiencing LBP. **Materials and Methods:** Twelve subjects (male=5, female=7) currently seeking physical therapy treatment for their LBP were enrolled in the study and randomly assigned to a sham manipulation group or a thrust joint manipulation (TJM) group. The resting and contraction thickness of TrA was measured using real-time ultrasound imaging (RUSI). Measurements of TrA thickness were compared both between the two groups and within each group for pre and post treatment analysis using 2 separate (time: pre and post) χ^2 (intervention: sham and manipulation) repeated measures ANOVA. **Results:** Results from our study demonstrated that there was no interaction between treatment and time for TrA thickness at rest ($p>0.05$). The main effect for treatment and time were not found to be significant. Moreover, an interaction between treatment and time was observed between TrA thickness during contraction ($p=0.032$). The main effect for treatment and time were found to be significant. **Conclusion:** Our results indicate no significant differences in resting thickness of TrA between the two groups before or after treatment. There was however, a trend towards significance in contraction thickness of TrA following manipulation intervention. Although our results fell short of demonstrating significance, this study reveals that TJM may be a useful intervention in treating patients with LBP. Future large-scale research would be necessary to determine the effects of TJM on TrA thickness in this study cohort.

A.2.7. MUSCULOSKELETAL TRAUMA

PA250

Application of Kinesiotaping Treatment of Rib Injury

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Introduction: Rib injuries include bruises, torn cartilage and bone fractures. They cause strong pain at the injury site, breathing difficulties and changing position of body, especially flexion. Uncomplicated breakdowns are treated by analgesics drugs. Treatment aims to relieve pain while the injury heals. One of physical methods for pain decreasing in musculoskeletal dysfunctions is kinesiotaping. We hereby would like to present the effectiveness of the kinesiotaping treatment that we have administered to our patient suffering from right tenth rib injury. **Case:** A 50 years old male patient was administered to our outpatient clinic with a complaint of severe pain with movement of chest flexion and with a deep breath that increased for the last one week. He did not use analgesic drugs regularly because of their adverse events. On physical examination, sensitivity was present at the right tenth rib during palpation. The patient was treated with kinesiotaping every 5 days to rib for 5 sessions. Functional correction technique was used at the right tenth rib of the patient and 3 I tapes have been applied as kinesiotaping treatment. Medical treatment was not given to the patient. Pain was assessed by visual analogue scale (VAS) separately for two different time of day: daytime and night. The VAS of the patient prior to treatment of daytime and night were 70 mm and 80 mm, respectively. This pain scale receded to 20 mm for daytime and 30 mm for night following the first session of the kinesiotaping. After the 5th session, he did not feel any pain. **Conclusion:** Apply functional correction technique using kinesiotaping could be effectiveness method of reduction pain after ribs injury, especially patients who do not use medical treatment because of any reason. Kinesiotaping is safety, inexpensive and practical method. In addition, more randomized controlled studies with longer follow-up and with large samples are needed in order to support our data. **Keyword:** kinesiotaping, pain, rib injury.

PA251

Demographic and Clinical Characteristics of Patients Treated for Muscle Injury in a Physical Medicine Department

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Introduction: Muscle injuries can be managed in sports medicine or in physical medicine. However, in most cases data are reported in the context of sports medicine. This work aimed to study demographic characteristics of patients suffering from muscle injuries and treated in physical medicine and rehabilitation department. **Material and Methods:** We analyzed records of patients treated in physical medicine and rehabilitation department for muscle injuries. Demographic and clinical data were collected. **Results:** Our population included 14 professional athletes (24±4.5 years), 20 recreational athletes (41.1±9.7 years) and 9 non-athletes (42.7±6.5 years). The muscles most frequently affected were the gastrocnemius (14 athletes and 3 non-athletes), rectus femoris (8 athletes and 3 non-athletes) and hamstrings (7 athletes and 1 non-athlete). The lesion was intrinsic in 37 cases and extrinsic in 6 cases. In athletes it was stage 1 (3 cases), stage 2 (17 cases) and stage 3 (14 cases). The lesion had interested the myotendinous junction in 13 cases. In professional athletes, injuries had occurred during a competition in 12 cases and during training in 1 case. Acute treatment phase included ice in 38 cases (23 athletes, 5 non-athletes), compression in 25 cases (22 athletes, 3 non-athletes) and immobilization in 22 cases (16 athletes, 6 non-athletes). Physical therapy was performed in 10 professional athletes, 9 recreational athletes and 7 non-athletes. Recurrence was observed in 2 recreational athletes because of the insufficient recovery time. **Conclusion:** Early resumption of sports activities is an important etiology of recurrent muscle injury in recreational athletes. Professional athletes have a better observance of the physical therapy.

PA252

Conservative Treatment of Proximal Humerus Fracture. Functional Results of Rehabilitation Program Group

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Background: Proximal humerus fractures are the third most common fractures in elderly patients. Accounts for approximately 4% of all fractures. Around 85% of the patients are treated conservatively. Despite the high incidence and costs of proximal humerus fractures, there is currently no valid scientific evidence for the best treatment method. **Material and Methods:** Non randomized, prospective observational study. The aim of the study is to assess the outcome of group physiotherapy in conservatively treated proximal humerus fractures. Main outcome measures are pain relief and functionality. **Setting:** tertiary hospital orthopaedic and rehabilitation departments. Recruiting time was 1 year and a half. Inclusion criteria: humerus proximal fracture nonsurgical treated an age over 18. 32 patients were consecutively recruited from orthopaedic emergencies. Fractures were grouped according to the Neer proximal humeral fracture classification as 1, 2 and 3. Intervention: 3 times per week, 1 hour group physiotherapy (15 sessions) started after three weeks of immobilization. Main Outcome measures were: visual analogue scale (VAS) for pain and constant Murley Test (CMT) for functionality. At end of physical therapy (week 10 from fracture (W10)), at 6 months and one year after the fracture. The level of significance was set at $p<0.05$. **Results:** 32 patients were recruited. (84.4% female) with a mean age 72.56 years, Neer 1 31.3%, Neer 2 50% and Neer 3 18.8%. All groups have a signifi-

cant improvement in CMT from the tenth week to 6 months and from tenth week to 12 months. Neer 1 fractures have a functionality (CMT) significantly better than the rest. In the evolution of pain results are more variable. *Conclusion:* Treatment group achieved a functional improvement in patients with proximal humerus fracture treated conservatively and may be an alternative to optimize the resources of a rehabilitation service.

PA253

Functional and Thermographic Correlation of Post-Surgical Hand Rehabilitation

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Introduction/Background: The hand, through its complexity of performed functions, is often involved in various injuries (contusions, fractures, nerve and vascular sections). In recent years there has noticed an increase in the number of patients with pathologies above mentioned in the rehabilitation clinic. A large number of these patients, are professionally active, and therefore the need for good and quick rehabilitation is high. Almost all the trauma of the hand results in functional deficit and peripheral circulation impairment. The study aims are to analyze the efficacy of the physical treatment. Functional and thermographic assessment can evaluate also the effects of the treatment. *Material and Method:* We selected a group of 20 patients, admitted for outpatient treatment in the IIIrd rehabilitation clinic of National Institute in a period of 3 months. Patients presented complex trauma of the hand, for which there have been performed various surgical interventions. They were directed for rehabilitation treatment at 2-4 weeks after surgical treatment. The treatment was performed for 10 days, 3 months consecutively and consisted in electrotherapy (high, medium and lower frequency) massage and kinetotherapy (including occupational therapy). The patients were assessed from clinical and functional point of view every day. From thermographic point of view the patients were evaluated at the beginning and at the end of each week of treatment. Also it was performed ultrasound examination each month. *Results:* It is seen from the results of the study that fist-hand-finger region affected has an average temperature modified from the contro-lateral region. After physical-kinetic procedures it was found an increase of temperature by an average of 0.5 degrees. Although thermal tendency of the affected region was of increasing immediately after treatment, final evaluation of patients found variable changes to the original status, with improved peripheral circulatory balance. Also there was an improvement in functional assesment with increase of degrees of mobility in the affected segments. *Conclusions:* Improvement in peripheral circulatory balance, in patients with trauma of the hand, may lead to better results in functional rehabilitation, by facilitating participation of soft tissues.

PA254

Case Report-Rehabilitation in a Patient with Complex Trauma after Car Accident

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Case Diagnosis: Algo-dysfunctional sequelae post traumatic burns of the thighs. Algo-dysfunctional sequelae post cominutive fracture of left humerus. Rupture of bilateral antero-cruciate ligament. Injury of the bilateral knee meniscus. *Case Description:* This is a case of a young patient (28 years) who sustained an accident (July 2014), being driver of a motorcycle in direct collision with a truck. After accident the patient was admitted in the University Emergency Hospital Bucharest for assessment, in the surgical

department. At admission the patient presented crushing injuries to the thighs and minor head injury. There were performed imaging evaluation, which revealed the presence of a fracture in the left humerus. At the request of the patient's family, he was transferred in the surgical department of Military Emergency Hospital. Here the patient received surgical treatment for the skin lesion, including skin grafts. Further evolution was slow positive, being encumbered by the appearance of a compartment syndrome in the left leg, for which was performed surgical debridement, with subsequent favorable evolution. Also was performed surgical reduction of the humerus fracture (fixation with plaque and screws) with good evolution and was diagnosed with lesions of the meniscus and cruciate anterior ligament of both knees. After 1 month and 2 weeks the patient was released at home, with the recommendation for the beginning of the rehabilitation program. He was admitted in the IIIrd Rehabilitation Clinic of National Institute of Rehabilitation for clinical and functional evaluation, and for the beginning of the rehabilitation program. After evaluation the patient received a complex rehabilitation program for 2 weeks, 2 times per day, with assessments every day. The rehabilitation program consisted in electrotherapy (medium and high frequency) and kinetotherapy 2 times per day. *Discussion:* After 2 weeks in our clinic we observed an important improvement in range of motion for the affected segments. The patient was able the walk with the help of walking frame at the admission and with a crutch at the end of the program. He was due to have another orthopedic evaluation (for meniscus and antero-cruciate ligament lesions) and continuation of the rehabilitation program.

PA255

Patellar Tendon Tear after Patellar Fracture Surgical Treatment: a Clinical Case

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Case Diagnosis: Patellar tendon tear after patellar fracture surgical treatment. *Case Description:* 30 years old male, suffered an open fracture of the patella in 22/01/2014. The patient underwent partial patellectomy, and started the rehabilitation program as an inpatient, presenting good functional improvement. Suffered a fall in 15/07/2014, resulting in patellar tendon tear. The patient underwent surgical treatment. He started the rehabilitation program 75 days after. The patient presents severe pain and limitation of the range of motion. *Discussion:* Patellar fracture surgical treatment may present several complications as osteomyelitis, nonunion, complex regional pain syndrome as well as other acute complications. These complications may lead to severe functional impairment. The patellar tendon tear occurred due to a trauma, after surgery around the tendon. *Conclusions:* In the case described, rehabilitation is a challenge as the second surgery caused a severe loss of the range of motion, but the surgical procedure was necessary to preserve the knee kinematics.

PA256

Quality Assurance and Outcome after Orthopedic Shoe Supply in Orthopedics and Trauma Surgery

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Quality assurance and outcome after orthopedic shoe supply in orthopedics and trauma surgery. *Summary:* The orthopedic shoe is a tool which is used in addition to complex foot trauma after surgery. It is important to detect the outcome and satisfaction and the problems of patients with orthopedic shoes, in order to secure the compliance of the patient and the post surgery result. *Introduction/Background:* In trauma surgery about 10% of all ankle and backfoot injuries are detected as a complex foot trauma (1). The

supply with orthopedic shoes is an important component in the treatment and social reintegration. The patients are subjectively significantly affected by the injury and the remaining damage; in work as well as in leisure time (2). *Methods:* Based on the modified "Münster foot and shoe questionnaire" the satisfaction and benefit of the orthopedic shoe provision should be recognized and valued by the patient. In 2012 a total of 189 patients that have been treated in the trauma center Murnau, have been cared for with orthopedic shoes because of a foot deformity. The questionnaire was anonymous and filled out by the patient. *Results:* 125 questionnaires were answered back, representing a response rate of 66%. The questions that rated the orthopedic shoe in general, there was a generally satisfactory statement. Handling (1.5 MW), adjustment (1.7 MW), and the optics (2.6 MW) were rated positive. Big restrictions could be seen in the ICF-relevant areas, such as walking distance 1km without orthopedic custom made shoe (4.8 MW), everyday constraints (4.7 MW) and pain (4.8 MW). The overall satisfaction of the patients was a mean of 2.0, so it can be assumed that the injured person benefits from an orthopedic custom made shoe. This is also reflected again in the number of those who have returned to working life. With a share of 71%, this is a satisfactory result. *Conclusions:* The modified questionnaire is suitable as a screening/monitoring and thus ensures the quality of orthopedic shoes in particular with regard to the reintegration into social and professional life and proves the usefulness of the resource supply.

PA257

The Effects of Kerotherapy and Mobilization Combined with JAS Brace on Post-Traumatic Elbow Stiffness

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Introduction/Background: The elbow joint is often prone to stiffness, especially if immobilized for long periods of time due to fractures or the ligamentous lesions. Therefore, early mobilization of the posttraumatic elbow is very important. But the stiffness still happened in many patients because of some reasons. Rehabilitation of the elbow includes many physical methods, manipulation and the use of braces. Braces can fix protection or allow dynamic and static progressive movement. The latter plays a special role in conservative treatment and following surgical release. However, the ways and the time of these methods in the rehabilitation treatment of elbow stiffness are different and lead to different effects. *Material and Methods:* We examined the effect of the kerotherapy and mobilization combined with JAS braces on post-traumatic elbow stiffness in adults. Healthy adults (aged 21-56 years) were divided into JAS braces (n=8) or non-JAS braces (n=11) groups. Both groups were treated with kerotherapy and manipulation. All the patients were guided active exercise training after the above treatments. The JAS braces were used after the above treatments for 30 minutes every time, 3 times a day. The Mayo Elbow Performance Score, patient satisfaction and complications were evaluated and analyzed. *Results:* All the patients were followed up, and the mean duration was 6.5 months. There were no complications such as internal fixation loosening and obvious displacement fracture. Only one heterotopic ossification occurred in the non-braces group. The Mayo score and patient satisfaction in braces group were higher than those in non-braces group ($t=12.67$, $P=0.00$; $\chi^2=8.742$, $P=0.003$). One patient needed reoperation in non-JAS braces group. *Conclusion:* Posttraumatic elbow stiffness can improve with combined therapy including kerotherapy, manipulation, progressive brace and active exercises to practice over a period of 3 to 6 months. *References:* 1) Charalambous CP, Morrey BF. Posttraumatic elbow stiffness. *J Bone Joint Surg Am.* 2012 Apr 18; 94(8): 694-700. 2) Fusaro I, Orsini S, Sforza T, etc. The use of braces in the rehabilitation treatment of the post-traumatic elbow. *J Gerontol A Biol Sci Med Sci.* 2014 Jun 10. 084.

PA258

Long Term Follow-Up after Forearm Replantation

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Introduction: Nowadays, hand replantation on forearm level is no longer a huge challenge to hand surgeons since the constantly refined microsurgery instruments and techniques, which guaranteed high survival rate. Hence, the focus of attention has shifted on how to preserve a useful functional hand, as well as the satisfaction survey from patients or hand surgeon. This led us to follow-up our case series of 24 forearm replantations to make good understanding on replanted hands through objective and subjective evaluating. *Methods:* Twenty-four patients with traumatic forearm amputation were enrolled in our study. Objective assessments, including range of motion of each joints, muscle strength (grip, lateral pinch, tip-to-tip pinch), sensory recovery and Jebsen hand function test, were measured by therapists according to evaluation protocol. The Disability of Arm, Shoulder and Hand (DASH) questionnaire was done as subjective survey of overall hand function recovery, as well as cold intolerance and pain score. *Results:* Twenty-four patients with successfully replanted hand, who had a mean age of 38.83 ± 9.73 years (ranged from 23 to 58 years) at the time of surgery, were followed up over an average of 33.75 ± 13.94 months. There were 18 male and 6 female in our research, 12 patients injured on the dominated side. The mean grip strength and pinch were 7.65 ± 8.95 and 4.67 ± 4.09 kg respectively. The total active motion (TAM) and the motion of wrist, forearm rotation were 156.30 ± 54.06 , 64.96 ± 32.28 and 134.38 ± 32.77 degrees. There were 19 patients regained protective sensation (pain and temperature sensory), among which six patients' two-point discrimination recovered. There were 17 out of all 24 patients complained of cold intolerance. The Jebsen hand function test results revealed that most patients could fulfill daily living tasks using their involved hand, however, they consumed more time than un-involved hand. The average DASH score was 34.97 ± 16.54 (ranged from 1.67 to 61). *Conclusions:* The long-term results of forearm replantation confirmed satisfactory outcomes in terms of general upper limb function, grip and pinch strength, range of motion and upper extremity function, as well as protective sensation. Hence, replantation is still the best way to reconstruct hand function after total amputation of a major limb segment.

PA260

Factors Influencing Functional Recovery after Femoral Fracture in Elderly in an Inpatient Rehab Facility

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Introduction: Restriction in functional capacity is a sine qua non in all femoral fractures and various factors have been reported to influence functional outcome. The aim of the present study was to investigate the influence of cognitive impairment and other psychosocial factors on functional outcome upon discharge and 3 months after the insult. *Material and Methods:* The study sample comprised of 38 elderly (12 male, 26 female) community-dwellers prior to fracture, with a mean age of 81.5 ± 8 years and a mean length of inpatient stay: 69 ± 4 days in an inpatient rehabilitation facility over a period of 8 months. Patients were evaluated upon admission with Mini Mental State Examination (MMSE) and were subsequently stratified into the following groups: a) severe cognitive impairment: MMSE score 0-15, b) mild: MMSE score 16-23 c) none: MMSE score ≥ 24 . Socio-demographic data such as education level, marital status, age and sex were also recorded. Classification according to Functional Ambulation Categories was evaluated upon admission, on discharge and 3 months after admis-

sion. *Results:* Out of 38 subjects, 2 deceased and 5 were transferred to other health care units and were excluded. From the 31 subjects finally enrolled, 14 subjects presented with severe cognitive impairment, 7 with mild impairment and 10 with normal cognitive function upon admission. Out of 31 patients, 3 were wheelchair bound after 3 months and out of the rest 28 subjects, 15 were independent on level ground, 7 independent and 6 dependent on supervision. The mean MMSE score of ambulatory patients was 22 ± 2 , whereas the percentage of married people was 69%. On the other extreme mean MMSE score was 15 ± 6 and percentage of married people was 46% in dependent on supervision patients. Limitations of the study include retrospective design, small sample size and small age range that did not allow age stratification. *Conclusions:* Functional recovery positively correlated with good premorbid mental status and marital status. Married people had better functional recovery after stratification for MMSE score. Among married subjects, those with children had better prognosis compared with those without. Divorcees had the worst prognosis followed by widowers.

PA261

Jumper's Knee and Platelet-Rich Plasma: Is It for Real?

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Background: Jumper's knee (JK), also known as patellar tendinosis, is a common musculoskeletal disorder characterized by degenerative changes of the patellar tendon and an inadequate regenerative response due to poor vascularization. With a high incidence in elite athletes, especially in sports demanding a high request of the knee extensors, it represents a potential cause for long-term dysfunction. Rest and rehabilitation programs remain the leading solutions for its treatment, many times with unsatisfactory results. This led to the pursuit of new treatments, such as platelet rich plasma (PRP). *Objective:* To determine the efficacy and safety of platelet rich plasma and compare it with other therapeutic modalities used for the treatment of JK. *Methods:* A literature review was conducted in the MEDLINE database for articles published between 01/01/2009 and 31/12/2014, written in English, with the main outcomes: pain and function. The following keywords were used: "jumper's knee", "patellar tendinosis", "treatment" and "platelet-rich plasma". *Results:* We found seven articles that met the proposed criteria, with a total of 219 participants. Two articles were randomized controlled trials, one was a prospective cohort study and the remainders were case studies. Charoussat C. et al (2014), in a prospective study, showed that there was a significant improvement in both pain and function after the use of PRP, results also observed in all case studies analyzed. As for comparative studies, Vetrano M. et al (2013) found that the group treated with PRP showed better results but only after six months of follow-up and Drago L. et al (2014) observed an early significant improvement at 12 weeks of follow-up, however, its superiority was lost at 26 weeks. *Conclusion:* The PRP emerges as a therapeutic approach in the treatment of JK, with promising results and good safety profile but further studies are required to determine its effectiveness.

A.2.8. MISCELLANEOUS

PA262

An Evaluation of the Effects of Low-Level Laser Therapy on Function, Strength and Electroneuromyographic Tests in Patients with Carpal Tunnel Syndrome: a Prospective, Randomized, Double-Blind, Placebo-Controlled Pre-Study

J Rehabil Med Suppl 54

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Introduction/Background: The aim of this pre-study was to evaluate the effects of Low-level laser therapy (LLLT) in patients with carpal tunnel syndrome (CTS). *Materials and Methods:* Ten women (18 hands) were included in the study, and clinical examinations and electroneuromyographic (ENMG) evaluations were used for the diagnosis. All patients were treated with a standard physiotherapy program consisting of a paraffin, TENS, ultrasound, nerve and tendon gliding exercises, and LLLT that was supervised by the same physiotherapist. The patients were randomly assigned to either a group that received true LLLT (n=10 hands) or one that received sham LLLT (n=8 hands). The outcomes were measured using Boston Symptom Severity Scale (BSSS), Boston Functional Status Scale (BFSS), grip strength, pinch strength and median nerve conduction studies. Hand grip was measured by Jamar dynamometer, and pinch grip was measured by pinchmeter. These variables were repeated immediately after the treatment for a total of ten sessions by the same physiatrist, who was blinded just as the patients were. *Results:* When we evaluated the true and sham LLLT groups according to age, duration of symptoms, and the pre-intervention values of the BSSS, BFSS, grip strength, pinch strength and ENMG, we found no statistically significant differences. BSSS, BFSS and pinch strength increased significantly only in true LLLT group after the treatment ($p < 0.05$). Sensory and motor distal latencies of median nerve increased significantly only in sham LLLT group ($p < 0.05$). P-value of the motor conduction velocity of the median nerve was found 0.05 in sham group. It was no significantly improved in the true LLLT group ($p = 0.678$). There were no statistically significant differences between the pre- and post-intervention readings of the other parameters of the two groups ($p > 0.05$). When compared the outcomes after the treatment, it was found that there were not significant difference between the groups except median motor amplitude ($p > 0.05$). It was improved in the placebo group ($p < 0.05$). *Conclusion:* In patients with CTS, LLLT interventions improve the functional status, symptoms and pinch strength. However, we determined that the LLLT had yielded no additional efficacy when added to the physiotherapy treatment regimen of patients with CTS.

PA263

Research: DNA Methylation Levels and Muscle Fiber Configuration in the Model of the Spastic Paralysis Rat's Skeletal Muscle

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Spasticity is one of the most typical symptoms of cerebral palsy. It, however, could not be longer to improve the muscular's function and also slower to increase muscle's power. Definitely, we could say the reason was the injury of the upper motor neuron, but the changes of the structure of the skeletal muscular, which is the unique executor of the function, might not be ignored. Many studies have investigated the changes of the ultrastructure of the spastic muscle on which was the type I fibers based. In contrast, little is known about molecular mechanisms for morphological changes of muscle spasms. And we also know that the DNA methylation, which is one of the most common kind of epigenetic modification, can regulate gene expression and thus affect the tissue phenotype. From the perspective of the performance of genetics, our research was to initially explore and analysis the spasticity how it affects the DNA methylation levels of muscular and ultra microscopic structure of muscle fibers. Here, we present a approach based on the hypothesis that muscle tension (++), as an unusual factors, affects the levels of DNA methylation of muscular, and thus makes the developing muscle fibers become abnormal configuration. To obtain this representation, we copied the model of the spastic paralysis. And then we gave the implementation of the gastrocnemius muscle biopsy. Later,

DNA methylation levels, Myosin Heavy Chain I and Quantitative RT-PCR were detected. Finally, we found that it performed hypomethylation phenomenon and highly expression of MHC-I mRNA in spastic paralysis rats, which were different from the normal one. Spastic skeletal muscle was shown by Transmission electron microscope (TEM) that: (i) longitudinal sections: Z-line arrangement was not structured and on both sides of the Z-line mitochondria increased and swelled and mitochondria cristae partially broken; (ii) transverse section: Relationship between the number of thick and thin filaments unbalanced, and myofibrils envelope fused. The conditions of the spasticity can not only cause the internal structure of the skeletal muscle secondary pathological changes, but result in the super submicron structures secondary changes. However, there were no sufficient evidences to show the correlation between the DNA methylation and the secondary pathological changes.

PA264

Bipartite Sternocleidomastoid Causing Torticollis; a Rare and Late Diagnosis in Adults

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Case Diagnosis: Bipartite sternocleidomastoid causing torticollis; A rare and late diagnosis in adults. *Case Description:* A 27 year old soldier presented with a fixed, mild left sided turn and tilt since childhood. The abnormality was mild and was ignored by the patient and also missed by health care professionals being very less obvious. The patient complained of having pain in neck and shoulder after doing heavy manual work requiring continued posturing. He also had headaches and upper back pains due to it. His birth history was not available. On examination he had a bipartite right sternocleidomastoid, dividing a little above half length, the lateral belly of the muscle inserted at the middle of the clavicle while the medial belly fused at the sternal insertion point. Palpation of the neck musculature revealed a non tender sternocleidomastoid dividing in the middle into two bellies and one inserting into the middle of the clavicle was taught but non tender. There was no abnormal posturing of any other body parts. Patient had limited head rotation and tilt on the left side. Patients musculoskeletal ultrasound re confirmed the diagnosis and patient was planned for myectomy of the lateral bipartite belly of the right sternocleidomastoid. *Discussion:* Congenital muscular torticollis is a rare pathology seen mostly in neonates and occurs unilaterally. Its presence in adults is rare and shows negligence and missed diagnosis initially. Torticollis in adults due to bipartite sternocleidomastoid is extremely rare and rarely reported. The author could only find a single similar case report in a cadaver. Its unilateral presence and subtle findings initially might delay the diagnosis till late adult life. Timely treatment can have dramatic improvement in symptoms and quality of life. Surgical release is beneficial and recommended. *Conclusion:* Bipartite sternocleidomastoid with a more lateral insertion on the clavicle is a rare cause of torticollis and can cause significant morbidity in the patient in terms of pain and range of motion.

A.3. NEUROLOGICAL AND MENTAL HEALTH CONDITIONS

PA265

Aphasia and Neglect Due to Acute Thalamic Hemorrhage

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Background: During the last decades, some studies have shown that the thalamus is crucially involved in language and visuo-spatial function. However aphasia and neglect were also reported to occur after thalamic lesions, there are few reports about de-

tails of them. In this study, we investigate the characteristics of aphasia and neglect due to thalamic hemorrhage in acute stage. *Material and Methods:* Subjects were 124 patients after thalamic hemorrhage in acute stage. We assessed cognitive function; verbal function for patients with left thalamic lesion and visuo-spatial function for patients with right thalamic lesion. Additionally, we checked the volume of hemorrhage, CT classification of thalamic hemorrhage and Functional Independence Measure (FIM) for all subjects. After then we investigate the relationship between cognitive dysfunction and the hematoma volume, type of hemorrhage, and FIM. *Results:* 88.6% of the left thalamic patients and 77.2% of right thalamic patients had aphasia and neglect in acute phase. Severity of aphasia and neglect significantly related to hematoma volume. FIM score of patients with cognitive dysfunction was lower than that of patients without cognitive dysfunction. *Conclusion:* Aphasia and neglect were not rare and they had influence to activity of daily living, especially, in acute phase.

PA266

Addition of Botulinum Toxin Type A to a Repetitive Facilitative Exercise Program for Upper Paretic Limb in Chronic Stroke: a Randomized Controlled Trial

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Background: Repetitive facilitative exercise (RFE), a combination of high repetition rate and neurofacilitation, is a recently developed approach to rehabilitation of stroke-related limb impairment. Botulinum Toxin type A (BTX-A) reduces upper-limb poststroke spasticity, however, recovery of upper-limb function is limited. *Objective:* To examine the combined efficacy of an RFE program and the treatment with BTX-A injection for the upper paretic limb in chronic stroke patients. *Methods:* In this randomized, controlled, observer-blinded trial, 40 adults (19-80 yrs.) with stroke-related upper-limb spastic paresis (Brunnstrom stage \geq III and Modified Ashworth Scale (MAS) score \geq 1 in the involved upper-limb) were randomized into two groups. The intervention group received BTX-A injections into the target muscles of the affected upper-limb (maximum dose of 240 U) plus a 4-week RFE program. The control group received the RFE program alone. Outcome measures were Fugl-Meyer Arm (FMA), Action Research Arm Test (ARAT), and MAS scores that were assessed at baseline and at 4-weeks (trial conclusion). *Results:* All 40 participants (20 in each group) completed the trial without any adverse effects. Improvements in the MAS, FMA and ARAT scores were obtained at 4-week in both groups. At the end of treatment, the intervention group evidenced significantly greater improvement than the control group on all the measures. *Conclusions:* These findings suggest that the combination therapy of RFE program and BTX-A injection for upper-limb hypertonicity may be more effective than the RFE alone in lessening motor impairment and improving upper-limb function in chronic stroke.

PA267

Barthel Index as a Physical Activity Measure

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Introduction: Daily physical activity is recommended after stroke. Based on aerobic consideration, an efficient activity is defined by a 20 minutes period at 3-5, 99 METs (Metabolic Equivalent Task), 3 times a week. However, level of activity still difficult to measured at early stroke phase in rehabilitation. Our hypothesis is that Barthel index could be an activity level's approach. *Material and Methods:* Patients with recent subtentorial stroke (day 7 to third month) were included and measures were collected at different neuro-rehabilitation's time: first week at admission, one month

after and one week before discharge. Sexe, age, NIHSS score and Barthel index were considered. Physical activity was measured at each time point, during 48 h, with a triaxial accelerometer Actigraph® wGT3x+ device and was expressed in METs. Statistical regression was searched. *Results:* Patients (8 men and one woman, mean age=63.1±13.7 years) were admitted at Stroke unit with a NIHSS score at 11.8±5.7. At neuro-rehabilitation center's admission, Barthel index was 35±31.9 ; it increased to 56±31 at discharge. Twenty-one coupled data (Barthel index and physical activity in METs) were recorded. There is a strong correlation between Barthel index and physical activity ($p<0.01$) *Conclusion:* Further studies are needed to confirm that, in rehabilitation units, Barthel index could be used like physical activity's reflect.

PA268

Construction of a Practical Motion Analysis System to Study Reaching in Patients with Hemiparetic Stroke

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Introduction: Reaching is important in daily hand-finger performance. In patients with hemiparetic stroke, trunk and shoulder stabilization and coordinated movement of the trunk, scapula and upper extremity are impaired. However, a clinically useful motion analysis system is not yet available. The aim was to construct a practical motion analysis system to evaluate reaching. *Methods:* Three healthy persons, 1 occupational therapist and 2 physical therapists experienced in stroke rehabilitation, performed repeated reaching and grasping with the dominant upper extremity (UE) at their comfortable speed using a peg-board task. They then performed the same task simulating patients with mild, moderate and severe hemiparetic UE. By combining video cameras, motion sensors and telemetric electromyography (EMG), we searched for an optimal combination of equipment, sites for sensor placement and calibration method. Next, 5 patients with chronic hemiparetic stroke showing mild to severe UE paresis performed the same task, and motion analysis was performed using the system constructed based on the experiment in healthy persons. The participants rated the burden felt during the experiment using a 10 cm- visual analog scale (VAS). Finally, six rehabilitation professionals assessed the clinical usefulness and practicality of the system with the Quebec User Evaluation of Satisfaction with assistive Technology (QUEST). *Results:* A compact motion analysis system was constructed, which consisted of 2 video cameras, 8 wireless inertial measurement units containing tri-axial accelerometers, tri-axial gyroscopes and tri-axial magnetometers, and a 12-channel telemetric EMG. The following kinematic parameters could be easily measured: movement time, acceleration, velocity, displacement, joint angle changes, EMG of shoulder girdle and UE muscles. Based on them, inter-joint coordination and cocontraction index during reaching could be quantified. VAS evaluation of the burden of being measured was within a tolerable limit. The system setup and calibration took less than 10 minutes, and QUEST evaluation of the system with respect to size, weight, adjustability, safety, durability, ease of use, comfort of use and effectiveness yielded satisfactory results. *Conclusion:* We developed a clinically useful and practical motion analysis system to assess reaching in patients with hemiparetic stroke. We will further study psychometric properties of the parameters obtained with the system.

PA269

Comparison of Balance in Hemiparetic Patients with Right and Left Hemispheric Lesion

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Introduction: The aim of this study was to compare balance ability in patients with single lesion of either the right or the left hemi-

sphere. *Materials and Method:* A total of fifty hemispheric lesion survivors (25 patients with right hemispheric lesion-Group I, 25 patients with left hemispheric lesion-Group II) were included in this study. The Barthel Index was used to determine independency level of the sample. The following tests were used to evaluate their balance ability: (1) One leg stand test and Portable Computerized Kinesthetic Ability Trainer (Sport-KAT 550) were used to static balance measurement. (2) Timed Up-Go (TUG) Test, 10-meter walk test, Sit-to-stand test and Berg Balance Scale (BBS) were used to for dynamic balance assessment. *Results:* The independency level of two groups was similar. The results showed that the patients with left hemispheric lesion had better scores for balance measurements ($p\leq 0.05$). *Conclusion:* The patients with lesion of either the right or the left hemisphere perform balance ability poorly. Hemispheric lesion location is related to balance disturbances in brain lesion survivors. There is effect of lesion location on severity of balance impairments.

PA270

The Relationship Between Risk for Eating Disorder and Health-Related Quality of Life in Turkish Patients with Multiple Sclerosis

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Introduction/Background: Patients with multiple sclerosis (MS) have an increased risk for developing eating disorders because of their physical and psychosocial problems. However, studies on eating disorders in this population are very limited. The aim of this study was to evaluate the risk for eating disorder and health-related quality of life in Turkish patients with MS and also to determine the relationship between these two variables. *Material and Methods:* A cross-sectional design was used. The study population consisted of 78 patients with MS who were followed up by the Neurology Department of a training hospital in Turkey. Inclusion criteria were ability to communicate in Turkish and agreeing to participate in the study. Patients who had diabetes and psychiatric diseases, who underwent MS attack within the last two months, and who were clinically unstable were excluded from the study. The sample included 57 patients (73.7% female). Data were collected by using a questionnaire, the Eating Attitudes Test (EAT), and the MS Quality of Life-54 Instrument (MSQOL-54). Descriptive statistics, reliability analysis and Spearman's correlation coefficients were used for the analysis of data. A p value of <0.05 was regarded as statistically significant. *Results:* The mean age of study group was 36.4±11.3 years (range=19-70) and the median disease duration was 48 months. All of the patients (100%) were diagnosed with relapsing-remitting MS. The mean EAT score of the patients was 18.4±8.4. Total six patients (10.5%) had risk for eating disorder (EAT ≥ 30). The mean MSQOL-54 physical health composite score was 64.1±22.3, and the mean mental health composite score was 66.4±22.0. The EAT scores were negatively correlated with the MSQOL-54 physical health composite subscale scores (physical function: $r=-0.271$, $p=0.041$, and role limitations due to physical problems: $r=-0.387$, $p=0.003$; respectively), the mental health composite score ($r=-0.306$, $p=0.026$) and role limitations due to mental problems subscale score ($r=-0.469$, $p<0.001$). *Conclusion:* The risk for eating disorder was relatively high in patients with MS and the health-related quality of life of patients was also higher than moderate level. The risk for eating disorder adversely affected health-related quality of life of patients.

PA271

Duloxetine Improves Quality of Life in a Neurogenic Bladder and Stress Urinary Incontinence – a Case Report

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Case Diagnosis: incontinence urinary in a mixed (stress and neurogenic) bladder treated with duloxetine. **Case Description:** Woman, 57 years old, with personal antecedents of bladder sling, victimized of politraumatism, with spinal cord injury and rupture extraperitoneal of the bladder. During the internment in a center of rehabilitation, she presents neurogenic bladder sphincter, by urinating sensation with urinary losses within a framework of urinary incontinence, affecting her treatments and severely affecting her quality of life. Urodynamic study reveals bladder with normocapacity without detrusor hyperactivity and with good compliance of detrusor; urinary leakage with coughing. She began treatment with duloxetine and two weeks later reports improvement of symptomatology, with decreased amount of urine loss and improvement in her quality of life. The repercussion of urinary incontinence on quality of life pre and post treatment with duloxetine was evaluated with the scale ICIQ-SF, which is validated by the European Association of Urology and with validation for the Portuguese translation. **Discussion:** Urinary incontinence is defined by the Continence Society as an involuntary passage of urine. Stress urinary incontinence (SUI) is a major urologic health care issue. The etiology of SUI is multifactorial thus the treatment is frequently difficult. Duloxetine is approved for treatment of women with moderate to severe forms of stress urinary incontinence. The action of duloxetine is associated with the reuptake inhibition of serotonin and norepinephrine at the presynaptic neuron of Onuf's nucleus of the sacral spinal cord. This is a drug approved by European Society Urology with a level of evidence 2 and grade of recommendation B. **Conclusion:** Duloxetine has showed efficacy in treating urinary stress incontinence in a patient with neurogenic bladder, in improving her quality of life, decreasing the ICIQ-SF scale from 10 to 5. This case reinforces what the literature says about the use and efficacy of duloxetine in the treatment of SUI.

PA272

Quantitative Analysis in Reaching in the Patients with Hemiplegia after Stroke by Motion Capture Unit integrated Synchronous sEMG

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Objective: The aim of this study was to evaluate motion capture unit (MCU) integrated synchronous sEMG, when it was used to assess reaching characteristics in the patients with hemiplegia after stroke. **Subjects and Methods:** Sixteen stroke patients with hemiplegia, the average age 66±13 years (from 49 to 84 years), and ten normal subjects with age matching were admitted to the study. The subjects were asked to sit on a chair and use the affected arm or right arm of normal subjects to reach a cup which was on a table just at a front of shoulder with an arm distant away. Four small sensor boxes which could detect movement path, speed and smooth in three dimensions were fixed on spine, upper arm, front arm and hand. Meanwhile, the sEMG signal of the trapezius, anterior of deltoid, biceps and triceps of the tested limb were transferred to PC. The test was repeated four times except two times for try. The best job was accepted. After signal processing, we got the rage of movement, time to aim, angular velocity, peak angular velocity, time to peak of shoulder and elbow, and work of muscle and work ratios of trapezius/deltoid and biceps/triceps. All these parameters were used for statistic analysis with SPSS 19.0. The comparison between patients and normal subjects was analysis. **Results:** All kinematics parameters and the work ratios showed significant different between patients and normal subjects. **Conclusion:** The results suggest that MCU integrated synchronous sEMG can quantitatively assess the kinematics and kinetics characteristics in reaching among the patients with hemiplegia after stroke. It can provide the valuable data about multiple joint functional movement quality in three dimensions.

PA273

Non-Val30Met TTR Type Familial Amyloid Polyneuropathy with Asp38Ala Mutation

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Case Diagnosis: Non-Val30Met TTR type familial amyloid polyneuropathy (FAP) with Asp38Ala mutation. **Case Description:** The 57 year-old woman visited the cardiology clinic with chief complaint of palpitation. She didn't have any past history of cardiac disease except diagnosis of carpal tunnel syndrome and operation of carpal tunnel release. She got diagnosed with ventricular tachycardia by ECG and hypertrophic cardiomyopathy by echocardiography. Because of sustained ventricular tachycardia, she got implantation of implantable cardioverter defibrillator (ICD) and diagnosed with cardiac amyloidosis by muscle biopsy. Afterwards, she was referred to rehabilitation department to evaluate her tingling sense and sensory loss in both arms and legs. Electrodiagnostic study revealed peripheral sensory-motor polyneuropathy at all four extremities combined with bilateral carpal tunnel syndrome. She had family history of peripheral polyneuropathy in her brother. We could consider FAP and confirmed non-Val30Met TTR type FAP with Asp38Ala mutation identified by DNA sequencing. **Discussion:** FAP, a genetic disease showing the autosomal dominant inheritance pattern was first reported by Andrade in 1952. There are three precursor proteins of amyloid inducing FAP: transthyretin (TTR), Apolipoprotein A-1, and Gelsolin. Among these three proteins, abnormal transthyretin (TTR) expression by point mutation is most frequently discovered in FAP. Although TTR type FAP has been treated and classified according to clinical findings in the past, it is classified genetically these days. Since the substitution of methionine for valine at position 30 is most common gene mutation, TTR type FAP is divided into Val30Met type FAP and non-Val30Met type FAP. Because Asp38Ala mutation type is very rare in non-Val30Met TTR type FAP, we are reporting the clinical characteristics and disease progression of this patient. **Conclusions:** According to previous study, up to 13% of patients with hypertrophic cardiomyopathy were caused by FAP. If a patient has cardiac disease such as arrhythmia and/or hypertrophic cardiomyopathy as well as peripheral polyneuropathy, FAP should be considered and family history should be evaluated. Early diagnosis can help preventing progression of disease by early management.

PA274

Comparing Quality of Life Among Brazilian and American Persons with Spinal Cord Injury

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Introduction/Background: Quality of life (QOL) is considered an endpoint for clinical trials in SCI. Yet its use across countries is rarely discussed. Using the International SCI QOL Basic Dataset, researchers compared the results of SCI samples living in Brazil and in the US. Differences between the two samples provide critical information about the use of QOL in multisite international clinical trials. **Materials and Methods:** The International SCI QOL Dataset includes 3 questions focusing on ratings of QOL in relation to overall well-being, physical health and psychological health. Items are rated on a 0-10 scale. The Brazilian version was translated using the recommended guidelines for translation of the International SCI Datasets. The two samples included 50 Brazilian outpatient subjects and 76 US subjects. Subjects were interviewed in clinics or over the phone. **Results:** The Brazilian sample included 46% of subjects with complete paraplegia, 22% complete tetraplegia and 32% had incomplete injuries. Etiology was 50% falls.

Subjects were on average of 44 years old; 11 years post injury. In contrast, US subjects were 52 years old and 18 years post injury. Etiology was 48% auto accidents, 27% sports and 14% falls. US subjects were 80% male. They were more likely than the Brazilian subjects to have had incomplete injuries (57%), with 21% having both complete paraplegia and complete tetraplegia. The US sample rated QOL lower but these differences were only significant with for perceived physical health ($p < 0.017$). Only in the Brazilian sample were difficulties noted concerning question meaning. All correlations with the WHO-BREF were strong (0.80 $p < 0.001$). **Conclusions:** The measure presented good convergent validity in relation to the WHO-BREF. The two samples differed significantly in terms of their physical health. Differences in etiology, neurological status, age, time since injury and question understanding may explain why the US sample rated their physical health related QOL lower. Geographical and socio-cultural differences between samples were also apparent. Issues of culture and interpretation need to be carefully considered in using QOL measures as outcomes of international trials for SCI. These issues will be discussed and recommendations provided for future use of this QOL dataset.

PA275

Depression as Predictor of Functional Outcome in Stroke Patients

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Introduction/Background: Depression is associated with stroke. Activity limitation results in depression in stroke survivors. On the other hand depression itself has an adverse effect to the rehabilitation procedure (1, 2). The purpose of this study is to investigate the relationship between clinical depression and functional outcome in patients with stroke. **Material and Methods:** This is a retrospective cohort study of three hundred and twenty eight stroke patients who were admitted in the our department during a 10-years period (2003-2012). The presence of clinical depression was assessed using the beck depression inventory. Functional outcomes were assessed through the Barthel index. Statistics used were unpaired *t*-test and chi-square test. **Results:** The study sample comprised 328 stroke survivors. Thirty seven stroke patients (11.3%) were diagnosed with depression. The mean age of stroke patients with depression was 64.4±15 vs 66.5±12.2 ($p=0.3$) years in the non-depressed group ($p=0.3$), 62.1% were men ($p=0.8$), 37.8% had right side hemi ($p=0.9$) and 62.2% had ischemic attack ($p=0.07$). Patients with depression were admitted in our department with an average Barthel index score of 14.6±14.8 and discharged with an average Barthel index score of 29.7±20.9 whereas the non depressed group admitted with 28.1±19 ($p=0.0001$) and discharged with 54.8±24.5 score ($p=0.0001$) additionally, depressed post-stroke patients had an average length of stay 50.1±40.4 days, and delay of admission 62.8±79.4 days Vs 53.1±47 ($p=0.6$) and 88.8±237 ($p=0.5$) days for the non depressed stroke patients. **Conclusion:** Depression in stroke patients is strongly correlated with limited improvement after the completion of a rehabilitation regimen. Clinical depression was not significantly associated with the presence of expressive aphasia, age, gender, laterality of stroke, type of stroke or delay of admission. **References:** 1) D sinyor, P. A. (1986). Post-stroke depression: relationships to functional impairment, coping strategies, and rehabilitation outcome. Stroke, pp. 17: 1102-1107. 2) Eugene M Cassidy, R. O. (2004). Prevalence of post-stroke depression in an irish sample and its relationship with disability and outcome following inpatient rehabilitation. Disability and rehabilitation, pp. Vol. 26, no. 2: pages 71-77.

PA276

Neural Substrates of Lower Extremity Motor and Balance Function Using Voxel-Based Lesion Symptom Mapping (VLSM) in Stroke Patients

ping (VLSM) in Stroke Patients

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Introduction/Background: Stroke frequently impairs motor and balance function and it significantly influences on the activities of daily living. Understanding the relationship between brain lesion and its resulting deficits in motor and balance function can make the clinicians easier to set the goals during rehabilitation. We aimed to elucidate the neural substrates of lower extremity motor and balance function using Voxel-based Lesion Symptom Mapping (VLSM) in stroke patients. **Material and Methods:** We retrospectively screened the stroke patients from January 2008 to September 2014 who met the inclusion criteria; a first-ever stroke, supratentorial lesion and who underwent brain MRI. Stroke patients who had infratentorial lesion or intracerebral hemorrhages were excluded. Finally brain MRI data of total 133 stroke patients were selected for VLSM analysis. Demographic data, neurologic characteristics and Fugl-Meyer motor assessment (FMA) of lower extremity and balance function measured by Berg balance scale (BBS) were collected. We generated statistic maps of lesion contribution related to motor and balance function using VLSM. **Results:** Highest frequency of brain lesion location was observed in the deep territory of the middle cerebral artery with lesion distribution at the striatocapsular region and insula on the overlay lesion plot of all the patients. VLSM revealed that FMA of lower extremity was associated with damage to the putamen, lentiform nucleus, caudate, lateral globus pallidus, insula, frontal precentral gyrus, subgyral white matter adjacent to corona radiata. Asymmetry was observed and lesions were more widely distributed in the left than right hemisphere. However, lesion maps associated with balance function measured by BBS were not established at an FDR of 0.05. **Conclusion:** In our results, motor impairment was associated with the lesions including the precentral gyrus, basal ganglia, insula, and white matter adjacent to corona radiata. However, VLSM revealed no specific lesion location in regard to the balance function. It might be caused that balance is complex sensory and motor skill that requires the spatial and temporal integration of sensory input and planning and execution of movement patterns. For more accurate prediction of balance function, the ambient factors other than lesion location need to be unveiled.

PA277

The Relative and Absolute Reliability of Upper Extremity Motor Domain of the Fugl-Meyer Assessment

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Introduction: Fugl-Meyer assessment is one of the most recognized comprehensive quantitative measures of motor impairment following stroke. Especially, the upper extremity motor subscore of Fugl-Meyer Assessment (FMA-UEMo) is widely used for clinical trials of stroke rehabilitation. However, there are a few reports regarding relative reliability of this test, moreover, there are scanty reports regarding absolute reliability. This study was conducted to evaluate the relative and absolute reliability of the FMA-UEMo. **Material and Methods:** This study was part of a larger study that examined the measurement properties of the Korean version of the Manual Function Test. Eight occupational therapists from two university affiliated hospitals participated as raters. Before conducting the study, all therapists were trained sufficiently with standardized measurement methods. 81 stroke patients (mean age of 60.2 years) were recruited and performance of each participant was videotaped for detailed analysis. The inter-rater and intra-rater intraclass correlation coefficients (ICCs) with 95% confidence intervals, standard error of measurement (SEM), smallest real difference (SRD) were calculated. **Results:** For inter-rater agreement of

FMA-UEMo total score, ICCs was 0.999 (95% confidence interval [CI], 0.999 to 1.0; $p < 0.001$). Inter-rater SEM and SRD of total score were 0.781 and 2.166 respectively. For intra-rater reliability of FMA-UEMo total score, ICCs were above 0.949 for all raters. The indexes of test-retest reliability SEM and SRD of total score were less than 0.78 and less than 2.16 respectively. **Conclusion:** FMA-UEMo shows good reliability for measurement of hemiparetic upper extremity in stroke patients. Based on this study, FMA-UEMo is highly useful in assessment of upper extremity motor deficits for clinical and research purposes.

PA278

Epidemiological Data on Carpal Tunnel Syndrome (CTS): The Experience of an EMG Laboratory

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Introduction: The purpose of this work was to study CTS epidemiological data of patients who were examined at the EMG-laboratory of our department during the last five years considering gender, age, occupation, diabetes. **Material and Methods:** Six hundred seventy patients, 473 women and 233 men (age 21-77) were tested for CTS. We used surface electrodes to record sensory and motor nerve conduction. **Results:** From the 437 women, 225 of them (age 21-55) were working while the other 248 were homemakers. From the 225 working women, 174 of them were diagnosed with CTS. More specifically 147 of them were diagnosed with right-CTS, 8 with left-CTS and 19 of them with bilateral-CTS. From the 248 homemakers, 180 of them (age 31-77) were diagnosed with a CTS form. More specifically 151 of them were diagnosed with right-CTS, 4 of them with left-CTS and 25 of them with bilateral-CTS. From the 174 working CTS-women, 82 had an office job, 72 a manual job and 20 had both types of jobs. From the 233 men 214 were diagnosed with CTS. Out of them 111 had a manual job and in 95 of them the CTS was localized right, in 7 left and in 9 was bilateral. Fifty six men had an office job and in 52 of them the CTS was localized right while in 4 of them was localized left. The remaining 47 men were retired and the CTS was localized right in 29, left in 7 and bilateral in 11 of them. **Conclusion:** In women it was not observed any notable difference between homemakers and those that were working. However in men the highest percentage with CTS (+) findings was among those who were working and particularly those with manual jobs. In early ages there was not a notable difference between manual and office workers. The observation that 20 out of the 174 working women had bilateral-CTS indicates a more serious burden when in addition to housework there is also an occupational job. All the retired men (age 62-74) with CTS had an avocation and the 11 of them who had bilateral-CTS were also diagnosed with diabetes.

PA279

Reliability of Oxygen Saturation Monitoring in Dysphagia Patient

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Introduction: In previous studies, there were many arguments to the usefulness of water swallow test and the oxygen desaturation test in order to detect tracheal aspiration. In this study, we aimed to verify the usefulness of pulse oximetry and water swallow test in the detection of aspiration compared with videofluoroscopic swallowing study (VFSS). **Material and Methods:** We studied 119 patients who have swallowing difficulty. We examined 10cc water swallow test and VFSS with oxygen saturation monitoring to each patient. In 10cc water swallowing test, all patients were asked to drink 10cc of water from a cup. Signs of coughing or wet voice within 3 minutes after drinking were considered as abnormal finding. In VFSS with oxygen saturation monitoring, decline in oxy-

gen saturation by 3% from baseline was considered as abnormal finding. **Results:** The result of 10cc water swallow test showed sensitivity of 50.0% and specificity of 80.0% for the detection of aspiration. The result of oxygen desaturation showed sensitivity of 9.4% and specificity of 96.4%. When both tests were combined, a sensitivity of 51.6% and a specificity of 78.1% were attained. There was no significant correlation between 10cc water swallow test and aspiration in VFSS, oxygen desaturation test and aspiration in VFSS in McNemar test ($p < 0.05$). **Conclusion:** We concluded that 10cc water swallow test and oxygen desaturation test are insufficient test to detect the tracheal aspiration.

PA280

Usefulness Of Vibration Perception Thresholds in Screening of Diabetic Polyneuropathy

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Introduction: The assessment of vibratory perception thresholds (VPT) is important for evaluating human somatosensory functions and provides new aspects in clinical practice and research. In this study, we examined the acuity of VPT test in predicting the diabetic polyneuropathy compared with nerve conduction study (NCS). **Material and Methods:** We studied 73 patients who have symptoms of diabetic poly neuropathy. Each subject had VPT test and NCS. We used biothesiometry for measurement of VPT. When the value of VPT was more than 97.5 percentile, it was considered as abnormal finding. **Results:** Sensitivity of biothesiometry to reflect abnormal nerve function was estimated as 68.5% and sensitivity of NCS was 75.3% in clinically diabetic polyneuropathy patients. There was no statistically significant difference between two methods ($p > 0.05$). **Conclusion:** VPT test by biothesiometry is a useful noninvasive tool for the detection of diabetic polyneuropathy compared with NCS. We suggest that using biothesiometry might be complement to NCS for screening of polyneuropathy.

PA281

Comparison between Swallowing and Cough Function According to the Stroke Lesion

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Introduction/Background: After stroke, many patients suffered from dysphagia and airway infection due to swallowing and/or cough dysfunction. The aim of this study is to compare between swallowing and cough function according to the stroke lesion, using the functional dysphagia scale (FDS), penetration aspiration scale (PAS) and peak cough flow-meter (PCF). **Material and Methods:** Acute stroke patients with dysphagia symptoms and/or pulmonary problem were recruited in this study. Stroke lesions were divided into one of the three categories; cortical, subcortical and brainstem. Swallowing function was evaluated using FDS and PAS based on the results of VFSS. VFSS was performed within 2 weeks after stroke. PCF was used as a parameter to measure voluntary coughing ability, the maximum observed flow in at least 3 attempts was noted. These evaluations were performed on the same day within 2 weeks after stroke onset. All test procedures were recorded and the findings were analyzed by three physiatrists. Correlation analysis between swallowing and cough function were assessed. **Results:** One-hundred twenty seven patients were completed all evaluations within 2 weeks after stroke. Fifty-one patients were classified as cortical stroke group, 42 patients as subcortical, and 34 patients as brainstem. PAS was 4.2 ± 2.7 , 4.1 ± 2.2 and 4.9 ± 2.6 in cortical, subcortical and brainstem group, respectively. FDS was 26.0 ± 18.2 , 23.4 ± 14.4 , 21.1 ± 11.7 and PCF was 176.5 ± 118.9 , 188.1 ± 121.1 , 252.1 ± 97.8 , respectively. The score of FDS was divided into sub-scales. PAS and oral phase of the FDS sub-scales showed significant group differences. Significant correlation was found among PCF, PAS and FDS in all pa-

tients. The sub-scales of FDS which present oral phase swallowing showed significant correlation with cough function in patients with cortical stroke, whereas the sub-score of FDS which present pharyngeal phase swallowing showed significant correlation with cough function in patients with brainstem stroke. **Conclusion:** In this study, significant correlation was revealed between swallowing and cough function in whole stroke patients; among that, differences were noted according to the stroke lesion. We suggest that objective evaluation of swallowing and cough function would be helpful to decide on proper management in stroke lesion.

PA282

The Effect of Upper Limb Rehabilitation Robot on Hemispatial Neglect in Stroke Patients

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Introduction/Background: The aim of this study was to investigate the effect of upper limb rehabilitation robot on hemispatial neglect in stroke patients. **Material and Methods:** We enrolled 19 sub-acute stroke patients who had hemispatial neglect as a result of right hemisphere stroke. All patients were randomly divided into upper limb rehabilitation robot therapy group (Robot group) and control group. The patients in robot group received left upper limb training using the upper limb rehabilitation robot (Neuroox-®Absun, Korea). During the robot therapy, they were sitting on the right side of the robot, thus the monitor was located to the left side of the patients. The programs of the robot therapy had passive and active assistive exercises of the upper limb, and the game to stimulate wrist and elbow movements toward left side of the patients. Occupational therapists supervised the patients during robot therapy and only assisted with initiating the treatment and changing the robot therapy modes. The control group received conventional neglect therapy by occupational therapists. Both groups received each therapy for 30 minutes a day, 5 days per week for 3 weeks. The effect of therapy was assessed with Motor-free visual perception test (MVPT), line bisection test, star cancellation test, Catherine Bergego scale (CBS), Mini-mental state examination (MMSE), and the Korean version of modified Barthel index (K-MBI). These measurements were taken before and after treatment. **Results:** Ten patients were recruited in robot group, and 9 in control group. Three weeks after the therapy, both groups showed significant improvement in MVPT, line bisection test, star cancellation test, CBS, and K-MBI. And the changes in all measurements were no significant difference between two groups. **Conclusion:** The results of this study showed that compared to conventional neglect therapy, upper limb rehabilitation robot therapy has similar benefit to the treatment of hemispatial neglect in stroke patients. Upper limb rehabilitation robot therapy could be an useful tool for hemispatial neglect treatment after stroke.

PA283

Man with HIV Infection and Motor Neuron Disease, a Case Report

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Case Diagnosis: Amyotrophic Lateral Sclerosis and Human Immunodeficiency Virus infection. **Case Description:** A 52-year-old right handed man was admitted to the electrophysiology laboratory, for progressive 9 years myalgia, generalized muscle weakness and dysphagia. He has developed weakness in the last 6 months in both legs (thighs), impairment in getting out of a chair and difficulty climbing stairs. There's no apparent sensory symptoms, urinary or bowel incontinence. He has a history of infection with human immunodeficiency virus (HIV) since he was 34

years old. He has received antiretroviral treatment since 2003. He is currently treated with Efavirenz 600 mg/day, Tenofovir 300 mg - Emtricitabine 200 mg/day, achieving adequate control of HIV, with an undetectable viral load and CD4 + lymphocytes in 542.0 cel./mm³. Physical examination exhibits signs of upper motor neuron: hyperreflexia in right Biceps and corneomandibular reflexes; and jaw jerk reflex. Electrodiagnostic studies showed normal neuroconduction of the right Peroneal and Ulnar nerves and left Tibialis nerve. Electromyography of the muscles examined showed signs of denervation in the bulbar, cervical, thoracic and lumbar segments. Recruitment was decreased in the right Vastus medialis muscle and unstable polyphasic units were observed in the right medial Gastrocnemius. No myopathic units were observed on examination. No other medical condition explained the symptoms. **Discussion:** The presence of clinical and electro-physiological signs of injury to the upper and lower motor neuron, along with the progression of symptoms suggests a diagnosis of Amyotrophic Lateral Sclerosis (ALS). ALS in patients with HIV syndrome is a rare clinical condition, with only a few case reports described in the literature. The clinical presentation in these patients differs in some issues from the classic presentation of ALS: early onset and stabilization of symptoms with antiretroviral management. **Conclusion:** The patient meets criteria for ALS and his clinical presentation is consistent with reports in the literature of patients infected with HIV-associated ALS.

PA284

Factor of Determining Functional Outcome at Discharge in Patients with Acute Subtentorial Stroke

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Introduction: Prediction of ADL function at an early stage stroke enables to select treatment programs and goals. There has been reported on several predictive studies in acute stroke patients. However these studies are often not included subtentorial stroke. The subtentorial stroke patients have various symptoms such as hemiparesis, ataxia, sensory deficits and ocular motility disorder. Therefore, it is necessary to search predictive indicators that include these symptoms and performance. The purpose of this study was to determine the factors of functional outcome at discharge in patients with acute subtentorial stroke. **Methods:** Participants in this study were 42 patients who diagnosed subtentorial cerebral hemorrhage or infarction. NIH Stroke Scale (NIHSS), Ability for Basic Movement Scale II (ABMS II), modified Rankin Scale (mRS) were used as clinical measurements. The NIHSS measure neurological function in patients with signs and symptoms of stroke. The NIHSS includes 15 individual elements that measure motor and sensory function, language and speech production, vision, level of consciousness and attention, and neglect. The elements are summed to provide an overall assessment of stroke severity, with the score ranging from 0 to 42. The ABMS II consists of 6 grades for the ability to perform basic movement. ABMS II requires "turn over from the supine position," "sit up," "remain sitting," "stand up," and "remain standing." Total scores range from 0 to 30. The modified Rankin Scale is a measure of global disability that has been widely used to assess outcome after stroke. This scale consist of 6 grade from 0 (no symptoms) to 5 (severe disability); 6 indicates death. We analyzed relationship between NIHSS and ABMS II, and the independent or dependent of ADLs. These index were selected as independent variables, mRS were selected as dependent variable. The dependent variable was defined as follows: independent group (mRS ≤2; 22 patients) or dependent group (mRS ≥3; 20 patients). And discriminant analysis was performed. **Result:** In the result of

the discriminant analysis, independent group could be discriminated with 90.9% and dependent group with 80.0% accuracy for factors as selected above. *Conclusion:* The result suggest that these clinical scales are useful indicator of determining mRS score at discharge in patients with subtentorial stroke.

PA285

Tibialis Posterioris Stimulation for the Treatment of Overactive Bladder In Parkinson's Disease – Current Evidence

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Introduction: Urinary dysfunction in Parkinson's disease (PD) results from unregulated dopaminergic inhibition of micturition and antiparkinsonian drugs side effects, showing a prevalence of 27-39%. Complaints include nocturia (up to 86%), urgency (33-71%) and frequency (16-68%), frequently on context of an overactive bladder (OAB). In PD the loss of manual dexterity, immobility and/or cognitive dysfunction increase the risk of incontinence and urinary complications. The use of anticholinergics for OAB in PD patients is poorly studied and its side effects (cognitive decline, risk of fall) limit their use. Levodopa has shown variable effects in urinary complications of PD. In patients showing poor response or contraindications to pharmacological treatment, other therapeutic modalities have been proposed. Transcutaneous/percutaneous Tibialis posterioris nerve stimulation (TNS) has shown safety and effectiveness on OAB refractory to pharmacological treatment in various populations. Periodic stimulation allows for a long term effect. TP originates from L4 to S3 spinal segments, also responsible for bladder innervation. TNS seems to inhibit sacral efferents to bladder by reflex inhibition at spinal level and/or reorganisation of sensitive cortex. We review evidence on TNS for the treatment of overactive bladder in PD. *Material and Methods:* Pubmed database search including MeSh terms: "tibial nerve stimulation", "overactive bladder" "parkinson". 19 results were obtained and only 3 studies were included. *Results:* 3 prospective non controlled clinical studies are reviewed. Krivoborodov et al (2006) used percutaneous TNS (PTNS) once a week, with symptom and/or urodynamic improvement after 6 months in 26 out of 29 patients (6 of which refractory to pharmacological treatment). Kabay et al (2009) performed PTNS in 32 patients showing decreased uninhibited detrusor contractions and bladder capacity. Ohannessian et al (2013) treated 6 patients with transcutaneous TNS. At week 6, improvements were only found on Patient Global Impression of Improvement questionnaire. *Conclusion:* There is growing evidence on TNS for OAB treatment. In PD patients clinicians face additional challenges. Despite promising results, the design, number of participants and lack of parametrisation on TNS are important limitations of the studies. Better designed, higher evidence level studies are needed to define TNS role on treatment of OAB in PD.

PA286

A Rare Cause of Stroke in a Young Patient

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Case Diagnosis: Hemorrhagic stroke associated to cavernoma. *Case Description:* 21 year old female patient with no previous medical history. Comes to ER complaining of loss of strength and sensation on right homebody for 2 days. She denied headache, vomiting, convulsions or lipothymia. On examination she had no speech or swallowing problems, she had discrete anisocoria (R>L) with left ptosis, reactive pupils, right hemiparesis (muscle strength graded 3 upper limb and 4 on lower limb, with normal to-

mus) with ipsilateral central facial palsy and indiffernt plantar cutaneous reflex. Brain CT scan revealed an acute intraparenchymal hematoma on mesencephalo-diencephalic transition, extending to anterior thalamus. MRI scan confirmed a subacute hematoma associated to a cavernoma. She was admitted to stroke unit, after a conservative approach was decided by neurosurgery. An early rehabilitation program (physical and occupational therapy) was started. The patient showed a good clinical and radiological evolution: at day 5 she maintained a left Horner syndrome, discrete facial palsy, grade 4+/5 right hemiparesis and parcial recovery of hemihypoesthesia. Control CT scan showed an hematoma reduction with perilesional edema. She was oriented to Neurosurgery follow-up and PMR consultation for rehabilitation care. *Discussion:* Cavernous angiomas, hemangiomas and cavernomas are vascular central nervous system lesions. Histologically they are compact thinned wall cavities in cerebral parenchyma. They occur at any age, but more frequently from 30 to 40 years. Most are small, asymptomatic lesions, sometimes occult in CT scan, warranting MRI scan for diagnosis. Despite histologically benign, they can cause a myriad of neurological symptoms and may demand surgical treatment. Asymptomatic cavernous need follow-up as some other selected symptomatic cases. When associated with recurring hemorrhage, refractory epilepsy or progressive neurological deficit, surgery is to be considered. In some cases they may be unresectable. *Conclusion:* Intraparenchymal hematomas represent about 10% of strokes but they are rarely associated with cavernomas, especially in young patients. This case highlights an uncommon condition. Its possible recurrence warrants clinical and imagiological surveillance, while the patient participates in a properly customised rehabilitation program.

PA287

Spontaneous Intracranial and Spinal Hematomas in Patient with Idiopathic Trombocytopenic Purpura (ITP)

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Case Diagnosis: Spontaneous intracranial and spinal hematomas in patient with idiopathic trombocytopenic purpura (ITP) *Case Description:* A 16 years old female with ITP visited the emergency room for suffering headaches and lower back pain two weeks ago after mild hit on head. Neurological assessment and cranial computerized tomography (CT) were normal. In blood analysis, a severes thrombocytopenia and anemia was evidenced. Hospitalization was indicated for steroid therapy, and the patient refused it. Her parents approved the patient decision, and they reported that she has left treatment of dexamethasone months ago. They left hospital voluntarily. A month later, she is brought to the hospital after suffering to loss of strength in lower limbs and back pain. Later she suffered an epileptic seizure and decreased level of consciousness. In cranial CT was evidenced a left frontal hematoma and occipital chronic subdural hematoma. In magnetic resonance imaging (MRI) was observed a subacute spinal epidural hematoma. Steroid therapy, subsequent urgent splenectomy, surgical cerebral evacuation and lumbar drain was required. A program of integrated and individualized rehabilitation was necessary to minimize the consequences in this patient. *Discussion:* Intracranial hemorrhage (ICH) is a potentially fatal complication of ITP. There is no reliable estimate of the frequency. Predisposing factors in the development of ICH are the presence of a severe thrombocytopenia, previous head injury and the existence of a bleeding beyond petechiae and ecchymoses. The presence of a subdural hematoma is possible, but extremely rare. The spinal epidural hematoma can occur with previous trauma or punctures in the area associated with severe thrombocytopenia, but not related to spontaneous appearance. *Conclusions:* Given the infrequency in the appearance of each of these events in patients with ITP we could say that the appearance of all of them in the same patient is quite unlikely.

The action that has been followed with our patient was consistent lifelong commitment to representing each bleed, acting at first in the HIC and once stabilized proceed to try the epidural hematoma. The rehabilitation treatment has a very important paper in these kind of complications, trying to restorate the functions and quality of life of patients.

PA288

The Effects of Transcranial Direct Current Stimulation Combined with Peripheral Electrical Stimulation on Maximum Strength and Force Accuracy of Quadriceps

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Background: Transcranial direct current stimulation (tDCS) is non-invasive brain stimulation tool for inducing cortico-spinal excitability and facilitating motor learning. Further, peripheral neuromuscular electrical stimulation (ES) have also an important role in stimulating cortical sensory areas allowing for improved motor function. The objective of this study was to investigate the effects of tDCS combined with ES on maximum isokinetic quadriceps strength and accuracy of submaximal quadriceps force. **Material and Methods:** Six healthy subjects (all men, average age was 27.6±4.9 years old) were randomly underwent three sessions (sham, tDCS and tDCS+ES) separated by at least one week. tDCS was administered for 20 min at a 1 mA current intensity, with the anodal electrode placed over the left primary motor cortex of lower leg and cathodal electrode above the right orbit. ES was delivered for 20 min which electrodes were located on the motor point of quadriceps. Before and after stimulation, maximum isometric strength and force accuracy of right quadriceps were assessed using Biodex system 4 pro. Isokinetic maximum strength was assessed at 60 degree/sec for three times. Quadriceps force accuracy was determined during isokinetic contraction of 60 degree/sec. We selected 20 N target force from 90 degree flexion to 0 degree. **Results:** TDCS+ES increased the maximum quadriceps isokinetic strength compared with baseline. Force accuracy of quadriceps were significant improved after tDCS+ES and tDCS only. The most improvement of accuracy force control was in tDCS+ES. **Conclusion:** This study showed the combination of tDCS and ES had positive effects on the muscle control ability.

PA289

Propulsion Force During Gait and Forward Step Movement in Subjects with Hemiparesis

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Introduction: The propulsion impulse (PI) during gait has been reported as an important factor to determine the gait function. However, the PI during the non-paretic maximum forward stepping from a static standing position has not been fully verified. The purpose of this study was to clarify the relationship between walking and non-paretic maximum forward stepping ability, based on the PI, in subjects with hemiparesis. **Material and Methods:** Eleven subjects with chronic hemiparesis participated in this study. Leg propulsion forces during gait and forward stepping were assessed using force plates. To assess the PI during gait, the subjects were instructed to walk through the 3 m-walkway at comfortable and maximum gait speeds without any orthoses or aids. We measured gait speed and PI which was calculated from the time integral of the anterior ground reaction forces in each stance phase. To assess the PI during maximum forward stepping, the subjects stood on

the force plates and then were instructed to step forward as far as possible by using their non-paretic leg. We measured step length and PI of the paretic leg during the swing phase of the non-paretic leg. The maximum isometric strength of the muscles of knees and ankles on both sides were also measured. The relationships between the parameters in the walking and stepping tasks, and muscle strength were analyzed using the Spearman rank correlation coefficient. **Results:** The maximum gait speed significantly correlated only with the PI of the non-paretic leg during gait. The PI of the paretic leg during the non-paretic maximum forward stepping significantly correlated with the step length, and the sum of the paretic muscle strength of knee flexor and ankle plantar flexor. The PI of the paretic leg during non-paretic stepping did not significantly correlate with the PI of the paretic leg during walking at both speeds. **Conclusion:** The PI of the paretic leg during the non-paretic maximum forward stepping reflected the capacity of paretic muscles, and determined the step length of non-paretic leg. However, walking ability in this population was not related to the PI of paretic leg during gait because of the compensation of the non-paretic leg.

PA290

Camptocormia: a Case Report

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Case Diagnosis: Camptocormia. **Case Description:** A 73 years old woman with type 2 diabetes mellitus and hypertension, personal history of intervention of total knee arthroplasty and adenomatous polyps. The patient was referred for presenting repeat lumbago. The patient had recurrent lower back pain and appreciated by her family that is growing curved. She referred recurrent falls forward, not associated with back pain, inability to correct kyphosis voluntarily (deformity produced in less than a year) and an attitude in anteropulsion and cephalic flexure. The examination showed a marked inclination trunk flexion to the right, mild cogwheel rigidity in upper right limb without other alterations. In imaging (Xray, CT, MRI) showed a column vertebral crush on T12, spondylolisthesis grade I L4 on L5 with posterior bone protrusions causing mass effect on the dural sac without signs of radicular commitment along with a tilt marked to the right side. She was valued by Orthopedic surgery and traumatology and they rule out surgery. We ask a neurophysiological study using electromyography compliant data that showed an abnormal posture of the axial position of the haft (camptocormia) clockwise. We decided to indicate the use of a walker to aid movement, a lumbar corse BOSTON SOFT and a lumbar capacitation program and oral analgesics. **Discussion:** Camptocormia is clinically characterized by excessive involuntary flexion of the trunk due to progressive weakness of the spinal extensor muscles. Is enhanced when standing and walking and is relieved in the supine position. It can be associated with low back pain and weakness of the gluteus maximus and hip. It may be associated with neuromuscular conditions: myopathies, neuromuscular dystrophies, amyotrophic lateral sclerosis and extrapyramidal disorders as Parkinson's disease, focal dystonia, etc. Treatment options are limited for camptocormia, it is aimed at treating the underlying disease and if there is no underlying disease can be applied therapies such as orthotics, physiotherapy, botulinum toxin or analgesics. **Conclusion:** The camptocormia is an axial myopathy, which is often found underdiagnosed. We might think of it when an elderly patient with the characteristics mentioned before. The definitive diagnosis is made by electromyogram showing an altered paraspinal muscle contraction.

PA291

A 55-Year-Old Man, with Dermatological Lesion in His Leg, Sacral Plexus Injury and Neurogenic Bladder

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Case Diagnosis: Adult 55 years old with no relevant medical history, reported 3 months ago erythematous and vesicular lesions on the posterior left leg extending from buttocks to back of foot accompanied by intensive burning pain. At 15 days after onset he had difficulty in gait due to left foot drop, and also showed urinary retention. He developed progressive resolution of skin lesions with decreased pain without improvement of neurological symptoms. Diagnosing Herpes Zoster Associated limb paresis (ZALP) with Sacral Plexus Injury. **Case Description:** In the posterior region of the left lower limb developed skin hyperpigmentation, hipotrophy of gastrocnemius, foot drop. Strength: hip abductors and extensors 1/5, hip flexors and knee extensors 4/5, dorsiflexors and plantarflexors 0/5, hypoesthesia on lateral side of the leg and entire foot, reflexes: patellar normal and achilles bilateral absent. Absence of sensitive nerve conduction on superficial peroneal nerve, and motor nerve conduction on left tibial and peroneal nerve. In conventional electromyography, medial gastrocnemius, gluteus maximus, tensor fascia lata and left biceps femori shown fibrillation potentials and positive sharp waves (denervation), with absence of motor units. In the left anterior tibial nerve was found denervation, and units of large amplitude and long duration, with greatly reduced recruitment and interference pattern. Left L5 paraspinal muscles and quadriceps, right anterior tibialis EMG were normal. **Discussion:** The sensory involvement shown in nerve conduction localize the lesion to postganglionic level; and normality in lumbar paraspinal muscles and quadriceps which is innervated by lumbar plexus discarded injury at that level. The electrodiagnostic study supports sacral plexus injury without evidence of reinnervation, that explains motor impairment and neurogenic bladder patient. The incidence ZALP is very low 2-3% of cases of Herpes Zoster, and is more frequently in upper limbs, but our patient had sacral level injury. **Conclusion:** This patient meets all criteria for case definition of ZALP, with a Sacral plexopathy, which is confirmed through electrodiagnostic studies; which is very difficult to find at this level.

PA292

When Morpheus Calls: the Rehabilitation Answers

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Introduction: Narcolepsy with cataplexy (NC) or without cataplexy (NwC) is a relatively common neurological sleep disorder. These disorders have a prevalence of about five to six per 10,000 individuals. The major symptoms of narcolepsy are excessive daytime sleepiness and cataplexy as well as fragmented night-time sleep, hypnagogic hallucinations and sleep paralysis, the latter two due to instability of REM sleep and motor tonus regulation. **Methods:** A systematic review of literature was made using the research motor PubMed using the terms "Narcolepsy" and "Rehabilitation". **Results:** It is of utmost importance the establishment of an accurate diagnosis. Unfortunately, narcolepsy is often unrecognized and has a delayed diagnosis. Patients with narcolepsy suffer from severe limitations in the performance of every-day life activities. Excessive daytime sleepiness (EDS) while driving is dangerous. Narcolepsy has serious effects on daytime performance and has been associated with an increased risk of automobile accidents, as well as accidents on the job and at home. **Conclusion:** The morbidity (diseases of the endocrine, nutritional, metabolic, nervous, respiratory, and musculoskeletal systems, of the eye and adnexa, and diffuse central nervous symptoms like hypersomnia) in patients with the narcolepsy diagnostic is augmented three years after the diagnostic is established. Several studies support the necessity of early treatment of patients with hypersomnia. The role of physical medicine and rehabilitation in this disease is to promote and increase of the quality of life of the patients by improving performance of every-day life activities, focused medical treatment and avoid harmful activities.

PA293

Outcomes of Short Course Inpatient Stroke Rehabilitation in Tertiary Hospital in Thailand

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Introduction: There are less than 5 rehabilitation centres in Thailand and almost located in the capital city. Maharat Nakhon Ratchasima hospital is a tertiary hospital in north-eastern part of Thailand which has 1,200 beds for acute care and 12 beds for rehabilitation. With the limitation of resources, services of rehabilitation were modified to short course inpatient program. **Objective:** To evaluate the efficiency and cost of short course inpatient stroke rehabilitation in Maharat Nakhon Ratchasima hospital. **Material and Methods:** This is a prospective study in stroke patients with aged over 18 years old, able to follow one step command and admitted in rehabilitation ward for short course rehabilitation program during 1st January to 31st August 2014. Barthel Index (BI) scores, BI effectiveness, BI efficiency, length of stay, Thai Hospital Anxiety and Depression Scale (THAI HADS), Quality of life using WHOQOL-BREF-THAI, cost and training time were recorded. **Results:** There were 31 stroke patients in this study. The mean interval from onset of stroke to admission was 28.5 days (1-128, SD 13.8). The mean age was 57 years (19-86). Seventy-seven percents of cases were ischemic stroke. All cases had hemiparesis, 32% had aphasia, 26% had dysarthria, 10% had incontinence, CRPS, 6.5% had dysphagia and cognitive problem. The mean length of stay was 8 days (3-16, SD 3.7). Mean BI score on admission and at discharge were 9.58 (0-18, SD 4.45) and 13.94 (5-20, SD 4). The mean of BI score change was 4.35 (SD 1.78). The BI efficiency was 0.54 points/day. Four cases (16%) had anxiety and 6 cases (24%) had depression. The mean WHOQOL-BREF-THAI score was 73.12 (30-90, SD 15.72) which reflected fair quality of life. The mean total cost was 7,566 Thai Baht (1,828-17,416, SD 3,980) or about 189 Euro. The average training time was 494 minutes (85-1,250, SD 284). **Conclusions:** Short course inpatient rehabilitation could improve functional ability of stroke patients with low cost but high efficiency.

PA294

Guillain-Barré Syndrome: Factors Associated with Incomplete Recovery

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Introduction: Guillain-Barré syndrome (GBS) is a monophasic illness characterized by acute onset. It typically begins with paresthesia in the hands or feet, followed within hours to days by leg and arm weakness. The cardinal clinical features consist of progressive relatively symmetrical weakness, mild sensory symptoms and areflexia, but effects on the cranial and respiratory muscles as well as the autonomic nervous system are not uncommon. The acute onset is followed by a plateau phase of 2-4 weeks, before the start of recovery, which usually lasts 1-2 years. The aim of our study the epidemiological, clinical and electrophysiological profile of patients with GBS and to determine the factors associated with incomplete recovery. **Material and Methods:** It is a hospital-based retrospective observational study. 42 patients, mean age at onset 37 years, were enrolled and followed up for 2 years after GBS onset. Epidemiological, clinical and electrophysiological parameters were evaluated. GBS disability score was used to measure functional outcome. Factors associated with poor functional outcome were determined. **Results:** 42 patients (20 males; 22 females; mean age of 37.54 years) were enrolled in this study. All patients were independent in activities of daily living before onset. The time to the peak of symptoms was 10 days (1-20) and the plateau phase lasted 11 days (2-33). Antecedent infection was present in 18 (42.85%) and gastrointestinal illness was reported in 2 cases. 7 patients (16.7%) needed me-

chanical ventilation and the median time of ventilator support was 56 days. 18 cases (42.85%) were of axonal variety. In our study, predictors associated with poor functional outcome at 2 years were age ($p=0.029$), extension phase <7 days ($p=0.0001$), axonal variety and plateau phase >21 days ($P=0.001$). *Conclusion:* Detailed evaluation of the clinical and electrophysiological profile may help in predicting the functional outcome in patients with GBS.

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Residual Disability 2 Years after Falling Ill in Guillain–Barré Syndrome

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Introduction: Guillain-Barré syndrome (GBS) is an acquired autoimmune disorder and is the most common cause of acute polyradiculopathy. The acute onset is followed by a plateau phase of 2–4 weeks, before the start of recovery, which usually lasts 1–2 years. The aim of our study is to describe residual disability 2 years after GBS onset. *Material and Methods:* It was a hospital-based retrospective observational study. 42 patients with GBS diagnosed as per Asbury criteria were enrolled and followed up for 2 years. GBS disability score was used to measure functional outcome. *Results:* At 2 years, the facial paralysis found in 12 patients at onset was present in one case, one participant experienced hypoesthesia, 2 had limitations in their arms and 7 (16.7%) had limitations in walking. GBS decreased significantly between onset and 2 years. Actually, 7 of 42 participants (16.7%) had moderately to severe residual disability at 2 years after onset, defined as GBS disability score >2 . *Conclusion:* Recovery occurred essentially during the 2 first years after onset.

PA296

Acute Spontaneous Spinal Epidural Hematoma Causing Paraplegia in Geriatric Patient under Anticoagulant: a Case Report

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Introduction: Spontaneous spinal epidural hematoma is a rare neurological condition which can lead to acute spinal cord compression. It is a rare entity that brings about spinal pain, myelopathy, radiculopathy, and cauda equina syndrome. It is a rare condition, which usually requires urgent surgical treatment. *Material and Methods:* We report an independent 71-year-old female, with history of hypertension and who is on anticoagulant for chronic atrial fibrillation. She presented to the emergency department with a 6-hour history of acute lumbar back pain accompanied by urinary retention and progressive bilateral lower limb paresis. *Results:* Examination revealed saddle anaesthesia, reduced anal tone and complete paraplegia. Urgent spinal MRI demonstrated an epidural haematoma extending from L2 to L5. A prompt surgical evacuation of the hematoma was performed. Initially the patient experienced little post-operative neurological improvement and begun to mobilise. 1 month after intensive physiotherapy, The patient made an almost complete recovery of the deficits. She could walk 4 months later. At the 1-year follow up, there was no recurrence of spinal epidural haematoma and no residual neurological abnormality. *Conclusion:* The case highlights the significance of clinical suspicion, especially in those patients on anti-coagulant therapy, rapid spinal radiography and emergent decompressive surgery in Spontaneous Spinal epidural Hematoma patients, as well as the importance of ongoing rehabilitation in restoring neurological function.

PA297

Bladder and Sphincter Disorders among Hemiplegic Stroke

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Introduction: Bladder and sphincter disorders are common in the initial phase of stroke. According to the literature, they are found in 24–54% of patients and are correlated with the severity of the stroke. The aim of our study was to evaluate the frequency of bladder and sphincter disorders, to identify and study their impact in patients with hemiplegic stroke followed in Physical Medicine and Rehabilitation department. *Materials and Methods:* It is a retrospective study on cases of hemiplegic stroke followed in Physical Medicine and Rehabilitation department of university Hospital Sahloul Sousse Tunisia, between January 2009 and December 2013. We looked for type, frequency of bladder and sphincter disorders, and examined their relationship with functional outcome. *Results:* Sixty four stroke hemiplegic patients: 36 men and 28 women were included. The average age was 69 years, ranging between 60–81 years. The mean duration of follow up was 20 months. The stroke was ischemic in 56 patients (87.5%), bleeding in 8 patients (12.5%). The bladder and sphincter disorders were found in 29 patients with a frequency of 45% (leak urinary 20%, urinary incontinence 22%, and bladder retention 3%). The persistence of bladder and sphincter disorders beyond 90 days is correlated with poor functional recovery. *Conclusion:* Bladder and sphincter disorders are common after stroke and dominated by urinary incontinence. They are an important prognostic and functional factor which require early detection and appropriate treatment

PA298

Spontaneous Spinal Epidural Hematoma with Prompt Recovery of Paraparesis without Surgical Treatment

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Introduction: Spontaneous spinal epidural hematoma is a rare cause of spinal cord compression that requires emergency investigation and treatment. There is an indication for urgent surgical decompression, however, conservative therapy is supposed to be feasible in selective patients with early recovery. *Material and Methods:* We present a 65-year-old female with history of hypertension and atrial fibrillation. She was on anticoagulant. She presented to the emergency department with an acute lumbar back pain, severe paraparesis and urinary retention. *Results:* Examination on admission, revealed lower limb paralysis (grade 1/5), cauda equina syndrome and urinary retention. MRI demonstrated an epidural hematoma at T12-L1 with spinal cord compression. A complete resolution of the hematoma and neurological recovery ensued without surgical intervention. Neurological recovery was observed within 24 h after SSEH onset. MRI one month later showed total absorption of hematoma. *Conclusion:* Surgical decompression is the main treatment option of Spontaneous spinal epidural hematoma, however, a conservative therapeutic approach with careful observation may be considered as a treatment of choice in some cases.

PA299

Anthropometric Measures of Obesity in Korean People with Spinal Cord Injury

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Introduction: Obesity is an independent risk factor for metabolic syndrome and cardiovascular diseases which is the leading cause of death worldwide. Anthropometric measures, such as body mass index (BMI), waist circumference (WC), and body fat percentage (BF%) were used to assess obesity in the general population. People with spinal cord injury (SCI) are known to be a high-risk group for obesity. It is important to use appropriate measures for obesity in this group in order to prevent the development of obesity-related disorders. The aim of this study was to identify relevant measures of obesity in people with SCI. **Material and Methods:** A total of 71 persons with SCI were enrolled; 54 persons were men. All of the participants were classified with a motor complete spinal cord injury (25 with paraplegia; 46 with tetraplegia). The mean age in study was 43.1 years (± 11.4 , age range; 24 to 69 years), whereas the mean duration after injury was 12.9 years (± 8.4 , duration range; 0.6 to 37.5 years). Obesity was evaluated by BMI (≤ 25.0 kg/m²), WC (male ≤ 90.0 cm, female ≤ 85.0 cm), BF% ($\leq 22.0\%$), respectively. BF%, as measured by Dual-energy X-ray absorptiometry (DXA), was chosen as the criterion variable in this study because BF% was used to define obesity in SCI population-based studies. **Results:** BMI and WC and BF% in study was 21.9 kg/m² (± 3.6), 85.2 cm (± 11.3) and 32.9% (± 9.4). Prevalence of obesity was 19.7% by BMI, 38.0% by WC and 87.3% by BF%. Among the participants, 48 persons who were not identified as obese by BMI were found to be obese by BF% measures, and more than half of them (35 persons) were misclassified as not obese by WC, but were found to be obese by BF% measures. **Conclusion:** This study reveals a limited value of BMI and WC in determining the obesity in people with SCI. These measures underestimate obesity in people with SCI. We suggest that BMI and WC cut-off value should be lowered in people with SCI.

PA300

The Effect of Shoulder Sling on Balance in Stroke Patients with Hemiplegia

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Introduction: Balance impairment is a common problem caused by multiple factors in patients with hemiplegia. Various types of shoulder slings are used in hemiplegic shoulder subluxation. But, it is not well known about how shoulder sling affect on balance. So, this study investigate the effect of a shoulder sling on balance in patients with hemiplegia. **Material and Methods:** 23 Hemiplegic stroke patients were enrolled in this study. Mean body weight and height were 66.31 \pm 12.96 kg and 165.8 \pm 8.7 cm. Median time since stroke was 6.77 \pm 4.05 weeks. Median Fugl-meyer score of upper extremity was 34.44 \pm 16.27. Balance test were performed with simple arm sling and with bobath sling and without sling in random serial order. Static and dynamic balance was assessed by using BALANCE SYSTEM SD (SD950-302, Biodex Medical System Inc, USA). The distance from the centre of the platform to the reference position is measured and a score named the Balance Index (BI) is calculated from summation of distance. Low BI demonstrates good balance. Patients were asked to keep the "O" sign at the centre of the platform in the centre of the screen for 20s. Static and dynamic balance testing was carried out 3 times. Functional balance was evaluated using the Berg balance test and Trunk impairment scale. Data analysis was performed by using SPSS for Windows, version 18., Wilcoxon signed Rank test used to compare the scores of balance tests with simple arm sling and with bobath sling and without sling. **Results:** Static and dynamic overall BI score was lower with simple arm sling compared with that score with bobath sling and without sling. but the difference was not statistically significant in each comparison. Likewise, Other index including, Anterior-Posterior (AP) index and Medial-Lateral index, performed with simple arm sling was better when compared to that with bobath sling and that without sling. but no statistically significant. In functional balance, there were no significant difference in Berg balance score and Trunk impairment scale in each comparison. **Conclusion:** There were no significant

effect of shoulder sling on balance in hemiplegic stroke patients regardless of sling type.

PA301

Hemorrhagic Transformation in Patients with Cerebral Infarction at Rehabilitation Hospital

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Purpose: Hemorrhagic transformation is a common complication of ischemic stroke. The aim of this study is to evaluate the impact of hemorrhagic transformation on rehabilitation outcome. **Subjects and Methods:** One hundred and sixty-nine patients with subacute cerebral infarction were referred to our Rehabilitation Department, of which 235 patients were included for analysis in this study. Patients who underwent surgery and those who had previous stroke were excluded from this study. The age of subjects ranged from 36 to 93 years; there were 105 men and 64 women. Cerebral infarction was caused by small vessel occlusion in 13 subjects, large artery atherosclerosis in 77 subjects, cardioembolism in 50 subjects, and other conditions in 29 subjects. The period from stroke onset to our rehabilitation hospital was 10–64 days (30.9 \pm 13.1 days), whereas the average hospitalization period was 59.2 \pm 34.1 days (range, 10–210 days). Hemorrhagic transformation was categorized with the CT-based classification of the European Cooperative Acute Stroke Study (ECASS). The following clinical data were collected from the medical records of the participants: (1) age and gender; (2) stroke subtype based on Trial of Org 10172 in Acute Stroke Treatment (TOAST) criteria (small vessel occlusion, large artery atherosclerosis, cardioembolism, and other determined etiology); (3) duration from stroke onset to admission; (4) duration from stroke onset to initial evaluation; (5) Canadian Neurological Scale (CNS) score on admission; (6) Mini Mental State Examination (MMSE) score on admission; (7) length of hospital stay; (8) Functional Independence Measure (FIM) score; and (9) destination after discharge. **Results:** Hemorrhagic transformation was detected in 32 of the 169 cases. Half of them were seen in patients with cardioembolism. There was no significant difference in age, gender, and duration from stroke onset between patients who did and did not show hemorrhagic transformation. Patients who showed hemorrhagic transformation had lower CNS, MMSE and FIM scores than patients who did not show hemorrhagic transformation. In large artery atherosclerosis or cardioembolism, FIM efficiency in patients with hemorrhagic transformation was lower than patients without hemorrhagic transformation, although there was no significant difference in CNS, MMSE, or FIM scores. **Conclusion:** Hemorrhagic transformation in patients with cerebral infarction may affect rehabilitation outcome.

PA302

Cognitive Impairment by High-Voltage Electrical Injury

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Introduction: Even though many patients are suffering from cognitive impairment after high-voltage electrical injury (HVEI), this problem just has been considered as a symptom of post-traumatic stress disorders and neglected as a transient and minor problem. However, patients have cognitive impairments in more than one domain, therefore, early and accurate diagnosis is essential for the better outcome. In this study, the authors evaluated the cognitive function in patients with cognitive impairment by HVEI. **Material and Methods:** 13 patients (13 men, mean age: 41.4 year-old) com-

plaining decreased attention span, easy loss of memory or difficulty of learning for more than three months after HVEI participated in this study. 18 people (6 women, 12 men, mean age: 41.4 year-old) participated as control group. To investigate the cognitive function, executive function, language, visuospatial function, memory, and depressive symptom were assessed using (1) animal naming test, (2) phonemic fluency with Korean consonant (ㄱ/ㅇ/ㄴ), (3) digit symbol coding, (4) Trail making test-Korean version, (5) Seoul verbal learning test, (6) Boston naming test-Korean version; short form, (7) Rey-Osterrieth complex test, (8) Hamilton depression rating scale, (9) Mini mental status examination-Korean version, and (10) Korean Wechsler Intelligence Scale-III. For statistical analyses, mean performance scores on the each test were calculated for both groups and all assessment scales were compared with respect to age, gender and level of education in each group. **Results:** Patients had lower scores in all cognitive domains with significance ($p < 0.05$). Especially, attention and executive function were most severely deteriorated. The p -values of attention tests (digit span forward test and immediate recall test) and executive function test (animal naming test, phonemic fluency test, digit symbol coding test) were less than 0.0001. Patients had severe depressive mood. **Conclusion:** The patients complaining cognitive dysfunction after HVEI demonstrated significantly impaired task performance in the all cognitive function test, particularly domains of attention and executive function. Moreover, the patients had severe depressive mood. Considering the results of both cognitive function tests and depressive mood, the patients are thought to have lesion in the frontal lobe. (This study was supported by a grant from Hallym University Medical Center Research Fund 2014 (HURF-2014-06)).

PA303

Predictors of Functional Outcomes and Quality of Life at 12 months after First-Ever Stroke in Korea: the KoSCo Study

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Introduction: This study aimed to analyze the factors influencing functional status and quality of life of stroke survivors at 12 months after stroke onset to provide useful information for establishing comprehensive and systematic care for stroke patients. **Methods:** This study is the interim results of the Korean Stroke Cohort for Functioning and Rehabilitation (KoSCo) designed as 10 years long-term follow-up study of stroke patients. All patients who admitted to the representative hospitals in 9 distinct areas of Korea with their acute first-ever stroke were recruited. Both ischemic and hemorrhagic strokes were included. 1,090 patients completed face-to-face assessments at 12 months after stroke onset. Patients completed face-to-face assessments at discharge of the 1st admission after stroke onset using the functional evaluation battery including Korean Mini-Mental State Examination, Fugl-Meyer Assessment (FMA), Functional Ambulatory Category (FAC), American Speech-Language-Hearing Association National Outcome Measurement System Swallowing Scale (ASHA-NOMS), Korean Version of Frenchay Aphasia Screening Test (K-FAST), and Geriatric depression scale-short form (GDS-SF). For all participants, a complete enumeration survey was also done using review of the

medical records. Functional independency and quality of life at 6 months after stroke were assessed by Korean modified Barthel index (K-MBI) and Euro Quality of Life (EQ)-5D, respectively. Multiple regression analysis was done to analysis the factors influencing functional outcomes and quality of life at 6 months after stroke. **Results:** Among 1,090 patients (mean age 63.6±12.8, ratio of male to female 1.41:1) participated, 76.6% suffered from ischemic stroke and 23.4% hemorrhagic stroke. Mean duration of hospitalization was 19.6±24.7 days. Factors influencing to functional status measured by K-MBI at 12 months after stroke were their age, FMA score and FAC at discharge ($p < 0.05$). However, factors influencing to quality of life measured by EQ-5D at 12 months after stroke were FMA score and GDS-SF at discharge ($p < 0.05$). **Conclusion:** These results revealed that age of patients and motor function at discharge was the most influential factor for the functional level and the quality of life at 12 months in stroke survivors. Implication of systematic stroke care to improve the motor function might be positively needed to increase functional independence and quality of life for first-ever stroke patients in Korea.

PA304

Dual-Mode-Noninvasive Brain Stimulation over the Primary Motor Cortices in Stroke Patients

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Introduction: Noninvasive brain stimulation (NBS) using the repetitive transcranial magnetic stimulation (rTMS) or the transcranial direct current stimulation (tDCS) were recently adopted for modulating motor function of stroke patients. We investigated the effect of simultaneous dual-mode stimulation using rTMS and tDCS over bilateral primary motor cortices (M1) whether it is more effective than single stimulation using rTMS for recovery of motor function in subacute stroke patients. **Material and Methods:** Twenty-two subacute stroke patients whose total Fugl-Meyer Assessment (FMA) score marked under 84 were recruited in this open-label study. In the dual-mode stimulation group, the 10 Hz rTMS (90% of resting motor threshold, 1,000 pulses) were applied over the ipsilesional M1 for 20 minutes with simultaneous application of the cathodal tDCS (2mA) on the contralesional M1 for 20 minutes. Single stimulation group underwent 10 Hz rTMS without tDCS. Ten daily sessions were conducted for 2 weeks. The total, upper, and lower scores of FMA were measured before, after, and 2 months after the intervention. **Results:** The scores of total and upper FMA were significantly improved over time in both dual and single stimulation group ($p < 0.05$). However, there were significant group and time interaction effects in both total and upper FMA ($p < 0.05$). Post-hoc study showed that the mean changes in total ($p = 0.024$) and upper FMA ($p = 0.019$) scores were significantly better in the dual stimulation group than the single group after 10 sessions of stimulation. **Conclusion:** The dual-mode NBS with simultaneous application of 10 Hz rTMS and the cathodal tDCS over the bilateral M1s was safe and superior to 10 Hz rTMS alone for improving motor function in subacute stroke patients. (Supported by the NRF grant funded by the Korea government (MSIP) (NRF-2014R1A2A1A01005128) and the Brain Research Program through the NRF funded by the Ministry of Science, ICT & Future Planning (NRF-2006-2005330)).

PA305

Application of Repetitive Transcranial Magnetic Stimulation for Treatment of Freezing of Gait in Parkinsonism

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Objective: Although the freezing of gait (FOG) affects mobility and balance seriously, the efficacy of levodopa treatment has limit. There were few reports investigated the effect of repetitive transcranial magnetic stimulation (rTMS) on FOG in parkinsonism. We investigated the efficacy of high-frequency rTMS for the treatment of FOG in parkinsonism. **Material and Methods:** Twenty-five patients diagnosed as parkinsonism (Parkinson's disease: atypical parkinsonism =17: 8) were recruited in randomized, double-blind, cross-over designed study. High frequency rTMS (90% of resting motor threshold, 10 Hz, 1,000 pulses) was applied over the lower leg primary motor cortex of dominant hemisphere (M1-LL) for 5 sessions in a week as well as sham stimulation alternatively with wash out period for 2 weeks. The primary outcomes were measured before, after, and 1 week after the intervention by the Timed Up and Go (TUG) tasks and Standing Start 180° Turn Test (SS-180) using video analysis. The secondary outcomes including Unified Parkinson's Disease Rating Scale part III (UPDRS-III), FOG questionnaire (FOG-Q), and motor cortical excitability using motor evoked potential (MEP) were also evaluated at the same time. **Results:** The TUG ($p=0.036$), SS-180 time ($p=0.029$) and steps ($p=0.018$), UPDRS-III ($p=0.011$), and FOG-Q ($p=0.017$) were significantly improved over time in real rTMS condition. The cortical excitability including the MEP amplitude at 120% resting motor threshold ($p=0.022$) and intracortical facilitation ($p=0.044$) also increased after rTMS. On the contrary, no significant improvements were shown in both primary and secondary outcomes in sham condition. Subgroup analysis showed similar results in Parkinson's disease (PD). **Conclusions:** High frequency rTMS over the M1-LL can be an add-on therapy for improving the FOG in patients with parkinsonism. (Supported by the NRF grant funded by the Korea government (MSIP) (NRF-2014R1A2A1A01005128), the Brain Research Program through the NRF funded by the Ministry of Science, ICT & Future Planning (NRF-2006-2005330) and Samsung Medical Center grant, [SMO1131391]).

PA306

Comparative Outcomes of Traumatic Brain Injury from Biking Accidents with or without Helmet Use

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Objective: To determine if demographics and health outcomes differ according to helmet status between persons with cycling-related traumatic brain injuries (TBI). **Methods:** This is a retrospective study of 128 patients admitted to the Montreal General Hospital following a TBI that occurred while cycling from 2007-2011. Information was collected from the Quebec trauma registry. The independent variables collected were socio-demographic, helmet status, clinical and neurological patient information. The dependent variables evaluated were length of stay (LOS), extended Glasgow outcome scale (GOS-E), injury severity scale (ISS), discharge destination and death. **Results:** 25% of cyclists wore a helmet. The helmet group was older, more likely to be university educated, married and retired. Unemployment, longer intensive care unit (ICU) stay, severe intracranial bleeding and neurosurgical interventions were more common in the no helmet group. There was no significant association between the severity of the TBI, ISS scores, GOS-E or death and helmet wearing. The median age of the subjects who died was higher than those who survived. **Conclusion:** Cyclists without helmets were younger, less educated, single and unemployed. They had more severe TBIs on imaging, longer LOS in ICU and more neurosurgical interventions. Older cyclists were over represented in the group who died.

PA307

Mirror Therapy's Role in Improving Paretic Upper Limb Motor Function in Post Stroke Patients – a Randomized Controlled Trial

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Introduction/Background: Mirror therapy is designed to assist in the reorganization processes in the brain by stimulating the patients' motor and sensory systems, being based on a visual feedback that can substitute for the paretic limb's missing proprioceptive feedback. The patients have to visualize the non-paretic upper limb's movements in a mirror that is superimposed over the paretic upper limb, which has to remain unseen by the patient. **Materials and Methods:** This is a randomized controlled trial that lasted from January to September 2014 and included 28 patients with hemorrhagic or ischemic stroke that occurred less than 6 months before the beginning of the study and were admitted to the National Institute of Physical Medicine and Rehabilitation, Clinic IV. The patients were divided into 2 groups: those in the first group ($n=14$) attended mirror therapy for one hour 5 days a week for two weeks in addition to receiving the conventional stroke rehabilitation therapy and those in the second group ($n=14$) underwent the standard stroke rehabilitation procedure. The patients were evaluated using the Fugl-Meyer Assessment (FMA) for the motor function before the procedures, 2 weeks and 3 months after. **Results:** Out of the 14 patients in the first group, 8 had a significant motor function enhancement with an improved score of $>25/66$, 4 had an improved score of $15-24/66$ and 2 had a mild motor function enhancement with an improved score of $<14/66$ on the FMA for the motor function at the 3 months evaluation. As for the patients in the second group, 5 had a significant motor function enhancement with an improved score of $>25/66$, 5 had an improved score of $15-24/66$ and 4 had a mild motor function enhancement with an improved score of $<14/66$ at the 3 months evaluation. The difference between the two groups is statistically significant ($p<0.005$). **Conclusions:** Mirror therapy has a significant contribution in restoring upper limb motor function in post stroke patients and should be included in the conventional stroke rehabilitation program.

PA308

Upper Extremity Function One Year after Inpatient Rehabilitation for Brain Injury

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Traumatic brain injury is a leading cause of mortality and disability among adults in modern Western societies. In Europe, direct healthcare costs related to traumatic brain injury have been estimated up to €2.9 billion per year. Indirect costs related to the loss of productivity and intangible costs related to reduced quality of life are often not taken into account. Among the long-term sequelae of patients with brain injury, common deficits include cognition, behavioral, social dysfunction and reduced independence. While neuromotor impairment is a common sequelae of brain injury, it has been understudied relative to neurocognitive outcomes. This retrospective study reviewed the outcomes of upper extremity strength and coordination among a cohort of patients admitted to a brain injury unit for acute inpatient rehabilitation. Charts of all patients admitted to this brain injury unit, over a five-year period, were reviewed. Upper extremity strength and coordination data were obtained for both extremities at admission to the brain injury unit. At one-year follow-up, upper extremity strength and coordination were obtained for patients available for follow-up. Data from 2,405 admissions were reviewed. Of these, 909 had bilateral upper extremity weakness, while 901 had bilateral full strength. In addition, at admission, 1,357 had normal coordination in the left upper extremity, and 1,451 had normal coordination in the right upper extremity. At one year, 827 were available for follow-up. Of these 596 demonstrated full strength bilaterally, while 643 demonstrated normal coordination of the left upper extremity, and 661 demonstrated normal coordination in the right upper extremity. Of the patients with bilateral weakness at rehabilitation admission, the Glasgow Coma Scale score mean was 10.54. Those with left upper extremity or

right upper extremity weakness at admission had a mean Glasgow coma scale score of 11.01 and 11.2 respectively. *Conclusion:* this study of patients admitted to an inpatient brain injury unit found that, at admission, a significant portion have weakness in the upper extremities, as well as decreased coordination, with most recovering full strength and coordination at one year.

PA309

Effect of Intermittent Theta Burst Stimulation on Spasticity in Hemiplegic Patients

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Introduction/Background: Spasticity is a common cause of long term disability in post-stroke hemiplegic patients. We investigated whether the intermittent theta burst stimulation could reduce the upper limb spasticity in post-stroke hemiplegic patients and how long the improvement persisted. *Material and Method:* Fifteen post-stroke hemiplegic patients were recruited for a double blind sham-controlled cross-over design. They received single session of both intermittent theta burst stimulation (iTBS) and sham stimulation on the motor hotspot of the flexor carpi radialis muscle (FCR) at the affected hemisphere in random order, with a one-week interval. Modified Ashworth scale, Modified Tardieu scale, H/M amplitude ratio, peak torque, peak torque angle, work, rectified integrated electromyographic (EMG) activity of the FCR were assessed one day before, before and just after stimulation, 30 minutes, 1 week after stimulation. *Results:* All parameters did not show any significant difference between one day before and before stimulation. Repeated measures analysis of variance revealed a significant interaction between TIME and INTERVENTION on Modified Ashworth scale, Modified Tardieu scale, peak torque, peak torque angle and rectified integrated EMG activity ($p < 0.05$), indicating these parameters were significantly improved after iTBS compared with sham stimulation. But H/M ratio and work did not. The Modified Ashworth scale, Modified Tardieu scale was improved for at least 30 minutes after iTBS, but other parameters were significantly improved only just after iTBS ($p < 0.05$). *Conclusion:* The intermittent theta burst stimulation on the affected hemisphere may be helpful to reduce spasticity transiently in post-stroke hemiplegic patients

PA310

Neural Correlates of Walking Ability in Post-Stroke Patients: a Study Using Voxel-Based Lesion-Symptom Mapping

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Objective: Large proportion of post-stroke patients has to deal with problems in walking. To specify the neuroanatomical correlation of walking ability in patients with stroke is important. We therefore aimed to reveal the correlation with the lesion location from MRI and walking ability at 7 days from attack. *Methods:* 600 patients with first onset acute stroke (within 7 days after onset) were enrolled and took the MRI who visited the Severance hospital from August 2012 to June 2014. Brain MRI scans included fluid attenuated inversion recovery (FLAIR) and diffusion images obtained with standard parameter on a 3.0T Philips intera scanner. First, region of interest (ROI) surrounding the diffusion image lesion was drawn manually with a generous margin at each affected slice, using MRICro software. The accuracy of lesion delineation was inspected visually at each slice, and the corresponding FLAIR was checked for confirming plausibility and extent of infarct ROI. Second, it was transformed to the standard brain MRI template using Statistical Parametric Mapping 8 (SPM8) running under Matlab. The normalized lesion images were used as ROI for subsequent analysis in

MRICro and voxel-based statistical analysis. We examined walking ability measured by the FAC score (0-5) after 7 days and the patients were divided into two groups according to their independent walking ability at 3 months; the ambulatory group (FAC 3, 4, 5) and the non-ambulatory group (FAC 0, 1, 2), and then compare the lesion in the ambulatory and non-ambulatory group, using voxel by voxel chi square statistics. *Results:* 385 post-stroke patients (64.2%) could walk independently. Non-ambulatory group showed a much more frequent involvement of insula ($\chi^2=30.56$, peak MNI coordinate: -30, -2, -10), superior temporal lobe ($\chi^2=21.38$, peak MNI coordinate: -52, -6, 8) of left hemisphere and insula ($\chi^2=23.21$, peak MNI coordinate: 42, -12, 8), putamen ($\chi^2=19.57$, peak MNI coordinate: 30, -2, 12) of right hemisphere compared to ambulatory group (corrected $p < 0.01$). *Conclusion:* Using voxel-based lesion-symptom analysis, the lesion localization from early MRI could predict the walking ability. Damage to motor pathway and motor control area, and the cortical areas related to body orientation may be strongly correlated with walking ability. *Acknowledgements:* This work was Supported by Korea Centers for Disease Control and Prevention (2013E3301701).

PA311

Home Safety of Individuals with Neurological Disorders: a Turkish Sample

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Introduction/Background: This aim of this study was to determine environment safety status and risks of individuals with neurological disorders. *Material and Methods:* 83 participants living in Denizli with Cerebrovascular Disease (CVD; n=43), Parkinson's disease (PH; n=10), Multiple Sclerosis (MS; n=16) or Spinal Cord Injury (SCI; n=14) were included in the study. Disability status was evaluated using by Modified Rankin Scale, Modified Hoehn Yahr Scale, Expanded Disability Status Scale or American Spinal Injury Association. Home safety status of the participants was evaluated using by Home Safety Check List (HSCL). The data in terms of living style and residential design of the participants were also recorded. *Results:* The mean age of the participants was 56.89 ± 16.53 years and the duration of disabilities was 5.67 ± 6.58 years. While 77 (93%) participants had 'dangerous' homes, 6 (7%) participants had 'good' homes according to the HSCL scores. Nobody had 'perfect' home in this study. When all participants were compared in terms of types of disability, education level, income status and home style, no significant differences according to their HSCL scores were found ($p > 0.05$). When the participants using or not assistive ambulatory devices were compared, a significant difference was found ($p < 0.05$). *Conclusion:* The results of this study showed that home safety of participants with neurological disorders was highly insufficient. Secondary problems, such as home accidents of the individuals with neurological disabilities can easily be prevented with routine home assessments and making relevant modifications. That's why; the results obtained from this study would be basic for new studies about home safety of the disabled people with neurological diseases.

PA312

Effect of Rehabilitation on the Salivary Amylase Activity after the Skilled Movement in Cervical Myelopathy Patients

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Introduction/Background: The skilled movement disorder of finger is one of the major symptoms of cervical myelopathy along with gait and vesicorectal disorder. Yamaguchi et al. suggested that the normalized salivary amylase activity correlated with the

mental and physical fatigue states. Although a few studies involving healthy person have reported psychological research, no detailed effect of rehabilitation on the stress on the movement have been performed. The purpose of this study was to examine the short-run effect of rehabilitation therapy on the salivary amylase activity after the skilled movement in patients with cervical myelopathy. **Material and Methods:** The subjects were nine patients (57.9±16.0 y.o.) with cervical myelopathy after surgery. The salivary amylase activity determination system (Salivary amylase monitor; NIPRO Inc) was used to obtain the value of α -amylase activity before (Rest AMY) and after Evaluation No. 9 (small ball) of the Simple Test for Evaluating Hand Function (STEF) (post-STEF AMY). We assessed the following the value of α -amylase activity and clinical parameters (grip strength, pinch strength, 10-second grip and release test, and STEF) on 2 and 4 weeks after surgery. The muscular exercise, the range of motion exercise, the skill movement exercise, and the electrical stimulation for upper extremities and fingers were performed over 1 day after surgery through discharge. Before study participating, patients were informed of possible risks and signed a consent form approved. **Results:** The grip strength, pinch strength, 10-second grip and release counts on 4 weeks after surgery increased than those on 2 weeks after surgery. The value of ((post-STEF AMY) – (Rest AMY)), and time of Evaluation No. 9 on 4 weeks after surgery decreased than those on 2 weeks after surgery. **Conclusion:** Improvement of the skill movement might reduce the stress factor after the skilled movement in patients with cervical myelopathy. **Reference:** Yamaguchi M, et al.: Hand-held monitor of sympathetic nervous system using salivary amylase activity and its validation by driver fatigue assessment. *Biosensors and Bioelectronics* 21; 1007-1014. 2006.

PA313

Observations on a Series of Three Patients Surviving Acute Infective Endocarditis

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Introduction: In 1885, Osler described malignant endocarditis, a triad of fever, heart murmur and hemiplegia. Its modern incarnation is acute infective endocarditis (IE) and more patients are surviving this illness with neurological complications. We present case histories of three patients who survived acute IE with details of their risk factors, causative organisms, radiological findings, neurological impairments and functional outcomes. **Case Presentation:** *Case 1:* This 34 year old lady, an IV drug user, presented with severe headache and left hemiparesis. Brain imaging showed multifocal low density abnormalities, predominantly right hemisphere. Echo confirmed mitral valve vegetations and blood cultures grew methicillin-sensitive *Staphylococcus Aureus* (MSSA) and Group C *Streptococcus*. She achieved home discharge with family support. *Case 2:* This 59 year old man was found unconscious at home. Brain imaging showed small vessel disease and multifocal infarcts. Echo revealed mitral valve vegetations and prolapse, necessitating surgical repair. Blood cultures grew *Streptococcus Pneumonia*. On admission to rehabilitation he had poor dentition, and complex perceptual and high-level cognitive difficulties. He achieved home discharge with carer support. *Case 3:* This 43 year old man presented with right hemiparesis and confusion on a background of hepatitis C and IV drug use. Brain imaging showed multifocal abnormalities predominantly left hemisphere. Echo revealed vegetations on his mitral valve and blood cultures grew MSSA. By discharge, he was walking independently with an orthosis and aid. **Discussion:** The increase in IE related neurological impairment can be attributed to (a) Mortality reduction with modern diagnostic and treatment modalities resulting in increased incidence of residual neurological impairments in surviving patients (b) recreational IV drug use and greater isolation of *Staphylococcus Aureus*, an organism associated with greater valve destruction and cerebral complications (c) occurrence of 75% of neurological complications before, or within 48 hours of presenta-

tion, before antibiotic treatment can impact on the risk of cerebral embolization. **Conclusion:** These cases illustrate the challenges posed by IE-related brain injury. Their focal and generalised deficits are varied and patients require highly individualised rehabilitation programmes. With a skilled interdisciplinary specialist approach significant functional improvement can be realised. **Reference:** Osler W. Gulstonian lectures on malignant endocarditis. *Lancet*. 1; 415, 459, 505 (1885).

PA314

Community Independence May Be Achievable Following Hypoxic Encephalopathy with Cortical Laminar Necrosis

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Background: The finding of cortical laminar necrosis (CLN) on neuroimaging of patients with hypoxic ischaemic brain injury (HIBI) confers a grave prognosis. Those who do not die are left with severe disability and require lifelong care. We present the case of a man with extensive CLN whose recovery enabled him to live independently. **Clinical Details:** A 34 year old male bicycle courier was found unresponsive and hypothermic on a street. After prolonged resuscitation for pulseless electrical activity (PEA) sinus rhythm was restored and he was transferred, ventilated, to the ITU. After weaning of sedation his GCS was 5. MRI brain at 2 weeks showed extensive high signal throughout his cortex consistent with CLN. Ventilatory support was withdrawn after discussion with his family. His awareness improved slowly and after 4 months he transferred to a neurological rehabilitation unit. By discharge 6 months after his injury he was mobile and communicating, with global cognitive impairment. **Discussion:** Clinical assessment is not considered reliable in determining prognosis and investigations such as MRI and/or EEG are used to guide management particularly around treatment withdrawal decisions. **Conclusions:** 8% of patients in a recent series of HIBI patients had a good functional outcome. Early MRI alone was not helpful in selecting that group. Clinical circumstances such as hypothermia should enforce longer observation of recovery before withdrawal of active treatment is considered. **Reference:** Hypoxic-ischaemic brain injury: imaging and neurophysiology abnormalities related to outcome. RS Howard et al. *QJM* epub: Feb 9, 2012.

PA315

How Common Is Immobilization Hypercalcaemia on a Brain Injury Rehabilitation Unit? – a Review of 337 Patients

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Introduction: Immobilization hypercalcaemia (IH) as a cause of high calcium levels is considered after exclusion of conditions such as metastatic cancer, multiple myeloma and hyperparathyroidism. It is rare and is confirmed by documentation of low levels of parathyroid hormone (PTH) and vitamin D. The true prevalence of IH in brain-injured patients is unknown and an audit was conducted to establish this in a cohort of such patients at the National Rehabilitation Hospital. **Material and Methods:** A retrospective review was performed with data collected from 337 in-patients with acquired brain injury (ABI) treated at the NRH between 2007 and 2012. Information was obtained from hospital medical records and a review of patients' blood results on admission. Hypercalcaemia was defined as a serum corrected calcium greater than 2.5mmol. **Results:** Records of 337 in-patients with ABI were examined. 235 (70%) had a serum calcium estimation on admission and mean serum corrected calcium was 2.39 mmol/L. 38 patients (11.3%)

of those tested were identified as having hypercalcaemia ranging from 2.51 to 3.17 mmol/L with a mean of 2.60 mmol/L. Of these only 3 (7.89%) had further investigations including vitamin D, parathyroid hormone and bone specific ALP estimations. Only 2 cases (0.6%) of IH were confirmed. *Conclusion:* More than a quarter of ABI in-patients did not have their calcium levels estimated during their rehabilitation admission. Of those in whom hypercalcaemia was detected (11%) fewer than 8% were tested in sufficient detail to determine its cause. Acknowledging the limitations of this series we note that fewer than 1% of ABI in-patients have proven IH. This audit demonstrates the need for (i) greater awareness of potential biochemical disturbances in immobile patients and (ii) more focused investigation and treatment of such abnormalities.

PA316

Pilot Study for Use of a Virtual Model for Analyse Paretic Upper Limb Functional Outcome Evolution in Acute Stroke Patients

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Introduction: Approximately 70-80% of stroke patients have upper limb (UL) impairments in acute phase and 40% in chronic phase. UL functional prognosis depends mostly of the motor control beginning and muscle balance above shoulder and hand (finger extension) evaluated first days after stroke. These prognostic factors are evaluated by clinical test. *Purpose:* Establish a model that predicts the functional outcome of the hand based on clinical and kinematic variables of the hand. *Material and Methods:* Longitudinal, prospective study. Inclusion criteria: patients with paretic UL secondary to acute stroke, without previous stroke or motor sequelae. Evaluated: 3-4 day, 7 day, 3 and 6 month after stroke. Collected variables: demographic, stroke type, Oxford Classification and NIHSS Scale; Barthel Index (BI), Rankin Scale, UL Fugl-Meyer Scale (FM), Ashworth, UL Muscle Balance with Medical Research Council Scale (MCR). Action Research Arm Test (ARAT) evaluated at 6 month. Hand kinematic has been evaluated by Cyberglove glove *Results:* 32 evaluated patients, 5 excluded for lack of monitoring, 6 exits and 3 new stroke. Total 18 patients with 67,7 medium age (DE10.9); 6 women and 13 men. No significant relation with ARAT at 6 months: sex, age. Significant relations ($p < 0.05$) with ARAT at 6 month: NIHSS, Ashworth, FM, MCR. Tendency towards statistical significance: stroke type, BI, Rankin scale, but not enough because short sample. Hand simulation has given a virtual support to check UL evolution. *Conclusion:* The study of motion simulation of the paretic hand paretic in patients with paretic UL after acute stroke, could guide us to predict functional outcome of the upper limb.

PA317

Evaluation of Plantar Pressures and Contact Areas During Gait Following the Therapy of Botulinum Toxin Type A for Lower Limb Spasticity of Stroke

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Introduction: Following the therapy of botulinum toxin type A for lower limb spasticity of stroke, we investigated the applicability of an evaluation method that allows plantar pressure and contact areas during gait to be measured and visualized. Subjects The subjects were 12 post-stroke hemiplegic patients who were capable of walking without an orthotic device (12 men: 7 with right hemiplegia and 5 with left hemiplegia: Brunnstrom stages of lower limb: 3–4; Mod-

ified Ashworth Scale scores for the foot and ankle joints: 3–4). *Material and Methods:* The subjects walked barefoot on a sheet-style plantar pressure measurement device (WalkWay MW-1000; Anima Corp., Tokyo, Japan) at their normal speed. Their plantar pressures and contact areas during the stance phase of gait were measured before, one month after, and three months after the therapy of botulinum toxin. Then we calculated the mean plantar pressure and contact area, and we obtained the ratio of the value of the affected side to that of the contralateral side at each measurement time point for comparison. *Results:* In terms of plantar pressures, the percentage of the ratio was $61.5\% \pm 12.4\%$ before therapy, $75.0\% \pm 9.5\%$ at one month after therapy, and $61.2\% \pm 7.3\%$ at three months after therapy. As for the plantar contact areas, it was $75.3\% \pm 11.7\%$ before therapy, $87.9\% \pm 8.7\%$ at one month after therapy, and $77.8\% \pm 8.8\%$ at three months after therapy. The ratio of the value of the affected side to that of the contralateral side was significantly increased at one month after therapy compared to that before therapy and at three months after therapy ($p < 0.01$). *Conclusion:* The therapy of botulinum toxin alleviated lower limb spasticity and increased the range of motion in the ankle joints, possibly thereby making it easier for the sole of the foot to contact the ground during the stance phase of gait. By using the plantar pressure measurement device, it is possible to visualize the plantar pressures and contact areas, which may potentially enable patients to more accurately acknowledge the benefit of the therapy of botulinum toxin.

PA318

Comparison of Gait Pattern During Walking with and without Functional Electrical Stimulation “DearndeeTM” in Foot Drop Patients: Pilot Study

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Objective: To compare gait pattern during walking with and without functional electrical stimulation “DearndeeTM” for foot drop in terms of gait velocity, time in each phases of gait cycle and angle of hip and knee motion in foot-drop patients. Study Design: Experimental study. *Setting:* Rehabilitation Medicine Department, Faculty of Medicine Ramathibodi Hospital. *Subjects:* Patients with foot drop from upper motor neuron lesion. *Methods:* Gait velocity was measured while subjects randomly walked either with or without “DearndeeTM”. Time during each phases of gait cycle was assessed by using computer dynography. Video recording was used for assessing the angle of hip and knee motion during walking. *Results:* Subject group was thirteen stroke patients. Eight patients were right and five patients were left hemiparesis with mean age (range) of 43.69 (22-65) years. For the affected leg during walking with and without “DearndeeTM”, median (range) of swing and stance time were 0.70 (0.45-1.21), 0.97 (0.52-3.07) and 1.16 (0.89-2.83), 1.02 (0.70-1.47) seconds, respectively. Mean (standard deviation; S.D.) of angle of hip abduction, flexion and knee flexion were 6.63 (6.53), 6.97 (4.56) and 16.45 (13.72), 16.00 (12.43) and 25.17 (16.67), 30.63 (14.20) degrees, respectively. Mean gait velocities (S.D.) were 0.51 (0.28) and 0.52 (0.30) meter per second, respectively. Only swing and stance time of the affected leg were significantly changed at $p < 0.05$. *Conclusion:* Functional electrical stimulation “DearndeeTM” could make the foot-drop leg swing faster and stance longer but no significant change in angle of hip and knee motion. The device does not change the patient's gait velocity.

PA319

Brain Activity in Patients with Acquired Brain Injury Operating a Driving Simulator: a Functional Near-Infrared Spectroscopy Study

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Background and Objective: Driving is an important activity of daily living. However, the ability to drive is often affected after acquired brain injury. The aim of this study was to investigate the fundamental region of neural activity in healthy subjects, which is believed to be necessary for driving ability and to examine the effect of brain injury on driving safety. **Patients and Methods:** Experimental studies were performed on 15 healthy right-handed adults and 17 patients (7 vascular accidents and 10 traumatic brain injury). The participants were asked to drive in the driving simulator. During driving, changes in oxy-Hb levels were measured using functional near-infrared spectroscopy at 34 sites including both hemispheres. **Results:** During the driving task in healthy subjects, neuronal activity was significantly increased in the right frontal lobe, right parietal lobe, right temporal lobe, and left temporal lobe. Patients who resumed driving showed similar patterns as healthy subjects; cortical activations near damaged regions were retained as seen on CT or MRI. However, the patients who could not resume driving showed no cortical activations near the lesions. **Conclusion:** From the above, and in light of previous studies, it can be suggested that while the right side is dominant, the frontal lobes, parietal lobes, and temporal lobes of both the right and left cerebral hemispheres are involved during automobile driving. Based on this result, the cerebral hemodynamics of individuals with brain damage were examined during driving, and were contrasted with the extent of brain damage.

PA320

Auditory Stimuli on Virtual Spatial Navigation: to Help or Not to Help?

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Introduction: Topographical disorientation is a frequent issue among patients suffering from brain injury. Virtual reality environments allow the exploration of spatial navigation in this population, even for patients with motor or sensory disorders. Furthermore, we can add stimuli to the software, which can positively or negatively impact the test results. In the present study, we used the Virtual Action Planning Supermarket (VAP-S) with the addition of some contextual ("sonar effect" and "name of product") and non-contextual ("periodic randomized noises") auditory stimuli. The use of these stimuli notably involves attentional and executive processes. In this study, we aimed at investigating how these auditory stimuli influence the performance of brain-injured patients over a navigational task in the supermarket VAP-S. **Material and Methods:** The study included 22 patients with a first unilateral hemispheric brain injury and 17 healthy subjects. After a software-familiarization, all subjects were tested without auditory stimuli, with a sonar effect or periodic random sounds in a random order, and with the stimuli "name of product". **Results:** The results showed that contextual auditory stimuli improved patient performance more than the control group (with "sonar effect": (H(1)=6.74, p<0.05); with "name of product": (H(1)=6.24, p<0.05)). Contextual stimuli were most helpful for patients with large dysexecutive disorders or with severe unilateral neglect. **Conclusion:** These results suggest that additional stimuli in virtual reality may be helpful in the assessment and rehabilitation of patients with brain injury.

PA321

Interlimb and Intralimb Coordination when Obstacles Crossing in Patients with Subcortical Stroke

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Introduction: The motor deficit of subcortical stroke patients is associated with pathological interhemispheric interactions among bilateral motor cortex. Although studies about limbs coordination have been dedicated to the evaluation of upper limbs, neurophysiological findings indicate that coordination of lower limbs could be impaired. In recent studies, obstacle crossing have become a relatively novel task for coordination in stroke patients. Asymmetrical lower limb functions owing to muscle weakness and impaired movement control in hemiparetic patients may lead to different performance of obstacle crossing. However, there are few studies focus on interlimb and intralimb coordination when obstacle crossing in patients with subcortical stroke. The purpose of this study was to investigate the interlimb and intralimb coordination in bilateral lower limbs when obstacles crossing in patients with subcortical stroke. **Material and Methods:** The current study will recruit 20 age-matched healthy controls to provide normal baseline elderly gait data. Subcortical stroke was diagnosed by physiatrists. Instrumentation included 1) three-dimensional digit cameras system, 2) electromyography (EMG), and 3) force platform. Experimental tasks included 1) walking task, and 2) obstacle crossing task. Video images of the gait and obstacle crossing trials will be collected and post processed via the Cortex. Both kinematic and analog (kinetic and electromyography) data will be inputted into OrthoTrak 6.6.1 software. **Results:** Smaller hip flexion/extension/range, knee flexion/extension/range, and ankle dorsiflexion/range were found in the subcortical stroke group in leading limb during obstacle crossing with unaffected leading limb. Smaller hip flexion/range, knee flexion/extension/range, and ankle dorsiflexion/plantar flexion/range were found in the subcortical stroke group during approaching stride. Smaller hip flexion/extension/range, knee flexion/range, and ankle dorsiflexion/plantar flexion/range were found in the subcortical stroke group in trailing limb during obstacle crossing with unaffected leading limb. Similar tendencies in sagittal plane were found during walking. Furthermore, the lower extremity muscle strength and the gait velocity were worse in the subcortical stroke group than the control group. **Conclusion:** The results suggest that subcortical stroke patients have an altered walking and obstacle crossing strategy that might be associated with interlimb and intralimb coordination.

PA322

Seasonal Distribution of Spinal Cord Injury: Retrospective Study of 10 Years

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Introduction: Spinal cord injuries (SCI) could be associated with significant functional impairment. Based on the results of our and many other studies, the largest number of spinal cord injuries is caused by traffic accidents and falls from heights. The aim of this study was to investigate seasonal distribution of spinal injuries. **Material and Methods:** A retrospective study of 419 patients admitted to the Clinic for Rehabilitation Dr M. Zotovic, Belgrade from January 2000 to December 2009. Seasonal distribution of injuries was analyzed for each month for a period of 10 years. The level of statistical significance in our study was set to 0.05. **Results:** The average age of patients in this study was 63.95±11.46. Of the total number of patients, 310 (74.0%) were male and 109 (26.0%) were female. In our study 269 (64.2%) patients had traumatic and 150 (35.8%) had non-traumatic spinal cord injury. The most common causes of traumatic spinal cord injury were: a fall from a height in 114 (42.4%) patients, traffic accident (car and motorcycle) in 113 (42.0%) patients, jump into the water in 23 (8.6%), and injury by firearms in 19 (7.0%) patients. The most common causes of non-traumatic spinal cord injuries were: tumors in 57 (38.0%) patients, myelopathy in 49 (32.7%), infectious diseases in 21 (14.0%), vascular disease in 18 (12.0%), polyradiculoneuritis in 3 (2.0%)

and pathologic fractures in 2 (1.3%) patients. Seasonal distribution of spinal cord injuries in this study was: in January 22 (5.3%) patients, February 14 (3.3%), March 36 (8.6%), April 28 (6.7%), May 50 (11.9%), June 49 (11.7%), July 59 (14.1%), August 39 (9.3%), September 41 (9.8%), October 27 (6.4%), November 30 (7.2%) and in December 24 (5.7%) patients. *Conclusion:* This seasonal distribution of injuries suggests that most injuries were in the summer months caused by falls from a height in the performance of agricultural and construction work, traffic accidents by car and motorcycle and jumps into the water. *Keyword:* spinal cord injury, etiology of injury, seasonal distribution.

PA323

Effects of Transcranial Magnetic Stimulation in MS Patients with Lower Limb Spasticity

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Introduction: Exercise therapy (ET) has frequently been recommended as beneficial in disabled MS patients. Intermittent transcranial magnetic theta burst stimulation (iTBS) induces cortical excitability changes that can last beyond the duration of the brains stimulation and may ameliorate spasticity in MS patients. We conducted a pilot study that examined the effect of the combination of iTBS and a program of three weeks ET in MS patients with lower limb spasticity. *Material and Methods:* We have evaluated 9 patients with MS in remitting phase of disease, and EDSS comprised between 2-6.5, and lower limb spasticity. Patients were treated with repeated daily sessions of iTBS and after that exercise program for five consecutive days for three weeks. Before and after the treatment, measures of spasticity by the modified Ashworth scale (MAS), Patient reported Impact of Spasticity Measure (PRISM) were collected. Timed-25-foot walk was measured before and after the treatment as well as quality of life by a disease specific instrument, MSQoL-54 (The Multiple Sclerosis Quality of Life). *Results:* The average value of EDSS for all patients was 4.7±1.3. Median MAS before rehabilitation was 2.0 and after 2.0 with statistically significant difference (p=0.034). There was significant decrease in average value of walking speed before (11.3±4.5) and after rehabilitation (8.9±3.2) (p=0.032). There was significant decrease in median PRISM values before (77.0) and after rehabilitation (60.0) (p=0.008). We found non significant difference in the average value of MSQoL-54 before (159.8±15.5) and after rehabilitation (164.6±13.7) (p=0.090). *Conclusion:* The study findings may suggest that iTBS of motor cortex along with ET can induce significant reduction of spasticity measured by MAS and PRISM scales. Therefore, we may suggest that priming the motor cortex with iTBS in combination with ET is able to anticipate the neuroadaptation and is promising tool for motor rehabilitation in MS patients. *Keyword:* Transcranial magnetic stimulation, multiplex sclerosis, spasticity.

PA324

Functional Outcome in Patient with Simultaneous Bilateral Thalamic Hemorrhage: a Case Report

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Introduction: Hypertensive intracranial hemorrhage (ICH) is generally unilateral. Simultaneous bilateral ICHs are rare, and the effects of rehabilitation for that case are unclear. The purpose of this case study was to determine the functional outcome of simultaneous hypertensive bilateral thalamic hemorrhage patients. *Case Presentation:*

A 58-year-old male presented with sudden left hemiparesis. Computed tomography 2 hour after the onset showed high density areas in bilateral thalamic hemorrhage and ventricular rupture. As a clinical measurement, patient was evaluated by the NIH stroke scale (NIHSS) and the Trunk Control Test (TCT). Activities of daily living (ADL) function was assessed by the Barthel Index (BI) and modified Rankin scale (mRS). At baseline, neurological examination found consciousness disturbance (semicoma), severe tetraparesis, bilateral severe sensory deficits, severe dysarthria, moderate facial palsy, and pseudobulbar paresis. His NIHSS is 21, the TCT zero, the BI zero, and mRS 5. *Results:* Patient started the conventional stroke rehabilitation program 2 days after onset. The program consists of physiotherapy, occupational therapy, neuropsychological therapy, and speech therapy, which were performed 3 hours a day, 5 days a week. After 54 days of onset, patient transferred to the convalescence rehabilitation ward. At discharge of our hospital, neurological examination showed moderate left hemiparesis, mild right hemiparesis, severe sensory deficits on the left side, moderate dysarthria, and moderate facial palsy. Since his right hemiparesis was mild, he could roll over, sit, and stand up with assistance. He was able to eat and excrete. His neurological deficits improved NIHSS to 11 about 2 months after onset, however, his ADL and trunk function were still severely affected (TCT of 36, BI 15, and mRS 4). The BI gain was only 0.29. *Conclusion:* This patient presented various neurological signs such as tetraparesis, dysarthria, and pseudobulbar paresis. This case report illustrates that the patient with simultaneous bilateral thalamic hemorrhage may be severely incapacitating. It would help to predict the functional outcome about 2 months after this disease.

PA325

Botulism Following Cervico-Dorsal Vertebral Fracture Surgical Reparation

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Case Description: A 49 year old man presented to the emergency department 12 weeks after surgical reparation with hardware fixation of a cervico-dorsal vertebral fracture. He had bilateral ptosis, visual acuity deficit, difficulty swallowing, slurred speech and bilateral muscle weakness, more noticeable on the right limbs and anal incontinence. He had no significant past medical history and was not taking any medication. He denied drug use. On physical examination he had bilateral mydriasis, with minimal reaction to light or accommodation, bilateral ptosis, low visual acuity and dysphagia with reflex coughing and wet voice after drinking 5 ml of water. He tolerated liquids with honey consistency. He also had global muscle weakness, presenting with grade 3 on the Medical Research Council muscle strength scale. The only abnormal auxiliary exam results were the positivity to botulinum toxin type B in the blood sample. He was administered botulinum anti-toxin type B and started speech and language therapy for dysphagia during hospital admission and continued after discharge. He also did physical therapy exercises for muscle strengthening, aerobic exercise and facial mimic exercises after discharge in a physiotherapy clinic. 6 weeks after discharge he presented only with a right hemiparesis with grade 4 muscle strength and 5 months after discharge he had just a discrete deficit in muscle strength in the right limbs, grading 4 in MRC scale. *Discussion:* Wound botulism is a rare disorder, usually associated with traumatic injuries, surgical wound infections and infections due to the use of drugs such as cocaine and heroin. In this case there was no history of drug use or previous infection on the surgical site, but the history of the cervico-dorsal surgery and the absence of the typical prodromal symptoms of foodborne botulism make wound botulism the most probable diagnosis. It is important to note that the proper speech and language and physical therapy treatment helped in allowing the patient recover almost completely, remaining only a discrete right hemiparesis. *Conclusions:* Although being a very rare diagnosis, botulism requires prompt medical treatment and PMR has a very important role in recovering the acquired deficits.

PA326

Using Assistive Transfer Devices for Paraplegic Patients***L. S. Stratulat**

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Introduction: Spinal cord injuries have as chronic result tetraplegia (affecting both arms and legs) or a paraplegia (affecting legs and partially pelvic organs). One of the most important rehabilitation problem for the paraplegic patients is to get independence of movement, in hospital and at home, from the wheel chair to daily living activities. Simple device for this type of mobility, which induces good psychological effect must be introduced in current rehabilitation activities. **Material and Methods:** Our goal was to use an assisting transfer device, "transfer plate", for paraplegic patients. This device realizes the transfer of paraplegic patients from the bed to the wheelchair, from the wheelchair to training gear and gives full possibility of movement using only his arms. The device was used for the patients in Medical Rehabilitation department, Clinic CF Hospital Iasi, Romania. We analyzed the movements achieved with this plate and also the psychological effect on the patients. **Results:** Using this type of transfer device – simple, low-cost and easy to use by the paraplegic patients with good psychological impact is more effective than the high-tech devices which are limited in use due to their high costs, complex rehabilitation team needed. **Conclusions:** One of the goals in rehabilitation of paraplegic patients is to achieve mobility in wheelchair and to realize easy transfer from the wheelchair to daily living activities. Improving psychological status, this device enhances functional independence of a paraplegic patient in hospital and at home.

PA327

The Usefulness of Ultrasound Elastography in the Evaluation of Median Nerve Stiffness in Patients with Carpal Tunnel Syndrome***R. Abe¹, T. Mizushiri¹, Y. Tomiyama², H. Metani³, I. Yokoyama²**¹Nagamachi Hospital, Sendai, ²Saka General Hospital, Shiogama, ³Kawasaki University, Kurashiki, JP

Introduction: Recently, both sonographic measurement of the median nerve cross-sectional area (CSA) and nerve conduction study are available for the diagnosis of carpal tunnel syndrome (CTS). However, these are not sufficient evaluation methods for following median neuropathy after treatment. There are the discrepancies among the improvement of nerve conduction study, the reduction of CSA and subjective symptom. **Purpose:** The aim of this study was to assess the relationship among the elasticity evaluation of the median nerve using ultrasound elastography (USE), nerve conduction study and subjective symptom after treatment of CTS. **Subjects and Methods:** Eight normal healthy volunteers with 16 normal hands and 10 CTS patients with 13 CTS hands were participated in this study. Ten of 13 CTS hands were received carpal tunnel release. Numeric Rating Scale (NRS), terminal latency of compound muscle action potential (CMAP) in median nerve, second lumbrical-interosseous latency (2L-INT) and median nerve CSA using ultrasound sonography were measured on both hands before and after treatment. The elasticity of median nerve was estimated using USE (Preirus® HITACHI ALOKA Medical Systems, Sendai, Japan) at the time of 3 months after CTS release. The result of elasticity estimation of median nerve using USE was classified by Tsukuba Elasticity Score (TES) (1-5; 5 is hardest). **Results:** TES in normal hands had a score of 1 or 2. In 10 CTS hands with TES score 1 to 3, which received any treatment, NRS were improved. On the other hand, 3 CTS hands which had TES score 4 or 5 were not improved. There was little relationship between NRS improvement and the result of nerve conduction studies and measurement of CSA. **Conclusion:** It might be useful for patients with CTS to evaluate the elasticity of median nerve using USE to predict a median neuropathy after treatment.

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Post Stroke Spasticity as a Condition: a New Perspective on Patient's Evaluation***A. Baricich¹, E. Guanzirio², A. Santamato³, A. Picelli⁴, M. Berton⁵, P. Belotti⁶, J. Bemporad⁷, L. Bissoletti⁸, M. Murgia⁹, M. Nazzaro¹⁰, A. Scalise¹¹, F. Sciarrini¹², S. Valvo¹³, F. Molteni²**¹Maggiore della Carità University Hospital, Novara, ²Valduce Hospital - Villa Beretta, Costamasnaga, ³University of Foggia, Foggia, ⁴University of Verona, Verona, ⁵Ospedale di Circolo - Fondazione Macchi University Hospital, Varese, ⁶MultiMedica Hospital, Castellanza (VA), ⁷San Giovanni Battista Hospital, Roma, ⁸Domus Salutis Hospital, Brescia, ⁹Policlinico Umberto I Hospital, ¹⁰San Camillo Forlanini Hospital, Roma, ¹¹Santa Maria della Misericordia University Hospital, Udine, ¹²AUSL 2 Umbria, Perugia, ¹³Cannizzaro Hospital, Catania, IT

Background: Post stroke spasticity (PSS) is a relevant problem for its clinical and economic impact. In literature there is paucity of studies able to identify its correlation with disability, but different papers demonstrated the efficacy of spasticity treatment in functional improvements. A possible explanation can be that PSS is not a pure motor disorder, possibly influencing the subjective sensations of the patient, perhaps affecting body ownership. In this case, its impact might be better highlighted by patient-reported outcome measures. We propose a patient-centered approach for evaluation of upper limb (UL) in PSS, in order to evaluate a potential correlation between objective and subjective measures and sensations. **Material and Methods:** We screened patients with UL PSS [Modified Ashworth Scale Score (MAS) < 4], considering: (I) UL muscle tone; (II) UL limitations in Range of Motion; (III) capacity to execute reaching and hand to mouth; (IV) a self-estimation of upper limb use during ADL; (V) a self-estimation of sensations related to the perception of the condition of spastic upper limb: pain, heaviness and rigidity; (V) associated reaction of upper limb. We analyzed patient's data with the principal component analysis (PCA) to obtain different classes using 2 principal components; then, we analyzed MAS scores in order to highlight the differences in the groups. A p value of 0.05 was chosen. **Results:** 116 subjects were included [right hemiparesis (RH) n=41, left hemiparesis (LH) n=75]. The algorithm provided 3 different classes. Class 1 (n=29; RH n=12, LH n=17) showed high level of heaviness and pain localized at proximal level; Class 2 (n=29; RH n=11, LH n=18) high level of rigidity and pain localized in all the joints considered; Class 3 (n=58; RH n=18, LH n=40) lower heaviness, intermediate rigidity level, but a major ability in functional tasks. No significant differences in MAS scores was observed between groups. **Conclusion:** In our sample, patients with PSS described different sensations related to the perception of the spastic upper limb even without significant differences in MAS scores. Further research are needed to highlight the correlation between PSS, subjective unpleasant sensations of body perception and functional ability.

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Scapular Winging and Iatrogenic Accessory Nerve Injury: a Case Report***A. Yee, C. Rodrigues, M. Soares, L. Cunha Ventura, A. Silveira**

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Case Diagnosis: The spinal accessory nerve (SAN) is vulnerable to injury, due to its long and superficial course in the posterior cervical region. Injury of SAN may lead to dysfunction or paralysis of the trapezius muscle with accompanying pain, loss of active shoulder motion and winging of the scapula. **Case Description:** We present a case report of a 27 year old female, submitted to left parotidectomy followed by radiotherapy. After surgery the

patient presented with moderate left shoulder burning pain and functional limitation. She was followed by the Pain Unit with the diagnosis of brachial plexus lesion. After two years with moderate pain relief, but without functional improvement, she was referred to a Physical Medicine and Rehabilitation (PMR) consult. She presented shoulder range of motion (ROM) limitation in active abduction (70°) and flexion (90°), scapular winging of the left shoulder, isolated paralysis with atrophy of ipsilateral trapezius muscles and weakness of ipsilateral sternocleidomastoid muscles. *Discussion:* Scapular winging is diagnosed easily by visible inspection of the scapula, but the determination of etiology is often delayed. The differential diagnosis most commonly found is injury of the long thoracic nerve, SAN, dorsal scapular nerve or direct muscle injury. The main cause of scapular winging, dropped shoulder and persistent pain after posterior neck surgery is SAN lesion. The most helpful studies in confirming trapezius dysfunction are electromyography (EMG) and nerve conduction studies. Periodic EMGs follow recovery of the injured nerve and help in the decision of nerve exploration versus muscle transfer. *Conclusion:* The diagnostic evaluation of a SAN injury should be based on a patient's history and physical examination. In a patient with persistent shoulder symptoms, it is important to be cognizant of the possibility of SAN injury after a posterior cervical triangle surgery. This approach will allow early intervention, reduce pain and improve upper limb function. Pain Units should be multidisciplinary in nature. The unique skills of PRM clinicians are invaluable in avoiding prolonged symptom based treatment.

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Monofocal Motor Neuropathy: an Atypical Immune-Mediated Variant and Implications on Current Classification. A Case Series

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Case Diagnosis: Multifocal motor neuropathy is defined as a chronic, immune-mediated, peripheral myelinopathy that presents in a slowly, progressive fashion with asymmetric weakness involving 2 or more motor nerves. Its unique characteristics include its multiple nerve involvement and response to immunosuppressants, which distinguish it from a monofocal motor neuropathy. We present two cases of monofocal motor neuropathy that challenge the definition of these disorders. *Case Description:* Patient 1: A 20 year old right-handed male presents with 2 years of progressive right wrist and finger extension weakness after a viral respiratory syndrome. Electromyophysiological studies showed normal sensory responses and an axonal sparing radial motor neuropathy distal to the spiral groove. MRI spine and brachial plexus negative. Symptoms improved after intravenous immunoglobulin, both clinically and electromyographically with evidence of decrease in conduction block. Strength improved to 4/5 in wrist extension and finger extension. Atrophy reversed in the right hand. He was followed for an additional 5 years, with reproducible improvement after IVIG administration. Patient 2: 40 year old right handed female presented with isolated left thumb weakness exacerbated by cold weather. Symptoms progressed to all five finger extensors without sensory involvement. She underwent surgical decompression for presumed posterior interosseous neuropathy without improvement. NCS revealed EIP motor block without sensory involvement. She was treated with IVIG with immediate improvement of symptoms. Laboratory revealed positive anti-GM1 antibodies. Symptoms continued to be well managed with continued iterative IVIG administrations. *Discussion:* The paradoxical response of monofocal motor neuropathy to immune suppression in this case is highly peculiar. It suggests these monofocal neuropathies are immune mediated and thus likely a less-appreciated variant spectrum of multifocal motor neuropathy. A PubMed literature search

at presentation revealed only 3 previous cases of this particular occurrence. This type of immune-mediated response is particularly described with multifocal motor neuropathy. The behavior of these monofocal motor neuropathies are likely representative of an atypical variant of a multifocal motor neuropathy. This case series represent rare occurrence in the literature and challenge the previous description of multifocal motor neuropathy. *Conclusions:* This immune-mediated monofocal motor neuropathy broadens previous descriptions of multifocal motor neuropathy by suggesting the existence of a new atypical variant.

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Application of Constraint Induced Movement Therapy Combined with a Motor and Sensory Stimulation Protocol Based on the Bobath Concept, May Increase the Functionality of the Upper Limb in Children with Spastic Hemiparesis

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Introduction: Cerebral Palsy (CP) is defined as a set of disorders tone, posture and movement. They are a consequence of non progressive alterations produced in an immature brain. There are a lot of techniques and therapies used in the PC's children treatment. The most useful are Constraint Induced Movement Therapy (CIMT), the Bobath Concept (BC) and botulinum toxin injections (BT), but the combination therapies provide a greater benefit. *Material and Methods:* Randomized, experimental single blind. The aim of the study is to assess whether the application of CIMT combined with a motor and sensory stimulation protocol (PESM) based on the BC, increases the functionality of the upper limb, in children with spastic hemiparesis. *Setting:* primary area, rehabilitation department. 12 patients were recruited, obtaining a homogeneous sample, divided into 2 randomized groups: 6 in the experimental group (EG) and six in the control group (CG). PESH is applied in all of them, for 4 weeks (one hour per week), adding CIMT for an hour a day in the EG. Main outcome measures were performed before and after treatment: the joint range of motion (ROM), Ashworth scale for spasticity, the Shriners Hospital for Children Upper Extremity Evaluation (SHUEE) and the Quality of Upper Extremity Skills Test (QUEST) for functionality, and the Nottingham scale for sensitivity. The level of significance was set at $p < 0.05$. *Results:* The EG obtained a functional increase of 25% compared to the CG (5%). It was aimed a maintenance of the ROM, degree of spasticity and sensitivity in both groups. *Conclusion:* CIMT applied to children with spastic hemiparesis should be recommended as adjunctive therapy in the PESH to obtain better functional results. The CIMT is an economic therapy, simple, easy to apply and a non-invasive method and is well tolerated by children.

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The Effects of Stroke Rehabilitation Provided by Interdisciplinary Team in Mongolia

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Introduction: In 2013, stroke unit was established in the third central hospital by supporting WHO and Millennium Challenge Corporation. In the frame of this project we have done clinical guideline of the stroke rehabilitation in Mongolia. By implementing this project we have started to work by interdisciplinary team. *Objective:* To assess the effectiveness of the stroke rehabilitation

provided by interdisciplinary team in stroke unit. **Materials and Methods:** Sixty patients were recruited following Modified Rankin Scale II-IV who are hospitalized from May 2013 to May 2014 at the Third Central Hospital of Mongolia. We conducted a clinical trial study and patients were divided into 2 groups matching of their age, sex, diagnosis, and the level of the functional disability level at the time of admission. Experimental groups receive comprehensive rehabilitation services provided by interdisciplinary team in the stroke unit based on the clinical guideline, whereas control group were treated by physical therapy mainly passive which was carried out before the establishment of team. The assessments were performed by NIHSS for the severity of disease, functional ability and ADL by mRS and FIM at the time of admission and discharge, and after 3 and 6 months. **Results:** In this study, 33 male and 27 female patients are recruited and average age were 57.2 ± 11 . The average length of hospital stay were 7.6 ± 1.9 days in experimental group and 10.8 ± 2 days in the control group ($p < 0.001$). When we evaluated the effectiveness of the rehabilitation therapy by NIHSS, mRS, FIM at the time of admission and discharge, there was no statistical significance between two groups. However, patients by mRS ($p < 0.001$) and by FIM ($p < 0.05$) were effectively improved in experimental group when compared with control group after 3 and 6 months. **Conclusion:** Early rehabilitation treatment provided by interdisciplinary team in the stroke unit improves patients' functional ability and activities daily living and have a favorable influence on prognosis.

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Preservation and Evolution of Functionality of Stroke Patients after the Discharge from the Rehabilitation Center

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Introduction: The aim of an inpatient stroke rehabilitation program is to achieve the best functional status of the patient and prepare the discharge into a supporting environment that will develop the patient's abilities. The preservation of the functionality of a patient in the daily life is a major component determining the quality of life of the patient and its family. **Material and Method:** 35 stroke patients (12 males and 23 females), aged 51-82 years old with first ischaemic stroke and FIM score at discharge > 70 were enrolled in the study. A telephone interview occurred several months after discharge recording the functional abilities according to FIM scale (eating, grooming, toileting, bathing, dressing, transfers, walking, bowel and bladder management, expression and communication) and a questionnaire was completed about health problems, adjustment problems and the caregiver's opinion about the functional abilities of the patients. Then a comparison followed between the functional abilities of the patients at the discharge and at the time of the interview. **Results:** All patients returned to their home with relatives as the caregivers. Two patients had additional caregiver with salary. The majority of the patients had improved their functionality. Special improvement showed in (independent FIM 7): eating (71% discharge-94% interview), bladder management (46% discharge-74% interview), bowel management (42% discharge-74% interview), transfers (20% discharge-51% interview), grooming (20% discharge-46% interview), bathing (3% discharge-26% interview) and comprehension (26% discharge-69% interview). Notable improvement (FIM 6 and 7) showed in: dressing (20% discharge-40,5% interview), walking (25,5% discharge-66% interview). Only 4 patients were characterized at the same status or deteriorating because of dementia, new stroke or abdication. Most of the patients (19) continued exercises at home with a therapist or a relative. Most of them (23) continued using the walking aids. All the relatives supported strongly that the return home had beneficial effect on patient's psychology as well as function. **Conclusion:** The return of the patients to their home and a supportive environ-

ment is beneficial for them and helps them improve the functional abilities and the quality of their lives. No special non-manageable adjustment problems were reported.

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Calcifying Pseudoneoplasm of the Neuraxis: a Rare Differential Diagnosis of Tetraplegia

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Case Diagnosis: Calcifying pseudoneoplasm of the neuraxis (CAPNON). **Case Description:** A 49-year-old male presented with a 4-year history of cervical pain and progressive tetraplegia. MRI revealed a cervical mass lesion (thickening and calcification of the cruciate ligament and posterior longitudinal ligament at C0-C1 level), compressing the spinal cord. A neurosurgical intervention was performed. Craniotomy and C1-C2 laminectomy revealed no abnormalities. An Y shaped dural incision revealed a markedly thickened and calcificated dura mater. This lesion occupied the occipito-vertebral and C1-C2 transition and was highly adherent to all planes. The histopathologic examination revealed a CAPNON. Post operatively, the patient presented with an incomplete tetraplegia (AIS D, neurologic level C2), and a cerebellar syndrome - possibly due to ischemic event in the PICA territory. The patient was referred to a rehabilitation program with significant functional improvement. At our last observation, the main deficits were limb dysmetria (affecting mostly the fine-motor coordination), and ataxic gait. The patient presented with good recovery and good adaptation to all the daily living activities. **Discussion:** CAPNON is a rare lesion described for the first time by Rhodes and Davis at 1978. To the authors knowledge, only 41 cases were described in the literature. It is a slow-growing, benign lesion of yet unknown origin. The most common clinical symptoms reported are related with irritation of the adjacent tissue and local compression, as we can confirm in the clinical case presented. The total or partial lesionectomy is the treatment of choice. Little is known about the natural course of the disease, but the prognosis is usually benign. In spite of its benign prognosis, it is important to distinguish these lesions from the more common calcified vascular, neoplastic or non-neoplastic differential diagnosis. It was important to treat this patient with an early lesionectomy, since it allowed us to establish the definitive diagnosis and to stop the compressive/irritating symptoms. **Conclusion:** We report a new case of CAPNON. The clinical presentation was related with the lesion size and location, among other complications in the post-operative period. The post operative establishment of a rehabilitation program adapted to the therapeutic needs of this patient was crucial to the recovery.

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Autonomic Dysreflexia: Incidence, Demographics and Etiology

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Objective: to ascertain the incidence of autonomic dysreflexia in spinal cord injury inpatients during the hospitalization; to identify the main triggering factors; to determine which variables influence the autonomic dysreflexia incidence. **Methods:** a retrospective review of all the patients with spinal cord injury above T6 admitted to a physical medicine and rehabilitation department from January 2011 to December 2013 was conducted. The autonomic dysreflexia episodes, the demographic information, the patient's characteristics, the triggering factors and the need of pharmacological treatment were collected from the medical records. The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. **Results:** 12.7% of the included patients developed autonomic dysreflexia; 71.4% of the events occurred in patients with complete spinal cord injuries (AIS A). All of the events occurred in patients with traumatic spinal cord injury and with cervical neu-

rologic levels. The main triggers of autonomic dysreflexia were genitourinary (48%) and gastrointestinal (44.2%). Oral antihypertensive medication was used in 26.5% of the events. *Conclusion:* Autonomic dysreflexia seems to be a common complication in spinal cord injury patients. It is important to be aware of this condition, since the effective management implies the early recognition of its signs, the reversal of the trigger factors along with the prompt administration of pharmacological treatment if needed.

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Phenoxybenzamine – a Potential Solution for Recurrent Episodes of Autonomic Dysreflexia

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Introduction: Autonomic dysreflexia is a potential fatal complication in patients with spinal cord injury above the neurological level T6. It is a condition of uncontrolled sympathetic response secondary to a noxious stimulus below the level of the spinal cord injury. Phenoxybenzamine is an alpha-adrenergic receptor antagonist that is commonly used in the treatment of the pheochromocytoma. *Objective:* to assess the utility of phenoxybenzamine in the prophylaxis of chronic recurrent episodes of autonomic dysreflexia. *Methods:* The authors present a case report of two young male patients with complete SCI at C4 neurological level, and chronic recurrent episodes of autonomic dysreflexia. During a period of 14 weeks in case 1 and 15 weeks in case 2 every autonomic dysreflexia episode was recorded. After that, phenoxybenzamine 10 mg was orally administered on a daily basis. The effects of this procedure were assessed for 14 weeks in case 1 and 9 weeks in case 2. *Results:* The autonomic dysreflexia episodes declined from an average of 2.85 episodes/week to 0.85 episodes/week in case-1 and from 1.20 episodes/week to 0.22 episodes/week in case 2. Also, the need for antihypertensive drugs of rapid onset in the management of the episodes was reduced from 42.5% to 16.7% in case 1 and from 5.9% to 0% in case 2. *Conclusion:* Phenoxybenzamine seems to be of benefit in the prophylaxis of chronic recurrent episodes of autonomic dysreflexia. Further research with well designed trials and larger population samples should be performed.

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Annual Fatigue and Depression in Multiple Sclerosis Association with Physical Functioning (PF) and Social Functioning (SF)

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Background: Fatigue is among the three most disabling symptoms of the patients with MS and the 70–90% of their complaints about the impact of fatigue on their daily life. The purpose of the present study was to associate the annual fatigue and depression with the parameters physical functioning (PF) and social functioning (SF) of quality of life level on MS patients' during seasons. *Methods:* Forty five patients with MS participated in the study. Measurement of fatigue was based on Fatigue Severity Scale, measurement of depression was based on BDI and three subscales of SF-36 (PF, SF, VT) were also evaluated. The measurements were conducted every three months, November, February, May and August and on the last day of respected month (30/11, 28/2, 31/3 and 31/8) at the outpatient clinic. The measurements in the aforementioned months represent the end of a season. November is the last month of autumn, February the last month of winter etc. *Results:* No significant seasonal differences were observed in MS patients. Linear regression models showed that PF and BDI score are independent prognostic factors of fatigue and their contribution to the model depends on season, being particularly intense in summer months (ranging

from 29% to 61%), the peak observed in August. *Conclusion:* Fatigue and depression are major determinants of certain quality of life aspects in MS patients. *References:* 1) Wood B, van der Mei I, Ponsonby AL, Pittas F, Quinn S, Dwyer T, Pittas F Lucas RM, Taylor BV. Prevalence and concurrence of anxiety, depression and fatigue over time in multiple sclerosis. *Mult Scler* 2013; 19:217–24. 2) Bakalidou D, Giannopoulos S, Stamboulis E, Voumvourakis K. Effect of seasonal fluctuation of ambient temperature on fatigue in Multiple Sclerosis patients living in Attica, Greece. *Journal of Clinical Neuroscience*. 2014; vol 21 (7): 1188–1191.

PA340

Strategies to Promote Better Health Service Delivery Emerging from a Provincial Workshop on Traumatic Brain Injury and Mental Health

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Introduction: Many agree that issues with mental health, more than physical or cognitive sequelae are the most difficult to cope with following traumatic brain injury (TBI). However, research has shown a gap exists between the needs and services offered to TBI patients who suffer from mental health problems. *Objective:* Using a qualitative design, the objective of this study was to identify concrete and practical solutions to optimize mental health care service delivery to persons with TBI with mental health issues in Québec. *Material and Methods:* Eighty provincial service providers, decision-makers, government and community representatives participated in a discussion groups held simultaneously in three cities representing different regions of the province. A logistic management software (DRAP) was used to collect and analyse the ideas/statements emerging from workshop discussions. During the workshop, participants rated the importance of each statement (essential, necessary, desirable) and then statements were sorted by three experts in TBI and mental health according to four fields of activities (clinical practice, policies, service reorganization and training). *Results:* 341 statements were collected during the workshop; 70.3% statements relating to clinical practice were considered essential, 63.2% in policies, 50.7% in service reorganization and 66.6% in training. The most important clinical practice strategy proposed was that the trauma care system should implement systematic screening and standardized assessment of mental health issues throughout the continuum of care. With regards to the most important strategy for service reorganization, direct access to psychiatrists should also be included in an action plan. At the policy level, it was suggested that agreements should be formalized between the trauma care system and partners specialized in mental health. Finally, training on TBI and mental health should also be widely offered to stakeholders. *Conclusion:* This workshop identified important strategies and priority actions thought to be essential to implement in the Quebec health network for persons with TBI.

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Effects and Comparison of the Lee Silverman Voice Treatment Versus the Extended Version of the Lee Silverman Voice Treatment for Individuals with Parkinson Disease

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Introduction: Lee Silverman Voice Treatment (LSVT) is the most efficacious behavioral treatment for voice and speech disorders in Parkinson's disease (PD) and it is supported by published Level I efficacy data. *Purpose:* The present study examined and compared

speech characteristics in PD, vocal SPL and voice handicap following two different treatment dosages of the LSVT, the extended version versus the traditional. The purpose was to determine if the clinical outcome depends from the dosages of the treatment. **Methods:** One participant with idiopathic PD received the traditional treatment of LSVT, which was administered four 60 minutes session per week for 4 weeks. The second participant, with idiopathic PD, received the extended treatment version of LSVT (LSVT-X), similar to LSVT, which was administered twice a week for 60 minutes each session for 8 weeks and required substantially more home practice. Recordings were made immediately before and after treatment, and again 6 months later. Vocal SPL was measured for 4 different tasks and compared between them and the Voice Handicap Index (VHI) was completed from each participant before each set of recordings. **Results:** Vocal SPL after treatment was significantly increased and maintained increased at 6 months. VHI scores improved for the intensive LSVT participant and for the extended LSVT -X following treatment. **Conclusions:** LSVT and LSVT-X successfully increased vocal SPL improved functional speech and decreased perceived voice handicap in individuals with PD. Findings support that treatment dosages are not compromised for the clinical outcomes. Further large-scale research is required. **Reference:** 1) Fox M. C., Morrison E. C., Ramig O. L. & Sapir S. (2002). Current Perspectives on the Lee Silverman Voice Treatment (LSVT) for Individuals with Idiopathic Parkinson Disease. *American Journal of Speech Language Pathology*, 11, 111-123. 2) Hartelius, L., & Svensson, P. (1994). Speech and swallowing symptoms associated with Parkinson's disease and multiple sclerosis: A survey. *Folia Phoniatrica Logopedia*, 46, 9-17. 3) Sapir S., Spielman J., Ramig O. L., Countryman S., Hinds L. S. & Fox M. C. (2003) Effects of Intensive Voice Treatment (the Lee Silverman Voice Treatment (LSVT)) on Ataxic Dysarthria: A Case Study. *American Journal of Speech-Language Pathology*, 12, 387-399.

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Study of the Level of Troponin T in Sera of Acute Stroke Patients

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Introduction: Levels of the cardiac muscle regulatory protein troponin-T (cTnT) are frequently elevated in patients with acute stroke and elevated cTnT predicts poor outcome and mortality. The pathomechanism of troponin release may relate to co-morbid coronary artery disease and myocardial ischemia or, alternatively, to neurogenic cardiac damage due to autonomic activation after acute stroke. **Aim:** Was to assess the level of troponin-T in the sera of acute stroke patients and its effect on stroke severity. **Material and Methods:** Fifty patients with acute cerebrovascular stroke (25 with intracerebral hemorrhage, 25 with acute ischemic stroke) diagnosed by brain CT scan. Serum cardiac troponin-T (cTnT) and creatine kinase-myocardial band (CK-MB) levels were measured by immunoassay in all patients at the time of admission and five days later. Twelve lead electrocardiograms (ECGs) were done at the time of admission and 12 hours later. The stroke severity was assessed by Scandinavian stroke scale (SSS). **Results:** Serum cardiac troponin-T was elevated in 17 patients, (8 patients with hemorrhage (32%), and 9 with infarction (36%)). Abnormal ECGs findings were observed in 27 cases, (13 patients with hemorrhage, and 14 with infarction). All patients with elevated serum troponin showed abnormal ECG (100%). ECG changes were more in patients with elevated cTnT than in patients with elevated CK-MB. There is a positive correlation between Elevated cTnT serum levels and Scandinavian stroke scale and mortality. CK-MB was not elevated in most patients with elevated cTnT, the non parallel increase of CK-MB with cTnT may signify the non cardiac source of CKMB. Patients with a left parietal lobe stroke compared with those with stroke in other brain locations were at higher risk of myocardial injury. **Conclusion:** Measurement of the serum level of cardiac troponin-T provides a useful measure in assessment of

the prognosis of the stroke in clinical practice. Serum cardiac troponin-T is a sensitive marker in detecting myocardial injury after cerebral stroke.

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Genetic Polymorphism in IL-18137G/C: Relation to Subtypes and Severity of Acute Ischemic Stroke

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Background: Stroke remains the leading cause of severe disability and the third leading cause of death after heart disease and cancer. Stroke is a complex multifactorial disorder that is thought to result from an interaction between a person's genetic background and various environmental factors. **Aim:** This study aimed to evaluate the association of IL-18137G polymorphism and high sensitivity (hs) C-reactive protein (CRP) with risk in acute ischemic stroke (AIS) and their relationship with subtypes and severity of stroke. **Materials and Methods:** 106 patients with acute ischemic stroke in addition to 97 age and sex matched healthy controls were evaluated for genetic polymorphism of IL-18137G/C by PCR -sequence specific primer and hs CRP by nephelometry using BN prospec system. **Results:** Results showed significant association of 137/CC genotype with increased risk of acute ischemic stroke (OR=2.131, 95% CI=2.559). Similar results were observed in large artery atherosclerosis (LAA) and cardioembolic (CE) subtypes (OR=3.226, 95% CI=2.408-4.321 and OR=8.667, 95% CI=4.688-16.022, respectively) and severity of stroke (p=0.004). CRP levels on admission were significantly higher in AIS patients than controls (p<0.001). Also as they were associated with increased risk of AIS (OR=4.880, 95% CI=3.440-6.922), all subtypes (OR=8.462, 95% CI=5.079-14.097 for LAA, OR=10.700, 95% CI=5.931-19.305 for small vessel disease (SVD) and OR=49.500, 95% CI=12.55-195.157 for CE subtype and severity (p=0.013). **Conclusion:** IL-18137G/C polymorphism and CRP acting together as inflammatory and atherosclerotic players in the progression of cerebral tissue injury. **Keyword:** AIS: acute ischemic stroke; CRP: C-reactive protein; LAA: large artery atherosclerosis; CE: cardioembolic.

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Value of a Specific Referral Program for Post-Stroke Hospital Disposition in Bordeaux Region

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Introduction: A "post-acute stroke program" was developed in 2008 in the University Hospital of Bordeaux (France) in order to organise care supply in rehabilitation units specialised in neurological diseases (NR units). The objective of our study is to describe the characteristics and outcome of patients included in this program. **Material and Methods:** Once a week, Rehabilitation physicians working in one of the four NR units participating in the program assess patients hospitalised for stroke in acute units of the University Hospital of Bordeaux. All the patients with stroke who were assessed between July 2008 and December 2012 were included in our study. A common chart was used for assessment. Time to assessment, functional status, referral proposed and discharge data were collected. **Results:** Among 1,465 surviving patients who were assessed, 69.8% were referred to NR units after assessment. After the stay in acute units, 63.6% were discharged to rehabilitation units, including 90% in NR units. Median length of stay in acute units was 14 days before transfer in NR units. The median Barthel index at admission in NR units was 42,5 versus 75 at discharge, with a rate of 75% of patients who returned home. **Conclusion:** The rate of patients discharged to NR units was higher than in nationwide studies. This program has the feature of associating the main NR units of Bordeaux region in a common collaborative referral system and lets to keep the control of the referral for each patient.

PA345

A Rare Cause of Progressive Paraparesis: Spinal Dural Arteriovenous Fistula

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Case Diagnosis: We describe the case of a male patient who presented with gradually progressive bilateral lower extremity weakness, subsequently diagnosed with spinal dural arteriovenous fistula (dAVF). **Case Description:** A 63-year-old male patient, was admitted to our clinic with a 3-month history of progressive weakness in the lower extremity with recovery periods. The neurologic examination upon admission revealed hypoesthesia in L4 dermatome, and the strength in bilateral proximal lower extremity muscles was 4+/5. Hyperactive DTRs were noted bilaterally in lower extremities. Babinski's response was positive. Cranial and spinal MRI were planned due to the inconsistent course of the paresis and reflex abnormalities. MRI revealed multiple disc protrusions and an extruded hernia at the level of T8-9 vertebrae. At lumbar and thoracic regions, vascular structures surrounding dural sac were prominent in contrast images. Spinal cord edema was observed. Cranial MRI was normal. An angiography was performed with the suspicion of arteriovenous malformation. A spinal dAVF was detected, that had arisen from lumbar artery at the level L1-2, draining vena cava by spinal perimedullary veins. After patient's muscle weakness increased (1/5, bilaterally) with complete loss of sensation in lower extremities, endovascular embolization was performed on fistula and fistulas drainage veins with spinal angiography. Control angiography didn't show any finding of dAVF. Before the embolization the patient was paraplegic but he showed remarkable improvement in first month of rehabilitation. At discharge, patient's lower extremity muscle strength returned to normal. He had minimal hypoesthesia in the L5, S1 dermatomes and didn't have any gait disability. The patient was discharged and scheduled for a follow up. **Discussion:** Spinal dAVF is a rare, disabling but a potentially treatable vascular malformation of spine. The resultant venous hypertension decreases spinal cord perfusion and can lead to ischemia and edema, resulting in slowly progressive myelopathy, sensory disturbances, and bowel and bladder dysfunction. It usually affects the thoracic and lumbar spine. Few cases of this vascular malformation have been reported in the literature. **Conclusions:** Spinal dAVF is an important and treatable condition that should be considered in the differential diagnosis of patients with paresis and plegia. In appropriate cases, embolization treatment may be considered.

PA346

Alien Hand Syndrome Following Stroke – a Case Report

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Case Diagnosis: We present a case report on an alien hand syndrome in a stroke patient. **Case Description:** A 50 year old woman, with no significant past medical history, presented to the emergency department with symptoms of left arm involuntary movements, paresthesia and loss of balance, that had started in the previous four days. Initial neurological examination demonstrated hypoesthesia of the left limbs but did not reveal any motor deficits. A brain CT-Scan was performed and it displayed an acute ischemic lesion in the right frontal-parietal involving the cortex and sub-cortex. The patient was then admitted to the hospital for adequate post-stroke care. On the initial evaluation by the attending PRM physician, the patient complained of a feeling of "strangeness" in relation to the movements of the left hand and that rarely she felt like her left hand "had a will of its own". The diagnosis of alien hand syndrome was considered. Brain MRI confirmed the initial CT findings. Occupational therapy was provided to the patient, in order to try to improve left hand function. **Discussion:** Alien Hand syndrome is a rare motor function disturbance that occurs follow-

ing a neurologic lesion. It is characterized as involuntary complex and goal oriented movements by the affected hand or limb. There are commonly sensory deficits associated with a loss of the sense of agency of the movements, as the individuals dissociate themselves from the hand and its actions, frequently remarking on the hand's behavior as if it does not belong to them. It has been associated with stroke and different subtypes have been established according to the localization of the lesions. Additional clinical manifestations may include involuntary grasping of objects, inter-manual conflict and sensory deficits. There is no definite cure for this condition although its manifestations might diminish over time. The treatment proposed is varied and mostly involve strategies control the involuntary movements. **Conclusions:** This case report sums up the importance of considering the diagnosis of alien hand syndrome and understanding the relevance that this condition might have in the quality of life of the patients.

PA347

Urodynamic and Upper Urinary Tract (UUT) Finding in Spinal Cord Injury in Patients with Infectious Spondylitis

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Introduction: A lesion of the upper urinary tract is possible outcome of the bladder dysfunction following spinal cord compression caused by infectious spondylitis. The aim of the study is to describe urodynamic finding and to evaluate prevalence of UUT abnormalities using ultrasound. **Methods:** We evaluated 10 SCI patients who underwent ultrasound and urodynamic evaluation. **Results:** The mean age was 50 years (23-79). The sex ratio is 1. Brucellosis infection was the major cause. 8 patients were paraplegic. Most of lesions are in thoracic level. 6 complain of overactive bladder syndrome and 3 have a dysuria syndrome. Maximal detrusor pressure was 54.33±32.5 cm H₂O. Maximal cystometric capacity was 312.17±30.5 cm H₂O. Detrusor sphincter dysynergia was observed in 56% of cases. In 4 patients were found abnormalities in UUT. Six patients are treated by anticholinergic medications and intermittent catheterization. 6 patients showed an improvement of bladder and sphincter dysfunction. **Conclusion:** Urodynamic evaluation is an important test before treatment. Only longer follow-up will determine if different therapeutic regimens will prevent upper urinary tract deterioration in this pathology.

PA348

Pancerebellar Syndrome after Cardiac Arrest and Heat Stroke: a Challenge for Rehabilitation

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Case Diagnosis: Pancerebellar syndrome after cardiac arrest and heat stroke. **Case Description:** A 40-year-old male was transferred to our hospital 8 months after he suffered a cardiac arrest and heat stroke, with clinical information of having had diffuse cerebral edema, multi organic dysfunction with need of mechanical ventilation. The recovery of the mental status was accompanied by delirium, pancerebellar syndrome and myoclonus. At physical examination he was conscious/oriented, involuntary cephalic movements, horizontal nystagmus on the lateral left gaze, cerebellar dysarthria, dysphagia (need of percutaneous gastrostomy), dysmetria, myoclonus of the upper extremities with movements, Babinski sign, truncal ataxia being unable to stand/walk. Reflexes were increased but symmetrical. MRI showed cerebellar atrophy, with no changes on encephalic parenchyma, namely on basal ganglia. Myoclonus were controlled with levetiracetam/clonazepam.

Rehabilitation focused on cerebellar syndrome, was performed, with the main aim of improving balance and postural reactions for restoration of gait. After three month of rehabilitation, he was able to stand, and needed assistance of one person on walking; cerebellar signs were less exuberant. FIM score improvement from 44 to 57. *Discussion:* Cardiac arrest is the most common cause of reversible global brain ischemia, with diffuse brain injury reported in 30-80% of the survivors. The cerebellum is among the brain regions most vulnerable to damage caused by cardiac arrest and their very sensitive Purkinje cell loss could contribute to neurologic dysfunction, including posthypoxic myoclonus and ataxia. To the best of our knowledge, there have not been any reports concerning cardiac arrest due to heat stroke. Heat stroke is characterized by hyperpyrexia, hot dry skin and central nervous system disturbance. Confusion, delirium, stupor or coma are the main neurological features in all cases. Recovery is usually without sequelae, however, a few scattered case reports have revealed noncortical involvement, namely cerebellar atrophy. *Conclusion:* Pancerebellar syndrome is the most frequent permanent neurological sequela of heat stroke, although very rare. The association of cardiac arrest and heat stroke is not described in the literature. This case illustrates that, although patients with cerebellar dysfunction and post-anoxic myoclonus cannot be fully cured, their functionality and quality of life can be improved by rehabilitation interventions.

PA349

Feasibility of the SMART Glove System for Hand Rehabilitation with Stroke-Randomized Controlled Trial

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Introduction/Background: Upper extremity functional deficits after stroke are common, and strongly related to the quality of life of stroke survivors. Many interventions have been developed and tried for upper extremity rehabilitation, however, hand rehabilitation tool is limited. We applied the SMART glove rehabilitation system, which combined exo-skeleton type glove and gaming system, and assessed its feasibility. *Materials and Methods:* Randomised controlled trial of 29 patients with subacute or chronic stroke who received 20 sessions of one-hour of conventional occupational therapy only (OT-only group) or 30 minutes of conventional occupational therapy plus 30 minutes of SMART glove intervention (SMART glove group) over four weeks. Fugl-Meyer assessment score was measured as a primary outcome measurement and Jebsen-Taylor hand function test, purdue pegboard test was also done as a secondary outcome. All of the measurements were obtained at baseline, two and four weeks after intervention. The change of those variables were compared between the two groups using the linear mixed model. *Results:* SMART glove group showed the improvement of writing of Jebsen-Taylor hand function test ($p=0.017$) and assembly of Purdue pegboard test ($p=0.024$) across evaluation time. Changes of the Fugl-Meyer assessment and other measurements did not differ between two groups, but the better tendency of the SMART glove group compared to OT-only group were also revealed. *Conclusion:* SMART glove system is a feasible rehabilitation tool for enhancing upper extremity, especially hand function in patients with stroke.

PA350

A Rare Mix for Rehabilitation: Bickerstaff Syndrome Overlapped by Miller-Fisher Syndrome and Guillain-Barré Syndrome

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Introduction: Bickerstaff's brainstem encephalitis (BBE) is a rare syndrome defined by ophthalmoplegia, ataxia and decreased consciousness. It's considered to be a variant of Miller Fisher syndrome (MFS) and Guillain-Barré syndrome (GBS) but it is differentiated by the presence of central nervous system (CNS) involvement, commonly in the form of impaired consciousness. The annual incidence of BBE was estimated as 0.078/100 000, with an annual onset of 100 cases. The authors report a rare case with overlapping BBE, MFS and GBS. *Material and Methods:* A 60-year-old female patient, with previous history of depression and hypertension, who developed, a neurological state of decreased consciousness, ataxic gait, ophthalmoplegia and areflexic flaccid tetraparesis, days after an abdominal surgery for abscess drainage. Brain CT scan was normal. EMG showed diffuse axonal sensory-motor axonopathy. CSF examination showed albuminocytologic dissociation. Brain MRI revealed demyelination foci in the brainstem. Virology and serology tests were negative. Finally, BBE was diagnosed based on the clinical features: ataxia, ophthalmoplegia and impaired consciousness. The patient was treated with intravenous immunoglobulins, and improved consciousness level, but was left with tetraparesis, unable to walk and dependent for ADLs – FIM 41/126. It was only 16 weeks after the onset of symptoms, that she was admitted to a rehabilitation center. *Results:* BBE, MFS and GBS are considered part of a continuous clinical spectrum with variable CNS and peripheral nervous system (PNS) involvement. Diagnosis of each disorder relies primarily on clinical presentation and physical examination. BBE patients presenting concurrent GBS are rarely described in the literature, predominantly characterized by axonal damage, and MFS. This suggests that the three conditions are closely related. The pathophysiology is poorly understood but an underlying autoimmune mechanism, often triggered by previous infection, is the proposed cause. Treatment comprises intravenous immunoglobulins and/or plasmapheresis. Most patients achieve a good recovery from the CNS, but PNS dysfunction may have poor prognosis. Early, intensive, multimodal rehabilitation is determinant for the final functional outcomes. *Conclusion:* BBE is a rare condition that must be suspected in patients presenting with ataxia, ophthalmoplegia and central nervous system involvement. Early referral for rehabilitation is ideal, but it depends on a speedy diagnostic process.

PA351

Atypical Presentation of a Ramsay-Hunt Syndrome – a Case Report

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Introduction: Ramsay-Hunt's (RH) syndrome develops due to infection by herpes zoster virus in the geniculate ganglion of the facial nerve, and leads to facial palsy, otalgia, and skin lesions of the auricle and external auditory canal. In addition, symptoms such as dizziness and hearing loss may develop following involvement of the vestibulocochlear nerve. Rarely, there have been case reports describing simultaneous involvement of the glossopharyngeal and vagus nerves. The authors reports a case of RH syndrome complicated by dysphagia, due to the involvement of the facial, vestibulocochlear, glossopharyngeal and vagus nerves. *Material and Methods:* A 63-yr-old male patient, with a past medical history of rheumatoid arthritis, was admitted to the department of infectious because of left-sided facial weakness, headache, otalgia, dizziness, hoarseness and dysphagia that had developed 3 days before admission. Detailed physical examination revealed erythematous vesicles on the left auricle, gag reflex was hyporeflexic, and laryngeal elevation was decreased when swallowing saliva. Auditory examination showed normal hearing function. No evidence of brain pathology was found on magnetic resonance imaging. Acyclovir (800 mg/day) was administered intravenously for 21 days, and prednisolone (22.5 mg/day) was administered orally for 15 days, beginning on the day of admission. He was referred

to the department of rehabilitation medicine for evaluation and management of the facial palsy and swallowing difficulty. **Results:** The authors report a case of RH syndrome in which facial palsy, otalgia, hoarseness, and dizziness developed along with dysphagia. Although the mechanism about descending involvement of lower cranial nerves is uncertain, several hypotheses have been proposed. First, invasion of cranial nerves may have been due to anatomical locations. The facial nerve joins the vestibulocochlear nerve via anterior and posterior locations of the geniculate ganglion, and on account of connection with the glossopharyngeal nerve and vagus nerve, simultaneous viral infection is possible. Secondly, the glossopharyngeal, vagus, accessory and hypoglossal nerves are supplied by the ascending pharyngeal artery. The facial, maxillary and mandibular nerves of the trigeminal nerve are supplied by the middle meningeal artery. This supports the possibility of polyneuropathy occurring after vasculitis due to viral infection. **Conclusion:** Although rare, dysphagia can be a complication of a RH syndrome.

PA352

The Relationship between Motivation and Functional Outcome in an Inpatient Rehabilitation Setting

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Introduction: Apathy is a disturbance of motivation, emotion or interest. This neurobehavioral symptom is a frequent finding among elderly and people with neurological disorders, such as stroke. Apathy has been reported to interfere with efforts at rehabilitation and complicate further both assessment and treatment. This study aims to assess whether, and to what extent, lack of motivation relates to overall functional outcome among elderly patients in an inpatient rehabilitation setting. **Material and Methods:** 30 subjects (mean age 76.79 years, 22 females and 8 males) that were admitted in Euromedica Arogi Thessaloniki rehabilitation center recruited in this prospective study. Twenty two had orthopedic problems and 8 had right-hemispheric stroke. Patients with aphasia and dementia were excluded. The clinician version of the Apathy Evaluation Scale (AES-C) was used to assess apathy. The Functional Independence Measure (FIM) was used to document the functional status of the patients on admission and after a 1-month rehabilitation period. **Results:** 11 patients (36.6%) were diagnosed as being apathetic. 8 (36.36%) of them had orthopedic issues and 3 (37.5%) had right-hemispheric stroke. The apathetic patients tended to be older (mean age 82.91 years) than the nonapathetic patients (mean age 73.06 years). Apathy had a statistically significant impact on admission functional status ($p=0.006$). The apathetic patients showed lower mean FIM on admission (63.16 ± 17.6) than the nonapathetic patients (45.45 ± 11.17). The functional status on discharge did not differ significantly in the patients with or without apathy. Although the difference was marginal, apathetic patients showed less improvement in the FIM than nonapathetic patients after 1-month rehabilitation period. **Conclusion:** Results showed that apathy appeared to have a significant negative impact on overall functional outcome. It does seem to interfere in improving or worsening the patients' clinical condition. Older age was found to be a significant predictor of apathy. Our size sample was small and further investigation is required.

PA353

Relationship between Cortical Stroke Lesion Volume and Postural Control Ability in Middle Cerebral Artery Stroke

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Introduction/Background: Lower extremity (LE) hemiparesis remains one of the most common and devastating stroke-induced impairments. The characteristics of a lesion, including its volume, have been suggested to influence stroke recovery, but equivocal evidence supports this precept. We To evaluate the relationship between volume of middle cerebral artery ischemic lesion and postural control ability in the chronic phase of stroke. **Material and Methods:** Fifty patients with chronic stroke (middle cerebral artery involved, stroke occurred >4 months, ischemic vascular lesion) and score on the lower extremity (LE) section of the Fugl-Meyer assessment (FMA) was ≥ 12 and ≤ 30 , stable, active distal LE movement were recruited. Patient who had hemorrhagic or multiple stroke lesions, any neurologic condition (beyond the stroke) that impaired function of affected leg, previous history of seizure disorder were excluded. Lesion volume was obtained from original medical record and measured by manually tracing the perimeter of the area of abnormal low attenuation on each MRI or CT slice showing the infarct. We also measured static balance control and dynamic balance control by using computerized dynamic posturography (SMART Balance Master® system (NeuroCom inc, Oregon, U.S.A)) to determine the effect of computer-based work on postural balance. Static balance control was measured by equilibrium score and dynamic balance control was measured by rhythmic weight shift test. Outcome variables and lesion volume were analysed using SPSS program. **Results:** Data were collected related to patient's lesion volume (mean volume= 14 cm^3 or $4.5\text{ cm}^3 * 2.6\text{ cm} * 1.2\text{ cm}$) and static balance control (mean equilibrium score= 63.6 ± 5.9), dynamic balance control (mean on-axis velocity= 2.1 ± 0.8 , mean directional control= 58.5 ± 3.1). The p value for the regression coefficient of lesion volume was 0.325 in static balance and 0.42 (on-axis velocity), 0.24 (directional control) in dynamic balance. **Conclusion:** There are no significant relationship in lesion volume and postural control ability in the chronic phase of stroke. Other factors may account for variance in postural control ability after stroke.

PA354

Effect of Electrical Stimulation on Extensor Spasticity in Traumatic Spinal Cord Injury Patients

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Introduction: Spasticity is one of the complications of spinal cord injury and it threatens the activities of daily living and may cause delay in rehabilitation. **Material and Methods:** **Aim:** To determine the effect of electrical stimulation in extensor spasticity of lower limbs in traumatic spinal cord injury patients (ASIA A to D). **Study Design:** Hospital-based randomized study. **Setting:** Yangon General Hospital, National Rehabilitation Hospital. **Participants:** Thirty-five traumatic SCI patients (ASIA A to D) with lower limb extensor spasticity (29 males, 6 females). **Intervention:** Study group ($n=18$) received electrical stimulation and standard physiotherapy treatment. Control group ($n=17$) received sham electrical stimulation and standard physiotherapy. Parameters used for electrical stimulation in study group were 60 Hz with 5 second on and 2 second off, intensity ranging from 1 to 10 mA with suboptimal motor contraction with treatment duration of 20 minutes per session, one session per day, and 5 days per week for 6 weeks. Patients were assessed at beginning of study, at 2nd, 4th, and 6th weeks. **Outcome measures:** Modified Penn Spasm Frequency Scale (Modified PSFS), Modified Ashworth Scale (MAS) and Functional Independence Measure Motor Subscale (FIM Motor Subscale) **Results:** There were no significant differences in patients' characteristics before treatment in both groups. After 6 weeks of treatment, there was a significant reduction in spasticity in study group. Although spasm frequency and MAS reduced from week 0 to week 6 in both groups, the rate of reduction was much higher in study group than that in control group statistically ($p<0.001$). Rate of reduction of spasm severity was also much higher in study group than control group ($p=0.002$). Rate of improvement in FIM Motor Sub-

scale was much higher in study group than that in control group (p-value<0.001). **Conclusion:** There was statistically significant improvement in outcome measures in study group. So, electrical stimulation can safely be recommended and it can be noted that it is an effective treatment in patients with extensor spasticity (MAS 1 to 4) of lower limbs following traumatic spinal cord injury.

PA355

AVM-Related Acute Spinal Cord Ischemia Syndrome (ASCIS) and the Pivotal Role of Acute Inpatient Rehabilitation: a Case Report

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Case Description: 48-year-old male presented with acute bilateral lower extremity weakness causing him to drop to the floor after bending over to lift a heavy box. **Setting:** Tertiary care hospital. **Results:** Examination revealed a T5 AIS A spinal cord injury. Xrays and CT revealed no spinal instability or bony pathology. Magnetic resonance (MR) imaging revealed a high-intensity signal abnormality involving the central portion of the spinal cord from T5-T11. A spinal angiogram revealed a parenchymal arteriovenous malformation (AVM) at the level of T9, supplied by a posterior lateral spinal artery, arising from the left T11 intercostal artery. The decision was made against neurosurgical treatment and the patient was transferred to acute inpatient rehabilitation (AIR). Initial examination found symmetric paraplegia, T9 AIS C. Neurogenic bowel/bladder were managed, trained in transfers, and progressed in wheelchair mobility. Upon discharge, the patient was fully independent in transfers, feeding, and upper body dressing, and at follow-up, was ambulating with bracing and walker, independent in bowel/bladder management. **Discussion:** This case demonstrates one of the unique mechanisms of AVM-related Acute Spinal Cord Ischemia Syndrome (ASCIS). Valsalva maneuver during lifting, increased intra-abdominal and intra-thoracic pressures, decreased venous return, retrograde venous pressure, and over-filling of the valveless Batson's plexus that is in direct continuity with the spinal veins: In the presence of an AVM, this additional venous pressure compromises an already abnormally pressurized vascular malformation, resulting in acute hemorrhagic infarct of the spinal cord. Surgical intervention may be possible if the benefit to addressing the lesion does not pose a higher risk to the remaining blood supply of the injured spinal cord. This non-surgical case is equally important in highlighting the importance of AIR in addressing the medical comorbidities and sequelae of spinal cord injury. In the setting of acute-onset low-velocity activity-related injuries, one must consider the complex role that AVMs play in SCI. AIR works best at addressing both the medical and non-medical concerns of patients.

PA356

Prevalence of Vitamin D Deficiency on the Phoenix Centre (Trauma and Neurological Rehabilitation Unit)

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Introduction: Vitamin D is well linked to osteopenia, osteoporosis and bone health. Research suggests that Vitamin D deficiency may cause muscle weakness, musculoskeletal pain, increased body sway and falling events, impaired physical function and reduced ability to perform activities of daily living. Kiebzak (2007) found that baseline functional status, length of stay and FIM efficiency were favourably affected by higher Vitamin D concentrations. New research is looking into the link between Vitamin D and cog-

nition which plays major part in rehabilitation. The study wanted to look at the prevalence of Vitamin D deficiency (≤ 30 nmol/L Serum 25-hydroxyvitamin D (25(OH)D) in patients admitted to the Phoenix Centre for Rehabilitation (Royal Liverpool and Broadgreen University Hospital Trust). **Methods:** Serum 25-hydroxyvitamin D (25(OH)D), serum calcium, alkaline phosphatase and phosphate, liver function and renal function and full blood count levels were checked on all new admissions to Phoenix Centre for Rehabilitation as per the Mersey Cluster Guidelines (2012). Forty three patients were included in the study from April 2014 to October 2014. **Results:** 53.4% of total patients were found to be deficient in 25-hydroxyvitamin D (25(OH)D) (< 30 nmol/L).

Serum 25-hydroxyvitamin D (25(OH)D) level	Number of patients	Percentage
Optimum > 75 nmol/L	4	9.3%
Adequate > 50 - ≤ 75 nmol/L	9	21.0%
Insufficient > 30 - ≤ 50 nmol/L	7	16.2%
Deficient > 15 - ≤ 30 nmol/L 10	10	23.2%
Severely Deficient ≤ 15 nmol/L	13	30.2%
Total	43	100%

Additional demographic data showed that males and females are equally deficient with 28% and 25.5% respectively having ≤ 30 nmol/L. Of the patients that were deficient equal number of patients had a diagnosis of trauma, SCI, non-traumatic brain injury (21.7%) and equal numbers were of a neurological and medical diagnosis (17.3%). **Conclusion:** The study found that the prevalence of Vitamin D deficiency in patients admitted between April and October 2014 was 56.1%. As 90.7% of patients were found to have below optimum levels 25-hydroxyvitamin D (25(OH)D) (≤ 75 nmol/L) a procedure for assessing and supplementation of 25-hydroxyvitamin D (25(OH)D) has been developed and put into practice on the Phoenix Centre for Rehabilitation. The procedure developed recommends which blood tests to perform and an action plan for supplementation, depending on the levels of Serum 25-hydroxyvitamin D (25(OH)D) and dietary calcium intake.

PA357

Idiopathic Simultaneous Bilateral Facial Nerve Palsy – a Case Report

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Introduction: Simultaneous Bilateral Facial Nerve Palsy (BFNP) is an extremely rare clinical entity with an annual incidence estimated about 1 per 5 millions. Contrarily to the Unilateral Facial Nerve Palsy that is idiopathic in 80% of the cases, the BFNP generally has a well defined aetiology. Concerning to its rarity BFNP represents a diagnostic challenge. The most common causes are bilateral Bell's palsy, Lyme disease, Guillain-Barré Syndrome, Sarcoidosis, Moebius syndrome, Leukemia, Viral infections, Syphilis, Basilar skull fractures and Pontine gliomas. The purpose of this paper is to describe a case of a 21-year-old man with idiopathic Simultaneous Bilateral Facial Nerve Palsy. **Case Report:** A 21-year medical student male presented to emergency room with a 2-day history of frontal headache, bilateral ocular dryness and dysarthria. There was no other significant past medical history and he was on no regular medications. The physical examination revealed bilateral incomplete lower motor neuron type of facial palsy (House & Brackman Grade V). The remaining cranial nerves were intact and there was no evidence of sensory deficits elsewhere. Lab tests for Cytomegalovirus (CMV), Syphilis (VDRL), HIV, Infectious Mononucleosis and Lyme disease were negative. Cranial Computed Tomography Scan was normal and Lumbar Puncture did not revealed alterations. The Electromyography (EMG) confirmed bilateral lesion of the VII cranial pair. He was diagnosed with probable Idiopathic Simultaneous Bilateral Facial Nerve Palsy and started on 60 mg/day of prednisone and a rehabilitation program. His facial muscle function gradually improved, and facial weakness had almost completely resolved (House & Brackman Grade II) 6 months after starting the rehabilitation program. **Conclusion:** Simultaneous presentation of bilateral facial palsy is very uncommon. And because of the rarity

of idiopathic cause of BFNP this case represented a diagnostic dilemma and required a tighter assessment and follow-up. Treatment of idiopathic BFNP is controversial due to the lack of large, randomized, controlled, prospective studies but is widely accepted that a rehabilitation program with facial neuromuscular re-education exercise program emphasizes accuracy of facial movement patterns and isolated muscle control improving the complete recovery. **Keywords:** Bilateral facial nerve palsy, idiopathic, rehabilitation clearness of the guides during distant training as 2.8 ± 0.4 , adequacy of medical control as 2.6 ± 0.6 and efficacy of the treatment as 2.7 ± 0.5 . Patients mentioned such advantages of telerehabilitation as no need for transfer, staying in comfortable home environment, flexible schedule, optimal training due to professional guidance. **Conclusion:** The developed telerehabilitation program appears to be a feasible option for patients with chronic disabling neurological diseases. In case of limited funding short-term intervention may be still effective.

PA359

Robotic-Assisted Rehabilitation of the Upper Limb in Stroke Patients with Unilateral Neglect and Shoulder Subluxation

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Purpose: To evaluate the efficacy of the upper limb stroke rehabilitation program which utilises robotic support using Armeo® Spring system, electrical stimulation (ES), and voluntary effort, designed to increase functional use of the upper extremity (UE) in stroke patients with hemilateral neglect and shoulder subluxation. We hope to achieve repetitive training of reach, grasp, and release in an engaging environment that can be adapted to individual capabilities, and to enable stroke survivors whose motor weakness and visuo-perceptual problems may have excluded them from performing repetitive therapy tasks. **Material and Methods:** The study includes 24 patients (male 55 ± 7 y.o., right-handers, 4-8 weeks after stroke) (16- right CVAs, 8 - left CVAs), age - 54.6 ± 9.5 years, who had sustained ischaemic (16) or haemorrhagic stroke (8) with hemineglect syndrome and shoulder subluxation. The patients were randomly assigned to experimental (14) and control (10) groups. Both groups received conventional therapy and ES of hemiplegic UE muscles for 50-60 minutes (12 minutes each position), 5 times a week, 3-4 weeks. The experimental group additionally completed 20-24 one-hour sessions using the Armeo® Spring system. All subjects were measured for hemineglect presence (verbal designation of the upper contralateral extremity, recognition of their own upper extremities, neglect while reading or writing, copying drawings), shoulder subluxation, arm function (Modified Ashworth Scale, Motricity Index (MI), Fugl-Meyer Assessment Scale (FM), Motor Assessment Scale (MAS), Manual Function Test (MFT), muscle electromyographic activity, range of motion in joints) and daily life activities (Barthel Index) at baseline and post-intervention. **Results:** The results show that experimental group patients improved significantly better than subjects of the control group according to visuo-perceptual, visuo-motor abilities, reduction in subluxation, arm function and activity scales. Repeated measures showed significant improvement for all function scales ($P < 0.01$ for FM and MI) and activity scales ($P < 0.01$ for MAS, MFT) and clear benefits related to Armeo® Spring training, especially on activity scales. **Conclusion:** The positive results are promising with respect to reducing upper limb impairments in stroke patients with hemilateral neglect and shoulder subluxation.

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Traumatic Brain Injury in Elderly Adults. Which Accompanying Factors Affect the Functional Independence

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Introduction: Traumatic Brain Injury (TBI) in the elderly usually happens because of falls and traffic accidents. Their rehabilitation progress is also affected by other diseases and co morbidities which delay the levels of their Activities of Daily Living (ADL) achieved. **Material/Methods:** The subjects were 43 patients (27 males/16 females) with moderate TBI and average age 79 years. The causes of TBI were falls (32 patients) and motor vehicle traffic accidents (11 patients). The average duration of stay in the rehabilitation center, was 114 days. Patients were categorized according to the co-morbid situations, in group A (heart diseases), group B (neurological diseases), group C (orthopedic diseases-fractures), group D (respiratory diseases), group E (psychiatric disorders –dementia), group F (diabetes mellitus). The Functional Independent Measurement (FIM) scale from 1 to 7 was used to evaluate the patient's progress in four daily living activities: eating, toileting, grooming and transfers. We compared FIM at admission and discharge of the patients. Additionally in group C (orthopedic diseases-fractures), patients were evaluated 2 months post-admission. **Results:** Group E had the worst progress in all categories, especially in toileting (72.73% totally dependent, 0% entirely independent). 9.38% of the patients who were not in group E reached the entire independence in toileting and only 37.5% remained totally dependent. Likewise 66.67% of group B remained totally dependent in the same category. Toileting seems to have the highest percentages of dependence of all categories, even after their rehabilitation period (total 46.51%, partial 46.51%). Finally, the improvement in eating was impressive in all groups, (only 11.76%-22.22% remained totally dependent). **Conclusions:** Group E (psychiatric disorders-dementia) has the worst impact on the functionality of all patients with TBI in the four compared ADLs. Groups A, D, F of co morbidities do not actually affect the progress of rehabilitation as well as group C after two-month rehabilitation. Eating is the category in which patients reach the highest levels of independence, while toileting presents the worst progress of all.

PA361

The Occupational Therapy and the Armeo Spring as Training Tool to Improve Upper Limb Functionality in Stroke Patients

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Introduction: Stroke is the largest single cause of severe physical disability and rehabilitation to reduce functional deficits is the most effective treatment. Occupational therapy is a profession that uses meaningful activities across the spectrum of physical and mental domains to reduce limitations after stroke. Robotic (Armeo Spring) training devices are increasingly being used in the rehabilitation of upper limb function in subjects with neurological disorders. **Material/Methods:** Ten participants (5 males and 5 females) with ischemic stroke for the first time between 65-83 years old were recruited, 4 participants were diagnosed with right (without Apraxia) and 6 with left hemiplegia. All the participants started an occupational therapy program (5 times per week/45/2 months) and robotic therapy with Armeo Spring (5 times per week/5 exc x 5/2 months). Oxford scale, Upper Extremity Functional Index (U.E.F.I.) and Workspace program (Armeo Spring) were used to evaluate the patient's progress. **Results:** Participants started the occupational therapy sessions on average Oxford scale 1+ and a mean score in U.E.F.I. 25.8/80. In the end of the program interventions the Oxford scale results recorded to be improved from 1+ to 2+, as well as, the U.E.F.I. mean score reached 42.90/80. Subsequently the occupational therapy program patients were started a two months robotic therapy with Armeo Spring. During those two months patients were evaluated three times with the Workspace

program. A final assessment after the four months of therapies was done and the results noted an improvement of the Oxford scale's reports (3 ± 1). Also, U.E.F.I scores reported increase (58, 4/80). **Conclusion:** The results of this study indicate that occupational therapy has the leading role of rehabilitation in patients with low or no upper extremities muscle power but also robotic therapy could be useful to improve occupational therapy's achievements. Patients during the Armeo Spring therapies seem to be really thrilled of the robotic experience, thus they performed better with a significant range of improvement.

PA362

Nontraumatic Spinal Cord Compression: a Descriptive Study about 50 Cases

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Introduction: Individuals with nontraumatic Spinal cord injury (NTSCI) account for an important proportion (up to 50%) of the SCI cases admitted to rehabilitation setting. However, relatively few studies have been focused on NTSC. The aim of our study is to assess the incidence of NTSCI, and to evaluate demographics injury patterns, clinical presentation and functional outcomes of patient with NTSCI. **Methods:** Retrospective study between January 2010 and December 2013 in the department of physical medicine of Sahloul hospital. **Results:** Individuals with NTSCI account for an important proportion (43%) of the cases admitted to our department. A total of 50 cases were reported over the 3 years study period. The mean age was 49.9 years (19-79), the sex ratio was 1.13. Most of lesions were at the thoracic (15 cases) and cervical level (15 cases). 40 patients have incomplete lesions with present with paraplegia. Disc herniation were the major cause of SCI (16 cases). 34 patients were admitted to our department after a post operative period of 78 days. They followed a rehabilitative protocol. There was a functional improvement in 20 patients, however, we have reported several complications (constipation in 43% cases, decubitus ulcer in 32% cases) **Conclusion:** Tends to affect older adults. Although incidence rates for non traumatic and traumatic SCI are similar. Demographic clinical characteristic are different. Delivery of rehabilitation has an important role in fonctionnel outcomes in this population.

PA363

Vertebral Hydatidosis Revealed by Spinal Cord Compression. Report of Three Cases

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Introduction: The vertebral hydatidosis is a rare entity, account for 1% of all cases. The prognosis is poor because of severe neurological complications and inexorable spinal destruction. **Methods:** We report three cases of paraplegia secondary to vertebral hydatidosis and we evaluate the functional outcome after 4 years. **Results:** They are three women. The mean age was 37 years. Two patients presented dorsal pain and disturbances of gait before surgery. Clinical exam found a paraplegia and sphincter dysfunction. The spine MRI showed a cystic lesion in dorsal vertebrae. Posterior laminectomy with decompression of the spinal cord and removal of the hydatid cysts was performed. After 4 years, two patients showed little improvement of their neurological status and in one case a recurrence of the vertebral hydatidosis was revealed. **Conclusion:** The prognosis of vertebral hydatidosis is generally regarded as very poor even when both medical and surgical procedures are provided. The prevention and the sanity education stay the best measures.

PA364

Relationship between Dysphagia and Biochemical Markers in Patients with Stroke

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Introduction: Dysphagia is a symptom that defined as difficulty of swallowing foods by mechanical obstruction, reduced muscle strength or impaired muscle coordination. When structural defects were put aside, neurologic disorders take an important place for oropharyngeal dysphagia. Aim was to determine the relationship between dysphagia and biochemical markers in patients with stroke. **Material and Methods:** 93 patients (47 female, 46 male) with stroke were included. Age, sex, length and weight, time after stroke, length of hospital stay, stroke etiology, stroke localization, side of lesion were recorded. Body mass index was calculated. All patients had laboratory examination including complete blood count, liver function tests, electrolytes, albumin and total protein levels, iron, iron binding capacity, ferritin, vitamin B12 blood levels in 2 days time after hospitalization. Bedside swallowing assessment tests were performed on all patients. Swallowing score was used to determine presence of dysphagia. **Results:** Mean age was 63.97 ± 12.96 years. 48 patients (51.6%) were dysphagic and 45 patients (48.4%) were not according to the Bedside swallowing assessment tests. Between dysphagic and non-dysphagic patients, there was no statistically difference for age, sex, and time after stroke and affected side. When dysphagia rates examined in comparison with stroke etiology; rates were higher in ischemic strokes compared with hemorrhagic strokes and the difference was statistically significant. Body mass index was statistically significant lower in patients with dysphagia ($p=0.001$). Total protein, prealbumine and iron levels and blood electrolytes were significantly lower in dysphagic patients (respectively $p=0.009$, $p=0.001$, $p=0.024$, $p=0.001$). Regarding this, magnesium deficiency was the most encountered electrolyte deficiency. **Conclusion:** stroke patients should be evaluated for dysphagia. It should be kept in mind that dysphagia can cause impaired laboratory findings.

PA365

The Functional Outcome of Dysphagia in Stroke Patients

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Introduction: To determine the relationship between stroke related dysphagia and demographic patient characteristics, concomitant diseases, motor impairment and impacts of dysphagia on patients daily living activities and functionality. **Material and Methods:** 93 patients with stroke were included. Age, sex, body length and weight, time after stroke, length of hospital stay, stroke etiology, stroke localization, side of lesion, risk factors for stroke and comorbid diseases were recorded. Pre-stroke oromotor problems, feeding habits at hospitalization and discharge time and clinical markers for dysphagia and aspiration were recorded from relatives or hospital records. Bedside swallowing assessment tests were performed on all patients. Barthell Index and functional independence measures were used for evaluating daily living activities. **Results:** 48 patients (51.6%) were dysphagic and 45 patients (48.4%) were not according to the Bedside swallowing assessment tests. Between dysphagic and non-dysphagic patients, there was no statistically difference for age, sex, and time after stroke and affected side. When dysphagia rates examined in comparison with stroke etiology; rates were higher in ischemic strokes compared with hemorrhagic strokes and the difference was statistically significant. The MCA was the most affected vessel in dysphagic patients. Length of hospital stay was significantly longer in dysphagic patients. In dysphagic patients, FIM and

Barthell Index scores were significantly lower at hospitalization and discharge compared with non-dysphagic patients. The differences of FIM and Barthell Index scores were higher for dysphagic patients. Dysphagic patients had lower BMI values at the time of hospitalization compared with non-dysphagic patients and the difference was statistically significant. Also, we detected a positive correlation between length of hospital stay and severity of dysphagia. Regarding to these findings; the patients who had severe dysphagia, also had longer length of hospital stay and lower FIM and Barthell Index scores. **Conclusion:** We determined that dysphagia caused by stroke has effecting patients daily activities and functionality negatively. Also dysphagia related complications cause longer length of hospital stay and thus higher treatment costs. Regarding to these, early detection and treatment of stroke related dysphagia is very important. With easily applicable and reliable methods, dysphagia can be recognizable with ease and mortality and morbidity related to dysphagia can become a reducible entity.

PA366

Does Recovery of Sitting Balance in the First 4 Weeks Following a Hemiplegic Stroke Predict Recovery of Functional Ambulation by 8 Weeks?

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Introduction: More than 80% strokes are hemiplegic, which cause weakness on one side of the body. Predicting recovery of functional gait following a hemiplegic stroke aids better utilisation of rehabilitation resources. **Material and Methods:** We conducted a literature search to study the current knowledge on recovery of sitting balance in the first 4 weeks following a hemiplegic stroke and its ability to predict functional ambulation by 8 weeks. **Results:** A Pub Med search undertaken on 10/08/2013 revealed 105 articles on stroke and sitting balance. The 3 duplicate studies were excluded. Only studies relating to Hemiplegic stroke, sitting balance (Static and/or Dynamic) and prediction of functional ambulation also known as functional gait was included. Animal studies, studies on healthy volunteers and studies which did not compare sitting balance with functional outcomes were excluded. Finally, 18 studies were included in our review. Many studies have looked at activities of daily living and function as the final outcome measure rather than gait on its own. Studies which looked at gait as the primary outcome measured balance using elaborate subjective scales which require additional training and can be time consuming. Customised balance systems are objective and not widely available. None of the studies used the Nintendo Wii Balance board, which is an objective, reliable, valid and efficient way to measure sitting balance. [1] **Conclusion:** Recovery of sitting balance in the first few weeks can predict the ability to walk in the future, [2] however we remain unclear whether recovery of dynamic sitting balance by 4 weeks can predict functional gait by 8 weeks following an acute hemiplegic stroke. **References:** 1) Clark, R.A., et al., Validity and reliability of the Nintendo Wii Balance Board for assessment of standing balance. *Gait Posture*, 2010. 31(3): p. 307-10. 2) Feigin, L., et al., Sitting equilibrium 2 weeks after a stroke can predict the walking ability after 6 months. *Gerontology*, 1996. 42(6): p. 348-53.

PA367

Beat-To-Beat Cardiovascular Responses to the Progressive Overload Exercise in Individuals with Spinal Cord Injuries

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Introduction/Background: A few studies describe the association between cardiovascular responses during exercise and neurologi-

cal injury level and exercise habits. The purpose of this study is to evaluate the beat-to-beat cardiovascular response to the progressive overload exercise, in accordance with the varying degree of neurologic level and exercise habit in individuals with spinal cord injury. **Material and Methods:** Total of 15 subjects with spinal cord injury who were enrolled in this study were recruited from the Sports Medical Center of Wonju Severance Christian Hospital. All subjects were over 20 years of age and we excluded individuals who had medical or orthopedic problems. The participants were interviewed for their demographic information. The study started with warm-up exercise for three minutes, and the intensity was raised by two-minute intervals until the subjects felt exhaustion while exercising with arm ergometer. The examiner provided instructions and checked that the subjects were fitted with a one-lead ECG and a finger plethysmograph for the beat-by-beat assessment, respectively. We collected data including the heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP) and Mean arterial pressure (MAP). **Results:** The neurologic level of the subjects were divided into two groups; higher neurologic level (5 subjects, means at or above T6 level) and lower neurologic level (10 subjects, means at or under T7 level). Among these participants, eight subjects performed regular daily exercise. In the group of higher neurologic level, one subject who exercised regularly showed lower maximal HR compared to non-exercised subject, (187 beats per minute, 108 beats per minute) and also showed decreased slope in HR and MAP during exercise. The mean SBP of participants during warm-up exercise was 93.01 ± 2.90 mmHg, 98.46 ± 2.72 mmHg in 30 W exercise, 113.91 ± 2.66 mmHg in 45 W exercise, 124.53 ± 2.33 mmHg in 60 W exercise, 135.78 ± 2.33 mmHg in 75 W exercise, 151.49 ± 3.40 mmHg in 90 W exercise, respectively. **Conclusion:** This study provides detailed data on the immediate cardiovascular responses to exercise in spinal cord injuries. We found that regular exercise influences the cardiovascular function in individuals with higher neurologic level spinal cord injuries.

PA368

Effect of S1 Dermatome Electrical Stimulation during Stance Phase Added to Ankle Dorsiflexor Stimulation during Swing Phase on Hemiplegic Gait

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Introduction: To evaluate the effects of electrical stimulation to ankle dorsiflexor (DF) and S1 dermatome on kinematic parameters of hemiplegic gait. **Methods:** Six post-stroke hemiplegic patient was participated in this study. Electrical stimulation was delivered to ankle DF during the swing phase and S1 dermatome during the stance phase respectively, using 2 channel functional electrical stimulation (FES) with single foot switch. Kinematic data were collected using computerized motion analysis system. Data of No-stimulation (NS), DF stimulation only (DS), DF and S1 dermatome stimulation (DSS) trial were compared among each other. **Results:** Peak knee flexion angleduring swing phase of DSS group ($21.51 \pm 7.27^\circ$) was significantly greater than that of NS group ($17.15 \pm 6.59^\circ$) ($p < 0.017$). But did not show significant difference between NS ($17.15 \pm 6.59^\circ$) and DS group ($18.95 \pm 7.43^\circ$) nor DSS ($21.51 \pm 7.27^\circ$) and DS group ($18.95 \pm 7.43^\circ$). Gait speed and step length of DSS group (0.49 ± 0.26 m/s, 0.37 ± 0.14 m) was significantly greater than that of NS group (0.31 ± 0.04 m/s, 0.28 ± 0.04 m) ($p < 0.017$). But did not show significant difference between NS (0.31 ± 0.04 m/s, 0.28 ± 0.04 m) and DS group (0.41 ± 0.19 m/s, 0.34 ± 0.11 m) nor DSS (0.49 ± 0.26 m/s, 0.37 ± 0.14 m) and DS group (0.41 ± 0.19 m/s, 0.34 ± 0.11 m). **Conclusion:** In addition to the usual FES application stimulating ankle DF only during the swing phase, stimulation of S1 dermatome during stance phase can help to increase gait speed in stroke survivors with ankle plantar spasticity. This study shows the potential advantages of stimulating the ankle DF and S1 dermatome using single foot switch for post-stroke gait.

PA369

Effect of Polyunsaturated Fatty Acids on Physical FunctioningA. Norouzi Javidan¹, H. Sabour¹, *Z. Soltani²¹Tehran University of Medical Sciences, ²Tehran Medical Science, Tehran, IR

Introduction/Background: The anti-inflammatory and neuroprotective effect of omega-3 fatty acids have been shown so far, but still its influence on clinical measures in spinal cord-injured human models were not known. We tried to investigate changes in disability and dependency scores in chronic traumatic spinal cord-injured patients after 14 months of omega-3 fatty-acid consumption. **Methods:** Main inclusion criteria were: traumatic spinal cord injury (SCI) and post injury duration longer than 1 year. HRQOL was assessed in both groups using a Farsi version of the Short Form Health Survey (SF-36) before and after the educational programs. Repeated measures analysis of variance and ANOVA were used for data analysis through SPSS. MorDHA capsules (435mg of docosahexaenoic acid and 65mg of eicosapentaenoic acid) were administered in treatment group, whereas control group received placebo capsules for 14 months. **Results:** SF-36 domains of physical functioning ($P < 0.03$), role physical ($P < 0.04$) and mental health ($P < 0.002$) were significantly increased in the intervention group. **Conclusions:** Appropriate interventions may potentially lead to improvement in the HRQOL of these patients. **Keyword:** spinal cord injury, Physical Functioning, omega3.

PA370

Limiting Movement of The Non Affected Arm in an Hemiplegic Patient After Stroke: Action Protocol Based on Bibliography Search*M. J. Gonzalez Toro¹, B. Ferrer Gonzalez¹, B. Rendon Fernandez¹, M. J. Zarco Perñan², M. Barrera Chacon¹¹Hospital Universitario Virgen del Rocío, Zafra, ²Hospital Virgen del Rocío, Sevilla, ES

Introduction: Stroke is the second cause of death in EEUU and Western Europe. 85% of patients have a hemiparesia due to stroke which reduce the functionality of the upper limb and difficult the daily live activity. After the stroke, the patient often used his/her non affected upper limb in his/her daily life because it is easier and more effective. In the last years due to neuroscientific advances and based on neuroplasticity the rehabilitation treatment is focused on reaching functional activities of daily life in his/her real live. **Objective:** Determining if limiting movement of the non affected arm in a hemiplegic patient after a stroke is effective to recover functionality in the affected hemiplegic upper limb. To establish a treatment protocol in a hemiplegic patient due to stroke based on the repetitive use of the affected upper limb in his/her daily functional activities and the restriction of movement in the health upper limb. **Methods:** After reviewing the scientific bibliography based on the best evidence, determining the effectiveness of limiting movement in the health upper limb we establish a new protocol of action in the Neuro rehabilitation department of the hospital. **Results:** After searching in PubMed, PEDro, Trydatabase, EMBASE, Cochrane, CINAHL we conclude that the restriction movement in the health upper limb after stroke is a beneficiary therapy together with the used of the affected upper limb in daily life and obtain better results in functional independence. **Conclusions:** This therapy have meaningful evidence increasing functional independence and a better use of the affected upper limb. Based on these results we have created a new specific action protocol for our patients. **References:** 1) Sirtori V, Corbetta D, Moja L. Constraint-induced movement therapy for upper extremities in stroke patients. *Cochrane Database Syst Rev.* 2009 Oct 7;(4): CD004433. 2) Wolf SL, Winstein CJ, JP Miller. Effect of constraint-induced movement therapy on upper extremity function 3 to 9 months after stroke: the EXCITE randomized clinical trial. *JAMA.* 2006 Nov 1;

296(17): 2095-104. 3) Steven L; Wolf PA; Thompson CJ. The EXCITE Stroke Trial. Early and Delayed Constraint-Induced Movement Therapy *Stroke* 2010; 41: 2309-2315.

PA371

Return to Work in a Patient with Sacral Chordoma: a Case Study

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Case Diagnosis: Sacral Chordoma. **Case Description:** 58-year-old male with history of large sacral chordoma measuring 16.5 × 18 × 10 cm undergoing a staged resection which included a partial sacrectomy S2 through S5 with partial resection of the left gluteus muscle and a laminectomy at S1 and neurolysis of bilateral S1 nerve root and flap reconstruction. He presented to inpatient rehabilitation with significant fatigue and orthostatic hypotension as he remained on supine restrictions and weightbearing restrictions of 50-75% bilaterally. He completed a 4 week inpatient rehabilitation program, advancing to 30 minutes of sitting restriction. He completed neurogenic bowel and bladder training and discharged home and transitioned to outpatient rehabilitation. Patient continued outpatient rehabilitation for 4 months, with gains in manual muscle testing and increased endurance, walking 100 feet to over 1,410 feet with a rolling walker. He returned to work 8 months after his surgery working a 40 plus hour week full time at a postal station. He is required to lift, stand and walk during most hours of his 9 hour shift. He continues his bowel program twice daily and self-catheterizes independently. He now walks with a single tip cane. **Discussion:** Sacral chordoma is a rare, low to intermediate grade tumor often diagnosed late because of location and insidious onset. This case highlights rehabilitation program for sacral chordoma patient with significant physical impairments, neurogenic bowel, bladder and gait abnormality. Through extensive rehabilitation and multidisciplinary approach, he returned to work less than 10 months after his surgery. **Conclusions:** Cancer survivors now have a higher life expectancy with improved treatment regimens and earlier detection. Return to work is a goal for many cancer survivors. The positive influence of physical rehabilitation and long term continuation of rehabilitation after cancer diagnosis and treatment may be optimized to allow more cancer patients to return back to work. Future studies to assess factors associated with cancer types and socioeconomic factors may help improve rates of return to work with cancer patients. Ultimately, development of rehabilitation program to return to work may help improve quality of life for many cancer survivors.

PA372

A Case Report on Weaver Syndrome

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Case Diagnosis: Our case of Weaver Syndrome. **Case Description:** We present you a case of a 26-year old male admitted in our department for pain in the right hip after a fall from his own height. The x-rays were negative for fracture but revealed an area of high bone density while the rest of the bone appearance was of rather low density. While bone cancer was excluded the finding was attributed to the "hypermaturity" of the bones as the patient is suffering from a genetic disease called Weaver syndrome. Craniofacial malformations, limb abnormalities and foot deformities were identified. Family history of the patient includes a brother with heart valve deformity that was corrected surgically at the age of three years old. The remaining family history is negative. **Discussion:** Weaver syndrome was first described by Dr. David Weaver in 1974. About 30-50 cases have been published in the medical literature. It is a syndrome mainly of overgrowth of prenatal onset, advanced bone age, retarded psychomotor development and distinctive craniofacial appearance. The cause of Weaver syndrome is not known and

the gene(s) that is involved in it has not been identified. However, several genes that control in the long run stem cells' maintenance and lineage determination, such as osteogenesis, myogenesis, lymphopoiesis and hematopoiesis have been associated. Most cases are sporadic with no family history of the syndrome, although, there have been a few cases in families where autosomal dominant inheritance has been reported. What we found unusual about this case is the tension of the organism to produce stones in several organs (kidneys, gallbladder) and hyperlaxicity of the joints. *Conclusions:* The collaboration between the family and the rehabilitation services as well as the appropriate in time interventions have led to the good functional state of the patient. However, more characteristics of the syndrome rest to be found as it appears from the constant correlation of new symptoms with the syndrome.

PA373

Phrenic Nerve Clipping in Stroke Patient for the Treatment of Intractable Hiccup

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Hiccup is the sudden and erratic contraction of diaphragm and intercostal muscle immediately followed by laryngeal closure. Persistent and intractable hiccup is a rare but severely disabling disorder. Persistent hiccup can result in depression, fatigue, impaired sleep, dehydration, weight loss, malnutrition, and aspiration. The causes of persistent hiccups (brain malignancies, cerebral vascular lesions, multiple sclerosis, myocardial infarction, hiatal hernia etc.) are numerous, as are the treatment options. The conventional treatments for hiccups are pharmacologic or non-pharmacologic approaches. However, none of the treatments have proven to be effective, and no treatment has been shown to be superior to others. A 61-year-old man was admitted to our department who has been suffering from intractable hiccup. Hiccup had developed after subarachnoid hemorrhage and intraventricular hemorrhage and had continued for 6 years. Hiccup had not been treated effectively with conventional medicines (metoclopramide, gabapentin and baclofen etc). We discussed his persistent hiccup with cardiothoracic surgeons, and then he got phrenic nerve clipping operation, monitored by electromyogram. After the surgical procedure, frequency and intensity of hiccup was decreased.

PA374

Telerehabilitation for Chronic Neurological Disorders with Severe Disability: Feasibility and Efficacy

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Background: In 2013–2014 we have developed and applied a 3-week governmentally-funded telerehabilitation program for neurological patients with severe disability. The aim of the study was to evaluate the feasibility and efficacy of this intervention. *Material and Methods:* 91 patients aged 46±18 years (59 male) with chronic stroke, TBI, spinal trauma, multiple sclerosis and cerebral palsy with severe disability were included into the study. Face-to-face assessments and trainings were performed with the use of Scopia teleconference system. Telerehabilitation lasted 3 weeks (5 days a week) and included individual exercise therapy, physical training in virtual reality (VirtualRehab with Kinect), manual dexterity training with the use of biofeedback glove (Hand Tutor) and ReJoyce device, speech therapy, face-to-face and computerized cognitive training, psychological consulting. Assessment was performed at enrollment, at the completion of the program and at a 2-week follow-up. *Results:* An improvement in Barthel (65.6±27.7 vs. 61.3±29.5, p<0.001), Rivermead MI (7.8±4.4 vs. 7.0±4.5, p<0.001) and DASH (Disabilities of the Arm, Shoulder and Hand, 59.2±39.0 vs. 61.4±32.7, p<0.001) scores was observed during the telerehabilitation program. A slight improvement was also observed during the 2-week follow-up: Bartel 66.5±27.2 vs.

65.6±27.7 (p=0.02), Rivermead 7.9±4.4 vs. 7.8±4.4 (p=0.01), DASH 57.8±32.5 vs. 59.2±39.0 (p<0.001). The latter may be explained by an increase in frequency (3.5±3.0 per week at enrollment vs. 4.6±3.6 at the follow-up, p<0.001) and quality of the self-maintained trainings that participants reported after the program. In a feedback questionnaire patients rated equipment usability as 2.7±0.5 (max 3 for each item), clearness of the guides during distant training as 2.8±0.4, adequacy of medical control as 2.6±0.6 and efficacy of the treatment as 2.7±0.5. Patients mentioned such advantages of telerehabilitation as no need for transfer, staying in comfortable home environment, flexible schedule, optimal training due to professional guidance. *Conclusion:* The developed telerehabilitation program appears to be a feasible option for patients with chronic disabling neurological diseases. In case of limited funding short-term intervention may be still effective.

PA375

Neuropathic Plantar Foot Ulcer Management: a Comparison on the Efficacy of Total Contact Cast and Patellar Tendon Bearing Cast with Walking Iron

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Introduction/Background: Neuropathic ulcers are related to the loss of protective sensation in the feet are typically located on weight-bearing surfaces i.e., plantar surface of foot, metatarsal heads, and heels. Offloading is often considered for reducing foot pressure points and for prevention, as well as for healing. Total contact casting (TCC) is an inexpensive ambulatory procedure, but may cause joint stiffness, muscle atrophy, the possibility of new ulcerations. Patella tendon bearing brace (PTB), custom off-loading brace transfers weight from the foot to the patella and also increases rotational control of the lower extremity; thus, reducing pressure to prevent and treat distal ulcerations. Disadvantages include size, cost, and aesthetics and may be a factor in noncompliance because it is removable. *Material & Methods:* The purpose of this study is to evaluate the efficacy of TCC compared to PTB cast with walking iron in the treatment of neuropathic plantar foot ulcer. Sixty adult patients with neuropathic plantar ulcer (Wagner grade 1 and 2) were randomized for treatment with off loading TCC and PTB cast with walking iron. The treatment duration was 6 weeks. The reduction in ulcer surface area and total healing rates were evaluated after treatment. *Results:* A total of 65 patients were screened; however, four patients in TCC and one in PTB group did not complete the study and were considered dropouts. The ulcer surface decreased from 474.9 mm² to 47.7 mm² in the TCC group (P<0.001) and from 481.0 mm² to 29.0 mm² in the PTB with walking iron group (P<0.001). However, there were no significant differences between the groups (P=0.722). The ulcer depth was decreased from 5.6 mm to 0.3 mm and 3.8 mm to 0.3 mm in TCC and PTB group respectively. 85.2% patients in TCC group and 77.5% in the PTB with walking iron group achieved healing (P=0.724). Average healing time was 30±3.1 days and 28±2.6 days in the TCC & PTB group respectively (P=0.748). *Conclusion:* The results of this study indicate that pressure off loading using the TCC and PTB cast with walking iron are equally effective in the treatment of neuropathic plantar foot ulcers.

PA376

Shz-rTMS Effectiveness on Suprahyoid Motor Cortex in Chronic Dysphagia Patient after Stroke: Preliminary Study, 2 Case Reports

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Introduction: Dysphagia after stroke is a major concern because it may lead to aspiration pneumonia and increase mortality after

stroke. rTMS is effective in stroke patient with changing brain plasticity. But there are a little study about rTMS effectiveness in dysphagia patient after stroke. So we investigate rTMS effectiveness in chronic dysphagia patients after stroke. *Material and Methods:* We selected 2 patients with dysphagia that lasted longer than 1 month after unilateral stroke. One subject's lesion is left MCA infarction and the other's lesion is left PICA infarction. We performed 4 times VFSS and 1 time MEP on suprahyoid motor cortex. After 1st VFSS and MEP, we have 10 sessions 5Hz-rTMS, 100% rMT intensity in contralesional hemisphere. rMT was measured in FDI muscle. After rTMS stimulation, we conducted immediate VFSS. Then we followed up VFSS at 1 and 3 month later. We measured VDS(VFSS Dysphasia scale, 100 point scale), pharyngeal delay time (PDT) and pharyngeal transient time (PTT) as outcome parameters before stimulation, 1 month and 3month later. *Results:* After 10 sessions rTMS, some improvement in VDS scoring, PDT and PTT. VDS was measured in before, after TMS, 1 month later and 3 month later. PDT and PTT were measured in before TMS, 1 month later and 3 month later. In subject 1, VDS score was 74, 62, 36 and 40. PDT was 3.4 s, 0.8 s and 1.2. PTT was 4 s, 1.2 s and 1.67 s. In subject 2, VDS score was 53, 56, 38 and 41. PDT was 3.36 s, 1.6 s and 0.86 s. PTT was 3.93 s, 1.87s and 1.16 s. Subject 1 was kept in Levin tube at initial state and was trained by some food such as pudding texture via oral route in 3month later after rTMS. And subject 2 was kept in Levin tube at initial state, but Levin tube was removed and subject 2 started oral feeding such as pudding texture in 3 months later after rTMS. *Conclusion:* 5Hz-rTMS stimulations in contralesional hemisphere targeting with suprahyoid motor cortex have some effectiveness in oropharyngeal dysphagia patient after stroke.

PA377

Effects of Transcranial Direct Current Stimulation on Paretic Arm Function in Restorative and Chronic Stage Stroke Patients

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Introduction: Many studies of tDCS have indicated the effect on the performance of paretic hand, however there were a little study as to analyze arm movement kinesiologicaly. We aimed to investigate the effect of tDCS on the improvement of the paretic hand function by using kinesiological parameters. In order to assess the improvement of the upper extremity movements, we measured the angle and velocity by using motion capture analysis. *Material and Methods:* Five stroke patients participated in this study. We applied tDCS (1 mA, 20 minutes) bilateral primary motor cortex and measured paretic wrist extension and thumb abduction and box and block test (BBT) as performance test. Paretic limb movement were analyzed with motion capture and analysis software (Flame-Dias IV). Measurements were taken at before and after the tDCS and sham stimulation. We used Wilcoxon signed-rank test to compare the effect of tDCS and sham stimulation. Significance level was set at 0.05. *Results:* tDCS generally improved wrist extension and thumb abduction movement (maximal angle, average velocity, respectively) as compare with sham stimulation. Especially, we found the improvements speed and the significant improvement at BBT score after the tDCS compared to sham stimulation ($p < 0.05$). *Discussion and Conclusion:* The findings demonstrated the feasibility and efficacy of tDCS. The facilitative or inhibitory effects of tDCS on motor cortex resulted in improvement of paretic hand with faster and wider movement. The results indicated implications for the use of tDCS in stroke rehabilitation. Nissan Tamagawa Hospital and Saitama Misato rehabilitation hospital ethics committee approved this study. All participants gave their written informed consent.

PA378

A Typical Guillain-Barré Syndrome Presentation: from Misdiagnosis and Surgical Propose to Correct Diagnosis and Successful Rehabilitation.

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Case Diagnosis: Guillain-Barré Syndrome (GBS). *Case Description:* 68-years-old women, with known symptomatic lumbar spinal stenosis and recent total knee arthroplasty, presenting to the emergency department with 10 days duration lumbar pain irradiating to the lower limbs, associated with motor and sensory dysfunction. Further imagiological investigation with magnetic resonance was elicited and surgical treatment proposed. At PMR evaluation, at day 2, she presented with progressive flaccid and irreflexive tetraparesis, urinary retention, dysphonia, dysphagia and respiratory insufficiency. She was diagnosed with GBS and promptly monitored and transferred to the intensive care unit, where it was performed immunoglobulin therapy, tracheostomy and invasive ventilation, nasogastric tube feeding and urinary catheterization and posterior, PEG. After clinical stabilization, she was transferred to PMR Department for intensive rehabilitation program. Successful decannulation and removal of PEG were possible and progressive motor and functional recovery was achieved. After 6 months, she was independent in daily living activities and gait was possible with a hiker, with reasonable cadence, so that she was discharged from inpatient to outpatient rehabilitation program. *Discussion:* GBS is an acute inflammatory demyelinating polyneuropathy (AIDP), typically presenting with lumbar pain, numbness, paresthesia or progressive sensory and motor dysfunction. Much of these symptoms overlap with those of spinal cord injury, such as lumbar spinal stenosis, especially in initial stages. However, several clinical and paraclinical features may be used to rapidly discriminate patients with AIDP from those with acute myelopathies. AIDP patients often have both upper and lower extremity involvement, no sensory level and they are more likely to have autonomic involvement with cardiovascular instability. The reported case highlights the importance of a rigorous and adequate clinical evaluation and differential diagnosis, even when there is a previous presumptive diagnosis.

PA379

Computerized Dynamic Posturography in Patients with Diabetic Peripheral Neuropathy and Visual Feedback-Based Balance Training Effects

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Background: Diabetic peripheral neuropathy (DPN) often has reduced stability during standing conditions. *Aim:* To compare balance control in diabetic patients and normal subjects using computerized dynamic posturography and to assess effect of visual feedback-based balance training in DPN. *Materials and Methods:* A total of 57 patients of type 2 diabetes mellitus and 30 age-matched normal control subjects were recruited. The sensory organization test was done before and after the training program. *Result:* There was a significant decrease of mean (\pm SD) of composite equilibrium score and somatosensory ratio score between subgroups of DPN and control healthy group ($p < 0.05$). There was a significant increase of mean (\pm SD) of composite equilibrium score and the somatosensory ratio score after treatment as compared to results before training ($p < 0.05$) in mild DPN. Moreover,

there were a significant correlation between composite equilibrium score and disease duration before training in the severe DPN ($r=0.368$, $p<0.05$). **Conclusions:** Computerized dynamic posturography is an important quantitative tool in the assessment of posture instability and allows for early disclosure of the failure of the postural control system. Visual feedback-based balance training was shown to be a promising method for fall prevention among early diabetes mellitus with peripheral neuropathy. **References:** 1) Greene DA, Stevens MJ, Feldman EL. Diabetic neuropathy: scope of the syndrome. *Am J Med* 1999; 107 (2B):2S-8S. 2) Arezzo JC. New developments in the diagnosis of diabetic neuropathy. *Am J Med* 1999; 107 (2B):9S-16S.

PA380

Rehabilitation Program in Patients with Parkinson's Disease and Pulmonary Dysfunction

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Introduction: Parkinson's disorder (PD) is defined as the most common movement disease and the second most common neurodegenerative disorder which leads to progressive deterioration of motor function. Parkinson patients present a high risk for pulmonary dysfunctions. The aim of our study was to analyze the type of the impairment in breathing and to establish the effects of rehabilitation program on quality of life and physical performance and pulmonary function in PD patients. **Materials and Methods:** 36 PD subjects, in accordance with the Hoehn and Yahr classification, were assigned to a pharmacologic group (PG - $n=20$; mean age [\pm SD]= 56 ± 8 years) or a rehabilitation group (RG - $n=16$; mean age [\pm SD]= 58 ± 7 years). Each patient was complete evaluated (clinical and functional) in two moments: T1 – initial, and after 8 weeks –T2. The RG patients received supervised pharmacotherapy, education, exercise and respiratory muscle training, psychological support; the kinetic program was learned by patient in hospital and continues at home. Measured outcomes were pulmonary function tests, the distance walked in 6 minutes (6MWD), the Garden City scale and Chronic Respiratory Questionnaire (CRQ). Differences parameter values between groups were tested by ANOVA test. **Results:** Taking into consideration the locomotor dysfunctional status, almost patients were included in the second and third evolutionary stages. The restrictive dysfunction was the most common pulmonary abnormality (19 patients) and upper airway obstruction was mentioned in 6 patients. No significant correlations between pulmonary functions parameters and functional data were obtained. Important differences were observed in the mean changes of 6MWD at 8 weeks (47m in RG, 25 m in PG). By 8 weeks, Garden City scale scores had improved by 43% in RG and by 21% in PG, and CRQ scores had improved by 33% in RG and by 24% in PG. **Conclusion:** Although both groups improved by 8 weeks, patients in the RG achieved about twice as much improvement in 6MWD values and scale scores than subjects who performed only pharmacology treatment. The frequency of respiratory dysfunction in PD is significant and the management of exercise performance and quality of life requires taking into consideration all disabling aspects.

PA381

The Spatiotemporal Characteristics of Language Lateralization in Broca's Aphasics

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Objective: The purpose of this study was to explore the spatiotemporal characteristics of language lateralization during picture naming in chronic Broca's aphasics without speech treatment. **Methods:** Five patients with chronic Broca's aphasia and five matched right-handed healthy controls were recruited. Spatiotemporal changing of language cortical activation during picture nam-

ing was detected by magnetoencephalography (MEG). Language dominance was estimated by the laterality index (LI), which was defined to be left when the LI was more than 0.1, right when the LI was less than 0.1, and bilateral when the LI was between 0.1 and 0.1. **Results:** During the 275-400 ms, 400-600 ms and 600-800 ms time window, the aphasia group have significantly right lateralization of combined ROIs compared to the control group ($P<0.01$). At each ROIs level, Broca's area, Wernicke's area, supramarginal gyrus, and premotor area have significantly right lateralization during the specific time window in aphasia group compared to the control group ($P<0.05$). **Conclusion:** Broca's aphasics have significantly right lateralization during language processing of picture naming, which is associated with specific time window and ROIs. **Keywords:** aphasia; magnetoencephalography, MEG; Laterality Index; language processing; picture naming.

PA382

Rehabilitating Balance in People with Cerebellar Disease: a Randomised Controlled Feasibility Study of Training with Opto-Kinetic Stimuli in the Home

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Background: People with a pure type of inherited cerebellar disease, spinocerebellar ataxia type 6 (SCA6), feature ataxia with impaired balance from onset of their condition. As the condition progresses balance impairment is accompanied by other cardinal features of ataxia, loss of function and activity restrictions. The mechanism through balance impairment develops remained uninvestigated. This research programme first investigated sensory mechanisms of balance control in pwSCA6 in the laboratory before undertaking a randomised controlled feasibility trial of a newly designed targeted therapy. Laboratory investigations revealed largely normal use of vestibular and proprioceptive sensory information but clearly abnormal responses to visual perturbations in pwSCA6 compared to matched healthy controls. A targeted therapy was therefore designed to challenge the visual system, using opto-kinetic stimuli in the home environment, whilst participants underwent a systematic daily balance exercise programme. **Methods:** 12 people with SCA6 were stratified according to disease severity (SARA score) into pairs and then each randomised into either a therapy group (TG) or control group (CG). All participants received identical assessment at baseline, 4 weeks and 8 weeks in the home setting. During weeks 4 to 8, TG subjects undertook a home-based balance training program whilst CG participants received no intervention. The balance training program comprised of a set of standardised exercises undertaken in front of a visual screen with back-projected optokinetic stimuli. Test-retest reliability was analysed from outcome measures collected twice at baseline and at 4 weeks. Feasibility issues were collected using daily diaries and end exit interviews from both TG and CG participants. **Results:** Test-retest reliability is strong for balance impairment and activity measures (>0.7) with some indication of improvement observed in TG participants. Overall the balance training program was feasible for people with SCA6, with a dropout rate of 8%. Using balance-only relevant scores of the SARA (the Bal-SARA), a clinically significant change of 0.8 points could be detected in future trials of 80 participants per group. **Conclusion:** With the availability of valid and reliable outcome measures and with feasibility established, a fully powered RCT of the balance training program is now indicated.

PA383

Word Association Navigation Training Induced Language Lateralization Reorganization in Broca's Aphasics

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Objective: The purpose of this study was explore the mechanism of language lateralization reorganization in chronic Broca's aphasia with Word Association Navigation Training (WANT), by detecting language laterality of region of interests (ROIs) activity during language processing before and after training. **Methods:** Five patients with chronic Broca's aphasia were recruited for a ten-day intensively Word Association Navigation Training. The behavioral assessments were conducted by Western Aphasia Battery (WAB), Standard Language Test of Aphasia (SLTA), Mini-Communicative Activity Log (Mini-CAL) and picture naming tasks before and after WANT. The neural activity during language processing using a delayed picture naming task before and after WANT were detected by MEG. Language laterality of region of interests (ROIs) activity was compared before and after WANT. **Results:** The behavioral performances of patients with chronic Broca's aphasia were improved after WANT. The correct number of picture naming, "repetition", "naming" and "AQ" of WAB, "speaking" and "calculating" of SLTA were extremely significantly improved after training ($p < 0.01$); "spontaneous speech" of WAB, "listening" of SLTA were significantly improved after training ($p < 0.05$). Language laterality of neural activity during picture naming showed: during 275-400 ms time window, neural activity of language related brain regions showed left lateralization after WANT, the difference was statistically ($p < 0.05$). Neural activation of ROIs between two hemispheres showed: during 150-275 ms and 275-400 ms, the activation of right Broca homologous area was significantly higher than Broca's area ($p < 0.05$), during 275-400 ms, 400-600 ms time windows, the activation of Wernicke homologous area, right supramarginal gyrus, and right premotor area were significantly higher than Wernicke's area, left supramarginal gyrus, and left premotor area respectively before training ($p < 0.05$). After training, these differences between right brain areas and left brain areas were not observed ($p > 0.05$). **Conclusion:** Word Association Navigation Training induce left lateralization reorganization of neural activity during language processing in patients with chronic Broca's aphasia, which effectively improve speech function. **Keywords:** Broca's aphasia; magnetoencephalography, MEG; language recovery; lateralization reorganization; Word Association Navigation Training, WANT.

PA384

Rehabilitation among Hemiplegic Patients Treated during 2009–2013

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Background: Cerebrovascular accident (CVA) has important role in adult morbidity and mortality, causing serious medical, socio-economic and rehabilitation problems. Cerebrovascular accident is a pathology more frequented among population age group 45-60 years old; causing disability that requires specific care and treatment. **Objectives:** The goal of this research is to analyze and verify the most frequent and dangerous risk factors among hemiplegic patients and the impact of age in the overall success of rehabilitation. **Methods:** Data was extracted upon review of patient records of the Physiatric Clinic, University Clinical Center of Prishtina, who have undergone rehabilitation from January 2009 until December 2013. During this study down mentioned methods of physical therapy are implemented: electrotherapy, kinesiotherapy, seating and standing balancing, respiratory exercises, massage, ergonomic therapy, gait exercises as well as speech therapy. **Results:** Multi-morbidity is more frequent among patients above 60 years age. 47.1% of these patients with hemiparesis have two additional disease, meanwhile 52.9% are with three chronic disease. The most frequent risk factor that can cause hemiparesis is hypertension, present in 85.2% of cases. Patient's age proved considerable influence in rehabilitation success ($p > 0.05$). Important correlation is acquired from the number of risk factors in the success of rehabilitation. With increased number of risk factors the probability of getting completely dependent on someone's assistance is very high

($p < 0.01$). In this study the type of hemiparesis demonstrated high influence in the rehabilitation success of the patients. Significant statistical results of high importance are obtained based on early onset of physical therapy as a predictor of rehabilitation success. **Conclusion:** The physical therapy should start as soon as possible, and the presented algorithm of rehabilitation should be taken into consideration. Changing lifestyle, increase of physical activities, health education, weight loss and smoking cessation can prevent morbidity and mortality from CVA. **Keyword:** hemiplegic, risk factors, rehabilitation.

PA385

Diagnostic Value of 2nd Lumbrical-Interosseous Distal Motor Latency Comparison Test in Severe CTS

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Introduction: Some of the patients with severe carpal tunnel syndrome (CTS) occasionally present absent median sensory and motor responses in nerve conduction studies. In these cases, it is very challenging to localize the median mononeuropathy, and may lead to misdiagnosis. This study aims to examine the usefulness of second lumbrical-interosseous (2L-INT) distal motor latency comparison test in localizing CTS in patients with absent median sensory and motor conduction studies. **Material and Methods:** Electrodiagnostic results of 1,705 hands with CTS symptoms were reviewed retrospectively. All subjects were evaluated using standard nerve conduction study; median sensory and motor conduction. Additionally, all subjects were undergone 2L-INT distal motor latency comparison test. **Results:** Total of 1,705 hands were enrolled in this study. 401 hands were diagnosed with severe CTS. Among the severe CTS, 56 hands (14.0%) were unable to localize the exact lesion due to its absent median sensory and motor response in standard nerve conduction study. Among hands with absent median sensory and motor response, 42 hands (75.0%) showed abnormal 2L-INT response. The mean 2L-INT distal motor latency difference was 4.53 ± 2.63 ms. In severe CTS patients who showed absent median motor and sensory responses, 75.0% revealed prolonged median lumbrical distal motor latency and 2L-INT latency difference. **Conclusion:** In patients with absent median sensory and motor response, it is not possible to localize lesion definitely with using standard nerve conduction study. In our study, 2L-INT distal motor latency comparison test was of great value in localizing even the most severe CTS patients who showed absent response in the standard nerve conduction studies.

PA386

When Should We Start Balance Training to Prevent Balance Inequality during Gait in Hemiplegia?

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Background: Most chronic stroke patients walk awkwardly because of deviation of body weight balance on intact side, causing frequent fall and decreased gait endurance. To address this problem, we aimed to assess the change of standing balance during progression of gait training stage and determine the appropriate timing to start balance training in subacute hemiplegia. **Materials and Methods:** Consecutive subacute hemiplegic stroke patients who were prescribed for gait training in neurology or rehabilitation wards were recruited. Gait training stages were classified into 3 stages: 1) tilt table training, 2) parallel bar (p-bar) standing training, and 3) p-bar or cane gait possible for more than 10 steps. Balance evaluation was performed in each stage. In each stage, symmetry of weight bearing during quiet standing was evaluated using a pair of force-sensor embedded shoe. Trunk Impairment Scale (TIS) and Berg Balance Scale (BBS) were also evaluated. **Results:** In patients whose initial gait stage was stage 1 or 2 ($n=18$,

group A), the percentage of weight bearing on the hemiplegic side changed from 37.9±5.4% (mean±standard error mean, stage 1) to 25.6±7.2% (stage 2) to 13.6±3.0% (stage 3). There were significant difference between stage 1 and 3 ($p=0.007$). TIS (1.46 ± 0.72 to 8.40 ± 1.23 , $p<0.001$) and BBS scores (1.18 ± 0.54 to 6.29 ± 1.84 , $p=0.001$) increased from stage 1 to 3. The patients who were initially in stage 3 ($n=7$, group B) showed 35.5±4.2% weight bearing on hemiplegic side, demonstrating similar weight distribution pattern with group A in stage 1 ($37.9\pm 5.4\%$, $p=0.585$), but significantly different from stage 3 of group A ($13.6\pm 3.0\%$, $p=0.002$). **Conclusion:** This was the first study to evaluate the longitudinal change of weight distribution with regards to gait training stage. Despite partial neurologic recovery of lower extremities, hemiplegic patients demonstrated a tendency to bear more weight on the intact side with gait stage progression, especially when they started gait training in p-bar. Early facilitation of the hemiplegic lower limb during stroke rehabilitation is necessary.

PA387

The Assessment of Fatigue by Patients with Parkinson Disease

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Introduction: Fatigue can be found in some chronic disease in rehabilitation. It is one of the symptoms in Parkinson, too. The objective is to assess the fatigue by those patients, that have many benefits for the level of medical care and plan for rehabilitation. There were difficulties in their assessment, because it can be produced by many reasons. The aim of our study was to make assessment of fatigue with 2 parallel scales. **Methods:** We have used 2 scale - Fatigue Severity Scale (FSS) and Parkinson Fatigue Scale (PFS-16) and collection of personal and social data on 28 patients (age, medication, sex and social status). **Results:** From total 28 patients, 19 (68%) have fatigue continually in last 3 years. Score for fatigue with Parkinson Fatigue Scale scale was by 61% or patient was with bad quality of live 75-100%. The score with Fatigue Severity Scale was by 82% or their quality of live was 65-85%. There were no differences between use of scales, $p>0.05$. **Conclusion:** The assessment of fatigue by patient with Parkinson, can be basis information of potential of him in future, to plan program for rehabilitation and how much we can expect of him. **Keywords:** fatigue assessment, Parkinson, rehabilitation.

PA388

Cognitive Optimization – Interim Results of a Pilot Study

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Introduction: An optimal level of independent functioning and a good quality of life require a certain level of cognitive functioning. Cognitive functions are frequently impaired in central neurological conditions. Therefore, neurological rehabilitation must involve, besides the interventions for improving the physical functioning of the person, a specific, individually tailored cognitive optimization intervention. This intervention has to be designed and permanently adjusted to the level of the cognitive impairment and to ensure an efficient entrainment and use of the preserved functional resources of the individual. **Material and Method:** We present the interim results of an intervention of cognitive stimulation therapy on a group of 10 patients, hospitalized in our Rehabilitation Medicine Department, with central neurological conditions (stroke and traumatic brain injury), presenting a mild cognitive impairment, expressed by memory and mental calculus disturbances, impaired focused attention, mild spatial orientation

impairment. The learning capacity was preserved. They received 15 individual sessions of personalised cognitive stimulation therapy, consisting of memory and mental calculus exercises, attention focusing exercises, spatial orientation exercises. Our psychological clinician used pencil – paper worksheets. Among others, we used the following assessment tools: The Clock Drawing Test, The Yerkes Cubes, Mini Mental State Examination, Montreal Cognitive Assessment, Wechsler Memory Scale, Clinical Dementia Rating, Reisberg Scale, Global Assessment of Functioning Scale and Stroke Specific Quality of Life Questionnaire. The psychological evaluation has been performed before the first session and after the last session of cognitive stimulation therapy. **Results:** The execution times improved from one session to another, the patients became more self confident and more operative. The scores of the cognitive evaluation tests and of the quality of life improved considerably, as well as the physical functioning scores and the physical independence degree. **Conclusion:** A well designed cognitive therapy intervention reduces the time costs of a rehabilitation program and improves the patient’s quality of life. A good compliance and working disponibility of the patient improves the efficiency of the therapy. **Acknowledgments:** This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number POSDRU/159/1.5/S/137390.

PA389

Neuromuscular Electrical Stimulation (NMES) in Stroke Patients with Swallowing Disorders. The State of the Art.

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Introduction: Neuromuscular electrical stimulation (NMES) technique is an electrotherapy system designed for different neuromuscular conditions. Specifically, Vitalstim is a dual-channel treatment for swallowing dysfunctions. The purpose of this study is to evaluate the outcome of Vitalstim stroke patients through an analysis of the literature aimed at aiding with the decision of whether or not to acquire the instrument for our hospital. **Methods:** Basic information is provided about the physiological background of electrical stimulation. The literature reviewed in this manuscript was derived through a computer-assisted search using the biomedical database Medline to identify all relevant articles published from the initiation of the different databases up to December 2013. **Results:** We searched in the Pubmed, Cochrane Library, CINALH and ACP Journal Club databases. The literature about this condition varies greatly regarding all kinds of dysphagia and is not univocal in conclusions and methods for stroke patients. The only review found regards NMES in general and does not address Vitalstim. **Conclusions:** The conclusion is favorable to the effectiveness of NMES for this kind of dysphagia. Specifically, 8 articles were found. The review not only elucidates the substantive potential benefit of this treatment, but also potential key concerns for patient safety and long term outcome. 5 out of 8 trials had effective results, 2 of them an uncertain result and 1 an ineffective method. The discussion within the clinical and research communities, especially around the commercially available Vitalstim stimulator, is objectively explained. **References:** 1) Margareta Bulow, ReneeÅ’ Speyer, Laura Baijens, Virginie Woisard, Olle Ekberg: Neuromuscular Electrical Stimulation (NMES) in Stroke Patients with Oral and Pharyngeal Dysfunction. *Dysphagia* (2008) 23: 302-309. 2) Christy L. Ludlow, PhD, Ianessa Humbert, PhD, Keith Saxon, MD, Christopher Poletto, PhD, Barbara Sonies, PhD, and Lisa Crujido, MS: Effects of Surface Electrical Stimulation, Both at Rest and During Swallowing in Chronic Pharyngeal Dysphagia. *Dysphagia* (2007): 22;1-10. 3) Debra M. Suiter, PhD, Steven B. Leder, PhD, and Jacki L. Ruark, PhD: Effects of Neuromuscular Electrical Stimulation on Submental Muscle Activity. *Dysphagia* 2006: 56-60.

PA390

Functional Become of Shoulder Hand Syndrome in Hemiplegic: about 32 Cases

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Introduction: The reflex sympathetic dystrophy of the upper limb is a common complication of hemiplegia. Its clinical manifestation associated pain, joint stiffness, vasomotor and trophic disorders and affects the shoulder and/or hand (shoulder-hand syndrome). The aim of our study was to investigate the epidemiological, clinical and functional outcomes of shoulder-hand syndrome in hemiplegic patients in a rehabilitation department. **Materials and Methods:** Retrospective study of 32 hemiplegic patients after a stroke and followed at the department of Physical and Rehabilitation Medicine of Monastir for over 9 years (2006-2014). **Results:** Sixteen men and 16 women, whose mean age was 66.2 ± 10.6 years, were recruited. In their medical history, there was hypertension in 65.6% of cases, diabetes in 50% of cases, dyslipidemia in 25% of cases, cardiac disease in 18.8% of cases and thyroid dysfunction in 6.2% of cases. Hemiplegia was in the right side in 59.4% of cases and in the left side in 40.6% of cases. The median time to onset of symptoms was 10 ± 9 months. Forty percent of our patients had an overall deficit of more than 3 and 21.9% a deficit at 0. An upper limb spasticity was noted in 65.6% of cases. An isolated involvement of the shoulder was observed in 68.8% of patients, associated with an impairment of the hand in 31.2% of cases. A subluxation was present in 5 patients. For range of motion, mean abduction was 66.8° , the average of 68.4° forward flexion and external rotation of 25.6° . The therapeutic management included an appropriate rehabilitation with an average of 58 sessions associated with analgesics in 81.2% of cases, infiltration of the shoulder in 56.2% and an immobilization sling for hemiplegic 40.6% of cases. The evolution was marked by a stabilization and/or improvement in 65.6% of cases and worsening of symptoms in type of joint stiffness in 34.4% of cases. **Conclusion:** The reflex sympathetic dystrophy of the upper limb is unique by its high frequency in the hemiplegic making it a topic of therapeutic care requiring proper care. We emphasize the importance of prevention by avoiding the glenohumeral decoaptation.

PA391

Impact of Age of Second Language Acquisition on the Brain Activity of Korean-English Bilinguals*H. Park¹, *D.-K. Kim², S.-B. Pyun³, H. Cho³¹Hankuk University of Foreign Studies, ²Chung-Ang University, ³Korea University, College of Medicine, Seoul, KR

Introduction: The objective of this study was to investigate whether AoA is still an important determinant for highly proficient bilinguals and whether they show similar or different neural responses when their language proficiency in both languages are equated. **Material and Methods:** Twenty Korean-English interpreters (first language (L1)=Korean, second language (L2)=English), ten early-bilinguals (EB) and ten late-bilinguals (LB), have been purposely selected. Early-bilinguals are defined as those who have acquired their L2 before age of 12 and have spent more than two years in English-speaking countries while later-bilinguals are those who have acquired L2 after age 12 and have no or short experience of residing in English-speaking countries. All the subjects underwent: *i*) consecutive interpretation from English to Korean (9 min.) and *ii*) consecutive interpretation from Korean to English (9 min.). Each run is composed of six sub-sets of "fixation" (30 sec.), "auditory input" (30 sec.), and "covert translation" (30 sec.). Siemens Magnetom Trio 3T System was used. The coordinates of activated brain regions were generated and filtered through the statistical threshold levels of q FDR-corr ≤ 0.05 at cluster-level and Puncorrected ≤ 0.001 at peak-level in SPM8. **Results:** During L2

comprehension, EB interpreters tended to activate the left hemisphere more extensively than their LB counterparts. LB interpreters mobilized wider areas of the right hemisphere than EB. During L1 comprehension, regardless of AoA, the left-lateralization was observed both in EB and LB groups. During L1 production, EB interpreters showed significant activation of the left insular cortex, supplementary motor area and cerebellum. The 'k' value of voxels in EB interpreters, which measures the extent of activation, was far greater than that of LB interpreters. During L2 production, both EB and LB interpreters showed extensive activation of the precentral gyrus and supplementary motor area in the left hemisphere. **Conclusion:** The age of L2 acquisition proved to remain as a determinant factor in the brain activation even in the highly proficient bilingual group. Left-lateralization during L2 comprehension among EBs compared with LBs' mobilization of both left and right hemispheres supports the theory of different L2 acquisition routes between EB and LB learners in the previous studies on bilingualism.

PA392

The Prevalence of Pronator Teres among Patients with Carpal Tunnel Syndromes: Cross-Sectional Study*M. Asheghan¹, M. T. Hollisaz², A. Shahabi Aghda¹, A. Khatibi Aghda¹¹Baghyatollah University of Medical Sciences, ²Baghyatoolah University of Medical Sciences, Tehran, IR

Introduction: We tried to determine the prevalence of pronator teres syndrome among patients with carpal tunnel syndrome, and to assess the relationship between clinical, ultrasound, and EDX findings. **Materials and Methods:** A single group, cross-sectional study was performed in clinical setting facilities. We included 148 participants [107 women, 41 men, mean age (std) of 51.4 (7.6) years] with clinical manifestations of carpal tunnel syndrome. The primary outcome was the prevalence of pronator teres syndrome. Clinical, electrodiagnostic, and ultrasound assessments were aimed to the diagnosis of both syndromes. **Results:** 13 (8.8%) patients presented electrodiagnostic, and 27 (18.2%) had clinical manifestations of pronator teres syndrome of which, 17 showed ultrasonic signs of the syndrome. In addition, 2, 7, and 8 out of the 17 patients had mild, moderate, and severe carpal tunnel syndrome, respectively (p-value=0.021). There was no significant difference in age between the patients with, and without pronator teres syndrome (p-value=0.179). Nine participants with pronator teres syndrome were male and there was a significant difference concerning sex (p-value=0.013). There was a good agreement between electrodiagnostic and ultrasound findings (Cohen's kappa coefficient=0.71, p-value<0.0001). **Conclusion:** Pronator teres syndrome should be considered as a possibility among patients with carpal tunnel syndrome. The association is stronger for severe carpal tunnel syndrome. Both electrodiagnostic and sonographic studies are efficient for diagnosing pronator teres syndrome, and their results are well correlated. Age is not a significant predictor, but men are more prone to develop pronator teres syndrome.

PA393

The Prevalence of Carpal Tunnel Syndrome among Long-Term Manual Wheelchair Users with Spinal Cord Injury: a Cross-Sectional Study*M. Asheghan¹, M. T. Hollisaz¹, T. Taheri²¹Baghyatollah University of Medical Sciences, ²Khatamolambia Hospital, Tehran, IR

Background: Use of a handrim wheelchair could force the wrist into extreme excursions and encroachment of the median nerve. We performed a study of the prevalence of carpal tunnel syndrome in prolonged wheelchair users. **Methods:** A cross-sectional study was conducted for one year in an outpatient clinic of spinal cord

injury. Participants had traumatic injury at the first thoracic level and below, with time since injury of at least 5 years. **Results:** Participants (N=297) were all male. Mean (SD) age and duration since injury were 48 and 23 years, respectively. A significant difference in median duration of injury based on the severity of the syndrome ($p < 0.001$), and a significant trend in time since injury for the severity [p (one tailed) < 0.001] were seen. There was a significant difference in the median age among the groups ($p = 0.009$), and the median increased with the severity [p (one tailed) $= 0.001$]. **Conclusions:** Carpal tunnel syndrome is a common side-effect of the long time use of wheelchair, and its severity is associated with duration of wheelchair use and patient's age. Alternative methods for wheelchair propulsion should be developed to diminish the likelihood of the syndrome.

PA394

Comparison the Effectiveness of Partial Body Weight Support Treadmill Training (PBWSTT) and Traditional Walking Training on TNF-Alpha Plasma Level of Ischemic Stroke Patient

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Introduction: TNF-alpha is an inflammatory marker for Cardio-vascular disease. Interventions that reduce TNF-alpha level could contribute to prevent atherosclerosis and reduce future stroke events. Physical exercise is associated with a reduction in stroke risk. The objective of this study is to compare the effectiveness of treadmill walking with partial body weight support (PBWSTT) and traditional exercise training in stroke ischemia on TNF-alpha. **Methods:** Sixteen stroke ischemic patients from Medical Rehabilitation out patient clinic Soetomo General Hospital Surabaya who already able to walk were enrolled in the pretest-posttest control group design study. All subject in this study were randomized into 2 groups: group 1 PBWSTT and group 2 traditional walking training (TE). Group 1 undertook treadmill walking with partial body weight support and group 2 undertook grounded walking. Exercise must be completed in 12 session, 3 times/week and 30 minutes per day. TNF-alpha plasma level was measured on pre and post training. **Result:** No significant difference in the reduction on pretest and posttest TNF-alpha levels between PBWSTT and TE groups, neither on posttest results between PBWSTT and TE groups. **Conclusion:** In our study either PBWSTT and Tradisional exercise training not decrease TNF-alpha. The causes behind elevated circulating cytokines are complex, and there are gaps in our knowledge about how to intervene against chronic inflammatory disease in stroke. Elevated levels of proinflammatory markers have also been reported after stroke and have been strongly associated with larger infarct size and poor outcomes. In our study no difference on decreasing plasma levels of TNF-alpha both two groups, so if there is no equipment treadmill walking with partial support in Rehabilitation centre, the traditional walking training still can be choose for standard method for endurance exercise.

PA395

Dual-Mode-Noninvasive Brain Stimulation over the Primary Motor Cortices in Stroke Patients

**M. KIM*

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Introduction: Noninvasive brain stimulation (NBS) using the repetitive transcranial magnetic stimulation (rTMS) or the transcranial direct current stimulation (tDCS) were recently adopted for modulating motor function of stroke patients. We investigated the effect of simultaneous dual-mode stimulation using rTMS and tDCS over bilateral primary motor cortices (M1) whether it is more effective than single stimulation using rTMS for recovery of motor function in subacute stroke patients. **Material and Meth-**

ods: Twenty-two subacute stroke patients whose total Fugl-Meyer Assessment (FMA) score marked under 84 were recruited in this open-label study. In the dual-mode stimulation group, the 10 Hz rTMS (90% of resting motor threshold, 1,000 pulses) were applied over the ipsilesional M1 for 20 minutes with simultaneous application of the cathodal tDCS (2 mA) on the contralesional M1 for 20 minutes. Single stimulation group underwent 10 Hz rTMS without tDCS. Ten daily sessions were conducted for 2 weeks. The total, upper, and lower scores of FMA were measured before, after, and 2 months after the intervention. **Results:** The scores of total and upper FMA were significantly improved over time in both dual and single stimulation group ($p < 0.05$). However, there were significant group and time interaction effects in both total and upper FMA ($p < 0.05$). Post-hoc study showed that the mean changes in total ($p = 0.024$) and upper FMA ($p = 0.019$) scores were significantly better in the dual stimulation group than the single group after 10 sessions of stimulation. **Conclusion:** The dual-mode NBS with simultaneous application of 10 Hz rTMS and the cathodal tDCS over the bilateral M1s was safe and superior to 10 Hz rTMS alone for improving motor function in subacute stroke patients. (Supported by the NRF grant funded by the Korea government (MSIP) (NRF-2014R1A2A1A01005128) and the Brain Research Program through the NRF funded by the Ministry of Science, ICT & Future Planning (NRF-2006-2005330)).

PA396

Computerized Dynamic Posturography in Patients with Diabetic Peripheral Neuropathy and Visual Feedback-Based Balance Training Effects

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Background: Diabetic peripheral neuropathy (DPN) often has reduced stability during standing conditions. **Aim:** To compare balance control in diabetic patients and normal subjects using computerized dynamic posturography and to assess effect of visual feedback-based balance training in DPN. **Materials and Methods:** A total of 57 patients of type 2 diabetes mellitus and 30 age-matched normal control subjects were recruited. The sensory organization test was done before and after the training program. **Result:** There was a significant decrease of mean (\pm SD) of composite equilibrium score and somatosensory ratio score between subgroups of DPN and control healthy group ($p < 0.05$). There was a significant increase of mean (\pm SD) of composite equilibrium score and the somatosensory ratio score after treatment as compared to results before training ($p < 0.05$) in mild DPN. Moreover, there were a significant correlation between composite equilibrium score and disease duration before training in the severe DPN ($r = 0.368$, $p < 0.05$). **Conclusions:** Computerized dynamic posturography is an important quantitative tool in the assessment of posture instability and allows for early disclosure of the failure of the postural control system. Visual feedback-based balance training was shown to be a promising method for fall prevention among early diabetes mellitus with peripheral neuropathy. **References:** 1) Greene DA, Stevens MJ, Feldman EL. Diabetic neuropathy: scope of the syndrome. *Am J Med* 1999; 107 (2B):2S-8S. 2) Arezzo JC. New developments in the diagnosis of diabetic neuropathy. *Am J Med* 1999; 107 (2B):9S-16S. 3) Boulton AJ, Malik RA, Arezzo JC, Soslenko JM. Diabetic somatic neuropathies. *Diabetes Care* 2004; 27(6):1458–86.

PA397

Effectiveness of Execution of Actions Observed in Association with Sound Stimuli in Treatment of Upper Limb Activity in Post Stroke Patients. A Protocol for a Randomized Controlled Trial

**S. Cocci Grifoni, A. Caiazzo, A. Levantesi, F. Morsut, A. Giattini*

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Background: Different studies show the presence and the mechanism of action of the neurons mirror system and of its application in neurological rehabilitation, in particular in acquired brain accidents. The rationale of this experimental protocol of study is the possibility of learning about the execution of observed movements (action observation therapy). As well, the execution of movements observed with the addition of a sound stimulus have been studied and verified as probably effective in increasing the motor performances and improving the function of the upper limbs. The aim of this study is to verify the influence of sound stimulus in functional recovery accompanied with action observation therapy. **Methods:** This protocol of the randomized controlled trial (RCT) expects to enroll 30 patients affected by ischemic or hemorrhagic strokes with the involvement of their upper limb. Participants will watch video footage of daily routine tasks (actions) carried out with the upper limb in order to prepare to imitate the presented action. The video will be accompanied by sounds in the experimental group. The control group will be submitted to a treatment without sounds stimuli. Outcome measures will be: Functional Independence Measure, Modified Ashworth Scale, Motricity Index, Wolf Motor Test, Nine Hole Peg Test, and muscular examination. Eligibility criteria are: between 40 and 85 years of age, first stroke of their life with the enrollment made within 60 days from the acute event. General motricity must be maintained, and serious cognitive deficits that may invalidate the treatment must not be present (apraxia, neglect, attentive deficit, memory deficits and visual impairments). The protocol plans for 20 applications of this treatment, for 20 minutes each, in one month. Three assessments will be made per patients. The final assessor will be blind. **Results and Conclusions:** The expected results are to demonstrate that the outcome measure scales used will have a significant difference at the end of the treatment in the experimental group versus the control group. This difference should be maintained at the follow up as well.

PA398

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minutes each, in one month. Three assessments will be made per patients. The final assessor will be blind. **Results and Conclusions:** The expected results are to demonstrate that the outcome measure scales used will have a significant difference at the end of the treatment in the experimental group versus the control group. This difference should be maintained at the follow up as well.

PA399

Morbidity Aspects in Spinal Cord Injury with Insights into the Transplantation of Stem Cells in the Injured Cord

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Background: Spinal Cord Injury (SCI) is one of the most devastating injuries that afflict young people at the height of their social and working life. It is a multi-system injury which leads to a significant morbidity and mortality. SCI repair is one of the biggest challenges in modern medicine and this complex human experiment in neural repair for SCI individuals must be proven safe and effective by the highest standard evidence-based medicine. **Objective:** This study aims to ascertain the morbidity trends in individuals with Spinal Cord Injury (SCI) and its association with demographic characteristics and treatment modalities. **Methods:** The medical records of 190 patients with SCI who were admitted during 2006-2011 were enrolled in this study. Their demographic data, causes of injury and mode of treatment were analyzed. American Spinal Injury Association (ASIA) impairment scale was used to categorize injury level and severity. The causes of morbidities surveyed were; cardiovascular, respiratory, renal complications, pressure sores, spasticity and neurogenic pain. **Results:** A total of 190 cases were reviewed. The majority were predominantly males (80%). The male/female ratio was 4:1 the mean age at the time of injury was 32 years range from (13 - 70 years). The vast majorities were traumatic causes (88%) and road traffic accidents were the main cause of their injury. non-traumatic causes were recorded in 12% of the cases. Of all the morbidities studied, pain was the dominant cause (45%) followed by urinary tract infection (30%), pressure sores (25%), spasticity (23%), thromboembolic complications (18%) and respiratory complications (10%). Among the few cases of chronic SCI patients who opted for stem cell trial outside our center perioperative morbidity and lack of significant functional outcome were documented. **Conclusions:** The most common cause of morbidity was neurogenic pain followed by urinary tract infection. This study showed that traumatic causes and particularly road traffic accidents are the leading cause of Spinal Cord Injury in Jordan. Stem Cell Transplant is still limited in Jordan as neither national nor international standards are yet implemented. Systematic preclinical studies are needed to establish and optimize therapies for clinical trials.

PA400

Effects of Robot-Assisted Gait Training to the Lower Limb Function of Patients with Hemiplegia in Stroke

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Objective: The aim of this study was to evaluate the effects of robot-assisted gait training to the lower limb function of patients with hemiplegia due to a stroke less than 3 months. **Methods:** 40 stroke patients were randomly assigned into the control group and the trial group with 20 patients respectively. Both group were treated with routine rehabilitation therapies, while the trial group was also treated with robot-assisted gait training for 30 min per day, with a total 42 training in 6 weeks. The Fugl-Meyer assessment (FMA), Ueda Satoshi standardized hemiplegic function scale (Ueda Satoshi standardized hemiplegic function scale)

and the functional ambulation categories (FAC) were used to evaluate the lower limb function in both group before and after the 6 weeks therapies. *Results:* There was no significant difference between the two groups in any assessment above before therapy ($P>0.05$). And after the treatment, the FMA, the grade of Ueda Satoshi standardized hemiplegic function scale and the FAC were all improved significantly in both group ($P<0.05$), but the trial group with the robot-assisted gait training were significantly better than the control group in the assessment above ($P<0.05$). *Conclusions:* The lower limb function was improved further more in the stroke patients (less than 3 months) with the robot-assisted gait training on the basis of the routine rehabilitation therapies.

PA401

Corticospinal Tract Degeneration after Cerebellar Injury: from the Viewpoint of Diffusion Tensor Tractography

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Introduction: Crossed cerebellar diaschisis (CCD), suggested to be related to a corticopontocerebellar (CPC) tract, is known as a contralateral cerebellar dysfunction in an ipsilateral cerebral injury patient. On the other hand, cerebello-cerebral diaschisis means a contralateral cerebral dysfunction following a cerebellar injury. However, the relationship between motor function and cerebellum-cerebral connection is still unclear. We report a cases of a corticospinal tract (CS) degeneration after cerebellar injury including cerebellar ICH with arteriovenous malformation (AVM), revealed by diffusion tensor tractography (DTT). *Case Report:* A 15-year-old boy was admitted due to a sudden severe headache. He was diagnosed with right cerebellar hemorrhage and IVH by AVM. He had external ventricular drain and AVM nidus removal was done. Three weeks later, he showed decreased mentality, mutism and double hemiparesis, suggesting posterior fossa syndrome. Four months after onset, he was transferred to the rehabilitation unit without significant functional improvement. He underwent DTT four times at intervals of 1-2 months and CS tract and CPC tract was done. The 1st DTT, performed on the 5th month, showed discontinuation on left CPC tract and degeneration on right CPC and bilateral CS tracts. On the 2nd DTT, the left CS tract showed a progressed degeneration. After intensive rehabilitation therapy, he showed progressive functional recovery (Modified Barthel Index/Berg balance test/Grooved pegboard test 22/12/3'49"(Lt) on 5th month, 76/28/1'32"(Lt) on 7th month, respectively). DTT findings also represented progressive improvement of integrity and volume in left CPC and bilateral CS except the right CPC tract. *Conclusion:* Cerebellar injury might lead to the disruption of corticospinal tract, which constitute a diaschisis phenomenon. Both cortico-ponto-cerebellar and corticospinal tract were restored with proper rehabilitation, and these process of neuroplasticity could be proven by diffusion tensor tractography.

PA402

Effect of 8-Week Home-Based Yoga and Resistance Training on Muscle Strength, Motor Capacity and Balance in Patients with Multiple Sclerosis

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Introduction and Objective: This study was designed to determine effect of 8-week home-based yoga (YT) and resistance training (RT) on muscle strength, motor capacity and balance in 26 patients with multiple sclerosis (MS). *Methods:* The subjects were categorized into three groups (Age: 31.3±9.0749): YT, RT and control.

Two experimental groups participated in YT and RT. *Results:* The data analyzed using one way ANOVA showed; however, that YT had no significant effect on leg muscle strength, but home RT increased it. Also, motor capacity was not affected by any YT and RT, but the balance changed. *Conclusion:* Each exercise modality has an effect on some fitness indices in MS patients. *Keyword:* Resistance training, Motor capacity, Yoga. *References:* 1) Oken B.S, Zajdel D, Kishiyama S, Flegal K, Dehen C, Haas M & Leyva J. (2006), Randomized, controlled, six-month trial of yoga in healthy seniors: effects on cognition and quality of life. *Altern Ther Health Med*, 12(1), 40. 2) Jackson K, Mulcare J. A, Donahoe-Fillmore B, Fritz H. I & Rodgers M. M, (2007), Home balance training intervention for people with multiple sclerosis. *Int J MS Care*. 9 (3), 111-117., 9: 111-117). 3) Ahmadi A, Nikbakht M, Arastoo A, Habibi A, (2010), The effects of a Yoga intervention on Balance, speed and endurance of walking. Fatigue and quality of life in people with Multiple Sclerosis. *J Hum Kinet*, 23: 71-78.

PA403

Effects of Repetitive Transcranial Magnetic Stimulation on Lower Extremity Spasticity in Stroke Patients

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Background: Spasticity is a common disorder and one of the causes of long term disability after stroke. In the last decade, rTMS has been used in various neurological conditions control muscle spasticity. The purpose of the present study is to investigate the effect of inhibitory repetitive transcranial magnetic stimulation (rTMS) on lower extremity (LE) muscle tone and motor neuron excitability in chronic stroke patients. *Material and Method:* This study was a randomized sham-controlled cross-over trial with 1-week follow-up. A total of 20 post stroke patients were randomized to receive active (n=10) or sham (n=10) rTMS. Fourteen of patients (7 in each group) crossed over to the sham or active rTMS after a washout period of 1 month. Interventions consist of 5 consecutive daily sessions of active or sham rTMS to the unaffected lower extremity motor area (1,000 pulses; 1 Hz; 90% of motor threshold). Outcome Measures were Modified Modified Ashworth Scale (MMAS), the H-reflex, Lower extremity section of Fugl-Mayer Assessment (LE-FMA) and Timed Up and Go (TUG) test. All outcomes were measured at 3 levels in each intervention period: pre and post intervention, and 1-week follow up. *Results:* Friedman's test revealed significant improvement in MMAS score only after active rTMS. This improvement lasted for one week after the active rTMS. Repeated measure ANOVA showed significant time*intervention interaction for LE-FMA. There are no differences between groups for the MMAS and LE-FMA. No significant change in Hmax/Mmax as well as the TUG test was noted. *Conclusion:* Inhibitory rTMS over the LE motor area can improve clinical measures of muscle spasticity. No significant changes in electrophysiologic measures of spasticity were observed in this sample of patients.

PA404

A Pilot Study of a Randomized Controlled Trial to Investigate the Most Efficacious Dose of Botulinum Toxin A for the Treatment of Sialorrhoea in Adults with Neurological Diseases

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Introduction: There is no literature available on the most efficacious dose of botulinum toxin for sialorrhoea treatment amongst Asian patients with neurological disorders. Current dosage recommendations are based on research conducted in Western countries

whereby safety profile may vary compared to Asian population. This study aims to determine the most efficacious dose of botulinum toxin by comparing the efficacy, safety, tolerability and adverse effects of three different doses of botulinum toxin A (BoNT-A): Dysport 50 MU, 100 MU and 200 MU in the treatment of sialorrhoea in Asian patients with neurological disorders. *Methods:* This is a single center, prospective, double-blind dose finding study. BoNT-A injection to all four glands (bilateral submandibular and parotid) in adult patients with significant sialorrhoea was done via ultrasound guidance. Assessments were carried out at pre-injection and at post-injection at 2 weeks, 6 weeks, 12 weeks and 24 weeks. The primary assessment was done by measuring the differential weight of dental roll gauze and the secondary assessment was done using the subjective Thomas Stonell score. Tolerability and adverse effects were monitored during each visit. *Results:* Reduction in sialorrhoea is seen as early as 2 weeks post-injection for all three doses of BoNT-A. However, the duration of efficacy is better with BoNT-A 100 MU and 200 MU which lasted for more than 3 months as compared to 50 MU. Patients given BoNT-A 200 MU continued to have more than 50% reduction in sialorrhoea even after 6 months. There were no serious adverse effects reported throughout the study for all doses. Statistical significance was only seen with the Thomas Stonell score at 2 weeks comparing BoNT-A doses of 100 MU and 200 MU. *Conclusion:* BoNT-A (Dysport) of 200 MU injected to bilateral submandibular and parotid glands via ultrasound guidance is the most efficacious dose for sialorrhoea treatment amongst Asian patients with neurological disorders. It is safe, tolerable and efficacious up until 24 weeks of duration.

PA406

Comparison between Swallowing and Cough Function According to the Stroke Lesion

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Background: Swallowing and cough function is important behaviors in airway protection. After stroke, many patients suffered from dysphagia and airway infection due to swallowing and/or cough dysfunction. The aim of this study is to compare between swallowing and cough function according to the stroke lesion, using the functional dysphagia scale (FDS), penetration aspiration scale (PAS), and peak cough flow-meter (PCF). *Materials and Methods:* Acute stroke patients with dysphagia symptoms and/or pulmonary problem were recruited. Stroke lesions were divided into one of the three categories; cortical, subcortical, and brainstem. Swallowing function was evaluated using FDS and PAS based on the results of VFSS. VFSS was performed within 2 weeks after stroke. PCF was used to measure voluntary coughing ability, assessed by having patients cough as forcefully as possible through the peak flow meter. These evaluations were performed on the same day within 2 weeks after stroke onset. All test procedures were recorded and the findings were analyzed by three physiatrists. *Results:* 127 patients were completed all evaluations. 51 patients were classified as cortical stroke, 42 as subcortical, and 34 patients as brainstem. The scores of FDS was divided into sub-scales. PAS and oral phase of the FDS sub-scales showed significant group differences. Significant correlation was found among PCF, PAS and FDS in all patients. The sub-scales of FDS which present oral phase swallowing showed significant correlation with cough function in patients with cortical stroke, whereas the sub-score of FDS which present pharyngeal phase swallowing showed significant correlation with cough function in patients with brainstem stroke. *Conclusion:* In this study, significant correlation was revealed between swallowing and cough function in whole stroke patients; among that, differences were noted according to the stroke lesion. We suggest that objective evaluation of swallowing and cough function would be helpful to decide on proper management in stroke lesion.

PA407

The Association between the Risk of Stroke and Metabolically Obese Normal-Weight

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Background: Each metabolic syndrome (MetS) and obesity increases the risk of stroke. However, few studies have compared the risk of stroke between metabolically obese normal-weight (MONW) and metabolically healthy obesity (MHO). The aim of this study was to compare the risk of stroke between MONW and MHO. *Methods:* 19,891 subjects aged 40 years old or older were selected from the Korea National Health and Nutrition Examination Survey IV and V. MetS was defined according to criteria from the 2001 National Cholesterol Education Program (NCEP)/Adult Treatment Panel III (ATP III) and the 2005 American Heart Association (AHA)/National Heart, Lung, and Blood Institute (NHLBI). Waist circumference cut-off points followed the criteria from the 2006 International Diabetes Federation (IDF). Normal weight was defined as body mass index (BMI). *Results:* MONW showed a higher prevalence of stroke than MHO in women after adjustment for age, smoking status, alcohol consumption, level of physical activity, and total energy intake (adjusted odds ratio [OR]=2.13, 95% confidence interval [CI]: 1.27–3.58). But there were no significant differences in men. The risk of stroke increased as the number of MetS components increased. Adjusted odds ratios of MONW with 4 and 5 MetS components were 2.53 (95% CI: 1.37–4.66) and 2.55 (95% CI: 1.17–5.56), respectively. *Conclusion:* In women aged 40 years old or older, MONW increases the risk of stroke and has more risk of stroke than MHO. There is a dose-response relationship between MetS components of MONW and the risk of stroke.

A.3.1. STROKE

PA409

Sexuality after Stroke and Its Relation to the Functional Independence Degree

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Introduction: There is increasing recognition about the factors that influence on sexuality after stroke. Although data on sexual functions after stroke are limited, it is a relevant issue to quality of life. *Objective:* To describe the relation among sexual function and the independence degree on patients with stroke post sub-acute stage. *Materials and Methods:* Cross-sectional descriptive study. The analyzed population was users from National Rehabilitation Institute Pedro Aguirre Cerda, Chile, greater than 45 points on Barthel Index. Data are obtained from ad hoc database and clinical records. It was used the modified self-administered of sexual evaluation questionnaire by Monga and Barthel Index. Data are collected in Excel spreadsheet 2011 and analyzed in SPSS 2.0 program and it is used the Spearman's coefficient to measure correlation. *Results:* The obtained sample was from 34 users, 62% masculine gender, middle age 51 years, 76% with ischemic event, 56% with Barthel of total independence and 38% slight dependence. A marked decrease in libido was observed, sexual frequency, erection, ejaculation, vaginal lubrication and orgasm. 70% declared to be dissatisfied with their sexual life, an 85% emphasized that sexuality is an important topic. The correlation coefficients between functionality and sexual function were: libido $r=0.469$; frequency: $r=0.305$; erection, ejaculation, vaginal lubrication and orgasm: $r=0.088$; for satisfaction with sexual life is $r=0.155$; for general attitude toward sexuality $r=0.086$; fear of impotence $r=0.142$; fear of another stroke the correlation coefficient obtained is $r=-0.008$; ability to discuss sexuality with the spouse $r=0.175$ and

the result in ability to participate in sexual activities is $r=0.045$. **Conclusions:** Sexual dysfunction is a prevalent situation for stroke patients after sub-acute stage. There is evidence that allows us to affirm that the correlation is significant between the obtained score from Barthel, and the libido variable and frequency. Not this way, in other items. This must be an area to be considered inside the interview and aims of intervention given the relevancy of the topic for the life of these patients.

PA410

Repetitive Peripheral Magnetic Stimulation in Balance Recovery at Recent Stroke Patients

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Introduction: The aim of this study was to demonstrate the utility of the peripheric magnetic stimulation, together with an intense kinetic program to regain balance during the subacute periode in stroke patients. **Material and Methods:** Our study included 70 patients with ischemic and haemorrhagic recent stroke, cardiovascular and neurological balanced, who recived their drug therapy, divided in two equal groups: the A group received the SMr on anterior Tibial muscle and Quadriceps muscle of the hemiparetic side accordingly with the given parametres, along with the kinetic program, and the group B received only the kinetic program. The evaluation was made at two different times: T1-initially at the start of the treatment and T2-after 2 months distance after the treatment. The patients were clinically and functionally evaluated using Berg and Tinetti scales. **Results:** In group A patients with SMr the results were higher with 25% for the Tinetti balance section and until 10% for Tinetti gait section than the group B. For the Berg scale was an improvement in independent transfers for the A group. **Conclusion:** The data obtained indicate the importance of the SMr at recent stroke patients for regaining the active movement. By being a noninvasive well tolerated procedure the SMr may accompany the kinetic program in regaining the early independance in activity daily living.

PA411

Factors Influencing Early Arrival of Acute Stroke Patients to Emergency Department in Saudi Arabia

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Background: Tissue plasminogen activator (t-PA) within 4.5 hours of onset is effective in acute ischemic stroke. However, small proportion of patient received such therapy mainly due to delayed presentation to Emergency Department (ED). This study aimed to examine the extent of and factors associated with prehospital delays after acute stroke in Riyadh, Saudi Arabia. **Methods:** We conducted a cross sectional survey at King Abdulaziz Medical City (KAMC), Riyadh, Saudi Arabia from November, 2012 to April, 2013. A convenient sample of consecutive acute stroke patients admitted through ED was selected. A self-administered questionnaire by patient (or relative if communication was impaired) was used to explore the reasons of delayed arrival to the hospital. The study was approved by the local IRB. **Results:** Of the 229 patients enrolled, 68% were men and the mean age was 60.4 (± 15.6). Stroke risk factors were diabetes (61%), hypertension (71%), dyslipidemia (35.8%), cigarette smoking (28.4%), previous stroke (20.5%), physical inactivity (69.6%), heart diseases (25.3%) and family history of stroke (15.7%). Nearly 12% had some form of disability (motor, visual, language or other) prior to stroke. The acute stroke symptoms and signs were mainly motor weakness (77.3%), speech difficulty (63.7%), dizziness (35.8%), altered level of consciousness (22.7%) visual (17.9%), headache (15.7%) and vomiting (21%). The median hospital arrival time was 4 hours and 54.6% arrived late (3.5 hours from symptoms

onset). In bivariate and multivariate analysis, living within the city of Riyadh, non-Saudi nationality, using ambulance, knowledge of stroke signs, knowing the Red Crescent number and having companion were predictors for early arrival. The most common reasons for late arrival were lack of stroke recognition (41%) and difficulty accessing care (19.4%) while others did not have a clear reason for delay. **Conclusion:** More than half of stroke patients might miss the golden hours for thrombolysis due to delayed presentation to ED. Reasons include lack of knowledge, underuse of ambulance and difficult access to care. Urgent community based intervention is recommended.

PA412

Spasticity Onset Correlates with Lesion Location, Severity, and Functional Recovery in First-Ever Stroke Inpatients

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Introduction/Background: Spasticity is one of the major complications in stroke patients, and it could cause acute or chronic pain, joints contractures, interruption of motor recovery, and poor hygiene which influence the ability to undertake activities of daily living and increase the caregiver burden. The aim of current study is to evaluate the correlation of spasticity onset with initial clinical presentations and discharge functional recovery in first-ever stroke inpatients. **Material and Methods:** This prospective observational study enrolled 123 participants, aged 72.3 ± 10.5 years old with 65 men, in a neuro-rehabilitation ward of one tertiary medical center. These patients were allocated into 3 groups: no spasticity (group A), spasticity onset less than 14 days (group B), and spasticity onset greater than 14 days after stroke (group C). Parameters measured included (1) past medical history, stroke type, lesion location, (2) Mini-Mental Status Examination, Geriatric Depression Scale, and modified Ashworth scale, (3) National Institute of Health Stroke Scale (NIHSS), Brunnstrom Stage of Motor Recovery, Fugl-Meyer Assessment (FMA), Functional Independence Measure (FIM), and FIM efficiency. **Results:** The participants whose spasticity onset greater than 14 days after stroke (group C) had a significant higher distribution of lesion location over the main trunk of anterior circulation (group A, B, C = 8.3%, 12.2% and 44.4%, $p=0.005$). They also had a higher initial NIHSS (7.3 ± 6.0 , 10.4 ± 6.6 and 16.4 ± 8.2 , $p<0.001$), lower initial Brunnstrom stage ($p<0.001$), lower initial FMA (14.6 ± 8.5 , 8.8 ± 5.8 and 4.5 ± 3.5 , $p<0.001$), lower initial FIM (68.1 ± 27.0 , 61.4 ± 17.3 and 44.8 ± 20.4 , $p=0.001$) and lower discharge FIM (84.7 ± 27.4 , 72.6 ± 21.8 and 55.7 ± 25.0 , $p<0.001$). Patients who did not have spasticity during hospitalization (group A) had the highest FIM efficiency (0.90 ± 1.24 , 0.48 ± 0.40 and 0.39 ± 0.29 , $p=0.013$). **Conclusion:** Stroke inpatients with an onset of spasticity after 2 weeks had higher disease severity, higher percentage of lesion location in the main trunk of anterior circulation, and presented with the poorest functional performance both in the initial and the discharge assessment. For these patients, clinician should place great emphasis on spasticity management to diminish its side-effect and maximize the functional outcome.

PA413

Naming Difficulties Seen in a Case of Prosopagnosia Caused by a Left Postero-Inferior Temporal Lesion

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An 85-year-old right handed man presented face recognition deficits and naming difficulties with right homonymous upper quadrantanopsia. Brain MRI showed cerebral subcortical hemorrhagic infarction extending from left anterior inferior temporal lobe to

occipital lobe. The patient was alert and co-operative. Neuropsychological examinations revealed mild fluent type aphasia, disorders of color naming and prosopagnosia but writing and reading difficulties were existed. He had near-normal auditory comprehension and spoke fluent and grammatically but have moderate word retrieval problems. There was no difference among abilities of tactile naming and visual naming. We administered a test of naming and auditory comprehension of nouns in 10 categories in the "Test of lexical processing in aphasia" (TLPA). Although he showed a high success rate in naming tools, a low success rate in naming vegetables/fruits, animals, plants and colors. He also showed a low success rate in comprehending animals and processed foods. He produced characteristic naming errors. His naming error features were summarized as follows: His naming errors were mostly classified as semantic paraphasia and circumlocution. There was no phonological paraphasia. He also reported that he was uncertain of the experience of having ever seen the stimulus presented by the examiner. He often produced hyponyms of target words. He described parts and details of presented pictures, he could not succeed in naming correctly because he might process visual information analytically, not synthetically. He could not identify the word meanings, although he was able to identify the rough categories to which stimulus belongs. Besides, it was difficult for him to identify objects which had visual features such as vegetables/fruits, animals and plants, on the other hand, it was easy to identify ones which had functional features such as tools. These findings lead us to indicate that in addition to the difficulty of lexical retrieval, prosopagnosia caused his characteristic naming difficulties. In addition, it was suggested that the left hemisphere might have a possible role in the face recognition in this case.

PA414

Formula for Predicting FIM Gain and Discharge FIM

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Objective: To predict FIM gain and discharge FIM score by multiplying the standard value by influence coefficients for age, cognitive function, and transfer interval. **Methods:** The subjects were 1,118 stroke patients admitted to a Kaifukuki rehabilitation ward of hospital A. The median value of motor FIM (mFIM) gain and discharge mFIM based on mFIM at the time of admission was used as the standard value. We then created a formula for predicting mFIM gain and discharge mFIM by multiplying the standard value by the influence coefficients for age, cognitive function, and transfer interval. **Results:** The correlation coefficient between the actual and predicted values was 0.681 in the prediction of mFIM gain and 0.874 in the prediction of discharge mFIM. The residual of the subtraction of the predicted value from the actual value was 1.4 ± 12.5 (median value: 0) in the prediction of mFIM gain, and 1.3 ± 12.6 (median value: 0) in the prediction of discharge mFIM. **Conclusion:** The correlation coefficient is comparable with those of reports that use multiple regression analysis. This new method clearly showed the relationship between factors and mFIM gain/discharge mFIM.

PA415

The Hand Hub: Increasing the Intensity of Upper Limb Rehabilitation after Stroke

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Background: Although most patients regain walking ability, 30%-60% of stroke survivors fail to regain functional use of their arm and hand. Rehabilitation of the arm is frequently given a lower priority than training of walking (only 4-10 minutes per session). In order to improve the functional outcome for the upper limb follow-

ing stroke or any other neurological injury, and to maximise the patients' time in inpatient/ambulatory rehabilitation, the amount of practice of arm and hand activities needs to be increased. Advances in robotics, sensor and game technology now provide a means of enabling patients to undertake intensive structured practice of upper limb tasks with minimal supervision. **Methods:** We established a Hand Hub, comprising several workstations of relatively inexpensive devices to facilitate activities via computer games that are appropriate for patients with varying levels of severity of arm and hand impairment. Intervention is delivered via individual or group sessions for a period of 6 weeks and is additional to the patients' regular therapy. Patients are assessed before and after the program on the Arm Activity Measure (ArMA), the Wolf Motor Function Scale and the EQ-5D. **Results:** Eighty-three participants have been recruited, with 25 completing both baseline and final assessments to date. The Hand Hub has been staffed within existing clinical resources and has not been operating at full strength over this period, hence while recruitment has been strong, there has been a waiting list for intervention. Our results to date have shown that participants made significant improvement in arm function and spasticity as measured by the ArMA, and in quality of life, as measured by the EQ-5D. Increasing the intensity of rehabilitation for the upper limb via the Hand Hub is feasible and appreciated by patients. **Conclusions:** The establishment of the Hand Hub has increased the intensity of rehabilitation for the upper limb and has shown promising results with respect to functional outcomes.

PA416

Correlation between the Cognition and Activity of Daily Living (ADL) in Acute Stroke

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Introduction: Stroke is the third leading cause of death and the most common cause of disability. In India prevalence rates of 800 per 100,000 person. Stroke as a condition, the people appreciate the physical aspects rather than cognition and perceptual impairment faced by the clients. Cognitive problems are some of the most puzzling and disabling difficulties that a person can experience thinking, remembering, reasoning and making sense of the world around us are fundamental to carry out every day activities. During acute stroke phase approximately 70-80% of patients demonstrate problem in activity of daily living. **Methods:** By convenient sampling 30 patients diagnosed with acute stroke, age group of 40 to 60 were selected for this study. They were assessed for cognition and Activity for daily living with Lowenstein Occupational Therapy Cognitive Assessment (LOTCA) and Functional Independent Measure (FIM) respectively. The score were statistically analyzed using SPSS 10. **Result:** This study shows evidence that 79% of correlation between the FIM score (mean 73.38 SD 18.5) and LOTCA (mean 64.53 SD 15.23). As more the ADL scores more is the cognitive function and vice versa. **Conclusion:** This study shows that there is a positive correlation of cognition and activity of daily living in acute stroke patients.

PA417

Therapy Intensity in Post Stroke Unilateral Neglect - How Much is Enough?

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Introduction/Background: High intensity and task specificity form the cornerstone of stroke rehabilitation. Cognitive rehabilitation for unilateral neglect is domain-specific and fulfils the principle of task specificity. Treatment intensity in unilateral neglect and its dose-response relationship needs further exploring. **Objective:** To

study the trends in therapy intensity (treatment length, frequency and duration of sessions) for unilateral neglect and identify the association between cumulative duration of treatment and therapy effectiveness. *Materials and Methods:* Randomized Controlled Trials (RCTs) on interventions for unilateral neglect published from 1990-2013 were included. Data on intensity were obtained for treatment length (weeks), frequency of treatment sessions and session duration (minutes). Total cumulative duration of treatment was determined for each intervention. Immediate and long-term improvement of neglect and function were dichotomized into positive/negative outcomes based on a statistical significant of $p < 0.05$ for a positive outcome. *Results:* Twenty-seven RCTs were included. Data on intensity were reported in 88.9% of RCTs on treatment length, 81.5% on frequency of sessions and 74.1% on duration per session. 18.5% of RCTs reported inadequate data to determine the total cumulative duration of treatment. The median number of treatment sessions was 17.5 (IQR:9.3-20.0) with a median treatment length of 4 weeks (IQR:2.9-5.7). Median treatment duration was 55 mins per session (IQR:30.0-71.3). The cumulative treatment duration varies widely with median of 900 minutes (IQR:517.5-1200.0). Immediate improvement in neglect were reported in 63% of RCTs, however less than 15% demonstrate positive outcome in long-term neglect or functional improvement. No significant association exist between cumulative duration of treatment with immediate or long-term improvement in neglect and function. *Conclusion:* Wide variation in therapy intensity exist according to the type of intervention for unilateral neglect. Improved compliance on reporting the details of therapy intensity is required to demonstrate change in neglect and functional improvement and thus allow identification of substantial dose-response relationship.

PA418

“Eight-and-a-half” Syndrome – a Rare Type of Stroke

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Case Diagnosis: Ischemic stroke. *Case Description:* A70 year old female, retired farmer, living alone and fully autonomous (mRankin Scale=0). Previous history of poorly controlled hypertension. She presented to the ER complaining of sudden dizziness and double vision on unspecified eye position. No headache, vertigo, sensitive and motor deficits and gait abnormalities were reported. On examination: BP=190/122 mmHg, HR=98 bpm, eupneic and no fever, normal auscultation and abdomen examination. Visual fields were maintained, but a right conjugate gaze palsy and right internuclear ophthalmoplegia were present and remaining cranial nerves unchanged. Normal superficial and deep sensation, no dismetria. Grade 4+ muscle strength left hemiparesis. Sinus rhythm on EKG. On CT scan a small focal hypo-density in left corona radiata (possible acute stroke on left medial cerebral artery). During neurology department stay, neurological status worsened: a left gaze paretic nystagmus was superimposed on initial findings maintained ocular supra and infraversion, a right facial palsy and left hemiparesis was graded as grade 1 in upper limb and grade 2 in lower limb. Gait was now not possible. Control MRI scan revealed a lacunar pontine infarction. She started a rehabilitation program including physical and occupation therapy, which was continued after transfer to a rehabilitation unit. She had steadily improvement of left hemibody muscle strength (graded 4 in last examination), on hand dexterity. She could ambulate without aids, but needing occasional supervision due to vision deficits and was discharged for ambulatory rehabilitation. *Discussion:* “Eight-and-a-half” syndrome is “one-and-a-half” syndrome (conjugated horizontal gaze palsy and internuclear ophthalmoplegia) plus ipsilateral fascicular cranial nerve seventh palsy. This rare condition, particularly when isolated, is caused by circumscribed lesions of the pontine tegmentum involving the abducens nucleus, the ipsilateral medial longitudinal fasciculus, and the adjacent facial colliculus. *Conclusion:* We report a rare cause of stroke in which ocular examination and “peripheral like” facial nerve palsy constitute pearls for diagnosis,

confirmed by MRI imaging. The vision deficits superimposed on motor deficits make rehabilitation particularly challenging.

PA419

Low Current Intensity of Functional Electrical Stimulation Cycling Training in Subjects with Stroke

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Introduction: Symmetric gait pattern is a key issue in the rehabilitation for stroke patients. Low intensity of electrical stimulation was proposed to be beneficial in better facilitation of volitional muscle contraction. Thus the aim of this study is to investigate the effect of low intensity functional electrical stimulation assisted cycling (FES cycling) training by using near infrared spectroscopy (NIRS) and electromyography (EMG). *Materials and Methods:* Subjects were asked to have the evaluation with EMG and NIRS before and after FES training. The FES cycling trainings with 10 mA electrical current on affected side were performed 30 minutes a time, three times a week for one month. EMG was used to measure the muscle activities and evaluate the level of symmetric cycling pattern. A continuous wave NIRS system was used to record the hemodynamic signal in sensorimotor cortex (SMC), supplement motor area (SMA), primary motor cortex (PMC), and secondary sensory cortex (S2). *Results:* In most of training subjects, the EMG showed an improvement in the symmetry of cycling pattern, and their quantitative NIRS values that shows an increase in the changes of oxyhemoglobin in most regions. However, in some subjects the EMG amplitude of sound side increases largely but there is no increase in the affected side, indicating the subject mainly used sound side to complete the movement. *Conclusions:* Some training cases showed an improvement in both cortical activation and muscular symmetry pattern after one-month FES cycling training, but others showed no effective progress. This may be due to 10 mA of electrical currents is too small to be sensed by subjects. Further study can be performed by using higher intensity up to sensory threshold for better feedback facilitation.

PA420

Misdiagnosis and Implications in Neurological Care: Multiple Sclerosis Mimic Presentation in Acute Stroke; a Case Report

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Case Diagnosis: Multiple Sclerosis Mimic Presentation of Stroke. *Case Description:* 52YOF with PMH of Multiple Sclerosis (MS), hypertension, and peanut allergy presented to an outside hospital (OSH) with bilateral lower extremity weakness, left shoulder pain, left arm weakness, and a right gaze preference. Symptoms ensued after accidental consumption of a peanut. Due to history of allergy, she subsequently administered Benadryl and went to bed. Upon arousal the following morning, her lower extremity weakness had progressed, resulting in a fall onto the left shoulder. MRI was inconclusive. OSH neurologists felt that the patient’s symptoms were more consistent with an MS exacerbation. The patient was subsequently discharged from the OSH with the primary diagnosis of MS exacerbation. Upon arrival at the acute inpatient rehabilitation facility, further diagnostics were solicited for presenting illness. Given the inconsistencies on the imaging results and the exam findings, the patient was empirically started on aspirin 81 mg and the OSH images were re-evaluated by a staff radiologist. Repeat MRI/MRA with diffusion-weighted imaging (DWI) revealed an evolving subacute lesion of the right posterior internal capsule extending into the adjacent thalamus. Stroke diagnosis was officially made, blood pressure was optimized, and patient was started on statin for secondary stroke prevention. *Discussion:* MS-mimics have been reported in the literature, particularly with tu-

mefactive MS. MS mimicking as stroke is relatively rare, accounting for only 2% of these cases. The most common mimickers of stroke include seizure, complicated migraine, and conversion disorder. In this case, accurate diagnosis of the stroke was impeded by confounding clinical issues, including peanut allergy, left rotator cuff injury, and pre-existing MS history. Given the time-sensitive nature of treatment of acute stroke, it is vital to accurately identify stroke syndromes during the acute care pathway and treat immediately. Minimization of barriers is key to ensuring quality of care and maximizing the treatment window. The implications of this topic are immense. This missed window of treatment in this case was secondary to an inability to recognize a vital and common differential diagnosis. *Conclusion:* Many neurological conditions mimic one another. This case illustrates how an MS presentation may actually represent a stroke illness.

PA421

Early Changes in Scapula Orientation after Stroke: Implication for Rehabilitation

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Introduction: Limitation of shoulder Range of motion and Post-Stroke Shoulder Pain are frequent for hemiplegic patients. They are related with lower upper-limb function and low quality of life. *Objective:* To evaluate the scapular orientations at early stage of stroke and during 6 months follow-up. *Methods:* 10 consecutive patients with stroke, compared to age matched controls, were evaluated for 3D scapular orientations in an opto-electronic system, during standardized passive flexion and abduction at 1, 3 and 6 months after stroke onset. *Results:* The hemiparetic group exhibited modified scapular orientations with more external rotation ($p < 0.01$) and more medial rotation ($p < 0.01$) in flexion and abduction, and more posterior tilt in abduction ($p < 0.01$) than controls. These differences were observed at 1 month and remained unchanged despite functional motor recovery. *Conclusions:* Scapular orientation is modified after stroke at early stages. Early interventions limiting consequences on upper limb passive mobilizations have to be considered in rehabilitation programs.

PA422

Sources of Delay in Seeking Treatment Post-Stroke

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Introduction: The last few decades have seen an increasing number of people experiencing stroke. Thankfully, substantial improvements have been achieved in the therapy of the acute phase, especially during the all-important 3-hour window. The next important step is to get patients to the Emergency Department within 3 hours of symptom onset. This study considers what risk factors might contribute to delayed entry to hospital. *Material and Methods:* We analyzed data from 2,472 patients admitted to the Stroke Unit of the Royal Brisbane Women's Hospital, Australia, between 2002 to 2011. *Results:* We found a correlation between gender and delay in admission: males had an average delay of 0.072 days, which was reliably longer than for females (0.67 days, $p = 0.0247$), this finding goes against many previous studies. This variation does not change if we exclude speech deficits and take into consideration only motor deficits, still women get to the hospital sooner than men. Patients with lower limb deficit seek help sooner (delay = 0.53 days) than with upper limb deficit (0.81 days). Probably due to the fact that the leg's deficit is more disabling than an arm's one. *Conclusion:* Acute surgical-pharmacological therapies are most effective if applied immediately after stroke. Hence delays to admission can be crucial to the degree of recovery. Why do men go to hospital so late? We don't know yet! Nevertheless an awareness plan specifically directed to the male population should be on the agenda of Health Departments.

PA423

The Importance of Diagnosis and Treatment of Blood Hyposmolarity after Traumatic Brain Injury

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Introduction: Brain trauma favors the occurrence of sodium disorders that correlate with various syndromes, including the syndrome of inappropriate antidiuretic hormone (SIADH) secretion, cerebral salt wasting syndrome (CSWS) and central diabetes insipidus (CDI). The authors intend to review the etiology and pathogenesis of hyponatremia after traumatic brain injury, its diagnosis and treatment, with reference to the importance of controlling natremia in neuromotor rehabilitation. *Material and Methods:* A systematic review was performed through an extensive search in the indexed database (MEDLINE) using the following keywords (MeSH terms) traumatic brain injury and hyponatremia. 120 articles were obtained and 39 articles that met the inclusion criteria were selected. *Results:* Syndromes of hyponatremia (SIADH and CSWS) are most frequently described in hemorrhagic stroke and traumatic brain injury (TBI). The association of hyponatremia and higher morbidity and mortality is well described. Both SIADH and CSWS result in a reduction of blood osmotic pressure and distinction may be difficult. The diagnosis is performed through the analysis of blood and urine biochemistry. Hyponatremia is not just a problem of the neurocritical patient, it may be recurrent or chronic, and complications may result from inadequate quick correction and misdiagnosis. There are new treatments with fewer side effects that can improve blood sodium control. *Conclusion:* It is important to regularly monitor the patient's serum sodium in the neuromotor rehabilitation period and early recognize SIADH and CSWS syndromes in patients with brain injury in order to prevent worsening of the neurological condition.

PA424

Implementation of Stroke Rehabilitation Protocol in Clinical Practice

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With the purpose to provide evidence-based recommendations related to recovery from stroke and to assist decision-making based on the best evidence available at the time, in PMR Department in Rashid Hospital we formed interdisciplinary team to develop Stroke rehabilitation Protocol. The protocol was developed to put in place processes of care that are designed to achieve maximum functionality and independence and improve patient/family quality of life. The role of Rehabilitation in Acute Ischemic Stroke Pathway and interaction within different clinical teams will be presented with collaborative input from all rehabilitation team members, comprehensive and individualized assessment and treatment plans are formulated. This protocol was implemented for all adult (above 18 years old) stroke patients, started with acute setup (ED, Intensive care units, Stroke unit), continuing with post acute care in general wards/rehab ward and outpatient setup in Rashid Hospital. Rehabilitation treatment was planned from the moment of admission and started immediately after stabilizing general medical conditions (on day 2 after Acute CVA). Our focus on selection and implementation of Outcome measurements and importance of awareness and education will be presented. Continuous auditing and monitoring are required to follow up the process of implementation for developed Stroke rehabilitation protocol.

PA425

Relation between Stroke and Lunar Phase

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Introduction: The different lunar phases probably influence the humans because the magnetic field around earth is different in each phase. Lunar effects on human health have been postulated for centuries, but the scientific evidence has not been demonstrated yet. We hypothesized that stroke event can be influenced by lunar cycle. **Materials and Methods:** To clarify the correlation between lunar phase and stroke we recorded in a database all admissions with stroke diagnosis in our General Hospital between January 2006 and December 2013. We study the possible relation between the different types of stroke and the lunar phase. **Results:** Until the moment we haven't positive results but we have some tendency in hemorrhagic stroke.

PA426

Visually Induced Kinesthetic Illusion Positively Affects on Motor Function in Patients with Stroke: a Case Series

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Introduction: Visual stimulation using videos of own body movement could induce a kinesthetic illusion induced by visual stimulation (KiNVIS). The aim of the current study was to report any acute effects on motor function of using KiNVIS in patients with stroke. **Methods:** Five Japanese patients with stroke participated in this study. The present research was approved by the local Ethics Committee. Patient 1 had not been involved in rehabilitative therapy for his upper extremity (UE) for 11 years. That extremity did not voluntarily move with slight muscular contraction of the forearm and upper arm. Patient 2 was in the recovery phase. Movement of that extremity exhibited a flexor synergy pattern. Patient 3 was in the recovery phase rehabilitation ward, and did not use the involved UE for functional activities. Patient 4 was an inpatient with a pons infarction of the chronic phase. The UE on the involved side was often used for functional activities. Patient 5 was an inpatient with a putamen infarction, and unable to voluntarily use his involved UE. A display was set over the forearm so that the position of the display would give the illusion that their forearm was actually the same as the one depicted in the movie during KiNVIS. Movement in the movie to a repeated hand grasping and opening task on the uninvolved side was repeatedly played for 15 min. Appropriate examinations were individually executed depending on the subject's motor function level. **Results:** In Patient 1, the elbow flexion angle was 56.1 degrees after KiNVIS, and 3.1 degrees before. The surface electromyography value of the elbow flexor during elbow flexion was increased after KiNVIS. In Patient 2, the time period, which was needed for completing the pegboard task, was found to be shortened after intervention. In Patient 3, 1.02 N of hand grasping force before intervention increased until 2.74 N after intervention. In Patients 4 and 5, the range of motion, which was measured during voluntary execution of hand grasping and opening, increased. **Conclusion:** All patients with stroke were acutely and positively affected by KiNVIS. These case reports provide strong possibility that KiNVIS can acutely affect motor function positively with stroke.

PA427

Crossed Aphasia after Right Temporal Ischemic Stroke – Analysis of Two Cases

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Case Diagnosis: We describe two cases of crossed aphasia in right handed patients and discuss its neural substrate, possible relation with lateralization of other cognitive functions and importance of clinical suspicion localizing the lesion after acute cerebral stroke. **Case Description:** Case 1 – A 70-year-old woman admitted to our

hospital due to behaviour alteration with speech incoherence revealed a temporal-parietal right lesion on CT, suggestive of recent ischemic lesion. On our evaluation she presented with no motor deficits. Evaluating language we diagnosed a transcortical sensitive aphasia with fluency and repetition preserved, poor comprehension and nomination. Case 2 – A 72 year-old woman presented to the emergency room with incapacity to produce speech, which started abruptly that morning. The CT performed revealed a hypodense cortico-subcortical lesion on the right temporal lobe. Evaluating the language the patient presented with a mixed aphasic syndrome – poor fluency, poor comprehension, no nomination, gross errors on repetition. Both patients were evaluated through a battery aphasia tests (BAAL), verbal and limb praxis and left visuospatial neglect. They enrolled a speech therapy programme and were evaluated 3 and 6 months after the first evaluation. **Discussion:** Crossed aphasia refers to aphasia arising after right brain damage in right handed patients. Its prevalence has been estimated to be less than 3% of all aphasias. To better characterize this aphasic syndrome, diagnostic criteria emerged. Those criteria were accomplished in both cases described. While evaluating cognitive functions – we evaluated verbal and limb praxis and visuospatial neglect – we got similar responses from both patients, with no difficulty with limb gestures but difficulty with oral imitation tasks and no left visuospatial neglect. The constructive ability was not formally evaluated. The evolution of the aphasic syndromes here reported did not associate with expeditious recovering. Six months after the first evaluation both patients improved their language and communication skills, however maintaining mild to moderate sensitive aphasia, as we report. **Conclusion:** Proposed explanations for crossed aphasia in literature are diverse and new evidence is starting to emerge. The judicious clinical assessment of these cases is essential to better understand its neuropathology substrate. Recognizing this entity is essential to correctly evaluate the patient from an early phase.

PA428

Last but Not Least, Cervical Manipulation as a Cause of Stroke

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Case Diagnosis: We present the case of a 36-year old woman without cardiovascular risk factors, who suffered an ischemic stroke due to right vertebral artery dissection secondary to cervical manipulation (CM). **Case Description:** Although the symptoms appeared immediately after the CM, there was a 10-day delay in the diagnosis, as the initial clinical presentation with headache, dizziness with instability, nausea and vomiting had been attributed to neck pain. The patient accused language difficulties and the lack of left hand dexterity, which was not clinically observed during the two emergency room visits. Ten days later, given the persistence of symptoms, a brain MRI examination was performed. This revealed an isolated subacute right superior cerebellar artery stroke as a result of an ipsilateral vertebral artery dissection. She was remitted to our Rehabilitation Unit, with the diagnosis of mild dysarthria and mild left hand skill alteration. Speech and occupational therapy were initiated. Nine months later, despite the subjective improvement, the dysarthria and alteration of fine movements are still identifiable. **Discussion:** Neck pain is a common complaint in primary health care centers. Its prevalence is continuously increasing among visito alternative medicine centers, where CM is employed as a therapeutic method. CM is a chiropractic technique that exerts tremendous stress on the cervical spine joints. Severe side effects have been described secondary to CM, such as stroke, tetraplegia or even sudden death; fortunately, their incidence is low. The pathogenesis of stroke following CM is represented by the dissection of either the vertebral, internal carotid or vertebro-basilar arteries. Specific risk factors associated with post manipulative stroke have not been

identified to date, but patients younger than 45 years seem to have a higher incidence of acute ischemic events. In 50% of the reported cases the symptoms appear immediately after CM, whereas in the remaining 50% there may be a delay from several hours to several days. **Conclusion:** Stroke secondary to CM is a rare, but serious complication, with significant neurological consequences. The health care practitioner should be aware of it when confronted with the new onset of symptoms following CM, even if they are not clearly suggesting a neurological complication.

PA429

Stroke Rehabilitation after Discharge from Hospital: Domiciliary Versus Medium-Stay Centers

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Introduction: The aim of our study is to compare the functional ability and perceived health status of stroke patients treated by a domiciliary rehabilitation team or at rehabilitation medium-stay centers after discharge from hospital. **Material and Methods:** This prospective observational study involved 100 ischemic stroke patients (March 2011 - June 2013) treated and followed by our rehabilitation unit for six months. After discharge, half of the patients received a specific domiciliary rehabilitation program (DRP) and the other half at medium-stay centers (MSC). Data was retrieved on admission, discharge, first and third month after discharge. **Scales used:** NIHSS (National Institute of Health Stroke Scale), SIS-16 (Stroke Impact Scale), mRS (modified Rankin Scale), EQ-5D (Euroquo-5D). **Statistical analysis:** Stata (χ^2 test). **Results:** Mean age: 72.43 years; >65 years (DRP/MSC): 67%/84%. Family support (DRP/MSC): 77%/62%. Both groups had similar risk factors. **Mortality (DRP/MSC):** 12%/22.2%. **Complications (DRP/MSC):** 46.9%/70%. **Residence at third month (DRP/MSC):** Home 100%/44.7%; Institutionalized 0%/55.3%. Both groups had statistically significant results ($p < 0.001$) in: - Improvement of neurological deficit as measured by the NIHSS (DRP/MSC): admission =26.53%/78% severe, 55.1%/18% moderate, 18.3%/4% light; discharge =70.8%/24.2% light, 28.2/48.4% moderate, 0%/28% severe; third month =95%/39.6% light, 5%/41.8% moderate, 0%/12.4% severe. -Improvement in stroke-related specific disability as measured by the SIS-16 (DRP/MSC): discharge =56.6%/88.8% disability, first month =16.2%/69.4% disability, third month =12.2%/47% disability. -Improvement of general disability as measured by the mRS (DRP/MSC): admission =100%/100%, discharge =74.8%/98%, first month =68.8%/95%, third month =21.4%/83.3%. -EQ-5D third month (DRP/MSC) =60.8%/85.2% bad health state, 24%/0% regular, 19.4%/9.6% good. **VAS: 49.7** **Conclusions:** Both strategies of rehabilitation treatment are effective for recovery of function and improvement of neurological deficit and disability -as measured by the NIHSS, SIS-16 and mRS scales- after ischemic stroke when carried out from the first stage in Stroke Care Units. The stroke patients who received domiciliary rehabilitation program had lower initial neurological deficit and were younger than who were at medium-stay centers. These aspects could be the cause of better results in disability scales.

PA430

Assessment of Disability and Quality of Life after Ischemic Stroke: a Prospective Study

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Introduction: The aim of our study is to determine the impact of stroke on patients who were admitted to stroke care units and who underwent rehabilitation treatment, by measuring disability and quality of life. **Material and Methods:** This prospective observa-

tional study involved 100 patients with a diagnosis of ischemic stroke between March 2011 and June 2013, who were treated and followed by our rehabilitation unit for six months. Data was retrieved on admission, discharge, first and third month after discharge. **Scales used:** NIHSS (National Institute of Health Stroke Scale), SIS-16 (Stroke Impact Scale), OSCP (Oxfordshire Community Stroke Project Classification), mRS (modified Rankin Scale), EQ-5D (Euroquo-5D), Hamilton's depression scale. **Statistical analysis:** Stata (χ^2 test) **Results:** Mean age: 72.43 years. 50% male, 50% female. 68% had family support. **Risk factors:** hypertension (68%), body mass index ≥ 25 (57%), auricular fibrillation (34%), smoking (27%), diabetes (27%), dyslipemia (28%), previous stroke (17%), transient ischemic attack (7%), ischemic heart disease (16%), heart failure (10%), alcoholism (8%). **Etiology:** 35.3% atherothrombotic, 37.4% cardioembolic, 17% indetermined, 6% unusual, 4% lacunar. Left side was the most affected (54%). Anterior circulation was affected in 94% of the cases. **Complications:** (58%): fever (24%), vascular (14.8%), stroke progression (13%). After discharge, half of the patients received a specific home rehabilitation program and the other half at medium-stay centres. **Mortality =18%**. Statistically significant results appeared in -Improvement of neurological deficit as measured by the NIHSS: admission =53% severe, 36% moderate, 11% light; discharge =47.5% light, 38.4% moderate, 14.1% severe; third month =70.37% light, 23.5% moderate, 6.2% severe. -Improvement in stroke-related specific disability as measured by the SIS-16: discharge =72.7% disability, first month =43% disability, third month =29.6% disability. -Improvement of general disability as measured by the mRS: admission =100%, first month =83.3%, third month =63.1%. **Decreased depression severity** as measured by Hamilton's scale: first month =8 (light), third month =6 (no depression). -EQ-5D =73% bad health state, 12% regular, 14% good. **VAS: 49.7** **Conclusion:** NIHSS, SIS-16 and mRS scale measurements show that physical rehabilitation is effective in order to recover function and improve disability after ischemic stroke when carried out from the first stage in Stroke Care Units.

PA431

Falls among Stroke Patients during Inpatient Rehabilitation in a Tertiary Care Rehabilitation Hospital in Saudi Arabia: Incidence and Risk Factors

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Introduction: Falls are serious events for stroke patients admitted to inpatient rehabilitation. Following a stroke, people are at high risk of falls. Falls during rehabilitation were recognized as strong predictors of subsequent falls after discharge. Falls have been associated with considerable morbidity that may lead to increased length of stay and medical cost. **Methods:** Retrospective study conducted using medical charts (electronic and paper). All Stroke Patients admitted for Inpatient Rehabilitation was included in study. **Results:** 146 stroke patients were admitted from Jan 2011 to June 2013 in rehabilitation hospital. A total of 36 patients out of 146 had falls. Among 36 fall patients, 28 (77.78%) were male and 8 (22.22%) were female. Age range from 42 -82 yrs (mean 59.64 yr). A left-sided stroke was more common (55.56%). The strokes were predominantly ischemic in origin (26%). The frequencies of preexisting medical conditions among the patients shows that hypertension (83.4%), diabetes mellitus (65%), prior stroke (33.3%), and communication disorders (66.67%), were the most common preexisting conditions. Hypotensive medications (83.4%), antidepressants (25%), and anticonvulsants (11.11%) were commonly used medication among fall patients. Rate of fall was 2.85 falls per two months. 61.1% of fall patients were high risk and 36.11% were moderate risk for fall. 83.33% had one fall and 36.11% had 2 falls. Most of patients (58.33%) fell during morning shift. Most fell from bed (52.78%) then from chair (27.78%). Most of falls 61.2% were unobserved and reported after the fall. In 75%, the patient's room was most common location. Length of stay of in 24

(66.8%) of the fall patients was more than 45 days. Length of stay was significantly associated with rate of fall ($P=0.0162$). *Conclusion:* Stroke patients in this study had a significant fall rate during rehabilitation. Most patients who fell did so for the first time. The hospital stays of those who fell were significantly longer. The rehabilitation goals should be set in the activity dimension and focus on the most hazardous activities such as transfers, position changes and performing tasks while seated and in the patient room.

PA432

Visual-Spatial Agnosia: a Clinical Case

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Introduction: A 66-year old executive man was admitted in an Acute Stroke Unit for right parietal hemorrhagic stroke (19.3.2014). He presented with a left homonymous hemianopsia (LHH) and a left superficial hypoesthesia (NHSS 3). After a Physical and Rehabilitation Medicine (PRM) evaluation, due to balance impairment, he was proposed as an inpatient of the PRM Unit. *Material and Methods:* He was admitted on 1.4.2014 in the PRM Unit. The initial tests were negative to left neglect. He maintained LHH, left superficial hypoesthesia, diminished balance and gait disturbance. During physical therapy sessions, it was noticed that he would easily get lost in small walks, even after repeating the same exact trajectory many times and he wouldn't even reproduce it by his own words. It was also noticed that he hit the doors (right and left limits), although he stated that he could in fact see them. Besides those, he also presented with a dressing apraxia. He kept communication with high vocabulary patterns, expressing his frustration about hitting doors and obstacles; he was not aware about his difficulties of spatial orientation. Several videos documenting his difficulties in spatial recognition and positional impairment were taken and a scientific literature review was made. *Results:* In the scientific literature, we found some descriptions of a frequently unrecognized condition called visual-spatial agnosia or topographical disorientation. Difficulties in topographic landmarks recognition or positional relationships between points/objects are its main features; there are several forms, depending on the location of brain damage. Visual-spatial agnosia can be unnoticed during physical exam, as its recognition might only occur after the individual starts functional rehabilitation and it can be easily mistaken with cognitive deterioration after stroke. *Conclusion:* Visual-spatial agnosia may carry deep repercussions in daily living and social integration may be disturbed. It is very important to recognize this specific disability as it demands specific training during rehabilitation regarding landmarks and positional recognition in the environment.

PA433

Effects of Whole-body Vibration Training on People with Chronic Stroke: a Systematic Review and Meta-Analysis

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Background: The effects of whole-body vibration (WBV) on chronic stroke (CS) patients have been investigated by some previous studies. However, controversy still exists. *Objective:* The objective of this meta-analysis was to review existing studies that assess the effects of WBV training on CS patients. *Methods:* We searched Medline, Web of Science, EMBASE, and the Cochrane Library for papers published between January 2000 and January 2014. The meta-analyses were performed using Review Manager Version 5.2. Weighted mean difference (WMD) or standard mean difference (SMD) and its 95% confidence intervals (CI) were used as summary statistics. Funnel plot was used to assess the publication bias. *Results:* Seven studies with 298 CS patients (159 patients underwent WBV training in experimental group and 139

patients underwent nothing or the same exercise without vibration or with a "placebo" vibrating platform in control group) were included. No significant difference was found in muscle strength (isometric knee extension strength: SMD=-0.15, 95% CI, -0.43 to 0.13, $P=0.30$; isometric knee flexion strength: WMD=-0.05, 95% CI, -0.13 to 0.03, $P=0.22$), balance (berg balance scale, WMD=-0.23, 95% CI, -1.54 to 1.09; $P=0.74$) and gait performance (6-min walk test, WMD=-50.40, 95% CI, -118.14 to 17.34; $P=0.14$) between groups. No indication of publication bias was found in the funnel plot. *Conclusions:* WBV training had no beneficial effects in muscle strength, balance and gait performance of CS patients.

PA434

An Adverse Prognostic Factor for Acute Stroke Patients

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Introduction: Stroke often causes the disorder of consciousness. The disorder of consciousness seriously inhibits performance of rehabilitation. It is especially important whether commands can be obeyed. *Material and Methods:* We retrospectively investigated the patients who were admitted because of acute stroke between June 2012 and May 2014. A total of 561 patients underwent assessment of consciousness by means of Glasgow Coma Scale (GCS) at hospital admission and discharge. The patients who were not able to obey commands in motor response evaluation of GCS at admission were studied using univariate and multivariate analysis in order to investigate their characteristics and prognosis. *Results:* Eighty-eight patients scored less than six in motor response score of GCS. The average length of hospital stay was 50.8 ± 22.7 days. None of them discharged to home. Sixty-three (71.6%) were transferred to other hospitals for continuous rehabilitation, though twenty-one (23.9%) were put in rest home. Four patients (4.55%) died. Fifty-seven (67.9%) patients except the dead patients were able to obey commands at discharge of our hospital, and we call them Group 1. Twenty-seven (32.1%) patients were not consistently able to obey commands until discharge of our hospital, and we call them Group 2. Group 1 showed better improvement of hemiparesis in Brunnstrom recovery stage than Group 2. Group 1 had superior ability to ambulate to Group 2 at discharge. Univariate analysis showed that the mean age of Group 1 was significantly lower than that of Group 2 ($P<0.01$). Group 2 had a higher proportion of the lesion not in the vertebral-basilar system but in the carotid system ($P<0.05$). Multivariate analysis demonstrated that the presence of the lesion in the carotid system independently inhibits improvement of the ability to obey commands (odds risk, 6.46; 95% confidence interval, 1.24-33.6; $P<0.05$). *Conclusion:* The present study suggests that the inability to obey commands is associated with poor prognosis. Lesion in the carotid system may prevent recovery of the ability to obey commands.

PA435

Effectiveness of Combined Botulinum Therapy and Robot Suit HAL on Stroke Patients

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Introduction: Rehabilitation conducted at our hospital for stroke patients consists of botulinum therapy and the HAL robot suit to assist the lower limbs in response to reading the "bio-potential signal" of the wearer. In this study, we report on the results of a case in which the effects of this therapy were sustained for more than 6 months. *Case:* The subject was a 60-year-old woman with left hemiplegia due to a cerebral infarction suffered approximately 4 months prior. Her Br. Stage was III-III-III to IV. She was able to walk independently with the use of an AFO device and a T-cane. *Methods:* Following botulinum therapy to the left lower extremity (BTX300 unit injection), rehabilitation were carried out once a

week for 6 weeks on an outpatient basis. Walking evaluation was conducted using the 10m walking time and the Timed Up & Go test (TUG). We investigated this evaluation prior to treatment, the day following botulinum therapy, and at the start of rehabilitation each week for a total of 6 months. The Profile of Mood States (POMS) was used to evaluate mood prior to treatment, after 1 week and after 6 weeks for a total of 6 months. **Results:** The 10 m walking time (in seconds) and TUG (seconds) gradually decreased after treatment. This effect was sustained even 6 months after rehabilitation was ceased. All POMS items improved in the first week, particularly energy and depression. In the 6th week additional improvement was observed, and in the 6th month the subject showed similar progress. **Discussion and Conclusion:** The combined use of botulinum therapy and the robot suit HAL led to improvement in walking ability, indicating the effectiveness of this method. However, in the future it will be necessary to consider the difference in the effects of the two treatments. In addition, the subject's mood improved earlier than walking ability, and the mood improvement lasted 6 months. This suggests that the robot suit HAL can potentially be used not only for physical functions but also for the improvement of mental state. In the future we would like to increase the number of study cases and create a detailed manual for this therapeutic strategy.

PA436

Cough Reflex Induced by Citric Acid Inhalation for Screening Aspiration Following Stroke

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Introduction: To validate cough reflex testing (CRT) induced by different concentration of citric acid for identification of aspiration following stroke compared with instrumental assessment. **Material and Methods:** We studied cough reflex induced by the citric acid inhalation test at four different concentrations (0.2 mol/L, 0.4 mol/L, 0.6 mol/L, 0.8 mol/L) in 62 patients with dysphagia after stroke. Meanwhile, videofluoroscopic study of swallowing (VFSS) or fiberoptic endoscopic evaluation of swallowing (FEES) was administered to those patients within 48 hours. All tests were recorded by two researchers blinded to the result of alternate test. **Results:** Sensitivity decreased while specificity rose following the increased concentration of citric acid inhalation test. For detecting aspiration, sensitivity, specificity and Youden's index was optimized at 0.4 mol/L in post-stroke patients (76.9%, 69.4%, 0.46 respectively). But for detecting silent aspiration, sensitivity, specificity and Youden's index changed at 0.4 mol/L (80%, 55.8%, 0.36 respectively) and at 0.6 mol/L (66.7%, 71.2%, 0.38 respectively). **Conclusion:** CRT induced by citric acid is a valuable tool for screening aspiration following stroke. Lower concentrations of citric acid provide a better predictive measure of aspiration and silent aspiration. **References:** 1) Daniels S K, Anderson J A, Willson P C. Valid items for screening dysphagia risk in patients with stroke: a systematic review[J]. Stroke, 2012. 2) Miles A, Zeng I S, McLauchlan H, et al. Cough reflex testing in Dysphagia following stroke: a randomized controlled trial[J]. J Clin Med Res, 2013.

PA437

Development and Application of New-Sports Program on People with Chronic Stroke

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Introduction: The study was to develop a new-sports program including interest and competitive factors for stroke patients and to apply it. New-sports exercise can modify exercise intensity and

difficulty, has the advantage of creating a special material for stability on disabled. **Methods:** This study was composed of the pre test- post test control design. The subjects were randomly divided into two groups (New-sports program group (n=12), Conventional therapy group (n=11)). Both groups received a conventional physical therapy. The new-sports program group received a total of twenty-four sessions, sixth minutes per session, and three times a week during eight weeks. This new-sports program consists of a warm-up exercise for ten minutes, a main exercise for forty minutes and a cool-down exercise for ten minutes. A main exercises in new-sports program were as follows: curolling, tchouk-ball, disc golf, form gate, soft volley ball, hook ball, shuffle board, sports stacking, chipping target, ballroball, ladder, mimongi. Primary outcome measures were balance ability and confidence (Berg Balance Scale, BBS, Timed-up and Go test, TUG, Activities-specific Balance Confidence, ABC), strength (Motricity-Index, MI). Secondary outcome measures were walking capacity (6-Minute Walk, 6MWT and 10-meter Walk Test, 10 MWT), depression (Beck Depression Inventory, BDI). **Results:** There was significant improvement by new-sports program group that the ABC, BBS, MI and BDI score ($p<0.05$). TUG, 10 MWT and 6 MWT score in new-sports program group was improvement, but not significant. **Conclusion:** The New-sports program on chronic stroke improves depression, muscle strength, balance ability and confidence. These results suggest that is useful as a rehabilitation program of chronic stroke patients. **Reference:** Durstine, J.L., Moore, G.E. ACSM's exercise management for persons with chronic diseases and disabilities. (2009) Human Kinetics Champaign, JL. Acknowledgements: This work was supported in part by the Korea national rehabilitation.

PA438

Use of Care and Rehabilitation Services among Stroke Patients in Palestine

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The aim of this study was to investigate stroke patients characteristics and use of care and factors that predicts the use of care by stroke patients in Palestine. **Design:** A one-year hospital-based, observational, descriptive, cohort study. Mean age of the sample was 67.64 year. **Procedure:** patient interview, file screening and case follow up were performed at baseline (T1), three months (T2), and six months (T3). **Results:** Thirty eight percent (38%) of the patients at (T2) and 67% at (T3) did not have any type of rehabilitation. In-patient rehabilitation was accessed by 14.4% for an average length of stay of 43.25 days at T2, and 2.2% at T3, with an average length of stay of 24.67 days. Patients mainly used a home rehabilitation setting (49.60%), for an average of 50 days at T2, and this time reduced to 21.60% at T3, with a mean number of days of 59.6. Outpatient rehabilitation increased from 10.8% of patients accessing it at T2 period, to 15.1% at T3. There was an increase in the period of average use of 49.24 days in T3, compared to an average of 44.7 days at T2 period. Main motivations for the using or not using rehabilitation services, were financial reasons, medical insurance (inpatient setting), doctors' and therapists' recommendations (home rehabilitation setting) and the transport difficulties and patient mobility (outpatient setting). **Conclusion:** More than a third of the stroke patients did not receive any rehabilitation during the first three months post stroke. Home rehabilitation was the most common setting. Rehabilitation services besides physiotherapy were not or minimally provided at home and outpatient rehabilitation settings. The main motivations for using or not using rehabilitation services, were financial reasons, medical insurance (inpatient setting), doctors' and therapists' recommendations (home rehabilitation setting) and transport difficulties and patient mobility (outpatient setting).

PA439

Physiotherapeutic Stimulation Methods on Different Stages of Stroke

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Introduction: Movement disorders are the most severe after-effects of stroke. Secondary complications, namely contracture and arthropathy, hinder active physical rehabilitation, expansion of movement regimen, social adaptation. Therefore the most important direction of contemporary neurorhabilitation is development of physiotherapeutic treatment algorithms which could be applied in the course of first 24 hours after stroke to prevent secondary complications. **Material and Methods:** Study included 28 patients divided in 2 groups. Main group (6 women, 9 men aged from 38 to 53 years old) had neuromuscular electrostimulation of affected limbs in passive regimen for 15 minutes once a day, pneumostimulation of foot for 15 minutes once a day together with course of basic rehabilitation. In the other group (5 women, 8 men aged from 45 to 65 years old) patients got only basic course of rehabilitation. Effectiveness was estimated according to Barthel-index, Fugl Mayer scale, Weiss scale. Patients were tested before and after the course. **Results:** Mean Barthel-index value in main group was 67 points before and 80 points after rehabilitation course, in control group – 66 points and 78 accordingly. Fugl Mayer scale in main group gave a mean value of 92 points before and 128 points after rehabilitation, in control group – 93 and 119 points accordingly. Weiss scale: main group had a mean value of 2.2 points before and 3.5 points after rehabilitation, and a control group – 2.3 and 2.8 points accordingly. In main group, no secondary complications were observed during rehabilitation. In control group, two cases of musculo-vascular thrombosis of shin sinus were elicited during duplex scan. **Conclusion:** Incorporating of physiotherapeutic methods in early rehabilitation after stroke leads to faster movement abilities recovery, prevents secondary complications, improves rehabilitation prognosis.

PA440

Study Regarding the Correlation between the Adherence Level and Functional Improvement of Stroke Patients in a Rehabilitation Clinic*B. I. Mitoiu¹, *S. A. Nica¹, M. Moise², L. S. Meiu², G. Mologhianu¹, M. C. Brailescu¹, V. E. Gusita³¹UMF “Carol Davila”, ²National Institute of Rehabilitation, ³Sapoca Hospital, Bucharest, RO

Background: Stroke is always nowadays a main cause of long-term disability around the world. In the attempt to find new methods to achieve better results in the rehabilitation treatment of their patients, the specialist need to use multiple types of approach. **Material and Methods:** We have measured the adherence of 105 stroke patients before the rehabilitation program using a score composed of the sum given by two questions marked between 1 and 10 regarding the motivation and trust to follow the therapy. At the beginning, at the end of treatment and six months later, we have assessed functionality using FIM. **Results:** The adherence score has been correlated with the functional score showing higher functional improvement for the patients with better adherence at the end of treatment and also six months later. **Conclusions:** Adherence is one of the predictive factors of a better functional score. That is why the complex approach of the stroke patient must contain compliance assessment and include it as a therapeutic objective.

PA442

Effectiveness of the Lokomat Training on Gait, Functional Independence and Risk of Falls in Stroke Patients from Post-Acute Rehabilitation

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Background and Objectives: Stroke is a major cause of long-term disability due to hemiparesis and gait and balance impairment which can severely affect functional independence and quality of life. Therefore, one of the key goals for these patients is the recovery of balance and walking function. The current evidence shows that the highest level of recovery of motor function could be reached by intensive, repetitive task-specific movements as provided by the robot driven gait orthosis which facilitates treadmill training for non-ambulatory stroke patients. Lokomat therapy allows a gait training involving repetitive gait-like movements with body weight support over a longer period of time with increased intensity and minimum risks. We investigated the effectiveness of a robotic gait training program in conjunction with over-ground physical therapy in gait rehabilitation of patients with post-stroke hemiplegia. **Methods:** 46 in-patients with gait impairment and disability due to hemiplegia after CVA, admitted in Rehabilitation Hospital Felix-Spa in 2014 were included in this study, randomly divided into 2 groups: the Lokomat group, who received 10 sessions of 50 minutes gait training with Lokomat device in addition to the conventional physiotherapy and the control group, who attended only the conventional physiotherapy program, including over-ground gait training. Outcome measures were functional independence, assessed using FIM, functional ambulation, with FAC Index (Functional Ambulation Categories), walking speed and Berg Balance Test to assess the risk of fall. **Results:** After 10 session of Lokomat training patients in the study group show significant improvement in functional ambulation and functional independence scores, and a slight decrease in risk of fall, while walking speed achievements is similar in the both study groups. **Conclusions:** The results show that Lokomat appears to be a promising way to improve gait and functional independence and to decrease risk of fall in hemiplegic patients with significant motor deficits.

PA443

Learning to Walk Again after Stroke*K. M. Stephan¹, C. Dohle², J. Quintern³, S. Saat⁴, R. Tholen⁵, H. Wittenberg¹¹St. Mauritius Therapieklinik, Meerbusch, ²Median Klinik Berlin-Kladow, Berlin, ³Medical Park, Loipl, ⁴Universität Halle-Wittenberg, Halle, ⁵Physio Deutschland, Köln, DE

Background: Learning to walk again after stroke is a major aim for patients who lost that ability. In neurorehabilitation different therapeutic approaches are used to reach this aim. The value of these therapeutic approaches is intensively debated. It may differ according to the specific aims of the therapy (e.g. between “improving walking ability in non-ambulatory patients” and “improving walking speed of ambulatory stroke patients”). **Methods:** We performed a systematic search of the literature. 1,650 articles were scanned systematically and around 200 RCTs identified which met the target criteria. These 200 articles covered 38 interventions. The articles were systematically evaluated by at least two members of the group. Recommendations for the treatments were compiled separately for different aspects of walking ability: a) establishing walking ability, b) improving balance, c) improving walking speed and d) improving walking capacity. These recommendations were made for the subacute and the chronic stage of rehabilitation. **Results:** The available evidence led to differential recommendations for the different aspects of walking ability and for the two stages of stroke rehabilitation. Training should be tailored specifically towards pre-defined targets of the therapy (e.g. regaining walking ability, balance, walking speed and walking capacity). According to the individual’s stage of stroke rehabilitation the aim, with which robotic or mechanical devices are used, will differ. Intensity and specificity of training are prerequisites for improvements of walking ability in the subacute and in the chronic stages of stroke. **Conclusions:** Learning to walk again after stroke does benefit from multiple therapeutic approaches. A systematic review of the literature helps to define the (relative) value of each approach to achieve

specific therapeutic aims. The experience and the skill of the therapist are necessary to choose from these approaches according to the patient's needs and preferences.

PA444

The Effects of Early-Phase-Started Contralaterally Controlled Functional Electrical Stimulation Treatment for Recovery of Wrist Dorsiflexion of Stroke Patients

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Background: To investigate the first appearing time of active wrist dorsiflexion and the effects of early-phase-started Contralaterally Controlled Functional Electrical Stimulation Treatment for recovery of wrist dorsiflexion of stroke patients. **Methods:** Thirty stroke patients were randomly divided into two groups as treatment group and control group, each 15 cases. The patients of control group and treatment group were treated with routine rehabilitation training. Based on routine rehabilitation treatment, the control group received Functional Electrical Stimulation (FES) treatment, the treatment group received, both twice per day, 20 minutes per time, for 3 weeks. Took all the patients' records on their first-time appearing of active wrist dorsiflexion. They were assessed with ROM for active wrist dorsiflexion (AROM), upper limb Fugl-Meyer score, and the ability of activities in daily living (ADL), ICF core-set stroke 7 cats add part hand-function-related cats, Jebsen Test of Hand Function, at the time of beginning and 3 weeks later. **Result:** After 3 week's treatment, treatment group's first appearing time of active wrist dorsiflexion is much earlier than control group's, on average about 3.33 days. Two patients of control group haven't appear action wrist dorsiflexion during the treatment course. AROM of wrist dorsiflexion, motor function of upper limb, hand function, and ADL in two groups improved significantly than before treatment ($P < 0.05$), and treatment group was better than control group ($P < 0.05$). **Conclusion:** Early-phase-started Contralaterally Controlled Functional Electrical Stimulation Treatment can shorten the first appearing time of active wrist dorsiflexion, improve the ability of patients' wrist dorsiflexion function. **Reference:** 1) Knutson JS, Harley MY, Hisel TZ, et al. Improving hand function in stroke survivors: a pilot study of contralaterally controlled functional electric stimulation in chronic hemiplegia[J]. Arch Phys Med Rehabil, 2007; 88: 513-520. 2) Jayme S. Knutson, John Chae, et al. Contralaterally Controlled Functional Electrical Stimulation for Upper Extremity Hemiplegia: An Early-Phase Randomized Clinical Trial in Subacute Stroke Patients[J]. Neurorehabil Neural Repair, 2012; 26(3): 239-246.

PA445

Evaluation and Treatment Protocol for Central Post-Stroke Pain

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Stroke is the most important morbidity and chronic disability in Europe, Portugal not being an exception. In Northern Portugal incidence rates range from 202/100,000 in rural areas and 173/100,000 in urban areas. Being stroke a more disabling than fatal disease, it is fundamental to implement good clinical practices for the treatment of disabilities resulting from motor and neurological deficits. Chronic pain is a multidimensional entity with sensory, affective, motivational, cognitive and environmental components, defined by the IASP as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described as such. It is understood as the 5th vital sign, being the systematical recording of the pain intensity recommended by the circular rule Nr. 09, 14/06/2003, Direção Geral de Saúde - Portugal. Central

post-stroke pain has as most frequent causes stroke, the spinal cord injury and multiple sclerosis. Contrary to peripheral neuropathic pain, the pathophysiological mechanisms of central neuropathic pain are still poorly known, being the occurrence of disinhibition phenomena by reduction of the action of GABA regarded as the principal mechanism. According to the literature, the pharmacological treatment comprises a multi-modal approach. The first line of treatment comprises the tricyclic antidepressant, antiepileptic and anticonvulsants (gabapentin and pregabalin) drugs, basing the choice on the comorbidities of the patient. The opioid therapy appears as second-line due to the high occurrence of side effects. You can count on a third line of treatment that includes other drugs. The authors of this paper present the treatment protocol of central post-stroke pain in patients with stroke, using the pain disability index as a means of registration.

PA446

There Are a Seasonal Influence in Stroke Incidence?

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Introduction: Seasonal variation in stroke incidence was referred since a long time ago. Portugal is a country with a Mediterranean climate: humid temperate climate with dry and temperate summers; cold in the north, according climate classification of Köppen: average air temperature of the coldest three months between -3°C and 18°C ; Mean temperature of the warmest month $>10^{\circ}\text{C}$. The hospital influence area's the country northern coast. **Material and Methods:** All admissions to the Centro Hospitalar de São João are recorded in a database. We analysed admissions between January 1, 2006, and December 31, 2013 (inclusive). Association between admission rate and seasons were registered. **Results and Conclusion:** We want with this study confirm the variation of incidence depending on year seasons.

PA447

Habitual Physical Activity and Its Relation with Cerebrovascular Accident (CVA)

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Introduction: The World Health Organization ranks Bangladesh's mortality rate due to stroke as number 84 in the world. Study suggested that a lot of several factors are involve in the CVA among them Habitual Physical Activity play an important role in prevention of stroke. Surgeon General's report indeed shows that physical activity is associated with lower stroke risk and subsequent stroke death. **Purpose of the study:** To understand the level of habitual physical activities of patient's with cerebrovascular accident (CVA) before stroke. **Methods:** Cross-sectional type of study design is used to find out the study aim and objectives. Non probability "purposive" sampling method though some preset inclusion and exclusion criteria. **Results:** It is found that among the 135 participants their mean age was 53.06 ± 12.716 (Standard Deviation) maximum age group 34.8% (n=47) participants were more than 58 years and male were more 76.3% (n=103) then female. Besides, maximum participants 52.6% (n=71) from upper lower class according to Kuppuswamy's SES Classification. Maximum had heavier workload 37.8% (n=51) compare with others. Alongside, during leisure 1.5% (n=56) were sometimes watching TV and among the participants highest number were seldom walking during leisure 54.8% (n=74). Nevertheless, it was found that among the participants maximum 48.1% (n=65) were never play sports during leisure. Investigator has found no significant relation between workload and CVA because $=8.796 > P=0.05$ and relationship between social status and of CVA found $=1.936 > P=0.05$ which also insignificant. However, in the workload relation $=2.965 > P=0.05$. **Conclusion:** Researcher and scientist that habitual physical activity or active life style reduces the risk of CVA. In contrast, sedentary life style or less physical activity impact on individual's health. Participants were less in per-

centage affected by CVA who involved in physical activity either in the job or in the leisure activities.

PA448

Effect of Zolpidem on Behavioral Recovery in Acute Ischemic Stroke Rat Model

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Post-stroke insomnia aggravates the brain damage after stroke. Zolpidem, non-benzodiazepine related GABAnergics, is often prescribed for the management of post-stroke sleep disturbance in clinical practice. However, there was no trial to report as to whether zolpidem could be helpful through the inhibition of vulnerability of the injured brain, or harmful as a result of the inhibition of neural plasticity in the acute period of ischemic stroke. Herein, we evaluated the beneficial or hazardous effect of zolpidem on behavioral recovery of stroke during the acute period. Forty two Ischemic stroke rats were randomly assigned to variable doses of zolpidem (0.1, 0.25, 0.5, 1.0, 2.0 or 4.0 mg/kg, n=6, respectively) or normal saline (N/S, n=6), which was intraperitoneally injected for 2 weeks after post-stroke 1 day (total 10 times). Behavioral functions were measured with Motor Behavioral Index (MBI) and Beam Balance (BB) and Radial 8-arm maze (RAM) test was performed to evaluate memory function at post-op 1 day and 2 weeks. 0.5 mg/kg zolpidem group showed significant improvement in motor behavioral index (MBI) compared with n/s group at 2 weeks after stroke (one-way ANOVA, Scheffe's post-hoc, $p < 0.001$), of which the effect was not observed with flumazenil (non-selective benzodiazepine antagonist). With this dose, radial 8-arm maze test was not significantly different compared with N/S group (t -test, $p > 0.05$). 1.0 mg/kg zolpidem group also had significant improvement in MBI (one-way ANOVA, Scheffe's post-hoc, $p < 0.001$). In contrast, 4.0 mg/kg group had significantly impaired MBI compared with n/s group (one-way ANOVA, Scheffe's post-hoc, $p < 0.001$). The immunohistochemistry showed that 0.5 mg/kg and 1.0 mg/kg group had significantly higher optical density (OD) of BDNF in peri-lesional cortex compared with n/s group (one-way ANOVA, Scheffe's post-hoc, $p < 0.001$). These results suggest that optimal dose of zolpidem had a beneficial effect on behavioral recovery in acute period of ischemic stroke. However, zolpidem overdose could exacerbate the brain damage after acute ischemic stroke.

PA449

Prevalence of Modifiable Risk Factors among Stroke Patients in a Tertiary Care Hospital Abbottabad, Pakistan

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Background: Cerebrovascular accident is considered to be a common cause of admission at medical and neurology units in hospitals. The purpose of this study was to find out the occurrence of modifiable risk factors, and association of stroke with these risk factors among stroke patients admitted at a tertiary care hospital in Abbottabad. **Methods:** This hospital based study was carried out in medical units of Ayub Teaching Hospital, Abbottabad on 150 patients with stroke, using the cross sectional descriptive study design. Thorough history, clinical examination and appropriate investigations were performed to collect all pertinent information. Stroke was diagnosed using Computed Tomography scan. The said scan also differentiated between ischaemic and haemorrhagic stroke. **Results:** Out of 150 subjects, 90 (60%) were males, while 60 (40%) were females. Ischaemic stroke was found in 105 (70%) patients and 45 (30%) were having haemorrhagic stroke. The risk factors were hypertension in 127 (84.7%), diabetes 31 (20.7%), cardiovascular diseases 31 (20.7%), previous TIA/stroke 42 (28%), smoking 28 (16.7%) and obesity 16 (10.7%). **Conclu-**

sion: There was no statistically significant association between risk factors and stroke except coronary artery diseases with stroke.

PA450

Changes in Center of Mass Trajectories and Acceleration of Poststroke during Obstacle Crossing

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Introduction: Obstacle crossing is impaired following stroke [1] and may contribute to a high falls rate [2]. In order to ensure effective training program and fall prevention, balance deficits have to be quantified. COM motion, COM-COP distances, COM-COP inclination angles have been used for the studies of the body's dynamic stability during obstacle crossing. [3] **Methods:** 4 adults with post-stroke and 4 healthy adults were recruited in this study. Full-body three-dimension motion analysis system and force plates were used to capture and explore the characteristics of dynamic balance when crossing 10%, 20%, and 30% height of leg length of obstacles. The RMS (root mean square) value of the COM-COP distance as well as the peak COM acceleration in horizontal direction was calculated. **Results:** The results showed that group effect ($p < 0.05$) was detected in RMS values of COM-COP in ML direction when the affected limb act as the leading limb to cross the obstacle and AP direction at the two single stance phase during obstacle crossing. The Paired test also showed that the COM-COP distance was smaller during the single stance phase of the affected limb. And the peak COM acceleration ($p < 0.05$) was lower in the stroke group. **Conclusion:** The stroke showed bad balance control during obstacle crossing. Not only muscle strength should be enhanced, but also the stability should be improved as the rehabilitation process. The average COM-COP divergence and peak COM acceleration were proved to be reliable and useful quantitative measurements for assessing one's ability to control the body's dynamic stability. **References:** [1] Said CM, et al. Balance during obstacle crossing following stroke. *Gait Posture* 2008;27(1):23-30. [2] Forster A, Young J. Incidence and consequences of falls due to stroke: A systematic inquiry. *BMJ* 1995;311:83-6. [5] Huang SC, et al. Age and height effects on the center of mass and center of pressure inclination angles during obstacle-crossing. *Med Eng Phys* 2008;30(8):968-75.

PA451

Longitudinal RCTs in Rehabilitation Post-Stroke: Results of a Systematic Review the Quality of Reporting and Use of Baseline Data

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Background and Purpose: The World Health Organisation stresses the need to collect high quality longitudinal data on rehabilitation and to improve comparability between studies. This implies using all the information available and transparent reporting. We therefore investigated the quality of reported or planned randomised controlled trials on rehabilitation post-stroke with a repeated measure of physical functioning, provided recommendations on the presentation of results using regression parameters, and focused on the difficulties of adjustment for baseline measures. **Methods:** We performed a systematic review of the literature from 2011 to 2013 and collected information on the way data was analysed. Moreover we described the possible ways to adjust for baseline as well as two approaches to analyse the data using mixed models illustrated with real data. **Results:** Eighty-four eligible studies were identified of which 52% (44/84) failed to analyse the data longitudinally. Moreover, for 30% (25/83) the method for adjustment for baseline is not known or not existent. Using real data we were able to show how much difference in results the method of adjustment for baseline data can make. We showed how to provide interpretable intervention effects using regression coefficients while making use of all the information available in the data. **Conclusions:** Our review showed

that improvements were needed in the analysis of longitudinal trials in rehabilitation post-stroke in order to maximise the use of collected data and improve comparability between studies. Reporting fully the method used (including baseline adjustment) and using methods like mixed models could easily achieve this.

PA452

Plantar Pressure Distribution in People with Stroke and Association with Functional Consequences

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Background: People with stroke suffer abnormal foot posture, and structural and movement deficiencies in the intrinsic foot segments on the affected side associated with limitation in functional ability. **Purpose:** As part of a programme of research examining foot and ankle biomechanics after stroke, we investigated plantar pressure distribution under the hemiparetic foot of people with stroke and the relationship with function. **Methods:** Plantar pressure distribution was investigated while standing and walking on the affected side of twenty stroke and fifteen healthy sex and age-matched participants. Plantar pressure was measured using a Medilogic platform system at a frequency of 20 HZ. The global functional consequences of abnormal plantar pressure was evaluated using the measure of functional walking ability. **Results:** while standing, people with stroke bore greater pressure on the affected side through the lateral heel and lesser toes ($p < 0.01$) and less at the medial (MP1) and central forefoot (MP23) areas ($p < 0.05$) than healthy controls. During the stance phase of walking, more pressure was taken through the heel area, especially on the medial heel and less through the medial and central forefoot. The results of the logistic regression model revealed that stroke participants with greater pressure on medial heel during walking (odds ratio=1.11, $p < 0.05$) were more likely to be household walkers. While standing, none of the standing plantar pressure distribution variables made a significant contribution to the model ($p > 0.05$). **Conclusions:** The pattern of plantar pressure distribution in the stroke group was significantly different from the control group. Our results showed for the first time that abnormal plantar pressure distribution only during dynamic condition is a significant contributor to limited functional ability post stroke. **Implications:** These findings will improve in the clinical management of the foot and ankle in stroke survivors, ultimately, quality of life for people with stroke.

PA453

Hemiparetic Knee Extensor Strength and Balance Function Are Predictors of Ambulatory Function in Subacute Stroke Patients

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Introduction: To identify the potential predictors of ambulatory function in subacute stroke patients and to determine the contributing factors according to gait severity. **Material and Methods:** Fifty-three subacute stroke patients were enrolled. Ambulatory function was assessed by gait speed and endurance. Balance function was evaluated by Berg balance scale score (BBS) and time up and go test (TUG). The isometric muscular strengths of bilateral knee extensor and flexor were measured using isokinetic dynamometer. Cardiovascular fitness was evaluated using expired gas analyzer. Participants were assigned into household ambulator group (< 0.4 m/s) or community ambulator group (≥ 0.4 m/s) based on gait severity. **Results:** In linear regression analyses of all patients, paretic knee isometric extensor strength ($p = 0.007$) and BBS ($p < 0.001$) were independent predictors of gait endurance ($R^2 = 0.668$). TUG ($p < 0.001$) and BBS ($p = 0.037$) were independent predictors of gait

speed ($R^2 = 0.671$). Paretic isometric extensor strength was a predictor of gait endurance ($R^2 = 0.340$, $p = 0.008$). TUG was a predictor of gait speed ($R^2 = 0.404$, $p < 0.001$) in the household ambulator group whereas BBS was a predictive factor of gait endurance ($R^2 = 0.598$, $p = 0.008$) and speed ($RV = 0.713$, $p = 0.006$). TUG was a predictor of gait speed ($R^2 = 0.713$, $p = 0.004$) in the community ambulator group. **Conclusion:** Our results revealed that balance function and knee extensor isometric strength were strong predictors of ambulatory functions in subacute stroke patients. However, they work differently according to gait severity. Therefore, comprehensive functional assessment and different therapeutic approach should be provided depending on gait severity in subacute stroke patients.

PA454

Effects of Regional Vibration Stimulation on Walking Ability Improvement in Patients with Stroke

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Background: Vibration stimulation can promote the motor control of the lower extremity in stroke patients. By assessing the performance of the gait and walking ability before and immediately after the vibration stimulation, this clinical trial was aimed to determine the effects of the lower limbs regional vibration stimulation (RVS) on the walking ability improvement in stroke patients. **Subjects and Methods:** Part 1: Twenty-six patients with post-stroke hemiplegia (Male 23; Female 3; Age 66.54 ± 6.54 year) were enrolled in this study. All of them received the lower limbs RVS (16 Hz, 4mm) on the bilateral foot soles for 10 min in sitting position. The modified Ashworth scale (MAS) score for the triceps surae muscle tonus, the timed up and go test (TUGT) and 10 m maximum walking speed test (MWST) were performed before and immediately after the vibration. Part 2: Twenty-two stroke patients (Male 20; Female 2; Age 67 ± 6.4 year) participated in the trial. They had received the RVS the same as the part 1 (16 Hz, 4 mm) for 10 min in sitting position. Their gait temporal-spatial parameters were collected with the 3-dimensional gait analysis system before and immediately after the RVS. **Results:** Part 1: Comparing the assessment records before and immediately after the vibration stimulation (RVS), the average of the TUGT decreased from (17.60 ± 7.33) s to (16.15 ± 6.70) s significantly ($P = 0.037$), and the result of the 10 m MWST also showed significant improvements when increased from (1.51 ± 0.49) m/s to (1.62 ± 0.53) m/s ($P = 0.002$). However, the MAS score did not have significant change ($P > 0.05$). Part 2: After the RVS, as the spatial parameters, the step length of the affected side had increased from (38.84 ± 11.92) to (41.06 ± 12.20) and the step width had decreased (18.91 ± 4.01) to (17.93 ± 3.61) significantly ($P = 0.02$; $P = 0.005$), while the double support status for one of the temporal parameter decreased from (61.24 ± 5.96) to (58.50 ± 7.05) significantly ($P < 0.05$). **Conclusion:** The lower limbs RVS on the bilateral foot soles in sitting position could immediately increase the stability of locomotion to improve the gait in post-stroke hemiplegic.

A.3.10. VEGETATIVE STATES, MINIMALLY CONSCIOUS AND LOW AWARENESS STATES

PA455

Basler Vegetative State Assessment - BAVESTA: a New Interprofessional Bedside Assessment in Diagnostics of Severe Disorders of Consciousness

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Introduction: Bedside diagnostic in the field of severe disorders of consciousness is a great challenge for physicians and therapists. One of the problems of bedside assessments to differentiate between vegetative state and minimally conscious state is an insufficient sensitivity or specificity. On the other hand, there are assessments, which can only be used as part of specific therapeutic concepts. For this reasons we developed a new assessment. **Methods:** The Basler Vegetative State Assessment- BAVESTA - German version was developed to map the rehabilitation process of patients with severe disorders of consciousness. The BAVESTA is an interprofessional assessment on the basis of the ICF. The development of the BAVESTA bases on observations of different behaviors, patients with clinical diagnosis of vegetative state or minimally conscious state show during therapies and activities of daily live. In regard of patients with severe disorders of consciousness the assessment is resource or ability orientated. The BAVESTA was validated between 2007 and 2012 on a specific ward for severe disorders of consciousness in the REHAB-Ag Basel. The study population consists of 126 patients with clinical diagnosis of vegetative state or minimally conscious state. The observations of 84 patients could be included into the validation. **Results:** Internal consistency is very high with a Cronbach's Alpha of 0.97. The inter-rater reliability is high with an ICC of 0.98. Convergent validity ranges between Spearman's r of 0.46 and 0.80 in comparison to four related assessments. The psychometric properties are good to excellent. **Discussion:** The BAVESTA is able to map the subtle changes of the patients and presents information about consciousness for physicians as well as functional information for therapists. The BAVESTA can be used independent of therapeutic concepts.

A.3.11. MISCELLANEOUS

PA456

The Research of the Transcranial Magnetic Stimulation Assessment to the Effect of Upper Limb Movement Functions in Patients with Stroke

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Objective: Use of the TMS technology to predict and assessment the rehabilitation effect of the movement function in the paralyzed upper limb after stroke, and observe the changes in the excitability of cerebral cortex, from the point of electrophysiology view to judge the prognosis of patients with stroke and to guide the rehabilitation treatment. **Methods:** 46 patients with stroke in the early stage were divided into two groups: MEP positive group and MEP negative group. Under the condition of giving the same basic treatment, respectively before and after treatment for 2 w, 4 w and 8 w, the FIM scale was used to assess the bilateral upper limb movement function in the patients with stroke. Simultaneously we utilized the TMS technology to detect the change of MEP in the contralateral motor cerebral cortex, including RMT, Amp, CL and CMCT. **Results:** The score of the FIM significantly improved in both groups. After treatment of 4w, the FIM in the positive group was obviously higher than that of negative group ($P < 0.05$), and treatment for 8 w, this difference became more significant ($P < 0.01$); while the RMT were progressive lower in both groups, and the RMT decline and decline rate of the negative groups were significantly greater than that of the positive group ($P < 0.05$); At the same time, after rehabilitation treatment, the Amp of two groups patients showed a trend of gradual increase, and the Amp increase of the positive group was earlier than that of the negative group, but the increase extent was no significant statistical differences ($P > 0.05$). In addition, after the rehabilitation treatment the CL and CMCT significantly shorten in the negative group ($P < 0.05$), while in the positive group the change of CL and CMCT no statistical significance ($P > 0.05$). **Conclusion:** The motor cortex excitability presents a trend of dynamic change in patients with stroke. We can make use of the characteristics of MEP to early predict and evaluate the recovery conditions of the

paralyzed upper limb movement function in patients with stroke. The TMS is help to guide the rehabilitation treatment, among all the detection indexes the RMT with the highest sensitivity.

PA457

Sturge-Weber Syndrome: Life through a 4° Tunnel – a Clinical Case Report

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Introduction: Sturge-Weber Syndrome (SWS) is a rare sporadic congenital neurocutaneous syndrome first described in 1879 and recently associated with an activating somatic mutation of GNAQ gene. The hallmark of this syndrome is a triad of vascular malformations of the skin, typically on the ophthalmic (V1) and maxillary (V2) divisions of the trigeminal nerve (“port-wine stain”), the eye, often with glaucoma and ipsilateral leptomeningeal venous angioma, mostly unilateral. According to the Roach Scale, it can be classified in types I, II or III as there is simultaneous oculocutaneous and meningeal, just oculocutaneous or meningeal involvement, respectively. Other neurological symptoms of SWS include seizures, stroke-like episodes, cognitive deterioration, hemiparesis, hemiatrophy, visual field defects. The treatment is aimed mainly at symptomatic control of seizures and glaucoma. Early neurosurgical intervention is indicated when seizure control cannot be reached merely on medical therapy to prevent a declining cognitive state and mental retardation, hemispherectomy being one of the possible surgical solutions. These patients must be continuously followed from neuropsychosocial and rehabilitation points of view, considering physiotherapy, occupational and speech therapies are cornerstones to maximizing the functional potential of the patients. **Clinical Case:** The Authors present the case of a 23 year old female patient, leucodermic, with congenital cutaneous involvement of the right trigeminal territory, and a history of seizures of the left body since 3 months old, resistant to medical therapy and diagnosed with SWS since then. She has undergone right hemispherectomy at 14 months old with seizure control. As sequelae she presents left hemiparesis, hypoesthesia and atrophy - mainly evident at the hand, 40 tunnel vision and cognitive deficit including reading disability. When she was 15, she relapsed on absence episodes, with not yet established etiology. She has been going through a rehabilitation programme, including physiotherapy, rehabilitation balneotherapy and occupational therapy, not in a regular basis, without substantial functional loss. **Discussion:** SWS is a rare disorder with important multidimensional functional repercussions directly or indirectly related either to the disease or its treatment. Thus, it is up to the physiatrist to follow up these patients so as to maximize their abilities and prevent functional deterioration.

PA458

Pilot Study: Efficacy and Safety of Botulinum Neurotoxins in Patients with Polysubstance Abuse in Chemical Dependency Program Setting

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Significance & Background: The idea that BoNTs can be used for mood stabilization and cravings control is based on clinical data accumulated for years in this country and in Europe. For example, Botox, one of the older BoNTs, has been widely used for cosmetic purposes to remove wrinkles and rejuvenate skin (Jandhyala R, 2012, Yamauchi PS, 2012). Over the years, clinicians had observed that patients treated with a BoNT became calmer and more emotionally stable, and reduced their need to use alcohol and illicit drugs in order to “perk up”. Similar observations were made in patient populations that were treated for chronic headaches. Here, it was found that patients consumed lower amounts of opioid-based

drugs to achieve the same level of pain control and mood stabilization. One reason that little information in this regard has been formally published is because clinicians generally tend to exchange such observations and opinions in the context of informal gatherings, open discussions at scientific meetings, and personal communications, as opposed to reporting them in peer-reviewed journals. Physicians practicing concierge medicine continue to use BoNTs for cosmetic and medical reasons, and attempt to achieve multiple effects, i.e. optimal cosmetic results, emotional stabilization, appetite control, and attenuation of alcohol and drug use. *Hypothesis:* Administration of BoNTs in patients with polysubstance abuse in chemical dependency settings is useful and safe as a part of integrative pain management and rehabilitation program. We anticipated that our proposed study will validate this hypothesis and demonstrate that a BoNT will indeed help patients achieve mood stability, control their cravings, and decrease their abuse and diversion of prescription medications, alcohol and illicit drugs. The ultimate goal would be complete discontinuation of abnormal, addictive behavior by weaning such patients off their chemical dependency and away from substance abuse. Specific Aims of the Study: - establish efficacy and safety of a BoNT used in a chemical dependency program as part of an integrative rehabilitation program - compare data and perform an initial efficacy analysis - ensure self-reporting of patients' responses. *Study Design:* To achieve these aims, we proposed to employ a cross-sectional survey focused on patients with a history of polysubstance abuse that are referred to Rule 25 assessment and treatment at a specialized chemical dependency program. In this study, individuals were selected from patients with a history of polysubstance abuse that have been enrolled in the chemical dependency rehabilitation program. There were two groups of 30 patients each. One group received standard-of-care treatment for chemical dependency and was administered a BoNT at a prescribed dose and route of administration. The second, control group received the same standard-of-care treatment for chemical dependency as in group one, but these patients were administered a placebo injection that does not contain the BoNT. Patients in both groups were of the same age and socio-economic background, and those selected for group one or two were randomly selected by flipping a coin for the first patient to enter groups one or two, and then each subsequent patient will be entered into the other group, and then alternately entered into groups. This helped control for physician bias. Once patients were recruited and agreed (via consent forms) to enter into the study, they were asked to fill out a questionnaire prior to initiation of treatment. The questionnaire asked various questions related to medical history, reasons for their substance abuse problem, other health related queries, how they feel when on (and off) their substance of choice (SOC), how much of it they consume, social issues, relationships with family and friends, how use of their SOC affects these relationships, reasons for entering this program, etc. The questionnaire also was modified and adjusted to the research sample, and the final version of the protocol for the patient will be developed. The survey will be anonymous. BoNT were injected every three months, 1-2 standard vials, in the head and neck areas. 3 sets of injections were administered with 3 follow up office visits one month after each injection session. During each follow up office visit the patients were asked to fill out another, post-injection questionnaire, with many of the same questions posed in the intake questionnaire and related to post-treatment changes in their health, feelings, level of pain, need for SOC, social issues, etc. During each follow up office visit collection of patients' blood and/or urine samples as a quantitative and unbiased measure of drugs in their systems was done. This controlled for patient truthfulness in answering the questionnaire in terms of whether their usage is reduced or not by BoNT. Data were collected at the Rehabilitation Consultants, PA, medical clinic and at the chemical dependency program affiliated with the University of Minnesota. Data were collected over two years with the assistance of community leaders and church officials. Questionnaires were compiled and analyzed using unconditional logistic regression in main effect models. Results were correlated with social parameters, e.g. living singly, social network, socio-economic status, unhealthy behavior, smoking, alcohol/drug abuse. *Results:* - Patients with a history of

polysubstance abuse in the chemical dependency program benefit from the use of BoNT. - Use of BoNT is safe and effective for this population. - 3 injections sessions every 3 months BoNT administration in combination with standard-of-care chemical dependency treatment lead to enhanced mood stabilization, reduced cravings, improve pain control at the same or even reduced dosage of opioid-based medication. - Integrative pain management and substance abuse rehabilitation was improved, along with increased social engagement, better response to psychological intervention, and enhanced quality of life.

A.3.2. TRAUMATIC BRAIN INJURY

PA460

Peer Mentoring after Traumatic Brain Injury – Findings from a Feasibility Study

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Background: Peer mentoring is a strategy that has been used to improve participation in some client groups. However, evidence in TBI populations is limited. We will present findings from our feasibility study relating to two of our study aims: to ascertain-mentee and mentor retention rates and to examine the appropriateness of the training. *Methods:* A feasibility study in which six people with a moderate or severe TBI and who were about to be discharged from inpatient rehabilitation were matched with a peer mentor with TBI who were discharged between 1 and 5 years previous. Peer mentors took part in a 2-day workshop, which focused on role definition, the mentor-mentee relationship, strategies for managing common challenges and staying safe. The peer mentoring intervention consisted of one session in the rehabilitation unit and five sessions in the community, intended to take place over a 3-month period. Sessions focused on establishing what participatory activities are important to the mentee, developing goals, and supporting participation in these activities. Emphasis was given to establishing a trusting relationship and working with the person with TBI within their context. Qualitative interviews were carried out with mentors on completion of the intervention. *Results:* Six consenting eligible mentees (18-46 years, 4 male, 2 female) were successfully matched with six mentors 21-59 years, 4 male, 2 female). Two mentees did not remain in contact after the first session, due to personal circumstances (75% retention rate). The sessions for the four who remained in the programme took place over 5 months. The main reasons for the programme taking longer than anticipated included on-going medical issues (e.g. surgery) and personal circumstances (e.g. family commitments). Initial qualitative data suggest that the 2-day workshop was effective in supporting mentors in their role. Furthermore, the workshop and experience of being a mentor also provided them with skills and confidence in communication and relationship building that extended beyond the programme. *Conclusions:* The study is near completion and data analysis will be complete by January 2015.

PA461

Constraint Induced Movement Therapy in Day Treatment Program for People after Brain Injury

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Our department is concerned with brain injury patients. We offer a day treatment out patient multidisciplinary program for them. We

decided to start our programme using the concept of CIMT. CIMT (Constraint Induced Movement Therapy as was described first by Taub (1994, 1999) and Millner 1999). It is based on two basic principles. Forced use of the affected arm by restraining the unaffected arm e.g. by hand splint or glove during dedicated exercise sections or ADL (activities of daily living) and massed practice of the affected arm through so called shaping activities. Shaping involves conditioning method in which an objective is approached in small steps of progressively increasing difficulty. In contrast to other rehabilitation treatment of neurological disorders procedural learning is the most important principle of this method. *Method:* 12 patients with hemiparesis due to stroke age 18 and older were involved. They had good cognitive functions to understand and follow the tasks. Cognition was proved by neuropsychological assessment. All patients had paresis of upper limb and were able to extend wrist at least 20 degrees and fingers in metacarpophalangeal joints extend at least 10 degrees. Patients had four weeks of intensive day programme (eight hours a day, four and half hours of intensive training including shaping activities from Monday till Friday and then they were practicing at home. The evaluation of the effect was done by using standardised functional tests (e.g. Purdue Pegboard Test, FIM) as well as measuring time of shaping activities and spasticity scales (MAS – modified Ashworth scale and Tardieu scale). They were controlled after one month, three and six months after finishing the programme. The first patients even after one year after. The results are very promising. All patients were much better after the programme, 80% were better even after three and six months after the therapy and 68% even after one year. CIMT method is very promising even for chronic patients and the results persist long time.

PA462

Tracheostomy Discharge Protocol in Increased Care Unit of A Rehabilitation Center. A Prospective Cohort Study

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Introduction: Tracheostomy intubation is a fundamental intervention for treatment of patients hospitalized in increased care units (ICUs) where long term mechanical support is required and offers considerable advantages in better management and faster release from mechanical ventilator. However there is a gap in literature concerning the optimal time of removal of tracheostomy and a lack of standardized criteria for ICU clinicians to proceed with this action. *Materials and Method:* 65 records of patients with tracheostomy treated in ICU between April 2011 and July 2014 were included in the study. There were 46 men and 19 women with mean age 61.2 and 51.4 respectively. The tracheostomy discharge criteria were non pathological deglutition process (assessed by Evans test), active cough reflex and ability for expectoration of secretions, absence of active infection (temperature, WBC, CRP, ESR blood gazes measuring values within normal limits and chest X-ray). After successful removal of tracheostomy tube the patients were followed with regular measurement of blood pressure and SpO₂ every day and chest X-ray every 10 days for 2 months. *Results:* The study population consisted of 10 patients with polyneuropathy/myopathy, 12 with haemorrhagic and 18 with ischemic stroke, 12 with traumatic brain injury, 11 with hypoxaemic encephalopathy and 2 patients with spinal cord injury. Forty patients out of 65 were successfully removed their tracheostomy tube. The average time under tracheostomy for these patients was 50.3 days. Two patients after tracheostomy discharge developed complications. One had tracheal stenosis and one developed respiratory failure and the tube was reinserted. The rest 38 (95%) had satisfactory recovery with good outcome at 60 days after tracheostomy removal. The rest 25 patients were discharged from our centre with the tracheostomy. *Conclusion:* The high percentage of uncomplicated recovery after tracheostomy discharge shows a significant level of safety of the used tracheostomy removal criteria despite the fact of heterogeneity of our study population.

PA463

Meal Complexity: an Important Influence on the Assessment of Activity Performance Following Acquired Brain Injury?

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Background: Cognitive and behavioural difficulties following acquired brain injury may lead to severe limitations in activities and restrictions in participation. To address this issue, a unique 7-week holistic and multidisciplinary rehabilitation program was developed at the Pitié-Salpêtrière Hospital, France. Recently, the program's impact on "cooking" performance was assessed using the Instrumental activity of daily living profile (IADL Profile), a tool measuring individuals' ability to prepare a meal for themselves and guests in their home. Using a single subject design, we observed a decrease in the need for assistance during the task for all participants (n=7), between the pre (T1) and post (T2) program periods. However, the IADL cooking scores of 4 participants (FA, CO, MN, MI) decreased at 3 (T3) or 6 months (T4) post program, despite improved autonomy observed by clinicians and with other tools. *Objective:* Analyze the complexity of menus chosen by participants to explore whether choice of menu could explain the worsened cooking activity scores over time. *Methods:* Seven judges (group-matched for cooking ability) independently ranked the complexity of each participant's 4 meals. We were interested in cases where at least 4/7 judges deemed the menus increasing in complexity. *Results:* According to complexity rankings for MI and FA, the need for greater assistance at 3 m post could be explained by the individual's menu choice (e.g. MI's second menu=coleslaw, chopped steak and lentils; 3rd menu=carrot and avocado salad, quiche Lorraine). Improvement in FA's score at 6 m could partly be explained by his preparation of a simpler menu (1st menu=canned soup, homemade quiche Lorraine and salad, pudding; later menu=pasta salad, store bought ice cream). Poorer results at T4 for one participant and another's at T3 and T4 could not be explained by menu complexity. *Conclusion:* Changes in IADL Profile scores may be explained by real changes in individuals' capacity to complete the cooking activity or in changes in menu complexity over time. Future assessments of an individuals' ability to perform a cooking activity should thus include an analysis of meal complexity since this aspect of the task could help explain test results.

PA464

The Role of Rehabilitation Therapy on Patients with sTBI in Intensive Rehabilitation and Care Unit in Controlling Pneumonia

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Introduction: Pneumonia is a common complication for patients with severe traumatic brain injury (sTBI) in intensive care unit (ICU). Antibiotic resistance of bacteria makes it difficult to control the pneumonia. The rehabilitation therapy (RT) in ICU seem be beneficial for patients with sTBI to control pneumonia. This study aimed to explore the role of RT on patients with sTBI in intensive rehabilitation and care unit (IRCU) in controlling pneumonia. *Material and Methods:* 30 cases with sTBI who were transferred to IRCU 20 days later after neurosurgery were included in this study. All patients with GCS below 8 were diagnosed as pneumonia and monitored under electrocardiograph. Besides drug therapy, all patients received RT which contained electrical stimulation, magnetic stimulation, sputum elimination, ultraviolet ray, acupuncture, passive movement and so on. The times and duration of antibiotics, procalcitonin and GCS were analyzed to observe the role of RT in controlling pneumonia of patients with

sTBI in IRCU. *Results:* *P. aeruginosa* and *acinetobacter baumannii* accounted for 66.7% and 22.2% respectively, others 11.1%. 40% patients could stop the use of antibiotic via RT. RT could shorten the times and duration of antibiotics. The procalcitonin also were decreased. *Conclusions:* RT is helpful for patients with sTBI to control pneumonia during ICU stage. It is also vital to set an IRCU in rehabilitation department to receive patients with sTBI or other severe neuropathy.

PA465

Functional Outcome and Social Reintegration of Patients with Severe Traumatic Brain Injury: About a Tunisian Population

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Introduction/Background: The severe brain injury (TBI) is in industrial countries a major health problem, a personal and family tragedy and a challenge for the Rehabilitation Medicine. The main objective of this study was to investigate the functional and socio-professional outcome of a population with severe TBI. *Material and Methods:* The functional and socio-professional outcome (lifestyle, occupation and education) has been researched by a telephone interview with the victims' families. The following parameters were analyzed: demographic characteristics, mechanism of trauma, the season of onset, length of coma, the nature of neuro-orthopedic sequelae and cognitive disorders. Functional level was assessed by the Functional Independence Measure (FIM) and the Glasgow outcome scale (GOS) was used to assess global outcome. *Results:* The average age of the 50 patients included in the study was 28.1±15.3 years, mostly male (76%). Most accidents had occurred in summer (36%) and were secondary to a public road accident (74%). Time management in rehabilitation averaged 9 months. All patients included in this study were socially active before the accident and lived with family. Only 6 patients had returned to work and only 8 patients had resumed their schooling. Problems with memory, executive functions and thinking were reported in 48% of cases. The behavioral troubles (frontal syndrome and emotional problem health) were noted in 40% of cases. The average value of the FIM was 84.1±29 and 40% of patients were scored 3 in disability categories of the GOS (severe disability). *Conclusion:* Our study population is relatively young and predominantly male. The rehabilitation management is very late and the rate of socio-professional reintegration is very low. These findings highlight the importance of providing coordinated rehabilitation medicine and intensive care unit to promote social outcomes after severe TBI.

A.3.3. SPINAL CORD INJURY

PA466

Global Meaning in People with Spinal Cord Injury: Content and Changes

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Background: After spinal cord injury (SCI), people are confronted with abrupt discontinuity in almost all areas of life, leading to questions on how to live a meaningful life again. Global meaning refers to basic ideas and goals that guide people in giving meaning to their lives, in specific situations. Little is known about global

meaning relating to SCI and whether global meaning changes after SCI. *Purpose:* The purpose of this study was twofold: (i) to explore the content of global meaning of people with SCI, and (ii) to explore whether or not global meaning changes after SCI. *Methods:* In depth semi structured interviews were conducted with 16 people with SCI. Interviews were analysed according to the method of grounded theory. *Results:* (i) Five aspects of global meaning were found: core values, relationships, worldview, identity and inner posture. (ii) Overall, little change in the content of global meaning was found after SCI; specific aspects of global meaning were foregrounded after SCI. *Conclusion:* Five aspects of global meaning were found in people with SCI. Global meaning appears to be relatively insensitive to change.

PA467

Global Meaning and the Process and Outcome of Rehabilitation in People with Spinal Cord Injury: a Qualitative Study

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Background: Global meaning refers to global beliefs and global goals guiding people in living their lives. Global meaning has been hypothesized to guide the process of adaptation to a traumatic event, such as spinal cord injury (SCI). Knowledge on the role of global meaning in the adaptation to SCI is limited. *Purpose:* The purpose of this study was to explore whether global meaning affects the process and outcome of rehabilitation, as experienced by people with SCI. *Methods:* In depth semi structured interviews were conducted with 16 people with SCI. Interviews were analyzed using the qualitative research methods of structural and provisional coding. *Results:* Various aspects of global meaning (i.e. core values, relationships, worldview, identity and inner posture) were found to affect elements of the process and outcome of rehabilitation; elements affected included motivation, regulation of emotion, making decisions, handling stress or other psychological demands, quality of life, and participation. The influence was positive as well as negative, but mainly positive. *Conclusion:* Global meaning was found to affect elements of the process and outcome of rehabilitation. The influence of global meaning on rehabilitation process and outcome is for the most part positive.

PA468

Problematic Secondary Health Conditions and Its Impact on Social Activities and Daily Life within a Spinal Cord Injury Population

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Introduction: Modeled after van Loo, Post, Bloemen, and Asbeck [1], this exploratory study describes the secondary health conditions perceived as most problematic by a SCI population in the United States. Social activities and daily living were also examined. With the restructuring of health care and decreasing length of stay within rehabilitation hospitals [2], minimal time is given to the management of secondary health conditions and the impact these have on social activity and daily living post SCI. *Methods:* This study employed a cross-sectional survey design. 56 adults with SCI completed an online questionnaire. Subjects were asked to identify the top five problematic secondary health conditions related to his/her SCI, belief about the impact these conditions have

on social activities and daily life, and if they believed the secondary health condition was avoidable. Demographic data were also collected. *Results:* 33 males and 23 females between the ages of 16 and 73 completed the survey. The top problematic areas identified were bladder, pain, bowel, pressure ulcers, and breathing, and 73% felt that these problems were unavoidable. In addition, more than 66% had this problem continuously during last 12 months. When examining the impact of the problematic secondary health conditions, 75% identified that the primary problem had a direct impact on social activities and 64% identified it directly impacted daily life. *Conclusions:* Bladder, pain, bowel, pressure ulcers and breathing were identified as the top problematic secondary conditions. Although the majority of this sample was participating in an outpatient wellness program, it appears that the secondary health conditions identified had a negative impact on both engagement in social activity and daily living. Future research and in depth analysis is needed to examine management of problematic secondary health conditions and to determine what type of community-based rehabilitation programs are successfully addressing these health care concerns. *References:* 1) Van Loo MA, Post MWM, Bloemen JHA, and van Asbeck FWA. Care needs of persons with long-term spinal cord injury living at home in the Netherlands. *Spinal Cord*. 2010; 48, 423-428. 2) National Spinal Cord Injury Statistical Center. Spinal cord injury fact and figures at a glance. National Spinal Cord Injury Statistical Center; 2013.

PA469

An Investigation into Implicit Motor Imagery Using Laterality Recognition of the Hand after Stroke

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Introduction: Laterality recognition is a form of implicit motor imagery where participants determine the laterality of a pictured hand by subconsciously imagining moving their hand into the position shown in the picture. Deficits in laterality recognition have previously been shown after stroke. The aim of the study was to explore the relationship between laterality recognition after stroke and impairments in attention, 3D object rotation, clinical signs and functional ability. *Methods:* Thirty-two acute and sub-acute stroke patients were compared to 36 healthy, age-matched controls on assessments of laterality recognition, attention and mental rotation of objects. Within the stroke group, the relationship between laterality recognition and functional ability, neglect, hemianopia were explored. *Results:* Stroke participants were significantly less accurate (69% vs 80%) and showed delayed reaction times (3.0secs vs 1.9 secs) when determining the laterality of a pictured hand. Deficits either in accuracy or reaction times were seen in 53% of stroke participants. The accuracy of laterality recognition was associated with reduced functional ability ($R^2=0.21$), less accurate mental rotation of objects ($R^2=0.20$). Lesions involving the motor network, particularly the parietal lobe and fronto-parietal network were associated with deficits in laterality recognition. *Conclusion:* Implicit motor imagery is affected after stroke. This research provides new insights into how laterality recognition is related to a number of other deficits after stroke, including the mental rotation of 3D objects, attention and dyspraxia. Further research is required to determine if treatment programs can improve deficits in laterality recognition and impact functional outcomes after stroke.

PA470

What Support Do Men with Spinal Cord Injury Need When Deciding on the Method of Bladder Drainage? A Qualitative Study

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Introduction: Many consumer and professional governmental organizations endorse patients' involvement in making decisions about their health care. However, the extent to which patients are involved in decision-making varies. This study explored the decisional support men with spinal cord injury (SCI) needed when making a decision on the method of bladder drainage. *Material and Methods:* This qualitative study was conducted in the hospitals of Malaysia in 2013. Trained researchers used a topic guide to conduct individual in-depth interviews with men with SCI (n=17) and their caregivers (n=4). All interviews were audio-recorded, transcribed verbatim, and analysed using a thematic approach. *Results:* Four themes describing patients' decisional support needs emerged from the analysis: chance to participate in decision making, information needs, time, and post-decisional support. Men with SCI revealed they were not always involved in the process of choosing a bladder drainage method. They wanted the doctor to give them the opportunity to participate. Doctors were the only source of information during the initial hospitalization period. The participants had varied opinion on the sufficiency of information they received and most information was difficult to understand. The participants preferred information to be delivered in the form of graphics and video to text. They wanted information about the disease, its treatment options, and peers' experiences with the different methods of bladder drainage. They wanted the doctors to spend more time with them and explain to them about the disease. Finally, there was a lack of post-decisional support. Men with SCI wanted the healthcare professionals to help them overcome the difficulties they faced implementing the choice, including how to catheterize. *Conclusion:* Men with SCI from this study wanted more involvement and information throughout the decision making process. The healthcare professionals must address these needs to ensure successful implementation of the decision.

PA471

Delayed Diagnose of Bilateral Tibial Fracture in a Patient with Spinal Cord Injury

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Case Description: Tibial fractures occur often in wheelchair-related falls (Nelson et al. 2003). However, sensory loss may cause some challenges in diagnosing fractures. A 67-year old man with C6 fracture and a spinal cord injury 36 years earlier, fell down from his wheelchair in June. He had got cough before the accident. He hurt his knees and feet. He went to the emergency after 3 days, because he was sweating and shivering. Big haematomas were around in his feet in metatarsal area. X-rays were taken from his feet and no fractures were found. Thorax x-ray was normal, hemoglobin 127 g/l, and C-reactive protein (CRP) 118. He got antibiotics for 10 days. Diagnose was bronchitis. After 2 weeks he was still sweating and shivering. CRP was 21, and hemoglobin 110 g/l. He was referred to the department of pulmonary diseases at the central hospital. There, after 1.5 months from the accident, nothing special was found from the lungs. Five months after the accident, the patient came to the outpatient clinic for spinal cord injury patients. He had felt poorly for a long time. He had also noticed that the shape of his knees had changed. X-rays were taken from the knees and legs. Bilateral tibial fracture with ongoing ossification were found. *Discussion:* A patient with SCI is at risk for fractures due to immobilization osteoporosis. Fracture of lower leg is often related to wheelchair-related falls. The haematoma may run downwards due to gravitation, if the patient sits in the wheelchair after the injury. The patient is unable to localize the injury, but may have symptoms of autonomic dysfunction. Bilateral tibial fracture may cause a significant bleeding, decrease of hemoglobin, and an increase in C-reactive protein. *Conclusion:* In this case, CRP increased and haemoglobin decreased probably due to bilateral tibial fracture rather than due to bronchitis. *Reference:* Nelson A, Ahmed S, Harrow I et al. Fall-related fractures in persons with spinal cord impairment: a descriptive analysis. *SCI Nurs* 2003; 20(1): 30-7.

PA472

Traumatic Brain Injury and Neurogenic Heterotopic Ossification

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Introduction: Heterotopic ossification (HO) is primarily observed as a slowly developing complication following trauma to the central nervous system, traumatic spinal cord lesions as well as traumatic brain injury. The aetiology and pathogenesis of this lesion are unknown. The aim of this study was to determine the potential risk factors of developing symptomatic heterotopic ossification among adult patients with traumatic brain injury. **Material and Methods:** Were included in this study all adult patients hospitalized in our department between January 2012 and December 2014 for management of head injury sequelae and having developed neuropathic heterotopic ossification. For each patient we defined history, the presence of spasticity, the location of heterotopic ossification and means of management. **Results:** 17 male patients were included in our study with a mean age of 29 years. All of them had a Glasgow score less than 8. The average time to discover the HO compared to the initial injury in our patients was 40 weeks. The knee and hip were the 2 main joints affected by them. They were affected in 10 cases each. 7 patients had a spasticity with modified Asworth score higher than 3. A raised level of serum alkaline phosphatase was found in 11 patients. The measure of functional independence objectified a score below 80 in 9 patients. Surgical treatment was necessary in 4 patients (two with nervous compressions and two for non functional limitation of range of motion). **Conclusion:** HO is positively correlated with the severity of the brain damage. Several risk factors for developing HO have been published, as brain damage, prolonged coma, spasticity, immobilization and raised level of serum alkaline phosphatase. All of these risk factors were found in this study. However we found that the period of discovery of the HO is much more important to rapport by other studies.

PA473

Prevention of Added Disability in Spinal Cord Injury

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Background: The decubitus complications cause many problems in the rehabilitation phase of the traumatic spinal cord injured patients. The aim of our study was to analyze the severity of these complications and to highlight the importance of prevention in the initial care services. **Methods:** We conducted a retrospective study in the service of Physical Medicine and Rehabilitation of the MTKassab Institute, on victims of traumatic spinal cord injury admitted into the service between the years 2008 and 2012. We have analyzed the specialized examination on admission and the details of the initial care. We studied the leading preventable complications with their own functional impact and subsequent follow-up care, and then we looked for connections between all these different parameters. **Results:** Thirty-five patients were identified. The average age was 33.6 years with a male predominance (80% of patients). The main complications were urinary tract infections which were found in 71.1% of patients, followed by pressure ulcers (60%) joint limitations (31.42%) and respiratory infections (11.43%). We found a match between the presence of pressure ulcers and transfer time, hypoalbuminemia and functional status. Joints stiffness were associated with a longer time to transfer a greater number of pressure ulcers and a need for mechanical ventilation. The respiratory infections were associated with functional dependence, anemia and the use of mechanical ventilation. The therapeutic measures were effective in 46.8% of pressure ulcers and in 50% of limited joints. The functional evolution was favorable in 37.1% of pa-

tients, stationary in 60% of patients and poor in 2.9% of patients. Among our active patients before the accident, 15.4% have found a job and 46.1% of them have lost their jobs. **Conclusion:** Decubitus complications had serious repercussions on the health and functional outcomes and required an expensive special care which concluding in the importance of prevention through a prevention protocol established at the initial phase support.

PA474

Health Related Quality of Life in Person with Spinal Cord Injury

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Background: Spinal cord injury (SCI) is one of the most devastating and life-threatening event. Due to the changes in an individual, the Health Related Quality Of Life (HRQOL) of a person with spinal cord injury is affected. Examining the Health Related Quality Of Life (HRQOL) and the factors influencing it will help in setting appropriate rehabilitative goals for the patients with spinal cord injury (SCI). **Methods:** The data was collected from the 92 patients who attended the follow up program conducted in the Rehabilitation institute of a tertiary care hospital. **Results:** Health Related Quality Of Life (HRQOL) is significantly low in patients with spinal cord injury when compared to the normal population. Variables like marital status, vocation, and level of injury have a significant influence on Health Related Quality Of Life (HRQOL). Functional Independence as measured by Functional Independence Measure (FIM) and Modified Barthel Index (MBI) has a positive correlation with Health Related Quality Of Life (HRQOL). Occupational performance issues of self care wherein functional mobility are the most commonly reported issues in persons with spinal cord injury. **Conclusion:** Persons with spinal cord injury (SCI) have a significant low Health Related Quality Of Life (HRQOL) related to the factors like marital status, vocation, and level of injury and self care most is the affected occupational performance domain. Therapy incorporating these aspects is imperative for holistic rehabilitation.

PA475

Development of a Discharge Nursing Plan for Social Adjustment in Patients with Spinal Cord Injury

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Background: Discharge from the hospital is a critical transition point in a patient's care, especially for patients with spinal cord injury. For leading patients to more independent life, social adjustment is the final goal of rehabilitation treatment in patients with spinal cord injury. Developing elements of the nursing discharge plan for social adjustment may help to address the gaps in quality that occur when patients transition from the hospital to community and enhance our nursing care. **Material and Methods:** To develop social adjustment items in discharge nursing plan, first literature review was conducted and 31 peer reviewed journal articles and one case study were found. Based on the literature review, 21 items were selected and examined by clinical experts for content validity. This research evaluate the data using exchange CVI (content validity index), ranging from five point scale to one-point scale and patients' need for social adjustment in their discharge plan. **Results:** The finalized discharge nursing plan consisted of 20 items in seven domains, only one item was eliminated, considered necessary for educating social adjustment at hospital discharge. This items focused on family, job, psychology, social activity, physical, mobility, and facility/system. Professional evaluated all of seven domains as important discharge plan, whereas patient choose 5 domains except job and psychology. Although job and psychological domain is less important to patients' need, but in a long term job and psychologi-

cal domains is very important to their disabled lives in Korea. In conclusion 7 domains including job and psychological domains are chosen essential discharge plan for patients with spinal cord injury. **Conclusion:** The development of a nursing discharge plan for social adjustment in patients with spinal cord injury is the first step in providing comprehensive nursing care and improving the handoff of care from inpatient to the post-hospital setting. The findings of this study may serve to provide a basis for further improvement of discharge nursing care and ultimately affect patient outcomes.

PA476

An Investigation into Implicit Motor Imagery Using Laterality Recognition of the Hand after Stroke

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Introduction: Laterality recognition is a form of implicit motor imagery where participants determine the laterality of a pictured hand by subconsciously imagining moving their hand into the position shown in the picture. Deficits in laterality recognition have previously been shown after stroke. The aim of the study was to explore the relationship between laterality recognition after stroke and impairments in attention, 3D object rotation, clinical signs and functional ability. **Methods:** Thirty-two acute and sub-acute stroke patients were compared to 36 healthy, age-matched controls on assessments of laterality recognition, attention and mental rotation of objects. Within the stroke group, the relationship between laterality recognition and functional ability, neglect, hemianopia were explored. **Results:** Stroke participants were significantly less accurate (69% vs 80%) and showed delayed reaction times (3.0 s vs 1.9 s) when determining the laterality of a pictured hand. Deficits either in accuracy or reaction times were seen in 53% of stroke participants. The accuracy of laterality recognition was associated with reduced functional ability ($R^2=0.21$), less accurate mental rotation of objects ($R^2=0.20$). Lesions involving the motor network, particularly the parietal lobe and fronto-parietal network were associated with deficits in laterality recognition. **Conclusion:** Implicit motor imagery is affected after stroke. This research provides new insights into how laterality recognition is related to a number of other deficits after stroke, including the mental rotation of 3D objects, attention and dyspraxia. Further research is required to determine if treatment programs can improve deficits in laterality recognition and impact functional outcomes after stroke.

PA477

Effect of Electrical Stimulation on Extensor Spasticity in Traumatic Spinal Cord Injury Patients

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Introduction: Spasticity is one of complications of SCI and it threatens activities of daily living and may cause delay in rehabilitation. **Material and Methods:** Aim - To determine effect of electrical stimulation in extensor spasticity of lower limbs in traumatic (SCI) patients (ASIA A to D) Study Design - Hospital-based randomized study. Setting - Yangon General Hospital, National Rehabilitation Hospital. Participants - 35 traumatic SCI patients (ASIA A to D) with lower limb extensor spasticity (29 males, 6 females). Intervention - Study group (n=18) received electrical stimulation and standard physiotherapy treatment. Control group (n=17) received sham electrical stimulation and standard physiotherapy. Parameters used for electrical stimulation in study group were 60 Hz with 5 second on and 2 second off, intensity ranging from 1 to 10 mA with suboptimal motor contraction with treatment duration of 20 minutes per session, one session per day, and 5 days per week for 6 weeks. Patients were assessed at beginning of study, at 2nd, 4th, and 6th weeks. Outcome Measures - Modified Penn Spasm Fre-

quency Scale (Modified PSFS), Modified Ashworth Scale (MAS) and Functional Independence Measure Motor Subscale (FIM Motor Subscale). **Results:** There were no significant differences in patients' characteristics before treatment in both groups. After 6 weeks of treatment, there was a significant reduction in spasticity in study group. Although spasm frequency and MAS reduced from week 0 to week 6 in both groups, rate of reduction was much higher in study group than that in control group statistically ($p<0.001$). Rate of reduction of spasm severity was also much higher in study group than control group ($p=0.002$). Rate of improvement in FIM Motor Subscale was much higher in study group than that in control group ($p<0.001$). **Conclusion:** There was statistically significant improvement in outcome measures in study group. So, electrical stimulation can safely be recommended and it can be noted that it is an effective treatment in patients with extensor spasticity (MAS 1 to 4) of lower limbs following traumatic SCI.

PA478

Post Stroke Checklist Identifies Unmet Needs for Health Care in Post-Acute Stroke Patients

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Introduction and Background: Post stroke checklist (PSC) is advocated as a simple and easy-to-use clinical tool to identify unmet needs among stroke survivors. However, its design based on preliminary pilot results from Delphi panel and several physician endorsements. A more comprehensive evaluation is therefore required to ensure that the long-term needs of stroke are recognized in different countries. **Material and Methods:** A total of 311 first-ever stroke patients, aged 67.8 ± 14.3 years and in 192 male (61.7%), with Functional Independence Measure 76.4 ± 23.7 were enrolled in this study. The 11-items PSC includes: 1) Secondary stroke prevention, 2) Activities of daily living (ADL), 3) Mobility, 4) Spasticity, 5) Pain, 6) Incontinence, 7) Communication, 8) Mood, 9) Cognition, 10) Life after stroke, and 11) Relationship with family, and they were assessed to identify the ranks of key problems. Based on our preliminary results and clinical experiences, a revised PSC (dPSC, dysphagia item added) was also conducted to exam the importance of dysphagia in last six months of this study and to compare the ranks of key problems between PSC and dPSC. The numbers of "Yes" response is presented by percentage for each question. **Results:** ADL (71.1%) ranked first in PSC, followed by mobility (68.0%), spasticity (35.1%), life after stroke (35.1%), and communication (28.5%). Mobility (83.0%) and ADL (78.0%) list Top 2 ranks in dPSC, followed by life after stroke (46.0%), mood (43.0%), and dysphagia (42.0%). Secondary prevention (PSC: 13.4%, dPSC: 19.0%, respectively), relationship with family (16.2%, 15.0%), incontinence (16.5%, 24.0%) and pain (21.0%, 19.0%) were both last four concerned problems after stroke. **Conclusion:** Our results confirm the feasibility and usefulness of the PSC in clinical practice. Due to different culture and medical service model, the ranking of PSC in this study is somewhat different from Delphi panel, especially in secondary prevention and swallowing problem. More importantly, it reminds us that we should pay more attention for dysphagia in the post stroke, and should be included in PSC to facilitate appropriate referrals and intervention.

PA479

Spinal Cord Damage and Disabling Spasticity – Introducing the Ability Networks' Clinical Pathway for Best Practice

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Introduction: Optimizing treatment of disabling spasticity in patients with spinal cord damage (SCD) is hampered by a lack of guidelines presenting a clinical pathway to support the non-specialist rehabilitation community. Additionally, there is no acceptable definition of spasticity, many patients are managed outside specialist centers and variations in practice result in unequal access to best practice despite equal need. To harmonize practice, the Ability Network (AN) was initiated to develop a clinical pathway with recommendations for standardizing the assessment, treatment and evaluation of outcomes. **Methods:** The AN is an independent panel of international medical experts from specialist rehabilitation centers. Consensus recommendations are obtained through facilitated, in-person meetings. **Results:** Once spasticity has been identified based on a common definition, patient selection using relevant multidimensional assessment tools is required. The International Classification of Functioning, Disability and Health (ICF) was used as a framework and an "ICF Spasticity Set" was developed. The AN's clinical pathway will facilitate treatment decisions, accounting for the impact of spasticity on the health status, functioning, distribution of spasticity, patient preferences, treatment goals, and tolerance to adverse events. Literature reviews are guiding the selection of tools to evaluate clinicians', caregivers' and patients' perceptions of treatment outcomes of spasticity management on body functions, activity, participation and quality of life. **Conclusions:** The AN's recommendations will establish a unified approach to patient management and provide a common language and frame of reference to optimize treatment decisions and patient outcomes.

PA480

Early Access to Vocational Rehabilitation for Inpatients with Spinal Cord Injury: a Qualitative Study of Patients' Perceptions

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Background: Individuals with spinal cord injury (SCI) consistently rank participation in employment and economic self-sufficiency as a very high priority. Inpatient rehabilitation with a predominant physical focus may not adequately equip the recovering individual for life in the real world, nor sustain hope of return to full participation. Influences on decision-making about employment often begin early, involving factors such as self-confidence, perceptions about physical capacity to work again, uncertainty about job options and employer expectations. A pilot early intervention vocational rehabilitation program was recently conducted in SCI units in Sydney, Australia. It was hypothesized that the early provision of integrated vocational rehabilitation services in the hospital setting for newly injured individuals will result in better employment and related outcomes. The objective of this qualitative inquiry was to examine the issue of timeliness of intervention, that is, whether it is too early (within first 6 months post-injury) to be exploring return to work or education. **Methods:** Participants who received early vocational intervention were selected by accessibility and interviewed individually after discharge using a semi-structured approach, with additional probing as required. Transcripts of the interviews were created via audio recordings, transcribed verbatim and the contents were analyzed thematically. **Results:** The sampling was continued until the point of data saturation, where no new understandings seemed to emerge and 13 participants between 19 to 60 years were interviewed out of a total of 168 participants. Overall, there seemed to be a consensus that vocational interventions were viewed positively with emerging themes such as hope, sense of direction and distraction, meaningful therapy, avoidance of boredom, motivation, advocacy and support. There were a few dissenting voices about interventions being offered too early (particularly in the intensive care unit) and also about information overload. **Conclusion:** Vocational rehabilitation has traditionally not been provided during inpatient rehabilitation in Australian SCI units, but appears important. It can encourage patients to see the possibility of returning to work and/or education very early after injury and allow rehabilitation to be

directed accordingly. The importance of choosing the 'right time' for discussing vocational matters sensitively is paramount.

PA481

The Frequency Causes of Readmissions in Chronic Spinal Cord Injury

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Introduction: Spinal Cord Injury SCI, one of the leading causes of disability. There is concomitant rise in the complications and readmissions. In a 5 years' study conducted in Turkey, 56 out of 733 treated patients of SCI were rehospitalized due to spasticity (25%), pressure sores (17.9%), urinary infection (16.1%), spinal surgery (8.9%), urological surgery (5.4%), pain (5.4%) and further rehabilitation (21.4%). This study showed that number of cases with neuropathic pain were 27.5% which is less internationally. Patients lacking initial physiatrist care at SCI units and follow up, land up in complications leading to readmissions, morbidity and mortality. **Methods & Methods:** A descriptive study recruiting 51 readmitted SCI patients from Apr 2010 to Apr 2011. The cause of readmission was established and data was analyzed to see frequency of causes of readmission. **Results:** 46 (90.2%) were male and 5 (9.8%) females. Mean age 21 years. 38 (74.5%) patients were ASIA A, 5B, 5C and 3 in ASIA D. Causes were Neuropathic pain 27.5%, Spasticity 27.3%, pressure ulcers 19.6%, Gastrointestinal 9.8%, urinary tract infection 7.8%, DVT 3.9%, Heterotrophic ossification 2% with burns reported 1%. **Conclusion:** Neuropathic pain, spasticity and pressure ulcer are leading cause of hospital readmission along with gut related disorders and urinary tract infection.

PA482

Sustained-Released Fampridine in Multiple Sclerosis: Effects on Gait Parameters, Arm Function, Fatigue and Quality of Life

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Introduction: Sustained-release fampridine (fampridine-SR) improves gait velocity and self-perceived capacities in people with multiple sclerosis (MS). However, little is known about the treatment's effect on temporospatial gait parameters, walking endurance, general fatigue, hand function and quality of life (QoL). We sought to evaluate these parameters in a real-world setting open-label study. **Patients and Methods:** 112 consecutive, eligible patients with MS were evaluated at baseline (D0) and after two weeks (D14) of fampridine-SR treatment (10 mg twice daily). Responders were also evaluated after three months (M3). Walking was assessed with the Timed 25-Foot-Walk (T25FW), the 2-Minute Walk Test (2MWT), the Multiple Sclerosis Walking Scale (MSWS-12) and the measurement of temporospatial parameters. We also assessed fatigue (visual analogue scale and the Fatigue Severity Scale), the impact of symptoms (on the MS Impact Scale), hand function (with the Nine-Hole Peg Test) and QoL (with the SF-12). **Results:** 83 patients (74%) were found to be responders. Performance in the T25FW had improved by 34.5% at D14 and by 35.5% at M3, with improvements of 39% and 36.7% in the 2MWT and 19% and 11.6% in the MSWS-12, respectively. The increase in gait velocity was due to both a higher cadence and a greater step length; the distribution of swing and stance phases of gait was not modified. Responders also showed significant, lasting improvements in fatigue ($p < 10^{-5}$ at D14 and < 0.01 at M3), the impact of symptoms ($p < 10^{-5}$), hand function ($p < 0.05$) and QoL ($p < 10^{-5}$ at D14 and < 0.01 at M3). **Conclusion:** In responders, fampridine-SR is associated with lasting improvements in walking but also in other MS symptoms. It could lead to increase the patient's quality of life.

PA483

Spinal Cord Injury (SCI) and Vocational Rehabilitation Counseling: Utilizing the Interdisciplinary Team Model for Successful Outcomes

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Case Diagnosis: The presentation will demonstrate methods for integrating vocational rehabilitation services into the healthcare continuum for patients with SCI. The presenters will discuss SCI and the Vocational Rehabilitation Program, concentrating on integrating planning process. Content will use discussion and plenty of illustrations to show relationships that can occur during rehabilitation. **Case Description:** The presentation demonstrates challenges that patients with recent spinal cord injury face in areas of self-esteem, self-care, relationships and work reintegration. Patients with spinal cord injuries face many barriers to returning to work, such as perceived biases by employers, frequent hospitalizations, physical limitations, and financial and/or medical anxiety, and chronic pain. SCI patients have expressed various causes for lack of employment. **Discussion:** The presentation will include examples of how chart rounds, rechecks, and interdisciplinary goal setting offers value to patient's rehabilitation achievements, care needs and vocational potential. Interdisciplinary interventions to achieve vocational rehabilitation goals during inpatient and outpatient care that address mental health, attendant care, transportation, fear of losing benefits, and job restructuring will be featured. **Conclusions:** Sustaining adequate healthcare through an interdisciplinary approach, reaching maximum medical recovery, understanding vocational impediments, matching patients to suitable career goals, addressing vocational barriers, and providing appropriate support in helping patients address the inpatient and outpatient goals. **References:** 1) Tomassen PC, Post MW, van Asbeck FW. Return to work after spinal cord injury. *Spinal Cord*. 2000;38(1):51–55. 2) Anderson D, Dumont S, Azzaria L, Bourdais ML, Noreau L. Determinants of return to work among spinal cord injury patients: a literature review. *J Vocational Rehabil*. 2007;27(1):57–68. 3) Hess DW, Ripley DL, McKinley WO, Tewksbury M. Predictors for return to work after spinal cord injury: a 3-year multicenter analysis. *Arch Phys Med Rehabil*. 2000; 81(3): 359–363.

PA485

6 Weeks of Recumbent Rehabilitation Vs Early Mobilization: Effects on the ASIA Score in Spinal Cord Injury Patients*P. Santullo¹, S. Antiga², C. Vinod³, A. Farf³, S. Bandi³¹Bologna, Salisbury, GB, ²Bologna, Vittorio Veneto, IT, ³Salisbury Spinal Unit, Salisbury, GB

Introduction/Background: Literature reports that after a traumatic spinal cord injury, the spinal cord suffers a secondary injury caused by vascular changes and is well known the lack of blood autoregulation for the compromise of autonomic nervous system. One treatment for hypotension and oedema is keeping patients on recumbent rehabilitation for 6 weeks after injury. The aims of this study were firstly to observe any changes in the ASIA score, as well as the neurological level, motor level and motor score related to recumbent rehabilitation; and secondly, to identify any worsening in neurology and any motor power wasting related to recumbent rehabilitation (RR). **Material and Methods:** A retrospective study of SCI patients admitted to the Duke of Cornwall Spinal Treatment Centre. 64 medical notes were reviewed. Inclusion criteria: traumatic SCI, neurological level at the admission from C1 to T12; patients AIS A that had (RR); AIS B, C, and D that either were treated with recumbent rehabilitation and were mobilised without recumbent rehab. Minitab 14 and Stat-Xact 4 were used to conduct statistical analysis **Results:** 46 patients met inclusion criteria. Dividing patients into two groups, those who had RR and who did not have it, there were 34 RR patients and 12 non-RR patients. There was no statistically significant correlation between either the vari-

ation in age or the RR and patients' change in AIS score from the time of admission to the time of discharge. There was statistically significant correlation between the variation in neurological level, variation in right motor level, changes in left motor level and the recumbent rehabilitation treatment. There was statistical significance between the presence of RR and changes in the upper limbs motor score. None of the RR patient had any loss in upper limbs motor power. **Conclusions:** Recumbent rehabilitation treatment has been shown not to have any effect on motor power wasting. It didn't bear any relation to changes in AIS score but significant relation to the improvement of neurological level, motor level (in terms of descending level) and upper limbs motor score.

PA486

Heterotopic Ossification in Spinal Injury Patient, Etiology, Pathology and Management

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Background: Heterotopic Ossification (HO) as a pathological condition can affect multiple patient diagnoses like spinal injury, brain injury, neurologically impaired, and burn patients. Simple excision of the HO had proved not to be effective to obtain functional goals. Therefore the radical excision of the HO and muscle flap is the optimal procedure which is described below in the results. **Study Design:** A retrospective analysis of all spinal cord injury patients at R.L.A.N.R.C who had undergone girdlestone arthroplasty and excision of heterotopic ossification with muscle flap between 1991 and 2005 was performed. Post-operative protocol for management of HO surgery and muscle flap was adapted in this study. **Results:** Over 15 years, 152 patients underwent the procedures of radical excision of Heterotopic Ossification and muscle flap. The average age was 36.7 years old, 92% male and 8% female. The primary diagnosis of these patients are spinal cord injury (142), spina bifida (8), and cerebral palsy (2). 28.6% were African American, 23.4% White and 1.8% Hispanic. These groups of patients underwent the procedure of excision of HO of the hip and muscle flap. Average blood loss 1,288 mls (range 520 – 2,500 mls). Average hospital stay was 13.3 weeks. All these patients had rehab program and on discharge all patients had adequate range of motion at the hip joint for sitting and transfer purposes. Average follow up of this group of patient was 40.3 months. It was found that 17 patients 11.1% had a clinical and radiological evidence of recurrence of heterotopic ossification substantial enough to require surgical excision over due course. **Conclusion:** The Girdlestone arthroplasty and excision of the HO and muscle flap is an effective modality to treat hip, ankylosis, heterotopic ossification, associated with the spinal cord injury patient. The role of the muscle flap is to close the defect resulted from the procedure and to prevent complications at an early stage post operation. The use of medication does help to prevent recurrence of the HO, in addition to the aggressive physical therapy post surgery.

PA487

Inpatient Rehabilitation of Vascular Spinal Cord Injuries*S. Rüder¹, J. Constantino², P. Margalho², J. Láins²¹Centro Hospitalar e Universitário de Coimbra, Coimbra, ²Physical and Rehabilitation Medicine Department, Tocha, PT

Introduction: Non-traumatic vascular injuries, either ischemic or hemorrhagic, are an uncommon cause of spinal cord injury (SCI). Our aim was to describe etiology, socio-demographic, clinical and functional evolution of patients admitted for an inpatient rehabilitation program with acute SCI of vascular etiology. **Materials and Methods:** We performed a retrospective analysis of medical records of patients discharged between 01/01/2010 and 30/09/2014 with non-traumatic SCI of vascular etiology. Epidemiological and injury etiology variables were collected, as well neurological and functional outcome measures, including AIS classification, Functional Independence Measure (FIM) and Spinal Cord Independence Measure III (SCIM).

Results: A total of 21 patients met the inclusion criteria, 14 patients had ischemic and seven had hemorrhagic myelopathy. All had an acute onset of neurologic symptoms and the event was on average 19.8±18.2 weeks before the admission. There was a slight male predominance (52.4%) and the average age was 54.3±16.3 years. Quadriplegia occurred in 14.3% and complete injury (AIS A) in 19.0% of cases. Assessing AIS classification at admission and discharge we have observed a significant neurological improvement ($p<0.05$). The length of stay was on average 18.6±11.0 weeks. The motor FIM and SCIM scores showed a very strong positive correlation both at admission and discharge ($r=0.92$ and $r=0.94$ respectively, $p<0.001$). The average motor FIM score at admission was 60.3±19.5, the daily functional gain for FIM score was 0.13 and by the time of discharge there was a average gain of 24.2% ($p<0.001$). The mean SCIM score was 57.4±21.1 at admission, the daily gain was 0.18 and at discharge there was a significant gain of 34.4% ($p<0.001$). **Conclusion:** These results are consistent with literature, suggesting a predominant incomplete neurological injury, a smaller occurrence of quadriplegia and a favorable outcome with the rehabilitation program.

PA488

Patterns of Hepatic Dysfunction Following Acute Spinal Cord Injury (SCI)

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Introduction: Trauma including SCI induces Systemic Inflammatory response (SIR) which can contribute to a high incidence of secondary organ complications. Liver is important in initiation and propagation of SIR. In its most extreme form the SIR can lead to acute respiratory distress or even multi-organ dysfunction. We aimed to study the patterns and severity of liver dysfunction using liver function tests. **Materials-Methods:** Retrospective study of liver function tests of previously healthy patients with acute spinal cord lesions from C1 to L1 with no abdominal trauma. The study period was between January 2012 and December 2012. Demographic details, injury details, past medical history, drug history, alcohol intake and smoking history noted. We used medical case notes, blood results from general practitioner, referring hospital and our centre. We excluded patients with abdominal trauma, neurologically intact, known history of excessive alcohol, on disease modifying drugs. **Results:** A total of 39 patients fit the criteria and were included in the study. The alanine transaminase (ALT) rose in 22 of the 39 (56%) patients. The mean and median days of onset of elevated ALT were 26 days and 12 days respectively. The pattern most commonly encountered was that of hepato-cellular injury with 18 of the 39(46%) presenting with isolated or predominant elevations of trans-aminase. The next common presentation was that of Cholestatic picture in 6 of the 39 (15.3%) having markedly elevated bilirubin levels at 4 days after trauma. The alkaline phosphatase (ALP) was elevated in 9 of the 39 (23%) patients. The mean and median days to normalization after trauma were 67 and 64 **Conclusion:** The hepatocellular pattern of liver dysfunction is most commonly seen. As ALT elevations were not 3x4 times normal upper limit, we can assume that these elevations are probably due to injury. The liver dysfunction and injury occur briefly after SCI.

PA489

Postoperatively Management of Patients with Medullary Dorsal Lumbar Spinal Injuries

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Medullary dorsal lumbar spinal injuries are injuries of the spine with spinal cord injury who have booked vital prognosis and psychological impact, social and economic impact on the patient. Out traumatic injuries spinal medullary dorsal spine damage percentage is 30% and 20% of the back; the causes are traffic accidents and falls from

height. Life expectancy is affected by age, complete neurological lesion in 20 years has a life expectancy of tens of years over the same injury that over 60 who have a life expectancy of 2-3 years. The economic impact produced by medullary spinal trauma due to long hospitalization is huge in the US overall cost/year for all trauma spinal marrow is estimated at about \$5.6 billion. The goals of treatment is well applied to transform these patients in people with a physical disability, moral and social self-employed persons, social reintegration and family and a suitable job. Costs amounting to a global management of the traumatized spinal marrow are huge, but the right treatment instituted immediately initiated posttraumatic, in a specialized center, leads to a significant decrease them. Thus one of the main objectives of rehabilitation is the normalization functions on the hip. The aim of these measures is the normalization of urinary detrusor muscle tone and anal. For patients with severe neurological disorders is important: prevention of development of contractures, muscle fiber degeneration; active muscle contractures restore and enhance muscle strength; learning compensatory movements by the patient, aimed at adaptation final vertical position and locomotion.

PA490

Factors Influencing Functional and Clinical Outcomes after Non-Traumatic Spinal Cord Injury (SCI)

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Introduction: Non traumatic spinal cord injury (SCI) causes serious disability and many secondary complications. The purpose of our study was to assess the short and long term medical complications and to evaluate the factors influencing functional and clinical outcomes after non-traumatic spinal cord injury. **Material and Methods:** A total of 50 patients with non-traumatic SCI admitted in our department are included. We assess their socio-professional characteristics and we count the medical complications during the hospitalization and during one year after discharge. The functional status are measured by functional independence measure (FIM). **Results:** The mean age was 49.9 years. 45% were living in family and 15% were unemployed. 75.5% were paraplegic, 20.4% were tetraplegic and 4% are autonomous. During hospitalization, the most frequent complications are the constipation (43%) and the decubitus ulcer (32%). During follow-up one year after discharge, the urinary tract infection was frequent (45%) and the spasticity was seen in 32% of cases. 23 kept the same neurological level. FIM was significantly improved after discharge ($p=0.0001$). Six patients were working without assistance and three are return to work. Our study found no significant differences between the two genders and shows a significant relationship between functional outcome and social characteristics ($p=0.001$), FIM ($p=0.004$), delay of surgery ($p=0.002$), etiology gender ($p=0.002$) and clinical presentation ($p=0.0009$). **Conclusion:** Our study shows a high percentage of complications which can affect the functional outcome. The study of prognostic factors is still a matter of interest but some prognostic factors may change over time as SCI management evolves.

PA491

Impact on Bone and Muscle Area after Spinal Cord Injury

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Introduction/Background: Spinal cord injury (SCI) causes inactivation and, consequently, unloading of affected skeletal muscle

and bone. This cross-sectional study investigated correlations of muscle and bone in spinal cord injured compared with able-bodied subjects. *Material and Methods:* Thirty one complete SCI paraplegics (mean age 39.23±15 yrs, duration of paralysis (DoP): 5.7±5 years) were compared with 33 controls. All were examined with peripheral quantitative computed tomography (pQCT) at 66% of tibia's length (bone and muscle area, bone/muscle area ratio). *Results:* In able-bodied subjects muscle area was correlated with bone area ($p<0.001$, $r=0.88$). Paraplegic group differed significantly from control group according to bone and muscle area ($p<0.001$). In paraplegics less muscle per unit of bone area (bone/muscle area ratio) was found compared to controls ($p<0.001$). Bone area was negatively correlated with the duration of paralysis in paraplegic group ($r=-0.66$, $p<0.001$). Muscle area and bone/muscle ratio area correlations in paraplegic group with DoP were weak. Paraplegic subjects who performed standing and therapeutic walking had significantly higher bone area ($p=0.02$ and $p=0.013$, respectively). *Conclusion:* The relationship between bone and muscle was consistent in able-bodied and predictably altered in those with spinal cord injury, a clinical disease affecting bone and muscle.

PA492

Sperm Quality Disturbance among Spinal Cord Injury Patients

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Introduction: Spinal cord injuries (SCI) disturb human life in a plenty of aspects. Rehabilitation management in areas related with motor, respiratory, cutaneous and tonus affections are very frequently described, but fertility problems are forgotten. Sperm quality is frequently affected and can influence paternity possibility of those patients. The goal of this study was to study the sperm quality in patients with SCI. *Material and Methods:* We performed a retrospective study of all patients submitted to sperm recoil in our Central Hospital. All patients were informed and agree to participate in the study. Data related to sperm quality (concentration, motility, progression, morphology and vitality) and aspects including age, ASIA scale and level, bladder drainage method, presence and type of ITUs and years after lesion when the recoil was done, had been analyzed. Patients with missing data or without SCI had been excluded. *Results:* A total of 80 patients had been analyzed, but only 49 accomplished the inclusion criteria. Patients were mainly between 20 to 35 years old (61%), AIS A (77.5%), dorsal level (75.5%), performing intermittent catheterization (57%). Sperm concentration was normal or increased in majority (63%), motility was superior to 80% in a half of patients but rapid progressive motility was reduced in 98%, defective morphology in 92% and vitality in 98%. There was a weak association (ϕ /cramer'sV 0'19) between urinary infections and worst sperm motility and a moderate association (Cramer'sV 0.28) between more aggressive urinary drainage methods and worst sperm motility but statistically not-significant. Urinary infections didn't affect the sperm concentration, value with statistical significance ($p<0.05$). *Conclusion:* Sperm quality is a decisive characteristic for birth possibility and can be analyzed different aspects like concentration, motility, progression, morphology and vitality. Spinal Cord injuries can affect fertility aspects including erectile and ejaculatory dysfunction and sperm quality. Urinary infection and invasive drainage methods seems to be related with worst sperm motility, an aspects that highlight the importance of an adequate control of a neurogenic bladder and the best drainage method to avoid complications, principally urinary infections. Further studies with larger samples are necessary to attest this tendency.

PA493

Neurogenic Osteoporosis after Spinal Cord Injury: a Challenge for Rehabilitation

J Rehabil Med Suppl 54

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Introduction: Typically, soon after SCI there is a progressive bone loss, unique for its onset, sublesional skeletal distribution, rate and resistance to currently available therapeutic strategies. The aim of this study was to review and discuss the pathophysiological mechanisms underlying osteoporosis (OP) and SCI, emphasizing the role of the SNC, available therapeutic strategies and recent relevant experimental findings. *Material and Methods:* we conducted a review of the relevant literature about this topic, searching in Medline, via PubMed, using the following *Keyword:* osteoporosis, neurogenic osteoporosis, treatment, prevention, spinal cord injury. *Results:* OP after SCI seems to be multifactorial: iatrogenia, prolonged immobilization, insufficient weight bearing and vascular impairment with venous stasis. More recently, some authors proposed a role for CNS and concluded that disturbances in adrenergic, serotonergic, nicotinic or leptin pathways may take part on it. Adding that, a new endogenous antagonist of Wnt pathway, sclerostin, is being recently studied and may be promising. Treatment of OP in SCI patients is controversial. Preventive measures are crucial for all patients with SCI. Non-pharmacologic measures, such as weight bearing and mobilization, functional electrical stimulation and vibrotherapy may be helpful but difficult to implement in some cases and there are poor quality studies to ascertain their efficacy. Pharmacologic treatment with calcium and vitamin D supplementation is indicated and treatment with biphosphonates appears to be a good choice for initial treatment. Emerging osteoanabolic agents acting on WNT signaling pathway may hold promise as therapeutic interventions. *Conclusion:* It is important for PMR physicians to be aware of the importance of preventing and treating osteoporosis in SCI patients. In the future, other biological markers and therapeutic options may be available. More studies are needed.

PA494

Effects of Isokinetic Strength Training on the Lower Limbs Power in Paralytic People with Incomplete Spinal Cord Injury of Thoracolumbar

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Objective: The aim of this study was to evaluate the effect of isokinetic strength training for power of the lower limbs in patients with incomplete spinal cord injury of thoracolumbar. *Methods:* 60 subjects were randomly assigned to either a trial group or a control group, so that each group involved 30 patients. All subjects were given comprehensive rehabilitation treatment, subjects in the trial group received keen isokinetic strength training of flexion and extension muscle in addition using the IsoMed2000 system fifth a week for four weeks. Peak torque (PT) and torque acceleration energy (TAE) of hamstring and quadriceps and hamstring in quadriceps muscle strength ratio (H/Q) were measured with the same system. Measurements were carried out at before and after the experiment. *Results:* Both the scores of PT, TAE and H/Q compared to the before experimental were evidently elevated. Compared comprehensive rehabilitation combined with isokinetic training group (trial group) with post-test control groups were even more raised. *Conclusions:* Our results suggest that isokinetic strength training have beneficial effects in improving the lower limbs muscle power and the stability of the knee joint as well as possible positive effects on gait pattern.

PA495

Autonomic Dysreflexia Knowledge in an Intensive Care Unit

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Introduction/Background: Autonomic dysreflexia (AD) is a clinical emergency that affects individuals who have suffered a spinal

cord injury. AD should be immediately recognized and treated, in order to prevent serious complications. The aim of this study was to determine the level of knowledge of AD, its causes and symptoms, treatment and complications, in health care professionals in the hospital setting, namely doctors and nurses of the Intensive Care Unit. **Materials and Methods:** The study design involved the creation of a questionnaire, adapted from two other questionnaires previously published. It was distributed and available both in paper and digital formats and was applied to the doctors and nurses of the Intensive Care Unit. **Results:** A total of 52 health care professionals completed the questionnaire (7 doctors and 45 nurses). 43% (N=3) of doctors and 60% (N=27) of nurses had never heard the term AD. Only 3 nurses and 1 doctor had pre-graduate education on AD. All nurses with Rehabilitation specialty (N=4) have heard the term AD and had higher scores than the other nurses. 10 responders admitted having previously treated patients with AD. Only 4 health care professional identified de T6 level of injury relatively to the patients at risk of AD, most of them identified hypertension regarding signs and symptoms, but only one mentioned conservative measures concerning the treatment. All the inquired would like to have more information about AD. **Conclusion:** AD it's still under-recognized by health care professionals outside of the rehabilitation field and there is generally little, if any, undergraduate or postgraduate training on spinal cord injury. Even though AD usually occurs in the chronic phase of the lesion, it can be present in the first days or weeks, and it is believed that it is still under-recognized in this phase. All health care professionals who deal with spinal cord injury patients should be alert to this condition, since it is a potential medical emergency, beyond rehabilitation care.

PA496

Nocturnal Polyuria in Patients with a Spinal Cord Injury

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Introduction and Aims: It is commonly observed that patients with spinal cord lesions (SCI) have nocturnal polyuria (NP), which gives rise to important complications (autonomic hyperreflexia, urinary tract infections, hydronephrosis) and affects quality of life. It is known that these patients experience more fluid retention during daytime, which returns in the intravascular space when they lie down. The objective of this study was to evaluate retrospectively the prevalence of NP by using different definitions. **Material and Methods:** Retrospectively we evaluated 74 patients with SCI from our hospital database from year till year. For 45 patients the micturition calendar was complete in the third week of the rehabilitation period. Eight definitions of nocturnal polyuria were compared. Paraplegic and tetraplegic patients were compared, age was taken into account. **Results:** Depending on the definition used, the prevalence of nocturnal polyuria in SCI was 41 (91%) up to 45 (100%) on the total of 45 patients, age between 25 y and 74 y (mean 48 y), 34 male and 11 female. The average prevalence is 44/45 patients (98%). The tetraplegic group (25 patients) had a minimum of 92% and a maximum of 100% prevalence NP, the paraplegic group (20 patients) had a minimum of 90% and a maximum of 100% prevalence NP. Patients <50 y (23 patients) had a minimum of 96% and a maximum of 100% prevalence NP, patients ≥50 y patients (22 patients) had a minimum of 86% and a maximum of 100% prevalence NP. Patients <65 y (9 patients) had a minimum of 64% and a maximum of 100% prevalence NP, patients ≥65 y had a minimum of 78% and a maximum of 100% prevalence NP. **Conclusions:** Nocturnal polyuria is frequently seen in patients with SCI. Depending on the definition used to determine "nocturnal polyuria" the prevalence can differ but stays very high. Consequently, specific treatment is necessary in order to avoid the symptoms and complications of NP.

PA497

Endogenous Neural Stem Cells in Central Canal Acquired Limited Ability to Proliferation and Differentiation Following Spinal Cord Injury in Adult Rats

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Background: Endogenous neural stem cells (ENSCs), which are found in the central canal of the spinal cord and its surroundings, bring hope for the regeneration of spinal cord injury. However, the proliferation and differentiation of ENSCs after mild SCI is not fully understood. **Material and Methods:** 10 μl DAPI or DIL was stereotaxically injected to the lateral ventricle of rats respectively. Ependymal cells were observed at different time points of both fluorescent dyes. Then, Allen's impactor was used to prepare a mild rat SCI model. Basso, Beattie & Bresnahan locomotor rating scale (BBB scale) and motor evoked potential (MEP) testing were used to evaluate the hind limb motor function and nerve conduction velocity. Staining of damaged spinal cord tissue and changes in the number of ependymal cells were recorded. Double immunofluorescence of GFAP or β-tubulinIII on ENSCs was done at different times. The expression of Notch1 and bHLH factors like Hes1, Ngn2, and Olig2 were estimated by western-blot, RT-PCR and immunofluorescence after injury. **Results:** DAPI only labeled the ventricle ependymal cells where as DIL labeled both spinal cord ependymal and ventricle ependymal. The labeling time of DAPI and DIL was pretty long, for there was no significant attenuation observed at day 14th (P<0.05). Mild Allen's impact caused obvious paralysis of rats' hind limbs. Spontaneous recovery in rats after SCI was observed, but the degree remained limited. Proliferation of ependymal cells and short distance migration were observed after SCI. Most cells differentiated to GFAP positive astrocytes, however, the β-tubulinIII positive neurons were less (P<0.05). RT-PCR and Western-blot found the Ngn2 and Olig2 transiently increased (P<0.05) at early time after SCI but reduced significantly after that (P<0.05); Notch1 and Hes1 increased after SCI and maintained quite long (P<0.05). Co-expressing of Notch1/Hes1, β-tubulinIII/Ngn2 and GFAP/Hes1 cells were observed around the central canal in SCI rats. **Conclusions:** DIL is suitable for a long period labeling of spinal cord ependymal cells. Ependymal cells in the central canal are parts of endogenous stem cells. Expression levels of bHLH factors after SCI have strong correlation with ENSCs' proliferation and differentiation.

PA498

Penile Cleavage in a Young Paraplegic

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Case Description: A 14 years old male patient sustained traumatic SCI C6, ASIA B, 18 months ago due to dive in a swimming pool. He was initially managed at combined military hospital Kohat and later at Combined military hospital Rawalpindi and armed forces institute of rehabilitation medicine. He had been on indwelling catheter ever since. He also had Ashworth grade III spasticity in lower limbs, that was resistant to conservative management for the past one year. There was no history of trauma to the perineal region or infection or diabetes mellitus. His father initially observed a gradually increasing cleavage in his penis while changing indwelling catheter for the past three months. There was no history of leakage, hematuria or urinary tract infection. On examination he had a 5 cm cleavage on the ventral aspect of penis. The patient was advised penile urethral repair surgery which he declined. Currently the patient is using indwelling catheter and is comfortable with that. **Discussion:** Neurogenic bladder in spinal cord injury (SCI) can be managed by different options depending upon the type of bladder, level of injury, personal preference of patient, mobility level and available social support. Indwelling catheters are commonly used in Pakistan. Although clean intermittent catheterization, condom catheters, and supra pubic catheterization are also used mostly by patients managed and trained in a spinal rehabilitation unit. Each has its own complications. Penile urethral cleavage is a rare occurrence in chronic indwelling catheter users, es-

pecially in the old age, diabetics, infections and lack of sensations in the area and can be managed successfully with surgical repair. Penile cleavage is extremely rare in young SCI patients on chronic indwelling catheters and only few cases have been reported in literature *Conclusion:* Penile cleavage is a rare complication in SCI with good prognosis. It occurs in chronic indwelling catheter use due to direct handling, routine maintenance and unaware catheter stretch in insensate area. Chronic SCI patients on indwelling catheters should be educated about penile care. In our case it was due to chronic catheter use, lack of sensations and severe spasticity in lower limbs. Further research is needed to ascertain the magnitude of this problem.

PA499

Effectiveness of Robot-Assisted Gait Training According to Clinical Severity of Spinal Cord Injury

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Introduction: To measure the effectiveness of robot-assisted gait training (RGT) in person with motor incomplete spinal cord injury following clinical severity. *Methods:* RGT was performed with the Lokomat. Each participant was trained with Lokomat every-day for 30 minutes, maximal 5 times per week and the total training sessions were 20 times. When the participants completed total 20-session RGT, conventional physical therapy for 4 weeks was performed. Evaluation of each participant is performed to measure their motor recovery, including Fugl-meyer assessment (FMA) and lower extremity motor scale (LEMS), their physical function, including functional ambulatory scale (FAC), walking index for spinal cord injury (WISCI) and spinal cord independence measure (SCIM) and their walking capacity by 10-meter walk test (10MW). The evaluations were performed 4 times, prior to beginning of treatment, immediately after completion of session 10 and session 20 and 4-week after completion of total 20 sessions. *Result:* Of the 20 participants, 6 participants were AIS C and 14 participants were AIS D. Although participants with AIS C were too small to analysis, 3 tetraplegic AIS C participants were not improved at all after RGT in contrast to those with AIS C paraplegia improving their gait function in all participants. Comparing prior to beginning of treatment with immediately after completion of session 20, 11 of 14 participants with AIS D improved their FAC score 1 point or more. Their FMA, LEMS and WISCI score showed greater improvement. 10MW was performed only 7 participants because others could not walk 10 meter independently and their score was also improved. However, their SCIM score was little improved, statistically not meaningful. *Conclusion:* Likewise published other study, RGT was effective for AIS C or D patients for improving gait function. In this study, almost participants with AIS D showed greater improvement in FAC, FMA, LEMS and SCIM score than those with AIS C, though AIS C group was too small to analysis. In this manner, RGT can help patients who have motor incomplete spinal cord injury, especially AIS D type, improve their gait function.

PA500

A Survey of Physician Spinal Cord Injury Pain Management Practices in China

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Introduction/Background: There is consensus in the medical community that pain after SCI is common. In order to define and classify it, the International SCI Pain (ISCIP) Classification and International SCI Basic Pain Data Set (ISCIBPDS) was developed by the international working group. The objective of this study is to investigate the current practices of physicians in China with regards to pain management after spinal cord injury (SCI). *Material and Methods:* A survey questionnaire was administered to 52

physicians from 20 provinces of China at a SCI workshop. The 11 items included questions about: the frequencies of encountering persons with SCI who have pain, the active querying of the presence of pain, the classification into subtype of pain, the use of different treatments, the use of the ISCIP Classification and ISCIBPDS; and the perceived need for formal training in the use of these instruments. *Results:* A total of 52 physicians completed the survey. 60% of the physicians always or often ask individuals with SCI whether or not they have pain, while 15% always try to identify the subtype of pain. Less than one half of these further differentiate the subtypes of nociceptive and neuropathic pain. 42% of the physicians are aware of and use the ISCIP Classification in clinical practice, while 19% use the ISCIBPDS. Before using the ISCIP Classification and the ISCIBPDS respectively, 87% and 94% of physicians feel they should receive formal training in their proper use. *Conclusion:* Most of the physicians who attended a SCI workshop always or often encounter individuals with SCI who have pain, while just over one-half ask about pain consistently and only a minority always tries to identify the subtype of the pain experienced. Formal training of physicians who treat persons with SCI in China in the use of the ISCIP Classification and the ISCIBPDS may improve the confidence of the physicians in China in asking about pain and classifying pain into subtypes.

PA501

Spinal Cord Injury in New Zealand: a Preliminary Analysis of Implementation of IPSCI Report

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Background: New Zealand (NZ) has a comprehensive medical care/rehabilitation system for persons with spinal cord injuries (SCIs). In order to implement the International Perspective of Spinal Cord Injuries (IPSCI), a SWOT (strengths, weaknesses, opportunities, threats) analysis is conducted to identify the strengths and gaps of health care in NZ for people with SCIs. *Material and Methods:* The data generated from Burwood Spinal Unit (Spindata), in conjunction with the progress report of the “National Strategy of Spinal Cord Services” were used to compare the status of the NZ health care system for SCIs with the recommendations from IPSCI. A SWOT analysis was conducted to demonstrate the strengths and gaps of the health care system in relation to SCIs in NZ. *Results:* NZ has a comprehensive health care, rehabilitation and long-term follow-up system, backed by strong government support, including a unique health insurance system (Accident Compensation Corporation). The country is working towards improvement of the national spinal cord injury statistics, by a linkage with the Rick Hansen Institute. Further solutions are made to improve the access of persons with SCIs to specialized health care services, as well as to assistive technologies and follow-up. NZ has a strong philosophy to encourage independence for persons with SCIs, and dedicates resources to the lived experiences of persons with SCIs. *Conclusion:* NZ, as a small country, has developed a comprehensive health care/rehabilitation system for persons with SCIs. The country is working towards further improvement, to reflect most of the recommendations from IPSCI.

A.3.4. AUTOIMMUNE AND INFLAMMATORY NEUROLOGICAL CONDITIONS

PA502

Ultrasonographic Assessment of Femoral Cartilage in Patients with Multiple Sclerosis

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Introduction: Multiple Sclerosis (MS) causes progressive disability more prominent in the lower limbs, and the patients with MS (PwMS) eventually experience walking impairment. Thus, it could be suggested that an earlier degeneration would occur in MS compared with the healthy subjects. In the literature, a few studies on some neurologically impaired patients (stroke and spinal cord injury) reported the changes in femoral cartilage. However, no studies about the femoral cartilage of PwMS are available. This study investigated the condition of femoral cartilage and effusion within the knees of PwMS and whether an association exists between these and the functional parameters of the PwMS compared with the controls. **Materials and Methods:** The study included 79 PwMS and 60 healthy controls. The Expanded Disability Status Scale (EDSS), the Western Ontario and McMaster Universities Arthritis Index (WOMAC), Visual Analogue Scale, Berg Balance Scale (BBS) were used to assess the functional status of the patients and the controls. All assessments except EDSS were done for the control group. Ultrasonographic (US) evaluation of the femoral cartilage and effusion within the knee was performed. The (cartilage degeneration) grading system, previously defined by Lee was used. **Results:** The mean cartilage grades of the patients were worse than the controls had. As the cartilage grade increased, the amount of effusion also increased. Compared with those of the controls', WOMAC scores and VAS scores were significantly worse in the MS group. BBS scores were lower in the MS group. Higher BBS scores were associated with lower WOMAC scores. There was a positive correlation between EDSS and WOMAC scores and a negative correlation between BBS score and the presence of effusion. No relationship between VAS and cartilage grades could be detected. **Conclusion:** This study showed that femoral cartilage degeneration and suprapatellar effusion is more common in PwMS and the degeneration seems to progress more rapidly than in the controls. We may be underestimating the subclinical impairments, such as a faster cartilage degeneration in PwMS. There are many wellknown favorable effects of rehabilitation in MS. We suggest a more comprehensive approach that early treatment programs, to protect the cartilage from degeneration and to maintain cartilage integrity, would be instituted.

PA503

Management of Fatigue in Persons with Multiple Sclerosis

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Background: Despite medical advances in management of multiple sclerosis (MS), fatigue continues to be common and disabling symptom in persons with MS. In current practice, both pharmacological and non-pharmacological interventions are used in combination, encompassing a multidisciplinary approach. The body of research investigating the effect of these interventions is growing. This review systematically evaluated the existing evidence on the effectiveness and safety of different interventions currently applied for the management of fatigue in person with MS in improving patient outcomes, to guide treating clinicians. **Methods:** An integrated approach was used, which included a comprehensive review of peer and grey literature for articles evaluating interventions (pharmacological and non-pharmacological) currently used in management of fatigue in MS. The medical and health science electronic databases (PubMed, Medline, EMBASE, CINAHL, PsycINFO and Cochrane Library) were searched up to June 2014. Two reviewers independently screened and selected potential studies and extracted data. Evidence for included studies was categorised based on the National Health and Medical Research Council criteria for hierarchy of evidence. **Results:** Overall, 27 studies (12 systematic reviews/meta-analyses, 12 RCTs, 2 CCT and 1 comparative study) were in-

cluded. Pharmacological agents used for treatment of fatigue in MS (such as Amantadine, Modafinil, Pemoline etc); however evidence to support use of these is insufficient. The non-pharmacological interventions evaluated included: physical therapeutic modalities, psychological/behavioural and educational programs, and specific fatigue management programs. Both exercise and psychological/educational interventions appear to have a stronger and more significant favourable effect on reducing the impact or severity of fatigue compared with pharmacological agents. **Conclusion:** A wide range of pharmacological and non-pharmacological interventions are used for the management of fatigue in persons with MS. However, effects of many of these interventions vary considerably and any beneficial effect was at best modest and/or is yet to be established. More methodologically robust trials are needed to build evidence and cost-effectiveness of these interventions.

PA504

Predicting and Overcoming Freezing of Gait in Parkinson Disease with a Smartphone

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Introduction: The freezing of gait (FOG) is a common and highly distressing motor symptom of patients with Parkinson's Disease (PD). Effective management of FOG is difficult given its episodic nature, heterogeneous manifestation and limited responsiveness to drug treatment. The aim of this work is to assess the reliability of a real-time FOG detection using a smartphone-based architecture built in agreement with acceptability and usability requirements in order to provide timely acoustic cues to the patient. **Material and Method:** Twenty-six non demented PD patients (6 women; age 69.0±9.7; disease duration 14.1±4.6) were considered eligible for the study, based on the following criteria: a) independent ambulation under drug therapy (ON-condition), b) clinical history of FOG. Patients were assessed in the morning and under the effect of their own chronic dopaminergic therapy, while they were performing three different types of video-recorded Time Up and Go (TUG) test, designed to provoke FOG on a standardized course of 5 meters: (i) the standard TUG test, (ii) the Cognitive Dual Task Timed Up and Go test and, finally, (iii) the Manual Dual Task Timed Up and Go test. Walking trials were recorded on a digital video camera and each video showed a complete TUG trial starting and ending in the seated position. Simultaneous acceleration data was acquired from the trunk. Synchronization of the video and accelerometer recordings was performed prior to data collection by alignment of the video camera and data acquisition computer clocks. **Results:** Eighteen (90%), out of the 26 enrolled patients, were defined as "freezers" showing at least one freezing episode during the proposed video assessment. We observed 75 FOG events, as recognized by clinicians based on video recordings. The application correctly identified 73 of them. The Specificity reached the 98.49% and the Sensitivity the 88.47%. **Conclusions:** This architecture is capable of identifying FOG episodes with a high sensitivity and specificity. Both the high score of performance results and the unobtrusiveness demonstrate the potential use of the architecture in monitoring, gait assistance during daily living and rehabilitation therapy.

PA505

Tools for Evaluating Therapeutic Response in Chronic Inflammatory Demyelinating Polyneuropathy (CIPD), a Case Report

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Teen 12 years, 4-month history of progressive muscle weakness to medium efforts, mainly in the lower limbs. Associated with muscle

fatigue, triggered by physical activity at school. At 2 months has altered gait pattern and limitation to climb stairs requiring external assistance for her ambulation, plus weakness to comb her hair. Physical examination for admission, areflexia and mild weakness (4/5) generalized, gait with small steps with full support planting. On functional tests: • Up & Go Test =7 s, • Scale modified Hughes 2 to 0 for lower limbs and upper limbs. • Measure Motor Function (MFM32) with a total score of 89.5%; lowest score in domain limitation for standing and transfers such as inability to run and jump on one foot • walk test in 6 minutes with 39% yield of the expected (330 mts). In the electrophysiological study demonstrated the absence of sensory responses and motor neuroconduction, in ulnar and peroneal nerves showed long latencies, decreased amplitude and decreased conduction velocities, with absence of potential tibial nerves. The electromyography was normal. Because these findings it was decided to start administration of parenteral immunoglobulin G Humana 60 grams for 4 days. The patient had clinical improvement after administration of immunoglobulin and functional tests are performed: 1. MFM 32 total score =100% 2. Up & Go Test 4.6 dg, 3. Test run in 6 minutes, with 65.2% of the distance (543 mts). Also showing a better gait pattern, achieving up in heels and tiptoes. New electrodiagnostic study was performed a month later. Which showed increase in amplitude of motor potentials, the CMAP (compound action potential) of tibial nerves start to appear, and the absence of potential sensory persisted. It was helpful the electrophysiologic study associated with functional testing as an objective measure of therapeutic response to human G immunoglobulin, because the dosage may vary and the dosage adjustment should be individualized.

PA506

Tick-Borne Meningoencephaloradiculomyelitis Patients' Rehabilitation Outcome

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Introduction: Tick-borne encephalitis is an RNA-viral infection comprising different clinical syndromes with involvement of central or peripheral nervous system, or both. Meningoencephaloradiculomyelitis seems to be the most disabling form of disease, with severe acute clinical course and possible severe long term activity limitations of patients. Comprehensive rehabilitation is therefore often required. The aim of our study was to assess rehabilitation outcome in these patients. **Materials and Methods:** 15 patients with meningo-encephaloradiculomyelitis, aged 56.1 years on average (SD 10.8, range 27-73 years), were included in the study. Activity was assessed using the Functional Independence Measure (FIM). Assessment was performed at admission and at discharge. Statistical analysis was carried out using R software (R version 2.15.3). Ratings of FIM at admission and at discharge were compared using a *t*-test for paired samples. Correlations between patients' age, time from disease onset, duration of rehabilitation and the improvement in FIM was assessed using Pearson's correlation coefficient. **Results:** Patients were admitted to our Institute on average 3 months after disease onset (SD 2.2 months, range 1-8 months). The rehabilitation lasted for 59.4 days on average (SD 34.6, range 25-123 days). At admission, moderate activity limitations were present in patients, with average motor FIM score 55.5 (SD 27.5, range 13-89) and no deficits in cognitive FIM. Clinically important improvements in patients' activities were achieved: motor FIM score improved for 19.4 on average (SD 16.8, range 0-54). The improvement was statistically significant ($p < 0.001$). Moderate and statistically significant correlation was observed between the improvement in patients' activities and duration of rehabilitation ($r = 0.602$, $p = 0.018$). There was no significant correlation between improvement in patients' activities and time from onset of disease to admission to rehabilitation or between improvement in activities and patients' age. **Conclusion:** Clinically important and statistically significant improvements

regarding activities were achieved in tick-borne meningoencephaloradiculomyelitis patients during relatively short inpatient rehabilitation. **Reference:** Ponflic M, Hacker S, Gdynia HJ, Linden R, Granz M, Nowak DA. Meningoencephaloradiculomyelitis after tick-borne encephalitis virus infection: a case series. *Eur J Neurol* 2012; 19: 776-82.

PA507

Hippotherapy Simulator Would Improve Stability in Multiple Sclerosis: a Pilot Study

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Introduction/Background: Multiple sclerosis (MS) is a major health burden, which could cause various morbidities in affected individuals. Instability is common in MS patients, and could be treated with medications and rehabilitation protocols. We aim to evaluate the effects of hippotherapy on stability in patients with MS. **Material and Methods:** In this randomized clinical trial, 28 MS patients (67.9% female with mean age of 41.28 ± 9.79 years) underwent treatment with hippotherapy simulator for three 30 minutes sessions each week for 12 weeks. Falling risk, postural stability, Berg Balance Scale (BBS) and Kurtzke Expanded Disability Status Scale (EDSS) before and each four weeks after the intervention were evaluated. **Results:** Falling risk, postural stability, BBS and EDSS were significantly improved with increase in hippotherapy duration ($p < 0.001$). Sixteen patients (57.14%) had improvement more than 10%. Cox regression analysis showed no relation between time to BBS improvement and hippotherapy ($p = 0.026$). There were significant differences between patients with and without improvement in Postural Medial Lateral index ($p < 0.001$) and EDSS ($p = 0.02$) before intervention. **Conclusion:** Rehabilitating MS patients with hippotherapy simulator improves stability and reduced the falling risk. Since patients respond differently to rehabilitation protocol, at least a 12 week period is recommended.

PA508

Incidence and Risk Factors of Falls in Subjects with Parkinson's Disease: a Case-Control Study

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Introduction: Gait impairment, balance disorders and falls are typical symptoms of Parkinson's disease (PD). However, the rate and risk factors of falls are not completely known. The scope of the present investigation is to understand the causes of falls in PD. **Material and Methods:** 40 subjects with idiopathic PD (women=17; age: 70.2 ± 7.1) and 40 age- and gender-matched healthy subjects (women=22; age: 69.8 ± 7.2) were studied through the following: body mass index, blood pressure values, history of falls, tests of walking (10MWT), balance (TUG; 10 steps TW, ABC, FES), mood (BDI, BAI) and cognition (CDR, FAB, MoCA). PD patients were also assessed through UPDRS, FOG-Q and PDQ-8. **Results:** The fall rate was higher in PD than in controls (Chisq=12.6, $p = 0.004$; Odds-ratio=6.2; 95% CI: 2.15-18.2). The only features that significantly differentiated patients from controls were blood pressure changes (Δ PAS) during transfers from lying to standing ($t = 4.4$, $p = 0.03$), balance (TUG: $t = 2.1$, $p = 0.04$) and gait speed (10MWT: $t = 3.98$, $p = 0.0002$). 52.5% of patients reported at least one fall during the past year, with significant risk increase with disease severity progression (27.8%, 53.8%, and 88.9% were the fall rates for Hoehn & Yahr stages II, III and IV, respectively – Chisq: 7:44 $p = 0.02$). The FALLERS, compared to NONFALLERS, showed a greater fear of falling (Chisq: 20.0; $P = 0.0002$), a higher Δ PAS ($t = -2.5$, $p = 0.01$), a longer 10MWT ($t = -2.3$, $p = 0.02$), a lower ABC score ($t = 2.6$, $p = 0.01$) and a worse cognitive profile [FAB ($t = 2.7$, $p = 0.008$), CDR ($t = -2.98$, $p = 0.004$), MoCA ($t = 2.6$, $p = 0.009$)]. Predictors of falls were 10MWT (F to remove: 10.75),

FOG (F to remove: 31.64), BAI (F to remove: 9:52) and CDR (F to remove: 26.14) (Adj R²: 73%; F=13.2, p=0.0001). *Conclusion:* The fall rate is significantly higher in PD than in the general population. Falls mostly occur in the advanced disease stage, albeit affecting also patients in the mid-stages, depending on the disability progression. Both motor and non-motor symptoms (depression, cognitive impairment) are relevant predictors of falls.

PA509

Characteristics of Walking Fatigability in Multiple Sclerosis

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Introduction: Multiple Sclerosis (MS) patients often present with walking fatigability that impacts activity in daily living, participation and quality of life. This study aimed at characterizing walking fatigability in MS patients for short-distance tests. *Patients and Methods:* Seventy-six patients (51.1±11 yo; median EDSS=5, min=4 – max=6.5) performed the Timed 25-Foot Walk Test (T25FWT), the 2-minute Walk Test (2MWT) and five successive trials at maximum walking speed on a GAITRITE electronic walkway (8 m). Walking fatigability was assessed by measuring the absolute and relative difference in gait speed between the first and the last part of each test. *Results:* In the low EDSS group (4-5; n=46), walking fatigability was only observed for the 2MWT (-0.12 m.s-1 that is -11% between the first and last quarter of the test). In the high EDSS group, absolute decrease in walking speed was not different compared to the low EDSS group (-0.12 m.s-1), but fatigability was higher relatively to initial walking speed (-19%; p=0.018). Walking distance for the 2MWT was significantly lower in the high EDSS group (72 vs 117 m; p<0.001). In both groups, walking fatigability was mainly due to a decrease in walking cadence. *Conclusion:* Absolute gait fatigability seems to be independent of functional status in MS patients, at least for short walking distances. This emphasizes the role of walking speed and cadence training in rehabilitation programs in MS patients.

PA510

Neurogenic Bladder in Multiple Sclerosis

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Introduction: Multiple Sclerosis (MS) is an inflammatory disease of the CNS with demyelination and axonal loss. Clinical course is heterogeneous and mostly starts by unpredictable relapsing-remitting disorder. Approximately 80% of patients have urinary symptoms with different neurogenic bladder types from mild to severe. *Aims of the Study:* Assess the start date of urinary symptoms in relation to onset of illness; characterize the frequency and type of urinary complaints and the urodynamic changes; correlate clinical data with urodynamic changes; correlate the risk factors for urological complications: type of bladder emptying, obstructive changes (dyssynergia, absence of sphincter relaxation) and irritative (hyperactivity, low compliance). *Material and Methods:* Retrospective study. Included patients with MS with neurogenic bladder followed in Physical and Rehabilitation Medicine from 2008-2014. All patients effected: study of renal function; urodynamic study; reno-bladder ultrasound; brain and spine MRI; Men: PSA. Data were collected in a specific protocol for the study. *Results:* 93 patients; 30 (32.3%) men and 63 (67.7%) women; mean age 49±10.7 years. According to the clinical course, 49 (52.7%) were relapsing-remitting, 23 (24.7%) primary progressive, 13 (14.0%) secondary progressive. 47 (50.5%) had an EDSS score lower than 6. Inaugural urinary symptoms showed an evolution of 1-5 years in 34 (36.6%). The most common urinary symptoms were mixed symptoms (irritative plus obstructive) with 41

(44.1%) individuals. The majority was under spontaneous voiding [63 (79.7%)]. Most men had normal PSA (91%). Detrusor hyper-reflexia (40%) and sphincter dyssynergia (31%) were the main dysfunctions. 37.7% had abnormal ultrasound findings. 11.1% had bladder thickening, 2.2% hidronefrosis, 24.4% lithiasis. No significant relation between clinical features and urodynamic patterns was found (p=0.481) and no correlation between urinary symptoms and MRI (p=0.138). *Conclusion:* Because there's no correlation between clinical symptoms and urodynamic assessment, this one is critical to direct therapy for urinary complaints in this population. We verify an early onset of vesico-sphincter changes and that these ones become worse with disease progression. Regular surveillance is essential to reduce complications in this population. We didn't find a relationship between the lesion site on MRI and the type of bladder dysfunction, but more studies are needed to clarify this situation.

PA511

Assessment of Practices Concerning Rehabilitation and Sport for Patients with Multiple Sclerosis

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Introduction: Maintaining physical activity for patient with neurological disorders is recommended for patient with Multiple Sclerosis (MS). *Objective:* The main objective was to assess physical activity and rehabilitation programs in patients with multiple sclerosis and compared it to recently published recommendations. The secondary objective was to evaluate the patient self-perception of these interventions on pain, fatigue, strength and global satisfaction. *Materials and Methods:* A prospective multicenter study conducted in the four counties of Brittany for patients with MS attending a consultation with a neurologist in the MS network "NeuroSEP Bretagne". Data were collected by a self-administered questionnaire including: neurological involvement, qualitative and quantitative practice of rehabilitation activity and/or sport, self-evaluation using a Likert scale and evaluation of fatigue using the Fatigue Severity Scale (FSS). *Results:* 167 questionnaires were analyzed (out of 250 sent). Only 32.34% (n=54) of patients had regular physical activity (including sport and/or physiotherapy) in accordance to recommendations and 30% had no physiotherapy and physical activity. In a multivariate analysis an EDSS superior to 4 was the only negative predictor of physical activity (p=0.049). Physical activity is considered beneficial for symptom respectively 63.1% (n 77) of patients with an average of 0.71 on the Likert scale for sport and 85.9% (n 67) of patients for physiotherapy with an average 1.14. *Conclusion:* The level of physical activity in MS patients is insufficient in our population. Educational programs and adapted activities are needed to improve patients care. *References:* 1) Latimer-Cheung AE, Martin Ginis KA, Hicks AL, et al. Development of evidence-informed physical activity guidelines for adults with multiple sclerosis. Arch. Phys. Med. Rehabil. 2013; 94(9): 1829–1836.e7. 2) Latimer-Cheung AE, Pilutti LA, Hicks AL, et al. Effects of exercise training on fitness, mobility, fatigue, and health-related quality of life among adults with multiple sclerosis: a systematic review to inform guideline development. Arch. Phys. Med. Rehabil. 2013; 94(9): 1800–1828.e3. 3) Sá MJ. Exercise therapy and multiple sclerosis: a systematic review. J. Neurol. 2013.

PA512

IVIG in Post-Polio Patients – Characteristics of Responders

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Introduction: The most common symptoms in post-polio (PPS) are fatigue, pain and muscle weakness. An inflammatory process

in the central nervous system has been identified in PPS patients. This process was down-modulated by means of IVIG and was followed by an improvement in vitality, pain and muscle strength. When studying cohorts of patients there are indications of a positive outcome but no studies have been successful in pinpointing responders after IVIG treatment. The aim of this study was therefore to characterize responder groups in 124 PPS patients after one IVIG treatment. *Material and Methods:* Open trial, prospective follow-up study. Data from quality of life inventory Short form 36 (SF-36), Physical Activity Scale for the Elderly (PASE) and Visual Analogue Scale (VAS-pain) were obtained before treatment and at 6-month follow-up. Data from medical records and clinical examination were collected before treatment. SF-36 Vitality and Bodily pain were chosen as outcome variables (Östlund et al 2012). *Results:* Forty-five percent of the participants were positive responders, identified before treatment by higher level of fatigue, a VAS pain score above 20, muscle atrophy in lower extremities and a reduced physical function. Negative responders were identified by low levels of fatigue and pain, lesser muscle atrophy in lower extremities, a good physical function and a good mental health. *Conclusion:* In order to maximize a positive outcome it is suggested to select patients with a high level of fatigue and pain and a reduced physical function. Negative responders may not fulfill the criteria for PPS.

PA513

The Importance of a Self-Regulation Program to Promote Physical Activity, to Reduce Fatigue and Perception of Disease Severity in People with Multiple Sclerosis

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Introduction: Multiple Sclerosis (MS) is a chronic disease of the central nervous system that affects more often young adults in the prime of his career and personal development, with no cure and unknown causes. The most common signs and symptoms are fatigue, muscle weakness, changes in sensation, ataxia, changes in balance, gait difficulties, memory difficulties and cognitive impairment. The aim of this study is to examine the implications of a self-regulation program in the reduction of the perception of fatigue and perception of disease severity in MS patients. *Methods:* This is a quasi experimental study. We carried out the first assessment on the first session of the implementation of program of self-regulation and a second evaluation at the end of the program. The intervention group consists of 27 patients with diagnosis of MS for more than one year. The sessions were held once a week for 90 minutes, over a period of 7 weeks. Each session aimed to stimulate group discussion about a theme related to inability or limitation in physical activity. We asked the subjects the question "Please classify the severity of your disease?" with answer in a 10 points analogue scale, and used the Fatigue Severity Scale (FSS), at the beginning (time A) and end (time B) of the program of self-regulation. We used the SPSS version 20. Was used a non-parametric statistical hypothesis test (Wilcoxon test) The intervention followed the recommendations of the Helsinki Declaration. *Results:* The age range of the subjects was between 20 and 58 years with a mean age of 44 years. 58.3% were women, 37.5% were currently married, 67% were retired, and the mean level of education was 12.5 years. The correlation between the severity of the disease perception and FSS, before the self-regulation program was $r=-0.30$, ($p<0.05$), and after the program was $r=0.42$, ($p<0.01$), changing from a low to moderate correlation, meaning less fatigue less perception of disease severity. *Conclusion:* We conclude that the program of self-regulation for physical activity in patients with MS can improve fatigue and this has an influence on the perception of disease severity.

A.3.5. NEURODEGENERATIVE DISEASES

PA514

Excitability of Spinal Neural Function Using the F-wave during Motor Imagery in Parkinson Disease

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Introduction/Background: To determine whether mental simulation without muscle contraction associated with motion can increase the excitability of spinal neural function in Parkinson's disease (PD) patients, we analyzed thenar muscle F-waves after stimulating the median nerve at the wrist with holding/not holding a sensor between the thumb and index finger. *Material and Methods:* We examined F-waves of the left thenar muscles in 10 PD patients under resting, holding/not holding, and motor imagery conditions. In motor imagery, the subjects were asked to imagine 50% maximal voluntary contraction (MVC) of isometric contraction holding/not holding the sensor between the thumb and index finger (motor imagery "with"/"without sensor"). *Results:* Persistence and F/M amplitude ratio during holding and motor imagery "with"/"without sensor" tended to increase more than those during relaxation (significantly for F/M amplitude ratio during motor imagery "with sensor"). *Conclusion:* Motor imagery "with" and "without sensor" increased the excitability of spinal neural output to the thenar muscles. Because excitability with the sensor was significantly higher than that during relaxation, movement preparation for a motor imagery task is important in PD patients.

PA515

Oral Health and Nutritional Status in Patients Affected with Parkinson's Disease

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Introduction: The prevalence of Parkinson's disease (PD) is expected to increase over the next decade. The disease has several implications relating to oral and general health, and are manageable with proper awareness and knowledge. The aim of the present study was to assess oral health status and nutritional status which may influence oral and general health among patients with Parkinson disease. *Methods:* A cross sectional study was conducted to assess the Oral Health and Nutritional Status of Parkinson's disease affected patients visiting Out patient department of Yenepoya medical College and Hospital, Mangalore from May 2013 to June 2014. The study population consisted of 75 subjects in the range of 60-76 years. Oral health status was assessed using the WHO Oral Health Assessment Form 1997, Nutritional status using anthropometric measurement of Body Mass Index after obtaining informed consent. Data was analyzed using SPSS 18 software and the statistical tests performed were Chi-square and ANOVA. *Results:* In the present study, the frequency of untreated caries, periodontal diseases, and missing teeth of the was significantly high. The proportion of filled teeth was insignificant while the need for prosthesis was largely unmet. Patients had more complaints of chewing difficulties and denture discomfort than controls. More than half of the patients had problems with swallowing. Intra oral mucosal lesion was more prevalent on the buccal mucosa region. (61.5%) of subjects were found to be underweight while (38.5%) subjects were considered as having normal nutritional status. *Conclusion:* The affected patients had poor oral and general health and required restorative and prosthetic therapy. These findings may help as adjunct for the personal care attendant of Parkinson's disease patients for improving their oral and general health which

would be helpful in making health care interventions strengthening community-based palliative care for parkinsonian patients.

PA516

Predictors of Physical Health Related Quality of Life in Parkinson's Disease Patients Presenting for Deep Brain Stimulation

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Introduction: Clinically relevant depressive and anxiety symptoms occur in about 35% and 50% of patients with Parkinson's disease (PD). Aside from depressive and anxiety symptoms, motor function and disease duration are associated with impaired quality of life in patients with PD. Patients candidates for treatment with Deep Brain Stimulation (DBS) in general are at an advanced stage of the disease. The aim of this study is to assess the factors associated with quality of life in patients candidates for DBS. **Materials and Methods:** Cross-sectional study. **Sample:** patients followed at the Disorders, Hospital Governador Celso Ramos Movement, in Florianópolis, Santa Catarina, evaluated between May 2009 and March 2013. **Inclusion criteria:** neurological indication for ECP (refractory tremor fluctuations in "off" and not correctable with medication dyskinesias). **Exclusion criteria:** diagnosis of dementia and patients already undergoing functional neurosurgery. **Neurological Evaluation:** PD diagnosis performed according to the Queen Square Brain Bank criteria for a clinical neurologist certificate (FGF), blind to the psychiatric evaluation. Motor function and disease stage assessed by MDS UPDRS III (6) and Hoehn & Yahr (7). **Psychiatric evaluation:** Structured Clinical Interview for Axis I Psychiatric Disorders ("The Structured Clinical Interview for DSM-IV Axis I Disorders" - SCID-I); Hospital Anxiety and Depression Scale ("Hospital Anxiety and Depression Scale" - HADS); Assessment of quality of life: 39-item Parkinson's Disease Questionnaire (PDQ-39). The study was approved by the Ethics Committee on Human Research of the Hospital Governador Celso Ramos and Federal University of Santa Catarina. **Results/Mobility:** HADS score and MDS UPDRS III were significantly associated with scores on the Mobility domain analysis of simple linear regression. **Activity of Daily Living:** only score in the MDS UPDRS III showed a borderline association with the domain score Activities of Daily Living in a simple linear regression analysis. **Discomfort Body:** HADS score and age were significantly associated with the score Body Discomfort in the domain analysis of simple linear regression. **Conclusion:** Depressive and anxiety symptoms showed an independent association for Mobility and Body Discomfort Scale dominoes quality of life PDQ - 39 in PD patients and indication for treatment with ECP.

PA517

Effects of Cueings for Freezing of Gait in Individuals with Parkinson's Disease: a Meta-Analysis and Systematic Review

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Introduction: Freezing of gait (FoG) is a common phenomenon in individuals with Parkinson's disease (PD). Rehabilitation strategies for FoG include gait modification and auditory, visual or somatosensory cueing stimuli. However, the effects of cueing for FoG have not been clearly concluded. Therefore, the objective of this meta-analysis study was to systematically analyze the effects of cueings for FoG in individuals with PD. **Methods:** A systematic

search of the literature from 1st Jan 2003 to the end of 1st May 2014 was conducted. The following published databases were searched: Pubmed, MEDLINE, Cochrane library, PEDro, EMBAS, CINAHL, AMED, SPORTDiscus, PsycINFO, PsycBITE, Otseeker, and National Digital Library of Theses and Dissertations in Taiwan. An on-line searching strategy was used to include the studies using cueing strategy for FoG in individuals with PD. Four researchers searched the databases using the following **key-words:** Parkinson's disease, freezing of gait, gait disturbance, and visual, auditory and somatosensory cueing. All studies that investigated the effect of any type of cueing for FoG in PD were included by two pairs of researchers who reviewed the titles and abstracts. Data extractions were undertaken by four researchers after the systematic search. The articles measured freezing of gait questionnaire (FOGQ), number of freezing and gait speed for the immediate and training effect of cueings were collected. **Results:** Cueings resulted in significant improvement in immediate effect for number for freezing (Hedge $g=-0.668$; 95% confidence interval [CI], -1.148~-0.189). Cueings also exerted significant training effects in FOGQ (Hedge $g=-0.744$, 95% CI, -1.106~-0.383.), number of freezing (Hedge $g=-0.0451$; 95% CI, -0.763~-0.14.), and gait speed (Hedge $g=0.685$; 95% CI, 0.329~1.041). **Conclusions:** The cueings demonstrated a positive influence on both FoG and gait speed in individuals with PD. Therefore, it is important to incorporate cueings during training or during daily activities to reduce freezing of gait or to increase gait speed in patients with PD.

PA518

Different Training Strategies for Turning Performance in Individuals with Parkinson's Disease

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Introduction: Many studies indicated that more than 50% of people with Parkinson's disease (PD) have difficulty in turning which may lead to falls during daily activities. However, effective training for improving turning performance is not immediately known. The balance control and lower extremity muscle strength were found to influence the turning performance in individuals with PD. On the other hand, the contemporary training strategy is task-oriented training for functional improvement. In this study, a specific exercise program emphasizing the balance and strengthening was designed for turning training. In parallel with the specific exercise training, a novel turning-based treadmill training was also proposed for the turning performance. Therefore, the aim of this study was to compare the effects of different training strategies for turning performance in individuals with PD. **Methods:** This study was a randomized controlled trial. Subjects meeting the selection criteria were randomly assigned to the specific exercise group, task-oriented group and general exercise group to receive specific training program emphasizing the balance and strengthening, turning-based treadmill training and general exercise training respectively, 30 min per session for total 12 sessions in 4 to 6 weeks. After 30-min of above mentioned training, subjects in each group received 10-min turning training on level surface. A battery of turning tests including Step/quick turn (SQT), 360-degree turn in place, and sudden turn 180-degree during walking were administered as the outcome measures. **Results:** Our results ($n=10$ for each group) showed both the specific exercise and task-oriented exercise resulted in decreasing the turning time ($p<0.01$, $p<0.05$) and turn sway ($p<0.01$) in SQT test, and decreasing the 360-degree turning time ($p<0.01$) more than the general exercise group. However, such beneficial effects can not be found in sudden turn 180-degree during walking test in individuals with PD. **Conclusion:** Our results indicated the balance control training with lower extremity strengthening exercise is equally effective as the turning-based treadmill training in improving turning performance of SQT and 360-degree turn in individuals with PD.

PA519

Parkinsonian Voice Classification of Kabyle Berber Patients Using Neural Networks***K. Ferrat**

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This study concerns the use of Artificial Neural Networks (ANNs) to discriminate the Parkinsonian Voice (PV) of Kabyle Berber patients from the Normal Voice (NV). In first stage, several acoustic parameters were analyzed to characterize the pathological voice, such as the fundamental frequency F0, the Jitter (measure of perturbation of F0), the Shimmer (measure of perturbation of intensity), the Zero Crossing Rate ZCR, and the energy of the speech signal. In last stage, a Time Delay Neural Network (TDNN) was used to classify the PV from the NV. We have applied a supervised training method based on Bayesian Regularization (BR) in combination with the Levenberg-Marquardt (LM) optimization algorithm, to adjust the synaptic weights in order to minimize the error between the computed output and the desired output for all samples. The test results show that the proposed Neural Network provides a recognition accuracy of 94.50% for the PV and 92.00% for the NV. This work aims to characterize the PV for their exploitation in speech rehabilitation, a conducting of automatic diagnostics and a development of expert systems to characterize the speech disorders at appreciable rates. In addition, such studies will provide a greater understanding of the impact of neurological disorders on speech production, thus enriching the analysis conducted by the clinicians in Algerian hospitals.

PA520

Effects of Treadmill Training with and without Body Weight Support on Balance of Parkinson's Disease Patients in Use of Deep Brain Stimulation***V. C. Sales¹, N. Luna¹, A. Alonso¹, R. B. M. Rodrigues¹, M. Peterson², E. T. Fonoff¹, E. R. Barbosa¹, M. J. Teixeira¹, J. Greve¹**¹University of São Paulo, São Paulo, BR, ²University of Michigan-Medicine, Michigan, MI, US

Introduction: Deep Brain Stimulation (DBS) improves Parkinson's disease cardinal symptoms (tremor, rigidity and bradykinesia). However, its effects on axial symptoms (postural instability and gait) are still unclear, and it can even deteriorate these aspects. Conventional therapeutics approaches as treadmill training with or without partial body weight support could improve balance and gait, potentiating DBS effects. **Objective:** Evaluate if body weight supported treadmill training and treadmill training improve balance in PD patients and if one of them is superior to other. **Methods:** 29 patients with PD using bilateral Subthalamic Nucleus DBS full filled inclusion criteria. 17 participated but six of them were excluded and 11 finished protocol. Main age 60.9±10.6 (41-72) years, disease duration 20±7 (12 - 39) years and time after surgery 20±4 (12 - 24) months. Patients were evaluated pre and post treatment using Berg Balance Scale (BBS), conventional, cognitive and motor Time Up and Go test (TUGT) and static posturography. Firstly, patients realized conventional physiotherapy (1 hour) followed by 30 minutes of treadmill training (TT), 2 times a week, during 16 sessions. After have finished the first protocol, patients had a 6 week wash-out and then they were revalued to start the same protocol with body weight supported treadmill training (BWST). **Results:** After treadmill training there were a reduction on cognitive TUG values (pre: 15.7±1.8 sec versus post: 13.7±3.1 sec; p=0.01) and an increment of anteroposterior and medio-lateral body oscillation with eyes closed. After body weight supported treadmill training there were a reduction on conventional (pre: 12.3±2.0 sec versus post: 10.7±1.7 sec; p=0.01) and cognitive (pre: 14.6±3.5 sec versus post: 12.5±1.6 sec; p=0.05) TUG values. There were no significant changes in the Berg Balance Scale following either training protocol. **Conclusions:** Both unsupported

and supported treadmill training improved static and dynamic balance in patients with PD after treatment with DBS surgery. Both methods had similar results; however, supported treadmill training seemed to be a potentially superior option, as patients tended to feel safer during supported training, and thus it may prove to be a more viable means of training.

A.3.6. LANGUAGE AND SPEECH DISORDERS

PA521

Fundamental Frequency and Formant of Vowels of Glossectomy Patients after Speech Therapy***Y.-J. Chen¹, J. R. Hsiao¹, C. H. Tseng²**¹National Cheng Kung University Hospital, Tainan, ²National Kaohsiung Normal University, Kaohsiung, TW

Introduction/Background: Patients with glossectomy demonstrate decreased tongue flexibility and articulation accuracy, resulting in reduced speech intelligibility and communication difficulties. Similar researches are plenty, yet studies focus on the changes of fundamental frequency and formant of vowels of glossectomy patients after speech therapy are limited. **Material and Methods:** Subjects were 51 male glossectomy patients who received speech therapy for 6 months after surgery. The test battery, designed by the researcher, includes all Mandarin consonants and vowels. Three vowels, /a//i//u/, were captured for acoustic analysis. **Results:** No significant difference is noticed among the fundamental frequency of the targeted vowels of the subjects. Yet, the fundamental frequency of low vowels are higher than those of high vowels. Compared with the control group, the fundamental frequency of /a/ and /i/ are higher, and the fundamental frequency of /u/ is similar. As for formant analysis, F1 is increasing from high vowel /i/ to low vowel /a/. F2 is decreasing from front vowel /i/ to back vowel /u/. The decreasing F2 in /i/ and increasing F2 in /u/ indicate a narrower vowel space of the subjects. **Conclusion:** It is found that patients with glossectomy demonstrate marked changes of fundamental frequency and formant of vowels. After speech therapy intervention, patients maintain apparent vowel space, which is beneficial for listeners to perceive patients' vowel production better and avoid miscommunication. Based on the research findings, it is suggested that physicians take the initiative to arrange speech therapy for glossectomy patients, so they are able to have the best speech performance after surgery. **Keywords:** Glossectomy, Formant, Speech Therapy.

A.3.7. NERVE INJURY

PA522

Fibular Nerve Damage after Knee Dislocation. Clinic, Neurophysiology and Ultrasound in Diagnosis, Prognosis, Treatment and Rehabilitation.***D. Coraci¹, V. Santilli¹, G. Granata², I. Paolasso², H. Tsukamoto³, L. Padua²**¹"Sapienza" University, Rome, IT, ²Università Cattolica del Sacro Cuore, Rome, IT, ³Teiko University, Tokyo, JP

Introduction: Fibular nerve palsy may occur after a close traumatic knee dislocation. Ultrasound shows its usefulness in traumatic nerve injuries. **Material and Methods:** We present 8 patients with a history of knee dislocation associated with fibular nerve damage, evaluated by clinical, neurophysiologic and ultrasonographic (US) examination. US evaluation was performed with a 12-18 MHz probe, assessing the fibular nerve from its origin from the sciatic nerve to the fibular head. All the patients were examined in follow-up. **Results:** At the first evaluation, the patients presented

a severe clinic and neurophysiologic damage of fibular nerve. US showed an increase of the cross sectional area (CSA) of the involved fibular nerve, between popliteal fossa and fibular head. In 5 subjects fibular nerve CSA was four-seven times larger than normal, while in the other 3 subjects it was only double compared to the other side. The first 5 patients did not present improvement in clinical, neurophysiologic and ultrasonographic follow-up. The other 3 patients showed a general improvement in the later evaluations. *Conclusion:* This observation let us consider that the larger the CSA of the involved peroneal nerve the worse the prognosis for the patient. Associating neurophysiology to US evaluation, we can obtain a guide for diagnosis, treatment and rehabilitation. In fact this combined evaluation gives data about the specific details and the changes over the time of the condition. This allows us to perform the best management for every individual case.

PA523

Botulinum Toxin Injections Cause Long Term Improvement of Frey's Syndrome: a Case Report

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Case Diagnosis: Frey's syndrome, also known as auriculotemporal syndrome or gustatory sweating, is most commonly a sequela of surgery to the parotid gland. Clinically it is characterized by sweating, warmth, erythema and flushing of the facial skin in the parotid area or of the neck when eating. The most accepted hypothesis is that of an abnormal cross-reinnervation of the parasympathetic fibers of the ninth cranial nerve, reaching the sweat glands in the area. The prevalence of Frey's syndrome varies from 20 to 65.9%. If suspected the diagnosis is completed with a Minor (starch-iodine) test, qualitative test used to evaluate sudomotor function (sweating). *Case Report:* A 70 years old female patient had a right superficial conservative parotidectomy of the facial nerve because of cervical paraganglioma. One year after the surgery she started with intermittent flushing and sweating in the right preauricular and genial region of her face during mealtimes. The Minor or starch-iodine test was performed and a violet patch was visible in the right preauricular area, confirming the presence of gustatory facial sweating. We injected intracutaneously in the area 60 U (2 U/cm²) of BT-A. The patient reported symptomatic improvement, which was confirmed 2 weeks postinjection by a negative Minor test. The patient was asymptomatic 15 months later. *Discussion:* No definitive and effective treatment for Frey's syndrome is available. Surgical treatment is rarely used. The therapeutic modality that has the most promising future is botulinum toxin A, that inhibits the liberation of acetylcholine preventing the gland from secreting. Recent publications have reported prolonged treatment responses of 6 to 18 months. Our case report showed that after a single infiltration the patient remained asymptomatic for at least 15 months. *Conclusion:* The main discomfort referred by patients is related to the appearance of symptoms in public, which can cause disability and social isolation. The intradermal injection of botulinum toxin A is a safe and effective long term method to control the symptoms. It is a procedure easily carried out on the rehabilitation consultations with very good results.

PA524

Rehabilitation Approach of Peripheral Facial Paralysis – 2 Years Experience

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Introduction: Peripheral facial paralysis (PFP) is a peripheral neuronal lesion of the facial nerve that results in muscle weakness on one side of the face. Xerophthalmia, hyperacusia or phonation and

deglutition changes may be present sometimes permanent sequelae subside after 3 months. PFP requires resources and therapeutic strategies available for Physical and Rehabilitation Medicine (PRM). The purpose of this study is to characterize and discuss the results of a population with PFP submitted to a rehabilitation program, as well as to contribute towards the treatment of PFP. *Material and Methods:* Retrospective study between January 2012 and December 2013 of patients with PFP, submitted to a rehabilitation program in PRM Department. The House-Brackmann Scale was used for assessing these patients. Data were collected from the PRM Department database, based on the patient's clinical records, statistically analyzed with the Statistical Package for Social Sciences. *Results:* In a total of 45 patients at rehabilitation program, 32 met the inclusion criteria. The mean age at event was 48 years (17-74), 50% patients were male and 50% female. A right PFP occurred on 53% of the cases and a left PFP on 47%. The etiology was idiopathic in 66%, iatrogenic in 13%, infectious disease in 13% and associated to pregnancy in 8%. The mean time between the event and the first assessment was 15 days (1-84) and between first assessment and the beginning of the rehabilitation program was 5 days (0-24). The rehabilitation program includes pharmacotherapy (53% of the patients underwent steroid therapy), specific eye treatments (72%), neuromuscular training and physical methods. Nineteen patients concluded the program – the mode of first assessment was V in House-Brackmann Scale, I after outpatient discharge and mode of the difference between admission and discharge was 4. Complications occurred in 7 cases and botulinum toxin injection was needed, keeping these patients in follow-up. It seems that there is a positive correlation between steroid therapy, early rehabilitation program and the evolution of these patients. *Conclusion:* PFP rehabilitation is a challenging endeavor, however, individualized treatment associated with an early rehabilitation program was essential in obtaining a generalized improvement on the functional outcome of these patients.

PA525

The Factors Influencing Nerve Thickness: a Sonographic Study

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Introduction: Ultrasound imaging of the peripheral nervous system pathology has a gaining popularity in recent years. The studies investigating peripheral nervous system showed enlarged nerves due to entrapment neuropathies. On the other hand, a few study has reported that the nerve thickness was increased in polyneuropathies. A couple of study evaluated the influence of specific personal factors such as age, height and body mass index (BMI) and race on nerve thickness in healthy individuals. However, the relationship between muscle mass and nerve thickness has not been studied. The aim of this study was to determine the effects of the dominant arm and leg muscle mass on peripheral nerve cross sectional area (CSA). Secondly, it was aimed to identify the relationship between nerve CSA and demographic factors in a large population. *Material and Methods:* Two hundred and thirty-three volunteers between the age of 18 and 75 years were enrolled. Median and ulnar nerve CSA's were measured at mid-point of forearm and common peroneal nerve CSA's were measured just above fibular head. Demographic data such as age, sex, body weight, height and BMI were recorded. Dominant arm and leg muscle mass were evaluated by using the bioelectrical impedance analysis method. *Results:* The CSA values of median, ulnar and peroneal nerves were not differing between two genders (p=0.06, p=0.91, and p=0.31 respectively). Ulnar and peroneal nerve CSA's increased with advancing age (p<0.001). BMI was only correlated with ulnar nerve CSA and height was only correlated with peroneal nerve CSA. Upper extremity muscle mass correlated significantly with ulnar and median nerve CSA's (p=0.022 and p<0.001, respectively); however, lower extremity muscle mass did not correlate with peroneal nerve CSA. *Conclusion:* We hypothesized that another factor that may

influence the nerve thickness may be muscle mass, as the subjects with higher muscle mass may have thicker nerves in physiological limits. This situation should be taken into account while imaging of nerves by ultrasound in peripheral nervous diseases. *Keyword:* cross sectional area, muscle mass, ultrasonography.

PA526

An Unusual Site of Ulnar Nerve Entrapment in a Patient with Normal Nerve Conduction Studies

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Introduction: The clinical diagnosis of ulnar nerve entrapment is not always easy, particularly when sensory complaints are absent or atypical. Moreover, it is usually difficult clinically and sometimes electrophysiologically to localize the lesion. Recently, ultrasonography (US) has an important role in the diagnosis of the entrapment neuropathies. It is stated that US could be a useful tool for assessing the patients with ulnar neuropathy symptoms and electrodiagnostic findings. We report a case of ulnar neuropathy caused by compression of the nerve between flexorcarpi ulnaris (FCU) and flexor digitorum of little finger diagnosed with US. *Case:* A 30 years old man presented with a one year history of pain and numbness in the ulnar area of left hand. On physical examination, there was sensory impairment to light touch, however no weakness of in abduction or adduction of the fingers was observed. Particularly, his pain was aggravated with resisted flexion of fifth finger and resisted wrist flexion and adduction. Rheumatological and endocrinological blood tests and exams presented normal values. Nerve conduction studies of bilateral median and ulnar nerves and needle electromyography study of left ulnar nerve were normal. US imaging of the wrist and hand demonstrated a well defined compression of the ulnar nerve between flexor digitorum tendon of the fifth finger and FCU. *Conclusion:* To the best of our knowledge, ulnar nerve entrapment at the wrist between FCU and flexor digitorum tendons was not introduced previously in the literature. Clinical presentations of ulnar nerve lesions at the wrist may initially be atypical, misleading the physician. Thus, ulnar nerve lesion at the wrist should be kept in mind for the differential diagnosis of patients with wrist or hand pain. US appears to be of particular importance in the diagnosis of patients with neurologic deficits in the hand to identify the cause of the nerve lesions. *Keyword:* nerve entrapment, ulnar nerve, ultrasonography.

PA527

Femoral Neuropathy Due to Spontaneous Iliopsoas Muscle Haematoma

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Case Diagnosis: We report a clinical case of femoral neuropathy as prime manifestation of spontaneous iliopsoas muscle haematoma in an anticoagulated patient who presented to the Emergency Department of our Hospital. We discuss the diagnostic approach and the distinct therapeutic options in light of the evidence presently available in literature. *Case Description:* A 67 year-old woman, with previous medical history of atrial fibrillation, chronic venous insufficiency of the lower limbs and surgical history of mitral valvuloplasty, anticoagulated with warfarin, presented to the emergency department. She complaint with right groin and tight pain which started 4 days before. She also claimed progressive difficulty on walking in the past days. The patient denied previous trauma. On physical examination she presented with pain in the groin and tight with passive mobilization of the right hip. While walking she couldn't do extension of the knee and flexion of the hip due to pain and muscle weakness. We also found right patellar hyporeflexia. No sensitive alterations were reported at this time. An X-ray of the hip was performed, which showed no alterations.

The pain was very severe, non-responsive to opioid treatment (tramadol). We decided to do a CT which revealed an extensive iliopsoas haematoma, involving mainly the iliac component. We choose to treat this patient conservatively, with bed rest, withdrawing the anticoagulation, and monitoring the evolution of the haematoma with abdominal-pelvic CT for which she was admitted in an Internal Medicine ward. *Discussion:* Bleeding complications associated with anticoagulant therapy have been reported in 1-7% of all patients taking this medication. Iliopsoas haematoma is among those complications and poses as a rare but potentially serious disorder. The compression occurs due to the long course of the femoral nerve as it arises from the lombar plexus and travels trough the iliopsoas groove. The treatment of this entity is often controversial. *Conclusion:* The diagnosis is difficult in the majority of the cases and clinical suspicion is essential. The preferred treatment in the majority of the cases is conservative, due to the difficulty of surgical approach and morbidity associated, however surgical treatment may be necessary essentially when the patient presents with profound neurological deficits.

PA528

Application of Mirror Therapy in a Severe Brachial Plexus Injury

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Case Diagnosis: We report a case of a 73 years old woman patient who suffered a dislocation of the right shoulder with a severe BP injury. Surgical option was discarded. *Case Description:* The evolution was satisfactory despite the poor prognosis of the injury, in the first year of monitoring. The mainstay of treatment was the application of TM in our area of Occupational Therapy. Initially the patient had paralysis of the entire limb and limitation of passive range of motion of the shoulder, elbow and wrist. Electromiography revealed a severe acute injury of radial, ulnar, median and axillary nerves. The treatment consisted of electrostimulation and manual therapy to regain mobility. Occupational Therapist designed a personalized MT program, adapted to the evolution. First, simple joint mobility exercises were done; later manual dexterity tasks were included. The patient was instructed to do a 15 minutes/day home program. One year later she is independent for the activities of daily living; she regain force and manual ability. *Discussion:* Anterior dislocation of the shoulder in patients over 60 years is associated with increased susceptibility to suffer complications. The involvement of the brachial plexus (BP) is the most serious neurological complication. The cases where the surgical intervention is not possible have a poor prognosis. Mirror therapy (MT) has shown its effectiveness in the treatment of the complex regional pain syndrome and in chronic stroke patients. It consists in placing a mirror in the midsagittal plane so the patient sees the unaffected limb as if it is the affected one. The patient looks at this reflection and gets the illusion of a restored, non-painful and functioning limb. There is evidence of MT's effectiveness for improving upper extremity motor function, activities of daily livings and alleviate pain. The design of a home program could optimize its effects. *Conclusion:* The MT is an economic tool, easy to apply and potentially useful in PB injuries. An occupational therapist trained in the technique is needed to design a program of exercise individually adapted to each phase of evolution. The motivation of the patient is essential because the implementation of a home TM-program improves its effects.

PA529

Neuropathy of Long Thoracic Nerve Post Infectious Mononucleosis

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Case Diagnosis: Scapular winging is a rare condition that besides cosmetic implications, can cause pain and altered scapulohumeral rhythm, affecting the ability to perform activities of daily living. This condition can have various etiologies. Causes of scapular winging are described and a clinical case due to long thoracic nerve injury in an unusual context is reported. **Case Description:** Male, 19 years old, student. No relevant previous medical history. The patient was referred to a Physical and Rehabilitation Medicine appointment presenting complaints of weakness and discomfort in the right shoulder with no associated trauma. On physical examination winged scapula was evident with push-up motion against a wall. By reviewing case history, the patient mentioned a period of fever in the previous month, diagnosed as infectious mononucleosis. An electromyography (EMG) was requested and the result proved lesion of the long thoracic nerve. The patient started a rehabilitation program focusing on the strengthening of the shoulder girdle muscles, especially serratus anterior muscle, with progressive improvement of the clinical picture. **Discussion:** The main function of the serratus anterior muscle is to maintain the scapula opposed to the thoracic wall, to protract and rotate the scapula and to position the glenoid. The muscle is solely innervated by the long thoracic nerve which descends superficially along the thoracic wall, making it more susceptible to injury. The commonest cause of scapular winging is serratus anterior paralysis. This dysfunction can be caused by traumatic lesions of the long thoracic nerve (for example, repetitive movements, as seen in athletes), idiopathic lesions and non-traumatic lesions. The latter include viral illness, allergic-drug reaction, drug overdose, among others. In this case, the presence of previous infectious mononucleosis was the only plausible cause for the paralysis, supported by the results of the EMG. Studies suggest that long thoracic neuropathy is generally associated with good prognosis. The favorable clinical evolution of this case, the age of the patient and the EMG findings are also in favor of a good prognosis. **Conclusions:** A throughout history and physical examination should be performed in patients presenting with shoulder pain and scapular winging in order to establish the correct diagnosis and select the appropriate rehabilitation treatment.

PA530

Comparison of Naproxen and Prednisolone in Treatment of Mild to Moderate Carpal Tunnel Syndrome

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Introduction: Carpal tunnel syndrome is entrapment of the median nerve in carpal tunnel of the wrist. Symptoms of this syndrome are numbness, tingling, weakness or pain in the fingers and wrist. Treatment includes rest, avoiding the many activities available, splints, non-steroidal anti-inflammatory drugs, oral steroids, topical steroid injection in wrist and surgery. This study compares the effects of oral prednisolone and naproxen in the treatment of mild to moderate carpal tunnel syndrome. **Materials and Methods:** This randomized clinical trial is simple, 44 patients that had mild to moderate carpal tunnel syndrome were selected and randomly assigned in two treatment groups: group 1 (n=22) received naproxen 1,000 mg daily for 4 weeks and the group 2 (n=22) received oral prednisolone 20 mg, daily, in the first 2 weeks and 10 mg daily for 2 weeks. The 3 persons of the second group dropped out of treatment. Re-evaluation of treatment outcome was performed 8 weeks after end of treatment. **Results:** The genders of patients were 87.8% female and 12.2% were male. The electrodiagnostic study were shown 16 hands (19.5%) normal, 19 hands (23.2%) had mild and 47 (57.3%) had moderate involvement in beginning of treatment. Prednisolone group was more reducing symptoms than naproxen and there was a significant relationship ($p < 0.05$). In naproxen group, there was 11 hands (31.4%) improved and treatment failure in 24 hands (65.8%), respectively, while the improvement in the prednisolone group was 18 hands (58.1%) and

treatment failure in 13 hands (41.9%) achieved with a significant relationship ($p = 0.027$). The recovery effect of prednisolone was higher than naproxen ($p = 0.054$). **Conclusion:** The comparison effects of oral prednisolone due to naproxen in treatment of carpal tunnel syndrome, is clearly more effective. The relief of symptoms and the intensity conflicts recorded by electrodiagnostic study in patients, who received prednisolone compared to naproxen, was more effective.

PA531

Comparison of the Efficacy of Acupuncture and Anti-Inflammatory Treatment in Carpal Tunnel Syndrome

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Introduction: This study aimed to investigate the efficacy of conventional acupuncture in comparison with anti-inflammatory treatment approaches in Patients with carpal tunnel syndrome (CTS). **Materials and Methods:** A total of 50 patients with mild to moderate CTS, based on electro-diagnostic study classification, were randomly divided into two groups. Patients in both groups received custom-made static wrist splints set at 0 to 5 degree of the wrist extension as the standard conservative treatment for a period of one month. Patients in the experimental group also received a total of 8 sessions of acupuncture therapy (two times a week). Also, patients in the control group received 400 mg of Ibuprofen 3 times a day for 10 days. Outcome measures included visual analog scale for pain intensity, Boston questionnaire for functional status, and Electro-diagnostic study findings. **Results:** We demonstrated significant improvement in both groups after one month ($P < 0.05$). When the control and acupuncture groups were compared, statistically. Significant improvement in the functional assessment, pain intensity, symptoms and electro-diagnostic parameters (expect distal motor latency) was observed in the acupuncture group ($P < 0.05$). **Conclusion:** Conservative treatment is effective in mild to moderate CTS. However, acupuncture can have an additive effect in management of these patients.

A.3.8. MENTAL DISORDERS

PA532

Comparison of Anxiety and Depression between Amputations and Spinal Cord Injury

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Introduction: Amputations and Spinal Cord Injury (SCI) can result in multiple physical, psychological and socio-economic sequelae. 1-2 Such individuals are reported radically in lower mental health with anxiety manifestation and depressive symptoms. 3 This study will compare anxiety and depression between amputation and SCI. **Material & Methods:** Design: Prospective cross sectional study. Setting: The study took place at Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi and Surgical Complex and Department of Neurosurgery and Orthopedic Surgery, Central Military Hospital (CMH), Rawalpindi from 1st December 2013 to 31st August 2014. **Participants:** A total of 73 male individuals, as per the inclusion criteria, participated in this study out of which 32 had SCI and 41 had amputations of one or more limbs. Interventions: Nil. Main Outcome Measures: Education, Income, Amputation, SCI, Hospital Anxiety and Depression Scale (HADS) **Results:** In amputees, 56.1% (n=23) did not have depression, 14.6% (n=6) were borderline cases and 29.3% (n=12) had clinical depression. While in SCI, 56.3% (n=18) did not have depression, 21.9% (n=7) were borderline cases and 21.9% (n=7) had clinical depres-

sion. The difference between depression in amputees (29.3%) and SCI (21.9%) was statistically insignificant (p -value =0.64). In amputees, 51.2% ($n=21$) did not have anxiety, 19.5% ($n=8$) were borderline cases and 29.3% ($n=12$) had clinical anxiety. While in SCI, 65.6% ($n=21$) did not have anxiety, 21.9% ($n=7$) were borderline cases and 12.5% ($n=4$) had clinical anxiety. The difference between anxiety in amputees (29.3%) and SCI (12.5%) was statistically insignificant (p -value =0.22). **Conclusions:** Anxiety and depression in amputees and SCI is low. There is no difference in anxiety and depression between amputees and SCI. **References:** 1) Mckechnie PS, John A. Anxiety and depression following traumatic limb amputation: A systematic review. *Injury*. 2014 Sep 28. pii: S0020-1383(14)00454-9. 2) Klaas SJ, Kelly EH, Anderson CJ, Vogel LC. Depression and anxiety in adolescents with pediatric-onset spinal cord injury. *Top Spinal Cord Inj Rehabil*. 2014 Winter; 20(1): 13-22.

PA533

The Effect of Prescribing of Methadone on Changing of Mood in Opium Addicts

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Introduction: The pharmacology of methadone is so straightforward, so unequivocal, and so simple for medical professionals. The benefits of such short-term addiction treatment with methadone are substantial. It is a safe, effective, relatively inexpensive medical intervention in the solving problems of addiction. However, some physicians and doctors and even healthcare providers who themselves prescribe methadone to addicts often have inadequate information and are unfamiliar with psychiatric and psychological aspects of how it works. For better understanding of these aspects the study aimed to investigate effects of Methadone on changing of positive and negative mood affect in addicted. **Material and Methods:** Research method is quasi-experimental. In sampling process, 19 addicted people were randomly selected and before Methadone therapy with a pretest, Watson's Positive Affect and Negative Affect (PANAS) were administered on them. One month later after Methadone therapy again Watson's Positive Affect and Negative affect (PANAS) was administered on them. PANAS assesses: interest, distress, powerfulness, fear, enthusiasm, proud, agitation, nervous and panic. Data were analyzed with dependent t -test. **Results:** Findings showed significant differences between PANAS components. Methadone therapy increased interest, powerfulness, enthusiasm, proud and decreased distress, panic and agitation in addicted. But there is not any significant difference between nervous components. **Conclusion:** The findings indicated that using Methadone drug in addition to reduce physical symptoms of addiction, can reduce significantly mental problems in addicted and can be regarded as a proficient drug for treating of addiction and as a results individuals can have a normal, productive, healthy, socially acceptable and self-fulfilling life style.

PA535

The Effects of Integrated Psychosocial Interventions on Psychosocial Functions in Patients with Schizophrenia: a Case Control Pilot Study

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Introduction/Background: Optimal management of patients with schizophrenia requires a comprehensive management of Psy-

choeducation, Cognitive Behavior Therapy (CBT), Social Skill Training (SST) and Stress Management. While whether integrated psychological intervention in combined group and individual treatments could be more effective and how to organize the treatment sessions become a potential target for research on optimal treatments of Schizophrenia. We hypothesized that the integrated psychosocial intervention composed of individual and group sessions could be effective among patient with schizophrenia. **Material and Methods:** Ten inpatients diagnosed with schizophrenia were recruited consecutively from West China Hospital. Intervention: Six participants received IPI s (9 sessions per week) for 2 weeks. Following one group pre- and post-design, the participants entered the 2-week treatment period and received integrated psychosocial intervention (1) Individual CBT, (2) Psychoeducation group therapy, (3) Stress management group therapy, (4) Social skills training, (5) Baduanjin exercise, and (6) individual therapy. Outcome measures conducted at baseline and after treatments include: Positive and Negative Syndrome Scale (PANSS), Beck Cognitive Insight Scale (BCIS), Depression Anxiety Stress Scales (DASS) and Self-made scale. **Results:** The results of Wilcoxon signed rank test revealed a significant improvement in positive symptom ($Z=-2.060$, $p<0.05$) of PANSS, anxiety ($Z=-2.232$, $p<0.05$) and stress ($Z=-2.060$, $p<0.05$) subgroup of DASS. No significant difference was observed in cognitive insight through BCIS reflective attitude ($Z=-1.051$, $p>0.05$) and concern attitude ($Z=-0.412$, $p>0.05$). Subjective feedback and observation showed positive progress in insight of the illness, social participation and stress management. **Conclusion:** IPIs may have positive effects on psychosocial function in patients with schizophrenia, which suggests that this intervention is worthy of further investigation, a high quality randomized control trial is needed.

A.4. INTERNAL MEDICINE AND OTHER CONDITIONS

PA536

Challenges in Bariatric Rehabilitation: First Experience in University of Malaya Medical Centre (UMMC). A Case Report

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Introduction: Obese patients undergoing bariatric surgery for weight reduction have underlying multitude of problems, which may include co-morbid conditions, functional limitations, behavioural and psychosocial factors. NICE guidelines state that surgery for obesity should only be undertaken by a multidisciplinary team that can provide regular pre and post op monitoring and support. However, this is currently missing in the current standard of care in many centres, including in UMMC. **Case Description:** A 29-year old super obese (Class III - BMI 93.6) female with Type 2 DM who was pre-morbidly independent in activities of daily living, was admitted to our centre for community-acquired pneumonia and pulmonary embolism. She was referred to rehabilitation team 3 weeks post admission for severe deconditioning with severe knee pain resulting in significant limitations in mobility and function; and for subsequent pre-rehabilitation for bariatric surgery. Our rehabilitation interventions included medical management of her newly diagnosed obstructive sleep apnea, hypertension, pain management for her bilateral knee osteoarthritis, reconditioning of musculoskeletal and cardiovascular systems and pre-op weight loss management. Endocrinology, psychiatry and social worker referrals were also initiated to facilitate medical, psychosocial and financial support. Her rehabilitation progress was met with various hurdles due to lack of bariatric equipments, safety in mobility and transfers, as well as psychological issues such as eating disorder and anxiety management which resulted in several setbacks in attaining her functional goals throughout her 6-months hospital stay.

However, after 3 months of intensive pre-rehabilitation prior to surgery, she achieved significant gains in mobility and function. She then underwent laparoscopic gastric bypass (Roux-En-Y) surgery and was discharged well 1 month post-op. *Discussion:* Our first bariatric rehabilitation patient proved to be a challenging one, in terms of medical, physical, psychosocial and environmental demands. A pre-rehabilitation program prior to bariatric surgery is vital to identify multiple issues usually present in this group of super obese patients, and to ensure successful outcome post-operatively. Goal-directed settings and a multidisciplinary approach were paramount in achieving our goals. *Key-words:* obesity, bariatric, surgery, rehabilitation, multi-disciplinary.

PA537

Prevalence of Asymptomatic Bacteriuria (ASB) and Pyuria Depending on Urination Management Methods in Patients of a Rehabilitation Department

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Introduction: The purpose of this work was to study the incidence of asymptomatic bacteriuria and pyuria depending on urination management methods in patients of a rehabilitation department. ASB is the isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained for a patient without symptoms referable to urinary infection. The diagnosis of ASB should be based on results of culture of a urine specimen. *Material and Methods:* Urine specimens were tested for white blood cells in microscopic examination and cultured in asymptomatic patients. Pyuria is detected by more than 10 white blood cells per high-power field on microscopic examination of unspun urine. Urine specimens were collected from 155 patients (age 22-92). The underlying diseases were 43.2% stroke, 15.5% SCI, 10.3% TBI, other neurological diseases 21.3% and 9.7 orthopedic diseases. By condom catheters, samples were collected using a freshly applied catheter and counts ≥ 105 cfu/ml was the criterion for identifying ASB. In catheterized urine specimens, bacterial species isolated in count ≥ 105 cfu/ml identify bacteriuria. The examinations were made in the context of active surveillance. *Results:* Eight out of the 24 (33%) SCI patients had indwelling catheter. All had bacteriuria and from them seven (87.5%) had pyuria. Eleven of them (45.8%) used intermittent catheter and from them 72.7% had bacteriuria and 63.6% pyuria. From the TBI patients, 37.5% had simultaneous voiding, and from them 50% had bacteriuria and 33% pyuria. From the 67 stroke patients, 59.7% had indwelling catheter. From those 85% had bacteriuria, 10% candiduria and 80% had pyuria. One third of stroke patients had simultaneous voiding and from them 72.7% had bacteriuria, and 63.6% had pyuria. *Conclusion:* The prevalence of ASB and pyuria was high in this population of patients (76.9% and 67.9% respectively). The presence of pyuria does not signify symptomatic urinary tract infection (although pyuria is the result of inflammation). Antibiotic use for ASB is associated with recurrent infection with multidrug-resistant bacteria, does not change survival while consequences of antibiotic treatment including increased adverse drug effects, increases isolation of resistant organisms and cost. The urinary tract infection is primarily a clinical diagnosis with laboratory testing providing supporting data.

PA538

Incidence and Antibiotic Susceptibility Pattern of Bacterial Isolates from Pressure Ulcers in a Rehabilitation Department

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Introduction: The purpose of this study was to record the bacterial flora of the pressure ulcers of hospitalized patients in a PRM department during a two years period of time (Nov. 2012 – Nov. 2014). *Material and Methods:* The material was consisted of 108 samples from pressure ulcers (10 of them were tissue samples after surgical debridement). The samples were collected from the ulcers' bottom after rinse with sterile saline. The cultures of samples were performed by the established methods. The identification and susceptibility testing of microorganisms was made by classical methods and Microscan-system. The examinations were made in the context of active surveillance and in clinical signs of infection. *Results:* In total, 317 aerobic bacterial strains were isolated, 80 anaerobic (60% *Bacteroides* spp. and 25% *Clostridium* spp.) and 6 of *Candida* spp. In average 3.7 strains per sample were isolated. From the 108 samples, 2 species of bacteria were isolated in 25% of them, 3 species in 30.6% and 4 to 6 species in 31.5% of them. The 34.4% of isolated aerobic microorganisms were gram(+) and 65.6% were gram(-). In order of frequency the isolated gram(+) aerobic microorganisms were *S. aureus* 47.7%, *Enterococcus* spp. 27.5%, *Coagulase-Negative Staphylococcus* 15.6%, *S. agalactiae* 5.5%. The most frequently isolated gram(-) aerobic microorganisms were *P. aeruginosa* 21.6%, *E. coli* 19.7%, *P. mirabilis* 19.7%, *A. baumannii* 18.3%, *K. pneumoniae* 11.1%, *Providencia stuartii* 5.8%. One third of the isolated aerobic strains were multidrug-resistant and in order of frequency those were MRSA 28.3%, *P. aeruginosa* VIM(+) 20.8%, *A. baumannii* 14.2%, *E. coli* 9.4%, *Providencia stuartii* VIM(+) 6.6%, *K. pneumoniae* KPC(+) 5.7% and *K. pneumoniae* VIM(+) 5.7%. It is notable that multiple isolations of multidrug-resistant strains were recorded in the same patients (up to six strains). *Conclusion:* Pressure ulcers are a major reservoir of multidrug-resistant microorganisms. Pressure ulcers' flora was polymicrobial in the majority of the samples. In polymicrobial isolations, the evaluation must be done regarding the predominating strains and their pathogenicity. The frequency of multidrug-resistant bacteria isolation was high (33.4%) in that population. Consequently the prevention measures of bacterial transmission and the implementation of effective infection control in a PRM department are considered as mandatory.

PA539

Correlation of Bone Mineral Density with Clinical and Pulmonary Parameters in Duchenne Muscular Dystrophy

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Introduction/Background: Due to increased life expectancy of Duchenne muscular dystrophy (DMD) patients, osteoporosis has become an important issue. However, the relationship between bone mass, patient age, body mass index (BMI), and pulmonary function including respiratory muscle strength has not yet been clearly defined. The purpose of this study is therefore to determine whether age, body mass index, pulmonary function, and respiratory muscle strength are related to bone mineral density in DMD patients older than 20 years old. *Material and Methods:* DMD patients admitted to the Rehabilitation Department in Gangnam Severance Hospital were studied between 2013 March and 2014 May. Age, height, weight, BMI, pulmonary function tests (vital capacity, VC, peak cough flow, PCF, maximum insufflation capacity, MIC), respiratory muscle strength (Maximal expiratory pressure, MEP, and maximal inspiratory pressure, MIP) and bone mineral density (BMD) were assessed. BMD of L1-L4 in PA projection was measured by dual-energy X-ray absorptiometry and the mean density was expressed as the unit g/cm². Pulmonary function and respiratory muscle strength were measured in the sitting position; VC, MEP, and MIP were expressed as percentages of predicted normal values. Bivariate correlation for BMD and other parameters were calculated with Pearson's coefficient of correlation. *Results:* Total 38 patients of DMD were included in this study. All

patients were not capable of ambulation. Among them 30 patients had osteoporosis (T score < -2.5) and 6 patients satisfied the criteria for osteopenia (-2.49 < T score < -1.0). Analysis revealed that BMD correlated significantly with BMI ($p < 0.001$), PCF and normal predictive value of MIP ($p < 0.05$). Weaker correlation ($p < 0.1$) was found between BMD and normal predictive value of MEP. However, age and normal predictive value of vital capacity did not correlate with BMD. **Conclusion:** There is a significant association between BMI and respiratory muscle strength in spinal bone density of DMD patients.

PA540

Preoperative Inspiratory Muscle Training to Prevent Postoperative Pulmonary Complications in Patients Undergoing Esophageal Resection (PREPARE Study)

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Introduction/Background: Esophageal resection is associated with a high incidence of postoperative pneumonia. Respiratory complications account for almost half of the readmissions to the critical care unit. A preoperative inspiratory muscle training program has shown to prevent postoperative pneumonia and reduce length of hospital stay in patients undergoing cardiac surgery. This randomized and controlled study investigates the effect of a preoperative inspiratory muscle training program on pre- and postoperative respiratory (muscle) function and postoperative outcomes. **Materials/Methods:** The PREPARE study is an international single blind multicenter randomized controlled trial. In total 248 patients undergoing esophageal resection for esophageal cancer will be included. They are randomized to either usual care or usual care with an additional inspiratory muscle training intervention according to a high-intensity protocol. Patients have to complete 30 dynamic inspiratory efforts twice daily for 7 days a week until surgery with a minimum of two weeks. The starting training load will be aimed to be 60% of maximal inspiratory pressure and will be increased based on the rate of perceived exertion. The main study endpoint is the incidence of postoperative pneumonia. Secondary objectives are to evaluate the effect of preoperative inspiratory muscle training on inspiratory muscle function (strength and endurance) and lung function, preoperatively as well as postoperatively. **Results:** Recruitment started in September 2013 and is expected to be completed in December 2015. During the congress in June 2015, data of at around 120 patients will be presented concerning participation rates and feasibility. Furthermore, analyses on the effect of the intervention on pre- and postoperative inspiratory muscle function and on lung function will be discussed. Preliminary analyses showed a significant impact of the intervention on inspiratory muscle strength and endurance. **Conclusion:** The PREPARE study is the first multicenter randomized controlled trial to evaluate the hypothesis that preoperative inspiratory muscle training leads to decreased pulmonary complications in patients undergoing esophageal resection. **Reference:** Valkenet K, et al. Preoperative inspiratory muscle training to prevent postoperative pulmonary complications in patients undergoing esophageal resection (PREPARE study): study protocol for a randomized controlled trial. *Trials*, 2014; 15(1): 144.

PA541

Validity of the Korean Version of the Self-Report Lower-Extremity Lymphedema Screening Questionnaire in Women

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Introduction: “Self-Report Lower-Extremity Lymphedema Screening Questionnaire in Women” (SRLELSQW) developed by Yost et al. is a sensitive and specific tool for detecting clinically relevant lower extremity lymphedema (LEL) among women. It consists of 13 questions concerning the symptoms and signs of LEL. We translated the original version into a Korean version and verified the validity of it. **Methods:** Initially, the authorization from original author of SRLELSQW, Kathleen J. Yost, was acquired. According to the cross-cultural adaptation guidelines, the translation process was divided into 6 stages. (1) Forward translation: Two bilingual translators; one medical doctor and one without medical background translated the original version into Korean. (T1, T2) (2) Synthesis: The two translators combined the results into one by consensus. (T-12) (3) *Back translation:* A native English speaker without medical background translated back T-12 into English. (BT1) (4) Expert committee review: The authors of the original and Korean version and the two translators discussed the consolidation of the final version. (BT1+) (5) *Pretest:* Pretests were conducted on 6 lymphedema patients with BT1+. After completing the questionnaire, patients were interviewed for their understanding of each item. (6) Final proofreading. Internal consistency of the questionnaire was evaluated using Cronbach’s coefficient α . In addition, the findings from each patient’s lymphoscintigraphy were compared to the results from the questionnaire. **Results:** The α coefficient for all the 13 questions was 0.799. All of 8 patients had 5 or higher total score for the questionnaire, of which cutoff score was 5. Seven of eight patients had taken a lymphoscintigraphy, all of them showing positive results for lymphatic dysfunction. **Conclusion:** The Korean version of the SRLELSQW not only showed good internal consistency, but high sensitivity when compared to the lymphoscintigraphy findings. To establish the concurrent validity, the correlation with other similar screening tests or questionnaires need to be confirmed. To verify the reliability, test-retest reproducibility should be assessed further.

PA542

Impact of Resistance Training and Moderate-Intensity Aerobic Exercise on ADP and Inflammatory Factors in Patients with Coronary Artery Disease

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Objective: To observe the elastic band of moderate intensity resistance training and aerobic exercise training on ADP and CRP levels in patients with coronary heart disease before the start of exercise training and at the end of the 1 week, 4 weeks, 8 weeks of exercise training. **Methods:** From Oct. 2012 to Oct. 2013, the patients with coronary heart disease comply with the inclusion criteria, on the basis of drug treatment were randomly divided into two groups, group A and group B. Group A received moderate-intensity aerobic exercise program (three times a week for 30-40 minutes, during 8 weeks) and group B received elastic band resistance training program (three times a week for 40-60 minutes, during 8 weeks). **Results:** The ADP levels of group A and B have no significant change after 1 week exercise training compared with the levels before the start of exercise training, but no difference between two groups. The ADP levels of group A and B increased after 4 weeks and 8 weeks exercise training ($P < 0.05$), but no difference between two groups. The CRP levels of group A and B have no significant change after exercise training compared with the levels before the start of exercise training. No tips between ADP and CRP correlated. **Conclusion:** Four weeks and eight weeks of elastic band resistance training and moderate intensity aerobic exercise training improved the ADP levels in patients with coronary heart disease, but no significant effect on CRP levels; No significant impact between this two methods of exercise training. **Keyword:** Resistance training; Aerobic exercise; In-inflammatory factors; Coronary heart disease.

PA543

Impact of Brisk Walking on IGF-1 and CRP in Patients with Coronary Artery DiseaseN. Zhou¹, *L. Ao²¹The Second Affiliated Hospital of KMU, ²Kunming, CN

Objective: To observe the brisk walking three kilometers in 30 minutes on Insulin-like growth factor-1 (IGF-1) and C-reactive protein (CRP) levels in patients with coronary heart disease at the end of the 2 week, 4 weeks, 9 weeks of aerobic exercise training. **Methods:** Review the patient with coronary heart disease met the inclusion criteria from January 2013 to June 2013, according to the accepted treatment for secondary prevention of coronary heart disease over two weeks, at 4 weeks and 9 weeks, randomly meets this test patients and recommended its return to the hospital, this test corresponds to perfect correlation detection indicators point in time, as a "control group (A)"; Admitted to our department in June 2013 and December 2013 CHD patients met the inclusion criteria as "the observation group (Group B)", given daily 30 minutes of brisk walking three kilometers sports rehabilitation programs. **Results:** The IGF-1 levels of group B after 2 weeks exercise training comparer with group A have no significant change ($P>0.05$); The IGF-1 levels of group B increased after 4 weeks and 9 weeks exercise training comparer with group A ($P<0.05$), but IGF-1 levels of group B between 4 weeks and 9 weeks exercise training have no difference change ($P>0.05$); The CRP levels of group B after 2 weeks, 4 weeks and 9 weeks exercise training comparer with group A have no significant change ($P>0.05$); No tips between ADP and CRP correlated. **Conclusion:** Four weeks and nine weeks of brisk walking three kilometers in 30 minutes exercise training improved the IGF-1 levels in patients with coronary heart disease, but no significant change on IGF-1 levels in group B between 4 weeks and nine weeks exercise training; Brisk walking three kilometers in 30 minutes had no effect on CRP levels, this observation did not show a correlation between IGF-1 levels and CRP levels. **Keyword:** Brisk walking; Aerobic exercise; Coronary heart disease; Inflammatory factors.

PA544

Rehabilitation after Electrical Shock Injuries: a Case Report

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Case Diagnosis: The patient is a male who got injured falling from heights and getting an electric shock. He was treated at Turin's "Città della Salute e della Scienza" Hospital. **Case Description:** The patient had multiple injuries: burns (T.B.S.A. 15%), chest trauma with pneumothorax, multiple rib fractures, left scapula fracture, compound vertebral fractures T9-T10 L1, right fibula fracture, left kidney and spleen contusion, traumatic brain injury (GCS 13 when first assessed), parietal and occipital contusion, ankle and electric current marks to both thigh. Brachial plexus MRI documented tissues infarction with extensive soft tissue injury located in the right axillary region. The patient had external sciatic popliteal nerve functional deficit and limitation of range of left upper limb motion. The diagnostic tests (spinal MRI, EMG and MEP) documented also myelopathy caused by electric shock. **Discussion:** The patient carried out the entire rehabilitation program in our Hospital, through different settings. We monitored and measured the archived progress by using functional assessment scale Barthel and FIM. He began an early rehabilitation program in the intensive care unit and continued during the 30 days at the Rehabilitation Medicine Department. The Clinical evaluation made when he was discharged to home documented: good muscle strength, limited ankle range of motion, cutaneous hypoesthesia in the distribution of the right radial nerve, dysthesias of the feet, normal deep tendon reflexes, bilateral exhausted Achilles clonus. He went from sitting to standing unaided, his gait pattern was spastic-ataxic and he

had difficulty changing directions while walking; for this reason he was using a crutch. Barthel index 100/100, FIM 115/126. Finally the patient got a 8 months outpatient rehabilitation to improve elbow's range of motion, muscle strength and gait abnormalities. After treatment the patient walked without crutch, the gait pattern was improved and he had less difficulty changing direction while walking. Muscle strength and elbow's range of motion were normal. **Conclusions:** This patient had severe and multiple injuries but, thanks to a specific rehabilitation program, he obtained excellent results. Quality assurance in rehabilitation of critically injured patients is possible thanks to early, individual and specific rehabilitation programs and multidisciplinary approach.

PA545

Predictor of Anaerobic Threshold in People with Heart Failure*S. Yamamoto¹, Y. Furukawa², O. Nitta²¹Ukima Central Hospital, Koto, ²Tokyo Metropolitan University, Arakawa, Tokyo, JP

Introduction: It has been demonstrated that higher aerobic capacity leads to decreased mortality. However, little is known about cardiopulmonary responses to exercise onset under the influence of aerobic capacity. Aim of this study was to predict aerobic threshold in people with heart failure using cardiopulmonary responses to exercise onset. **Material and Methods:** 28 male subjects (range: 36-82 years) with heart failure were participated in this study. They had been admitted to hospital for cardiac rehabilitation due to their heart failure. In the study, participants underwent a sub-maximal cardiopulmonary exercise test to determine oxygen uptake at their anaerobic threshold (AT) level, using cycle ergometry. Data for analysis were time constant, the area of under oxygen uptake curve (VO_2AUC) from exercise onset to initial four minutes period on warming up phase, age, body mass index (BMI) and left ventricular ejection fraction (LVEF). The individual effects of cardiopulmonary exercise testing variables (Time constant, VO_2AUC) and participant's characteristics (age, BMI, LVEF) for oxygen uptake at AT were examined separately in a series of univariate analysis. Subsequently, VO_2AUC , BMI, age and LVEF were elected to examine in a multivariate analysis to predict AT. The forward stepwise method was used for the multivariate analysis with entry and removal P-values set at 0.05 and 0.10, respectively. Statistical differences with a P-value <0.05 were considered significant. All analysis was done using IBM SPSS statistics (version 22). **Results:** Mean (SD) age was 63.9 (11.3) years, mean BMI was 24.0 (4.0) kg/m^2 , mean LVEF was 48.8 (17.7)% and VO_2AUC was 9.1 (2.4) ml/kg. However, VO_2AUC was entered separately into the multivariate model (standardized partial regression coefficient 0.572, $P<0.01$, 95% confidence interval; 0.14-0.53) and the coefficient of determination was 0.3 ($P<0.05$) in a multiple regression analysis. **Conclusions:** These results suggested that an easily and safely obtained measurement of physical fitness is related to VO_2AUC from exercise onset to initial four minutes period on warming up phase. Therefore, VO_2AUC from exercise onset to initial four minutes period on warming up phase could be powerful predictor to assess aerobic capacity in people with heart failure.

PA546

Comparison of Cardiopulmonary Fitness in the Perioperative Period of Esophageal Cancer

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Introduction: Many articles to describe an effect and importance of the perioperative rehabilitation are found in esophageal cancer operation, but there are few reports that showed the concrete numerical value about how much postoperative cardiorespiratory fitness decreases. Therefore we compared the data of cardiopulmonary exercise testing (CPX) before and after the esophageal cancer opera-

tion. **Material and Methods:** 23 men (average age 66.7+ 9.0 years old) who suffered from esophageal cancer and introduced perioperative rehabilitation. They were able to undergo CPX before and after an operation. We performed symptom limited exercise test by the ramp mode of 15 watts a minute by the cycle ergometer in preoperative (A) and postoperative (B) and we measured peakVO₂, peak workload and AT (anaerobic threshold) using the metabolic gas analyser. **Results:** We conducted (B) after surgery in an average of 22.7 days, and the mean hospitalization was 27.4 days. peakVO₂ significantly decreased from 21.1 (A) to 16.3 (B) mL/kg/min (p<0.0001), and the rate of decline was 22.5+ 12.2%. Also, peak workload significantly decreased from 96.8+ 19.2 (A) in the same way to 71.4+ 18.0 (B) watt (p<0.0001), and the rate of decline was 25.8+ 14.4%. The AT also significantly decreased from 12.5+ 2.0 (A) similarly to 11.0+ 1.6 (B) mL/kg/min (p=0.004). The change of peakVO₂ (A-B) and the change of the tidal volume showed a positive correlation (r=0.530, p=0.009). **Discussion:** Cardiorespiratory fitness decreased by 22.5% for the esophageal cancer surgery in perioperative period, and decreased in the workload by approximately 25.8%. Exercise tolerance at the discharge was equivalent to 4.6 Mets. This capacity means that ADL did not have any problem, but for a social life and the leisure activities this was not enough. The patients should take regular physical activities such as walking after the discharge in order to improve their fitness levels. Furthermore, as for the decrease of the postoperative respiratory function, it was thought that preoperative breathing instruction and postoperative rehabilitation were important. **Conclusion:** Approximately 20% of cardiorespiratory fitness decreases at the discharge after esophageal cancer surgery, and exercise therapy after the discharge is important similar to perioperative rehabilitation.

PA547

Fahr's Disease: an Incidental Finding in a Case Presenting Due to Hypoparathyroidism

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Case Report: A 65-year-old woman was hospitalized after acute management of intracerebral hemorrhage. Before this cerebrovascular event, she had presented with progressive memory impairment, gait disturbance and depression for past 1 year. The patient's mentality was alert while orientation and memory were impaired. Gait speed and stride length were also decreased. The brain computed tomography demonstrated hemorrhage in right parietal and occipital lobe with calcification in bilateral basal ganglia and cerebellum. Her son was also observed with similar clinical symptoms and radiologic findings of intracerebral calcification. In laboratory investigations, there were low levels of serum calcium (6.6 mg/dL) and ionized calcium (0.66 mmol/L). Thyroid stimulating hormone was normal (2.23 mIU/m) but parathyroid hormone was insufficient (7.61 pg/mL). As a result, it was corresponding with hypoparathyroidism. The levels of magnesium and vitamin D were normal. Then she was finally diagnosed with Fahr's disease and hypoparathyroidism as cause was investigated. She had rehabilitation therapy for gait disturbance and cognitive impairment. She also had medication therapy for hypoparathyroidism. **Discussion:** Fahr's disease is a rare neurologic disorder characterized by symmetric and bilateral intracerebral calcification. It is often inherited in an autosomal dominant manner. In addition it is clinically associated with mental retardation, extra-pyramidal symptoms and affective disorders. There were two reports of subarachnoid and right thalamic hemorrhage in Fahr's disease. However, since this intracerebral hemorrhagic event occurred in the unusual brain sites, we presume that the intracerebral calcification may have more correlation with affecting cerebral vascular abnormality. This is a rare case of Fahr's disease that this brain hemorrhage may be related to the intracerebral calcification and hypoparathyroidism as cause of Fahr's disease was investigated. **Conclusion:** We reported a case of intracranial calcification resulting from hypoparathyroidism with intracranial hemorrhage. Also this case is supposed to familial type. Therefore we recommend

that primary hypoparathyroidism should be ruled out when diagnosing a Fahr's disease.

PA548

A New Activities of Daily Living Measurement Scale at Home in Patients with Pulmonary Disease (P-ADL)

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Background: The patients with pulmonary disease at home strongly desire the way to relieve dyspnea in their medical treatment life. Therefore, it is important to evaluate the situation of dyspnea in their activities of daily living (ADL) accurately. We developed the New Activities of Daily Living Measurement Scale at Home in Patients with Pulmonary Disease (Pulmonary ADL: P-ADL). **Methods:** P-ADL is composed of 9 categories (Eating, Toileting, Bathing, Shampoo, Face washing & tooth brushing, Dressing, Indoor walking, Stairs, Outdoor walking). Each category has 6 items (achievement level, place, speed, level of breathless, volume of oxygen) that are disease-specific to pulmonary disease patients, which are evaluated by five grades (0–4). We investigated ADL of thirty five chronic obstructive pulmonary disease (COPD) patients at home using P-ADL. We divided them into two groups, HOT group (using home oxygen therapy) or non-HOT group (not using home oxygen therapy), and compared their ADL. In addition, we divided the same patients into two groups by the level of COPD classification (Group A: mild and moderate, Group B: severe and very severe), and compared their ADL. **Results:** P-ADL category scores were lower in turn to "Indoor walk", "Outdoors walk", "Bathing", "Shampoo" and "Dressing". All the P-ADL category scores in HOT group were significantly lower than those of non-HOT group. our of 9 the P-ADL category scores in Group B were significantly lower than those of Group A. **Conclusion:** ADL of COPD patients at home was more influenced by the home oxygen therapy than by the level of the COPD classification. It is necessary for us to devise the instruction method of ADL in patients using home oxygen therapy. P-ADL is useful for pulmonary disease patients in their ADL instructions at the time of the comprehensive pulmonary rehabilitation.

PA549

Music Attenuated a Decrease in Parasympathetic Nervous System Activity after Exercise

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Introduction: An imbalance between sympathetic and parasympathetic nervous system activity is involved in a variety of diseases. Music and exercise can both affect autonomic nervous system activity. However, the effects of combination music and exercise on autonomic activity are poorly understood. The aim of this study was to evaluate the effects of exercise while listening to music on autonomic nervous system activity. **Methods:** Twenty-six healthy volunteers participated in four sessions in a random order on four separate days: a sedentary session, a music session, a bicycling session, and a bicycling with music session. Subjects were asked to listen to their favourite music and to exercise on a cycle ergometer. We evaluated autonomic nervous system activity before and after each session by power spectrum analysis of heart rate variability. **Results:** High frequency power (HF), an index of parasympathetic nervous system activity, was significantly increased in the music session, and significantly decreased in the bicycling session. There was no significant difference in HF before and after the bicycling with music session. Additionally, the difference of the average HF value between pre-intervention and post-intervention was significantly higher in the bicycling with music session

compared with the bicycling session. There was no significant difference in the ratio of low frequency power (LF) to HF (L/H), an index of sympathetic nervous system activity, before and after each session. **Conclusion:** These data suggest that music increased parasympathetic nervous system activity and attenuated the decrease in parasympathetic nervous system activity after exercise. Therefore, combination with music and exercise may be an effective approach for preventing fatal cardiac events after exercise.

PA550

Effects of Exercise Training on Renal Function and the Cytochrome P-450 4A Metabolism of Arachidonic Acid in the Kidney of Salt-Sensitive Hypertensive Rats

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Introduction/Background: Previous studies have reported that exercise training (Ex) delayed the progression of renal disorder in some animal models. However, little has been reported on the effects of Ex on renal disorder in salt-sensitive hypertension. Additionally, mechanisms of renoprotective effects of Ex remain unclear. We investigated the effects of Ex on renal function in Dahl salt-sensitive (DS) rats, an experimental model of salt-sensitive hypertension. In DS rats, it is known that a deficiency in the production of 20-hydroxyeicosatetraenoic acid (20-HETE), which is metabolized from arachidonic acid by cytochrome P-450 (CYP) 4A family and inhibits tubular sodium transport and control renal vascular tone and glomerular protein permeability, contributes to progress the hypertension and subsequent renal disorder. Therefore we assessed the effects of Ex on the CYP4A expression in the kidney. **Material and Methods:** Six week-old, male DS rats were divided into four groups: 1) normal salt diet (0.6% NaCl) group (NS, n=10), 2) normal salt diet plus Ex group (NE, n=10), 3) high salt diet (8% NaCl) group (HS, n=11), 4) high salt diet plus Ex group (HS-Ex, n=11). The rats were then treated for 8 weeks. Ex groups underwent moderate exercise with treadmill running (16-20 m/min, 0 grade-incline for 60 min/day, 5 times/week) for eight weeks. **Results:** HS induced severe hypertension, massive proteinuria, renal dysfunction and glomerulosclerosis. Although Ex did not change blood pressure and plasma creatinine levels, Ex significantly improved proteinuria, creatinine clearance and glomerulosclerosis. CYP4A1 and CYP4A2 protein expressions in the outer medulla were significantly lowered by 37% and 48% in the HS group compared with the NS group, and were significantly elevated by 40% and 150% in the HE group compared with the HS group. Although there was no difference in cortical CYP4A2 between the NS and HS groups, it was significantly increased by 35% in the HE group compared with the HS group. **Conclusion:** This study demonstrated that Ex improves HS-induced renal disorder independently of blood pressure in DS rats. The increase in renal CYP4A protein expression may contribute to renoprotective effects of Ex in DS rats.

PA551

Changes in Autonomic Nervous System Activity during Cardiopulmonary Exercise Testing

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Background: Power spectrum analysis of heart rate variability (HRV), which is convenient and noninvasive, is widely used to evaluate autonomic nervous system activity. However, it has been difficult to measure autonomic nervous system activity during exercise accurately using a conventional power spectrum analysis of HRV. The aim of this study was to clarify changes in autonomic nervous system activity during cardiopulmonary exercise testing (CPX), using the MemCalc system which is superior in spectrum analysis. Additionally, we investigated the relationship between autonomic

nervous system activity and anaerobic threshold (AT). **Methods:** Subjects participated were six healthy male volunteers. The subjects performed CPX to exhaustion to determine peak VO_2 and AT. Electrocardiogram was recorded CPX and electrocardiographic R signals were obtained at 1,000 Hz. High-frequency (HF) component (0.15–0.40 Hz), low-frequency (LF) component (0.04–0.15 Hz) and very low-frequency (VLF) component (0–0.04 Hz) were extracted for power spectrum analysis. The HF is an index of parasympathetic nervous activity, and the ratio of LF to HF (L/H), is an index of sympathetic nervous activity. **Results:** Mean values for age, height, weight and body mass index were 28.6 ± 2.5 years, 173.4 ± 4.0 cm, 65.3 ± 7.6 kg and 22.0 ± 2.0 , respectively. Mean values of exercise time, peak VO_2 and VO_2 at AT were 678 ± 66 seconds, 33.2 ± 3.1 ml/kg/min, and 15.8 ± 1.2 ml/kg/min. HF was decreased soon after starting exercise in each case, and HF at AT level was significant lower compared with resting level. HF was increased rapidly after exercise. LF/HF did not change to AT level and tended to increase over AT level. There was a positive correlation between the decreasing rate of HF and AT. **Conclusion:** This study clarified that parasympathetic nervous system activity was decreased caused by incremental exercise and it was significantly lower at AT level compared with resting level. These results suggest that HF may be useful for deciding optimal exercise intensity.

PA552

Temporal Trends and Referral Factors of Inpatient Cardiac Rehabilitation in Patients with Ischemic Heart Disease: a Nationwide Population-based Retrospective Study

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Introduction/Background: Despite the evident benefit of cardiac rehabilitation after patients developed with ischemic heart disease, referral rates have been lower than recommended historically. Using a population-based nationwide database, we described the temporal trends and referral factors of patients with ischemic heart disease whom received inpatient cardiac rehabilitation program in Taiwan. **Material and Methods:** Using the Taiwan National Health Insurance Research Database (NHIRD), people diagnosed as ischemic heart disease and received inpatient cardiac rehabilitation program in Taiwan during 1998-2011 were identified for analysis. **Results:** Total 8,189 patients were identified. Most of them are male (76.52%) in their seventh to eighth decades (42.04%), resident in northern Taiwan (58.63%), and received inpatient cardiac rehabilitation in medical centers (72.88%). The total referral rates were steady increasing during the period, especially significant in 2008-2011. The referral rates were not influenced by comorbidity status of patient, and the distribution of Charlson Comorbidity Index (CCI) Score was relatively dispersed. **Conclusion:** Inpatient cardiac rehabilitation referral rates of patients with ischemic heart disease were steady increasing in Taiwan, although continued to be lower than recommended. The referral rates were differed according to patient age and residency among different hospital levels in Taiwan. Further studies are needed to clarify the reasons for patient exclusion from the benefits of inpatient cardiac rehabilitation.

PA553

Should Vitamin D Levels Be Assessed Routinely on All Patients after Severe Brain Injury?

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Background: Vitamin D deficiency is prevalent among the elderly and is thought to be related to reduced mobility, limited sun exposure and poor dietary intake of vitamin D. It is associated with hip fracture in older stroke survivors and is considered a risk factor for

cardiovascular disease and depression. The prevalence of vitamin D deficiency in younger acquired brain injury (ABI) patients generally, and in those who may be predisposed because of immobility, menopausal osteopenia or anti-epileptic drug treatment, has not been established. Available guidelines relate generally to vitamin D deficient adults rather than ABI patients specifically. **Material and Methods:** Vitamin D repletion in selected ABI patients may provide health benefits therefore an audit was conducted to examine the frequency of vitamin D estimation on a specialist brain injury rehabilitation unit for adults of working age. A retrospective review of hospital records from 338 in-patients admitted between March 2007 and March 2012 was performed. Vitamin D deficiency was defined as a serum level below 30ng/ml (75 nmols/L). **Results:** Vitamin D levels were checked in only 8 of 338 (3%) patients for specific medical reasons. 4 (50%) had levels below 30 ng/ml and replacement therapy was prescribed. **Conclusion:** This audit highlights the need for greater awareness of vitamin D deficiency in younger ABI patients. A routine screening test for vitamin D has been introduced in our unit and investigative practice will be re-examined early in 2015. **References:** Clinical Evidence. BestPractice: Vitamin D deficiency. 19 Nov 2011 Holick MF. Vitamin D deficiency. NEJM 2007 Jul 19;357(3):266-81.

PA554

Controlled Physical Training in Patients with Acute Coronary Syndrome after PCI – Evaluation of Selected Hemodynamic and Biochemical Parameters

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Introduction: Regular physical training through the cardioprotective and vasoprotective beneficial effect on cardiovascular status, and exercise capacity of patients, regardless of age. The method is increasingly used to monitor the hemodynamic status of patients during cardiac rehabilitation, due to non-invasive nature of the test is impedance plethysmography. The aim of the study was to evaluate the effect of controlled physical training on exercise capacity, EF and selected hemodynamic and biochemical parameters in patients with ACS treated PCI. **Material and Methods:** The study group consisted of 89 patients, aged 44 - 79 years after an acute coronary event after PCI. All patients underwent cardiac rehabilitation program. In group I were 2-week cardiac rehabilitation program, in group II 4 weeks. The basis for rehabilitation in both groups accounted for interval training. Group III (n=29) took part in the individually selected training program of lower intensity. In all patients, before and after the training cycle to assess the hemodynamic underwent chest impedance plethysmography. The method allows the testing of eg. CO and SV. Moreover determined level of NT-proBNP and echocardiography and exercise test. **Results:** Upon completion of training, SV, improved in gr I with 84.58 to 87.42; in gr II with 76.87 to 88.59. In gr III value changed from 64.85 to 48.11; similar results were as CO: in gr I, the mean value of 5.72 was reduced to 5.65 in gr II, there was an increase in the value of 5.37 to 6.08. In gr III values changed from 4.8 to 3.86. In all groups physical capacity significantly increased. In all groups showed a significant reduction of NT – proBNP and an increase of EF in gr I and II. In the gr III there was no statistically significant difference. In addition, the demonstrated correlation between the **Results:** NT-proBNP, SV, CO and EF. **Conclusions:** The results indicate that regular physical exercise plays an important role in the comprehensive rehabilitation procedure in patients with ACS. Affecting the biochemical and functional myocardial beneficial effect on the healing process and improve the quality of life of patients, the size of the observed changes conditioned by the nature and duration of the training.

PA555

Impact of the Therapeutic Patient Education for Adhesion of Rehabilitation in Patients with Coronary Artery Disease

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Objective: To observe the impact of the therapeutic patient education for adhesion of rehabilitation in patients with coronary artery disease. **Methods:** From Oct. 2012 to Oct. 2013, the patients with coronary heart disease on the basis of drug treatment were randomly divided into two groups, group A and group B. Group A received the brisk walking three kilometers in 30 minutes 3 days per week and traditional health education of our department, continued 3 months; Group B received the brisk walking three kilometers in 30 minutes 3 days per week and therapeutic patient education, continued 3 months. **Results:** Dropout rate: 52.51% in group A, 20.78% in group B, compared between the two groups, was significantly lower in group B than in group A, there are significant differences (P<0.05); The part of participation in exercise physique ratio: 10.06% in group A, 13.78% in group B, compared between the two groups, no significant difference (P>0.05); The fully participate in exercise physique ratio: 15.43% in group A, 28.52% in group B, compared between the two groups, was significantly higher in group B than in group A, there are significant differences (P<0.05); The cognitive level: 22.09% in group A, 69.89% in group B, compared between the two groups, was significantly higher in group B than in group A, there are significant differences (P<0.05); The logging: 25.41% in group A, 63.78% in group B, compared between the two groups, was significantly higher in group B than in group A, there are significant differences (P<0.05); **Conclusion:** Significant improvement in the treatment of sexual health education effect of coronary heart disease in our hospital routine health education, reducing patient dropout rate, improve the ratio of patients to participate in physical exercise, as well as in patients with the disease itself, cognitive level therapy, sports training, improving patient self-management skills of the disease. **Keyword:** Therapeutic Patient Education; Coronary heart disease; Exercise physique; Adhesion.

PA556

The Figure-8-Method and Jeweler Rings Are Reliable Tools to Assess Upper Limb Lymphedema in Patients with Stroke

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Introduction: Post-stroke lymphedema of the upper limb is often encountered as a complication by patients with hemiparetic stroke. About 10-33% of the stroke survivors will be confronted with this type of lymphedema [1]. A typical presentation of post-stroke lymphedema involves swelling of the fingers, hand and forearm. To assess this type of edema, circumferences measurements can be used. However, most circumference protocols do not measure fingers and hand circumferences. Therefore we evaluated the reliability of the figure-8-method (hand) and jeweler rings (fingers) as tools to assess post-stroke lymphedema. **Material and Methods:** 13 patients (n=26 hands) with stroke were included after they gave their informed consent. Two raters independently performed two series of measurements measuring both hands of all patients. Both raters assessed the figure-8 of the hand as well as the ring diameter of the middle finger and the ring finger twice in a random order. The second series of data were used to determine the inter-rater reliability. The first and second series of data of both raters were used to determine the intrarater reliability. Reliabilities were analysed by means of the Intraclass Correlation Coefficient (ICC). **Results:** Both tools, figure-8 and jeweler rings, provided excellent inter rater as well as intra rater reliable measurements. The ICC's (intra rater) for the jeweler rings are ≥ 0.96 (p<0.005). The ICC's (intra rater) for the figure-8-method are ≥ 0.98 (p<0.005). The ICC's (inter rater) for the jeweler rings are ≥ 0.95 (p<0.005). The ICC's (inter rater) for the figure-8-method are ≥ 0.97 (p<0.005).

Conclusion: The figure-8-method is a reliable measurement tool to assess the circumference of the hand. Additionally, jeweler rings can be used in a reliable manner to assess the circumference of the fingers. In combination, both tools provide a reliable assessment that can be used to monitor post-stroke lymphedema. *Reference:* [1] Gebruers N, Truijen S, Engelborghs S, De Deyn PP. Incidence of upper limb oedema in patients with acute hemiparetic stroke. *Disability and Rehabilitation.* 2011; 33(19-20): 1791-6.

PA557

Effect of Rehabilitation of Blood Cancer

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Purpose: We report the current state of cancer rehabilitation and investigate the effects of new cancer rehabilitation. And the effects of new system adopted before and after in the acute phase hospital is investigated. **Object and Method:** Crowd after patient who prescribed rehabilitation in 2012 after it makes to crowd before patient who prescribed rehabilitation in 2010 and 2011 before facility criterion of cancer rehabilitation is acquired is introduced in cancer rehabilitation, and facility criterion is acquired is introduced in cancer rehabilitation. Assorted traits from clinical record were investigated the points by the functional independence level evaluation, rehabilitation instruction numbers, the frequency of multi occupational category conference and home return rate. **Results:** An increase of the rehabilitation number and a shortening the duration of hospital stays, shortening on the rehabilitation instruction day, and the conference frequency were admitted compared with before the facility criterion was acquired. It was possible to intervene before the activity of daily life decreased because of shortening on the rehabilitation instruction day and the disuse syndrome was able to be prevented. **Conclusions:** It becomes clearer result that by ward charge cancer rehabilitation, there is an advantage on not only the patient but also the medical treatment person side, and is thought that it is an effect of ward charge cancer rehabilitation.

PA558

Late Radiation-induced Lumbosacral Plexopathy – a Clinical Case and a Review From Literature

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Introduction: Radiation-induced lumbosacral plexopathy (RILP) is a rare condition (incidence of 0.3 to 1.3%) after abdominal irradiation. Symptoms can begin from first months to more to 20 years after treatment and usually progress with variable velocity. Aim of our work is to present a clinical case and a review from literature related to this disorder. **Material and Methods:** 55 years old female patient was follow in Physical medicine and rehabilitation (PM&R) appointment because of persistent sensitivity complaints of lower limbs in last 2 years and minor left lower limb weakness in last year. She had history of chemotherapy and radiotherapy for ovarian cancer treatment 31 years before. Because of comorbidities she had a faint that results in a distal tibial and fibular fracture which has motivated the hospitalization during a long period in our PMR department. During this period she had been under a rehabilitation protocol but bilateral asymmetrical progressive lower limb weakness was noted. Complementary examination was performed. A review from literature and research based on Medline and Cochrane databases were done. **Results:** RILP has a progressive course but a rehabilitation plan may produce a crucial impact on prolonging autonomy. In this case mobilization, muscular strengthening and knee and ankle orthosis were vital to achieve an orthostatic balance and short distance walk. Complementary examination was crucial to exclude other diagnosis and electromyography did not show myokymia that are common in the evolu-

tion of this disease. From 108 selected references of our research for the term radiation plexopathy, majority were related to superior limb. Time of appearance of this case is also far ahead the usual. Studies with different radiation methodologies with lower doses seem to reduce the incidence. **Conclusion:** A lot of complications can be found after radiation treatment. Radiation-induced plexopathy has been increasingly described and clinicians should be alert to this diagnose and to atypical presentations. PM&R may had an important role on diagnose and autonomy maintenance of these patients. Further studies with larger samples are essentials to achieve the best management approach.

PA559

Nicotine as an Indicator of Tobacco Exposure and Its Effect on Oral Health

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Background: Tobacco use is termed as modern global epidemic. Nicotine is considered the most pharmacologically active component in tobacco. Thus the present study is undertaken to assess and correlate the periodontal status of 35-44 year old male tobacco users with their nicotine concentration in Blood and Urine. **Objectives:** The objectives of this study were to (a) Assess the periodontal status of 35-44 year old tobacco users using Community Periodontal Index. (b) Estimation of Nicotine levels in Blood and Urine by Spectrophotometry. (c) Correlation between Nicotine levels in the Blood and Urine samples of the subjects and their periodontal status. **Methods:** A cross sectional institution based study was conducted to assess the periodontal status of different tobacco users and the nicotine concentration in their blood and urine. The study instrument consisted of a questionnaire for recording information on tobacco use. The clinical data was recorded using Community Periodontal Index. The concentration of nicotine in blood and urine was estimated by Spectrophotometry. Karl Pearson Correlation tests were used and data was analysed using SPSS -17 software. **Results:** In this study of 150 male subjects, the findings showed tobacco users with the highest prevalence of periodontal disease. When blood and urine nicotine levels were compared with various forms of tobacco users, the nicotine levels was maximum in beedi smokers and minimum in cigarette smokers. However, there was no significant correlation when periodontal status was correlated with nicotine levels in blood and urine ($p > 0.0005$). **Conclusion:** The findings suggested a marked association between tobacco use and prevalence of periodontal disease. The present study showed that blood and urine nicotine level is increased in various tobacco users compared to non-tobacco users. The nicotine levels in blood and urine may be considered as good indicators to assess the exposure to tobacco in our population.

PA560

Knowledge and Attitude towards Vaccine Trial Concepts among Youth of Mangalore City

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Background: AIDS vaccine is seen as the ultimate prevention tool that will complement the existing prevention strategies in place. Patients participate in HIV vaccine trials with hope that developing a safe and effective AIDS vaccine is possible. To begin to understand adolescent attitudes to these complex issues, and inform our future work with adolescents in HIV vaccine trials, we undertook a formative study examining attitudes towards such trials, potential motivating factors and hypothetical willingness to participate, among youth. **Methods:** A self-administered, facilitated questionnaire was administered to 277 students in pre university colleges, Mangalore, India from August 2012 to February 2013. The questionnaire explored general HIV knowledge, perception of adolescent risk, knowledge of vaccine concepts, willingness to

participate in future vaccine trials, perceived personal and social harms and benefits associated with participation as well as barriers and facilitators to participating in future HIV vaccine trials. **Results:** 277 college-going youth provided consent to participate, and if under 18, we also obtained written consent from a parent. Of the 241 participants who responded to the question on HIV testing, 10% indicated that they have tested for HIV. Of The majority (57%) of participants believed that parents should give permission for their child's HIV test while most of the participants (84%) believed that parents should know the HIV status of their child. **Conclusions:** The youth report high degrees of willingness to participate in HIV vaccine trials. This may be related to the high levels of adolescent HIV risk perception. The spectre of HIV infection looms regardless of age group, and adolescents are no exception. Indeed, public health practice would seem to say that effective vaccination of this subgroup above all would result in the greatest reduction in new infections.

PA561

Non-Surgical Treatment of Pectus Carinatum Deformity

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Introduction: Pectus carinatum (PC) is a chest deformity that involves the protrusion of the anterior chest wall, being the second most common congenital deformity of the thoracic wall, with an incidence of 1: 2,500 live births. PC can be present at birth, although it can also occur during adolescence, emerging suddenly during the growth spurt at puberty, causing aesthetic concerns. Until recently, the mainstay of treatment was surgical remodeling of the deformed thoracic wall. However, recent evidence suggests that conservative measures, as thoracic wall orthoses, may be an effective therapy, with improvement of satisfaction and life's quality of the patients. The aim of this work is to perform a review about PC deformity and its conservative treatment with the purpose of developing a rehabilitation protocol in our department. **Material and Methods:** A review of literature published between 2000 and 2014 was conducted in Pubmed- Medline, Scielo and PEDro databases. Other relevant literature was consulted. The keywords pectus carinatum, orthoses, chest wall deformities and rehabilitation were used. A protocol was designed. **Results:** Currently, we found a considerable number of studies about PC and its non-surgical treatment. Surgical repair of PC has been the predominant treatment for over 50 years since its first introduction. However, since the experience of the utilization of thoracic wall orthoses, the non-surgical treatment has been considered the primary option for selected patients. Most motivated patients, especially those younger than 18 years with malleable chest walls, benefit from thoracic wall orthoses and, currently this is generally the first line of therapy, with described success rates of 65-80% in the literature. The use of thoracic wall orthoses in combination with an exercise program (aerobic exercises, postural changes) may improve or completely correct the problem. **Conclusion:** Patients with PC are at risk for a disturbed body image and reduced quality of life. Recent advances in patient evaluation and management, including the development of non-surgical protocols (orthoses and exercises program), have improved the care of patients with this condition. The implementation of a protocol and compliance to treatment is the key to a correct and successful management of PC's patients.

PA562

The Effect on Endothelial Dysfunction of Indoor Rowing Exercise for ESRD Patient

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Introduction/Background: Many studies have shown the importance of exercise or regular physical activity in preventing muscle

atrophy in end-stage renal disease (ESRD) patients. Rowing exercise is whole body strength-endurance type of sports. The aim of this study is to evaluate the effect of rowing exercise in ESRD patients' body composition, cardiopulmonary function and endothelial function. **Material and Methods:** 8 hemodialysis patients were recruited. 4 subjects completed 12-weeks rowing exercise training. Subjects exercised 3 times a week, using indoor rowing machine (Concept2 Model E.). The exercise session included a 5-minute warm-up, a 10-minute rowing exercise, and a 5-minute cooling-down period. The levels of biochemical markers showing endothelial function and serum lab data were compared before and after exercise to investigate the effect of rowing exercise. Dual-energy X-ray absorptiometry and cardiopulmonary exercise test were done before and after 12-weeks rowing exercise training for investigating the intensity of rowing exercise. During exercise, a medical technician had monitored subjects' blood pressure, heart rate and EKG rhythm and controlled exercise intensity. (RPE11-13) **Results:** Each subjects' serum protein was 5.6, 5.9, 5.8 and 6.1 mg/dl and changed to 5.9, 6.2, 6.1 and 6.5 mg/dl after exercise. Serum levels of hemoglobin, albumin, cholesterol, TG, HDL and LDL were changed but there were no consistency. Also, the changes of VO₂ Max and total body fat percentile were not consistently. Their BMI were not changed. The levels of serum TNF- α were changed to 4.59, 5.99, 4.29 and 7.12 pg/ml from 6.89, 8.59, 4.89 and 8.78 pg/ml. **Conclusion:** The levels of serum protein and TNF- α were decreased after 12-weeks rowing exercise, even though there were no consistent change in the results of DEXA and CPET. So we thought that low intensity rowing exercise might affect positively on endothelial function. Thus, for ESRD patients, low intensity rowing exercise is recommendable safe exercise to lower the cardiovascular risk.

PA563

Monoarticular Hip Involvement in Pseudogout

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Case Diagnosis: A case of pseudogout presenting with acute monoarticular hip involvement. **Case Description:** A 64-year-old male patient admitted with right hip pain. He had pain for 2 months but pain aggravated last two weeks inhibiting his night sleep. The patient had no previous joint involvement of this severity before. His physical examination revealed limitation of right hip movement on every direction. Range of motion was painless and unrestricted on left hip. No signs of arthritis were present at other joints. Laboratory findings were in normal range. Hip magnetic resonance imaging (MRI) revealed effusion at right hip joint and cystic collections in the periarticular soft tissue were in favor of focal abscess. On musculoskeletal ultrasonography there was periarticular cystic collections associated with right hip joint. Ultrasonography guided cyst aspiration was performed. Triamcinolone acetate (40 mg) was injected into lesion after aspiration. Direct examination of the fluid revealed birefringent crystals under polarized light microscopy. The patient was diagnosed as pseudogout according to synovial fluid analysis. **Discussion:** Pseudogout may present with many complex clinical phenotypes. Involvement of hip joint in pseudogout is rare and it may be provoked by minor trauma, current medical or surgical conditions. There are reported cases of monoarticular hip involvement in pseudogout. Hamilton reported a case with longstanding hip pain which was diagnosed as pseudogout after arthroscopy. Benan presented an HIV infected case with hip pain who was diagnosed as pseudogout. Presenting symptoms of this patient were matching with septic arthritis. Up to our knowledge this is the first case of pseudogout presenting as soft tissue abscess on MRI. In our case we diagnosed and treated the patient conservatively and successfully after periarticular cyst was aspirated under ultrasonography guidance. If MRI findings were taken into account unnecessary antibiotic use and/or surgical abscess drainage could have been applied. **Conclusion:** Monoarticular hip involvement is rare in pseudogout and may present with

septic arthritis or soft tissue abscess symptoms. Musculoskeletal ultrasonography may be efficient in differential diagnosis and micro invasive treatment. Pseudogout should always be kept in mind in elderly patients presenting with monoarticular symptoms.

PA564

The Effects of Early Rehabilitation Therapy on Severe Neuropathy Patients in Intensive Rehabilitation and Care Unit

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Introduction: It is important for severe neuropathy patients to receive early rehabilitation therapy. This study aimed to observe the effects of early rehabilitation therapy on severe neuropathy patients who were admitted to intensive rehabilitation and care unit (IRCU). **Material and Methods:** 40 cases including 21 cases with stroke and 19 cases with TBI were collected in this study. FMA and NIHSS were used to evaluate the stroke patients; GCS and MMSE used for TBI patients. The complications of severe neuropathy was also recorded. **Results:** The early rehabilitation therapy could improve the FMA and NIHSS of stroke patients. The GCS and MMSE were also increased significantly. The incidence of complications was lower. **Conclusions:** It is necessary to establish a IRCU for severe neuropathy patients to receive early rehabilitation therapy. Early rehabilitation therapy is vital to improve the function of severe neuropathy patients.

PA565

Camptocormia: a Case Report

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Case Diagnosis: We describe the case of a male patient who presented with gradually progressive postural disorder and back pain, subsequently diagnosed with camptocormia. **Case Description:** A 54-year-old male patient was admitted to our clinic with a complaint of back pain. He reported that in the last two years, he had found it progressively more difficult to maintain an erect orthostatic posture. On examination he had limited extension of the trunk at 60 degrees. He was able to ambulate safely and independently. Neurological examination was unremarkable. Laboratory analysis gave results within normal ranges except for vitamin D level of 7.6 ng/mL. In order to exclude an axial myopathic disease, an electrophysiological study of the paraspinal muscles were performed and revealed no evidence of myopathy. He was evaluated by neurologist and psychiatrist in terms of possible etiologies but they did not detect a neurological and psychiatric pathology. Cranial magnetic resonance imaging (MRI) was reported as normal. Radiological analysis of the spine by MRI revealed disc protrusions at C5-C6 and T11-T12 levels as well as paraspinal muscle atrophy. A localized muscle biopsy was normal. 30 sessions of electrotherapy and exercise program were applied to his paraspinal region. Back extension decreased to 30 degrees from 60 degrees. He declared that his complaint of pain was decreased. He had reached the erect posture after the usage of Jewett hyperextension orthosis brace. In his one year follow-up, we observed that erect posture was maintained and he had active extension of trunk at 40 degrees. **Discussion:** Camptocormia or "bent spine syndrome" is an acquired postural impairment, disabling, characterized by flexion of the thoracolumbar spine. The development of this condition is related to several disorders including organic, psychiatric, myopathic, malignant and drug related disorders or idiopathic. **Conclusions:** Due to variety of secondary causes of camptocormia, it requires careful assessment. In their treatment, conservative treatment methods should be used primarily after exclusion of secondary causes of the disease. Exercise and orthotics should be the first choice. In our physiatry

practice, we have to keep in mind this disease in their differential diagnosis of the patients who admitted to our clinics with postural disorder.

PA566

Cardiovascular Collapse after Vitamin K IV Injection in Stroke Patient

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Introduction: In the case of a Prothrombin time (PT) prolongation, there exists risk of bleeding and Vitamin K is administered to compensate for this. Yet, the side effects resulting from Vitamin K administration should be considered and cardiopulmonary complications and anaphylactic shock were reported as severe side effects. **Material and Methods:** A 71-year-old female patient was in hospital treatment for aphasia, dysarthria due to left middle cerebral artery territory infarction and acute kidney injury. While receiving coumadin therapy at usual therapeutic dose, a sudden elevation of PT/INR to 54.3 sec/5.13 was reported. Consequently, Vitamin K 10 mg was injected intravenously over a 5-minute period. One minute after the injection, the patient became pale with her blood pressure of 154/115 mmHg and heart rate of 69 beats/minute were observed. After two minutes, blood pressure and heart rate were checked to be 83/63 mmHg and 38 beats/minute respectively and then shock management was started. After defibrillating twice during the V-fib, CPR was carried out for 90 minutes but the patient was not resuscitated and expired. **Results:** Side effects of Vitamin K IV administration is reported in the foreign literature, and in the very rare cases, the collapse of the cardiovascular system due to anaphylactic reactions have been reported as well. Oral administration of Vitamin K is reported to be slow in showing its effect but reaches similar effect consequently. Moreover, complications such as anaphylaxis and collapse of the cardiovascular system was not definitely reported after oral administration. Therefore, studies on the usage that takes into account the stability and absorption of PO usage should be accomplished in the future. **Conclusions:** PT prolongation occasionally occurs in patients undergoing anticoagulant therapy, and Vitamin K could be injected intravenously to prevent the complications. We are trying to report a case of collapse of the cardiovascular system as a result of anaphylaxis reactions due to slow IV injection of Vitamin K, as well as related literature review.

PA567

Development of the Range of Movement in the Shoulder Joint Following Breast Mastectomy and Tumorectomy

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Introduction: Within the scope of our study women following breast operations were monitored before and after the operation, which concerned either a mastectomy (ABL group) or tumorectomy (TUM group). **Methods:** Twenty women participated in each of the monitored groups. One of the tasks was to analyse changes in the range of movement of the shoulder joint in the direction of abduction and lateral rotation. Two analytical methods were used to assess the difference between the groups: the time series approach and the survival analysis method. **Results:** Within the time series approach, the regression models were used to calculate estimates of the period after which the patients regained the pre-operative range of movement. In the case of abduction the TUM group would regain a 90° range of movement 14 months after the operation, while the ABL group would regain this range of movement 46 months following the operation. In the case of lateral rotation the TUM group would regain an 85° range of movement 7 months after the operation, while the ABL group would regain this range of movement 11 months after the operation. The Cox regression

model of proportional risk was used to compare survival function in both groups. Statistically significant differences between both groups (ABL and TUM) were demonstrated in the direction of abduction and lateral rotation on the basis of the p-values (both are less than 0.001). On the basis of the estimates we can state that, in the case of abduction, there is an approximately 6-times greater chance of regaining a range of movement on the level of 70° during the post-operative period in the TUM group than in the ABL group; in the case of lateral rotation this chance was nearly 4-times greater. **Conclusions:** Both statistical approaches were successfully used to model post-operative development and, in the case of survival analysis, also to assess the difference in development between both groups of patients: The group of patients undergoing a tumorectomy demonstrated statistically significant faster post-operative restoration of the range of movement to the pre-determined level.

PA568

UTIs and Antimicrobial Resistance in a Rehabilitation Center

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Introduction: Clinicians have tended to underestimate the clinical significance of urinary tract infections (UTIs) despite their frequency, cost, morbidity, and emerged management problems. These infections often hinder and delay the implementation of rehabilitation in patients. **Material and Methods:** The study is a retrospective cohort study and includes records of rehabilitation inpatients being treated in a time period between 1/1/2014 and 31/10/2014. The diagnosis was made by urinalysis positive for UTI accompanied by symptoms of high temperature (>38°) and dysuria. Urine Cultures negative for pathogens or asymptomatic patients were excluded. **Results:** There were isolated 389 urine cultures with 389 pathogen strains. The frequency of isolated pathogens was: *Escherichia coli* 184/389 (47.30%); *Klebsiella pneumoniae* 70/389 (17.99%); *Proteus mirabilis* 62/389 ((15.93); *Pseudomonas aeruginosa* 55/389 (14.13%); *Cocci* 13/389 (3.34%) and *Acinetobacter baumannii* 5/389 (1.28%). *Klebsiella pneumoniae* exhibited the greatest resistance to the semisynthetic penicillins, to the 2nd generation cephalosporins (78.93% and 87.15% respectively) and to quinolones (66.29%), followed by *E. coli* (36.69%, 87.15% respectively) and 21, 68% for quinolones. The sensitivity of the bacteria was good to excellent in the other groups of antibiotics. **Conclusion:** Our results demonstrate the significant prevalence of high resistance of bacteria related with UTIs in our center. This large resistance is attributed to the fact that patients are coming from many different hospitals, from ICUs, have urethral catheters and were treated in the past with antibiotics.

PA569

The Role of Physical and Rehabilitation Medicine in a Rare Case of Mounier-Kuhn Syndrome: a Case Report

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Case Diagnosis: Mounier-Kuhn Syndrome, also known as tracheo-bronchomegaly is a rare syndrome characterized by a significant increase in the diameter of the trachea and main bronchi. These changes result in repeated respiratory tract infections and bronchiectasis that in severe cases can lead to severe respiratory failure. The diagnosis requires confirmation by computed tomography and bronchoscopy, as well as pulmonary function testing. **Case Description:** We present a case report of a 65 year old male, caucasian diagnosed with Mounier-Kuhn Syndrome since the age of 59 years with a history of recurrent respiratory infections. He has been followed in a pulmonology consult and was referred to a Physical Medicine and Rehabilitation (PMR) consult for respiratory rehabili-

tation. **Discussion:** Mounier-Kuhn syndrome presents with varied clinical manifestations. It is characterized by the increased size of the trachea (>25 mm diameter) and of the main bronchi. Chronic productive cough and recurrent respiratory infections are the most common clinical presentations. Treatment is conservative and it implies chest physiotherapy and respiratory rehabilitation with complementary antibiotic therapy as needed. Tracheal stenting is reserved for the most severe cases. **Conclusion:** Physical and Rehabilitation Medicine has a preponderant role in the treatment of patients with Mounier-Kuhn disease through respiratory rehabilitation and chest physiotherapy. The main goal of rehabilitation is to maintain and if possible to restore respiratory function and thereby reduce the number of hospitalizations and associated morbidity. In Mounier-Kuhn's Syndrome clearance techniques are particularly important to promote the elimination of bronchial secretions through various maneuvers: directed cough, autogenic drainage, chest percussion and vibration and ventilation exercises. Reeducation of the expiratory muscles including the diaphragm and the abdominal transversus muscle are important to improve vital capacity.

PA570

People with Learning and Multiple Disabilities in the Acute In-patient Care – Selected Results of a Qualitative-Explorative Study

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Background: National and international publications indicate a higher importance of people with disabilities in health and nursing care. From the international literature it can be seen that for this target group the hospital care is to be regarded in many ways as deficient. Health professions do not very often interact not with the people concerned, show little understanding of the disabilities and nursing needs. In many cases, nursing and therapeutic requirements are not met. **Aim of the study:** This study intends to research experiences of employees of ambulatory and stationary residential facilities for people with mental and multiple disabilities and family members concerning their experiences in the health and nursing care of the target group. **Methods:** A qualitative research design (Grounded Theory) was applied. As data collection tool expert interviews were used. The literature search shows that from a research-methodological and ethical view the questioning of people with mental and multiple disabilities is difficult up to now. To date, no adequate questioning instrument for people with mental and multiple disabilities has been still developed. For this reason, proxy-interviews of employees of ambulatory and stationary residential facilities for people with mental and multiple disabilities and family members were carried out. **Results:** 21 interviews could be evaluated with the software programme MAXQDA. The results show above all that in the perception and from the experience of the interviewees mainly a „lack of“ exists in the care of the target group, e.g., in time, staff, resources, qualification, cooperation and so forth. Employees of ambulatory and stationary residential facilities for people with mental and multiple disabilities and family members must undertake to a high degree the care in hospitals, so that nursing and health measurements are performed.

PA571

Effects of Aerobic Training and Electrical Stimulation to Skeletal Muscles during Hemodialysis for Patients with End-Stage Renal Disease

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Background: Hemodialysis patients show reduced physical function and greater risk of arteriosclerosis because of hypertension, metabolic disturbances, and vascular calcification. Meanwhile, exercise training in hemodialysis patients improves fitness, physical function, quality of life, and markers of cardiovascular disease such as arterial stiffness. This study aimed to determine whether aerobic training and electrical stimulation to skeletal muscles for 12 weeks could improve physical function and dialysis efficacy in patients with end-stage renal disease (ESRD). **Material and Methods:** This was a controlled clinical trial. A total of 26 ESRD patients (16 males, 10 females; age: 72.5±9.1 years) were randomized to receive 12 weeks of aerobic training exercise during hemodialysis session (Ex-group: n=11), electrical stimulation to the lower limbs (ES-group: n=5), or no specific intervention (Cont-group: n=10). The Borg scale was used to control the intensity of training. At baseline and study completion, the primary outcome measures were grip strength, quad muscle torque, workout time, activities, dialysis efficacy, HDL-cholesterol, LDL-cholesterol, C-reactive protein (CRP), and blood pressure on the morning of the dialysis day. **Results:** In the Ex-group, hand grip, quad torque, and workout time increased significantly (P<0.05). Dialysis efficacy, HDL-cholesterol, LDL-cholesterol, CRP, and blood pressure on the morning of the dialysis day also improved significantly (P<0.05). These effects were not observed in the Cont-group. Meanwhile, in the ES-group, quad muscle torque and dialysis efficacy increased significantly (P<0.05), while the other parameters did not change significantly. **Conclusions:** In this study, the safety and efficacy of training and electrical stimulation during hemodialysis were confirmed without sudden drop of blood pressure or any other side effects. Therefore, training during hemodialysis session for 12 weeks might improve physical function with specific whole-body effects as well as local effects in ESRD patients. **References:** 1) Johansen KL, Painter P: Exercise in individuals with CKD. *Am J Kidney Dis.* 2012; 59: 126-134. 2) Dungey M, Hull KL, Smith AC, Burton JO, Bishop NC: Inflammatory factors and exercise in chronic kidney disease. *Int J Endocrinol.* 2013; 2013: 569831.

PA572

Effects of Ergometer Exercise in an Upright or Supine Position on Autonomic Nervous Activity in Patients with Parkinson's Disease

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Introduction: Autonomic disturbances are common nonmotor symptoms in patients with Parkinson's disease (PD). Orthostatic hypotension and supine hypertension are inter-related in these patients. 1 Previous studies have shown that therapeutic exercise with a lower-limb ergometer and some forms of physiotherapy can effectively inhibit sympathetic activity. However, the differences in the effects of ergometer exercise in a sitting versus supine position on autonomic nervous activity remain unclear. This study was performed to compare the short-term effects of ergometer exercise in an upright versus supine position. **Material and Methods:** Two Japanese men with PD (65 and 58 years of age, respectively; Hoehn and Yahr stage 3) performed three sessions of ergometer exercise each day. The first session involved 15 minutes of conventional training according to the European Guidelines for Physiotherapy in Parkinson's Disease 1 (con-s), the second session involved 15 minutes of ergometer exercise in an upright position (sitting-s), and the third session involved 15 minutes of ergometer exercise in a supine position (supine-s). The Borg scale was used to control the training intensity. We measured the short-term heart rate variability using the R-R interval to evaluate autonomic nervous activity before and after each session. **Results:** The autonomic nervous activity in these two patients with PD was lower than that in normal adults of the same age. 2 The parasympathetic activity was higher after con-s and supine-s, but

not after sitting-s. The sympathetic activity was lower after con-s and supine-s, but not after sitting-s. Orthostatic hypotension improved after con-s and supine-s. **Conclusions:** These findings suggest that both conventional exercise and exercise with a lower-limb ergometer effectively improve autonomic nervous system activity. However, the effect of each type of exercise on improvement in autonomic nervous activity depends on the patient's posture. **References:** 1) Horstink M, et al. European Federation of Neurological S, Movement Disorder Society-European S: Review of the therapeutic management of Parkinson's disease. *Eur J Neurol.* 2006; 13: 1186-1202. 2) Zipes DP: Heart-brain interactions in cardiac arrhythmias: role of the autonomic nervous system. *Cleve Clin J Med.* 2008; 75 Suppl 2: S94-96.

PA573

Primary Sjögren's Syndrome Presenting as Osteomalacia

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Introduction: Sjögren's syndrome (SjS) is an autoimmune disorder involving exocrine glands. The Renal dysfunction is dominated by Tubulointerstitial nephritis. A renal tubular acidosis type 1 is the usual pattern. Rarely, the secondary renal tubular acidosis to the SjS can be revealed by an osteomalacia. **Case Report:** A 47-year-old woman, complained from bilateral thigh pain for 1 year, which followed a limitation of her walking ability. Her march was waddling. She had a motor deficit of the pelvic belt. There was no joint pain or evidence of arthritis. Musculoskeletal radiography were normal. An isotope bone scan showed increased uptake at the ribs, on the left femoral neck and in the pubic rami. The MRI showed a fissure on the left femoral neck. Laboratory tests showed severe inflammation. Decreases were found in urinary and serum calcium, suggesting the diagnosis of osteomalacia. Serum alkaline phosphatase was normal and parathyroid hormone was 77 mmol/l. Serum electrolyte assays showed metabolic acidosis with low potassium, however, urinary PH was inappropriate, confirming the diagnosis of renal tubular acidosis. Besides, proteins were found in the urine and renal function was satisfactory. Findings were negative from urine cytology and microbiology. The lip salivary gland biopsy revealed Chisholm stage 3 lesions. Antinuclear antibodies were positive and regarding the typing, only Anti-SSA and anti-SSB were positive. Rheumatoid factor was well positive. A renal biopsy showed chronic tubulointerstitial nephritis with an important lymphocyte infiltration. The survey in immunofluorescence was negative. An ophthalmological examination revealed diminished tear secretion by the Schirmer test. Thus the diagnosis was osteomalacia caused by renal tubular acidosis complicating tubulointerstitial nephritis as part of Sjögren's syndrome. A corticosteroid (0.5 mg/kg), vitamin D, and calcium supplements were given. A month later, the clinical features were improved. The highdose of both, corticosteroid and vitamin D, was maintained until the normalization of the laboratory test. **Conclusion:** In spite of the rare cases of osteomalacia revealing SjS, this auto-immune disease must appear in the aetiologies osteomalacia list. Conversely, in patients with SjS, early investigation and treatment of renal tubular dysfunction may prevent future complications, such as osteomalacia.

PA574

Psoriatic Arthritis in the Tunisian Center

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Introduction: Psoriatic arthritis (PA) belongs to the group of spondyloarthritides. The objective of our work was to identify the epidemiological, clinical, paraclinical, therapeutic and progressive PA in the region of Tunisian center. **Methods:** A retrospective study including 51 cases of patients collected in the rheumatology department of the hospital Farhat Hached Sousse in Tunisia between

1990 and 2011. The diagnosis of PA was selected according to the criteria of CASPAR. **Results:** Our study included 51 patients with a mean age of 45 years (15-76). The average age of onset of psoriasis was 33 years and the joint manifestations in 36 years. Five of our patients had a family history of PA. The average time to diagnosis was 4 years. The initial involvement was peripheral in 37.8% of cases, axial in 5.4% of cases and mixed in 56.7% of cases. The joint most commonly affected was the ankle (75.6%) followed by the MCP (72.9%), wrist (70.2%), PPIs (64.2%) and IPD (40.5%). Achieving the sacroiliac was present in 10 patients with bilateral in 8 patients. Talagia were noted in 11 cases. Extra articular manifestations were rare in such restrictive pulmonary disease in 6 patients, renal failure in 2 patients, and aortic insufficiency in one patient. The radiographs were normal in 10.8% of cases. Radiological abnormalities most frequently encountered were: erosive arthritis of the IPP (37.8%), arthritis of the metatarsophalangeal (18.9%), syndesmophytes (27%) and a square set of vertebrae (19%). A biological inflammatory syndrome was noted in 48.6% of cases. HLA B27 was found in one patient. Received treatments were: steroidal anti inflammatory (81%), the low-dose corticosteroids (67%) and solumedrol bolus (2.7%). Background therapy was initiated in 32 patients: Methotrexate in all cases and was associated with the Salazopyrine in 24.2% of cases. Anti TNF were administered to 10 patients: etanercept (6 cases), infliximab (2 cases) and adalimumab (2 cases). **Conclusion:** The clinical presentation of RP is extremely variable since axial joint involvement and peripherals may exist separately, sequentially or in combination. The treatment includes symptomatic and DMARDs including anti-TNF for the most severe forms.

PA575

Polymyalgia Arthritis: Study of 21 Cases

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Introduction: Polymyalgia rheumatica (PMR) is characterized by inflammatory pain of the shoulder girdle and/or pelvic girdle which occur in patients over 50 years. The aim of our study was to report the clinical and therapeutic features of the PMR. **Methods:** A retrospective study conducted in the rheumatology department of Farhat Hached hospital in Sousse, interesting 21 cases of PMR patients between 2009 and 2013, according to the criteria of Bird. **Result:** 21 patients including 17 women and 4 men with a mean age of 72 years. The disease had a sudden onset in 2 cases. Inflammatory pain in the shoulder girdle was present in all patients, pelvic in 57% of cases and bilateral in 42.8% of cases. Non-erosive arthritis involving the wrists and hands was present in 23% of cases. These peripheral events were contemporaneous with the achievement of belts in 69% of cases. Spinal pain were noted in 71% of cases (60% cervical spine). General symptoms were reported in 12 patients, type of fatigue (4 patients), weight loss (5 patients) and fever (3 patients). Myalgia was present in 9 patients. The temporal headaches were noted in 7 patients, lower temporal pulse in 7 patients, jaw claudication in 4 patients, 3 patients blurred vision and hyperesthesia of the scalp in 2 patients. A biological inflammatory syndrome was present in 20 patients with anicteric cholestasis in 2 cases. There were no immunological abnormalities. Muscle enzymes were normal. A temporal artery biopsy was made in 12 patients. Horton's disease was associated with PPR in 4 cases (19%). All patients received corticosteroid therapy with a mean dose of 20 mg/d of prednisone, two patients had local corticosteroid injections and two underwent a rehabilitation of the shoulder and pelvic girdles. Biological and clinical improvement was noted in all patients with no recurrence at the degression of corticosteroids. No underlying neoplasia was observed. **Conclusion:** The diagnosis of PMR is sometimes difficult because the differential diagnoses are numerous and sometimes urgent. It may be the initial manifestation of giant cell arteritis or be an input in other diseases, rheumatic or not.

PA576

Efficacy of Infliximab in Spondyloarthropathy

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Introduction: The Infliximab, TNF antagonist, was used for the treatment of spondyloarthritis because of its effects on the articular and gastrointestinal symptoms of Crohn's disease and high levels of TNF observed in the serum and the sacroiliac of patients with spondyloarthritis. The objective of our study is to evaluate the efficacy of infliximab for the treatment of spondyloarthritis and the associated factor to the response to anti-TNF treatment. **Materials and Methods:** Retrospective study, including all the patients hospitalized in a Rheumatology department for spondyloarthritis and given Infliximab. **Results:** 7 patients, with an average age of 30 and extremes ranging from 17 to 58 years. Six patients were male. The diagnosis of ankylosing spondylitis (AS) was kept in 5 patients, 2 psoriatic arthritis and 1 Crohn's disease. The duration of disease was 5.7 years. Involvement of the hip was noted in 6 patients including 5 bilaterally. Enthesitis was present in two patients. Clinical improvement (BASDAI AND BASFI) and biological was noted in 6 patients after an average of 3 courses of infliximab 5 mg/kg. One patient developed side effects after infusion type of gastroenteritis associated with an influenza-like illness. **Conclusion:** Infliximab is particularly effective in spondyloarthropathies. The statement, however, must be evaluated carefully. Once the TNF antagonist therapy undertaken, its effectiveness must be evaluated accurately using appropriate tools.

PA577

Perioperative Rehabilitation Protocol for Pectus Excavatum

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Introduction: Pectus excavatum (PE) is the commonest type of congenital thoracic wall abnormality. It is due to an anomalous growth of ribs and sternum, conditioning a concave appearance of the thoracic wall. Problems with self-esteem are frequent in teenager patients. Other complications can derive from this deformity: abnormal exercise tolerance, restrictive pattern in pulmonary function test (severe cases), chest and back pain. Patients frequently present abnormal posture with anterior curvature of the thoracic spine and shoulders rolled anteriorly. The Nuss technique is a minimally invasive surgical repair technique of PE used worldwide. The aim of this work is to describe a rehabilitation protocol developed in our department to act as adjuvant for Nuss surgery. **Material and Methods:** A review of literature was performed comprising the last 15 years in Scielo® and MEDLINE® using the key-words pectus excavatum, treatment. Other relevant literature was consulted. A rehabilitation protocol was designed. **Results:** After the Nuss procedure postoperative pain can be significant, highlighting the importance of preoperative intervention. At this preoperative stage the patient should be taught how to increase thoracic expandibility and intra-thoracic pressure and to use incentive spirometry, as well as exercises to increase the mobility and flexibility of the spine and thoracic wall, stretching techniques, correct spinal alignment, exercises for self mobilization in bed and transfers. After surgery, mobilization is usually allowed on the second day (sitting with adequate spinal alignment). The patient should perform the respiratory exercises taught prior to surgery. The promotion of good posture should be reinforced and supervised. Regular activity is allowed according to pain reduction and mobility increase. Physical fitness should then be promoted (for example swimming crawl) and strengthening of muscles responsible for elevating and expanding the thoracic wall, stretching of tightened and shortened

structures and realignment of posture (both static and dynamic) should also be performed as part of the rehabilitation plan. Contact sports should be avoided during the first months. *Conclusion:* In order to optimize the results of the minimally invasive repair of PE a multidisciplinary approach seems to be beneficial. Developing a protocol of pre and postoperative rehabilitation allows a more organized and effective intervention to achieve best functional results.

PA578

Knowledge and Attitude Regarding Hepatitis B Virus Infection and Vaccine among Hospital Patients

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Background: Hepatitis B is a potentially life-threatening infection caused by the hepatitis B virus. It is the most serious type of viral hepatitis. About 400 million people have the virus, with most of these people living in Asia. Clearly, this is a significant public health and medical problem. With this background, the study was conducted to evaluate knowledge and attitude regarding HBV (Hepatitis B virus) infection and its vaccine among the patients attending tertiary care hospital. *Materials and Methods:* A Cross-sectional study was done among 856 patients attending a tertiary care hospital, at Mangalore, India, from November 2010 to May 2011 after approval from the institutional ethical committee. A pretested structured questionnaire was used to measure the participants' knowledge and attitude regarding HBV (Hepatitis B virus) infection and its vaccine after obtaining informed consent. *Results:* In all, 856 patients (698 male and 158 female) were studied. 50% of those who were aware had no knowledge about route of transmission, infectivity, or importance of vaccination. Educated individuals were more aware about hepatitis B vaccine ($P < 0.05$). The percentage of vaccination was 25% among study subjects. Lack of awareness was the common reason for non-vaccination (50%); of them. *Conclusions:* Knowledge of Hepatitis B disease and vaccine was low and misconceptions were common. About One third of the population are vaccinated for hepatitis B. Emphasis should especially be laid on awareness campaigns to educate the public that hepatitis B is vaccine preventable disease. Knowledge of the hepatitis B disease may be useful in determining health care interventions strengthening community-based care for patients.

PA579

Rehabilitation of Humeroscapular Periarthropathy in Persons with Diabetes Mellitus

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Glycemia is primary factor of the periarthropathy disease which during life brings many accompanying complaints that aggravate diabetic life even more. The weakening of muscles is a phenomenon that begins to appear very early, and with this nodes suffer and it humeroscapular which is manifested more than one attendant problem. The purpose of this study is to teach diabetics how to keep their muscles in shape so that it can normalize glycaemia, to keep the amplitude of mobility of joints full, to achieve active life. The survey has included 20 patients with diabetes mellitus in working group, 10 patients in control group, age of patients are 40-60 years who had periarthrit H/S. To those patients has been applied physical therapy (thermotherapy, electrotherapy, Chinese-therapy) for 3 months with interruption of thermotherapy and electrotherapy, Chinese-therapy has been the one that has been applied all the time with different intensity to individuals, active exercises, active exercises and assisted exercises with resistance. Based on the results, amplitude of mobility and muscle tone has improved in all patients; pain is revoked or reduced as a matter of muscular hypotony. Control group is based only on drug therapy,

this enabled pain to calm down a little bit during the duration of therapeutic treatment, and relapses were frequent. With the application of exercises to diabetics, pain in node is reduced. Exercises increase mobility of amplitude into patients that had difficulties in amplitude and at simultaneously remove follow obstacles as a result of contractures. Challenge diabetes through physical activity to reduce blood glucose values, to gain personal and familiar tranquility that you will be functioning in life. Contribute to your physical body to be healthy and beautiful. Be Proud of Yourself!

PA580

Stance and Gait Changes after Medial Head of Gastrocnemius (MHG) Bisection in Patients Suffering from Popliteal Artery Entrapment Syndrome (Project Protocol)

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Aim: Changes in the individual function of gastrocnemius after its medial head bisection when used to cure the popliteal artery entrapment. *Introduction:* This pilot study has been organized to research the effects of MHGM bisection on the gait cycle of patients suffering from PAES. This syndrome is a cause of intermittent claudication and may lead to degenerative stenosis of the artery and ischemia. Encountering that gastrocnemius is a muscle that plays several roles from the mid stance to the heel off faces of the gait cycle it is important to research whether this therapy creates an unstable and uncomfortable gait. No bibliography exists so far regarding this correlation. *Methodology:* Patients complaining for intermittent vascular claudication will be investigated with: Magnetic resonance imaging of the popliteal fossa to ensure the entrapment of the artery. Kinetic gait analysis to estimate the ground forces throughout the gait cycle, the center of gravity for the body and each lower extremity as well as the stabilometry to encounter any changes in the perception of balance. The imaging examinations will be performed before and three and six months after the surgery. Out of 3 patients who concluded the trial and 3 others who are in their 6-month follow up, 4 seem to have ameliorated the transmission of their center of gravity during body propulsion.

PA581

Activity Limitations in Breast Cancer Survivors at One Year of Surgery

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Introduction: Breast cancer is the most frequent tumor in women. Although mean life expectancy after diagnosis is currently 17.5 years, the quality of life is affected by a great number of treatment-related complications. This study aims to define the prevalence and predictors of activity limitations observed 12 months after breast cancer surgery. *Material and Methods:* 79 women (age=56.5±12.7 years), consecutively undergone breast surgery, were studied. A clinical and functional assessment was performed at 1 and 12 months of surgery, to evaluate shoulder function (Quick Dash - QD), upper limb strength and diameters, scar evolution, as well as check the occurrence of complications, like pain, fatigue (Brief Fatigue Inventory), body image perception change (Body Image Scale) and participation restriction (Functional Status Questionnaire - FSQ). *Results:* Surgery was quadrantectomy in 58% cases, non-radical mastectomy in 23%, radical mastectomy in 9% and other interventions in 10%. Total lymphnode dissection was realized in 62% patients. Breast prosthesis was implanted in 23% women. Symptoms occurring in more than 10% patients at T1 were: shoulder pain (62%), shoulder or upper limb sensory deficit (50%); shoulder ROM limitation (39%), hypertrophic scars (32%)

and lymphosclerosis (24%). At T12, the prevalence of the quoted complications did not change, except for pain (53% vs 62%) and lymphedema (11% vs 6%) rates. At T12, 58% of women complained of a severe arm impairment (QD<20), depending on shoulder pain ($p=0.03$), ROM limitation ($p=0.002$), sensory disturbances ($p=0.0008$) and muscle contracture ($p=0.004$). Surgery type was independent predictor of QD (ChiSquare: 4.1, $p=0.04$). Independence in instrumental activities (FSQ) was affected by shoulder pain ($p=0.005$) and ROM limitation ($p=0.005$), while the work performance was mainly influenced by the surgery type ($p=0.007$). Body image depended on the surgery type ($p=0.0004$), upper limb function ($p=0.008$), outcome of breast reconstruction ($p=0.01$) and mood ($p=0.02$). Fatigue was mainly affected by sensory disturbances ($p=0.0016$) and muscle contracture ($p=0.004$). **Conclusion:** Numerous 0activity limitations and participation restrictions affect women at 1 year of breast cancer surgery; arm mobility and surgery type are the strongest predictors of complications, reduced independence and impairment in body image perception.

PA582

Effect on Endothelial Dysfunction of Indoor Rowing Exercise in ESRD

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Introduction/Background: Many studies have shown the importance of exercise or regular physical activity in preventing muscle atrophy in end-stage renal disease (ESRD) patients. Rowing exercise is whole body strength-endurance type of sports. The aim of this study is to evaluate the effect of rowing exercise in ESRD patients' body composition, cardiopulmonary function and endothelial function. **Material and Methods:** 8 hemodialysis patients were recruited. 4 subjects completed 12-weeks rowing exercise training. Subjects exercised 3 times a week, using indoor rowing machine (Concept2 Model E.). The exercise session included a 5-minute warm-up, a 10-minute rowing exercise, and a 5-minute cooling-down period. The levels of biochemical markers showing endothelial function and serum lab data were compared before and after exercise to investigate the effect of rowing exercise. Dual-energy X-ray absorptiometry and cardiopulmonary exercise test were done before and after 12-weeks rowing exercise training for investigating the intensity of rowing exercise. During exercise, a medical technician had monitored subjects' blood pressure, heart rate and EKG rhythm and controlled exercise intensity. (RPE11-13). **Results:** Each subjects' serum protein was 5.6, 5.9, 5.8 and 6.1 mg/dl and changed to 5.9, 6.2, 6.1 and 6.5 mg/dl after exercise. Serum levels of hemoglobin, albumin, cholesterol, TG, HDL and LDL were changed but there were no consistency. Also, the changes of VO₂ Max and total body fat percentile were not consistently. Their BMI were not changed. The levels of serum TNF- α were changed to 4.59, 5.99, 4.29 and 7.12 pg/ml from 6.89, 8.59, 4.89 and 8.78 pg/ml. **Conclusion:** The levels of serum protein and TNF- α were decreased after 12-weeks rowing exercise, even though there were no consistent change in the results of DEXA and CPET. So we thought that low intensity rowing exercise might effect positively on endothelial function. Thus, for ESRD patients, low intensity rowing exercise is recommendable safe exercise to lower the cardiovascular risk.

PA583

The Effects of Worksite Supporting Exercise Intervention on Body Composition, Metabolic Profiles and Arterial Stiffness in Workers with Metabolic Syndrome

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Background: Exercise is well recognized to reduce visceral fat and is essential for the treatment of metabolic syndrome. However, metabolic syndrome patients often report that they can not have enough time for exercise due to busy duties. **Methods:** The aim of this study was to examine the hypothesis if addition of worksite supporting exercise intervention could improve health effects compared with traditional dietary and exercise guidance. We studied 28 metabolic syndrome patients (mean age 49±11 yrs, 11 men) who were recruited from employees working for Rosai Hospital groups. We conducted a randomized cross over study for 12 months. Subjects received 6-month regimens of traditional dietary and exercise guidance plus worksite supporting exercise intervention (T+S) and traditional dietary and exercise guidance alone (T) in random order. Group A (n=14) received T+S regimen first and then T regimen, and Group B was vice versa. Worksite supporting exercise intervention provided time and place of exercise, and guidance by physical therapist. The exercise intervention was done in the rehabilitation room of each hospital and the exercise training (10 min warm-up stretching+30 min ergometer exercise+20 min muscle power training) was given 3 times per week. Body weight, body composition, fasting blood and arterial stiffness as assessed by brachial-ankle pulse wave velocity (PWV) were studied before, 6 and 12 months after the intervention. **Results:** Baseline data were similar between the groups. Body weight tended to be more greatly reduced in group A than group B at 6 months (-3.3 vs. -1.5 kg, $p=0.07$) while weight reduction from 6 to 12 months tended to be greater in group B than in group A (-1.7 vs. +0.4 kg, $p=0.07$). Body weight reduction after T+S regimen was significantly greater than that after T regimen (-2.5 vs. -0.5, $p=0.01$). T+S regimen significantly reduced waist circumference, % body fat, systolic blood pressure, PWV, and increased high-density lipoprotein while those parameters remained unchanged before and after the T regimen. **Conclusion:** These data suggest that worksite supporting exercise intervention could improve efficacy of weight reduction, lipid profile and arterial stiffness compared with traditional lifestyle guidance in metabolic syndrome.

PA584

Disability Characteristics in Patients with Obese Polycystic Ovary Syndrome (PCOS) Described by Obesity ICF Comprehensive Core Set

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Objective: The purpose of this study was describe the disease characteristics in patients of obese polycystic ovary syndrome (PCOS) with obesity ICF comprehensive core set in order to reveal the related dysfunction domains. **Methods:** Sixty patients with obese PCOS were evaluated by using obesity ICF comprehensive core set. Categories reported as a problem by at least 30% of patients were considered as relevant functional profiles for PCOS patients. **Results:** In 60 patients with obese PCOS, 20 items were selected from 109 items of obesity ICF comprehensive core set and considered as the relevant functional characteristics for obese PCOS, in which 6 items of body functions (30% of all selected items), 1 item of body structures (5% of all selected items), and 13 items of environmental factors (65% of all selected items) were included. **Conclusions:** Obesity ICF comprehensive core set can be applied to patients with obese PCOS, which offers the possibility for clinic application ICF core set in clinic. **Keyword:** Obesity; ICF; PCOS.

PA585

Quality of Life in Patients with Neuromusculoskeletal and Movement-Related Function Disabilities*D. Estrella¹, L. Gomez de Regi², Y. Leos³¹Universidad Autonoma de Yucatán, ²Hospital de Alta Especialidad de Yucatan, ³Crit Yucatan, Merida, MX

Background: About 15% of the world's population (year 2010) is estimated to live with some form of disability. The number of people with disabilities is growing; populations are ageing – older people have a higher risk of disability – and chronic health conditions associated with disability are increasing. **Objectives:** 1) assessing the subjective quality of life of patients with neuromusculoskeletal and movement-related function disabilities and, 2) analyzing the possible effect of the medical condition (diseases of the nervous system vs. diseases of the musculoskeletal system and connective tissue) and its interaction with sex and age. **Methods:** 330 participants (62.4% female; mean age=48.9), were recruited from a public institution in Mexico providing specialized outpatient rehabilitation. After signing informed consent they responded a brief sociodemographic questionnaire and the WHOQOL-BREF scale. **Results:** In general quality of life levels were satisfactory. Males reported more favorable quality of life levels than women. Higher scores were found in the social dimension for the musculoskeletal system and connective tissue group. Younger participants scored significantly higher in the overall quality of life item and social dimension. Female and elderly patients with diseases of the nervous system were particularly affected in the physical and psychological dimensions. Women with diseases of the nervous system also showed a negatively affected social quality of life. Elderly with diseases of the musculoskeletal system and connective tissue scored the lowest in general health perception. **Conclusions:** Good quality of life is achievable for everyone, even if having a disability. Not all aspects and cases do as well: the physical and the psychological dimensions seem particularly negatively affected in female and elderly patients with diseases of the nervous system. Results demand further exploration and encourage the design of accordingly interventions in order to achieve rehabilitation to its greatest possible extent.

PA586

Effects of Rehabilitation on the Physical Condition of Patients with Lung Cancer Estimated Six-Minute Walk Test*N. Mujovic¹, N. Mujovic², L. Nikcevic³, A. Milovanovic², N. Jovic², S. Tomanovic-Vujaninovic²¹Clinical Center of Serbia, ²Faculty of Medicine, University of Belgrade, ³Clinik for cerebrovascular insult "Sveti Sava", Belgrade, RS

Aim of the Study was to investigate the effect of preoperative rehabilitation program in patients with lung cancer who are preparing for surgery. **Material and Methods:** A group of 48 men with mean age of 59 years, who had proven lung cancer and are intended for lung resection. As part of the preoperative preparation was carried out in all patients, respiratory rehabilitation and physical training on the bike and treadmill for a period of 12 days. 6-minute walk test in these patients was measured in three time periods: at the beginning of rehabilitation, then immediately prior to surgery and one month after surgery. In addition to the distance traveled in meters, we measured O₂ Sat%, degree of dyspnea using the modified Borg scale, as well as cardiac and respiratory frequency. **Results:** The results showed that there was a statistically significant improvement in distance traveled on 6mwt after performing rehabilitation, but also to decrease the distance 6mwt after lung resection, as well as to increase Sat% O₂. All other parameters showed a significant reduction. **Conclusion:** For the success of pulmonary rehabilitation, but also to determine the training, we use as a measure of value 6MTH and parameters that tell us about the degree of dyspnea that is a true indicator of improvement or deteriora-

tion in patients. **References:** 1) Alexander Borinow-Wojewodski et al. Effects of rehabilitation on physical efficiency in patients with lung cancer evaluated by means of the 6-minute walking test. *Physiotherapy* 2008, 16, 36-47. 2) ATS Statement: Guidelines for the Six-Minute Walk Test. This official statement of the American Thoracic Society was approved by the ATS board of directors March 2002. *American journal of respiratory and critical care medicine* vol 166, 2002: 111-117.

PA587

Modern Approaches to Correcting Contractile Function of the Sphincter of the Rectum

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According to the European and American statistics fecal incontinence occurs in about 6-10% of the population. The most frequent causes of violations of the contractility of the sphincter of the rectum (fecal incontinence) are the consequences of surgical interventions in the area of the anal sphincter (hemorrhoids, proctitis, paraproctitis) as well as patient age of 65 years. Treatment and rehabilitation of patients with faecal incontinence has great medical and social importance, since this pathology leads to a significant deterioration in the quality of life, reduced activity, a change in the emotional sphere of patients. **Objective:** To evaluate the effectiveness of comprehensive rehabilitation programs for patients with fecal incontinence. **Materials:** all patients we observed were divided into 2 groups: control group (CG), which included 11 people who were on the standard treatment with hardware complex «UROSTYM», without using additional treatments. Main Group (MG), which included 17 people were on treatment with hardware complex «UROSTYM» together with the magnetic and electric stimulation. **Methods:** All patients before and after treatment were surveyed Wexner scale, in order to assess the quality of life and severity of anal incontinence, as well as the diagnosis of anal sphincter contraction forces on hardware complex «UROSTYM». Treatment was administered daily from day 1 to 10: in CG using the appliance «UROSTYM» with biofeedback. In the MG using 3 hardware systems: «UROSTYM» - BOS, dual pacemaker «Cefar Peristim Pro» and electromagnetic stimulation on hardware complex «BIOCON-2000W». **Results:** The results of the pilot survey on the Wexner scale and diagnostics on hardware complex «UROSTYM» was found: in both groups - the positive dynamics in the form of increasing the compression force of the anal sphincter and reducing the number of episodes of anal incontinence. The results of treatment of patients in comparison with the MG and CG was considerably higher. In the MG 15 patients achieved complete disappearance of anal incontinence episodes, whereas in the CG receiving conventional treatment, this effect was achieved only 3 patients. **Conclusions:** Implementation of comprehensive rehabilitation with biofeedback-technology is an effective treatment of fecal incontinence.

PA588

The Evaluation of Basic Motor Functional Ability in Patients with Chronic Obstructive Pulmonary Disease (COPD)*T. Wloch¹, J. Bromboszcz², R. Piliński³, K. Barczyk⁴, O. Smoleński⁵, E. Niżankowska-Mogilnicka³, R. Nowobilski³¹University School of Physical Education, Kraków, ²Higher School of Administration, Bielsko-Biala, ³Jagiellonian University Medical College, ⁴Regional Respiratory Hospital, Jarosławiec, ⁵University School of Physical Education, Kraków, PL

Introduction: COPD is a systemic disease, where in addition to an incompletely reversible airflow limitation, extrapulmonary disorders, including the whole movement system also affect its severity. This forces the development of a broader assessment of the clinical

status. *Aim:* Evaluation of the relationship between functional ability and the COPD severity. *Material and Methods:* 54 consecutive clinically stable COPD patients (mean age 66.31±8.42 years) were enrolled into the study. The severity of COPD was assessed to GOLD 2006 and GOLD 2011. The predominant group of patients were those with 2. degree severity (44.4%) according to the GOLD classification. All patients were assessed for: spirometry before and after bronchodilator, mMRC questionnaire and Borg scale, the 6-minutes walking test. The multidimensional BODE index and ETGUG functional performance test were carried out. *Results:* The ETGUG test correlates with the disease severity evaluated with: the GOLD 2011 Combined COPD Assessment, dyspnea intensity, and the BODE grading system. A higher correlations between ETGUG test stages dependent on the ability to walk were observed. *Conclusion:* The relationship between the results of ETGUG test and COPD severity suggests that the ETGUG test can be a useful and simple additional tool to assess the functional status of COPD subjects.

PA589

Efficacy and Safety of 3-Week Cardiac Rehabilitation Program in Patients after Acute Coronary Syndrome

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Objective: To evaluate the impact of a short-term (3-week) cardiac rehabilitation (CR) program on the exercise capacity, lipid blood profile, hemodynamic parameters in patients after acute coronary syndrome (ACS). *Methods:* we prospectively evaluated 97 patients (mean age – 59.6±6.1 years; men – 72.2%, women – 27.8%) after ACS (56 – myocardial infarction, 41 – unstable angina) who underwent 3-week CR program. The CR program consisted of physical exercise, lifestyle modification, and pharmacotherapy. After determination of the initial exercise capacity, patients underwent 15 training sessions. At the beginning of the training, patients had no symptoms of heart failure and coronary artery disease. The training consisted of 60-min sessions of aerobic (on a cycle ergometer, treadmill, upper body cycle, walker and stepper) exercises performed 5 times a week; a total of 15 sessions. Electrocardiographic exercise test (EET), 6 min walk test (6MWT) and serum lipoproteins evaluation were performed before and after the finishing of the training program. *Results:* all patients showed a significant increase in exercise capacity parameters: peak heart rate increased from 116.1±15.7 to 126.0±16.7 beats/min, energy expenditure - from 5.4±1.0 to 7.5±1.0 METs during EET. The distance covered in the 6-min walk test was significantly greater after the short-term cardiovascular training (420.7±48.6 vs. 474.6±57.1, p=0.02). The 15 training sessions resulted in a statistically significant decrease in total cholesterol from 5.4±0.6 to 3.9±0.5 mmol/l (p<0.001), low-density lipoprotein cholesterol from 3.4±0.4 to 2.2±0.3 mmol/l (p<0.001), triglyceride from 1.6±0.2 to 1.3±0.2 mmol/l (p=0.05), whereas high-density lipoprotein cholesterol remained unchanged (1.2±0.1 vs. 1.2±0.1, p=0.91). All the patients received adequate antihypertensive drug therapy. However, systolic blood pressure additionally decreased from 133.2±13.9 to 122.8±14.8 mm Hg (p<0.001), while diastolic blood pressure decreased insignificantly (from 79.8±8.5 to 77.9±9.4 mmHg (p=0.23). No deaths, no complications or adverse events during the rehabilitation or exercise testing were noted. *Conclusion:* a statistically significant improvement in exercise capacity and serum lipids in patients with ACS was observed already after short-term (3 week) CR program.

A.4.1. HEART, CARDIOVASCULAR AND LYMPH DISEASES

PA590

Chronic Kidney Disease: a New Target of Cardiac Rehabilitation

J Rehabil Med Suppl 54

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Chronic kidney disease (CKD) is a worldwide public health problem. Levels of physical activity and exercise tolerance among CKD patients with hemodialysis are low. Increased physical activity in this population has been associated with improved ability and capacity to perform activities in everyday life, occupational tasks, health-related quality of life and survival. Therefore regular exercise is recommended to this population. In contrast, the effect of regular exercise in predialysis CKD patients has not been fully elucidated. We have been tried to demonstrate that renal protective effects of regular exercise in various animal models of predialysis CKD such as 5/6 nephrectomized spontaneously hypertensive rats, 5/6 nephrectomized Wistar Kyoto rats, Goto-Kakizaki Diabetic rats. Moreover, we established a new scientific society to study and to urge broad dissemination of Renal Rehabilitation (RR). In our laboratory, we have been demonstrated that renal protective effects of regular exercise in various animal models of predialysis CKD. Moreover, we established the Japanese Association of Renal Rehabilitation in 2011 and published a book “Renal Rehabilitation” to evaluate and promote RR. We define RR as, “RR is coordinated, multifaceted interventions designed to optimize a renal patient’s physical, psychological, and social functioning, in addition to stabilizing, slowing, or even reversing the progression of renal deterioration, thereby reducing morbidity and mortality. RR includes five major components: such as exercise training, diet & fluid management, medication & medical surveillance, education, psychological & vocational counseling”. RR is a feasible, effective and safe secondary prevention strategy following CKD, and offers a promising model for new field of rehabilitation. Future randomized controlled trials should focus more on the effects of exercise training and rehabilitation programs as these subjects and exercise types have not been studied as such as cardiovascular exercise.

PA591

Effects of Enhance External Counterpulsation and Cardiac Rehabilitation on Clinical Parameters and Plasma Nitric Oxide, Endothelin1 and High Sensitive CRP in Patients with Coronary Artery Disease

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Background and Objectives: Cardiovascular diseases are of the most common causes of death in the world. In this study we have compared the Enhance External Counter Pulsation (EECP) method with cardiac rehabilitation method based on clinical parameters and inflammatory markers in treatment of patients with cardiovascular diseases. *Materials and Methods:* 44 patients with coronary artery disease were randomized in two groups: EECP-group (twenty one-hour session; 22 patients) and cardiac rehabilitation group twenty sessions with specific protocol (22 patients). Patient’s information was collected before and after intervention. Outcomes of study was clinical improvement and increase in serum NO, decrease in hs-CRP and endothelin1 levels. *Results:* 20% of patients were female and 80% were male in the range of 35 to 75 years old. The hs-CRP level in EECP group was decreased from 1.52±0.7 to 1.27±0.4 µg/ml and was decreased from 1.98±0.6 to 1.75±0.6 µg/ml in cardiac rehabilitation group. NO level was increased from 7.87±0.99 to 8.21±1.27 ng/lit in EECP group and from 8.28±6.49 to 8.31±6.26 ng/lit in cardiac rehabilitation group. And, endothelin1 level decreased in both groups (P=0.38). But was not statistically meaningful. *Conclusion:* Both cardiac rehabilitation and EECP were effective in improvement of class of angina and quality of life. Increase in serum NO and decrease in hs-CRP and endothelin1 levels, in patients with coronary artery diseases, were seen. But these modalities did not show preferences to each other in therapeutic approaches, at present study.

PA592

Lymphedema Characteristics and The Efficacy of Complex Decongestive Physiotherapy (CDP) in Patients with Malignant Lymphedema

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Introduction/Background: The standard care for lymphedema is complex decongestive physiotherapy (CDP). Concurrent studies on the efficacy of CDP in malignant lymphedema are few. The aim of this study is to identify the lymphedema characteristics and to determine the efficacy of CDP therapy in malignant lymphedema. **Material and Methods:** We performed a retrospective review of patients with malignant lymphedema after advanced cancer who were treated with a CDP program in the Department of Physical Medicine and Rehabilitation, Changhua Christian Hospital between January 2004 and June 2013. All patients underwent an intensive CDP program of 4-12 sessions. The characteristics of the cancer and lymphedema (stage, duration), pain, heaviness, tension, shoulder or knee range of motion, percentage of excess volume (PEV) and percent reduction in excess volume (PREV) were recorded before and after CDP therapy. **Results:** Twenty-nine patients who had stage IV and a recurrent cancer status were included. The mean age was 49.2 years, 27 (93.1%) patients were female, 25 (86.2%) had upper limb lymphedema and 4 (13.8%) had lower limb lymphedema. Twenty-three (69%) patients had breast cancer, 2 (6.8%) had lung cancer. The patients received 10.5±2.3 sessions of daily CDP, and 74% of patients suffered from lymphedema within 6 months. The initial lymphedema volume was 725±503 ml and PEV was 43.4±33%, which was severe lymphedema. After the CDP program, lymphedema volume decreased 306±205 ml, PEV was 22.7±18.7% and lymphedema severity improved to moderate status. The CDP efficacy, PREV, was 46.6±15%. The stage of lymphedema ($p=0.004$), range of motion ($p<0.001$) and symptoms' scores ($p<0.001$), including pain, heaviness, and tension, were significantly improved after CDP therapy. The PREV was found to be not correlated with PEV, age, the number of CDP sessions, and the number of removed lymph nodes. **Conclusions:** PEV of 43.4% is severe lymphedema and the symptoms' scores showed moderate pain, although most lymphedema occurred within 6 months. The typical findings of malignant lymphedema are rapidly progressing swelling and combined neurological symptoms. The lymphedema reduction was 46.6% and the symptoms' scores, range of motion and stage were effectively improved after CDP therapy. However, CDP efficacy was not as good as with benign lymphedema, because of the fewer therapy sessions and poorer compliance with bandaging.

PA593

Cardiovascular Risk Factors: Effect on the Functional Capacity of Patients in Cardiac Rehabilitation*C. Matos¹, I. Cunha², P. Fernandes², S. Magalhaes², S. Gonçalves², S. Torres²¹Hospital Santo António, Pedrosa, ²Hospital de Santo António, Porto, PT

Introduction: The cardiac rehabilitation program (CRP) currently occupies a prominent position in cardiovascular disease prevention and control of risk factors associated with it. A significant part of its effectiveness is due to the positive impact on the functional capacity, improving prognosis. **Objective:** The aim of this study is to determine the influence of cardiovascular risk factors in the outcome of functional capacity in individuals in CRP. **Material and Methods:** Retrospective cross-sectional descriptive study of patients who initiated CRP between January 2008 and December 2013. The dependent variable was the increase in metabolic equivalents in exercise test at the beginning and end of phase II of the program. The independent variables were age, gender, dyslipidemia, diabetes mellitus, hypertension, smoking habits, body mass index, sedentarism

(assessed by questionnaire International physical activity questionnaire) and diagnosis for admission to the program. The variables were analyzed by univariate and multivariate linear regression model. **Results:** The sample included 1399 patients; 1,125 (80.4%) finalized the Phase II of the program. The average age was 61 years, 76% were male and 24% female, 62% were admitted to the program for Acute Coronary syndrome. The prevalence of dyslipidemia was 71%, diabetes mellitus 38%, hypertension 61%, obesity 18%, smoking habits 31% and physical inactivity 63%; 93% of participants had a favorable functional evolution registered in metabolic equivalent of tasks (METs), assessed by exercise stress test. Patients with diabetes mellitus showed a worse outcome of functional capacity. The remaining variables had no significant influence on functional capacity. **Conclusion:** This study reinforces the relevance of CRP in secondary prevention of cardiovascular disease. It is necessary to extend the evaluation of predictors of response to the PRC to a multifactorial context in order to maximize the effectiveness of these programs. **Keyword:** cardiac rehabilitation, functional capacity, cardiovascular risk factors.

PA594

Cardiopulmonary Exercise Testing Variables as Independent Predictors of Return to Work in Cardiac Rehabilitation ParticipantsH. Völler¹, A. Salzwedel¹, R. Reibis², S. Kaminski³, H. Buhler³, *S. Eichler¹, K. Wegscheider⁴¹University of Potsdam, ²Kardiologische Gemeinschaftspraxis am Parc Sanssouci, Potsdam, DE, ³Klinik am See, Rüdersdorf, ⁴University Medical Centre, Hamburg-Eppendorf, DE

Introduction: Cardiopulmonary exercise testing (CPX) has an independent prognostic value, especially in cardiovascular patients. We aimed to evaluate parameters of CPX as predictors for return to work (RTW) at discharge of cardiac rehabilitation (CR). **Methods:** We analysed sociodemographic and clinical data from a prospective registry of 489 patients (mean age 51.5±6.9 years, 87.9% men), who were referred to shortterm (3 weeks) inpatient CR between 06/2009 to 12/2011, predominantly after PCI (62.6%), CABG (17.2%) and heart valve replacement (9.0%). At admission, patients underwent noninvasive cardiac diagnostic (2D echo, exercise ECG, 6MWT) and a psychodiagnostic screening (HADS). CPX was performed at discharge for defining fitness. **Results:** During a mean follow up of 26.5±11.9 months 373 (76.3%) patients returned to work, 116 (23.7%) did not and 60 (12.3%) were retired. A higher number of comorbidities ($p=0.011$) and heavy work ($p<0.001$) were negatively associated with RTW whereas a higher exercise capacity at entry of CR ($p<0.001$) and elective PCI ($p=0.02$) increased the probability of RTW. After adjustment for covariates, max. work load (Watt) at CPX termination and the VE/VCO₂-slope had an independent prognostic significance for RTW. A higher work load increased ($p=0.009$) while a higher VE/VCO₂-slope decreased ($p=0.027$) the probability of RTW. Even for retirement, CPX had a prognostic value: the likelihood of retirement was smaller with increasing VO₂AT ($p=0.016$). **Conclusion:** CPX is a meaningful objective tool to assess patients' ability for return to work. Therefore it should be an essential part of functional assessment in CR for predicting participation in employment during two years after CR.

PA595

Ischemic Heart Disease Affects Sexual Function in Women Attending a Cardiac Rehabilitation Program*I. Cunha¹, C. Matos², A. R. Correia², A. Barreira², P. Fernandes², S. Viamonte²¹Rio Tinto, ²Centro Hospitalar do Porto, Porto, PT

Introduction: Sexual dysfunction after ischemic heart disease is well documented in men; in the female this issue is recent and literature is scarce. **Objective:** comparative analysis of the sexual

function in female patients before and after a cardiac event and identification of factors that interfere with it. **Material and Methods:** Unicentric, observational, prospective, cohort trial. Selected female patients, oriented to Cardiac Rehabilitation Program conducted in the first 3 months after hospitalization for acute coronary syndrome, during 2013-2014. Excluded patients older than 70 years, and who didn't have active sex life. Collected sociodemographic and clinical data on heart disease and cardiovascular risk factors. Functional capacity was estimated in MET obtained in exercise tolerance test. Anxiety and depression levels were evaluated by the Hospital Anxiety and Depression Scale (HADS). For evaluation of sexual function, self-reported, not validated questionnaire was applied. **Results:** 40 patients (mean age: 59±10.1 years). 81.3% hypertensive, 37.5% diabetic, 40.6% smokers, 65.6% dyslipidemic. Mean MET achieved was 7.18±2.25. There was an average of 11.62±4.66 for anxiety and 8.15±4.69 for depression on the HADS. Data collected through the questionnaire found that 75.0% resumed sexual activity after the event. Among these, 25.0% did so more than 8 weeks. The majority (73.9%) decreased the frequency of sexual activity with approximately 54.2% to refer a low degree of satisfaction. 66.7% denied cardiovascular symptoms during sexual activity, but 92.0% women's and 95.8% of partners expressed concern about the possibility of having a heart attack or sudden death during the same. Statistically significant relationship between anxiety levels and depression levels with the resumption of sexual activity was found ($p=0.023$ and $p=0.008$, respectively) as well as between levels of depression and the time at which it was taken up ($p=0.025$). **Conclusion:** This study clearly demonstrates the negative impact of a cardiovascular event in women's sexual function. The concern shown regarding the repetition of symptoms during sexual activity, shared by the woman and partner, demonstrates the need to clarify the couple. Sexual dysfunction should be addressed in the Cardiac Rehabilitation Program, and an interventional attitude is required towards the organic dysfunctions potentially aggravating this dysfunction.

PA596

Physical Ischemia Induced by Isometric Exercise Facilitates Collateral Development in the Remote Ischemic Myocardium of Humans

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Background: Coronary collateral formation could be a new therapeutic target in patients with coronary artery disease (CAD). Some animal studies have shown that brief episodes of ischemia applied in distant tissues initiates a protective phenotype within the heart. The objective of the present study was to investigate the effects of isometric handgrip induced physical ischemia training (PIT) on remote coronary recruitment and growth in humans. **Material and Methods:** Seventy-four CAD patients were randomly assigned to either isometric handgrip (IHG) or non-exercise groups (NEG). Patients in the IHG group performed isometric handgrip exercises during one minute of coronary balloon occlusion, while patients in the NEG group remained sedentary. Collateral flow index (CFI), heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were evaluated prior to and at the end of occlusion. In a second study, 21 CAD patients were randomly divided into isometric handgrip training (IHT) or non-training groups (NTG). Patients in the IHT group performed three months of isometric handgrip training, while patients in the control group remained sedentary. Single-photon emission computed tomography (SPECT) was used to evaluate myocardial perfusion and VEGF levels were determined using ELISA assays. **Results:** In the IHG group, CFI was significantly higher than in the control group ($P<0.01$). HR, SBP, DBP in the IHG group were significantly higher than the NEG group ($p<0.01$) at the end of occlusion. In the second study, myocardial perfusion and left ventricular ejection fraction were significantly improved in the IHT group ($P<0.05$,

$P<0.01$). VEGF levels in the IHT group were increased significantly ($P<0.01$). Levels of VEGF were negatively correlated with the summed rest score of SPECT ($r=-0.60$, $P<0.01$). **Conclusions:** Isometric handgrip exercise-induced physical ischemia training may promote remote collateral recruitment and growth in CAD patients.

PA597

Cardiac and Pulmonary Rehabilitation: Clinical Case

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Case Diagnosis: Peripartum dilated cardiomyopathy. **Case Description:** 35 year old woman, diagnosed with Wolf-Parkinson-White syndrome (WPWS) in 1997, and family history of WPWS. In 2003, the patient had an ejection fraction of 49%. She got pregnant in 2007 and at 24 weeks, presented dyspnea and palpitations, and later on anasarca. The echocardiogram showed severely decreased left ventricular function (LVF) (40%) and normal pulmonary artery systolic pressure (PSAP) (30 mmHg). She was diagnosed with peripartum dilated cardiomyopathy with heart failure (HF) New York Heart Association class III (NYHA), and started inpatient rehabilitation program. Despite the pharmacological treatment, the heart failure symptoms progressed (NYHA class IV) with LVF of 20% and PSAP of 55 mmHg. An implantable cardioverter-defibrillator (ICD) and a pacemaker were implanted in 2009. In 2010, the patient suffered a stroke in the territory of the left medial cerebral artery, currently with no neurological deficits. In 2014, she was on NYHA class III, with a LVF of 43% and a PSAP of 33 mmHg. The patient is on active heart transplant list. **Discussion:** Peripartum cardiomyopathy is a rare cause of dilated cardiomyopathy of unclear etiology that occurs in late pregnancy and the early postpartum period. The ICD or permanent pacemaker is rarely required. She attends the rehabilitation program every three months. It consists of respiratory exercises, electrostimulation, aerobic exercises and daily life activity training, supervised by the physical medicine and rehabilitation (PMR) doctor, and is constantly adapted to the patients clinical status. Before and after the program, blood pressure, heart rate and oxygen saturation are measured. During the program oxygen saturation, heart and respiratory rate are measured, and signs and symptoms of cardiac and respiratory distress are monitored. 6 minute walk test, Metabolic Equivalent of Task and Cardiopulmonary Exercise Test with VO_2 peak evaluation are performed regularly. Since the rehabilitation program started, the patient presented improved exercise capacity and better functional outcomes. **Conclusions:** Cardiac and respiratory rehabilitation are continuously challenging PMR teams. Pursue for better functional independence is especially important for young patients.

PA598

The Impact of Rehabilitation on Arterial Blood Pressure and Serum Glucose in Patients after Myocardial Infarction and Diabetes

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Introduction: The patients after myocardial infarction and diabetes are at high risk of new cardiovascular events. The aim of the study was to establish the influence of rehabilitation on arterial blood pressure and blood glucose levels in patients after myocardial infarction and diabetes. **Material and Methods:** The study included 65 patients with myocardial infarction and diabetes, average age 59.5 years. In all subjects clinical examination and exercise stress test were performed. Patients were included in the program of rehabilitation, which lasted 21 days, after which they were re-measured blood pressure, heart rate and blood glucose. The pa-

tients were instructed to follow a rehabilitation program using the bicycle ergometer (10 min, 2 times a day), aerobic exercise, hydrotherapy and walking. The patients continued to take the same medicaments in same doses. **Results:** After three weeks significant reduction of systolic (from 138.2±16.2 to 72.7±23.6 mmHg; $p<0.001$) and diastolic blood pressure (from 91.3±10.2 to 84.3±8.4 mmHg; $p<0.01$), heart rate (from 80.3±10.6 to 71.8±9.2 beat/min; $p<0.001$), double product (from 12,032.5±651.5 to 9,964.2±422.6 beat/min x mmHg; $p<0.001$), and blood glucose levels (from 7.9±2.1 to 7.1±1.6 mmol/L; $p<0.02$) was found in patients with myocardial infarction and diabetes. **Conclusion:** Rehabilitation had beneficial effects on blood pressure, heart rate, double product and glycemia in patients with myocardial infarction and diabetes.

PA599

The Influence of β -blockers in Heart Rate Recovery and Rating of Perceived Exertion When Determining Training Intensity for Cardiac Rehabilitation

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Background: The influence of β -blockers on heart rate recovery (HRR) and ratings of perceived exertion (RPE) during phase I cardiac rehabilitation for patients with a recent acute myocardial infarction is not clear. **Material and Methods:** From October 2009 to July 2011, 105 patients with a recent acute myocardial infarction who received a successful percutaneous coronary intervention were candidates for recruitment into this study. Before entering phase II cardiac rehabilitation, cardiopulmonary exercise test was arranged, RPE was assessed every minute, and parameters were recorded during the exercise test. **Results:** The subjects entering cardiac rehabilitation had relatively low mean peak oxygen consumption (VO_{2max}). The peak heart rate and VO_{2max} were lower in the subjects taking β -blockers. The RPE value at the ventilatory threshold was significantly higher (12.7±1.7) in subjects who were taking β -blockers relative to those who were not (11.5±1.4). HRR was lower (12.5±8.8) in subjects who were taking β -blockers relative to those who were not (17.0±9.1). **Conclusion:** These findings suggest that use of β -blockers increased the RPE value at the ventilatory threshold. Additionally, HRR was attenuated by β -blockers. In patients who do not undergo a cardiopulmonary exercise test, when using RPE for the initial exercise prescription for determining intensity, the use of β -blockers should be taken into consideration. **Keyword:** Ratings of Perceived Exertion; β -blocker; Acute Myocardial Infarction; Cardiac Rehabilitation.

PA600

Change of Physical Tolerance Capacity in Patients with Coronary Heart Disease after Coronary Revascularization

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Background: Coronary heart disease (CHD) is the most common cause of death in the world. Purpose of cardiac rehabilitation is to restore the function of the heart and blood vessels, to protect against the progression of CHD, possible complications, the decrease in the level of personal physical capacity, improve the quality of life. The aim of our study was to determine rehabilitation measures the performance of physical tolerance viability, patients with CHD, which have coronary revascularization. **Materials and Methods:** The study involved 238 patients (61% men; age 67.5±16.8 y/o) with CHD who have percutaneous transluminal coronary angioplasty (PCI) with stent implantation (n=168) or sur-

gery - coronary artery bypass grafting (CABG) (n=70). The clinical and functional status assessed at the beginning and end of the rehabilitation. Assessment the patient's cardiovascular functional capacity classes (by NYHA), the six-minute walk test (6 MWT), the left ventricular (LV) systolic function and exercise capacity change results. **Results:** Study subjects had 5 and more risk factors (78.6%). After CABG had greater overweight, inactivity, history of diabetes mellitus and familial history of CHD, not rational principles of nutrition than patients after PCI ($p<0.05$). After PTCA, measured by the NYHA, increase was observed in class I and class III subjects experienced decrease after rehabilitation ($p<0.05$). Exercise tolerance of patients was increased in both groups - assess 6 MWT ($p<0.05$): patients after PTCA - from 304.8±147.3 meters to 432.2±168.5 meters and after CABG - from 237.1±135.2 to 300.02±112.3 meters. After PTCA LV systolic function significantly increased (45.7 to 47.3%) ($p<0.05$). After CABG it wasn't statistically significant. **Conclusion:** Among patients after PTCA physical capacity changes is higher than after CABG surgery. Inpatient cardiac rehabilitation increases of patients after PCI and CABG exercise tolerance and left ventricular systolic function. **Keywords:** coronary heart disease, functional capacity, rehabilitation.

PA601

Weight Change in Cardiac Rehabilitation: Effect and Sustainability

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Background: Cardiac rehabilitation (CR) after acute coronary syndromes (ACS) exerts positive effects over several CV risk factors, including weight and body composition. We aimed to establish the effect size and sustainability of changes in weight and body composition during and after CR. **Methods:** ACS patients who concluded a two-month hospital-based CR program and with at least 12 months follow-up were evaluated. Sociodemographic, clinical, anthropometric and functional data were collected. Body composition was analyzed using bioelectrical impedance. One way repeated measure analysis of variance (ANOVA) was conducted to compare antropometric changes over time (t1-before CR, t2-after CR; t3-at 6months follow-up; t4: at 12 months follow-up) **Results:** of the 220 patients studied, 194 (88.2%) were male with mean age 53.4 (9.1) years. Half had ST-segment elevation myocardial infarction and 193 (81.7%) underwent percutaneous revascularization. There were 35 (15.9%) diabetics, 86 (39.1%) hypertensive, 66 (30%) had previous coronary history and 37 (16.8%) were obese. There was a marked improvement in both BMI [t1-t2: -0.5 Kg/m²; 95% CI:-1.05;-0.13], waist circumference [t1-t2: -1.95 cm; 95%CI:-2.8;-1.1] and%fat-mass [t1-t2: -0.8%; 95% CI:-1.5;-0.1] immediately after CR, with no change in%fat-free mass. Changes were sustained at one year follow-up for BMI (t1-t4: $p<0.01$; effect size 0.14), waist (t1-t4: $p<0.01$; effect size 0.23) and%fat-mass (t1-t4: $p<0.01$; effect size 0.07). **Conclusions:** CR is associated with persistent changes in weight, abdominal adiposity and body composition.

PA602

Diabetes: Effect Modification over Weight and Body Composition Response to Cardiac Rehabilitation

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Background: Diabetes Mellitus is an independent cardiovascular risk factor and is strongly associated with obesity and increased body fat content. After acute coronary syndromes (ACS) exercise training exerts positive effects over several CV risk factors, including weight and body composition. We aimed to identify

short and long-term differences in weight and body composition between diabetics (D) and non-diabetics (ND) who completed a cardiac rehabilitation program (CRP). *Methods:* ACS patients who concluded a two-month hospital-based CR program and with at least 12 months follow-up were evaluated. Sociodemographic, clinical, anthropometric and functional data were collected. Body composition was analyzed using bioelectrical impedance. Mixed between-within repeated measure analysis of variance (ANOVA) was conducted to compare anthropometric and body composition changes over time (t1-before CR, t2-after CR; t3-at 6months follow-up; t4: at 12months follow-up) between D and ND patients. *Results:* of 166 patients studied, 146 (87.9%) were male with mean age 53.4 (9.1) years. Almost half had ST-segment elevation myocardial infarction and 136 (81.9%) underwent percutaneous revascularization. There were 25 (15.0%) diabetics, 64 (38.5%) hypertensive, 50 (30.1%) had previous coronary history and 28 (16.9%) were obese. At inclusion, diabetics had higher body mass index (BMI) [D: 28.8 (4.4) vs ND: 26.8 (3.3), $p<0.01$], waist circumference (WC) [D: 101.6 (9.9) vs ND: 94.3 (8.6), $p<0.01$] and percent fat mass (pFM) [D: 27.3 (7.7) vs ND: 24.7 (6.7), $p=0.05$], and lower percent fat-free mass (pFFM) [D: 19.3 (2.1) vs ND: 20.1 (2.1), $p=0.05$]. Both groups showed significant reduction in WC (within-group difference D: $p=0.01$ vs ND: $p<0.001$; between-group difference $p<0.001$). Only non-diabetic showed improvements in BMI (within-group difference D: $p=0.38$ vs ND: $p<0.001$; between-group difference $p=0.04$) and pFM (within-group difference D: $p=0.43$ vs ND: $p=0.03$; between-group difference $p=0.07$). No difference was found regarding pFFM in either group (within-group difference D: $p=0.32$ vs ND: $p=0.11$; between-group difference $p=0.08$). *Conclusions:* Diabetic patients show worse anthropometric profile, which is also more resistant to interventions such as exercise training and behavioral strategies. Development of specific programs for this subgroup, including more intensive dietary counseling and exercise training programs, are warranted.

PA603

Neuroendocrine Response to Heated Water-Based Exercise Training on Resistant Hypertensive Patients: a Randomized Controlled Trial (Hex Trial)

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Background: Heated water based EXercise training (HEX) is a new alternative intervention in cardiac rehabilitation, and it has been studied about its effects on cardiovascular adaptations; but still there is no data about neuroendocrine effects of this training. This study examines the effects of HEX on neuroendocrine response in resistant hypertensive patients. *Methods:* This is a parallel, randomized controlled trial. 125 nonconsecutive sedentary patients with resistant hypertension from a hypertension outpatient clinic in a university hospital were screened; 44 patients fulfilled the study requirements and had their blood analyzed for the concentration of plasma catecholamines (dopamine, adrenaline and noradrenaline), endothelin-1, nitric oxide (NO), plasma aldosterone concentration and plasma renin activity (PRA) than the patients were divided in two groups, one group was trained in a heated pool (32°C) for 12 weeks, 3 times a week; and the other group was the control group. The sessions were performed for 60 minutes and were consisted of callisthenic exercises and walking inside the pool. The control group was asked to maintain habitual activities. After 12 weeks all patients repeated the blood tests. *Results:* 44 patients (HEX n=28; control n=16) were randomized; there was no loss during the follow-up and no adverse events occurred during the study. HEX decreased plasma concentration of dopamine (from 145±88 to 26±21 ng/ml, $p<0.0001$), adrenaline (from 353±156 to 169±93 ng/ml, $p=0.009$), noradrenaline (from 720±255 to 307±137 ng/ml, $p=0.001$), and endothelin-1 (from 42±14 to 26±8 pg/ml, $p=0.003$), aldosterone (from 94±48 to 77±22 pg/ml, $p=0.006$) PRA (from 35±14 to 3±3 mmHg ng/ml/H, $p<0.0001$); and increased NO (from 25±7 to 77±22 uM, $p=0.001$). The control group after 12 weeks did

not have any changes on blood analysis results. *Conclusion:* HEX was able to improve important neuroendocrine adaptations in resistant hypertensive patients. These effects suggest that HEX may be a potential new therapeutic approach in these patients.

PA604

The Prevalence of Impaired Glucose Metabolism in Patients Referred to Cardiac Rehabilitation

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Introduction/Background: The aim of conducting this study was to assess the prevalence of impaired glucose metabolism in patients who attended hospital-based cardiac rehabilitation. *Methods:* We performed a single group cross-sectional study. In a seven-month period, from September 2010, the study was conducted in a cardiac rehabilitation setting at a university hospital. Overall, 273 patients with an established diagnosis of ischemic heart disease who were referred to the cardiac rehabilitation center were included. The primary outcome measure was the prevalence of impaired glucose metabolism. We also compared cardiovascular disease risk profile among participants. *Results:* 121 (44%) participants had diabetes mellitus, of which, for 80 the diagnosis was previously established. Amongst the whole study population, 52 patients (27%) had normal glucose levels. Of the 193 patients without previous diagnosis of diabetes, 41 (21.2%) had diabetes, 14 (7.3%) were mild cases of diabetes, 49 (25.4%) had isolated impaired fasting glucose according to the American Diabetic Association criteria, 27 (14%) had isolated impaired fasting glucose consistent with the WHO definition, and 51 (26.4%) showed impaired glucose tolerance. The WHO fasting criteria alone would have left 15 patients (37.5%) with undiagnosed diabetes mellitus. *Conclusion:* Impaired fasting glucose and impaired glucose tolerance could not identify the same patients. It seems that both fasting plasma glucose and oral glucose tolerance test are necessary and indispensable in the diagnosis of impaired glucose metabolism in patients with coronary artery disease.

PA605

Inpatient Cardiac Rehabilitation: Functional Comorbidity after Cardiac Surgery

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Introduction: Diseases of the cardiovascular system are one of the most common causes of hospitalization, premature death and disability in the world, leading in turn to higher healthcare costs. It is therefore essential to optimize all the resources for the care of these patients. Comprehensive care for patients undergoing cardiac surgery includes rehabilitative medical care needed to ensure the best functional results and the highest quality of life possible. Cardiac rehabilitation has a key role in reducing the impact of cardiovascular diseases. *Material and Methods:* Retrospective longitudinal study of 450 patients enrolled in a phase I program for cardiac rehabilitation over a period of a year and a half after they had been operated on cardiac pathology. Socio-demographic variables (sex, age, social and labor conditions as well as many more) and clinical variables (type of surgery, post operative comorbidity influencing patient functional status, length of stay, hospital treatment and discharge treatment and functional status before the surgery and at discharge) were studied. *Results:* Most patients were male with an average age of 62 years old. The most frequent surgical procedures were coronary artery bypass and valve replacements. Around a 10% developed any complications during the stay at the hospital (polyneuropathy, mononeuropathy, myopathy osteoarticular complications, skin sternotomy) and they need additional rehabilitation treatment to the usual treatments de-

veloped in uncomplicated post operative cardiac rehabilitation patients. At discharge, most patients had a greater score than 80/100 with Barthel's score. The best short-term functional outcomes were associated with early rehabilitative approach, a good social and family support and pre-surgical functional status. **Conclusion:** Early post operation rehabilitation constitutes an integral part of the invasive treatment of cardiovascular diseases. It enables identification and modification of risk factors and early identification and treatment of new functional and frequently complex problems. Optimization of early rehabilitation prevents cronification and further disability and improves efficiency in problems solving in the management of these difficult patients, as well as a reduction in costs. Further studies are needed about the long-term effectiveness of phase I cardiac rehabilitation.

PA606

Elderly Coronary Patient: a Practical Guidance for Cardiac Rehabilitation

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Introduction: Cardiac rehabilitation following a cardiac event is divided into three phases. However, cardiac rehabilitation programs were remodelled integrating coronary risk factor reduction programs. Our aim is to translate from the literature the strongest clinical evidence into practice to better standardization of care in the elderly coronary patients. **Material and Methods:** Medline and Cochrane Library databases research with the keywords "Cardiac Rehabilitation AND Exercise" and relevant articles were selected. **Results:** A multifactorial rehabilitation program consists of baseline patient assessment, nutritional counselling and weight management, aggressive coronary risk factor management, psychosocial management, physical activity counselling, and exercise training. There has been wide acceptance of the benefits of supervised exercise programs for patients with stable angina, recent myocardial infarction and recent coronary artery bypass surgery. The risk of cardiovascular complications from exercise training should be evaluated before starting an exercise program. The risk stratification guidelines published by the American Heart Association (AHA) use four categories (A-D) of risk according to clinical characteristics and included contraindications for exercise. Patients referred for outpatient cardiac rehabilitation typically belong to class B or C. They require different degrees of monitoring or supervision during exercise. The components of an exercise prescription include the mode, frequency, duration, and intensity of exercise. Exercise progression and provision of appropriate supervision are also important elements of a cardiac rehabilitation program. The AHA has published recommendations for exercise prescription for endurance and resistance training and for classification of exercise risk, which are used to determine the need for supervision and the level of monitoring required. Most outpatient programs consist of three times weekly ECG-monitored exercise sessions for 8-12 weeks, and sometimes longer. The goals of these sessions are to develop and teach an individualized exercise prescription that is both safe and effective, to reduce coronary risk factors, and to identify and manage the psychosocial problems that commonly affect the cardiac patient. **Conclusion:** Exercise training programs in elderly subjects requires only modest modifications in the exercise prescription and training techniques that are used in younger coronary patients. The specific recommendations for activity levels and energy expenditure should be individualized and must take account of age-related cardiovascular changes if no contraindication is present.

PA607

Cardiac Rehabilitation in Elderly Coronary Patient: an Exercise-Based Secondary Prevention

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Introduction: Coronary risk factors are highly prevalent and tend to cluster at elderly age. The absolute risk attributable to each of these factors increases with age because of the excess occurrence of coronary events in an elderly population. As a result, the potential benefit of risk reduction may be even greater for elderly than for younger patients. Our aim is to make an upgrade about the role of the cardiac rehabilitation in the secondary prevention of coronary heart disease in patients older than 65 years. **Material and Methods:** Medline and Cochrane Library databases research with the keywords "Cardiac Rehabilitation AND Older Adults", "Cardiac Rehabilitation AND Coronary Heart Disease"; and relevant articles were selected. **Results:** In recent years, cardiac rehabilitation programs have observed increases in patients who are older, have multiple comorbidities, heart failure and/or peripheral arterial disease. Despite these benefits, both referral to and participation in exercise rehabilitation have been less frequent in older adults, especially elderly women. A statistically significant improvement in measures of exercise tolerance has been associated with exercise rehabilitation, with no significant difference between the relative improvement of older and younger patients. An exercise-based cardiac rehabilitation is effective in reducing cardiac death, without clear evidence whether an exercise only or a multifactorial cardiac rehabilitation program is more beneficial. There was a favourable but insignificant trend for nonfatal myocardial infarction (MI) and requirement for myocardial revascularization procedures. A meta-analysis showed comparable benefits with exercise and risk reduction strategies, solely exercise, and risk reduction without supervised exercise. Factors influencing participation include socialization opportunities, variation in forms of exercise, enhancing teaching about stress management and more individual counselling but the strength of physician referral was identified as the main one. **Conclusions:** A multifactorial cardiac rehabilitation is associated with a significant reduction in all-cause mortality and cardiac mortality improving processes of care, coronary risk factor profiles, functional status and quality of life but no significant differences were found in the rates of nonfatal MI and revascularization. Despite the evidence in support of benefit of cardiac rehabilitation in older adults, utilization rates are low.

PA608

Evaluation of the Results of Non-Invasive Revascularization When Combined Methods of Therapeutic Neoangiogenesis

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Introduction: In recent years, quite often there are cases of recurrent angina after years/months after successful surgical revascularization. Such patients may not be possible to carry out further surgery. In this context, the relevance becomes a combination of methods of non-invasive revascularization: enhanced external counterpulsation (EECP) and cardiac shock-wave therapy (CSWT). **Materials and Methods:** The study included 20 patients with coronary artery disease. The main inclusion criteria were: severe coronary atherosclerosis (multivessel disease), surgical revascularization in history, the inability to perform further surgery. All patients were treated according to the international standards of medical treatment of CHD. The study group consisted of 9 patients, the control – 11 patients. In study group held EECP (device Vasomedical Lumenair EECP) 35 sessions (duration 1 hour) in combination with CSWT (device Cardiospec) for 3 sessions per week, every 2 weeks (total of 9 sessions). Courses were repeated every 6 months. The control group consisted of 11 patients, who underwent EECP from a regular course. All patients were followed for 5 years. **Results:** The increase in exercise tolerance observed in both groups: peak oxygen consumption in the study group increased by 23,2%, in control group by 18,4% from baseline, $p \geq 0.05$. End-diastolic diameter LV decreased in the study group by $4.0 \pm 0.23\%$, in control group – by $3.3 \pm 0.37\%$, $p \geq 0.05$. Ejection fraction LV increased in the study group by $9.7 \pm 0.18\%$, in

the control group $8.9 \pm 0.26\%$, $p \geq 0.1$. Reduction zone of reduced RP accumulation load according to myocardial SPECT was 18.4% in the study group and 12.6% in the control group, $p \geq 0.05$. There positive results persisted throughout the observation period. The exceptions were 5 patients (2 patients in study group and 3 – in the control group), who underwent stenting of critical stenosis of the coronary arteries. *Conclusions:* According to our observation, this method has stable therapeutic effect. Therefore, the combined use of CWST+EECP, can be considered the best methods for non-invasive revascularization can improve the quality of life patients with severe coronary artery disease.

A.4.2. PULMONARY DISEASES

PA609

Long-Term Tracheostomy Care Status in Amyotrophic Lateral Sclerosis Patients

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Objective: Amyotrophic lateral sclerosis (ALS) patients need long-term management of their respiratory system. Most chronic ALS patients require placement of a tracheostomy. This study evaluated the care provided for long-term tracheostomies by caregivers of ALS patients. *Methods:* A survey was conducted in the form of questionnaires. All measurements were performed by two visiting nurses. *Results:* In total, 19 patients (15 men and 4 women) and their caregivers (7 men and 12 women) participated in the survey. Regarding the patients, the mean period of illness and of having a tracheostomy was 5.31 ± 3.19 and 3.00 ± 2.62 years, respectively. All patients were currently using a mechanical ventilator via a tracheostomy tube. The size of the inner diameter of the tracheostomy tube was 7.5, 8, and 7 mm in 11, 7, and 1 patient(s), respectively. The tube replacement interval was 14, 7, 21, and 28 days in 11, 4, 1, and 2 patient(s), respectively. One patient was unable to provide an accurate replacement interval. All tracheostomy tube replacements were performed by a visiting nurse; however, one caregiver did it herself. Eighteen (93%) caregivers had experience adding tracheostomy cuff volume without measuring the pressure. The reasons for adding cuff volume were difficulty or discomfort in breathing and air leakage around the tracheostomy site in 7 cases each; 4 patients were unable to provide an accurate reason. Two caregivers answered that there were 2 reasons for adding cuff volume: because it was requested by the patient and because of air leakage. According to the caregivers' records, the mean air volume of the tracheostomy cuff was 6.69 ± 3.20 mL; however, according to the visiting nurse, the real mean air volume of the tracheostomy cuff was 7.0 ± 2.86 mL of room air, and the mean pressure was 40 ± 9.40 cm H₂O. *Conclusion:* In this study, we evaluated the long-term tracheostomy care status in ALS patients. The known appropriate cuff pressure is under 20 cm H₂O. Our survey showed that most patients and caregivers had erroneous ideas about cuff volume and pressure. Improvement in the education of patients and caregivers, and long-term professional care of tracheostomies, is very important.

PA610

Some Features of Rehabilitation for Patients with Chronic Respiratory Diseases and Chest Deformations

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Clinical problem includes the thorax deformation because of different disturbances of spine and posture. It results in pathologic changing of chest volume and lungs volumes. Breathing biomechanics becomes inadequate to human demands in respiration. It is important for patients with chronic respiratory diseases. Drugs therapy is not effective.

The aim - determination of new approaches to breath restorative therapy for such patients. *Material and Methods:* Ambulatory and stationary treated patients. Rehabilitation programme included posture correction, breathing kinezotherapy, procedures of therapeutic physical exercises, Yoga-therapy, fitball gymnastics, sound exercises, relaxation exercises, water exercises, methods of massage. Rehabilitation course was carried out daily during 3.5 hours as the cycle of procedures for 2 weeks. It was repeated 2 months later. *Results:* The ventilation disturbances in patients with combined pathology were more expressed than in patients without chest deformation. These differences were interpreted in dynamic indexes of respiration volumes. The worked out tactics of restorative methods improved clinical state of these patients. *Conclusion:* The restoration of respiration function in patients with chronic respiratory diseases depends on improvement of compensatory mechanisms including correction of deformed volumes of chest and lungs. *References:* 1) Breslin E.H., Garoutte B.C., Kohlman-Carrieri V., Celli B.R. Correlations between dyspnea, diaphragm and sternomastoid recruitment during inspiratory resistance breathing in normal subjects. *Chest*, 1990.-Aug.98(2).-P. 298-302. 2) Mador M.J., Acevedo F.A. Effect of inspiratory muscle fatigue on breathing pattern during inspiratory resistive loading. *J Appl Physiol*, 1991.- Apr.70(4).- P. 1627-1632.

PA611

Effects of Whole Body Vibration on Chronic Obstructive Pulmonary Disease: a Systematic Review

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Background: Whole-body vibration (WBV) is becoming popular as an supplementary training in rehabilitation. Recent studies have investigated the application of WBV in people with chronic obstructive pulmonary disease (COPD). The purpose of this review is to examine the effect of WBV in enhancing pulmonary function, functional exercise capacity and quality of life in people with COPD and examine its safety. *Material and Methods:* Randomized controlled trials (RCTs) examining the effects of WBV among people with COPD were identified by two independent researchers. Sources included Cochrane Central Register of Controlled Trials, PubMed, CINAHL, EMBASE, PEDro, AMED, PsycINFO, ClinicalTrials.gov, Current Controlled Trials and reference lists of all relevant articles. Articles were excluded if they were research studies on people with other primary diagnosis, abstracts published in the conferences or books. PEDro scale was used to assess the methodological quality of the selected studies. The results were extracted by two independent researchers and confirmed by the third researcher if disagreement existed. *Results:* Three studies involving 191 participants satisfied the selection criteria and were included in this systematic review. Methodological quality was rated as good for two studies (PEDro score ≥ 6 and sample size > 50). No great benefits on pulmonary function and quality of life were found in WBV treatment group, regardless of the nature of the control group. However, three studies showed that WBV led to significant improvement in functional exercise capacity, as measured with six minutes walking test (6 MWT). Nearly no adverse events were observed. *Conclusion:* WBV might have potential to improve functional exercise capacity after COPD. There was insufficient evidence to prove the effects of WBV on pulmonary function and quality of life in people with COPD. More large and high-quality trials are required.

PA612

A Cadaver Study for Measuring Tracheostomy Cuff Pressure after Air Inflation in Different Tube Types

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Objective: When using cuffed tracheostomy tube, recommended limits of cuff pressure after air inflation are near 15-20 cm H₂O

which is to minimize the structural damage to trachea. Actual tracheostomy cuff pressure might vary with each patient. Therefore, this study was performed to assess tracheostomy cuff pressure by different air inflation and to standardize adequate average amount for various types of tracheostomy tube. **Methods:** We performed tracheostomy to a 46-year old cadaver. An ENT surgeon puts incision with the intention of entering the trachea between the first and second tracheal cartilage. Then, we inserted 3 types of tracheostomy tubes composed of 8 different internal tube diameters and cuff diameters of single cuffed, double cuffed and adjustable flange tracheostomy into the cadaver. Then, we inflated air into the cuff starting from 1ml and measured the cuff pressure with cuff pressure manometer until the pressure excess 120 cm H₂O. To verify the confidence, two rehabilitation medicine clinicians measured 3 times each and the average pressure value was documented. **Results:** For the 7.5 mm/14 mm tracheostomy tube, 3 ml of cuff air inflation showed cuff pressure within 20 to 30 cm H₂O on the manometer dial. Because of the larger diameter, 7.5 mm/24 mm tracheostomy tube showed adequate cuff pressure at 5 ml of air inflation. Similar values were observed between 8.0 mm/16 mm and 8.0 mm/27 mm. Cuff pressure of double cuffed tracheostomy (7.5 mm/20 mm and 8.0 mm/20 mm) at 3 ml of air inflation was 18~20 cm H₂O at both proximal and distal site. For the adjustable flange tracheostomy, cuff pressure at 6ml of cuff air inflation was within the green area. In addition, unlike other types of tubes, maximal air inflation that the cuff pressure was detectable by manometer dial was nearly 14 ml. **Conclusion:** This standard may be helpful to give guidelines for home discharged tracheostomy state patients who do not possess cuff pressure manometer. Also, according to our results, applying double cuffed tracheostomy or adjustable flange tracheostomy will be suitable for some patients who require more pressure than others.

PA613

Early Pulmonary Rehabilitation for Improving Functioning and Quality of Life in Patients with Lung Cancer Eligible for Surgical Treatment

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Background: Many studies have demonstrated the efficacy of pulmonary rehabilitation in COPD, but few clinical trials have focused on its use on lung cancer patients. In our study, we'd like to demonstrate the efficacy of pre and post-operative pulmonary rehabilitation with therapeutic education, on various outcomes (exercise tolerance, lung function, morbidity, depression, pain and QOL) evaluating changes over the short peri-operative period and on long term follow-up. **Material and Methods:** RCT single blinded study. **Participants:** adult patients (>18 years old), with primary lung cancer diagnosis, eligibly for surgical treatment (minor vs major resection) or patients with COPD and lung cancer, enrolled in IRCSS Arcispedale S. Maria Nuova, Thoracic Surgery Division, in a three-years clinical study. The intervention group will receive an overall rehabilitation treatment, with 10 sessions of pre-operative outpatient pulmonary rehabilitation (PR), early inpatient post-operative rehabilitation and long-term exercise beginning one month after surgery. We'll soministrate PR and educational therapy to optimize pulmonary function and the self-efficacy management to prevent complications. **Assessments:** T0 (enrollment): exercise tolerance, pain, depression, comorbidity, quality of life, pulmonary function. T1 (1 day before surgery): pulmonary function, exercise tolerance. T2 (3 month after surgery): length of hospital stay, perioperative complications, exercise tolerance, pain, depression, comorbidity, quality of life. T3 (6 months after surgery): exercise tolerance, pain, depression, comorbidity, quality of life, pulmonary function. **Results:** Treated group is expected to improve the exercise tolerance (6MWT) and lung function (measure of FEV1, DLCO, Tiffeneu index) one month from surgical treatment. We expect also a reduction of postoperative morbidity, mortality and in-hospital stay and an improvement of late outcomes (quality of

life, pain, depression). **Conclusions:** the primary aim of the study consists in improving quality of life and exercise tolerance after lung surgery for cancer through non-pharmacological intervention program, this could carry a positive socio-economical impact. The proposed treatment is non-invasive and non-pharmacological and costs due to treatment may be compensated by postoperative morbidity reduction and in-hospital stay shortening in treated patients. **References:** 1) Rueda Jr et al. Cochrane Database of Systematic Reviews 2011 Issue 9 Loganathan R et al. Chest 2006; 129: 1305-12. 2) Cesario A et al. Lung Cancer 2007; 57; 175-180.

PA614

Early Outpatient Rehabilitation Following Lung Transplantation

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Background: Despite removal of ventilatory limitations, exercise capacity and patients' functional health continues to be impaired following lung transplantation (LuTX). Evidence suggesting feasibility, advantageous effects or even effectiveness of early outpatient rehabilitation starting immediately after acute hospital discharge (phase 2) is sparse and has been limited to patients with relatively good postoperative functional health. This research sought to follow a cohort of consecutive LuTX patients, independent from their postoperative health state, who participated in early outpatient rehabilitation up to 9 months. **Material and Methods:** This prospective observation included 30 consecutive patients who had undergone single or double LuTX (n=28) at a department of thoracic surgery, and participated - independently from any postoperative complications - in a 2 months' outpatient rehabilitation program at a PM&R department. The baseline assessment was performed a few days before discharge from the acute hospital stay, and follow-up data were collected at the end of rehabilitation and 6 months later. The personalized treatment programs usually comprised of regularly supervised therapeutic and breathing exercises, neuromuscular electro-stimulation, psychological and dietic consultations, and regular encouragement to perform daily exercises themselves. Main outcome measures were vital capacity (VC%), forced expiratory volume in 1 second (FEV1%), 6 minutes walking test (6MWT), hand-grip strength, and the SF-36 and St George respiratory questionnaire (SGRQ). **Results:** Patients (mean age: 39 (±13) years, BMI: 19 (±4) kg/m²) started outpatient rehabilitation 21 days after LuTX. As at the end of rehabilitation VC% and FEV1% both significantly improved (p<0.001). 6 months later these outcome variables were further significantly improved. The 6MWT (baseline: 375 m (±113)) significantly improved by 173 m (±70) as at the end of rehabilitation with no further significant improvement 6 months later. Both the SF-36 and the SGRQ were found significantly improved at the end of the intervention, but not further improved 6 months later. **Conclusions:** LuTX recipients undergoing early outpatient rehabilitation benefit from such intervention. Perceived gains in exercise performance seem comparable to those observed in early inpatient programs. Continuing outpatient rehabilitation programs for a longer period of time (phase 3 rehabilitation) might reasonably further contribute to optimizing LuTX patients' functioning and health in the long term.

PA615

Controlled Breathing Training Provided by a Device to Improve Pulmonary Function and Exercise Capacity for Patients with COPD: a Novel Therapy Strategy?

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Objective: To compare the effects on pulmonary function and exercise capacity of controlled breathing training provided by a

device with traditional breathing training on COPD. *Methods:* This was a single centre, randomized controlled parallel group feasibility study. From Sept 2013 to Aug 2014, 40 patients with COPD were considered eligible for outpatient pulmonary rehabilitation for 4 weeks. 20 patients underwent the controlled breathing training program provided by a device (Named CBT group). 20 patients who underwent a traditional breathing training program were taken as controls (Named TBT group). Pulmonary function tests and exercise capacity estimation were respectively analyzed before and after training including forced vital capacity (FVC), forced expiratory volume at 1 second (FEV1), anaerobic threshold (AT), maximal oxygen uptake ($VO_2\text{max}$), and six-minute walk test (6-MWD). *Results:* Compare to the baseline, FVC, AT, $VO_2\text{max}$ and 6MWD improved significantly after 4-weeks rehabilitation program in the CBT group, and a significant increasing trend had also been observed for FVC, and 6MWD except for AT and $VO_2\text{max}$ in the TBT group. Furthermore, there was a trend for more improvement that did reach statistical significance for the CBT group patients in FVC, $VO_2\text{max}$ and 6-MWD compared with those of the TBT group patients. *Conclusions:* The controlled breathing training which provided uniformity and consistent instruction improved pulmonary function and exercise capacity more than traditional breathing training. The controlled breathing training should be a novel therapy strategy in pulmonary rehabilitation program for COPD patients.

PA616

Cervico-Brachial Neuralgia C8 Revealing a Pancoast Tobias Syndrome in Twin Brothers

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Introduction: The syndrome Pancoast Tobias is a set of clinical and radiological symptoms often associated with a malignant tumor of the lung apex. The prognosis is generally severe and depends on the histology of the tumor. We report two cases of Pancoast Tobias syndrome revealed by cervicobrachial neuralgia in twin brothers. *Observation:* This occurred in 41 years aged twin brothers who were smokers. The first presented with a progressive history of inflammatory right sided cervico-brachial neuralgia C8-D1 some two months before the consultation. There was a subclavicular tumour swelling, hyperesthesia in the territory of C8-D1 and a deficit of the intrinsic muscles of the hand. The second twin has consulted a year after for inflammatory left sided cervico-brachial neuralgia C8 some four months before the consultation. There was a partial Claude Bernard Horner syndrome (ptosis), a distended vein at the forearm and sharp and disseminated patellar reflexes. Biology showed an inflammatory syndrome for both; Screening of the thorax showed right apical opacity for the 1st and left for the 2nd. The cervicothoracic CT and MRI confirmed the presence of the apical tumor process and vertebral and rib osteolysis for both and an invasion of the epidural space for the second twin. The two died within a year of diagnosis. *Discussion:* In the early stages of the tumor of the lung apex, shoulder pain represents the most common symptom; common causes include invasion of the parietal pleura, upper ribs, brachial plexus, endothoracic fascia, or the adjacent vertebral bodies. The pain may radiate down the ipsilateral arm following the typical distribution of the ulnar nerve. Thus, clinical features depend upon the location and type of structures invaded at the thoracic inlet by the tumor. *Conclusion:* The diagnosis of Pancoast Tobias syndrome must be mentioned in front of an inflammatory cervico-brachial neuralgia C8-D1 in a smoker patient. Treatment modalities combine radiotherapy and surgical resection en bloc. However, the prognosis remains reserved.

A.4.3. BLADDER AND BOWEL DISORDERS

PA617

Changes of Bioelectrical Activity of Pelvic Floor Muscles during Pelvis Movement in Menopausal Women with Symptoms of Stress Urinary Incontinence: a Preliminary Observational Study

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Introduction: The authors decided to develop this project, assuming that pelvic orientation influences bioelectrical activity of the pelvic floor muscles (PFM) and anatomical location of the bladder neck and proximal section of urethra, depending on the pelvic floor statics. *Primary aim:* Evaluation of bioelectrical activity of the PFM, during forward and backward movement of pelvis in standing position. *Secondary aim:* To check a correlation between the activity of PFM during forward and backward pelvis movement and age, weight, height. The project was funded by the National Science Centre allocated on the basis of the decision number DEC-2011/03/N/NZ7/00505. *Material and Methods:* Forty participants, from the Department and Clinic of Urology, University Hospital in Wroclaw, Poland, were enrolled into project and submitted in qualification procedure based on the chosen inclusion and exclusion criteria. Finally, thirty menopausal and postmenopausal women with stress urinary incontinence (SUI) took part in the study. Electromyographic measurements were conducted using the Myosystem 1400 (Noraxon, Scottsdale, Arizona, USA) and Life-care Vaginal Probe PR-02 (Everyway Medical Instruments Co., Ltd., Taiwan). Measurement of electrical activity of the PFM was assessed in a standing position. All of the women participating in this study were asked to move the pelvis forward and backward. The movements were repeated five times in each side. The sEMG values of functional PFM activity were normalized to peak value (MVC - Maximum Voluntary Contraction). Statistical analysis was performed using Statistica 10. A value of $p < 0.05$ was considered statistically significant. *Results:* Primary outcomes: during forward movement of pelvis, the average bioelectrical activity was 45.0%, (min-max: 21.9 - 77.9%, SD=13.3%) and during backward movement was 52.7% (min-max: 23.5 - 78.5%, SD=15.6%). A statistically significant difference between the two results was observed ($p=0.0366$). Secondary outcomes: Pearson analysis showed non-statistically significant correlation between the results of PFM activity and age ($r=-0.11$; $p=0.550$), weight ($r=-0.12$; $p=0.501$), height ($r=-0.28$; $p=0.122$). *Conclusion:* A program of therapeutic management of SUI could include tasks connected with active work on pelvis orientation, especially increasing PFM activity during backward movement of pelvis, and making it more effective.

PA618

Comparison of Bioelectrical Activity of Pelvic Floor Muscles between Women in Menopausal Period with Stress Urinary Incontinence and Without: a Preliminary Observational Study

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Introduction: A proper assessment of the pelvic floor muscles (PFM) plays an important role in the diagnosis and treatment associated with pelvic floor dysfunction, particularly with respect to stress urinary incontinence (SUI). A surface electromyography (sEMG) is common tool, which is used in research or clinic practice. Continued evaluation of this method is relevant to become more accurate and reliable. The main aim of the study was the assessment of the bioelectrical activity of PFM in women in menopausal period in two groups: in women with SUI and without it. The project was funded by the National Science Centre allocated on the basis of the decision number DEC-2011/03/N/NZ7/00505. **Material and Methods:** Forty-five menopausal women were recruited from volunteers and patients at the Department and Clinic of Urology, University Hospital in Wroclaw, Poland. Based on inclusion and exclusion criteria, thirty-four women were enrolled in the study and they were divided into two groups: in group A, seventeen patients reported symptoms of SUI and in group B, fifteen had normal continence. Evaluation of bioelectrical activity of the PFM was performed by electromyograph MyoSystem 1400L (Noraxon, USA) and vaginal probes. The protocol of all measurements of PFM activity consisted of the assessment of such elements as "baseline", "quick flicks", "contractions", "static hold", "rest tone". Statistical analysis was performed using Statistica 10. Alpha level was set at 0.05. **Results:** During "baseline" and "rest tone" sEMG activity, the highest bioelectrical activity of the PFM was observed in the group B ("baseline" - $p=0.0433$; "rest tone" - $p=0.0157$). On the other hand a statistically significant highest bioelectrical activity of the PFM was observed in the group A during "contraction" ($p=0.0192$). There were no statistically significant differences between the groups during "quick flicks" and "static hold" sEMG activity. **Conclusion:** It seems that the measurement of resting PFM activity may be used in the diagnostics to confirm the prevalence of SUI. Higher functional activity of PFM in women with the SUI may indicate that women more often consciously activate the muscles to reduce the symptoms of SUI.

PA619

Trocar Catheter Transurethral Botulinum a Toxin Injection for the Treatment of Detrusor External Sphincter Dyssynergia

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Introduction/Background: Botulinum toxin A (BTX-A) has been safely used to treat detrusor external sphincter dyssynergia (DESD) in patients with spinal cord injury (SCI) and shown to have a therapeutic effect in improving voiding efficiency and recovering detrusor contractility with few reported side effects in a number of patients. However, BTX-A is not a routine treatment method in patients with SCI and DESD, due to injection operation inconvenience. A simpler method is desired. Therefore, the objective of this study was to evaluate the effects of ultrasound-guided trocar catheter transurethral injection of BTX-A into the EUS of patients with SCI and DESD. **Material and Methods:** a total of 15 male patients aged 22-64 yrs with suprasacral SCI and DESD were enrolled. Transrectal ultrasound was performed with patients using a well-lubricated transducer probe. The angle (θ) between the prostatic urethra axis and the bulbar urethra axis was measured in the sagittal plane. All patients received 100 U BTX-A injections into the EUS via transrectal ultrasound-guided trocar catheter urethra injection. The urodynamic parameters assessed included maximal detrusor pressure, detrusor leak-point pressure, maximal pressure on static urethral pressure, post residual urine volume and maximal flow rate. **Results:** The results showed that the mean angle (θ) between the prostatic urethra and the bulbar urethra was 108.1

(± 5.8) degrees. The EUS was clearly identified as a neatly hypo-echoic area extending from the prostatic apex to the levator ani muscle in all patients. BTX-A urethral injection provided 4 patients (28.5%) with an excellent result and 7 patients (46.7%) with an improved result, while 4 patients (28.5%) experienced treatment failure. The overall success rate was 75.2%. We observed significant reductions in the static urethral pressure ($P<0.05$) and detrusor leak-point pressure after treatment ($P<0.05$), but not in the detrusor pressure. The postvoiding residuals were significantly decreased in the fourth week after treatment ($P<0.05$). **Conclusions:** Transrectal ultrasound-guided trocar catheter transurethral BTX-A injection into the EUS effectively suppresses or ameliorates DESD. A potential advantage of the method is that ultrasound guidance may not be necessary in the next injection.

PA620

Patterned Electro-neuromuscular Stimulation (PENS) Vs. Tolterodine ER in the Treatment of Frequent Urination

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Purpose: Pilot study to compare the efficacy of home PENS vs. extended release Tolterodine 4mg in the management of urinary frequency. **Methods:** Prospective randomized clinical trial was conducted with subjects assigned to either 12 weeks daily home PENS therapy or 4 mg oral extended release Tolterodine. Home PENS treatment incorporated a neuromuscular stimulator producing brief repeated muscle contractions to the muscles of the lower abdomen and upper inner thigh for 20 min. five days per week. Bladder capacity and urgency were evaluated using pre and post treatment urodynamic testing and q 4 week bladder diaries, the Urinary Distress Inventory (UDI-6), the Incontinence Impact Questionnaires (IIQ-7), and the SF-36 questionnaire were used to compare clinical response to treatment. **Results:** 43 subjects were enrolled and randomized and 41 subjects completed the 12 week study. Statistically significant reduction in voiding frequency was observed for both groups at 12 weeks (PENS -26.0%, $p=0.001$; Tolterodine ER -17.3%, $p=0.002$). Both groups demonstrated statistically significant reduction in UDI-6 scores. PENS patients demonstrated a statistically significant increase in bladder volume at 1st sensation of filling (+27.7 cc), normal desire to void (+61.4 cc), and capacity (+63.0 cc) on urodynamic testing while no significant change was noted in sensory response to filling for the Tolterodine group. There was a significant reduction in IIQ-7 scores for the PENS group for questions: 2, 3, 4, 5, and 7, and a reduction in IIQ-7 scores for the Tolterodine group for questions: 2 and 7. A change in SF-36 scores for the PENS group for questions: 1, 2, 4, 14, 15, and 21. (General health, health vs a year ago, ability to perform activities, accomplish less than you would like, limited in the kind of work, bodily pain in the last 4 weeks) There was a statistically significant change in SF-36 scores for the Tolterodine group for question 5. (carrying groceries) **Conclusions:** Daily home PENS provides significant reduction in daily voids among women with urinary frequency, improved subjective assessment of inconvenience, and is comparable to oral Tolterodine LA. PENS provides improved urodynamic parameters of bladder filling and is well tolerated.

PA621

Bladder Dysfunction in Patients with Huntington's Disease

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Introduction: Although Huntington's disease most prominently affects patients' movement, cognition, and personality, patients also

complain of micturition problems. Bladder symptoms were reported in patients with advanced as well as in patients in early disease (1, 2). So the aim of the study was to objectively confirm micturition problems in Huntington's disease patients and presymptomatic gene carriers. *Material and Methods:* Patients and presymptomatic gene carriers were invited to participate in a standard urodynamic investigation including filling and voiding (pressure/flow) studies. The history of voiding dysfunction and Huntington's disease was taken. Level of neurological impairment was assessed with motor part of the UHDRS scale. Patients were asked to fill in the bladder diaries also. *Results:* Invited were 27 eligible candidates, urodynamic studies were done in 12 patients (6 men) and 1 presymptomatic patient. Median age of 12 HD patients evaluated with urodynamics was 50 years (range, 33–68 years), with median disease duration of 5 years (range 2–15 years), and median motor UHDRS score of 45 (range 18–96). In bladder diaries patients reported different voiding problems, most of them (seven) urgency. During filling cystometry the most common finding in our patients was normal detrusor function. Detrusor overactivity was found in 2 patients. During voiding cystometry detrusor-sphincter dyssinergia was found in 5 HD patients; 1 of them had detrusor overactivity on filling cystometry. Patients with detrusor-sphincter dyssinergia had rather long disease duration (median 12 years, range 4–15 years). Studies were completely normal in presymptomatic gene carrier and in 3 patients. *Conclusion:* In our patient sample in spite of typical symptoms urodynamically proven detrusor overactivity was rare. However, detrusor-sphincter dyssinergia was common in the advancing disease. These findings are probably consistent with degeneration and dysregulation of basal ganglia and other central autonomic structures. *References:* 1) Kirkwood SC, Su JL, Conneally P, et al. Progression of symptoms in the early and middle stages of Huntington disease. *Arch Neurol* 2001;58:273-278. 2) Kolenc M, Kobal J, Podnar S. No electrophysiological evidence for Onuf's nucleus degeneration causing bladder and bowel symptoms in Huntington's disease patients. *NeuroUrol Urodyn*. 2014; 33: 524-30. doi: 10.1002/nau.22451. Epub 2013 Jun 26.

A.4.4. CANCER

PA622

Impact of Interventions with Music on Pain, Anxiety and Quality of Life of Cancer Patients

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Background: Music can positively affect neuro-physiological and emotional responses. The aim of this study was to evaluate the evidence of benefit of music-based interventions in cancer patients, particularly their impact on pain, anxiety and quality of life. *Methods:* A systematic literature review published until September 2014 on the MEDLINE and Web of Science databases. *Results:* Fourteen randomized controlled trials (RCT) met the inclusion criteria (the analgesic effect was evaluated in 4 RCT, the anxiolytic effect in 11 RCT and the impact on quality of life in 4 RCT). The intervention methods and assessment measures differed across studies. Most studies showed a significant improvement of the parameters evaluated in the group of patients receiving intervention with music. *Conclusion:* Music positively influence the emotional and neurophysiological responses, it seems to promote analgesia, relaxation and improved quality of life. Thus, the literature suggests that music interventions have a significant positive impact on cancer patients, especially when they are subjected to treatments that cause pain, anxiety and inability in different levels. However, more studies are needed to determine the most effective type of intervention, the parameters that best assess its effectiveness and which subpopulations of cancer patients respond best to this type of intervention.

PA623

The Impact of Lymphedema on Functionality and Quality of Life of Patients with Breast Cancer

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Background: Lymphedema following breast cancer remains a common and feared treatment complication. The aim of this study was to review and evaluate the impact of lymphedema in terms of functionality and quality of life of patients with breast cancer; the associated risk factors and treatment. *Methods:* Review of literature published until September 2014 on the MEDLINE and Web of Science databases. *Results:* Axillary lymph node dissection is the risk factor for lymphedema secondary to breast cancer most often cited in the literature. Radiotherapy, chemotherapy, mastectomy, number of nodes removed or positive, obesity and lack of physical activity are other risk factors indicated. The development of lymphedema is associated often with pain, limited mobility, lack of muscle strength, fatigue, heaviness in the affected limb, decreased self-esteem, body image distortion, limitations in performing activities of daily living; causing thus organic, structural and functional disability. A rehabilitation treatment comprising an individualized exercise program appears to significantly reduce the pain, swelling and functional limitations. *Conclusion:* Recent advances in the treatment of breast cancer reduced the incidence of lymphedema. However, the negative impact of this entity remains significant. Early diagnosis and timely treatment is crucial and has a positive impact on therapeutic success, functionality and quality of life.

PA624

The "Chemobrain"; Topics about the Cognitive Impairment in the Oncologic Patient

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Cancer is a life critical event; it affect not only the structure, it could impact different aspects for the maintenance of function in activities of daily living. The effects on cognitive functions had been described in survivors cohorts, and they are explained in different damage pathways; each one interdependently affect the information processing. The Rehabilitation Oncologic group in Bogotá, has been observing the correlation between the cognitive function, the independence capability, the oncologic disease stage and the functional prognostic at short and medium term. The preliminary results has been oriented the interventions into two principal ways, the palliative care and the educative and cognitive stimulation. The inpatients with a great health damage because the oncologic disease progression or the treatment effects, shows a intercurrent encephalopathy, that is described as a fluctuation in the reality reason in short time, the fault in executive functions, and a several levels of dependence; as short the attention span is, short is the life prognosis. Patients with several levels of dependence, but without a progression of oncologic disease, has mistakes in executive function, with positive introspection, so the rehabilitation care should be educative oriented. In other hand, outpatient scenario, shows a great spectrum; at first place, there is not a pre-morbid functioning knowledge; anyway, there is a relationship between the highest mental function and adherence to proposed interventions from the rehabilitation service. The mental status are valued initially with MOCA, neuropsychological assessment is done when it is suspected course with cognitive impairment in elderly patients. The mayor issues affected in outpatient service were related with short term memory, work memory and executive function; so the interventions are oriented in compensation of these. As a result of these observations, the Oncologic Rehabilitation Team includes the formal assessment of higher mental processes, as a prognostic indicator in both inpatient and outpatient, allowing targeting interventions according to the patient's functional capac-

ity. This has enabled a more comprehensive approach to cancer patient, covering beyond the alteration in the structure, to include the impact of the disease on the patient's functioning.

PA625

Telemedicine Platform for the Comprehensive Management of Upper Limb Lymphedema after Breast Cancer

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Introduction: Lymphedema is a potential side effect of breast cancer surgery and radiation therapy that causes severe physical and psychological morbidity. As symptoms can appear during the months or even years after treatment ends, these patients require a comprehensive approach through information, prevention, treatment and close monitoring. The Authors and the Institute Ramón y Cajal for Health Research (IRYCIS) have developed an online platform for comprehensive management of upper lymphedema after breast cancer, including its early detection, a practical-theoretical training and the possibility of contact with the specialist for quick reference doubts and new symptoms. This tool would avoid unnecessary visits, shorten waiting lists, increase patient adherence to treatment and improve early diagnosis. **Material and Methods:** The prototype software and website have been developed by a multidisciplinary team formed by highly experienced rehabilitators, physiotherapists and computer engineers. The developed tool consists of a platform with educational content, including exercises, videos, and guidelines to monitor for signs and early symptoms of adverse effects. In the structure of the website are general and specific contents and provide relevant information about lymphedema, determine the degree of patient satisfaction, assess adherence. The therapy can be monitored by doctors and physiotherapists through the application, using a webcam or Kinect. This direct communication channel will also facilitate early diagnosis of new case. **Results:** Telemedicine brings the possibility to assess, diagnose and monitor patients' therapy without the need of face-to-face consultation. This option allows patients to choose the place and time for their therapy, avoiding absenteeism. The use of the telemedicine system could be extended to other centers or institutions. In addition, it could be used for the management of lower limb lymphedema secondary to cancer processes (vulvar cancer, ovarian cancer, melanoma and prostate cancer). **Conclusions:** Access to contents of this website is the best way to prevent the onset, complications and disability associated with lymphedema. This tool aims to be fast and convenient application to provide information about lymphedema, prevention, treatment and be a rapid doctor-patient communication. **Stage of Development:** Software and website prototype available. Intellectual Property Rights: Software and website code are protected by copyright.

PA626

Exercise Training in Cancer Patients Scheduled for Elective Surgery

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Introduction/Background: Europe is facing an annual incidence of 3.5 million new cases of cancer. Treatment of cancer is often associated with surgery, while surgery is associated with a risk of complications. Patients with a decreased health status before surgery, like cancer patients, have an increased risk of developing postoperative complications. This study investigates the feasibility and possible benefits of a preoperative exercise program aimed at improving general health status on training parameters and postop-

erative outcomes. **Materials/Methods:** Oncological patients were asked to participate in an in-hospital rehabilitation program prior to the surgery. The rehabilitation sessions took place twice a week for 1.5 hour per session and consisted of endurance exercises, strength exercises and inspiratory muscle training. Cardiorespiratory fitness (Astrand test), peripheral muscle strength (quadriceps and hand grip strength) and inspiratory muscle strength (maximal inspiratory pressure) were measured weekly in the participating patients. Feasibility was evaluated by participation rate, attendance rate and adverse events. Differences between participants and non-participants were determined for postoperative complications and length of hospital stay. **Results:** Of the 168 patients eligible patients, 115 followed the training program and 53 served as control. Patients suffered from cancer of the pancreas (16 vs 9), liver (28 vs 9), colon (27 vs 22), esophagus (35 vs 6) or stomach (9 vs 7). The participants attended on average 5.7 (± 3.5) training sessions. The overall attendance rate of the training sessions was 82%, no adverse events occurred during training. The time course of the training parameters will be analyzed using multi-level analysis. Preliminary analyses show a positive trend for inspiratory muscle strength and knee extension strength. Cardiorespiratory fitness and hand grip strength were comparable before and after training. Differences in postoperative outcomes will be corrected using propensity scores. Preliminary and uncorrected analysis show no differences between groups on postoperative complications or length of hospital stay. **Conclusion:** Exercise training in oncological patients awaiting surgery is safe and feasible. The exercise program resulted in stabilizing cardiorespiratory fitness and hand grip strength, and improved inspiratory muscle strength and knee extension strength. The training program seems not to have influenced postoperative outcomes. This conclusion is based on preliminary analysis.

PA627

Do Patients with Cancer Benefit from Rehabilitation Medicine Services?

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Background: The role of rehabilitation services in the management of cancer patients has not yet gained popularity in the United Kingdom despite the evidence supporting its use. **Aim of the Study:** To identify the extent of gains made by cancer patients in rehabilitation medicine settings. **Design, Subjects and Setting:** Retrospective case series review of cancer patients undergoing inpatient multidisciplinary rehabilitation at a rehabilitation department. **Methods:** Clinical notes over 56 months period (Jan 07-Aug 11) were reviewed. Information on Functional Independence Measure scores, length of hospital stay, psychological complications, discharge destination were collected. **Results:** 35 patients (19: 16 M: F). Mean hospital stay was 54 days. 32 (92%) patients were admitted from other hospital departments or hospice. Only 3 (8%) were admitted from home. 26 (75%) patients were discharged home following rehabilitation. 20 (57%) patients achieved their rehabilitation goals; their FIM improved from median 86 (41-118) on admission to median 110 (60-125) on discharge. On individual level the minimum improvement in FIM was 7 points. 9 (45%) out of these patients had mild psychiatric problems: 15 (43%) patients did not achieve their rehabilitation goals or did not become involved in the multidisciplinary rehabilitation process altogether. 14 (94%) out of these patients had severe psychiatric complications. **Discussion:** Patients with cancer diagnosis appear to benefit from interdisciplinary rehabilitation. Inpatient multidisciplinary rehabilitation may help to improve the function of cancer patients in preparation for being discharged home. Developing psychiatric complications is common in the cancer patients population which may threaten the rehabilitation process. **Conclusion:** Multidisciplinary rehabilitation teams need to be prepared to accept patients with cancer diagnosis. Early recognition of psychiatric problems may be useful.

PA628

Relevance of Pre-Operative Frailty and Post-Operative Complications in Geriatric Patients with Esophageal Cancer Treated Surgically*D. Makiura¹, J. Inoue¹, R. Ono², Y. Sakai¹, Y. Miura¹¹Kobe University Hospital, ²Kobe University Graduate School of Health Sciences, Kobe City, JP

Introduction: The number of geriatric patients with cancer who undergo surgery has been increasing remarkably. Physiological aging process plays important roles in postoperative recovery, however little is known regarding consequences of esophagectomy for geriatric patients with esophageal cancer. Therefore, we examined the relevance of preoperative physical frailty with postoperative complications and physical functions. **Material and Methods:** From September 2011 to May 2014, 92 patients with esophageal cancer underwent esophagectomy in our hospital. Seventy-two patients were included in this study while 20 patients without complete data or consent were excluded. Walking speed, grip strength, lower extremity strength and six-minute walk test were evaluated before and around 30 days after surgery. Weak grip strength (male: <26 kg, female: <17 kg) and/or slow walking speed (<1.0 m/s) defined physical frailty. Postoperative complications and physical functions were compared between the preoperative frailty group and the preoperative non-frailty group using the Fisher's exact test and the Student's *t*-test. **Results:** The subjects were 60 males and 12 females (mean age 66.4 years). Twenty-three patients (31.9%) were categorized into the frailty group and 49 (68.1%) were into the non-frailty group. Females were more likely to be categorized into the frailty group (frailty: 7 (30.4%), non-frailty: 5 (10.2%)). Patients in the frailty group showed significant higher rates of postoperative pulmonary complications (frailty: 39.1%, non-frailty: 12.2%). **Conclusion:** In geriatric patients with esophageal cancer treated surgically, female was related with the physical frailty. Moreover, preoperative physical frailty may predict postoperative complications.

PA630

Evaluation of Effects Of Strength - and Endurance Exercise on Oncologic Patients in an Ambulant Setting (Pilot Study)

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Introduction: 1/3 of all cancer associated fatal cases are attributed to tumor cachexia. As chemotherapeutical interventions cause a decrease of physical strength, oncologic patients lose the ability to perform adequate in activities of daily living. **Methods:** 21 patients were diagnosed with an oncologic disease (12 mastocarcinoma, 7 rectum carcinoma, 2 Hodgkin lymphoma) and were recruited after the first cycle of chemotherapy within 2 to 4 weeks before exercise training after approval by an oncologist. The participants received strength- and endurance group exercises according to the principles of medical training therapy (20 minutes endurance exercises, followed by an individualized strength exercise training). The participants received treatment in form of circuit training, including exercises on a bicycle ergometer, arm ergometer, treadmill, leg press and rope pull. Vital parameters (SpO₂, RR, puls frequency) were measured before and after exercise. Patients received 10 units of circuit training, 1 hour per week, as well as a home exercise plan with Thera-Band exercises for the upper extremities and an individualized squat training for the lower extremities. Assessment of the individual strength of each participant was performed by isometric measurement of maximum muscle strength on the leg press and arm ergometer. Target parameters for outcome evaluation were: walked distance in meters for the 6 minute walk test, rpm in N.m for Thera-Vital as well as maximum muscle strength in N.m for the leg press. **Results:** Evaluation of body strength and endurance before and after a 10 week exercise program using

paired *t*-test showed significant improvement in the target parameters for the 6 minute walk test [*p*=0.000; *t*=4.854 (19)], the leg press [*p*=0.000; *t*=7.732 (20)] and for the Thera-Vital [*p*=0.000; *t*=6.115 (14)]. **Conclusion:** In this study patients with an oncologic diagnosis received treatment in form of strength- and endurance training in an ambulant group setting. After 10 weeks of exercise, significant improvements to the overall strength and endurance, as well as increased mobility could be observed. The outcome of this pilot study is consistent with existing literature, according to which the increase of fast fibers (type II) is a result of an increased protein synthesis in muscle hypertrophy.

PA631

Thoracic Lumbar Spinal Orthosis Prescription as an Alternative to Stabilizing Surgery in Patients with Advanced Cancer with Bone Metastasis: a Local Experience*P. Ritter¹, R. Fernández¹, L. Berna², M. Orellana¹, J. Palominos³, H. Awad¹¹Hospital del Salvador, ²Rehabilitation National Institute, ³Military Hospital, Santiago, CL

Background: When an advanced cancer exists and secondary vertebrae metastasis occurs, there is a higher risk of spine injury related. Strategies to protect spine meanwhile the patient receives palliative radiotherapy and mineralization bone treatment is encouraged, plus anticancer therapy. Thoracic-Lumbar Spinal Orthosis (TLSO) plays an important role in places where there is no access to orthopedic surgery for advanced cancer patients. **Objective:** To show our experience about TLSO prescription in patients with pain and high risk of vertebral fracture due to advanced metastatic cancer, who had lack of access to a stabilizing surgery in a public hospital, Santiago, Chile. **Methods:** Descriptive, retrospective study. After Ethics Committee approval, clinical database of patients with bone metastasis and pain with TLSO prescribed at our Unit was collected. TLSO time of prescription, Pain classification and measurement with NRS before and after TLSO use, analgesic therapy and spine injury occurrence were obtained after chart review, and measure of central tendency was obtained and significance tests were applied. **Results:** A total of 64 patients (34 female) were included. Mean age 59, 5 year-old. Pain was classified as Somatic Pain (53%), visceral (19%), neuropathic (5%), and mixed (23%). Mean TLSO active time use was 3.2 months. NRS 8 (5-9) before using TLSO. NRS post 3 (2-8) without any modification to opioids analgesic dosage (*p*<0.005). No patient with opior-tune prescription suffered spine injury. **Conclusion:** To prescribe a stabilizing column orthosis is an effective tool to protect spine in patients with advanced cancer and bone metastasis, when there is no access to stabilizing surgery.

PA632

The Role of Physical and Rehabilitation Medicine in a Early Radiation Induced Lumbosacral Plexopathy – a Case Report*R. Cadilha¹, H. Amorim², C. Marques², J. Barroso²¹Viana do Castelo, ²Oporto, PT

Case Diagnosis: Radiation induced lumbosacral plexopathy. **Case Report:** The authors present a case of a 72 year-old woman, followed in a Physical and Rehabilitation Medicine (PRM) consult due to a radiation induced lumbosacral plexopathy. She was diagnosed with endometrial adenocarcinoma and submitted to total hysterectomy with bilateral anexectomy and pelvic and aortic lymphadenectomy in October/2013. Subsequently underwent external pelvic and paraortic radiation therapy (until February/2014 - 45Gy in 25 fractions) plus vaginal brachytherapy and systemic chemotherapy. In April/2014 she referred paresthesias in lower limbs interpreted as side effect of chemotherapy. In the end of May, she presented distal weakness in both lower limbs and was hos-

pitalized in Oncology department. She was observed in the PRM consult presenting reduced muscular strength (hip flexors G4/G4; knee extensors G3/G3; ankle dorsiflexors and plantar flexors G0/G0; hallux extensors G1/G1) and impairment of sensation in the lower extremities. Bowel and bladder function were normal. She realized a magnetic resonance imaging (MRI) of the pelvis and an electromyography (EMG) that confirmed the diagnosis of radiation induced lumbosacral plexopathy. She began a rehabilitation program with strengthening of lower extremity muscles, gait and use of assistive devices for ambulation training. After discharge, she was oriented to our consult to continue treatment. *Discussion:* Lumbosacral plexopathies can be seen in patients receiving pelvic irradiation, but are uncommon with standard external radiation doses. Generally it is a rare late side effect of radiation, but in this case appeared after a few months. So, it was necessary to exclude a nervous system involvement by tumor. Gradual progression of radiation-induced lumbosacral plexopathy is the rule and patients may have significant disability and pain. A good physical examination to determine what neurologic and functional deficits are present is crucial. *Conclusion:* Radiation plexopathy typically progress slowly for years after radiation therapy. Rehabilitation aims to maximize mobility and functional independence. Pain control is another important part of treatment.

PA633

Our Experience in Rehabilitation Treatment in Early Postoperative Period at Patients with Breast Cancer

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Background: Breast cancer is the most common malignancy in women worldwide. The main treatment for most of the breast cancer is mastectomy. Many cancer survivors suffer from post-operative trauma and treatment-related morbidities and 40% of patients complaints after primary treatment. This study aimed to explore the use of multidimensional rehabilitation in early post-operative period. *Methods:* Analysis was performed prospectively and retrospectively at study cohort (178 female, 30 – 72 years) and control cohort (150 female, 33 – 74 years) of surgically treated breast cancer patients. Rehabilitation therapy was provided at study cohorts next day after surgery. It was included physical activities of patients, massage in the electrostatic field, common magnetotherapy. Effectiveness was analyzed by presence of the pain, edema and chylorrhea, which were evaluated by clinical evidence the last ones at early postoperative period and at follow-up visits at 6 months. *Results:* Quantity of patient days in hospital at study cohort received early rehabilitation therapy was less on 4-5 days than at patients among the control cohort. The presence of the pain, edema and chylorrhea were noted among the study cohort in 10%, 24%, and 18% and were lower compared with control group - 12%, 29% and 24% respectively. The follow-up comparison at 6 months demonstrated the pain and edema in 32% and 41% in study cohort whereas these markers significantly higher in control group - 48% and 63% respectively. *Conclusion:* Early postoperative multidimensional rehabilitation at surgically treated female breast cancer patients significantly decreased treatment-related morbidities after primary treatment.

PA634

Lymphedema in Sentinel Node Negative Breast Cancer Patients: a Long Term View

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Introduction: The sentinel lymph node biopsy (SLNB) is widely used as a standard procedure in breast cancer patients. The advantage of SLNB is that it reduces the number of axillary lymph node dissections (ALND) in patients with breast cancer. In the literature, SLNB and ALND are often compared with beneficial

results in favor of SLNB regarding lymphedema. Despite a strong reduction in morbidity after the SLNB procedure, the negative aspects may be underestimated. There is still a risk of lymphedema among women operated with SLNB alone. *Methods:* 126 breast cancer patients who underwent a SLNB in the Breast Clinic of the University Hospital in Antwerp more than 2 years ago were included in this cross-sectional study. Lymphedema was assessed by means of a newly developed questionnaire. Patients were asked to report if they ever developed lymphedema post-surgery, whether they still had lymphedema and which treatment for lymphedema was provided. *Results:* 7.1% of sentinel node negative patients reported that they had developed lymphedema since their surgery. In the period of 2 to 7 years post-surgery 5.6% of patients reported that the lymphedema was still existent. Patients with lymphedema had significant limitations in activities of daily living; work ($p=0.027$), household ($p=0.027$), driving ($p=0.037$) and sports ($p=0.019$). Current standard management of secondary lymphedema is the complex decongestive therapy (CDT). This includes the application of bandaging, manual lymph drainage (MLD), exercise, skin care and compression therapy. Of all patients with arm lymphedema, MLD was performed in 77.8%, exercise in 44.4%, the application of bandaging in 22.2% and none of the patients received information on skin care. The correct CDT was provided in none of the patients. *Conclusion:* Arm lymphedema in sentinel node negative patients is not negligible and has a significant impact on activities of daily living. Few patients received the correct treatment for lymphedema which is essential for the management of this chronic condition. Therefore it is important to encourage therapists to use CDT. *Reference:* Verbelen H, Gebruers N, Eeckhout FM, Verlinden K, Tjalma W: Shoulder and arm morbidity in sentinel node-negative breast cancer patients: a systematic review. *Breast Cancer Res Treat* 2014, 144(1): 21-31.

PA635

Emerging Issues in Breast Cancer Rehabilitation and Quality of Life: an Observational Study in Italian Breast Cancer Survival Patients

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Introduction: In the last decades Breast Cancer (BC) survival has increased, however, patients receive aggressive treatments or associations of treatments (1) and emerging issues occur. The aim of our observational study was to evaluate prevalence and features of rehabilitation issues (2) and Quality of Life (QoL) in a population of disease-free BC women attending our oncologic rehabilitation center. *Materials and Methods:* From 1st July 2011 to 31st December 2011 we enrolled 179 disease-free BC women, after collecting their consent to the study. Inclusion criteria were: age 18-85 years; absence of severe comorbidities (excluding osteopenia/osteoporosis) and other cancers. We recorded: age; BMI; menopausal status; assumption of aromatase inhibitors (AIs); rehabilitation issues prevalence and features and QoL by SF124 (3) at enrollment and the issues persistence at 24 months. Suffering patients received appropriate drugs and Physical Therapy. *Results:* Our results were: median age 63 years (min 35 –max 85 ; median BMI 28 (min 19- max 42); percentage of menopausal women 96%, of women taking AIs 66.48%, of upper limb lymphedema 69.27%, of osteopenia 30.72% and osteoporosis 18.43%, of paresthesias 30.16%, of benign musculoskeletal pain (NVS> 4) 44.13%, and of tendinopathy 16.20%; SF12 mean PCS score 36.5 (SD 10.5) and mean MCS score 42 (SD 11.5); rehabilitation issues 24th month prevalence 62%. *Conclusions:* In our population lymphedema, osteopenia and osteoporosis, paresthesias, musculoskeletal pain and tendinopathy are the most represented issues, they can last a long time despite appropriate treatments and the QoL appears unsatisfactory especially in the physical components. Our study is not exhaustive about BC burning issues but we arise the question that

an early and prolonged rehabilitation care is need in these patients. *References:* 1) Niravath P. Aromatase inhibitor-induced arthralgia: a review. *Ann Oncol* 2013, June; 24(6):1443-9. The Diagnosis and Treatment of Peripheral Lymphedema, 2013 Consensus Document of the International Society of Lymphology. *Lymphology* 2013 Mar; 46 (1): 1-11. 2) Gandek B, Ware JE, Aaronson NK, Apolone G, Bjorner JB, Brazier JE, et al.: Cross-validation of items selection and scoring for the SF-12 Health Survey in countries: results from the IQOLA project. *J Clin Epidemiol* 1998; 51: 1171-1178.

PA636

Individualized Exercise Training for Cancer Patients in the Onkospportzentrum (Oncosportcenter) Bonn-Rhein-Sieg/Germany

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Introduction/Background: Cancer patients experience numerous disease and treatment-related adverse effects like fatiguesyndrome and poorer health-related quality of life. Exercise interventions are useful in order to alleviate these adverse outcomes. Oncology care in the region of Bonn/Rhein-Sieg in Germany is professionally organized in a network consisting of three large oncology specialized hospitals, 5 large private practices and psychooncology services. Lately a cancersports center, managed by a physiatrist specialized in sports medicine, has been adjusted into this network. There, patients are treated before, during and after chemo or radiation therapy. *Material and Methods:* During a preliminary investigation 75 patients (age 62±13.4) were treated with an individualized exercise protocol consisting of 30 sessions of fitness training. Patients were examined by the PRM-specialist and enrolled in the treatment protocol. Life quality measures of the Wisconsin pain questionnaire were used in order to evaluate pre and post treatment results. *Results:* Treated cancer entities were lung, stomach, mamma, kidney, rectum, CCL, Non-Hodgkin-Lymphoma and soft tissue sarcoma. Pain, general activity, mood, walking ability, normal work, relationship, sleep and joy of life could be improved significantly. *Conclusion:* Treatment of cancer patients with individualized training programs can be quite successful. The coordination of such training programs by a Physiatrist, who is in close communication with the oncologists and the physiotherapists can be very effective on behalf of the patient. Oncologists appreciate the expertise of a PMR specialist as a complementary treatment chain in order to improve life quality and fatigue syndrom.

PA637

Axillary Web Syndrome in Breast Cancer Patientes

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Introduction: The first time that the expression Axillary Web Syndrome (AWS) appeared in the literature was in 2001, to describe the pathologic triad of postoperative pain, decreased range of motion of the ipsilateral shoulder and a cord-like structure extending from the axilla into the ipsilateral arm that can arise after breast cancer surgery. *Material and Methods:* As AWS is becoming an increasingly recognized complication in these patients, the authors reviewed the literature about this syndrome. *Results:* Axillary Web Syndrome is a cause of significant morbidity following axillary surgery but there is a large variability in the reported incidences (6-72%). Its pathogenesis, risk factors, evolution and treatment are also controversial. AWS can rarely be associated with sub-cutaneous nodules which need investigation until metastases are ruled out. Although Axillary Web Syndrome is described as a self-limiting condition, in our practice education and physiotherapy treatment seemed to help in limiting subsequent shoulder dysfunction. We also found some chronic cases of AWS, which needed a specific approach. *Conclusions:* Further research is needed especially to develop a standardized therapeutic intervention for Axillary Web Syndrome.

PA638

The Effectiveness of Physical Exercise on Fitness and Fatigue in Patients Treated with High Dose Chemotherapy: The First Results of the Exercise Intervention after Stem Cell Transplantation (EXIST) Study

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Introduction: Although high dose chemotherapy followed by autologous stem cell transplantation (ASCT) improves the outcome of patients with multiple myeloma or lymphoma, patients often experience serious short- and long term side effects that negatively influence their quality of life. One of the most frequent and disturbing side effects is cancer related fatigue. Within the field of cancer rehabilitation, physical exercise interventions are currently seen as one of the most promising treatment options for cancer related fatigue. Evidence in patients treated with ASCT is, however, limited. Therefore, this study aimed to evaluate the effects of a rehabilitation program plus usual care on fatigue and physical fitness in patients with multiple myeloma or lymphoma recently treated with ASCT. *Materials and Methods:* Between March 2011 and January 2014, 109 patients were included in this randomized controlled trial. Patients were randomly assigned to the intervention (n=54) or control group (n=55). In addition to usual care, the patients in the intervention group followed an 18 weeks individualized supervised high intensity resistance and interval training program. Patients in the control group received usual care only. Outcome assessments took place before and directly after the rehabilitation program or at similar time points post ASCT in the control group. Primary outcomes included objectively measured cardiorespiratory fitness and muscle strength and self-reported fatigue with the Multidimensional Fatigue Inventory (MFI). *Results:* The effects of the rehabilitation program are still to be analyzed and will be presented on the ISPRM 2015.

PA639

Cancer Rehabilitation of Children with Bone and Soft Tissue Sarcomas

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Introduction: Cancer rehabilitation is becoming more of a focus for the field of physiatry due to increased longevity and the side effects of treatment. *Material and Methods:* In order to investigate the rehabilitation needs of patients, chart analysis was conducted on 46 children at the mean age of 12.4±4.2 years (aged 3 - 19 years), 25 (54.3%) males, 21 (45.7%) females treated for primary solid malignant tumors by chemotherapy, radiotherapy, oncologic surgery, included limb-sparing procedures. Histologically, 24 patients had ESFT, 18 - OS, rhabdomyosarcoma - 3, chondrosarcoma - 1. The most often affected area was lower extremity - 30 cases, upper extremity - 5, pelvis - 5, trunk - 4, axis - 2. Twenty patients had distant metastases. 18 patients underwent courses of preoperative inpatient physical therapy, at the neoadjuvant part of special treatment, 18 patients underwent courses of postoperative inpatient physical therapy at the adjuvant part of special treatment, 26 patients underwent courses of physical therapy during remission. This study evaluated the short and long-term changes in physical fitness of a child with a childhood malignancy; using an individual rehabilitation program, consist with combined physical exercise, kinesiotherapy, aquatic rehabilitation and orthopedic correction implemented during and shortly after treatment. Training is performed individually, under the supervision of an experienced pediatric physical therapist. *Results:* 37 patients were alive without disease, relapse occurred in 4 cases, 5 patients died. The individual rehabilitation programs are well tolerated. We suggest that the usage an individual rehabilitation program can decrease

pain, improve muscle strength and range of motion in joints, an increased supply of blood to the muscles, higher muscle metabolism, and more circulation in the limbs, improves tissue nutrition and helps the healing process. *Conclusion:* Physical activity can play a vital role in the treatment and prevention of many of the long-term effects of childhood cancer and cancer therapy. Physical activity may prevent the long-term risk for adverse cardiovascular effects, low bone density, low muscle strength and range of motion in joints. Childhood cancer patients undergoing long-term cancer therapy may benefit from an individual rehabilitation program since it may maintain or enhance their physical fitness and increase their quality of life.

PA640

Cancer Rehabilitation of Children with Solid Malignant Tumours

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Introduction: Cancer rehabilitation is becoming more of a focus for the field of physiatry due to increased longevity and the side effects of treatment. *Material and Methods:* In order to investigate the rehabilitation needs of patients, chart analysis was conducted on 53 children at the mean age of 12.02±4.6 years (aged 2 - 19 years), 30 (56.6%) males, 23 (43.4%) females treated for primary solid malignant tumors by chemotherapy, radiotherapy, oncologic surgery, included limb-sparing procedures. Histologically, 24 patients had ESFT, 18 - OS, other - 11. The most often affected area was lower extremity - 30 cases, upper extremity - 5, abdomen - 6, pelvis - 6. Twenty-three patients had distant metastases, 21 patients underwent courses of preoperative inpatient physical therapy, at the neoadjuvant part of special treatment, 33 patients underwent courses of postoperative inpatient physical therapy at the adjuvant part of special treatment, 30 patients underwent courses of physical therapy during remission. This study evaluated the short and long-term changes in physical fitness of a child with a childhood malignancy; using an individual rehabilitation program, consist with combined physical exercise, kinesiotherapy, aquatic rehabilitation and orthopedic correction implemented during and shortly after treatment. Training is performed individually, under the supervision of an experienced pediatric physical therapist. *Results:* 41 patients (from 53) were alive without disease, relapse occurred in 5 cases, 7 patients died. The individual rehabilitation programs are well tolerated. We suggest that the usage an individual rehabilitation program can decrease pain, improve muscle strength and range of motion in joints, an increased supply of blood to the muscles, higher muscle metabolism, and more circulation in the limbs, improves tissue nutrition and helps the healing process. *Conclusion:* Physical activity can play a vital role in the treatment and prevention of many of the long-term effects of childhood cancer and cancer therapy. Physical activity may prevent the long-term risk for adverse cardiovascular effects, low bone density, low muscle strength and range of motion in joints. Childhood cancer patients undergoing long-term cancer therapy may benefit from an individual rehabilitation program since it may maintain or enhance their physical fitness and increase their quality of life.

PA641

Cancer Rehabilitation of Children Treated with Intensive Chemotherapy, Surgery and Radiation Therapy

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Introduction: Cancer rehabilitation is becoming more of a focus for the field of physiatry due to increased longevity and the side effects of treatment. *Material and Methods:* In order to investigate the rehabilitation needs of patients, chart analysis was conducted

on 30 children at the mean age of 12.7±4.0 years (aged 2 - 19 years), 17 (56.7%) males, 13 (43.3%) females treated for primary solid malignant tumors by chemotherapy, radiotherapy, oncologic surgery, included limb-sparing procedures. Histologically, 15 patients had ESFT, 8 - OS, other - 7. The most often affected area was lower extremity - 16 cases, upper extremity - 4, pelvis - 3, trunk - 3, abdomen - 3. Nine patients had distant metastases. All of the patients underwent courses of physical therapy during remission. Childhood solid tumours survivors are known to be at risk for the musculoskeletal late effects. The most common late effects we had observed were: scoliosis - in 21 cases, muscular hypoplasia - 23, osteopenia - 15, limb-length discrepancy in spite of usage of growing endoprosthesis - 16, poor joint movement - 37. Fourteen patients had more, than 3 late effects. The most common adverse events were Grade 3 - 54 cases. This study evaluated long-term changes in physical fitness of a child with a childhood malignancy, using an individual rehabilitation program; consist with combined physical exercise, kinesiotherapy, aquatic rehabilitation and orthopedic correction implemented after treatment. Training is performed individually, under the supervision of an experienced pediatric physical therapist. *Results:* 29 patients were alive without disease, relapse occurred in 1 case. The individual rehabilitation programs are well tolerated. We suggest that the usage an individual rehabilitation program can decrease pain, improve muscle strength and range of motion in joints, an increased supply of blood to the muscles, higher muscle metabolism, and more circulation in the limbs, improves tissue nutrition and helps the healing process. *Discussion:* Physical activity may prevent the long-term risk for adverse cardiovascular effects, low bone density, low muscle strength and range of motion in joints. Childhood cancer patients undergoing long-term cancer therapy may benefit from an individual rehabilitation program since it may maintain or enhance their physical fitness and increase their quality of life.

A.4.5. METABOLIC DISORDERS

PA642

Effects of Comprehensive Rehabilitation in Non-Alcoholic Fatty Liver Disease (NAFLD) with Obesity

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Introduction: Non-alcoholic fatty liver disease (NAFLD) is a phenotype of metabolic syndrome. Paralleling the increasing prevalence of obesity, NAFLD becomes to be common and potentially serious all over the world. There are few reports of effective therapeutic intervention for NAFLD. Thus, we examined effects of comprehensive rehabilitation in pediatric and adult NAFLD. *Material and Method:* Ten children (age 12.0±1.4 years, male/female 7/3) and seven adults (age 41.4±16.7 years, male/female 3/4), who were diagnosed NAFLD and resistant to regular outpatient treatment, were admitted to Tohoku University Hospital. They underwent exercise therapy with a bicycle ergometer and an underwater treadmill and mild diet therapy of 1,900 kcal for children and 1,600-1,200 kcal for adults. After a guidance of life style modification, they were discharged and followed at home for 6 months. *Results:* In the pediatric patients, the body mass index (BMI) was 33.7±5.3 kg/m². Serum aspartate transaminase (AST) and alanine transaminase (ALT) were 80±34 IU/l and 141±61 IU/l. In the adult patients, BMI was 38.7±9.2 kg/m². AST and ALT were 98±48 IU/l and 143±90 IU/l. After the comprehensive rehabilitation, the body weight significantly decreased by 8.7±7.2 kg (P<0.01), the BMI significantly decreased to 29.9±3.7 kg/m² (P<0.01), and serum AST and ALT significantly decreased to 21±4 IU/l and 28±7 IU/l (P<0.01) in the pediatric patients. The BMI significantly decreased to 34.7±8.8 kg/m² (P<0.01), and serum AST and ALT decreased to 31±21 IU/l and 49±47 IU/l (P<0.01) in the

adult patients. *Conclusion:* The comprehensive rehabilitation has beneficial effects in pediatric and adult NAFLD with obesity.

PA643

Disability in Obesity With Comorbidities. A Perspective from PRM Societies

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Given the figures of obesity worldwide, its impact on disability and the burden on the National Health Systems, it appears necessary for rehabilitation specialists to face this issue. In 2010, the Italian Society of Obesity and the Italian Society of Eating Disorders have published a document where the rationale and the criteria of the comprehensive rehabilitation for the obese patient were described. In 2011, the Italian Ministry of Health has acknowledged the need for a multidisciplinary and integrated rehabilitation pathways for severely obese patients with comorbidities with multiple rehabilitative settings according to the severity of disability and in relation to the phases of instability of the condition. The particular characteristics of morbid obesity as a chronic disease, its comorbidities and consequential disabilities that negatively impact both quality of life and health expenditure calls for an approach that also involves rehabilitation and not just treatment alone. It is, therefore, important to devise pathways of care based on a multidisciplinary approach that not only deal with the weight issue in the long term, but, above all, prevent and treat its complications, improve quality of life and enhance participation. In May 2013, delegates of the Italian Society of Physical and Rehabilitation Medicine, the Italian Society of Obesity and the Italian Society of Eating Disorders have joined in a panel of experts to discuss a consensus document on the organizational requisites of rehabilitation units devoted to patients affected by severe obesity with comorbidities. Hospitals structurally adequate for the needs of patients with excess of body mass should be linked in a continuum of care to territorial facilities providing extensive rehabilitation. An Obesity Rehabilitation Study Group was founded under the umbrella of Turkish Society of Physical Medicine and Rehabilitation in May 2013 to increase awareness about obesity among PMR specialists and the public opinion. In June 2013, the International Society of Physical and Rehabilitation Medicine started a Special Interest Group on Rehabilitation in Obesity and Metabolic Conditions with the aim of gathering existing related national guide lines and documents and preparing guide lines. This presentation aims to provide an up-to-date overview of the state-of-the-art in Rehabilitation of obese patients.

PA644

Overcome Obesity (Live Healthy)

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During our practice in physical medicine and rehabilitation field, we face obese persons with impact of their obesity on their illness, as risk factor, preventing from cure, or aggravating. The most majority of people know the truth that overcome obesity need decreasing energy input and increasing output. But the actual experience show that this knowledge alone isn't enough for most people to overcome their obesity, also, the detailed directions we give to patients not enough. As result we developed a comprehensive program, the obese person undergo it, with some concerns: 1. Obesity is chronic problem. 2. Obesity is behavioral problem. 3. Wrong and partial treatments make it worse (drugs are temporary treatment besides its side effects which may attain suicide). The program applied through regular weekly visits, by determining the wrong behaviors which cause obesity, then begin the modulation gradually, logically, and suitable to environment and life and favorites of the obese person. The same time there is no hungry or deprivation. The program contains offering the psychological support to prevent depression and ensure continues until the obese person reach the suitable weight and maintain it permanently and easefully.

A.5. PAEDIATRICS

PA645

Mesh-Glove Electrical Stimulation in the Treatment of Upper Extremity Dysfunction in Children with Cerebral Palsy: a Preliminary Study

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Introduction/Background: Deficit of spontaneous movement is common problem in children with cerebral palsy (CP). Functional electrical stimulation used to be one of the regular intervention approaches on CP. Recent studies stated that mesh-glove electrical stimulation (MGES) made significant treatment effect in stroke patients. However, few studies investigate the MGES effects on upper limb dysfunction in children with CP. The aim of this study is to verify the treatment effect of MGES combined traditional rehabilitation on the upper extremity dysfunction in children with CP. *Material and Methods:* Five children with spastic hemiplegia CP (3 males, mean age: 8.6±5.17 years) were enrolled in this study. The Gross Motor Function Classification System (GMFCS) levels of our participants were levels I-III. The participants received 45 minutes MGES (Micro-Z MiniTM model) combined traditional rehabilitation in each session, twice per week, for 12 weeks. The outcome measures, including Box and Block Test (BBT), Modified Ashworth Scale (MAS), Quality of Upper Extremity Skills Test (QUEST), the self-care domain of Functional Independence Measure for Children (WeeFIM), were assessed before and after intervention. *Results:* The results showed that MGES combined traditional rehabilitation significantly improved the scores of the dissociated movement of QUEST at post-treatment ($p < 0.05$). In addition, The scores of functional grasp of QUEST and muscle tone of fingers of MAS also improved after intervention with borderline significance. However, the BBT, the muscle tone of wrist, and the self-care domain of WeeFIM did not achieve statistical significance at post-treatment. *Conclusion:* The MGES combined traditional rehabilitation adopted in this study showed benefit for the movement control of upper extremity in children with CP. The limitation of this study is the small sample size so that must be careful in inference. The larger sample will be guaranteed for assuring the therapeutic effectiveness.

PA647

The Effects of a Combined Portage Early Childhood Education and Bobath Therapy Program in Children with Intracranial Aneurysms: a Case Report

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Introduction/Background: Cerebrovascular events in childhood are not as often as adults. But lead to similar clinical outcomes. Intracranial aneurysms are the most common causes of subarachnoid hemorrhage in childhood. The aim of this study is to examine the results of physiotherapy and special education program of the girl. *Material and Methods:* A three years a month-old girl participated in a combined Portage Early Childhood Education and Bobath therapy program. The girl was evaluated before and after the combined therapy program. The Gross Motor Function Measure (GMFM), Gross Motor Function Classification System (GMFCS), Functional Independence Measure for Children (Wee-FIM) and the Denver Developmental Screening Test II (DDST II) methods were used to evaluate the girl. The girl received special education per a week and physiotherapy two times a week. The girl followed by a team included neurosurgery, physiotherapists, child development experts and special educators. *Results:* Before the treatment program,

GMFM total score was 21.55%, GMFCS was IV, Wee-FIM total score was 39. According to the DDST II, fine motor developmental age was found to be 7 and gross motor developmental age was identified as 10 Months. After treatment program; after a year: GMFM total score was 87.56%, GMFCS was II and Wee-FIM total score was 77. According to the DDST II, fine motor developmental age was found to be 20 and gross motor developmental age was found to be 21 months, after three years: GMFM total score was 97.5%, GMFCS was I and Wee-FIM total score was 119. According to the DDST II, fine motor developmental age was found to be 70 and gross motor developmental age was found to be 70 months. **Conclusion:** Mental and motor development can be supported by physiotherapy and special education program in these patients. In order to improve the quality of life of these patients, it is important to start early physiotherapy and special education program. **Keyword:** Aneurysm, Child, Denver, Bobath, Portage.

PA648

Late Onset Pompe Disease

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Case Report: 52 year old african female. Medicated for dyslipidemia and hypertension. Was observed in a Neurology consultation with complaints of fatigue and reduced muscle strength for some years. Physical examination revealed decreased muscle strength with predominance in the pelvic and scapular girdles, generalized abolition of osteotendinous reflexes in upper and lower limbs, with normal muscle tone and cardiopulmonary auscultation. She revealed a myopathic gait pattern and required use of a cane. The laboratory study revealed elevation of CK and aminotransferases and myoglobinuria. Chest x-ray revealed increased cardiothoracic index. EMG findings compatible with myopathy. The muscle biopsy revealed vacuolar myopathy involving predominantly type I fibers. The biochemical study conducted subsequently demonstrated reduced activity of α -glycosidase, compatible with Pompe disease. The patient was started on enzyme replacement treatment. The remaining study of respiratory and cardiac function showed no changes. She was referenced to PMR consultation where she maintains follow-up and attends a rehabilitation program consisting of respiratory physiotherapy, muscle strengthening, balance and gait training, with significant functional improvement. **Discussion:** Pompe disease is a hereditary autosomal recessive disease, associated with α -glycosidase deficiency, essential in the catabolism of glycogen. The late-onset variant develops after the first year of life. In this type there is some degree of residual activity of α -glycosidase. The accumulation of glycogen in skeletal muscle tissue leads to multisystem involvement, which contributes to a wide range of clinical manifestations. Definitive diagnosis requires determination of reduced levels of α -glycosidase activity. Enzyme replacement therapy is currently the only approved therapy for this disease and aims to prevent the progression of deterioration of muscle function. The multidisciplinary involvement is essential for the proper control of neuromuscular, cardiorespiratory and gastrointestinal elements of the disease. **Conclusions:** Late-onset Pompe disease is multisystem condition and PMR has an important role in the optimization of physiological functions on the affected systems, anticipation of complications and promotion of maximum level of function, participation and quality of life.

PA649

The Observation of Curative Effect of Virtual Scene Training Treatment on Motor Function and Muscular Tension of Children with Spastic Cerebral Palsy

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Introduction: To observe the effects of MOTomed virtual scene training treatment on muscle tension and motor function of chil-

dren with spastic cerebral palsy. **Methods:** 67 cases of children with spastic cerebral palsy were divided into the treatment group and control group by random number table, 34 cases in treatment group, 33 cases in control group. 2 groups were treated with routine rehabilitation therapy, while additional MOTomed virtual scene training was used by the treatment group. Before and after treatment, evaluating the muscle tension in children's adductor, hamstring and gastrocnemius using Modified Ashworth Scale (MAS), measuring the adductor angle, popliteal fossa angle and foot dorsiflexion angle using the joint protractor, evaluating gross motor function with the 88 items version of Gross Motor Function Measure (GMFM-88). **Results:** After treatment, the muscle tension of adductor, hamstring and calf muscle had significantly lower than before treatment between the treatment group and control group (all $P < 0.05$), the muscle tension score of adductor, hamstring and calf muscle [(1.79±0.54), (1.00±0.60), (2.29±1.77)] in treatment group was lower than the control group [(1.82±0.53), (1.15±0.44), (2.52±1.89)] (all $P < 0.05$). The adductor angle, popliteal fossa angle and foot dorsiflexion angle had greater than before treatment between the two groups, the adductor angle, popliteal fossa angle and foot dorsiflexion angle [(97.06±19.03), (126.62±12.54), (81.62±9.11)] in treatment group was greater than the control group [(98.94±21.42), (123.48±12.90), (84.70±14.30)] (all $P < 0.05$). The score of GMFM was greater than before treatment between the two groups, the treatment group (138.18±54.86) was greater than the control group (112.21±62.44) (both $P < 0.05$). **Conclusion:** The MOTomed virtual scene training can effectively reduce the muscle tone for children with spastic cerebral palsy and increase their motor function.

PA650

Visual Impairment Program – a Paediatric Rehabilitation Outpatient Consultation Experience

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Visual impairment is defined as visual acuity of less than 3/10 or a corresponding visual field of 20° or less with the best possible correction. According to the World Health Organization, an estimated 19 million children are visually impaired. Visual loss has a negative influence on the motor development of children when compared qualitatively and quantitatively to children with normal vision. Nevertheless, there is a lack of resources geared towards this population. A wide-reaching approach and a multidisciplinary service was created in our Centre to provide the best care to these patients. The purpose of this team is to evaluate visual difficulties but mainly their consequences on the daily living activities and the global development of the child. Rehabilitation aims to improve the lives of children with low vision by working on locomotion autonomy, self-confidence, functional independence and social integration. The authors describe a multidisciplinary outpatient consultation of Visual Impairment Paediatric Rehabilitation and its program, presenting a retrospective study of all subjects consulted between October 2013 and October 2014. Demographic variables, clinical diagnosis and prescription of physical therapy and rehabilitation products were reviewed in all patients. A total of 75 subjects were referred to the Paediatric Rehabilitation Low Vision outpatient consultation between October 2013 and October 2014, 56.0% of which were male (N=42) and 44.0% (N=33) were female. The mean age, considering the date of the first appointment, was 5.95 years (from 5 months to 16 years). In what concerns the etiology of the vision loss, 13.3% were acquired and 86.7% were congenital. The majority of patients (62.7%) underwent a physical and rehabilitation program during the period of follow-up, including orientation therapy, physical therapy and/or occupational therapy. Rehabilitation products or aids were prescribed in 36.0% of the patients. Improving quality of life and independence in chil-

dren with visual impairment is a challenge, as society at large is not well prepared to provide fully social integration. A holistic, multidisciplinary approach seems to be meaningful to meet low vision children's needs both in terms of maximizing their visual capacity as in assisting them in their development and in their social and family integration.

PA651

Clinical Determinants of Rehabilitation Outcomes in Children with Congenital Muscular Torticollis

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Introduction/Background: Congenital muscular torticollis (CMT) is one of the most common congenital problems of the musculoskeletal system in neonates and infants. The typical lesion is a hard mass within a tight sternocleidomastoid (SCM) muscle. In this study, we plan to investigate the correlation between clinical factors including location of mass and rehabilitation outcomes. **Material and Methods:** We reviewed medical records of 193 patients retrospectively from April 1st, 2011 to December 31st, 2013, who were clinically suspected as having CMT and diagnosed with neck ultrasonography. Thirty-seven patients met the inclusion criteria. Included were demographic characteristics as well as measurements of cervical ROM, SCM muscle thickness, and the abnormal/normal (A/N) ratio, defined as the ratio of SCM muscle thickness on the affected to the unaffected side. Location of SCM mass was divided into three groups; upper (proximal) 1/3, middle 1/3, lower (distal) 1/3, respectively. Rehabilitation outcomes were measured by treatment duration and recovery duration of cervical ROM. **Results:** Of the 37 patients, mass of location were upper 1/3 (5, 13.6%), middle 1/3 (27, 75.0%), and lower 1/3 (5, 11.4%). The initial A/N ratio has a positive correlation with the last A/N ratio and initial SCM muscle thickness (correlation coefficient 0.340, $p=0.039$; correlation coefficient 0.619, $p=0.000$, respectively). Treatment duration correlates positively with the initial A/N ratio and the last A/N ratio (correlation coefficient 0.390, $p=0.017$; correlation coefficient 0.328, $p=0.048$, respectively). Recovery duration of cervical ROM had a negative correlation with the initial cervical ROM (correlation coefficient -0.346, $p=0.036$). And relatively low location of mass correlates with early gestational age (correlation coefficient -0.330, $p=0.046$). **Conclusion:** Patients who have larger initial and larger last A/N ratio had a longer duration of rehabilitation program. And longer recovery duration of cervical ROM corresponded to a more severe limitation in the initial cervical ROM. Those who presented with SCM mass in lower location had earlier gestational age in this study.

PA652

Family Dynamics and Psychosocial Functioning in Children with SCI/D in Colombia, South America

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Introduction/Background: Pediatric Spinal Cord Injury and Spina Bifida impact child development in several domains, including physical (restriction of physical activities, multiple medications and surgical interventions, chronic pain, diminished strength and energy compared to peers), psychological (depression, anxiety, lower levels of self-esteem), and social (limited peer relations, deficits in social skills and judgment, social rejection) functioning. In addition to negative consequences of SCI/D on the physical and mental health of children with this disorder, families are often affected as well. Very little research has examined the connections between the psychosocial functioning of children with SCI/D and family dynamics. The purpose of this study was to

examine the connections between family dynamics and the psychosocial functioning of children with spinal cord injuries and disorders (SCI/D). **Material and Methods:** Thirty children with SCI/D and their primary caregiver were recruited from communities in Neiva, Colombia. Children were between 8 and 17 years of age, and had sustained their injury at least six months prior to data collection. The children completed measures assessing their own psychosocial functioning (Children's Depression Inventory, Revised Children's Manifest Anxiety Scale-2, Pediatric Quality of Life Inventory), and their primary caregiver completed measures of family dynamics (Family Adaptability and Cohesion Evaluation Scale- Fourth Edition, Family Communication Scale, Family Assessment Device- General Functioning, Family Satisfaction Scale, Relationship-Focused Coping Scale). **Results:** A correlation matrix showed a number of significant bivariate correlations between child and family variables, and three multiple regressions showed that family satisfaction, empathy, and flexibility significantly explained 27% of the variance in child worry; family satisfaction and communication explained 18% of the variance in child social anxiety; and family cohesion and communication explained 23% of the variance in child emotional functioning. **Conclusions:** These findings highlight the importance of rehabilitation professionals considering the association between family dynamics and the psychosocial functioning of children with SCI/D when working with this population.

PA653

The Middle Term Change of the Hip Dislocation and Gross Motor Function in the Children with Cerebral Palsy after Selective Hip Joint Muscle Release Surgery

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Introduction: A selective hip joint muscle release surgery is enforced as first choice for the hip dislocation for children with cerebral palsy in Japan. Longitudinal reports about the progress of hip dislocation are little found. Therefore, in this study, we investigated the middle term change of the hip dislocation and gross motor function in the children with cerebral palsy after selective hip joint muscle release surgery. **Material and Methods:** A total of 631 patients who underwent the hip surgery at Minamitama Orthopedic Hospital, Japan from July 2003 to October 2009 were included in this study. Only 37 patients (60 hip) were collected from the all participants, and only those patients with CP indicated as level III - V at the Gross Motor Function Classification System (GMFCS) and who a follow-up surgery was possible for five years were selected. We evaluated Migration Percentage (MP), Sharp angle (SA), Acetabular ridge angle (ARA) by the X-ray image at the preoperation and one year, three years, five years after surgery and investigate highest-level motor function by ordinal scale list consisting of level 1 to 14. We analyzed the data by a repeated-measures two-way layout analysis of variance, and multiple comparisons using the Bonferroni method. A 5% level of significance was assumed for statistical processing using IBM SPSS Statistics Ver.19. The procedures performed in this study were approved by the ethical review board of Tokyo University of Technology (approval no. E14HS-008). **Results:** In all levels, MP significantly decreased in one year and three years, five years after surgery compared with preoperation. And in the GMFCS level III and IV, ARA significantly improved in three years and 5 years after surgery compared with preoperation. The highest-level motor function in all levels significantly improved in five years after surgery compared with preoperation. **Conclusion:** Because MP was improved in all objects at one year after surgery, it became clear not to have the progress of lateral dislocation five years after surgery for all levels. By the SA and ARA, it became clear that differed magnitude of improvement of shelf of femoral head in GMFCS level III and IV.

PA655

The Importance of Respiratory Rehabilitation in Pre-term Newborn – a Case Report

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Introduction: A preterm newborn child is born before the 37 weeks of gestation. Complications that most commonly occur in these children were from the respiratory system and are manifested as respiratory distressor bronchopulmonary dysplasia. Afebrility child's, respiratory rate below 60/min., SaO₂ > 95, the absence of intracranial hemorrhage were prerequisites that must be met to start a respiratory rehabilitation. With the procedures of respiratory rehabilitation in premature newborn starts while the child is in an incubator. We present a case of a newborn gestational age 31 weeks born emergency Caesarean section in the second pregnancy complicated gestational diabetes mellitus. Body weight at birth was 1,650 gr and Apgar scores 5/7. The child was 18 days in the intensive care unit in respiratory support, 10 days in a mode of mechanical ventilation was applied and 8 days HOOD oxygen therapy. Respiratory rehabilitation is started, by the stabilization of general condition, included gentle massage of the chest, turning on side and exercises for the chest expansion. Respiratory rehabilitation program was carried out twice a day. On the tenth day the child is separated from the ventilator. HOOD oxygen therapy was continued and started intensive physical treatment using the aerosol therapy, chest massage, positional drainage, breathing exercises. The child was dismissed after 31 days of hospitalization with satisfactory gas analysis in good condition. **Summary:** Use of respiratory rehabilitation with the premature newbornintensive care and treatment measures, shortens stay in intensive care, and improves recovery of these small patients. **Keywords:** preterm newborn, rehabilitation, respiratory support.

PA656

The Effects of Lifestyle Intervention on the Health-Related Physical Fitness of the Preschoolers with Developmental Delay

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Introduction/Background: The preschoolers with developmental delay (DD) tended to have poorer health-related physical fitness (HRPF) than the normally-developed children. Health-promoting lifestyle intervention with daily practice on adequate amount of physical activity and control of diet and nutrition was shown to be effective in improving HRPF in much population, but little evidence was found in children with DD. The purpose of this study was to investigate the effects of a 20-week health-promoting lifestyle intervention on the HRPH in preschoolers with DD. **Material and Methods:** Preschoolers with DD (n=141) were recruited from 2 intervention and 2 control institutions for children with special needs. Seventy-four subjects at the intervention institutions received a 20-week health-promoting lifestyle program, which emphasizing on the progression of daily practice of adequate amount of physical activity and control of diet and nutrition with the assistance of preschool teachers and parents. The teachers and parents learned the strategies of intervention from the workshops and monthly focused-group meeting and with the use of manual book and video, supported and developed by the researchers. Sixty-seven subjects at the control institutions received the regular preschool program. The HRPH outcome measures were weight-for-height index, one-minute sit-up test, sustained semi-sitting test, sustained back-up test, six-minute walk test, sit and reach test. Two-way repeated measures ANOVA was used to compare between-group difference of HRPF. **Results:** Comparison of groups following the intervention indicated the intervention group

showed significant improvements compared with the control group in repetitions of one-minute sit-up (p<0.001), time of sustained semi-sitting (p=0.001), time of sustained back-up (p<0.001), the distance of 6-minute walk test (p<0.001) and the weight-for-height index (p<0.001). But the distance of sit and reach test did not change significantly but were trended to improve. **Conclusion:** The effectiveness of health-promoting lifestyle intervention on the HRPH was demonstrated in preschoolers with DD.

PA657

Performances of Vertical Jumping in Normal Arched and Flat-Foot Preschool Children

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Introduction/Background: Flatfoot is characterized by the collapse of the foot's medial longitudinal arch, which would develop during the first decade of life, especially during 2 to 6 years old. Flexible flatfoot is highly prevalent during early childhood and declined with age in the preschool period. Literature suggested that flexible flatfoot may influence dynamic foot function. Jumping is relatively difficult in primary motor skills and influential to athletic performance. Therefore, this study aimed to investigate the performance of vertical jump in preschool children with normal arched and flat foot. **Material and Methods:** Twenty typically-developed children, aged 4 to 5 years, were enrolled with ten children confirmed having flatfoot by the Chippaux-Smirak index and ten others with normal arched. Each child was asked to perform vertical jumps in a motion laboratory equipped with 6-camera motion analysis system and two force platforms. The peak power of the legs₁, the vertical leg stiffness₂, and the maximum joint angles of lower extremity during push-off phase of vertical jump were calculated and then compared between groups. **Results:** Better vertical jump performance, representing by jump height, and higher vertical leg stiffness were found in the normal arched group than in the flatfoot group (P<0.05). For peak power, the normal arched group showed slightly higher values than flatfoot group, however without reaching the statistical significance (P=0.052). Comparisons of the peak joint angles in lower extremity showed significant larger ankle plantar flexion in the normal arched group than those in the flatfoot group during the take-off phase. **Conclusion:** Preschool children in the flatfoot group showed poorer performance in vertical jump, less ankle plantar-flexion, smaller leg stiffness and less generated energy during take-off phase than in normal arched group. The results suggested that children with flatfoot may need some compensatory movements to accomplish the activity. These results may also be used as references to establish training strategy by strengthening the plantar-flexors to increase the joint movement and generate more energy during taking-off phase for children with flatfoot. **References:** 1) Padua DA, et al. J Athletic Training. 2006;41(3):294. 2) Sayers SP, et al. Med. Sci. Sports Exerc. 1999;31(4):572-577.

PA658

Therapeutic Effect of Microcurrent Therapy in Children with In-Toeing Gait

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Introduction: Spontaneous improvement of excessive femoral anteversion occurs before 8 years. Femoral anteversion caused by lesser decreased external hip rotation contracture than expected. The aim of this study was to investigate the efficacy of microcurrent therapy in children with in-toeing gait. **Methods:** Twenty four legs of twelve children (Male: Female=5:7, mean age 10.2±1.6 years) with in-toeing gait caused by excessive femoral anteversion were included in this study. All children received 60 minutes of microcurrent therapy (Granthé®; Cosmic Co., Seoul, Korea) daily for 4 weeks. The microcurrent therapy was applied to tensor fascia lata and gracilis

muscles. Clinical and gait motion measurements were performed at pre-treatment, 2 weeks, 4 weeks, and 8 weeks after initial treatment. A tibio-1st metatarsophalangeal angle (TMPA) during gait cycle was defined as an angle between longitudinal line of tibial bisection and transverse line of 1st metatarsophalangeal joint at mid-calcaneus and calculated. **Results:** At clinical measurements, hip internal rotation was $64.5 \pm 7.9^\circ$, $60.4 \pm 7.5^\circ$, $59.2 \pm 8.7^\circ$ and $59.6 \pm 8.2^\circ$ at pre-treatment, 2 weeks, 4 weeks and 8 weeks after initial treatment, respectively ($p < 0.01$). TMPA was $74.3 \pm 12.6^\circ$, $67.3 \pm 13.9^\circ$, $61.7 \pm 15.7^\circ$ and $54.3 \pm 14.7^\circ$ at pre-treatment, 2 weeks, 4 weeks, and 8 weeks after initial treatment, respectively ($p < 0.01$). **Conclusion:** Microcurrent therapy may be effective in improving gait pattern in children with in-toeing gait caused by excessive femoral anteversion.

PA659

Effects of a Deep Breath on the Class Room Off-Task Behavior in a Child with Attention-Deficit/Hyperactivity Disorder

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Case Diagnosis: A nine-year-old male school student with attention-deficit/hyperactivity disorder presented impulsiveness getting angry immediately or rioting at home. In a class, he is restless and cannot change his emotion. He gained the high verbal and performance IQ in WISC-iii, but Processing Speed was only low score. **Case Description:** We adopted AB design of the single case experimental method. I participated in a special classroom program at the baseline term. And I participated in the subsequent program in a normal classroom as an observer. Once the initial bustle had calmed down at the start of class, I observed the behavior of subject for 10 min in 1-min intervals using a time sampling record sheet and ticked boxes for target behavior that was exhibited. Targets included off-task behavior (doing something unrelated to the class) and postural collapse (tilting their body forward 60° or more, sideward 45° or more, or backward 60° or more) and hand mischief (playing with something). In intervention term, I carried out a deep breath using Souffle (R) (respiratory trainer POLA-Pharma INC. Tokyo) for 5 minutes at the last time of special classroom program. I conducted the same observation as before. I started observation by obtaining consent in written form in the child and his family. I drew the approximate linear on the graph which plotted the frequency of appearance of target behavior. And then I examined the effect of the intervention qualitatively. Also I examined the effect of it using the effect size (percentage of non-overlapping data: PND and Busk and Serlin's approach2: ES_BS2). **Discussion:** Postural collapse and hand mischief have the intervention effect about the frequency of appearance of target behavior visually. In PND, effect size of postural collapse was in the middle, hand mischief was small. In ES_BS2, effect size of postural collapse and hand mischief were small. It is said that the problem of processing speed is related in coordination disorder. And coordination disorder tend to cause a problem of stability of trunk and body balance. From this study, deep breath is considered to have activated the trunk muscles. But, improvement in concentration was not found clearly.

PA660

A Meta-Analysis of Exercise on Behavioral and Psychological Symptoms in Persons with Dementia

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Introduction/Background: Behavioral and psychological symptoms of dementia (BPSD) commonly affect quality of life of both persons with dementia and their caregivers. Pharmacological treatment was known as not being the best way to manage BPSD. Recently, exercise becomes as a new choice for managing BPSD, how-

ever the effect still was controversial. The aim of this review was to examine the effect of exercise on declining BPSD, and synthesize the current evidence to provide any information on the feasibility of exercise programs for persons with dementia. **Material and Methods:** A literature search was conducted using web databases and manual searches. Review Manager 5.2 was used to analyze the effect size and statistical heterogeneity. We performed subgroup analysis, based on the content of intervention, mode, session length, frequency, location of exercise program, and period of intervention time. **Results:** Ten of 817 papers identified by the search met inclusion criteria, and 6 papers were pooled in meta-analysis. The Meta-analysis showed that exercise intervention can be considered as clinically relevant benefit to reduce BPSD (SMD -0.57, 95% CI -0.94 to -0.19, $p = 0.003$) and psychological symptoms (SMD -0.60, 95% CI -1.02 to -0.18, $p = 0.006$), respectively, behavioral symptoms (SMD -0.93, 95% CI -1.36 to -0.51, $p < 0.0001$). Furthermore, activities not depending on the participant's skill ($p < 0.00001$) or using single-mode ($p < 0.0001$), around 30-minute ($p = 0.01$), short-duration exercise programs ($p = 0.008$) and taking place in institutions ($p = 0.04$) represented significant results. In contrast, there was no significant difference in intervention frequency and severity of dementia. **Conclusion:** The present studies suggested that exercise could have a significant impact on BPSD in persons with dementia. Results of effectiveness of various parameters of physical activities on BPSD, further support on how to train persons with dementia exercise.

PA661

Obstetric Brachial Plexus Lesions (OBPL): Course of Disease and Implications for the Future

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Introduction: OBPL is a traction injury to the brachial plexus during delivery, resulting in denervation of arm and shoulder girdle muscles. The recovery patterns differ a lot, immediately after birth it is impossible to predict the functional outcome. Patients with delayed or incomplete recovery have impairment of function, limitation of activities and participation. **Material and Methods:** Infants with OBPL at newborn age started a conservative therapy regimen and were examined regularly afterwards. Infants, who did not recover completely at three weeks of age, attended regularly our outpatient department of Physical Medicine and Rehabilitation. Muscle strength, active and passive range of motion (ROM), sensory function, motor development, gross and fine motor skill development, hand preference, bimanual activities, activities of daily living and participation at age related activities like playing, sport and arts were assessed. **Results:** In the period of 2003–2014, 35 patients have attended our outpatient department starting in the first week of life. Clinical examinations, electrodiagnosis (ENG, EMG), ultrasound, X-Ray and MR imaging were performed. Exercise and occupational therapy were offered almost for all patients. Additional therapeutic modalities like NMES, taping, orthotics were included in the conservative treatment. 7 patients underwent reconstructive surgery procedures. Following impairment of body function and structures were observed: weakness of upper extremity muscles, contractures at shoulder and elbow joints, reduction of active ROM, upper length discrepancies, scoliosis, impaired bone development of upper extremity, hand preference and dexterity, use of affected arm in bimanual activities. Pain was not reported. Activity limitation in ADL (e.g. putting on clothes) writing ability and fine motor activities were recorded. Older children had also restrictions in participating in sports activities like swimming, ball sports, and musical activities learning playing an instrument and fine arts, if bimanual performance was required. **Conclusion:** OBPL is a chronic health condition for a developing child, causing different extent of impairment of body functions and structures and causing developmental problems, limiting activity and par-

ticipation at older age. Therefore children with OBPL should be provided with long-term therapy and rehabilitation programs.

PA662

Impact Evaluation of a Specialized Seating Program for Children in a Low-resources Setting

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Introduction/Background: The World Health Organization (WHO) cites access to mobility devices and rehabilitation services as a major barrier for persons with disabilities in low-income countries, yet limited data exists on how best to address this need. It is recognized that many countries rely on external donations, but that donated wheelchairs are often inappropriate for the users injury and environment. This 6-month follow-up study was conducted to evaluate outcomes of a specialized pediatric wheelchair and seating program in northern Haiti, and to identify and address any un-met needs and critical features of such programs. **Material & Methods:** Team Canada Healing Hands (TCHH) worked in partnership with local rehabilitation organizations to provide seating assessments and customized wheelchairs to 91 beneficiaries in northern Haiti, in February 2014. Of 86 beneficiaries who consented to being contacted for follow-up, 57 were located 6 months post-seating program and agreed to do a survey. The survey tool was developed with input from international aid organizations and local rehabilitation clinics, and was administered during face-to-face or telephone interviews. Outcomes measured included extent of wheelchair use, barriers to use, wheelchair maintenance, wheelchair fit, environmental access, and benefits of wheelchair use. **Results:** All of the respondents still had the wheelchair, 70% were using it a minimum of 3-5 days per week, and 12.3% were not using it at all. The primary reasons for not using the wheelchair were that it was broken, physically uncomfortable, or difficult to transport. The most commonly reported benefits of having the wheelchair were improved mobility, increased independence, increased participation, and greater interaction with others. **Conclusion:** The large majority of children who received customized seating and wheelchairs continued to use their equipment 6 months later, with predominantly beneficial outcomes. Caregivers reported improved interaction, participation, and home accessibility, whereas lack of expertise to repair, adjust or modify the equipment contributed to non-use. Efforts to optimize both durability of equipment and training of local technicians should be supported and evaluated in future wheelchair and seating initiatives in low resource settings.

PA663

Correlation of Increased Muscle Tone with Neurophysiological and Ultrasound Findings of Central Nervous System in Newborns

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Introduction/Background: The important parameter for neurological abnormalities detection is the quality of muscle tone. Any change in muscle tone in the first months of life can lead to disturbances in the motor development of the child and be the first sign of early damage of the central nervous system (CNS). The study aim was to investigate correlation between neurophysiological and ultrasound findings with increased muscle tone. **Material and Methods:** The study enrolled 37 infants with signs of muscle hypertonus on clinical examination. Ultrasound of the CNS and neurophysiological tests (visual evoked potentials - VEP) were performed in study population. Patients were divided into 3 groups depending on the severity of tested parameters. The group I have been confirmed with first degree HIC, mild hypertonus and normal VEP findings, II group have been confirmed with second degree HIC, moderate hypertonus

and moderate VEP abnormality, and the III group was with severe hypertonus, third degree of HIC and severe abnormalities on the VEP. The 3 parameters of VEP were analyzed: response form, latencies and amplitudes. **Results:** The correlation coefficient in group I between evaluated parameters was 0.332 between ultrasound and VEP findings, for group II -0.588 between ultrasound and VEP, and for group III -0.791 between ultrasound and VEP findings. There are some discrepancies when the of increased tone except all the others examined findings were within normal values which can be attributed to the still unfinished maturation of the CNS. Among evaluated VEP parameters, the most increased correlation was between the form of response with ultrasound findings (group I -0.421, group II -0.617 and group III -0.812), and the least with amplitude and ultrasound findings (group I -0.309, group II -0.471 and group III -0.724). **Conclusion:** Our findings demonstrated that as severity degree of hypertonus is increased there is increased correlation between pathological findings on ultrasound and VEP evaluations.

PA664

The Efficacy of Sonoelastography in the Evaluation of Congenital Sternocleidomastoid Muscular Torticollis

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Objectives: Conventional B-mode ultrasound (US) has been shown to be useful for screening neck masses in children with fibromatosis colli and supporting clinical diagnosis of congenital sternocleidomastoid muscular (SCM) torticollis. But, tissue stiffness is difficult to assess using conventional B-mode US. Real-time US elastography has been used effectively to evaluate tissue stiffness. The purpose of this study was to evaluate the clinical usefulness of real-time US elastography in the assessment of congenital SCM torticollis. **Methods:** From November 2012 to February 2014, 25 patients (17 males, 8 females; age range at 1st visit, birth-3 months) with congenital SCM torticollis were enrolled. 17 infants had follow-up US examinations of two times and 8 had those of three times. We evaluated the thickness, morphology and echogenicity of SCM on grayscale images and color patterns on elastography. We applied conventional physical therapy and serially measured the degree of neck rotation deficits and side flexion deficits with 5 grades scoring system. We evaluated the correlations between US findings and clinical findings by statistical analyses. **Results:** The month interval of US follow-up was at least 3-6 months in each patient. 16 babies had right SCM torticollis and 9 had left. The difference between right and left SCM thickness was mean 5.7 mm (1.3-8.6 mm) at initial examination and mean 2.8 mm (0.5-5.8 mm) at 2nd examination. 20 babies had focal mass formation of SCM and 5 had diffuse thickening at initial examination and only 4 had focal form at 2nd follow-up. By Pearson correlation analysis, the grades of elastographic color patterns and echogenicities, the difference of right and left SCM thickness, and the morphology were significantly correlated with the results of clinical and physical examinations (p<0.05). Especially, the sonoelastographic color patterns were correlated most strongly with the physical grades (linear regression analysis, p<0.0001). **Conclusions:** The degree of sonoelastographic color patterns were correlated more significantly with the grades of clinical and physical examinations than the results obtained from conventional B-mode US in patients with congenital SCM torticollis.

PA665

Developmental Manifestation by Genetic Subtype of Prader-Willi Syndrome

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Introduction: Prader-Willi syndrome (PWS) is a neurogenetic disorder caused by the loss of functions of imprinted genes. The

genetic mechanisms include 15q11-q13 deletion, maternal uniparental disomy (UPD), and imprinting center defect (ICD). One well-known genetic epidemiology is genetic deletion in 70%, the other is UPD in 30%. A majority of the children with PWS have global developmental delay. The aim of this study was to investigate the differences of developmental profiles among young children with difference of genetic variation of PWS. *Methods:* Referred to the department of rehabilitation through genetic testing in patients diagnosed with PWS were included. Patients were excluded if they had any trauma known to cause motor and cognitive impairment. They were genotyped to identify deletions using methylation-specific polymerase chain reaction analysis and subsequent methylation-specific multiplex ligation-dependent probe amplification analysis. Microsatellite linkage analysis was performed to distinguish UPD from imprinting defect. Motor and neurocognitive developments were recorded by Bayley Scales of Infant development second edition (BSID-II) and compared between patients with paternal 15q11-13 deletion and UPD. *Results:* 15 patients (8 males and 7 females) with PWS received genetic analysis were included from March 2004 to May 2014. All of patients had received rehabilitation program and checked by motor and neurocognitive developments assessment. It was recorded by BSID-II. Deletions in the 15q11-13 region were present in 10 (66.6%) patients, and UPD was observed in 5 (33.3%) patients. All patients had developmental delay in infancy and decreased fetal activity. Significantly more developmental delay was revealed in deletion group than UPD group in all categories of BSID-II. Deletion group was revealed severe degree of developmental delay than UPD group, comparing with the chronological age. Categories of mental age, gross motor age, fine motor age, social age were significant. ($p < 0.05$) *Conclusion:* In our study we investigated relationship between developmental profiles and genetic analysis of PWS. This suggests that deletion group may be tended more developmental delay than UPD group, especially in motor development than cognitive development. So we recommend more active rehabilitation is needed in deletion group of PWS.

PA666

Two-Years Follow Up on Pulmonary Function in Children with Applied Cheneau Brace for Idiopathic Scoliosis

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Introduction: Scoliosis is defined as complex structural spine deformity with abnormal curves in all three spatial planes. Deformity causes limitations of thoracic cage movement and impacts on relations among interthoracal structures. In children, pulmonary function continually changes and in this retrospective study authors explored if there were delays or impairment in development of pulmonary function. The aim of this study was to establish potential changes in pulmonary function in children with applied Cheneau brace for idiopathic scoliosis during period of two years. *Material and Methods:* Study included 28 children with idiopathic scoliosis – four (4) boys and 24 girls. All children were treated on Children dept. of the Institute or PM&R “Dr M. Zotovic” Banjaluka. During the follow up period of two years the following parameters of pulmonary function were analyzed: Inspiratory vital capacity (VC IN), forced expiratory volume in first second (FEV1), ration of forced expiratory volume in first second and forced vital capacity (Tiffeneau index FEV1/FVC). *Results:* The influence of two-years application of Cheneau brace on development of pulmonary function was examined using the monofactorial variance analysis of repeated measurements. The established differences among arithmetic medians for parameters VC, FEV1 and FEV1/FVC were not statistically significant ($p < .05$). *Conclusion:* Application of Cheneau brace during the period of two years did not lead to either any delay in development of pulmonary function or its worsening.

PA667

Manual Ability Classification System in Assessing Hand Function in Children with Cerebral Palsy

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Introduction: Manual ability classification system (MACS) uses five levels to describe how children with cerebral palsy (CP) handle objects in ADL and what kind of support or adaptation they need. Aim of the study is to identify possibilities which MACS offers regarding intervention selection and evaluation of changes in manual activities in children with CP. *Materials and Methods:* Study included 44 children (4-16 years) and types of CP during habilitation treatment in Institute for PM&R „ Dr M.Zotovic”, Banjaluka. For each child we did functional assessment and definition of corresponding MACS level. Eight therapeutic interventions were defined: 1) Adaptation of chair/table; 2) Wheelchairs seat adaptation; 3) Manufacturing of trunk and hands support; 4) Cutlery adaptation; 5) Change of table surface; 6) Adaptation of personal hygiene items; 7) Adaption of clothes; 8) Selection of equipment for school and play. Interventions were analyzed and presented with respect to their frequency - total number of single interventions and number of interventions for each MACS level. Five months after therapeutic interventions we used MACS to assess changes in manual activities and quantified those as: 1) improvement of bimanual hand activity, 2) absence of improvement of bimanual hand activity. Fisher and McNemar tests were used for verification of statistical significance of results whereby $P < 0.05$ was defined as indicator of statistical significance. *Results:* Majority of children were on MACS III level – using objects with difficulties. Together with children from level IV and V they make up 62% of children who are dependent from other person assistance. In total, there were 153 interventions, 53 (35%) interventions aimed at improving postural control and stability. There is statistically significant difference for interventions done for children on lower MACS levels ($p < 0.001$). Majority of interventions were needed for children on level IV (42%). Five months later hand function was improved in 50% of children (< 0.0001), on all MACS levels. Biggest change (77%) was in children on level III ($p < 0.001$). Smallest change (25%) was in children on level IV. *Conclusion:* MACS for children with CP has multiple purposes and benefits. It helps in function assessment, goal setting, intervention selection and evaluation of change.

PA668

Effects of Cheneau Brace in Treatment of Idiopathic Scoliosis

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Introduction: Idiopathic scoliosis is complex three-dimensional spine deformity. Brace is applied in cases of frontal curve bigger than 20 degrees by Cobb. Cheneau brace provides three-dimensional correction and meets criteria of contemporary scoliosis treatment. Aim of study is to evaluate the effectiveness of Cheneau brace in treatment of idiopathic scoliosis. *Material and Methods:* Retrospective study included data for 20 girls treated with Cheneau brace, randomly collected from medical files. Inclusion criteria were: 1) double thoracolumbar scoliosis over 20 degrees by Cobb at beginning of treatment onset, 2) continuous treatment with Cheneau brace and therapeutic exercises until end of bone growth, 3) availability of three X-rays of spine with visible bone maturity signs (Risser) for each child a) before treatment, b) with applied primary brace and c) after treatment. Thoracic and lumbar curves were measured according to Cobb on each X-ray, average curves value was calculated. Changes in curves on three defined

X-rays, for each child and for each curve were presented as: 1) scoliosis change after primary orthosis and 2) scoliosis change at the end of treatment compared to initial values of Cobb angle. Upon completion of bone growth, treatment outcome was defined as curve 1) diminishment 2) stabilization 3) worsening, where 1 and 2 were regarded as good treatment outcomes. SPSS was used for results presentation and statistical reasoning. Values $p < 0.05$ were regarded as statistically significant. **Results:** At beginning of treatment average thoracic scoliosis was 33.8 degrees, lumbar scoliosis 29.4 degrees. In Cheneau braces thoracic scoliosis was in average corrected for $12.2 + 4.25$ degrees and lumbar scoliosis for $13.15 + 5.46$ degrees ($p=0.00$). At the end of treatment curve correction varied from $6.2 + 7.9$ up to $8.5 + 5.7$ degrees. Both thoracic ($p < 0.002$) and lumbar curves ($p=0.00$) were corrected, with correction (diminishment) of curve more frequent in lumbar scoliosis (70%). Cessation of scoliosis progression (curve stabilization) was more often in thoracic scoliosis. Scoliosis was diminished and stabilized in 90% of children and got worse in 10% of children, but there was no worsening which required surgery. **Conclusion:** Results confirm the effectiveness of Cheneau brace and importance of primary orthosis application in treatment of idiopathic scoliosis.

PA669

Child Stroke

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Introduction: Stroke often affects adults; but it can also affect children with consequences on their mental and motor development. The purpose of our study: report clinical characteristics and etiologies of pediatric stroke. **Patients and Methods:** Retrospective study 2011- 2014: 13 cases of children with stroke were collected. Epidemiology, etiology, clinical, para-clinical and treatments were recorded and analyzed. **Results:** The age of onset of stroke [4 Days - 11 years]; 2 girls, 11 boys. Stroke is characterized by: hemiparesis in 8 children, monoparesis in two children. Convulsions were inaugural in 5 children. The stroke was ischemic in 9 children. **Etiologies:** cardiomyopathy in 3 children; arteriovenous malformation in 1 child; 3 of our patients had nephrotic syndrome and chronic renal failure. All children had brain imaging (CT/MRI), supplemented by angiography in 2 children. Eight children have benefited from physiotherapy sessions. The outcome was favorable for 12 children. **Discussion/Conclusion:** The low number of cases collected confirms the rarity of this disease in children. Stroke is difficult to diagnose in children, especially during the first year of life. Often convulsions are inaugural. Brain plasticity could explain unexpected clinical outcomes in children.

PA670

Clubfoot Treatment: Ponseti Method

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Introduction: The Ponseti method is the "gold standard" in the treatment of clubfoot especially in developing countries- The purpose of our study is to evaluate the results of Ponseti method according initial severity and attendance of parents and to enumerate residual deformations. **Materials and Methods** Prospective study 2008 - 2011. Patients less than 3 months of age with idiopathic clubfoot were recruited and treated according the Ponseti method. All the feet were classified prior to casting and at the end of casting period into: benign, moderate, severe and very severe grade according to Diméglio's classification. Evaluation at walk age and at 5 years follows up. **Results:** 33 infants (48 feet) were recruited. The mean age before casting was 24, 48 day [1-90 days]. Initial Diméglio score: 12, 96

[1-17], 81% of feet were severe before starting treatment. At walk age: Diméglio score: 1, 81 [0-8]. Residual deformations: Equinus: 2 feet, adduction of the forefoot: 23 feet, minimal calcaneal varus: 9 feet, residual medial rotation: 4 feet. Treatments: plasters: 17 feet, postero-medial realises: 3 feet, nothing: 19 feet. **Discussion/Conclusion:** For equinus feet, parents did not have a good compliance to the splint. Ponseti method gives excellent results for very severe and short and stocky feet. The most encountered residual deformation is the metatarsus adductus because of muscle imbalance; why not combine physiotherapy to the Ponseti method?

PA671

Preliminary Study on the Relationship Between Pulmonary Function and Neurobehavioral Development in Premature Infants

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Objective: To explore the relationship between lung function and neurobehavioral development in premature infants. **Methods:** All preterm infants were recruited from neonatal department, the third affiliated hospital of Anhui Medical University between June 2012 and June 2014. Infants with infection of central nervous system, asphyxia, congenital dysmorphism and other illness may lead to neurological abnormal development. The premature infants were evaluated with the 52-item neurological motor examination at a postmenstrual age of 40 weeks, they were divided as the normal group and the abnormal group according to evaluation results. At the same time, lung function tests were performed on them, and the characteristics and differences in pulmonary function of premature infants were compared between the normal group and the abnormal group. **Result:** Totally 105 preterm neonates who conforms to the selected standard and has complete data were enrolled, 48 preterm neonates (male 26, female 22) were divided as the abnormal group and 57 as the normal group according to the 52 item neurological motor examination. In the abnormal group, the respiratory rate (RR) [(53.0±5.1) times/min vs (42.5±5.3) times/min, $t=10.28$] and minute ventilation volume (MV) [(439.1±72.3) ml/min vs (338.1±57.0) ml/min, $t=7.99$, $P < 0.01$] were higher than that in the normal group; Time to peak ratio (TPIEF/TE) [(27.4%±4.0%) vs (35.6%±6.3%), $t=-7.76$], the peak volume ratio (VPEF/VE) [(33.9%±2.0%) vs (40.0%±3.9%), $t=-9.42$], peak expiratory flow rate (PEF) [(58.2±11.3) ml/s vs (67.5±12.4) ml/s, $t=-3.92$] and tidal expiratory flow 75% remaining tidal volume (TEF75), tidal expiratory flow 50% remaining tidal volume (TEF50), tidal expiratory flow 25% remaining tidal volume (TEF25) [(52.6±9.5) ml/s vs (62.0±11.8) ml/s, $t=-4.43$, (34.6±5.2) ml/s vs (46.3±7.6) ml/s, $t=-8.92$, (31.6±3.8) ml/s vs (40.0±6.1) ml/s, $t=-7.95$, all $P < 0.01$] were less than that in the normal group. **Conclusion:** Abnormal neurobehavioral development may also exist in the preterm infants without significant brain damage, and this may be correlated with immature pulmonary function.

PA672

The Effectiveness of the Hospital Based Physical Fitness Program in Overweight and Obese Elementary Children in Taiwan – the Pilot Study

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Introduction/Background: The percentage of overweight and obese elementary school children in Taiwan has become 25% in these years, and the overweight and obese children are not only lower performance in physical fitness but also at higher risk of developing chronic disease. In the past studies, school based physical activity program could improve the fitness of children, but the

effectiveness of hospital based physical activity program is unclear. This study reports the effectiveness of the hospital based physical fitness program intervention by physical therapists and nutritionists in overweight and obese elementary school children. **Material and Methods:** The hospital based physical fitness program was designed as a weight loss and fitness camp, holding by Lotung Pohai Hospital in Taiwan once a week during 2014/7/8 to 2014/8/26. Ten overweight and obese children aged 6-11 (mean age 8.8 ± 1.75) years were invited into the camp. This camp included food and diet education, physical fitness education, and physical activity programs. All children were tested included body composition (weight-length index), muscular fitness (sit-up test), flexibility (sit and reach test), and cardio-respiratory fitness (six-minute walk test) at the beginning and end of the camp. **Results:** The average score of flexibility was significantly improved ($p=0.005$) after the camp. Although the average score of body composition ($p=0.320$), muscular fitness ($p=0.065$), and cardio-respiratory fitness ($p=0.136$) did not change significantly but were trended to improve. **Conclusion:** The hospital based physical fitness program intervention by physical therapists and nutritionists for overweight and obese elementary school children has a positive effect on children's health. In this study, the hospital based physical fitness program improved the average score of flexibility in overweight and obese elementary school children, and the average score of body composition, muscular fitness, and cardio-respiratory fitness were trended to improve, even though there were not significantly. This might be the period of intervention was short and the number of participant was small. Further study should extend the period of intervention and recruit more children to participate the study.

PA673

School Education as Participation in Children and Adolescents with Duchenne Muscular Dystrophy and Non-Invasive Ventilatory Support.

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Background: Duchenne Muscular Dystrophy (DMD) has been shown that with some therapeutic interventions i.e corticosteroids, spinal contracture surgeries, cardiac management and early ventilatory support improve survival. However, all this are focused on body functions and structures, but less has been said about social participation and, specifically, school education. **Objective:** To describe school education maintenance of children and adolescents with DMD and non-invasive ventilatory support at home. **Material and Method:** Retrospective chart review. Children and adolescents with non-invasive ventilatory support under control in a rehabilitation institute until June 2014 were reviewed. Demographic data and educational follow-up were described. Measures of central tendency was obtained. **Results:** 14 patients were receiving ventilatory support at home. Mean age was 16.5 year-old (range 10.8-23). Mean time using Non-invasive ventilatory support was 4.2 years (range 1-8). Mean age at ventilatory support onset was 12.3 (range 8.8-17). All of them were wheelchairs users. Of all, only 10 were able to make an educational follow-up (4 were missing). From this group, two were at primary school, two were at high school, three at differential education, and two were at at home educational programme. Only one dropped out. **Conclusions:** School inclusion as social participation is frequent in children and adolescents with DMD with non-invasive ventilatory support at home.

PA674

Torticollis in a Child Revealing a Spinal Tumor: a Case Report

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Introduction: Torticollis is an abnormal head posture. Clinical presentation includes ipsilateral tilt and contralateral rotation, and translation. Etiologies are various including muscular entities, traumatic, inflammatory, infectious, tumor and non-muscular entities. **Material and Methods:** A 10-year-old boy, without medical history, consulted for a recent painful torticollis. **Results:** His examination was normal, particularly in neurologic examination, there is no obvious deficit. There was a tight sternocleidomastoid muscle, and stretching exercises were recommended. Fifteen days later, the torticollis was unchanged and an MRI of the brain and cervical spinal cord was demanded. It revealed a cervical mass extended from C1 to C7 and the appearance of this lesion suggests an astrocytoma. Given the location of the tumor and the high risk of quadriplegia, surgical treatment was delayed until the onset of neurological deficit. **Discussion:** The case presented emphasizes the importance of researching the cause of an acquired torticollis which may be the first sign of a brain, spinal cord or spinal tumor. A careful history and exam is the key to an accurate clinical diagnosis. However, when the etiology is uncertain then diagnostic radiologic examinations are necessary to plan optimal treatment. **Conclusion:** Usually acute torticollis in children is benign post-traumatic or in frigore. However acquired torticollis in children must always instigate an etiology.

PA675

Effects of Balance Muscle Strength Training on Ankle Isometric Strength

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Introduction: Ankle motor function is vital to improvement in ability to walk for children with spastic cerebral palsy (CP), but they often suffered from muscle weakness. Balance muscle strength training (BMST) is a rehabilitation therapy combining the conventional neurology developmental therapy and muscle strength training, emphasizing the balance of muscle strength, muscle tone, and motor control. **Purpose:** To examine the effectiveness of BMST in treating children with CP. **Methods:** Twelve CP children (age in yr: 6.4 ± 1.25 ; height in cm: 122 ± 7.9 ; weight in kg: 18.5 ± 3.96 ; male%=xx) were divided into BMST and Control groups. BMST Group participated in a 60-min per time, 5 times a wk training for 12 weeks, including squat-walking, alternate half kneeling, waling on knees (forward, backward and side ward) by weight bearing with sandbag in affected ankle. Ankle isometric strength of dorsiflexion and plantarflexion (by isometric muscle testing chair) and thickness of anterior tibial muscle belly (by B ultrasound) were measured before and after the intervention. **Results:** It was found that, after 12 wk training, BMST group's ankle isometric strength of dorsiflexion increased from 36.5 to 43.00N ($p<0.05$); the thickness of anterior tibial muscle belly raised from 1.27 to 1.32 cm ($p<0.05$); with a growth rate 16.68% at ankle isometric strength of plantarflexion and an improved Gross Motor Function Measure (GMFM) score of 70.89, which were statistically significant better ($p<0.05$) than the Control Group, whose corresponding values were: 43.33 to 46.67N; 1.30 to 1.35 cm, 10.00%, and 66.66. **Conclusion:** BMST has been demonstrated is an effective treatment for children with CP's ankle muscle strength and GMFM.

PA676

Urodynamic Studies in Children

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Introduction: The child's bladder is physiologically different from the adult's bladder, as in infants and young children bladder control is in development. The realization of urodynamic studies (UDS) in children should be considered whenever there is a suspicion of functional changes caused by neurological or anatomical pathologies. The pathologies that are most frequently associated with

urodynamic changes in children are spinal dysraphisms, bladder and urethral defects and the vesicoureteral reflux. A correct identification of children with indication for UDS testing and proper and early treatment appears to have long-term benefit. *Material and Methods:* We evaluated the data from all children who underwent UDS testing between January 2012 and July 2014. Patients underwent cystomanometry with Andromeda device Urodynamics Systems Ellipse®. Other variables assessed were previous diagnoses, signs and symptoms, complications and treatment. *Results:* UDS were performed in 177 children and each child performed an average of 2.2 ± 1.3 studies. The average age was 8.7 ± 4.7 years and 52.0% were male. The most frequent diagnoses that led to the realization of UDS were spinal dysraphism (40.1%), vesico-ureteral reflux (11.3%), acquired spinal cord injury (9.0%) and urethral or bladder congenital defects (6.8%). Recurrent urinary infections were present in 14.7% of the children, 5.0% had hydronephrosis and 1.7% had chronic renal disease. Only 8.5% of the studies were normal. The most common changes were decreased bladder compliance (51.4%), detrusor overactivity (50.3%), decreased bladder capacity (42.3%), high pre-voiding bladder pressure (36.7%) and increased post-voiding residue (27.1%). Among children with spinal dysraphism, 95.8% had abnormalities. The most commonly prescribed treatments were parasympatholytic drugs (28.8%) and intermittent catheterization (19.2%). *Conclusion:* In our sample most of the children showed UDS abnormalities. Regular monitoring of children with bladder dysfunction is essential to assess the evolution and modification of bladder behavior over growth. UDS is an important diagnostic tool as it allows the diagnosis and monitoring of bladder abnormalities in children.

PA677

Perinatal Brachial Plexus Palsy – a Retrospective Study

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Introduction: Brachial plexus injury in newborns is a disorder characterized by motor and sensory changes of the upper limb, as a result of perinatal complications. Various risk factors are known, including fetal macrosomia, maternal diabetes, advanced maternal age or instrumented birth. The objective of this study was to characterize the cases of perinatal brachial plexus palsy (PBPP) followed in a rehabilitation outpatient department. *Material and Methods:* Case review of medical records of children with diagnosis of PBPP in a outpatient paediatric rehabilitation department. Data on gender, gestational age, birth weight, type of delivery, macrosomia, reference to shoulder dystocia, maternal diabetes, level of brachial plexus injury, the high consultation age, presence of sequelae and treatment performed were collected. *Results:* A total of 126 children were observed in a rehabilitation consultation. There was a slight predominance of male children (51.8%). The median age at first visit was 4.28 weeks. The median gestational age was 39 weeks and 6.7% of the children were premature. Delivery was eutocic in 45.7% and by Caesarean section in 4.1% of cases. The presentation was breech in 4.2% of births and 0.9% were due to twin pregnancy. PBPP affected slightly more the right upper limb with 51.8% of cases and was bilateral in 0.9%. Most of the injuries were the Duchenne-Erb type (90%), 8.9% had total lesions and 1.1% had Klumpke injury. Regarding the type of injury according to Narakas rating 38.6% belonged to group I, 14.9% in group II, group III 5.3% and 1.8% to the group IV. The factors associated with a significantly increased risk of sequelae at two years of age were female gender (OR=1.6; $p=0.02$), the absence of clavicle fracture (OR=4.2; $p<0.01$) and macrosomia (OR=4.8, $p<0.01$). The lack of function of the brachial biceps muscle at three months was the factor that was mostly associated with poor prognosis (OR=348.3; $p<0.01$). *Conclusion:* The results are in agreement with the literature reviewed. However it should be noted the unusual percentage of births by caesarean section. Data collection for the study was limited by the heterogeneity of consulted medical records.

PA678

Long-term Follow-up of Dopa-Responsive Dystonia

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Case Diagnosis: Dopa-responsive dystonia (Segawa disease) *Case Description:* A 8-year-old male child presented with tip-toe gait, loss of balance and falling. He was the product of a term uncomplicated pregnancy and spontaneous vaginal delivery. His early motor development was normal. His complaints started with tightness on his calf muscles when he was 5 years old. His parents noticed a limping. Thereafter, gait abnormality progressed. On physical examination, deep tendon reflexes on lower extremities were hyperactive with a left Achilles clonus. There was a hypertonicity on both gastrocnemius. He was diagnosed as having spastic paraparesis and cerebral palsy. Botulinum toxin injection provided a short-term relief. Because hypertonicity did not sufficiently reduce, botulinum toxin injection was not applied again. The patient was started on levodopa therapy of 200 mg per day. His symptoms relieved significantly and gait abnormality disappeared. No drug reactions or side effects were seen within a four-year follow-up after starting levodopa. *Discussion:* Dopa-responsive dystonia is seen mostly in first decade of life. It shows an autosomal dominant genetic hereditary. Striatal dopamine deficiency is the underlying mechanism of the dystonia. Slight parkinsonian findings, psychiatric and sleep disorders may accompany motor abnormalities. Misdiagnosis is very common. The symptoms dramatically improve with the levodopa treatment. *Conclusions:* Dopa-responsive dystonia should be considered in any child who presents with progressive hypertonia and unexplained gait abnormality of unknown etiology. The patients respond well to levodopa.

PA679

Effects of the Use of Prophylactic Caffeine on Preterm Infants' aEEG and Clinical Outcomes

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Objective: The aim of this study was to measure the effects of caffeine citrate on preterm infants for neurologic function using amplitude-integrated electroencephalography (aEEG). *Methods:* Forty-five preterm infants $\leq 1,250$ g birth weight randomly allocated to either caffeine group (n=21) or control group (n=24), the caffeine group received caffeine within 3 days of life; no other different treatment measures were existed in the caffeine group and the control group. The two groups were also underwent aEEG in the first day after birth (1 day) and at a postmenstrual age of 40 weeks (PMA 40 w). *Result:* Of infants receiving caffeine, 4.8% (1/21) died and 9.5% (2/21) developed bronchopulmonary dysplasia (BPD) compared with 12.5% (3/24) died and 16.7% (4/24) developed BPD ($P<0.05$). Duration of mechanical ventilation was shorter in infants receiving caffeine (caffeine group, 6 days; control group, 18 days; $P<0.01$); In 1 day, there were no significant differences in continuous background activity ($19 \pm 30\%$ vs $20 \pm 29\%$, $t=0.87$, $P=0.39$) and sleep-wake cycling ($52 \pm 27\%$ vs $51 \pm 29\%$, $t=0.77$, $P=0.36$) on aEEG tracings between caffeine group and control group, but at PMA 40w, aEEG tracings of caffeine group showed an increase in continuous background activity ($88 \pm 25\%$ vs $65 \pm 23\%$, $t=7.89$, $P<0.01$) and more frequent sleep-wake cycling ($95 \pm 33\%$ vs $76 \pm 26\%$, $t=10.02$, $P<0.01$) compared with control group. *Conclusion:* Infants receiving caffeine therapy had improved neonatal outcomes including lower mortality and incidence of BPD, and developing more mature aEEG background. Further studies of more samples and multi center are needed to confirm these caffeine prophylaxis effects. *Keywords:* aEEG; neurologic function; preterm infant; clinical outcome.

PA680

The Effects of Core Stability Training on Fine Motor Function and ADL Ability of Children with Spastic Cerebral Palsy

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Objective: To explore the effects of core stability training on fine motor function and ADL ability of children with spastic cerebral palsy. **Methods:** 60 children with spastic cerebral palsy were randomly divided into two groups according to the hospital medical records single, with 30 cases in each group. The control group received routine rehabilitation. The observation group received core stability training for 15 minutes during exercise therapy training in routine rehabilitation, including unarmed training, with the help of apparatus exercises and with the help of Swiss Ball Training. Before and 3 months after training, they were assessed with Peabody developmental motor scale-Fine motor (PDMS FM) and Motor function of WeeFIM. **Results:** The scores of PDMS FM, Motor function of WeeFIM were better after training ($P<0.05$), especially in observation group ($P<0.05$). **Conclusion:** Core stability training combined with routine rehabilitation is effective on improving fine motor function and ADL ability of children with spastic cerebral palsy. The scores of PDMS FM, Motor function of WeeFIM were better after training ($P<0.05$), especially in observation group ($P<0.05$). **Conclusion:** Core stability training combined with routine rehabilitation is effective on improving fine motor function and ADL ability of children with spastic cerebral palsy.

PA681

The Study of Reliability and Validity of the ICF-CY Self-Care Sets in Children with Cerebral Palsy

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Objective: To analyze the reliability and validity of the International Classification of Functioning, Disability and Health-Children and Youth Version (ICF-CY) Self-care sets for the children with cerebral palsy. **Methods:** 50 children with cerebral palsy were involved in this study. The functional evaluation was assessed by ICF-CY Self-care sets, Functional Independence Measure (WeeFIM) and Pediatric Evaluation of Disability Inventory (PEDI). The interrater reliability was analyzed with kappa correlation statistics. The sync validity between the ICF-CY Self-care sets and the PEDI was analyzed by Spearman's rank correlation coefficients. **Result:** The kappa value of retest reliability of 8 categories of ICF-CY Self-care sets was 0.806–0.932, excellent. The kappa value of interrater reliability of 8 categories of ICF-CY Self-care sets was 0.690–0.882, from moderate to excellent. The correlation analysis showed that the total score of the ICF-CY Self-care sets was associated with the scores of WeeFIM ($r=-0.832$, $p<0.01$) and PEDI ($r=-0.832$, $p<0.01$). **Conclusion:** The ICF-CY Self-care sets is reliable and valid as a measurement for children with cerebral palsy.

PA682

Developmental Evaluation in the Patients with Xeroderma Pigmentosum Group A, Using Enjoji Development Examination.*Y. Sakai¹, R. Saura², T. Ueda¹, D. Yamashita¹, N. Otsuki¹, T. Nakagawa¹, D. Toyoshima¹, M. Nishiyama¹, N. Morisada¹, E. Nakano¹, R. Ono¹, T. Masaki¹, S. Takeuchi¹, K. Nibu¹, F. Kanda¹, C. Nishigori¹¹Kobe University Graduate School of Medicine, Kobe, ²Osaka Medical University, Takatsuki, JP

Introduction: The patients with xeroderma pigmentosum group A (XP-A) have severe neurological abnormalities, the peak of their developmental curve is around their babyhood, and the curve de-

clines with age (1). However, there were few studies which performed developmental examinations in the patients with XP-A. In this study, we performed developmental examination in the patients with XP-A using Enjoji developmental test. **Methods:** 18 patients with XP-A were enrolled in this study. (7 males and 11 females. **Average age:** 13.7 years old, all patients had homozygous IVS3-1G>C in the XPA gene.) The Enjoji developmental examinations (2) were performed in these patients. We also evaluated their activity of daily life using Barthel index. In seven cases, we performed this examination repeatedly at intervals of 6 months or more. **Results:** The peaks of the developmental curve were almost 5-6 years old. The physical abilities of the whole body, skilled hand motor activities, behaviour, interpersonal skills and speech ability were decline linearly with age ($r=-0.5\sim-0.6$, $P<0.05$). However, language comprehension had not correlated significantly with age ($r=-0.27$, $p=0.195$). Two patients had almost full achievement of Enjoji developmental test. When we excluded these two patients in the analysis, the correlation between Enjoji scales and age was stronger ($r=-0.7\sim-0.8$, $p<0.05$). **Conclusion:** In this study, we reported the developmental examination of the patients with XPA using Enjoji developmental test. From our results, language comprehension was retained after the patients become bed-bound. Therefore, we should treat their hearing impairment appropriately in all their lives, and we should attempt to communicate using substitutes of speech when they have a difficulty of the treatment of hearing impairment. In conclusion, Enjoji developmental examination is useful for the evaluation of the patients with XP-A, and the peak of the developmental curve was 5-6 years old, and most patients became bed-bound around 20 years old. However, although they became bed-bound, the language comprehension of the patients with XP-A had been retained. **References:** 1) Kraemer KH et al., Arch Dermatol 123: 241-250. 1987. 2) Orito Y et al., J Clin Endocrinol Metab. 94: 1683-1688. 2009.

PA683

Effects of Quality of Life of Autistic Disorder Children

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Objective: To investigate quality of life in Autistic Disorder children. **Methods:** PedsQL4.0 was used to measure quality of life of 200 children with Autistic Disorder and 120 normal children. **Results:** The quality of life of Autistic Disorder group was lower than normal group in the scores of physical functioning were (62.30±25.05), emotional functioning were (53.57±26.69), social functioning were (44.63±27.91), and school functioning (38.69±30.60). The totals cores of PedsQL were (49.86±23.32), with the difference being significant (90.16±13.32, 79.09±19.56, 86.39±15.45, 82.75±16.03, 85.23±14.2, $P<0.01$). **Conclusion:** Children with Autistic Disorder took grievous influence on quality of life.

PA684

Children with Autism on Music Therapy Clinical Study

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Objective: To study the intervention effect of music therapy in the treatment of children's autism and observe the clinical effect of the therapy in improving the attention, social communication, and sensibility and emotion of the children with autism. **Methods:** 30 cases of children with autism from 2008 to 2009, come to outpatient of Nanhai Obstetrics and Pediatric Hospital Affiliated to Guangzhou University of Chinese Medicine, who answered for American DSMIV autism diagnosis were chosen. There are 26 male cases and 4 female cases in this group. 8 cases aged from 3 to 7 years old, 22 cases aged from 1 to 3 years old. 10 cases had cerebral anoxia history during neonatal perinatal. 20 cases had no reasons. Patients were treated with music therapy. **Results:** The grades of the behavioral development, musical development

and emotional development of children with autism after music therapy treatment were improved comparing to those before the treatment. The grades in the course of treatment were improved comparing to those before. The grades after treatment were improved comparing to those in the course of treatment. There were no adverse reactions in the course of treatment. The grades of the behavioral development before treatment was 18.80 ± 5.21 , in the course of treatment was 21.13 ± 5.45 , after the treatment was 25.33 ± 5.64 ; The grades of the musical development before treatment was 8.87 ± 3.18 , in the course of treatment was 12.50 ± 3.51 , after the treatment was 19.23 ± 4.94 ; The grades of the emotional development before participation was 5.50 ± 4.33 , in the participation was 10.20 ± 4.24 , after the participation was 15.13 ± 4.08 , before refuse participation was -8.27 ± 1.72 , refusing participation was -5.40 ± 1.91 , after refuse participation was -2.07 ± 1.70 ; The differences of each corresponding level before and after treatment were highly statistically significant ($p < 0.05$). **Conclusion:** Music therapy for autistic children can extend their attention time and span, increase their eye contact, improve their language abilities, reduce stereotyped behaviors and also mobilize their positive emotions.

PA685

Clinical Research on Improving the Brain Microcirculation of Children with Cerebral Palsy by Acupuncture

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Objective: To investigate the therapeutic action and value of acupuncture in Cerebral Palsy rehabilitation. **Methods:** 150 spasm Cerebral Palsy patients from 1.5 to 7 years old are randomly divided into three groups. Acupuncture group (group A): 50 patients are treated with head acupuncture and body acupuncture; Rehabilitation-training group (group B): 50 patients are treated with physical therapy of Bobath and Vojta methods. Acupuncture add rehabilitation-training group (group C): In this group 50 patients are investigated. **Results:** The total effective rate of group A and group C are obvious higher than that in group B. After treatment the DQ value of group A and group C are higher than that in group B ($p < 0.01$). The improve rates of CT brain dysphasia and atrophy in group A and C are significantly higher than that in group B ($P < 0.05-0.01$). The recover to normal rates of ECT brain blood stream in group A and C are obviously higher than that in group B ($P < 0.01$). The results of TCD after therapy are better than those before therapy in group A [PI: 1.19 ± 0.19 and 1.10 ± 0.16 ; VP: (132.92 ± 17.14) cm/s and (139.63 ± 14.64) cm/s] and group C [PI: 1.18 ± 0.24 and 0.91 ± 0.19 ; VP: (131.84 ± 15.93) cm/s and (139.68 ± 15.66) cm/s] ($P < 0.01$). **Conclusions:** Acupuncture can obviously increase cerebral circulation, improve cerebral cell metabolism, promote partial or complete compensation of cerebral function and the restoration and function of plasticity of cerebral tissue in children with cerebral palsy.

PA686

Effects of Quality of Life of Autistic Disorder Children's Parents

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Objective: To investigate quality of life in parents of Autistic Disorder children. **Methods:** SF-36 was used to measure parent's quality of life of 90 children with Autistic Disorder and 120 normal children. **Results:** The quality of life of patients in normal children was higher than in Autistic Disorder group in Physical (90.84 ± 11.46), Role-Physical (54.22 ± 42.10), Bodily Pain (72.36 ± 23.40), General Health (67.53 ± 21.20), Vitality (60.14 ± 25.00), Social Functioning (71.95 ± 26.60), Role-Emotional (53.38 ± 41.70), and Mental Health (67.23 ± 20.00) with the difference being significant (96.16 ± 13.32 ,

90.09 ± 19.56 , 89.53 ± 24.80 , 92.92 ± 20.20 , 86.39 ± 15.45 , 95.63 ± 25.40 , 22.2 ± 30.2 , 82.75 ± 12.03 , 91.75 ± 16.03 , $P < 0.01$). The quality of life of patients in normal children High functioning Intelligence group was higher than in Autistic Disorder group. The quality of life of patients in low functioning Intelligence group are worse than High functioning Intelligence group. **Conclusion:** Children with Autistic Disorder took grievous influence on parent's quality of life. Compared with High functioning Intelligence group, the low functioning Intelligence Children's Parents quality of life were even worse.

PA687

Effects of Quality of Life of Autistic Disorder Children

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Objective: To investigate quality of life in Autistic Disorder children. **Methods:** PedsQL4.0 was used to measure quality of life of 90 children with Autistic Disorder and 120 normal children. **Results:** The quality of life of Autistic Disorder group was lower than in normal group in the scores of physical functioning were (69.16 ± 15.69), emotional functioning were (46.87 ± 17.43), social functioning were (45.94 ± 16.54), and school functioning (45.94 ± 16.54). The totals cores of PedsQL were (49.42 ± 15.9), with the difference being significant (90.16 ± 13.32 , 79.09 ± 19.56 , 86.39 ± 15.45 , 82.75 ± 16.03 , 85.23 ± 14.2 , $P < 0.01$). The scores in quality of life in High functioning Intelligence group was higher than Low functioning group. **Conclusion:** Children with Autistic Disorder took grievous influence on quality of life. Compared with High functioning Intelligence group, the low functioning Intelligence Children quality of life were even worse.

PA688

Hip Morphology and Muscle Contraction in Assisted Standing in a Population of Children with Cerebral Palsy: a Preliminary Study

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Introduction: In cerebral palsy (CP) the hip is one of the most affected joints. Although their development is related to disorder of muscle tone and imbalance between abductor muscle group and adductor muscle group, there are no objective data that allow us to quantify the exact proportion between contractions of both muscle groups as of this joint is at risk. The aims of this study are: - To exhibit, in a population with CP at level V of Gross Motor Function Classification System (GMFCS), the mean of contraction percentage of hip abductors and adductors in assisted standing. - To compare it with the different degrees of alteration of the hip. **Material and Methods:** Muscle activity of the abductors and adductors was measured during standing in 14 hips of 7 subjects with cerebral palsy at level V of GMFCS using a surface electromyography. The standing aid used was the Gazelle PS from R82. Results were expressed as a percentage of the maximum isometric contraction previously obtained for the same muscle groups. The hips were evaluated using radiological studies by Reimer's migration percentage and cerebral palsy hip classification of Robin et al. **Results:** The mean of contraction percentage of adductor group (108%) and abductor (31.4%) are higher than means obtained in population without neurological disorders (1.29% for the adductor group and 3.72% for the abductor). In dysplastic hips, contraction percentage of abductor group (37%) is higher than the mean obtained in our population. In dislocated hips, contraction percentage of adductor muscle group (396%) is higher than the mean of our population. Individually, we did not get any pattern. **Conclusions:** In our population, the means obtained for both abductor and adductor muscle groups in assisted standing

are much higher than means of population without neurological disorders. Although adductor contraction is intuited as an important factor in the development of hip pathology, it is not useful as an individual indicator of hip status even using means of population with neurological disorder.

PA689

Vestibulocollic Reflexes and Intervention Program Based on Vestibular Stimulation in a Population with Cerebral Palsy

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Introduction: A large number of individuals with cerebral palsy (CP) exhibit alterations of vestibulocollic reflexes (VCR) which are responsible for maintaining the alignment of the head in space depending on vestibular information. The objective of this work is to evaluate, using surface electromyography, the improvements in neck muscle response to forward-backward and left-right imbalances following the implementation of an intervention program based on VS. **Material and Method:** We have carried out a quasi-experimental longitudinal study design pretest –intervention–posttest. 12 individuals with cerebral palsy at level V of Gross Motor Function Classification System (GMFCS) participated in the study. Inclusion criteria were diagnosis of cerebral palsy in level V of GMFCS and complementary diagnosis of multiple disabilities. Those individuals with different diagnosis, level of GMFCS or who received previous treatment following a multidisciplinary regular program of VS or program based on VS outside of school, were excluded. It was recorded using surface electromyography muscle activity of the neck extensor group with forward-backward and left-right imbalances. After the VS program was conducted 6 months, the registrations were repeated. **Results:** Statistically significant differences between the means before and after the VS program to forward-backward imbalances for both right neck extensor muscles ($p=0.025$) and left ($p=0.014$) were obtained. For sideways imbalances, after the implementation of the VS program, percentages of correct contraction were increased by 33.3% for the right neck extensor muscles ($p=0.10$) and 25% for the left ($p=0.18$), although not statistically significant. **Conclusions:** VS produces measurable improvements at sEMG in neck muscle response to imbalances, especially forward and backward, in individuals with CP at GMFCS Level V.

PA690

Pediatric Rehabilitation in Saudi Arabia: Diagnoses and Practice

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Introduction: The Kingdom of Saudi Arabia (KSA) has a youthful population, with a child growth rate of 1.43%. Children aged 0 – 14 years represent 29.4% of the total population. Information on the prevalence of disabilities in Saudi Arabia is scarce. Cerebral Palsy (CP) is one of the most common disabling conditions in Saudi Arabia. A leading cause of death in KSA youth is traumatic brain injury (TBI). The aim of this study was to define and better understand the common pediatric rehabilitation diagnoses, to identify the need for services and assist with future planning, funding, and development of rehabilitation services to children with TBI, SCI, and CP in Saudi Arabia to maximize their care and functional potential. **Methods:** Retrospective study conducted using medical charts (electronic and paper). All pediatric patients admitted to the KFMC Pediatric Inpatient Ward since the unit was established was included in study. **Results:** Total patient was 93 with 36 female (38.71%) and 57 male (61.29%). 36 (38.71%) patients were from Riyadh and 57 (61.29%) patients from outside Riyadh. Most common pediatric rehabilitation diagnosis was Brain injury 51.61% (48 patients out of

93). Among brain injury patients 37.63% were traumatic brain injury and 13.98% were brain tumors with astrocytoma as most common tumor. 25 (26.88%) out of 93 were cerebral palsy patients. 19 (20.43%) out of 93 were spinal cord injury patients. **Conclusions:** Most common pediatric rehabilitation diagnosis was Brain injury predominantly TBI. Most of patients from outside Riyadh. Suggesting implementation of strategies to prevent pediatric TBI, Establishing pediatric rehab units outside Riyadh and further research

PA691

Proximal Femoral Focal Deficiency – an Uncommon Congenital Deformity: a Clinical Case

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Case Diagnosis: Proximal Femoral Focal Deficiency (PFFD) is a rare and complex congenital disorder, with an estimated incidence of 1: 50,000 births. This condition manifests by hypoplasia or complete absence of the proximal femur with shortening of the entire limb. The typical presentation is a short bulky thigh where the hip is held flexed, abducted and externally rotated. Valgus feet are also present. The authors report a case of unilateral PFFD.

Case Description: F.M.S.V., female, 6 years old, with medical history of PFFD. The patient was born at 2007 presented, at birth, a shortening of left lower limb. The x-ray of the lower limbs showed hypoplasia of the left femur (type III in Pappas' Classification) and left tibia. With 1 year old was referred to our Physical and Rehabilitation Medicine (PRM) department. In the first consultation, at the physical examination, the patient presented shortness of left lower limb (thigh and leg) with abduction and external rotation of the left hip. A retraction of the Achilles tendon with an equinus valgus foot was also observed. One month later, the patient was observed in group consultation with PRM and Orthopedics. A lower limb orthoprosthesis was prescribed which the patient began using at 21 months of age, with good adaptation. Over the years the orthoprosthesis required to be adjusted according to the development of the patient. A surgical intervention was performed at 6 years old to correct the epiphysiolysis capitis femoris and hip contractures. **Discussion:** The PFFD leads to several structural changes that affect the functionality of the patients. Multiple options exist for treatment of unilateral PFFD. While surgery is often recommended, prosthetic or orthotic intervention is required in most cases to equalize leg lengths and allow for standing and walking. In our particular case, the patient used an orthoprosthesis to compensate the structural deficit and to allow verticalization and gait, with good adaptation. **Conclusions:** The PFFD is a congenital disorder that causes structural deformities that conduct to functional limitations. Currently, there are several treatment options that could be management to promote a better quality of life.

PA692

Scoliosis in Prader-Willy Syndrome: a Case Report

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Case Diagnosis: Scoliosis in Prader-Willy Syndrome (PWS). **Case Description:** We report the case of a eight years old girl, with characteristic phenotypic changes and genetic diagnosis of PWS, referred to our Center due to a progressing scoliosis. She was treated with growth hormone (GH) at the age of six. Clinically she presented a left lumbar hump in the Adams test and hipokyphosis. At radiographic evaluation it was objected a structured 30° left lumbar curvature. The patient initiated the use of Boston type thoracolumbosacral orthosis. After 6 months of treatment, there was a in brace reduction of Cobb angle. The patient maintains treatment with good compliance. **Discussion:** PWS is a rare disease (1/15000), with typical musculoskeletal changes and frequent appearance of scoliosis (40-80% of cases). The most common type of curve is thoracolum-

bar and lumbar, and about 40% of scoliosis diagnosed after 4 years progress to values that require surgical intervention. This therapeutic approach is associated with high risk of complications (higher than in cases of idiopathic scoliosis and related with comorbidities sometimes present in these patients). This is why it is increasingly advocated conservative approach of scoliosis in these patients. Some studies with small samples, suggest that the use of brace, may prevent the progression of scoliosis. The most recent studies seem to not relate the administration of GH in PWS with worsening or early onset of scoliosis. This case presents the changes most commonly described in scoliosis in PWS, where we have been adopted conservative treatment with good results so far. The prognosis is related to the continued use of the brace, the comorbidities, among others. **Conclusions:** Due to the frequency and potential severity of scoliosis in patients with PWS, an early diagnosis and intervention is critical. Although the best approach remains controversial, the high frequency of complications associated with surgery, make conservative treatment as increasingly frequent option. However, the decision will largely depend of the growth potential of the patient, the curvature characteristics and the clinical experience.

PA693

Sciatic Nerve Injury in a Newborn Resulting from Surgical Incision in a Caesarean Delivery: a Case Report

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Introduction: Caesarean deliveries are associated with risk of injuries to the newborn and the mother. Lacerations in the newborn are the commonest reported injuries that primarily occur on face, head and ear. Injury to the sciatic nerve due to fetal laceration has not been reported in the literature before. We report a laceration at the hip that resulted in sciatic nerve injury in a newborn caused by surgical incision of caesarean section of his mother. **Materials/Methods:** A 4-months-old infant was referred for electrodiagnostic (EDX) evaluation of flail right leg. History revealed that the right buttock of the infant was accidentally nicked by the surgeon during elective caesarean section of mother under spinal anesthesia at full term. At one month of age his mother noticed that he kept his right leg in a flail posture with a right sided foot drop. On examination the child had a right foot drop, which became more obvious when held in the air. EDX confirmed axonal pattern of injury to the right sciatic nerve proximal to take off to right biceps femoris with no sign of recovery. **Results:** Parents were advised conservative treatment with continuation of physiotherapy and home based exercised program under supervision of physiatrist. Patient is on regular follow up and has not shown any significant improvement at present. **Conclusion:** Caesarean section is a life-saving mode of delivery in certain circumstances but is not without risks to the mother and the child. Our case is the first report of such an incident. EDX evaluation has an important role in identifying location, severity and prognosis of recovery. **Keyword:** Caesarean delivery, fetal laceration, sciatic nerve injury.

PA694

Functional Prognosis of Postoperative Swallowing Impairment in Pediatric Patients with Posterior Fossa Brain Tumor

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Introduction/Background: Swallowing impairment is critical for the development and quality of life in children with the posterior fossa brain tumor (PFBT). However, insufficient evidence has been available for the swallowing impairment after surgery on PFBT. The purpose of this study was to elucidate the high risk group of swallowing impairment and its functional prognosis after the brain

tumor resection (BTR). **Material and Methods:** In this retrospective study, under 19-year-old patients with the PFBT who underwent BTR were reviewed. Among total of 183 patients, 39 were underwent the videofluoroscopic swallowing study (VFSS) due to swallowing impairments. The association between clinical, swallowing characteristics and swallowing impairment was explored from the initial to 13-month period of time. The duration of tube feeding in the swallowing impairment group was also investigated using Kaplan-Meier method. **Results:** The rates of swallowing impairment for 13-month follow-up period were 66.7%, 33.3%, 7.1% and 0.0% in atypical teratoid rhabdoid tumor (ATRT), ependymoma (EP), medulloblastoma (MB) and pilocytic astrocytoma, respectively. Among the patients with tube feeding at the initial VFSS, the rate of 13-month tube feeding and its mean duration were 44.4%, 306.17 days and 11.1%, 186.67 days in EP and MB, and no conversion to oral feeding was observed in patients with ATRT. Hydrocephalus before BTR was significantly associated with initial swallowing impairment (HR, 10.50; p=0.004). The brainstem involvement of tumor (HR, 6.00; p=0.039) increased risk of 13-month tube feeding. Delayed triggering of pharyngeal swallow (DTP) was associated with 13-month tube feeding (HR 28.52; p=0.030) and increased duration of tube feeding (DTP+, 321.78 days vs DTP-, 147.67 days) significantly. **Conclusion:** This study reports that the risk of swallowing impairment is the highest in patients with ATRT, which is followed by EP, MB and pilocytic astrocytoma among the tumor types. The patients with hydrocephalus before BTR increase the risk of swallowing impairment for short-term period of time. Brainstem involvement of tumor and DTP can be used to be as prognostic factors of long-term swallowing impairment. These results are expected to be applicable to determine the plan of evaluation, nutrition and intervention in clinical practice.

PA695

The Validity of Two Neuromotor Assessments for Predicting the Motor Performance at 12 Months in Preterm Infants

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Introduction: Neuromotor assessments are necessary in predicting functional motor performance in preterm infants with risks of developing neurological dysfunctions including cerebral palsy. Two different methods for neuromotor assessment, the Test of Infant Motor Performance (TIMP) and the General Movement (GMs) Assessment at 1 month and 3 months were evaluated for efficacy on predicting functional outcomes by the Alberta Infant Motor Scale (AIMS) at 12 months. **Methods:** 37 preterm (<36 weeks) infants in whom AIMS at 12 months were measured were recruited. GMs and TIMP at 1 months and 3 months after term age were analyzed retrospectively. The GMs were judged as abnormal based on presence of poor repertoire or cramped-synchronized movements at postterm 1 month and no or sporadic fidgety movement at postterm 3 months. TIMP score were categorized as normal (average and low average) and abnormal (below average and far below average). AIMS score were categorized as normal (>10 percentile) and abnormal (<10 percentile). Correlation analysis was used to examine the association between GMs, TIMP and AIMS. **Results:** GMs at 3 months was significantly correlated with AIMS at 12 months. Relationship between GMs and TIMP at 1 month and 3 months showed no significance. TIMP at 1 month and 3 months did not show significant relationship with AIMS at 12 months. But for infants with normal GMs (n=30), TIMP at 3 months correlated significantly with AIMS at 12 months. **Conclusion:** GM at 3 months can predict the motor performance assessed by AIMS at 12 months. Also TIMP in preterm infants with low risk of developing neurological dysfunctions may be informative in predicting AIMS at 12 months. We suggest that neuromotor assessment along with GMs and TIMP would be clinically useful to identify infants likely to benefit from intervention.

PA696

Segmental Colonic Transit Measurement in Children with Bowel Bladder Dysfunction*V. Zivkovic¹, I. Stanković¹, L. Dimitrijević¹, H. Colović¹, M. Spalević¹, M. Lazović², M. Vlajković¹, I. Djordjević³¹Medical Faculty University of Nis, ²Medical Faculty University of Belgrade, ³Clinical Centre Nis, Nis, RS

Introduction: The term “bowel bladder dysfunction” (BBD) describes the children with a combination of functional bladder and bowel disturbances. Children with dysfunctional voiding (DV) suffered most from constipation compared to other bladder disorders. They complain of urinary frequency and incontinence, non-monosymptomatic nocturnal enuresis, voiding dysfunction, recurrent urinary tract infections, chronic constipation and/or encopresis. Two different types of chronic functional constipation have been identified in children based on colonic transit time (CTT) measurement: a more generalized and severe form known as slow-transit (ST) constipation and a segmental type known as functional fecal retention (FFR). Both entities present with similar symptomatology but involve different pathophysiological mechanisms and require different treatment strategies. Children with ST constipation who respond poorly to diet/behavior modification may benefit from other treatments, such as transcutaneous interferential electrical stimulation.

Purpose: To evaluate types of constipation according to CTT in chronically constipated children with DV (BBD group) and to compare the results with transit type in children with normal bowel habits, but with lower urinary tract symptoms (control group).

Patients and Methods: 38 children with BBD and 20 control group children were included in the study and their medical histories were obtained. In BBD group physical examination including digital rectal examination was performed, together with the measurement of rectal diameter by transabdominal ultrasound. In both groups children kept a voiding diary, and underwent urinalyses and urine culture, ultrasound examination of bladder and kidneys and uroflowmetry with pelvic floor electromyography. Radionuclear transit scintigraphy was performed in all children according to a standardized protocol. Segmental colonic transit was analyzed visually and semi-quantitatively by calculating the geometric center. Patients were categorized as having either ST, FFR or normal transit.

Results: All the children with BBD demonstrated abnormal colonic transit. FFR was diagnosed in 31 children, while 7 children had ST. The control group children demonstrated normal colonic transit.

Conclusions: FFR is the most common form of constipation in children with DV. However, some children might suffer from ST constipation. The differentiation between these two types of constipation is clinically significant because they require different treatment strategies.

PA697

Characteristic of Bone Strength in Children with Acyanotic Congenital Heart Disease

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Introduction: It is clear that development disorder is very common in children with congenital heart disease (CHD). We conducted a study to describe bone strength outcome in children with acyanotic CHD, and the effect of different types.

Material and Methods: 120 acyanotic CHD patients were enrolled in this study. There were 45 patients with atrial septal defect (VSD), 61 with ventricular septal defect, 14 with patent ductus arteriosus. We obtained speed of sound (SOS), Z-score value, Percentile at the left 1/3 of distal end of the radius with a quantitative ultrasound device. Z-score value <-2 or Percentile <3%, -2< Z-score value <-1.5 or 3%< Percentile <10%, -1.5< Z-score value <-1 or 10%< Percentile <25%, -1< Z-score value <0 or 25%< Percentile <50%, Z-score value >0 or Percentile >50% were corresponded with so-called “severe bone strength shortage”, “moderate bone strength shortage”, “mild bone strength

shortage”, “low bone strength” and “normal bone strength” respectively.

Results: SOS of children with ASD, VSD and PDA was (3403.7±258.0) m/s, (3350.5±250.5) m/s, (3418.±212.3) m/s, Z-score value was (0.5±1.4), (-0.01±1.2), (-0.03±1.4), Percentile was (66.2±31.0), (50.4±32.9), (46.3±33.8), respectively. There were no significant differences in age, gender ratio, SOS, Z-score in children with ASD, VSD and PDA. Percentile of Children with VSD and PDA were both significantly lower than those with ASD. Among 120 cases, the percent of “low bone strength”, “mild bone strength shortage”, “moderate bone strength shortage” and “severe bone strength shortage” outcome were 20%, 10%, 3.3%, 5.8% respectively.

Conclusion: There exists a low bone strength status in the children with acyanotic CHD. Compare to children with ASD, children with VSD and PDA are more prone to decrease bone strength.

PA698

Effects of Multi-media Action Observation Therapy that Based on Mirror Neuron Theory on Motor Function of Cerebral Palsy Patients in Water and on Land

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Objective: To explore the effects of multi-media action observation therapy that based on mirror neuron theory on Motor Function of cerebral palsy patients in water and on land.

Methods: Forty cases with cerebral palsy were randomly assigned to an experimental group (n=20) or a control group (n=20). The conventional aquatic therapy (mainly Halliwick concept) was applied for both groups, and the experimental group received additional multi-media action observation therapy. The experimental group watched the action videos carefully before they practiced that movement while the control group watched some irrelevant static pictures in the observation section. Both groups were trained 8 weeks, 10 times/week and the duration of each treatment was 40 minutes (10 minutes for observation). Both groups were assessed by the Water Orientation Test of Alyn 2 (WOTA 2) and the Gross Motor Function Measure (GMFM) in pre-treatment and after 4 and 8 weeks of treatment.

Results: The WOTA 2 scores evaluation in the experimental group had significantly increased compared with pre-treatment and the control group (p<0.05). The GMFM scores in the experimental group had increased compared with pre-treatment and the control group (p<0.05). The WOTA 2 scores improve more than the GMFM scores.

Conclusions: The multi-media action observation therapy that based on mirror neuron theory is help to improve motor function in water and on land of patients with cerebral palsy. Additional action observation therapy in conventional physical therapy contributes to promote motor learning.

Keyword: mirror neuron, action observation therapy, multi-media technology, aquatic exercise, cerebral palsy, motor rehabilitation.

PA699

Effects of Home-based Training on Gross Motor Function and Activities of Daily Living of Children with Cerebral Palsy

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Background: Children with cerebral palsy suffer from various degrees of motor and cognitive disabilities, which usually require long-term rehabilitation training. However, few children have the conditions to receive long-term professional training due to the lack of medical resources, the unsound health insurance system and so on. Furthermore, much more intensive training is essential in order to drive neuroplastic changes in the brain. Thus, it is necessary to find a cost-effective way to help children with cerebral palsy to train intensively for a long time. The aim of this study is to

provide proof that parents training may provide a way to maintain the training of children with cerebral palsy and rehabilitation training combined family training can improve the function of children. *Material and Methods:* 55 children (M:F=25:30, aged 3-12 years) with spastic cerebral palsy were included in the study. 27 of them as intervention group participated in comprehensive rehabilitation which including physical therapy, occupational therapy and speech therapy for 6 months. And their parents received training by doctors and therapists in order to provide training for their children when they are at home. While 28 of them as control group only participated in comprehensive rehabilitation without family rehabilitation. Gross motor functions and activities of daily living were evaluated by GMFM-66, GMFM-88 and Barthel Index before and after 6 months of treatment. *Results:* After 6 months of training, both groups had significantly improved in mean GMFM-66, GMFM-88 scores. However, the intervention group had greater improvement than the control group. Assessment of Barthel Index also showed significant increases in both groups, while the intervention group showed more improvement in bathing, fecal control, urinary control and toilet use than the control group. *Conclusions:* The results of this study demonstrated that it is feasible to conduct training of family rehabilitation in order to ensure more intensive and longer training for the children even when they are at home.

PA700

Effects of Home-Based Training on Gross Motor Function and Activities of Daily Living of Children with Cerebral Palsy

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Background: Children with cerebral palsy suffer from various degrees of motor and cognitive disabilities, which usually require long-term rehabilitation training. However, few children have the conditions to receive long-term professional training due to the lack of medical resources, the unsound health insurance system and so on. Furthermore, much more intensive training is essential in order to drive neuroplastic changes in the brain. Thus, it is necessary to find a cost-effective way to help children with cerebral palsy to train intensively for a long time. The aim of this study is to provide proof that parents training may provide a way to maintain the training of children with cerebral palsy and rehabilitation training combined family training can improve the function of children. *Material and Methods:* 55 children (M:F=25:30, aged 3-12 years) with spastic cerebral palsy were included in the study. 27 of them as intervention group participated in comprehensive rehabilitation which including physical therapy, occupational therapy and speech therapy for 6 months. And their parents received training by doctors and therapists in order to provide training for their children when they are at home. While 28 of them as control group only participated in comprehensive rehabilitation without family rehabilitation. Gross motor functions and activities of daily living were evaluated by GMFM-66, GMFM-88 and Barthel Index before and after 6 months of treatment. *Results:* After 6 months of training, both groups had significantly improved in mean GMFM-66, GMFM-88 scores. However, the intervention group had greater improvement than the control group. Assessment of Barthel Index also showed significant increases in both groups, while the intervention group showed more improvement in bathing, fecal control, urinary control and toilet use than the control group. *Conclusions:* The results of this study demonstrated that it is feasible to conduct training of family rehabilitation in order to ensure more intensive and longer training for the children even when they are at home.

PA701

Robot-Assisted Upper Limb Therapy in Children

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Introduction: We investigated the application potentials and effects of robot-assisted upper limb therapy in children. *Material and Methods:* A retrospective chart review of children who had received robot-assisted upper limb therapy from September 2013 to June 2014 was performed. The identified variables included diagnosis, gender, age, duration of onset, Manual Muscle Test (MMT) and Modified Ashworth Scale (MAS) of upper limb, Fugl-Meyer Assessment (FMA), Modified Barthel Index (MBI), number of sessions completed, and the reason for treatment discontinuation. Robot-assisted upper limb therapy with the InMotion2 robot (Interactive Motion Technologies, Inc., Watertown, MA, USA) was provided during 30 minute session, 5 times per week, for 4 weeks. Children were seated comfortably at the robot workstation and asked to perform 640 repetitive, goal-directed planar reaching movements with the paretic arm during each therapy session. Changes in FMA, MBI, MMT and MAS values of upper limb before and after therapy were verified. *Results:* A total of 8 subjects (3 with cerebral palsy and 5 with acquired brain injury) received robot-assisted upper limb therapy; of them, 5 subjects (62.5%) completed the 20 sessions. Of the 5 subjects (mean age, 9.4 years; 3 boys and 2 girls) who completed the robot-assisted upper limb therapy, 4 had acquired brain injury (mean duration of onset, 12.7 months) and 1 had cerebral palsy. The 5 subjects showed no changes in MMT, MAS after therapy; however, their F-M assessment and MBI scores improved an average of 4.8 and 13 points. In particular, FMA showed improvements in the order of upper extremity (A), hand (C), coordination/speed (D), and wrist (B) subscore of 1.6, 1.6, 1.2, and 0.4 points, respectively. *Conclusion:* Improvements in upper-limb function and coordination in children can be anticipated after robot-assisted upper limb therapy. This therapy can promote interest and lead to active participation by the children. Additional future studies on subject selection and protocol are needed to maximize the effect of robot-assisted upper limb therapy in children.

PA702

Analyze Effect of Self-Talk and Focus on Balance Function of Children Who Suffering from Cerebral Palsy

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The research aimed to analyze effect of self-talk, and focus on balance function of children who suffering from cerebral palsy. The research was semi-experimental and its method was causative comparative. Statistical so citey was consisted of all 6-10 years old children who sufferings from cerebral palsy – under taking care in alborz province rehabilitation and welfare centers. Among them, a center has been chosen randomly and regarding to physical and mental specification of the statistical society, 36 children were chosen randomly as available sample, which were divided into 3 groups of 12 people. to collect data personal static faction for parents, personal specification question are, dynamometer plane to evaluate balance in static situations, biodex device to measure static and seem-dynamic balance and TGUG test to measure dynamic balance have been applied. Kolmogrove-smirnov test result, shows normal data distribution, so data analyzing of descriptive and inferntal statistic consisted of multi-factorial 3*3 variance analyzing test to compare intra group and inter group. Bonferroni following test had been applied. Data analyzing, was at meaning full level 25% and SPSS software used. The test result showed that educational and motivational self-talk, outer and inner focus had meaning full effect on dynamic, semi dynamic and static balance of the children (6-10) years old children suffering from cerebral palsy. At so outer compared to inner focus and motivational self-speech compared to educational self-talk caused to higher operation in dynamic balance activities, semi dynamic and static test. *Keyword:* Self-talk, focus of dynamic and sami dynamic balance, TGUG test

PA703

A Pilot Study of BoNT–A Treatment for Abnormal Co-Contraction of the Internal Rotators in Obstetrical Brachial Plexus Palsy*C. Chen¹, Y.-L. Zhu¹, Q.-Y. Li², J. Xu¹, T.-H. Gao¹, C. Du¹, L. Li², F. Li¹¹Huashan Hospital, Fudan University, ²Jing'an District Centre Hospital of Shanghai, Jing'an branch of Huashan Hospital, Fudan University, Shanghai, CN

Introduction: The muscular imbalance of better recovered internal rotators may lead to difficulties of abduction/external rotation of involved shoulder in children with obstetrical brachial plexus palsy (OBPP). The treatment of botulinum neurotoxin A (BoNT-A) for OBPP sequela has been introduced recently. This is our pilot study of BoNT-A treatment on the overactivity of internal rotators in OBPP. **Material and Methods:** Twenty seven children with OBPP sequela who had no surgery history were enrolled. Mallet classification and Gilbert shoulder grading scale were scored. Active range of motion (ROM) of shoulder abduction and inferior glenohumeral angle of both sides were measured. The co-contractions of the latissimus dorsi and teres major during shoulder abduction/external rotation were investigated by electromyography (EMG), and the amplitude ratio of the involved side to the non-involved side was calculated. Based on the amplitude ratio, the children were divided into two groups: group one ≥ 1.5 ; and group two < 1.5 . Five children in group one received BoNT-A treatment and followed assessments. **Results:** The children in Group two (n=6) were younger than those in group one (n=21) (p=0.01). There are no differences in gender, Narakas classification, Mallet classification, Gilbert score, ROM of shoulder abduction and inferior glenohumeral angle between two groups (p>0.05). The improvement of scoring of Mallet classification was found at one month (p=0.01) and three months (p=0.01) after BoNT-A treatment. However, no increased score of Gilbert scale was found. **Conclusion:** Overactivity of the latissimus dorsi and teres major of the involved shoulder may occur more easily in older children with OBPP. The EMG amplitude ratio may be a useful tool to assess the abnormal co-contraction. The improvement of scoring of Mallet classification was found after BoNT-A treatment.

PA704

Relationship-based Parenting Interventions to Support Developmental Outcomes for Young Children with Cerebral Palsy: a Systematic Review*J. Barfoot¹, P. Meredith², J. Ziviani², K. Whittingham²¹The University of Queensland, Highgate Hill, ²The University of Queensland, Brisbane, AU

Introduction: Extensive research suggests that secure parent-child relationships are key predictors of cognitive, language and social-emotional outcomes for children. However, little has been documented about the contribution of parenting on children's motor or functional outcomes. For children with cerebral palsy, the prevalence of parenting difficulties and disorganised parent-child attachment relationships is much higher than in the non-clinical population. This can be explained by the impact of grief commonly experienced by these parents and the added stress associated with parenting a child with a disability. In addition, a child with a disability may not initiate as many cues, or these may be harder to read and respond to as a result of the developmental implications associated with the diagnosis. Early intervention therapists working with young children with cerebral palsy understand the importance of involving parents in the therapy process as part of family-centred practice. However, it is still common for therapists to implement child-focused, developmentally-orientated interventions rather than considering the strengths and difficulties in the parent-child relationship and the impact this can have on child development. Recent literature has questioned the efficacy of cur-

rent intervention models for children with CP. In addition, it has been suggested that developmental gain occurs best when there are changes in parent responsiveness, leading to the recommendation that early intervention services increase the focus on positive parent-child interactions. As a first step in addressing this call, a systematic review was conducted to investigate existing evidence of the role of parenting interventions in contributing to positive motor and functional outcomes for young children with CP. **Methods:** This systematic review was conducted using the protocol based on recommendations from the Cochrane Collaboration and PRISMA statements. Searches were conducted in CINAHL, PubMed, PsycINFO, Embase and Web of Science databases. **Results:** A search of the databases identified 614 results. 588 articles were excluded following title and abstract viewing. A total of 26 papers were retained for detailed examination and two met study criteria. **Conclusion:** The two articles that met criteria will be discussed. Important considerations relating to the role of developmentally trained therapists providing parenting interventions to this population will also be explored.

PA705

Early Abnormalities of the Children with Disabilities Admitted to Outpatient Pediatric Rehabilitation Clinic

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Introduction: Neurodevelopmental disorders include a group of diseases with a variety of disabilities such as motor dysfunctions, mental abnormalities, language disorders and behavioural pathologies. Early motor and sensational symptoms can be important indicators for the diagnosis. This study investigates the early abnormalities of the children with neurodevelopmental disorders and the time that abnormality first noticed. **Material and Methods:** A total of 231 children with neurodevelopmental disorder and their families were admitted to our study. The clinical data of patients were collected from an outpatient pediatric clinic. Parents of children reported on the early abnormalities and the time of abnormality first noticed. **Results:** The mean age of the patients was 7.46±5.40. When the abnormalities that parents first noticed were examined; it was found that 49 patients had no head control with a ratio of 21.2%. The other detected early abnormalities were visual disorders (16.0%), delay in sitting (12.1%), the act of seizing (10.4%), delay in walking (9.5%), loss of muscle strength (6.1%), loss of hand functions (4.3%), auditory disorder (3.9%), developmental delay (2.2%), hypotonia (1.7%), impairment of walking (1.7%), speech disorder (0.4%), no sucking (0.9%), early development of fatigue (0.4%), increasing head circumference (0.4%), cyanosis (0.4%). When the time that abnormality first noticed was explored it was learned that the most detectable age groups were 0-1 years old (75.2%), 1-2 years old (13.0%) and 2-3 years old (5.2%) in order of frequency. **Conclusion:** Neurodevelopmental disorders constitute a major health problem for the children and their families. Early diagnosis of the disabilities is very important since it can provide an appropriate, efficient educational and rehabilitative treatment programmes for the patients.

PA706

Training with a Pediatric Ankle Robot: Preliminary Report*H. I. Krebs¹, L. Monterroso², J. Mast²¹MIT, Cambridge, MA, ²Blythedale Children's Hospital, Valhalla, NY, US

Background/Objectives: Cerebral Palsy (CP) affects 1 to 4 in 1,000 children born in the United States with the CDC estimating the number at 1 in every 323 children. Here we will summarize our initial findings from a series of trials, having over 6 children with

hemiplegic CP training for 16 sessions with a pediatric ankle robot (pediatric anklebot). *Design:* Single-arm pilot study; sample of convenience, repeated measures ANOVA, paired *t*-tests, Wilcoxon sign-rank test as required. *Participants and Setting:* Children with hemiplegic cerebral palsy, age 6 to 10 years old. *Materials/Methods:* Assessments included paretic ankle ranges of motion, strength, motor control, and overground gait function. Children training in the discrete intervention played dorsi-and plantar-flexion or inversion-eversion video games with the robot during two 1 hour training sessions weekly for 8 weeks with the pediatric anklebot. *Results:* Improved paretic ankle motor control was seen as increased target success, faster movements and smoother movements. Walking velocity increased. *Conclusions/Significance:* Training discrete pointing movements with the pediatric ankle robot appears to have improved paretic ankle motor control and improved floor walking. Improvement in walking speed was comparable to results reported from other task-oriented approaches. Larger studies are being planned.

PA707

Training Postural Control and Sitting in Children with Cerebral Palsy: Kinesio Taping vs. Neuromuscular Electrical Stimulation

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Introduction: The objective of this study was to elucidate the effects of Kinesio Taping (KT) in addition to neurophysiological exercises on posture and sitting, and to compare the effects of KT and neuromuscular electrical stimulation (NMES) on postural trunk control. *Methods:* Seventy-five children were allocated into control, KT, and NMES groups. Neurophysiological exercises were applied to all children for four weeks five times a day. In addition, KT and NMES were applied to KT and NMES groups, respectively. Gross Motor Function Measurements and kyphotic angles were compared within and among the groups. *Results:* Sixty-one children finished the study. Overall, there were 19 children in the KT group, 19 in the control group, and 23 in the NMES group for the analysis. Compared with baseline, Gross Motor Function Measurements improved significantly in all groups after the intervention ($F(1.58)=192.4, P=0.000$). However, the mean change levels were 11, 6.84, and 4.47 in the NMES, KT, and control groups, respectively (all $p<0.01$). Compared with baseline, kyphosis values decreased significantly in all groups after the intervention ($F(1.58)=349.7, p=0.000, p<0.001$). Nonetheless, the mean decrement levels in kyphosis values were 15.3, 7.68, and 4.32 in the NMES, KT, and control groups, respectively (all $p<0.01$). *Conclusion:* The results of this study suggest that KT or NMES application for at least four weeks in addition to neurophysiological exercises seem to be effective on improving kyphosis and Gross Motor Function Measurements, besides, NMES is more effective than KT.

PA708

A Systematic Review of PECS with Children with ASD: Investigation of the Efficacy, Setting and Implementation Phase

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The Picture Exchange Communication System (PECS) has become widely used for learner, especially children with autism. This paper analyzes the extant empirical literature from 2005-2014 for PECS relative to the efficacy for learners with autism. A systematic review is provided of the 24 studies identified, which included randomized controlled trials (RCTs), other group designs and single subject studies, include 6 countries, 438 children with

ASD whose age from 1.5-11 years. Effect size analyses were done using the Improvement Rate Difference method. Effect sizes were aggregated separately for outcomes, setting, and number of phases in the PECS protocol acquired by learners. Results supported the judgment that PECS is a promising intervention method. Analysis also revealed that social communication associated with the PECS protocol were most impacted, that preschool children. Effects on speech development remain unclear. In the natural environment parents' regular use of the PECS system with their children is more helpful. Directions for future research are discussed including the priority need for further well-conducted RCTs. A longer follow-up should be maintained to evaluate the efficacy of the treatment program.

PA709

Correlation between Motor Development and White Matter Tracts in Cerebral Palsy: Preliminary Study

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Introduction: To investigate the relationship between gross motor developmental status, white matter tract volume and brain MRI findings in children with cerebral palsy. *Methods:* Ten children with motor developmental delay (9 males, 1 female; gestational age 31.3 weeks ; birth weight 1.81 kg ; corrected age 21.3 months) underwent diffusion tensor tractography (DTT), FLAIR, T2 and susceptibility weighted imaging. Partial correlation analysis controlling for corrected age tested to find associations between gross motor function and DTT tract volume. Gross motor function was assessed by the Gross Motor Functional Classification System – Expanded and Revised (GMFCS-E&R), Gross Motor Function Measure (GMFM)-88. White matter tracts thought to be associated with gross motor and postural control – corticospinal tract, corticopontocerebellar tract, corpus callosum, inferior longitudinal fasciculus – were reconstructed and volume of each tract were measured by raw tract volume per whole brain volume. And Mann-Whitney U test was conducted to compare difference between groups classified by the presence of cerebellar abnormalities. *Results:* Eight children had periventricular leukomalacia (PVL) and four children had cerebellar abnormalities on brain MRI. Linear positive correlation were observed between whole brain volume and GMFCS-E&R level, GMFM-88 total score ($r=0.760, p<0.05$; $r=0.747, p<0.05$, respectively). Corticospinal tract, corticopontocerebellar tract, corpus callosum, and inferior longitudinal fasciculus were not correlated with GMFCS-E&R or GMFM-88. Linear positive correlation was observed between corticospinal tract and inferior longitudinal fasciculus ($r=0.457, p<0.05$). Children with cerebellar abnormalities showed higher GMFCS-E&R level and lower GMFM-88 total score compared with children without cerebellar abnormalities ($p<0.05, p<0.05$, respectively). *Conclusion:* The results of this study suggest that whole brain volume could be associated with gross motor developmental status and cerebellar abnormalities might have an adverse effect on gross motor development. But we could not find significance between gross motor function and related white matter tracts. Since this study was conducted with small number of subjects, further larger scale studies are warranted.

PA710

Miller Fisher Syndrome: Electrophysiologic Studies and Differentiation from Guillain-Barré Syndrome

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Background: Miller Fisher syndrome (MFS), a variant of the Guillain-Barré syndrome, is characterized by ophthalmoplegia, ataxia, and areflexia. Electrophysiology plays a determinant role in Guillain-Barré syndrome (GBS) diagnosis, classification of the

subtypes and in establishing prognosis. In MFS, immunohistochemical studies suggest a pathophysiological role for anti-GQ1b antibodies at the paranodal regions of oculomotor nerves, at some neurons of the dorsal root ganglia (DRG). The variability of abnormal electrophysiological findings in MFS are reported. But, common electrophysiological criteria for diagnosis are absent in other studies about MFS. The annual incidence is around one patient per one million population. And there are several problematic aspects in the electrophysiological examination of MFS. **Material and Methods:** We compare electrophysiologic findings in MFS and GBS through retrospective chart review of Asan Medical Center for 10 years. Out of total 26 patients diagnosed with MFS and 24 patients diagnosed with GBS in control group were compared. **Results:** In motor nerve conduction studies of the limbs, 8 patients are abnormal such as prolongation of distal latencies, 10 patients are abnormal such as slowing of nerve conduction velocity and 12 patients are abnormal such as decrease in the amplitude of the compound muscle action potential. But, sensory nerve conduction studies of the limbs consistently reveal reduced amplitudes of sensory nerve action potentials out of prolongation of the distal latencies or slowing of sensory conduction velocities. The H-reflex was absent in 16 patients. It is so different from GBS. 5 patients show axonal degeneration and 19 patients show demyelinating process. And 20 patients are abnormal in sensory nerve conduction and sensory nerve action potential. **Conclusion:** The selective and temporary impairment of the H-reflex points to a proximal demyelinating process near the DRG, which appears to be supported by recent immunohistochemical data. It is so significant in pediatric patients than older patients. H-reflex is limited but it could be applied in the diagnostic approach to MFS. It is needed to be updated common electrophysiologic diagnostic value in MFS.

PA711

The Effect of Physical Activity on BMI School Children and Youth

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Introduction/Background: Body mass index (BMI) is established risk factor for heart disease. Its values are in strong correlation with overall lifestyle. It is known that there is direct correlation between fat distribution, obesity and physical activity. Since sedentary lifestyle is more frequent in young population there is increased risk of obesity and cardiovascular disease. Aim of this study is to point out distribution of BMI values regarding physical activity in school children and youth over period of 3 year. **Material and Methods:** In the clinical prospective study we evaluated 390 children aged from 7-14th yrs (first group). Second examination was done on same population after period of 3 years when they were aged from 10-17th yrs (second group). BMI was measured in the morning before meal, while physical activity was evaluated as activity and practicing sport measured by hours per week. **Results:** The first group individuals were physically active 5-6 hours per week while second group older children were less active between 3-4 hours per week with a statistically significant increase in mean values of BMI. **Conclusion:** Our results pointed out there is in older children significant decrease of physical activity, and increase of BMI values. Therefore, healthier lifestyle habits should be promoted more frequently.

PA712

Application of Peabody Developmental Motor Scales in Children with Acyanotic Congenital Heart Disease

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Introduction: Studies have shown that children with congenital heart disease (CHD) have development problems. The aim of this study was to assess motor development in children with acyanotic CHD. **Material and Methods:** Gross and fine motor development were evaluated in 135 acyanotic CHD children, 42 with atrial septal defect (ASD), 57 with ventricular septal defect (VSD), 36 with patent ductus arteriosus (PDA) utilizing PDMS-2. Subtest scores are standardized by age and combined to calculate gross, fine, and total motor quotients (GMQ, FMQ, TMQ). Quotients 131 to 165 corresponded with so-called 'very excellent', 121 to 130 with so-called 'excellent', 111 to 120 with so-called 'above average', 90 to 110 with so-called 'average', 80 to 89 with so-called 'below average', 70 to 79 with so-called 'poor', and 35 to 69 with so-called 'very poor'. **Results:** The mean GMQ, FMQ, TMQ of 135 acyanotic CHD children were (90.1±8.1), (98.3±13.8), (93.2±8.1) respectively. GMQ was significantly lower than FMQ in these children. Among 135 acyanotic CHD children, the percent of 'very poor', 'poor', 'below average', 'average', 'above average', 'excellent', 'very excellent' in FMQ was 1.5%, 1.5%, 13.3%, 67.4%, 12.6%, 3.0%, 0.7%; the percent of 'very poor', 'poor', 'below average', 'average' in TMQ was 0.7%, 5.9%, 23.7%, 69.6%, respectively. There were no significant differences in the average age in age, gender ratio, GMQ, FMQ, and TMQ in children with ASD, VSD and PDA. **Conclusion:** PDMS-2 can reflect the motor development status of acyanotic CHD children effectively. The gross motor function level is lower than fine motor function level in children with acyanotic CHD. Therefore, it is important to monitor the gross motor development in this population.

A.5.2. CEREBRAL PALSY AND SPINA BIFIDA

PA714

Orthopedic Selective Spasticity Control Surgery for Treatment of Spastic Upper Extremity in Cerebral Palsy

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Introduction/Background: The upper extremity of children with spastic cerebral palsy (CP) typically presents with various functional problems including an impaired range of motion that affects the positioning of the upper extremity. This impaired range of motion often develops into contractures that further limit functioning of the spastic hand and arm. Various treatment methods like splinting, botulinum toxin injection and different surgical methods including tendon release and tendon transfer are available for the treatment of spastic upper extremity in CP. The purpose of the study was to assess the outcome of orthopedic selective spasticity control surgery (OSSCS) in treatment of spastic upper extremity in CP. **Methods:** A retrospective report analysis of 55 children with spastic CP who had upper extremity involvement was conducted. All the subjects underwent surgical release of shoulder, elbow, forearm or hand muscles (thumb adductors and hand intrinsic) using the principles of OSSCS. All the operations were performed by a single Orthopedic surgeon and was followed by plaster slab immobilization for 2 weeks. After plaster removal all the subjects underwent a sequenced rehabilitation protocol which included scar mobilization, myofascial release, stretching, taping, weight bearing activities for upper limb, peg board and other hand activities, constraint induced movement therapy, EMG biofeedback, virtual reality based therapy, strengthening and aquatic therapy for 3 to 6 months. Manual ability classification system (MACS) score, gripping of the child measured using a 5 point Lykert scale, gross motor function measure and activities of daily living were measured before and after interventions. Data was analyzed statistically. **Results:** Out of the 55 children, 29 were male and 26 were female. Mean age for males was 8.5 years and females was 12.09

years (Mean age – 10.23 years). Pre MACS level of all the subjects ranged between 1 and 3 (Median value – 2). Significant improvement was noted in gripping, gross motor function and activities of daily living following the intervention. *Conclusion:* The study concluded that OSSCS followed by rehabilitation led to improvement in grip, gross motor function, activities of daily living and over all hand function in children with spastic CP affecting the upper extremity.

PA715

Effect of Rehabilitation on Bone Mineral Density after Multilevel Lower Limb Surgery for Cerebral Palsy

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Introduction/Background: In general, bone mineral density (BMD) is decreased in persons with Cerebral Palsy (CP), especially those who are non-ambulant. Plaster immobilisation following Single Event Multilevel Surgery (SEMLS) of lower extremities further decreases the BMD. The objective of this study was to evaluate the effect of a protocol based rehabilitation including Whole Body Vibration Therapy following SEMLS on BMD in persons with CP. *Methods:* Prospective experimental study. 79 participants (Male: 46, Female: 33) with CP, who underwent SEMLS of both lower limbs participated in the study. Plaster immobilisation of the participants varied from 4 weeks to 8 weeks, depending on age and radiological signs of union of osteotomies. Z scores of the participants were noted with help of an ultrasound BMD scanner before the surgery and then at end of first and third month of the protocol based rehabilitation programme, including whole body vibration therapy, body weight supported treadmill training, EMG biofeedback, virtual reality based therapy, aquatic therapy, hippotherapy, in addition to conventional physiotherapy and occupational therapy. Rehabilitation was started immediately after plaster removal. *Results:* Age groups ranged between 4 to 19 years in males and 7 to 28 years in females (Mean age 10.23 years). A larger number of male participants (47.8%) were non-ambulant before surgery. Non ambulant persons (mean Z score -0.6 in males) had less Z scores when compared with ambulant persons (mean Z score 0.25 in males). Mean Z score value before surgery was 0.07 in females and -0.17 in males. Mean Z score values at the end of 3 months was 0.63 in females and 0.49 in males. A strong positive correlation ($p < 0.05$) was noted between BMD value and protocol based rehabilitation. *Conclusion:* The study concluded that non ambulant persons with CP had lower BMD when compared with ambulant persons. Plaster immobilisation was one of the causes for low BMD in persons with CP. The study also found that protocol based rehabilitation helped in improving the BMD in persons with CP during the postoperative period.

PA716

Biomechanical and Clinical Correlates of Swing-Phase Knee Flexion in Individuals with Spastic Cerebral Palsy Who Walk with Flexed-Knee Gait

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Introduction/Background: A flexed-knee position during stance was reported to dynamically reduce peak knee flexion during swing (PKFSw), resulting in a 'stiff-knee' gait pattern. However, not all persons with flexed-knee gait exhibit limited knee flexion in swing. Further research is needed to clarify the factors that contribute to stiff-knee gait in individuals with spastic CP who walk with a flexed-knee gait. The aim of this study was to identify

clinical parameters and gait kinematics that influence the magnitude and timing of PKFSw in individuals with spastic CP and flexed-knee gait. *Material and Methods:* Individuals with spastic CP (GMFCS I-III) with no prior surgery who exhibited knee flexion $\geq 20^\circ$ at initial contact were included; the more-involved limb was analyzed. Magnitude of PKFSw, timing of PKFSw, and total knee flexion excursion during gait were analyzed with respect to clinical data, including passive range of motion and Selective Motor Control Assessment for the Lower Extremity (SCALE), and biomechanical data, including joint kinematics and muscle-tendon lengths during gait. The muscle-tendon length was estimated using the Lower Limb Extremity Model 2010, a three-dimensional computer model of the lower extremity. Inverse kinematics of motion captures data with this model using OpenSim, a freely available biomechanics simulation application. *Results:* A total of 34 participants were included (20 males, 14 females; age 10.1 ± 4.1 years, range 5-20 years). The magnitude and timing of PKFSw were found to be independent and their biomechanical correlates differed. Higher magnitude of PKFSw correlated to higher maximum knee flexion velocity during early swing ($\rho = 0.582$, $p = 0.000$) and to longer maximum length of rectus ($\rho = 0.491$, $p = 0.003$). Earlier timing of PKFSw correlated to greater peak knee extension during single limb support phase ($\rho = -0.354$, $p = 0.040$), higher knee flexion velocity at toe-off ($\rho = -0.576$, $p = 0.000$), and to longer maximum length of gastrocnemius ($\rho = -0.355$, $p = 0.039$). *Conclusion:* Results indicate that the magnitude and timing of PKFSw were independent and their biomechanical correlates may differ, with important implications for treatment of both stiff-knee and flexed-knee gait.

PA717

Gender Differences of Lower Limb Kinematics during Horizontal Obstacle Avoidance in Children with Cerebral Palsy

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Introduction/Background: It is generally acknowledged that children with Cerebral Palsy (CP) are unable to optimally organize complex movements such as the horizontal obstacle avoidance (HOA), but possible gender differences are not thoroughly investigated. The purpose of the present study was to examine the kinematical differences between boys and girls with CP during HOA. *Material and Methods:* Six boys (CPB; 9.3 ± 1.5 yrs, 1.25 ± 0.07 m, 26.1 ± 8.1 kg) and 6 girls (CPG; 9.3 ± 1.5 yrs, 1.22 ± 0.08 m, 28.1 ± 6.9 kg) with CP were examined. Subjects walked through an 8-meter corridor, in the middle of which a 1.5 m x 0.02 m cylinder was placed on the ground perpendicular to the walking direction and served as an obstacle. Data were recorded using a six-camera 3D motion analysis system (VICON 612, OMG, Oxford), an EMG device (Telemg, BTS SpA, Milano) and a ground mounted 40 x 60 cm force plate (Type 4060, Bertec, Columbus OH). All devices were triggered by the motion analysis system, with the sampling frequency set at 100 Hz and 1 kHz, respectively. The evaluated parameters were: contact time (Tc) of the support before the obstacle, step length (SL), vertical ground reaction force (vGRF), agonist activity of plantar flexors (PF), antagonist activity of dorsal flexors (DF), swing leg's lateral malleolus vertical distance from the obstacle (HC), ankle joint flexion (Aang) and knee joint flexion (Kang). Subjects performed eight trials, but five successful trials were selected. The selected trials were averaged for further analysis. Differences between CPG and CGB were investigated utilizing independent samples *t*-test using SPSS 10.0.1 software (SPSS, Chicago IL). The effect size was estimated using Cohen's *d*. *Results:* Non-significant ($p > 0.05$) gender differences were noted regarding vGRF (higher in CPG), Tc (longer in CPB), SL (shorter in CPG), HC (lower in CPB) and the joint angles. However, the

trail leg's Aang was significantly more flexed in CPB ($p < 0.01$). **Conclusion:** CPG and CPB did not executed HOA utilizing different motor patterns. In general, results indicate that rehabilitation programs including HOA should be implemented in the same way in both CPG and CPB.

PA718

The Effect of Experience on the Inter-Rater Reliability of the Reimers' Hip Migration Percentage in Children with Cerebral Palsy

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Introduction/Background: Reimers' hip migration percentage (MP) is commonly used to document the extent of hip displacement in children with cerebral palsy (CP), but different measurements can be obtained due to poor patient positioning or a lack of awareness while taking the pelvic radiographs. In addition, variations can also occur when there is difficulty in defining the landmarks, a lack of concentration, inexperience, or a busy clinical environment. **Material and Methods:** In this retrospective study, two physiatrists with variable experience calculated the baseline MP on 62 hip radiographs relative to 31 children with spastic CP and performed the measurement again six weeks later. **Results:** After comparing the two MPs, it was determined that the correlations as well as the inter- and intra-rater reliabilities of the measurements were excellent. **Conclusion:** Experience does not appear to be a factor in the evaluation of MP. **References:** 1) Parrott J, Boyd RN, Dobson F, Lancaster A, Love S, Oates J, et al. Hip displacement in spastic cerebral palsy; repeatability of radiologic measurement. *J Pediatr Orthop* 2002; 22: 660–7. 2) Faraj S, Atherton WG, Stott NS. Inter- and intra-measurer error in the measurement of Reimers' hip migration percentage. *J Bone Joint Surg Br*. 2004; 86: 434–7. 3) Cliffe L, Shrkey D, Charlesworth G, Minford J, Elliot S, Morton RE. Correct positioning for hip radiographs allows reliable measurement of hip displacement in cerebral palsy. *Dev Med Child Neurol*. 2011; 53: 549–52.

PA719

Adverse Effects of a Hydrotherapy Program on an Ambulatory Adult with Cerebral Palsy

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Introduction: Hydrotherapy has become a popular form of rehabilitation therapy for individuals affected by motor impairments. The buoyancy of water creates an optimal environment for low impact exercise for people with impaired movement abilities. Several studies have reported the effectiveness of hydrotherapy programs for individuals with cerebral palsy (CP); however, these studies have excluded the adult population. The objective of this research is to investigate the effectiveness of a hydrotherapy program on an ambulatory adult male (48 years old, GMFCS II) with spastic CP. Biomechanical assessments were performed before and after an aquatic intervention program to evaluate the participant's functional mobility. **Methods:** A Vicon Corp. infrared camera system was manipulated to collect motion trajectories to calculate spatiotemporal and kinematic gait parameters. Hydrotherapy sessions were held twice weekly for 45 minutes. The sessions consisted of 30 minutes of water walking, and 15 minutes of leg strengthening exercises. **Results:** Anecdotally, the participant enjoyed the swim program and expressed excitement for upcoming sessions. However, following the third swim session he experienced increased tightness in the gluteus maximus. Spasticity continued to worsen throughout following sessions, eventually affecting both lower limbs. Upon consultation with his physical therapist, sessions were terminated at session 8 and the participant was biome-

chanically tested. All tests revealed significant decrease in range of motion at the hip, knee, and ankle following the hydrotherapy program. Spatiotemporal Measures: -Walking speed decreased by 70.8% (13.4% SD) -Single stance decreased by 29.4% (3.43% SD) Kinematic Measures, Flexor/Extensor Angles: -Hip range of motion decreased by 17.1 degrees (7.26 SD) -Knee range of motion decreased by 15.9 degrees (8.61 SD) -Ankle range of motion decreased by 11.0 degrees (4.69 SD). The participant was tested again following 5 weeks of rest. These results indicate that mobility has not improved since termination of the hydrotherapy program. **Conclusions:** While literature suggests that hydrotherapy is an effective treatment for children with CP, these benefits may depend on the individual, especially in the adult population. Although patient satisfaction is a key driver for increasing functional outcome measures, it is important to carefully monitor the participant both in and out of water, and reduce intensity if issues arise.

PA720

Factors Affecting Stiff Knee Gait in Cerebral Palsy

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Background: People with Cerebral Palsy (pwCP) commonly walk with a stiff-legged gait characterised by reduced knee flexion during swing phase. This gait pattern is inefficient and increases the risk of trips and falls. This study aimed to investigate the relative impact of lower limb impairments on stiff-legged gait in pwCP. **Methods:** Children with CP who were able to walk at least 100 m and had not had any surgery or botulinum toxin injections in the last 3 months were recruited from local orthopaedic clinics and child development centres. They were compared to age and gender matched healthy controls. Knee kinematics and kinetics during walking were measured using 3D motion analysis (Codamotion, Charnwood Dynamics UK) and force plates (9286AA Kistler, Instruments Ltd, Hampshire, UK). Isometric ankle plantarflexor and hip flexor isometric strength was measured using a dynamometer (Biodex System 3, UK) and normalised by body mass. Stereotyped motor-driven 15 o perturbations of the knee extensors were delivered at 50/s and 1750/s to assess the degree of passive and stretch-reflex related stiffness respectively. The torque, position, velocity and surface electromyography (EMG, MT8 Telemetry, MIE Leeds UK) were AD converted at 2KHz (Power 1401, Spike 2, Version 5, CED Electronics Cambridge, UK). Stiffness was defined as position/torque. **Results:** Twenty-seven pwCP (12 females, 13.6±8.3 years; GMFCS median =II range I-IV) and 20 controls (14.0±3.2 years; 7 females) were recruited. PwCP had reduced trough-to-peak knee flexion and reduced knee extension in stance; indicating a stiff knee and crouch gait. This was present even when differences in walking speed were accounted for. In pwCP the ankle plantarflexor and hip flexor maximal isometric torque were significantly lower than the controls. Knee extensor passive stiffness and stretch-reflex associated passive stiffness were significantly higher in pwCP. In pwCP stretch-reflex related stiffness of the knee extensors and the degree of extension in stance phase was associated with a lower range of knee flexion in swing phase ($R^2=0.47$ $P < 0.01$). **Conclusions:** PwCP present with Multiple Impairments that can affect walking. Knee extensor spasticity and a crouch gait can limit knee motion and should be targeted with physical interventions.

PA721

Immediate Improvement of Temporal Gait Parameters in Spastic Cerebral Palsy Children after One Session of Vojta's Reflex Locomotion Therapy

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Introduction: Vojta's Reflex Locomotion Therapy (RLT) is a form of physical therapy that one of the claimed benefits is improvement of gait functions. Cerebral palsy children typically walk with longer single support phase and shorter double support phase than normal children. There has not been any study to demonstrate the immediate improvement of gait parameters after one session of therapy. **Objective:** To study the changing of gait parameters after one session of Vojta's Reflex Locomotion Therapy (RLT) in cerebral palsy children. **Study design:** Cross-sectional study. **Setting:** Srisangwan school for disabled. **Subjects:** 10 diplegic cerebral palsy children. **Methods:** All of the children could ambulate independently (or with standby supervision) on level ground with or without gait aids and/or ankle foot orthoses. Temporal-spatial gait parameters were recorded and analyzed with the newly developed "TailGait", a modular type wearable gait analysis system. **Statistical analyses:** before and after the therapy was performed using Wilcoxon Signed Rank test. **Results:** The average age of the children were 10.6 years. Three children could ambulate with no support and seven children could ambulate with support from a wheeled walker. Average duration of single stance and double stance significantly ($p=0.028$) improved from 39.43% and 50.68% of total gait cycle time to 60.56% and 39.43%, respectively. The average gait speed before and after the therapy were 0.16 (SD=0.197) and 0.11 (0.073) km/h, respectively. **Conclusion:** The single stance phase could be lengthen with shorten of double support time after one session of RLT.

PA722

Correlation Between Motor Developmental Coefficient and the Presence of Motor Signs for Neurological Injury (Cerebral Palsy), during the First Year of Life

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Purpose: To determine the correlation between the motor development coefficient and the established motor prognostic signs for Cerebral Palsy at corrected ages of 6 and 12 months, using Munich developmental scale and the Early Motor Pattern Profile, in a neurodevelopmental high risk population. **Results:** 55 patients were followed, from september of 2010 to may of 2013. According with motor coefficient, the subjects were classified into three groups; normal development (85 – 100%), mild delay in development (66 – 84%), moderate delay (51 – 65%) and severe delay (<50%). The subjects with normal motor coefficient, stay at this level, with EMPP negative scores at 12 months. The subjects with a mild delayed motor development, have a likelihood of 4,8% for worsening their developmental delay and had positive scores in EMPP, finally they presented motor handicap like hemiplegia or diplegia. The individuals with severe retardation in motor development at 6 months, had EMPP positive scores at this age and poorest motor skills at 12 months, with severe motor impairment as spastic quadriplegia. The statistical analysis no independence in the results at 12 months compared to the results at 6 months; with a high correlation between the 2 measurements. **Conclusions:** Monitoring the population at high risk for neurodevelopmental must take into account the correction of age, according the gestational age, at least for the first 2 years of life. The motor coefficient is an useful tool for establish de risk for cerebral palsy, and can be used like a flags system: Red flags include children with severe and moderate motor retardation; at this group the expected is the primitive reflex and physiologic hypertonia persistency. Orange flags include a mild motor retardation, with a inadequate trunk control. Green flags should be children with biologic or social risk, without a motor development delay. Subjects with mild to severe delay in development should be refer to specialized rehabilitation services to prevent secondary musculoskeletal disorders and enhance the

skills that are not affected. **Keyword:** Neurodevelopment, Cerebral Palsy, Early detection.

PA723

A Longitudinal Follow Up of Health Related Quality of Life in Children with Cerebral Palsy of Different Motor Severities

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Introduction: Health related quality of life (HRQoL) in early life anticipates the later health status and is an important outcome in the evaluation of pediatric interventions. The aim of the study was to compare the longitudinal change of HRQoL in children with cerebral palsy (CP) of different motor severities. **Material and Methods:** Seventy three parents of preschool children with CP (mean age: 40.95±17.28 months; male: female =46: 27) were collected and classified into two groups: mild (levels I-III, n=53) and severe (levels IV-V, n=20) based on the Gross Motor Function Classification System (GMFCS). HRQOL was assessed by TNO-AZL Preschool children Quality of Life (TAPQOL) at baseline and 6 months later (follow-up). The TAPQOL consisted of four domains covering the physical, social, cognitive, and emotional functioning. The motor functioning is a sub-domain of physical functioning. The total functioning is an average functioning of all domains. The change scores were calculated by the differences between all domain and sub-domain scores and total score at follow-up and corresponding scores at baseline. **Results:** The mild group had higher score in motor ($p<0.05$), emotional ($p<0.05$) domains and total score ($p<0.05$), but not in social and cognitive domains, at both baseline and follow-up than severe groups. Furthermore, the severe groups had greater changes in the physical functioning ($p=0.034$) and total score ($p=0.043$) of TAPQOL at follow-up than mild group. However, there were no significant differences in the changes of social, cognitive, and emotional functioning at follow-up between 2 groups. **Conclusion:** Children with GMFCS levels I-III had greater HRQOL scores and changes in the certain domains than children with GMFCS levels IV-V. These findings suggest children with mild CP obtain greater HRQOL changes in the domain of physical functioning, than children with CP in severe group.

PA724

Effect of a New Single Event Multilevel Lever Arm Restoration and Anti Spasticity Surgery on Gross Motor Function and Mobility in Non-Ambulatory Children with Severe Cerebral Palsy

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Background: Children with severe cerebral palsy (CP) (GMFCS level IV and V) are generally non ambulatory and the effectiveness of orthopaedic surgery to improve and maintain mobility in these children has not been ascertained. The purpose of the study was to evaluate the outcome of a new Single Event Multilevel Lever Arm Restoration and Anti Spasticity Surgery (SEMLARASS) and protocol based rehabilitation on gross motor function and mobility of non-ambulatory children with CP with GMFCS levels IV and V. **Materials and Methods:** In this study 134 children with GMFCS IV and V participated. The surgical procedures were performed by a single Orthopaedic Surgeon which included Intramuscular Release and Controlled Tendon Lengthening using the principles of Orthopedic Selective Spasticity Control Surgery and simultaneous

restoration of lever arm dysfunctions and was followed by protocol based, sequenced multidisciplinary rehabilitation for average of 6 months, including body weight supported treadmill training, EMG biofeedback, virtual reality based therapy, aquatic therapy, whole body vibration therapy, hippotherapy, in addition to conventional physiotherapy and occupational therapy. The outcome measures such as components of GMFM-88, Functional Mobility Scale (FMS), Physicians Rating Scale (PRS), and Manual Ability Classification System (MACS) were used to compare the functional status of the child before and after the surgery and rehabilitation. *Results:* Mean age of the participants was 9.68 ± 4.77 years. Common lever arm correction surgeries included distal femoral derotation osteotomy (56.7%) and proximal femoral varus derotation osteotomy (43.3%). The commonest muscles released were semimembranosus (92.5%) and semitendinosus (91.2%). The results showed a significant improvement ($p < 0.001$) in all GMFM-88 components. The Median FMS of the subjects before and after the intervention was 1 and 3 respectively. The result of Pre-Post PRS evaluation showed a significant improvement for both sides ($P < 0.01$). *Conclusion:* A well-planned and executed SEMLAR-ASS, followed by intensive protocol based, sequenced multidisciplinary rehabilitation, provides the children with GMFCS levels IV and V a significant functional improvement in gross motor function and mobility.

PA725

Cerebral Palsy in Syria (Local Experiment)

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Background: Syrian population in 2010 about 20,000,000 inhabitant with 500,000 new live births. If we calculate upon the international statistics (2.1 per 1000 live births) - we do not have accurate statistics - there must be about 1,000 new C.P children every year. In the past decade 2000 – 2010: there was increasing interest from government in disabled persons, so cerebral palsied children had had some benefits. Established NGOs for disabled persons, the hospitals of Ministry of Health established units for C.P in the PMR departments, and the Ministry of Social Affairs and Labor began giving ID to disabled persons with financial support to C.P children. Now, after 4 years of war, the circumstances, the priorities, and the abilities are different. Our Experience: In 2005, Alasaad Hospital had open in Hama, and established the PMR department in it. In corporation with Saied Foundation, which interest in disabled children we did a course of C.P assessing and managing for assistance physiotherapists. We trained them: GMFM score, Bobath assessment, Bobath approach. In addition to another pediatric diseases which need rehabilitation. Upon this course we established the first “pediatric rehabilitation unit” in Syria. The physiatrist see the child for diagnosis, evaluating accompanying problems, prescribing medications and orthoses, referring to another specialists, then referring the child to physiotherapist to apply what he learned. Since 2005, we treated about 125 new child every year, and did about 2000 Sessions/year. We imparted our experiences to Aleppo PMR department by training physiotherapists. Therefore, they established “pediatric rehabilitation unit”. *Difficulties:* We have many difficulties to reach the international level of service for C.P children: There is not enough physiatrists. More training and more quality are critical. Exchanging experience with advanced countries. We cannot use botulinum toxin because it is not allowed to export to Syria for political reasons. Building rehabilitation team (O.T, Prosthetist & Orthotist, speech therapist...). *References:* <http://www.moh.gov.sy/Default.aspx?tabid=171&language=ar-YE> Alasaad Hospital Statistics.

PA726

Demographic and Clinical Characteristics of Patients with Cerebral Palsy in Mersin

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Introduction/Background: Cerebral palsy is the most common cause of childhood disability. The prevalence of CP has been determined as 4.4 per 1,000 live births in Turkey. The aim of this study was to investigate demographic and clinical features of CP patients in southern part of Turkey. *Material and Methods:* This is a retrospective study from a single centre. We analyzed the complete clinical records of total 525 patients with CP (boys/girls: 315/210) following at between 2007 and 2013 years. *Results:* The median age of patients with CP was 4.6 years (min-max: 0-21 years). The mean age of mothers at birth was 27.08 ± 6.0 years (min-max: 15-46 years). There was a consanguinity at 29.7% of the parents. Three hundreds eighteen (60.6%) patients had stayed in the incubator during neonatal period. The median incubator time was 15 days (min-max: 1-130 days). While there were multiple risk factors at 47.6% (n=250) of the CP, there wasn't any risk factor at 8.2% (n=43) of them. Bleeding during pregnancy, gestational hypertension, multiple pregnancy, prematurity, low birth weight, meconium aspiration, early membrane rupture, convulsion, kernicterus were the most common risk factors. The recognized age of problems in children was 6 months (min-max: 0-96 months). The problems were noticed by families (64.8%), pediatricians (27%), pediatric neurologists (1.5%) and family physicians (1.5%). Most patients were spastic (85.5%) and ambulatory (57.9%). Speech disorders, mental retardation, hypersalivation, epilepsy, dental problems and growth and developmental retardation were common concomitant disorders. Hip dislocation and scoliosis were common skeletal problems. The most important expectations of families were improvement of their children walking, sitting, and pressing fingertips. *Conclusion:* This study has showed that consanguinity was a major problem in our population, most cases had multiple risk factors, the problems were noticed by families rather than physician, spastic and ambulatory CP were more, and walking of children was the most important expectation of families. In the light of these results, we suggest that physicians should determine babies with higher risk during pregnancy and neonatal period, and begin their rehabilitation at the incubator and neonatal period.

PA727

Erector Spinae Involvement in the Development of Scoliosis in Cerebral Palsy: a Preliminary Study

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Introduction: Currently mechanisms involved in the development of spinal deviations in cerebral palsy are unknown. Thus, in many cases, despite having orthopedic and physiotherapeutic treatments, surgery is required. The objective of this study is to check the relation of muscle response to vestibular stimulation of erector spinae, specifically longissimus thoracis and iliocostalis lumborum, with the origin of scoliosis in a population of individuals with cerebral palsy belonging to a level V of the Gross Motor Function Classification System (GMFCS) *Material and Methods:* we recorded using surface electromyography in 12 individuals with cerebral palsy belonging to a level V of GMFCS, muscle activity of longissimus thoracis and iliocostalis lumborum with anterior-posterior and lateral imbalances comparing it to those obtained in sitting without the aforementioned imbalances. Scoliosis was assessed through radiological study following the method of Cobb. *Results:* The mean age was 9.3 years (standard deviation: 3.6). No association is found between scoliosis and longissimus thoracis and iliocostalis lumborum responses. Although, a relation between correct reactions of these muscle groups to the anterior-posterior vestibular stimulation and absence of scoliosis is observed. *Conclusions:* The symmetry of muscle responses to anterior-posterior imbalances, both longissimus thoracis and iliocostalis lumborum, appears to be one of the factors that prevents the development of spine deviations in this population.

PA728

Hip Dislocation and Preventive Treatments in Cerebral Palsy: a Preliminary Study in Granada

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Introduction: In cerebral palsy, hip dislocations are one of the most common musculoskeletal disorders and there are several preventive treatments. This study aims to determine the percentage of dislocations and subluxations of hip and results of its preventive treatments in a population with cerebral palsy (CP) of Granada. **Material and Methods:** Retrospective study in 35 subjects with CP between 8 and 20 years of received treatments of hip diseases. Data of infiltrations of botulinum toxin (BTX), orthoses, soft tissue surgery (STS) and bone surgery were collected. The study of hip joint was performed by radiological assessment of Reimer's migration percentage (MP). **Results:** The global percentage of development of dislocations and subluxations of hip was 31.4%. For levels IV and V of Gross Motor Function Classification System (GMFCS), percentages of implementation of preventive treatments studied were less than 50%. For these levels, the percentage of subjects who received BTX and STS and did not develop MP $\geq 30\%$ was over 60%, however the results were similar between cases who used molded seat and those who did not. **Discussion:** Although it was observed high levels of hip maintenance in subjects in level IV and V of GMFCS who have received BTX or STS treatments, percentages of implementation of these treatments as a preventive management are low. **Conclusions:** For our population are checked variability of protocols for prevention of hip dislocations with a result of development of hip disease higher than that obtained in studies of larger populations with standardized protocols.

PA729

Anthropometric and Nutritional Assessment of Children with Severe Cerebral Palsy

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Introduction/Background: Children with cerebral palsy (CP) are generally undernourished and growth retarded than normal children. Studies evaluating nutritional status in CP in developing countries are scarce. Thus we aimed to describe the nutritional status and anthropometric assessment in children with severe CP (GMFCS levels IV and V), verifying the correlation of growth curves specific for CP with general curves in addition to assessing the presence of digestive manifestations, musculoskeletal disorders and vitamin D deficiency associated with nutritional problems. **Material and Methods:** This was a cross-sectional study of 50 children with severe CP, evaluating anthropometric data, in addition to measure serum levels of total proteins, albumin, ferritin, cholesterol, LDL cholesterol, HDL cholesterol, and 25 (OH) D. **Results:** 60% of children were males, with mean age of 5.1 \pm 4.6 years. Anthropometric data of weight was below the 10th percentile, knee height and brachial circumference were significantly lower, except of brachial skin-fold thickness. Serum protein level was normal, children more severe motor handicap (GMFCS level V) and with multiple disabilities had lower skin-fold thickness, vitamin D deficiency and lower serum ferritin. **Conclusion:** Parameters of growth, nutritional status and vitamin D are significantly altered in severe CP especially those with severe motor and cognitive handicap.

PA730

Management of Mental Health Issues in Children after a Traumatic Brain Injury: an Exploratory Study about

Pediatric Rehabilitation Service Delivery in the Province of Quebec, Canada

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Introduction: Mental health problems and utilization of mental health services are common after paediatric traumatic brain injury (TBI). Preventive care, including screening, evaluation, treatment and education about mental health disorders after a TBI, is crucial to minimize their impact on children's development and quality of life. In Quebec, Canada several levels of service providers including trauma centers, rehabilitation centers as well as community centers and advocacy associations are involved in the care of pediatric TBI survivors. **Objectives and Methods:** The objectives were to 1- examine the structure and organization of existing mental health services dispensed in rehabilitation to TBI survivors using a questionnaire aimed at 28 TBI program managers across Quebec and 2- conduct focus groups with clinicians (n=14) and interviews with teen TBI survivors (n=2) and/or their family members (n=3) to identify perceived Strengths, Weaknesses, Opportunities and Threats of the present system. Results are presented pertaining to the paediatric population. **Results:** Paediatric teams appear to have good access to medical professionals (psychiatrists, paediatricians). Although not systematic, screening for pediatric mental health disorders is deemed adequate and timely and teams report good availability of tools/resources for evaluation and treatment. Follow-up and referral mechanisms have been established. All interview and focus group participants seem satisfied with services. There is appropriate coordination with the educational system and families are very involved in the recovery process, receiving education and support. However, resources are limited outside of the main regional centers. When adolescents are transferred to the adult system, service gaps appear when facing life transitions. Better follow-up and referral mechanisms between these levels are needed, as well as the development of facilities targeting the special needs of young adults with mental health issues post TBI. **Conclusion:** Paediatric mental health services in Quebec appear satisfactory. Children tend to receive coordinated care, notably with the education system. However, this coordinated effort often decreases when individuals are transferred to adult services. Using the paediatric system as a model of care may provide a relevant framework to improve mental health services after TBI among adults in Quebec and possibly internationally.

PA731

Observation of Effect on Neural Development on Massage Chinese in the Brain Damage In Preterm Infants

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Objective: The effects of the two groups is compared to see whether there are superiority in early intervention of brain damage in preterm infants with the Massage of Tongduxingnao and Yishenjianpi. Whether to further established the important position of traditional Chinese medicine in the early intervention of brain damage in premature infants. **Methods:** 82 infants with Brain damage in preterm infants were selected, randomly divided into two groups. The experimental group received the treatment of Massage of Tongduxingnao and Yishenjianpi combined with routine intervention. The control group received Massage of Sensory Stimulation combined with routine intervention. The Gross Motor Function Measure, Bayley scales of infant development II (MDI, PDI) and the Gesell Developmental Scales were tested before, right after and 3 months after the treatment designed. **Results:** The children's development quotients (DQ) and GMFM (A,B) areas in both groups are improved. The experimental group has a signifi-

cant superiority in improving the DQ of gross motor function by Gesell Developmental Scales and GMFM (B area) compared with the control group ($P < 0.05$), but no discrepancy in the others. After the treatment, the score of experimental group reach normalization in Mental Development Index (MDI) and Psychomotor Development Index (PDI) by BSID is higher compared with the control group ($P > 0.05$). *Conclusion:* The Massage of Tongduxingnao and Yishenjianpi and the Massage of Sensory Stimulation can promote the developmental level of the intelligence and gross motor function, and The Massage of Tongduxingnao and Yishenjianpi has a significant superiority in improving the DQ of gross motor function and sitting position (B area of GMFM).

PA732

Multiple Regression Analysis of Quality of Life in Children with Cerebral Palsy

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Objective: To analyze the correlation factors influencing quality of life (QoL) in children with cerebral palsy (CP). *Methods:* 80 children with CP and 80 healthy children were measured by Pediatric Quality of Life Inventory Version 4 (PedsQL4.0) to assess their QoL and then compared differences in QoL of children between two groups. Children with CP were also assessed using Gesell Developmental Scale (GDS) and Gross Motor Function Classification System (GMFCS) to test their developmental quotient (DQ) and severity degree (GMFCS), and then the correlation among QoL, age, sex, family income, clinical type, severity degree, intelligence degree of children with CP were analyzed by multiple regression analysis. *Results:* Significant differences in mean scores favoring control group were found in physical functioning/aspect, emotional functioning, social functioning, psychological aspect and total score ($P < 0.01$). Intelligence degree and severity degree correlated to total score of QoL. Severity degree, intelligence degree and age correlated to physical aspect. Intelligence degree correlated to psychological aspect. *Conclusion:* CP reduces children's QoL in full-scale. Severity degree and intelligence degree are two important factors influencing QoL in children with CP.

PA733

Intelligence Needle Therapy Treated Infants with Brain Damage Syndrome

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Objective: Employ intelligence seven needle treatment for infants with perinatal brain damage syndrome as early intervention, compared with the control group, observe the influence of the infants of neural development after this therapy. *Methods:* A randomized controlled trial was conducted. 64 infants with BDS were selected, randomly divided into two groups, experimental group and control group. Both the groups received the routine early intervention for get well, moreover, the experimental group received the treatment of intelligence seven needle adding. Before and after the treatment designed, the Bayley Scales, Gesell Developmental Scales, The Gross Motor Function Measure (GMFM) Transcranial Doppler color Doppler ultrasound (TCD) and Head imaging examination were tested for contrast. *Results:* 1) After the treatment, group of experimental has a significant superiority in improving the score reach normalization in Mental Development Index (MDI) by BSID compared with the control group ($p < 0.05$), but no discrepancy in psychomotor development index (PDI) ($p > 0.05$). 2) The children's development quotients (DQ) of experimental group has a significant superiority in improving the DQ of social adaptation by Gesell Developmental Scales compared with the control group ($p < 0.01$), and gross motor function, linguistic and social intercourse tested by Gesell Developmental Scales compared with the control group ($p < 0.05$), but no discrepancy in the fine movement DQ ($p > 0.05$). 3) The total scores

of GMFM in the experimental group is higher than the control group ($p > 0.05$). 4) Compared the two groups, experimental group has a significant recovery rate than control group on TCD ($p < 0.05$) after the treatment. 5) Follow-up more 6 months after start the treatment, there are some recovery both groups on broadening of brain outside space by Head imaging examination. Compared the two groups, experimental group has a significant recovery rate than control group ($p < 0.05$). *Conclusion:* The developmental level of the intelligence, motion function, linguistic competence and social intercourse can be promoted by treating the infants with perinatal brain damage syndrome by intelligence seven needle therapy, intelligence seven needle therapy can better the brain blood supply and promote the growth of Frontal lobe and parietal lobe.

PA734

Exploratory Development of Combined Rehabilitation Treatment for Children with Cerebral Palsy

*Z. Liu

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Objective: To investigate suitable rehabilitation modality of our country to spread. *Methods:* We studied the applying of integrated traditional and western medicine-home rehabilitation modality for children with cerebral palsy (tri-combined cerebral palsy rehabilitation modality) from Oct 1999 to Oct 2005. It was the first time that to study the combination of TCM rehabilitation with Western medicine rehabilitation and home rehabilitation modality in international and have an advantage of the technique of same kind. *Results:* The effective rate of 684 patients (80.4%) was significantly higher than that of Western medicine rehabilitation group (32%). And we took the leader of reporting the recovery rate of cerebral atrophy and dysplasia (31%) of cerebral palsy after treatment, significantly higher than that of treated by rehabilitation training only (2.56%). The study illuminated the dominant position of TCM and western medicine rehabilitation. After the study of molecular biology, etiology, haemodynamics, and microcirculation, brain electrophysiology, imaging, we also proved that the combined rehabilitation modality can promote the function rebuilding of nerve cell. We carried out home rehabilitation for children with cerebral palsy at home, edited and published series teaching material including book and VCD and replenished the vacant of internal. We published 20 paper's articles and one was included by ISTP and 20 times were cited. The opinion of the evaluation committee is that the study achieved the level of domestic leading and international advanced. *Conclusion:* The rehabilitation modality can effectively degrade mutilation rate of cerebral palsy and relieve mind and economy burden of family and society.

PA735

Effects of Quality of Life of Autistic Disorder Children's Parents

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Objective: To investigate quality of life in parents of Autistic Disorder children. Method: SF-36 was used to measure parent's quality of life of 90 children with Autistic Disorder and 120 normal children. *Results:* The quality of life of patients in normal children was higher than in Autistic Disorder group in Physical (90.84±11.46), Role-Physical (54.22±42.10), Bodily Pain (72.36±23.40), General Health (67.53±21.20), Vitality (60.14±25.00), Social Functioning (71.95±26.60), Role-Emotional (53.38±41.70), and Mental Health (67.23±20.00) with the difference being significant (96.16±13.32, 90.09±19.56, 89.53±24.80, 92.92±20.20, 86.39±15.45, 95.63±25.40, 22.2±30.282.75±12.03, 91.75±16.03, $P < 0.01$). The quality of life of patients in normal children High functioning Intelligence group was higher than in Autistic Disorder group. The quality of life of patients in low functioning Intelligence group are worse than High functioning Intelligence group. *Conclusion:* Children with Autistic Disorder

took grievous influence on parent's quality of life. Compared with High functioning Intelligence group, the low functioning Intelligence Children's Parents quality of life were even worse.

PA736

Clinical Research on Intelligence Seven Needle Therapy Treated Infants with Brain Damage Syndrome

*Z. Liu

Foshan, CN

Objective: Employ intelligence seven needle treatment for infants with perinatal brain damage syndrome as early intervention, compared with the control group, observe the influence of the infants of neural development after this therapy. **Methods:** A randomized controlled trial was conducted. 64 infants with BDS were selected, randomly divided into two groups, experimental group and control group. Both the groups received the routine early intervention for get well, moreover, the experimental group received the treatment of intelligence seven needle adding. Before and after the treatment designed, the Bayley Scales, Gesell Developmental Scales, The Gross Motor Function Measure (GMFM) Transcranial Doppler color Doppler ultrasound (TCD) and Head imaging examination were tested for contrast. **Results:** 1) After the treatment, group of experimental has a significant superiority in improving the score reach normalization in Mental Development Index (MDI) by BSID compared with the control group ($p < 0.05$), but no discrepancy in psychomotor development index (PDI) ($p > 0.05$). 2) The children's development quotients (DQ) of experimental group has a significant superiority in improving the DQ of social adaptation by Gesell Developmental Scales compared with the control group ($p < 0.01$), and gross motor function, linguistic and social intercourse tested by Gesell Developmental Scales compared with the control group ($p < 0.05$), but no discrepancy in the fine movement DQ ($p > 0.05$). 3) The total scores of GMFM in the experimental group is higher than the control group ($p > 0.05$). 4) Compared the two groups, experimental group has a significant recovery rate than control group on TCD ($p < 0.05$) after the treatment. 5) Follow-up more 6 months after start the treatment, there are some recovery both groups on broadening of brain outside space by Head imaging examination. Compared the two groups, experimental group has a significant recovery rate than control group ($p < 0.05$). **Conclusion:** The developmental level of the intelligence, motion function, linguistic competence and social intercourse can be promoted by treating the infants with perinatal brain damage syndrome by intelligence seven needle therapy, intelligence seven needle therapy can better the brain blood supply and promote the growth of Frontal lobe and parietal lobe.

PA737

A Randomized Controlled Study and Evaluation of Children with Cerebral Palsy by Mind Acupuncture

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Objective: To investigate the effects of clearing the Governor Vessel and refreshing the mind needling in neural development and remediation of children with cerebral palsy. **Methods:** 200 cases of children with cerebral palsy were randomly divided into the treatment group ($n=100$) and the control group ($n=100$). The treatment group was given the combined therapy of acupuncture and rehabilitation training, and the chosen acupoints were 13 points of the Governor Vessel, Shenshu (BL 23), Taixi (KI 3), Yanglingquan (GB 34), Zusanli (ST 36) and Sanyinjiao (SP 6), and points of refreshing the mind were also selected, which included puncturing Shenting (GV 24) toward Qianding (GV 21), puncturing Qianding (GV 21) toward Baihui (GV 20), puncturing Baihui (GV 20) toward Naohu (GV 17) and Sishencong (Ex-HN 1). The control group was only treated with rehabilitation training. A contrastive analysis of the therapeutic effect of acupuncture combined with rehabilitation training and pure rehabilitation training was made after a treatment

course of 3 months. The Gross Motor Function Measure (GMFM) and Beijing Gesell Developmental Scale were adopted to assess the neural development and rehabilitation outcomes of the two groups. In addition, skull CT/MRI was adopted to evaluate the plerosis of injured cerebral nerve after treatment. **Results:** The total effective rate in treatment group was 87%, significantly higher than the 55% in the control group. The children's development quotient (DQ) tested by Gesell Developmental Scale and scores tested by GMFM in the treatment group was obviously higher than the control group ($P < 0.01$). The improving and curing rates presented by skull CT/MRI in the treatment group were higher than the control group ($P < 0.01$). **Conclusions:** Clearing the Governor Vessel and refreshing the mind Needling could accelerate the recovery of injured brain nerve and the reconstruction of brain function. The acupuncture therapy could ameliorate both the motor development and cognitive development. On the other hand, the forward curative effect of acupuncture combined with rehabilitation training was significantly better than the pure rehabilitation training.

PA738

Exploratory Development of Combined Rehabilitation Treatment for Children with Cerebral Palsy

*Z. Liu

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Objective: To investigate suitable rehabilitation modality of our country to spread. **Methods:** We studied the applying of integrated traditional and western medicine-home rehabilitation modality for children with cerebral palsy (tri-combined cerebral palsy rehabilitation modality) from Oct 1999 to Oct 2005. It was the first time that to study the combination of TCM rehabilitation with Western medicine rehabilitation and home rehabilitation modality in international and have an advantage of the technique of same kind. **Results:** The effective rate of 684 patients (80.4%) was significantly higher than that of Western medicine rehabilitation group (32%). And we took the leader of reporting the recovery rate of cerebral atrophy and dysplasia (31%) of cerebral palsy after treatment, significantly higher than that of treated by rehabilitation training only (2.56%). The study illuminated the dominant position of TCM and western medicine rehabilitation. After the study of molecular biology, etiology, haemodynamics, and microcirculation, brain electrophysiology, imaging, we also proved that the combined rehabilitation modality can promote the function rebuilding of nerve cell. We carried out home rehabilitation for children with cerebral palsy at home, edited and published series teaching material including book and VCD and replenished the vacant of internal. We published 20 paper's articles and one was included by ISTP and 20 times were cited. The opinion of the evaluation committee is that the study achieved the level of domestic leading and international advanced. **Conclusion:** The rehabilitation modality can effectively degrade mutilation rate of cerebral palsy and relieve mind and economy burden of family and society.

PA739

The Study on Quality of Life of Children with Cerebral Palsy

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Objective: To study the quality of life of children with cerebral palsy. **Methods:** With the PedsQL4.0, 113 children with cerebral palsy were studied, and 52 children with common illness and 314 normal children were also studied and compared. With the PedsQL of school functioning, the children of these three groups who had been to school or kindergarten were also studied and compared. **Result:** The score of physiology functioning, communication functioning and total score of PedsQL in children with cerebral palsy were lower than those in the children with common illness

and normal children. The difference has statistic significance. The score of emotional functioning in children with cerebral palsy was only lower than that in the normal children, the difference has statistic significance. The score of school functioning in children with cerebral palsy was significant lower than that in children with common illness and normal children ($P < 0.01$). *Conclusion:* The quality of life of children with cerebral palsy is much lower than children with common illness and normal children. The illness has sever effect on the school functioning of children with cerebral palsy. Therefore, the whole improve of quality of life is the goal for the rehabilitation of children with cerebral palsy.

PA740

Brain Nervous Development and Neurorestoratolog of Children with Cerebral Palsy by Acupuncture

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Aim: To investigate action and value of acupuncture in Cerebral Palsy rehabilitation. *Methods:* 200 spasm Cerebral Palsy patients from 1 to 7 years old were randomly divided into two groups. Acupuncture group: 100 patients were treated with head acupuncture and body acupuncture; Rehabilitation-training group: 100 patients were treated with physical therapy of Bobath methods. *Results:* The total effective rate acupuncture and rehabilitation-training group were obvious higher than that of rehabilitation-training group. After treatment the DQ value of rehabilitation-training + acupuncture group were higher than that of rehabilitation group ($p < 0.01$). In acupuncture and rehabilitation-training group were higher than that of rehabilitation group ($p < 0.01$). In acupuncture and rehabilitation-training group, improvement rate of brain dysphasia, brain atrophy in skull CT and recovery normal rate of skull. *Conclusions:* Acupuncture can obviously increase cerebral blood flow and improve cerebral cell metabolism, promote partial or complete compensation of cerebral function and the restoration and function of plasticity of cerebral tissue in children with cerebral palsy.

PA741

Exploratory Development of Combined Rehabilitation Treatment for Children with Cerebral Palsy

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Objective: To investigate suitable rehabilitation modality of our country to spread. *Methods:* We studied the applying of integrated traditional and western medicine-home rehabilitation modality for children with cerebral palsy (tri-combined cerebral palsy rehabilitation modality) from Oct 1999 to Oct 2005. It was the first time that to study the combination of TCM rehabilitation with Western medicine rehabilitation and home rehabilitation modality in international and have an advantage of the technique of same kind. *Results:* The effective rate of 684 patients (80.4%) was significantly higher than that of Western medicine rehabilitation group (32%). And we took the leader of reporting the recovery rate of cerebral atrophy and dysplasia (31%) of cerebral palsy after treatment, significantly higher than that of treated by rehabilitation training only (2.56%). The study illuminated the dominant position of TCM and western medicine rehabilitation. After the study of molecular biology, etiology, haemodynamics, and microcirculation, brain electrophysiology, imaging, we also proved that the combined rehabilitation modality can promote the function rebuilding of nerve cell. We carried out home rehabilitation for children with cerebral palsy at home, edited and published series teaching material including book and VCD and replenished the vacant of internal. We published 20 paper's articles and one was included by ISTP and 20 times were cited. The opinion of the evaluation committee is that the study achieved the level of domestic leading and international

advanced. *Conclusion:* The rehabilitation modality can effectively degrade mutilation rate of cerebral palsy and relieve mind and economy burden of family and society.

PA742

Multiple Regression Analysis of Quality of Life in Children with Cerebral Palsy

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Objective: To analyze the correlation factors influencing quality of life (QOL) in children with cerebral palsy (CP). *Methods:* 80 children with CP and 80 healthy children were measured by Pediatric Quality of Life Inventory Version 4 (PedsQL4.0) to assess their QOL and then compared differences in QOL of children between two groups. Children with CP were also assessed using Gesell Developmental Scale (GDS) and Gross Motor Function Classification System (GMFCS) to test their developmental quotient (DQ) and severity degree (GMFCS), and then the correlation among QOL, age, sex, family income, clinical type, severity degree, intelligence degree of children with CP were analyzed by multiple regression analysis. *Results:* Significant differences in mean scores favoring control group were found in physical functioning/aspect, emotional functioning, social functioning, psychological aspect and total score ($P < 0.01$). Intelligence degree and severity degree correlated to total score of QOL. Severity degree, intelligence degree and age correlated to physical aspect. Intelligence degree correlated to psychological aspect. *Conclusion:* CP reduces children's QOL in full-scale. Severity degree and intelligence degree are two important factors influencing QOL in children with CP.

PA743

The Clinical Research of Early Intervention to Cerebral Sub-Health Infants by Traditional Chinese Medicine

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Objective: To observe the effect of early intervention to cerebral sub-health infants by TCM (Traditional Chinese Medicine). *Methods:* 60 cases clinical cured cerebral sub-health infants aged 2m~6m with moderate to severe brain damage in perinatal period were early intervened mainly by our TCM, mainly by massage of attacking vital points of DU meridian, benefiting kidney, strengthening the qi of spleen and five-elements music listening treatment, assisted with physical therapy etc. The course of the intervention was 3 months. The DQ of Gesell were compared before intervention, 3 months and 18 months after intervention. *Results:* 3 months and 18 months after the intervention, the DQ of the infants were increased compared with the DQ before the intervention. And the difference is significant for statistics ($P < 0.001$). 18 months after the intervention, the DQ of 45 cases were higher than 70. *Conclusion:* The intervention by TCM can reduce the probability of the occurrence of cerebral palsy, mental retardation and other sequelae which were caused by perinatal brain damage, and promote the development of movement, cognitive, language, social and other functions. And its mechanism may be related to the promotion of brain development, promoting damaged neuronal repair.

PA744

Effects of Musical Therapy on Children with Cerebral Palsy in Occupational Therapy

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Objective: To study the clinical effect of music therapy in treatment of occupational therapy for children with cerebral palsy. **Methods:** 30 randomized cases of cerebral palsy children with upper limb movement coordination disorder who come to our outpatient from February 2012 to July 2013, age from 1.5 to 7, 15 male and 15 female, were treated with music therapy with occupational therapy, by way of acupuncture therapy. The clinical effect of patients before, process and after music therapy were graded and analyzed. **Results:** The access of children with hand-eye coordination was $18.50 \pm 4.70/26.20 \pm 5.10$, $P=0.017$. The therapeutic effect after music therapy was significantly superior to before. Favorable therapeutic effect was obtained in 11 cases (36.7%), good effect in 10 cases (33.3%), ineffectiveness in 9 cases (30%). Follow up the cases 1 to 2 years more, manual function of patients keep progressing and developing. **Conclusion:** Music therapy in treatment of occupational therapy for cerebral palsy children have a clinical effect on emotion, cognition, communication, fine movement coordination and music development. Besides, it can improve patients' coordination during rehabilitation, and have a good effect on develop their potential and daily life abilities.

PA745

Effect of Music Therapy on the Behavior and Emotion of the Children with Cerebral Palsy

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Objective: To explore the effect of music therapy on children with cerebral palsy about the the physical coordination, cognition and music development level, emotional communication level. **Methods:** 30 children with cerebral palsy ,collected in the Nanhai maternity and children hospital affiliated to Guangzhou University of Chinese medicine from January 2009 to January2010, 22 boys and 8 girls, age (3.9 ± 1.2) years, 20 cases of HIE, 15 cases of premature birth, 13 cases of pathologic jaundice. At the beginning of treatments, the cases were diagnosed with mental retardation .According to the individual situation of each child, we would choose the specific music therapy program, such as RBT music therapy, creative music therapy, Orff music therapy, improvisational music activities, music prompt behavioral therapy, individual music therapy, group music therapy, body training, music listening, music desensitization training, body feeling music therapy. 60 times is a period of treatment. Before and after the treatment, we would evaluate the behavior, emotional communication and music development level by using the music therapy assessment scale. **Results:** 8 cases (26.7%) is markedly effective, 19 cases (63.3%) effective, 3 cases (10%) invalid, the total efficiency 90%. About the total scores, score before treatment is 32.3 ± 6.9 , after treatment 46.3 ± 6.5 , t value -8.0 , ($p < 0.00$). About the physical coordination and cognition, score before treatment is 15.8 ± 4.1 , after treatment 18.6 ± 4.1 , t value -2.6 , ($p < 0.05$). About music development level, score before treatment is 13.8 ± 2.5 , after treatment 17.0 ± 2.5 , t value -4.8 , ($p < 0.01$). About the emotional scores, score before treatment is 1.5 ± 1.3 , after treatment 5.5 ± 1.7 , t value -10 , ($p < 0.01$). About the communication scores, score before treatment is 1.2 ± 1.3 , after treatment 5.1 ± 1.4 , t value -10.7 , ($p < 0.01$). **Conclusion:** Music therapy for cerebral palsy can improve the level of body movement coordination, the cognitive, emotional communication.

PA747

Effect of Botulinum Toxin Type a Treatment on Functional Status in Children with Spastic Cerebral Palsy

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Introduction: Botulinum toxin A (Dysport), an acetylcholine-blocking, denervating chemical when injected into a muscle, has

been used in children since 1993 in the management of spasticity in cerebral palsy (CP). Research findings indicate that Dysport injections decrease spasticity in the injected muscles while increasing range of motion in corresponding joints. Children with CP have demonstrated increased function after Dysport injections. The most common indication is spastic equinus gait. Aim of this study was to explore functional motor outcome in children with spastic cerebral palsy after Botulinum toxin A application. **Methods:** the study included 17 children, 2-6 years old, with spastic form of CP (hemiparesis or paraparesis). After intramuscular Dysport injections physical therapy was applied for 16 weeks. Physical therapy intervention included hydrotherapy, kinesiotherapy, neurodevelopmental treatment, electrical stimulation, thermotherapy, and orthotic devices. Functional motor outcome was analysed before, 3, 8 and 16 weeks after the treatment. Gross Motor Function Classification System (GMFCS) and Gross Motor Function Measure (GMFM) were used for evaluation of motor and functional status of the patients. **Results:** we have found statistically significant improvement in functional status (GMFM) 3 weeks after Dysport injections. Improvement in motor status (GMFCS) was noticed 6 weeks after the treatment. **Conclusion:** intramuscular injection of Dysport is a safe and effective treatment for improving functional and motor status in children with CP. However, GMFM had shown greater sensibility than GMFCS.

PA748

Effects of Hand-arm Bimanual Intensive Training (HABIT) on the Children's Upper Limb Function and Ability of Daily Activity with Hemiplegic Cerebral Palsy

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Objective: From the structure and function of hand - arms, hands collaboration performance, hands ability of daily life activities were studied on Hand-arm Bimanual Intensive Training (HABIT) in this dimensions, objective to watch the effects of Hand-arm Bimanual Intensive Training (HABIT) on the children's upper limb function and ability of daily activity with hemiplegic cerebral palsy. **Methods:** 60 cases in children with hemiplegia type cerebral palsy were randomly divided into three groups: experimental A group (20 cases) and B group (20 cases) and control group (20 cases). On the basis of routine rehabilitation Therapy, the control group accepted conventional OT (Occupational Therapy) treatment, the experimental test group treated by HABIT, experimental group A and B training intensity respectively of 0.5 hours per day and 1 hour per day. Three groups respectively using the upper limb skills quality test scale (QUEST), Peabody develop getting motor scale - fine moto (PDMS FM), children's functional independence rating scale (Wee FIM) assessed before and after treatment of 4 weeks, 8 weeks and 12 weeks. **Results:** The three groups of children with 4 weeks, 8 weeks, 12 weeks after treatment, the QUEST scores, Peabody-FM scores, WeeFIM scores are better than before treatment ($p < 0.05$), the experiment of A and B group were better than control group ($p < 0.05$), the experimental group B is better than that of the experimental group A ($p < 0.05$); Experimental contrast within A and B groups, 4 weeks after treatment the scores improved ($p < 0.05$), and 8 weeks after treatment the score are significantly increased ($p < 0.01$), 12 weeks after treatment the score were significantly increased ($p < 0.01$). **Conclusion:** Hand-arm Bimanual Intensive Training (HABIT) treatment on children with hemiplegic cerebral palsy upper limb dysfunction can effectively improve the structure and function of hand - arm, hands collaboration performance, ability of daily life activities, high strength HABIT training intensity training effect bertter, effect of 8 weeks treatment improved most significantly. **Keywords:** Hand-arm Bimanual Intensive Training (HABIT), Occupational Therapy(OT), cerebral palsy, hemiplegia, the structure and function of hand - arm, fine coordinated movement, ability of daily life activities.

PA749

Cerebral Palsy Children Change Characteristics of Event Related Potential P300 Research*S. Dong¹, Z. Jiang²¹Jiamusi University, ²Harbin Medical University, Jiamusi, CN

Objective: To discuss the change of ERP in children with cerebral palsy. **Methods:** 40 patients who were diagnosed cerebral palsy in the Third Affiliated Hospital of Jiamusi University during the period of 2013 January to December 2014 were selected as the observation group. And the patients were divided into mild intelligence obstacle sub group 23 cases, moderate intelligence obstacle and sub group 17 cases according to the intelligence quotient (IQ). 40 normal children were chosen as the same period as control group. Detection of all subjects of event related potential P300 changes, and with the Wechsler Intelligence Scale for children (WISC-IV) assessment. Statistical analysis of the results. **Results:** The observation group with the latencies of P300, L-P2 and L-N2 were significantly more than the control group leader length ($P < 0.05$), and the P300 amplitude was significantly smaller than that of the control group ($P < 0.05$). IQ in children with mild disability subgroups P300 latency, L-P2 and L-N2 were significantly less than moderate long IQ disorders subgroup ($P < 0.05$), and P300 amplitude was significantly higher than that in moderate intelligence disability subgroups ($P < 0.05$). The observation group with VIQ, PIQ and FIQ were significantly lower than those of the control group ($P < 0.05$). Mild IQ disorders subgroup of children with VIQ, PIQ and FIQ were significantly higher than those in moderate sub group ($P < 0.05$). The latency of P300 was negatively correlated with VIQ, PIQ and FIQ ($P < 0.05$); the amplitude of P300 and VIQ, PIQ and FIQ had no correlation ($P > 0.05$). **Conclusion:** Event related potential P300 can be free of damage diagnosis of cognitive dysfunction in children with cerebral palsy, has important clinical value.

PA750

Effects of Task-Oriented Training Method as a Rehabilitation Strategy for Gross Motor and Gait Function of Cerebral Palsy Children

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Objective: To explore the application of the Task-oriented training method in the spastic cerebral palsy children's rehabilitation. **Methods:** 40 cases of children with spastic cerebral palsy in a randomized, 20 cases in control group, 20 cases in treatment group. Control group using conventional rehabilitation training, the treatment group with conventional rehabilitation training combined with Task-orientated training, the two groups were treated for 3 months. Taken respectively analysis method with children in before and after treatment, Gross motor function scale assessment (GMFM - 88), Footprint analysis, 10 meters walk test and 1 minute walk test were assessed. **Results:** Two groups of D and E rating scores of GMFM, turnover step length, step width, 10MWT times and 1MWT distance are better than before treatment ($P < 0.05$), the treatment group is better than that of control group ($P < 0.05$). **Conclusion:** Combined conventional rehabilitation training with Task-orientated training to improve children with spastic cerebral palsy movement function, improve gait, improve walking speed and endurance, helped children back to school and society better.

PA751

Analysis of the Clinical Characteristics of Cerebral Palsy Caused by Human CMV Infection*X. Chen¹, J. Qiu², C. Xu²¹Zhejiang Minzheng Rehab Center, ²Zhejiang Provincial Rehab Guidance Center for Disabled, Hangzhou, CN

Introduction: To Analyze the clinical characteristics of cerebral palsy caused by human CMV(HCMV) infection. **Material and Methods:** Fifty-one cases of HCMV infection were studied by analyzing related clinical symptoms of cerebral palsy, finding its characteristics, and analyzing its causes by comparing with control group of 50 patients with cerebral palsy caused by other causes. **Results:** The clinical symptoms of cerebral palsy caused by HCMV infection were similar to those of cerebral palsy caused by other reasons, However, the clinical symptoms of cerebral palsy caused by other reasons were more severe, 37.25% of cerebral palsy caused by HCMV infection showed damage to liver function. Brain CT and MRI for cerebral palsy caused by other reasons showed that 30% of alba was damaged with, local cyst. Developmental quotient determination of cerebral palsy caused by HCMV infection was 90.20% which was in moderate to severe defects, whereas that of cerebral palsy caused by other causes was 52.6%. There was a significant difference between the two groups with respect to their developmental quotient. The motor function in 88.23% of patients with cerebral palsy caused by HCMV infection was class II-III, which was mainly in slight to moderate damage. **Conclusions:** The movement function of cerebral palsy caused by HCMV was mostly in the slight to moderate damage, however the mental development obviously was mostly in moderate to severe defects, which showed the mental damage was much greater than the motor function damage. In patients with cerebral palsy caused by other causes, the degree of motor function damage was greater than the degree of intelligence damage. Besides, The children with cerebral palsy caused by HCMV infection were easy to suffer multiple organ injury such as liver damage. The brain CT and MRI showed that 30% of the brain damage caused by other reasons of cerebral palsy was in the alba.

PA752

Providing a Relationship-Based Parenting Intervention to Facilitate Developmental Gains for a Young Child with Cerebral Palsy: a Case Study*J. Barfoot¹, P. Meredith¹, J. Ziviani², K. Whittingham²¹The University of Queensland, Highgate Hill, ²The University of Queensland, Brisbane, AU

Introduction: Occupational therapists, physiotherapists and speech pathologists working with children with cerebral palsy typically implement developmentally-orientated interventions based on analysis of performance and behaviour. This usually involves providing direct therapy to the child accompanied by a home program undertaken by parents. However, the effectiveness of early intervention for children with developmental disabilities is now thought to be related to the extent to which parents are able to read their child's cues and respond sensitively. Furthermore, extensive research suggests secure parent-child attachment is a key predictor of cognitive, language and social-emotional outcomes. Within this, the child's ability to initiate cues and the way caregivers respond to these are considered pivotal. **Methods:** A case study of a young child with cerebral palsy and her parents where a brief relationship-based occupational therapy intervention was applied will be presented. This provided the foundation for an ongoing developmental intervention that could not previously be implemented due to high levels of distress for both mother and child. Session format will be discussed and theories that guided this parenting intervention outline. **Results:** Within five sessions greater maternal sensitivity was noted, accompanied by a reduction in distress and improvements were observed across all areas of the child's development. **Discussion:** Current research indicates that early intervention services need to reorientate interventions to include a parenting component. Jacqui will discuss how developmentally trained therapists respond clinically to this call in the literature and the tension of the child's presenting developmental needs, the parent's presenting emotional needs and the developing parent-child relationship. **References:** 1) Innocenti MS, Roggman LA, Cook, GA (2013) Using the PICCOLO with Parents of Children with a

Disability. *Infant Mental Health Journal*, 34 (4), 307-318. 2) Mahoney G, Nam S (2011) The parenting model of developmental intervention. *International Review of Research in Developmental Disabilities*, 41, 73-125. 3) Novak I, Hines M, Goldsmith S, Barclay R (2012) Clinical Prognostic Messages From a Systematic Review on Cerebral Palsy. *Pediatrics*, 130(5), 1285-1312.

A.6. GERIATRICS

PA753

Well-Being, Playfulness and Participation among Elderly with and without Disabilities

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Introduction and Background: Aging generates an array of social and health concerns, among which are the special concerns of the psychological well being of elderly. Wilson's et al. (2013) states that late life cognitive decline leads to loss of wellbeing (WB); however person's playfulness may be a potential component contributing to healthy aging and WB (Yarnal & Qian, 2011). As most geriatric population are retired but live now many more years, the issue of WB and participation in the community are of utmost importance. The aims of this study are to investigate the relationships between 1) the factors of playfulness, well being, and participation, and 2) the impact of underlying factors such as cognitive, executive functions, and emotional status, within elderly with and without disabilities. **Materials and Methods:** The current study is cross-sectional with convenience sampling method aiming to recruit 100 subjects of each population with and without major disabilities. A battery of reliable and valid instruments were assembled for the variables of interest: Cognitive status and executive functions (MoCA and DEX); Occupation/Activities (OQ and IADL); Participation (RNL); Playfulness (PSA); Wellbeing (PWI); and Emotions (PHQ). Data analysis will use Pearson Correlation coefficients first to study the relationships among variables. Regression analysis will be performed to analyze the best predictors of well-being and participation within each study group. Next analyses of variance will be performed to compare the two groups on all variables. **Results:** The study is in its pilot phase with data gathered for first subjects among the healthy elderly. The presentation will include the results of the study and discussion on their implications. **Conclusions:** As the elderly population is growing worldwide the significance of studying this topic is of paramount importance to enable better quality of life for a large population. Furthermore, being able to assist elderly with disabilities to enjoy and participate in their communities. **References:** 1) Wilson, R.S., et al. (2013). The influence of cognitive decline on wellbeing in old age. *Psychology and Aging*, 28, 2, 304-313. 2) Yarnal, C. & Qian, X. (2011). Older-adult playfulness: An innovative construct and measurement for healthy aging research. *American Journal of Play*, 4, 1, 52-79.

PA754

Place Orientation and Visual Construction Subdomains of the MMSE as Predictors of Rehabilitation Success of Post-Acute Hip Fractured Patients

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Background: Various factors have been reported to affect the rehabilitation outcomes of patients with hip fractures including sex, age, pre-fracture functional level, affective status, comorbidity and treatment intensity. Cognitive functional level is one of the major predictors of rehabilitation success in hip fractured patients. The Mini-Mental State Examination (MMSE) has been widely used to assess cognitive functional level in many rehabilitation setting.

The test assesses different cognitive domains. Former studies presented relationships between MMSE subdomains with high risk of fall and of hip fracture. The aim of the present study was to assess the relationship between various MMSE subdomains and rehabilitation success in post-acute hip fractured patients. **Methods:** A retrospective analysis of 605 hip fractures patients admitted to a post-acute rehabilitation ward during 1.10-6.13. Functional variables included the Functional Independence Measure (FIM) instrument and motor FIM (mFIM). Functional gain was determined as a mFIM score change. The relative functional gain on the mFIM score was calculated using the Montebello Rehabilitation Factor Score (MRFS). Rehabilitation success was determined when the patients achieved a mFIM MRFS score above median value. The Mann-Whitney *U* test assessed the significance of difference in clinical variables between patients who succeeded in their rehabilitation and those who did not. The Chi-square test examined the association between rehabilitation success and demographic variables and comorbidity. Logistic regression was used to find the most predictive variables for rehabilitation success. We applied the forward stepwise (likelihood ratio) procedure in selecting the variables for the regression model. **Results:** The patient group with a successful rehabilitation score was significantly younger, had a significantly higher admission albumin level, higher admission FIM score and higher scores in the MMSE test and in all cognitive domains, compared with patients who did not achieve a successful rehabilitation score. This patient group manifested a significantly lower rate of neurological and affective diseases and was significantly more independent prior to the fracture. Logistic regression revealed that the place orientation and visual construction MMSE subdomains had a predictive value for rehabilitation success. **Conclusions:** Post-acute hip fractured patients have a good chance to achieve a rehabilitation success when scored normally on place orientation and visual construction MMSE subdomains.

PA755

A Case Study Illustrating the Use of the Mini-BEST Test in Balance Exercise Prescription to Decrease Fall Risk in the Geriatric Population

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An elderly man with the diagnosis of cervical myelopathy was referred to Physical Therapy to address progressive decline in balance. Over the past 3 years, he had a decline in his functional status requiring the use of a cane. He fell 3 times in the past year. During the examination, patient scored 14/28 on the mini-Balance Evaluation Systems Test (BEST), with the sub scores: anticipatory 5/6, reactive postural control 0/6, sensory orientation 4/6 and dynamic gait 5/10. Patient was prescribed a home exercise program (HEP) designed to address specific constraints in balance control identified by the mini-BEST. A chart was designed to organize exercises into different modes: static, dynamic, gait, dual task, strength training and walking. To improve postural reaction, exercises that provoked stepping strategy were prescribed. Exercises to strengthen anticipatory postural control were given to diminish the need for postural reaction, as well as dynamic gait and sensory orientation exercises. The patient was seen for 9 visits over 2 months and was instructed to perform the exercises done in the clinic 3 days a week for 25 min at home. At discharge, the mini-BEST score was 25/28 with sub scores: anticipatory 6/6, reactive postural control 6/6, sensory orientation 5/6, and dynamic gait 8/10. Patient was able to ambulate without a cane and had 0 falls. There is strong evidence that exercise can reduce fall rates in the elderly. The development of an effective HEP is a key component. The program should be structured, individualized, progressive and challenging. The mini-BEST was developed to allow clinicians to examine the subsystems of balance. The results can assist therapists in constructing individualized balance exercises regimen. The above case study illustrates its application. This case study highlights the benefits of using the mini-BEST in identifying the specific balance impairments. It illustrates the design of an individualized exercise regimen that targets all subsystems of

balance control while considering the mode and volume of exercises. It also demonstrates improvement in postural reaction without using perturbation training or a motion platform that can be safely done as part of a HEP.

PA756

Reliability and Validity of Four Step Square Test in Older Adults

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Introduction/Background: The aim of this cross-sectional descriptive study was to determine the reliability and validity of Four Step Square Test (FSST) for use to evaluate balance ability in older adults. *Material and Methods:* 44 men and 36 women (N=80; mean age, 72.69±5.09 yr) were participated. Participants performed the FSST, the Time Up & Go (TUG) test, the Functional Reach test, the One Leg Standing test and completed the Berg Balance Scale (BBS). *Results:* The FSST has good Cronbach's Alpha (0.96) and had good correlations with the two dynamic balance measures (correlation coefficients for the TUG=0.000; BBS=0.000). *Conclusions:* The results obtained from this study indicate that the FSST is also a reliable and valid tool for measuring the dynamic balance ability in older adults. *Keywords:* Balance, Geriatrics, Four Step Square Test.

PA757

Acceptability and Predictors of Videoconferencing among Family Members of Residents of Nursing Homes in Taiwan

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Background: Videoconferencing with family members benefits nursing home residents by decreasing their depression and loneliness. Nevertheless, the rate of participation in videoconferencing by family members is low. The purpose of this study was to explore the use of and factors related to videoconferencing by nursing home residents' families in Taiwan. *Materials and Methods:* For this cross-sectional study, data were collected from 231 family members of residents at 16 medium-large (>70 beds) nursing homes in Taiwan. Data were collected on participants' and residents' demographic and clinical characteristics, acceptance of the use of videoconferencing as a form of nursing home visit, and reasons for/roles during visits to nursing home residents. Factors related to the use of videoconferencing were analyzed by logistic regression. *Results:* Family members' acceptance rate of videoconferencing use was low (7.8%). The findings also showed that videoconferencing use was predicted by hiring a private caregiver (odds=6.90), the role during/reason for family visits being to maintain residents' emotional status (odds=5.46), and the frequency of in-person visits to the nursing home. *Conclusions:* We recommend encouraging family use of videoconferencing by more available equipment such as smartphone or tablet program that can in time address residents' emotional issues. We also suggest developing more interactive content for videoconferencing, such as a family-oriented picture program that can help broaden topics of conversation.

PA758

Personality Associates with Mobility Deterioration among Older Adults

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Objectives: The ability to divide attention between two tasks while walking (i.e., Dual Task - DT) tends to deteriorate with aging. This deterioration is associated with mobility limitations, increased risk

of falls and reduced quality of life. Several factors were associated with mobility deterioration. However, the effect of personality is yet to be determined. The aim of this study was to examine the effect of personality on mobility and DT performance among older adults. *Methods:* Cross sectional study. Participants: Community dwelling older adults (N=92, mean age=75). Measures: Baseline characteristics were collected by self-report questionnaires. Personality was assessed by NEO Five-Factor Inventory (i.e., neuroticism, extroversion, conscientiousness, openness, and agreeableness) (NEO-FFI). Mobility was assessed by the Timed-Up-and-Go test (TUG). DT performance was evaluated by the following procedures: The participants performed each task as a single task (ST) and as a DT. The DT consisted of two cognitive tasks (verbal fluency and subtraction) while walking (DT) for one minute and also while sitting (ST). Order of administration was random. Dual-Task Costs (DTC) were calculated for walking distance and performance of the cognitive tasks. *Results:* Extroversion is negatively correlated to TUG for both genders. However, extroversion was positively correlated to DCT motor among males only (p<0.05). Conscientiousness is negatively associated with DTC cognition in females (p<0.05). Agreeableness is positively associated with TUG (p<0.05). *Conclusions:* Personality is associated with mobility performance. Evaluating personality may contribute to tailoring personality-based physical activity protocols for elderly people as well as prevent mobility deterioration among the elderly.

PA759

Prior Physical Activity and Disability Risk Two Decades Later in the Oldest-old

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Introduction/Background: The oldest-old (aged 90+ years) are the fastest growing age group in the population and have high rates of disability. Identification of modifiable behavioral targets for delaying or reducing disability is essential. We examined whether prior participation in physical or other leisure activities is associated with disability reduction two decades later, in people who survived to their nineties. *Material & Methods:* Participants were 1,176 individuals from The 90+ Study, a population-based longitudinal cohort study. Disability was defined as difficulty (requiring assistance or being dependent) in activities of daily living (feeding, bathing, dressing, or toileting), and was reported by informants upon The 90+ Study enrollment (2003-2012). Self-reported data on physical and other leisure activities had been previously collected two decades earlier during the Leisure World Cohort Study (1981-1985). Logistic regression models were used to estimate the odds of disability in relation to activity participation two decades earlier. *Results:* Any amount of time spent in physical activities (compared to no participation) was significantly associated with 40% lower odds of disability, in oldest-old participants without dementia. An average of 15-30 minutes per day of physical activity had the same effect as two or more hours per day (OR=0.6 for both). No association with disability was seen for other leisure activities (ORs between 0.9-1.4). Neither activity type was associated with disability in participants with dementia (ORs between 0.4-1.3). *Conclusions:* In non-demented oldest-old people, as little as 15-30 minutes per day of physical activity is associated with reduced disability later in life. Physical activity may be a better preventive strategy than other leisure activities.

PA760

Dysphagia in Elderly Patients with First-Ever Ischemic Stroke

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Introduction and Objectives: It has been reported that elderly dysphagic stroke patients has increased risk of chest infection and aspiration pneumonia. Here, we compared the clinical characteristic factors and the incidence of pneumonia between elder (≥ 65 years) and non-elder stroke patients by using functional oral intake scale (FOIS). **Methods:** We performed a retrospective study between March 2012 and Dec 2012 at Chi-Mei Foundation Hospital in Taiwan. Patients were included when met the following criteria by chart reviewing: (1) first-ever acute ischemic stroke, (2) dysphagia was confirmed by a speech-language pathologist. The demographic and clinical characteristics, including age, risk factors, the scores of the National Institutes of Health Stroke Scale (NIHSS) and the post-stroke modified Rankin Scale (mRS) were recorded. The Fisher's exact test and the independent *t*-test were used for data analysis. **Results:** Among 145 enrolled patients, 92 were elder group and 53 were non-elder group (mean age: 76.95 ± 6.58 vs 55.04 ± 8.80). The NIHSS and mRS scores were no significantly difference between two groups. The elder group has significantly lower FOIS score before discharge (5.7 VS 6.7 ; $p < 0.05$), higher the re-admission rate (48 VS 12 ; $p < 0.05$) and higher the rate of re-admission due to pneumonia (13 VS 0 ; $p < 0.05$). Pneumonia occurrence during hospitalization is significantly related to lower FOIS score (2.16 VS 4.96 ; $p < 0.05$), higher NIHSS (8.95 VS 4.38 ; $p < 0.05$) and mRS scores (3.79 VS 2.64 ; $p < 0.05$). Re-admission due to aspiration pneumonia is significantly related to older age (82 VS 67 ; $p < 0.05$), lower FOIS score (2.77 VS 4.77 ; $p < 0.05$) and higher mRS score (3.5 VS 2.75 ; $p < 0.05$). It is noticed that most re-admitted patients due to pneumonia relied on tube feeding. **Conclusions:** The elderly stroke patients may have poor swallowing function and easily occurrence of pneumonia which may causing their readmission. For severe dysphagia patients with tube feeding, it is worth noting that re-admission rate due to pneumonia remains high still. This finding suggests that tube feeding may not be the best way to prevent pneumonia. Improving oral hygiene and facilitating swallowing function are more effective in preventing pneumonia for them.

PA761

Variation in the Body Composition in Pre-Menopausal & Post-Menopausal Bangladeshi Women

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Introduction: Menopause is an important hallmark for women because of changes occur in the body secondarily due to diminished ovarian function. This comparison study was carried out in the Department of Physical medicine and rehabilitation, Bangabandhu Sheikh Mujib Medical University during the period January to June 2010, to describe the variation of body composition and to observe the variation of body density, fat deposition among pre and post-menopausal women. **Material and Method:** This is a prospective and comparative study. 50 patients of pre-menopausal and post-menopausal women were taken in this study. The study duration was for 6 months. Patients were selected non randomly on the basis of inclusion and exclusion criteria. Main outcome measures were mean value of height, weight and age of menarche, body mass index, total fat mass amount, percentage of body fat (%), lean mass amount (kg), and lumbar spine BMD, waist to hip ratio. The results were analyzed using *t*-test, Chi-square test, Fisher's Exact test with using SPSS programme. **Results:** In the premenopausal group (N=25) average height were 148.87 cm, weight were 59.40 kg, in the menopausal group average height were 146.82cm and weight were 51.60 kg. BMI were 26.76 and 23.53 in the pre and post-menopausal group respectively. Total fat mass amount were 23.27 kg and 17.64 kg in the pre and post-menopausal group. Percentage of body fat 40.71% and 35.34% in the pre and post-menopausal group with waist to hip ratio were 0.63 and 0.57 respectively which is significant ($p < 0.010$). **Conclusions:** Bangladeshi post-menopausal women have reduced body mass index,

total fat mass amount and total waist to hip ratio. **Keyword:** Body composition, Menopause.

PA762

The Association between Fear of Falling and Daily Physical Activity, Including both Step Count and Intensity, in Community-Dwelling Elderly

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Introduction/Background: Fear of falling (FoF) refers to a lack of self-confidence that normal activities can be performed without falling, and the prevalence ranges up to 60% in the community-dwelling elderly. FoF would be associated with the restriction of ADL and life-space. Some studies have explored the association between FoF and objective physical activity, however, they remain controversial and little is known about the influence of FoF on the intensity of physical activity. The aim of study is to investigate the associations between FoF and daily physical activity, including total daily step count and intensity, in community-dwelling elderly. **Material and Methods:** Participants were 106 people aged 65 and over. Each participant was categorized into either Fear or No-Fear group on the basis of having FoF. Additionally, the number of fall experience in the past year was determined by self-report. Each participant wore a pedometer/accelerometer (Kenz Lifecorder EX, Suzuken Co., Ltd., Nagoya, Aichi, Japan) for 7 days; measurements included the average number of steps from pedometer (PA) and the duration of activity at low intensity (LA) and moderate-vigorous intensity (MVPA) from accelerometer. Gait speed was calculated as a measurement of physical function, and psychological condition was assessed by using Geriatric Depression Scale (GDS). PA, LA and MVPA were compared between groups, and further analyses were performed using multiple regression analysis after adjustment for age, sex, the number of falls in the past year, GDS and gait speed. **Results:** PA, LA and MVPA significantly lowered in Fear group compared with in No-Fear group (PA: $p = 0.022$; LA: $p = 0.028$; MVPA: $p = 0.048$). However, the differences in PA and MVPA were no longer significant after adjusted by the variables. On the other hand, LA in Fear group was still low significantly compared with No-Fear group even after adjustment for variables ($p = 0.029$, $\beta = 0.212$). **Conclusion:** Our results suggest FoF would affect low-intensity activity. In the clinical setting, clinicians who work in both hospital and community should recognize that elderly people who have FoF would restrict light physical activity like indoor activity.

PA763

Relationships between Muscle Mass and Chronic Low Back Pain in the Elderly

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Introduction: Chronic low back pain (CLBP) has become an important social issue in the era of ageing because it leads to an increase of the medical social cost. Though relationships between lumbar lordosis and CLBP is still inconclusive, a few recent studies have reported sagittal imbalance and decrease of lumbar lordosis as potential causes of CLBP. There have been many reports that related cross sectional areas of the trunk or back muscles with CLBP. However, relationships among CLBP, lumbar lordosis and generalized muscle mass have not been investigated as far as the authors could search. The purpose of this study was to find relationships among CLBP, lumbar lordosis and generalized muscle mass. **Methods:** Retrospective analysis was done from the health screening data of old people (> 65 years old), who undertook body impedance analysis and lumbar lateral X-ray study. All subjects were divided into the CLBP and control groups based on medical records. Modified Skeletal Muscle Mass index (MSMI) was

calculated by weight adjusting with appendicular skeletal mass (ASM) [ASM (kg)/weight (kg) x 100%]. Lumbar lordotic angles were measured between L1 and L5 using Cobb's method. MSMI and lumbar lordotic angles were compared between the groups. Correlation coefficient was calculated between lumbar lordotic angles and MSMI. *Result:* Data of 165 old subjects (81 men and 84 women) were analyzed and divided into CLBP (n=35 and 36 for men and women, respectively) and control groups (n=46 and 48, respectively). The lumbar lordotic angles of the CLBP group (29.8±10.6 degrees, 32.1±11.2 degrees, respectively) were significantly lower (p=0.001 and 0.006, respectively) than those of the control group (37.1±8.5 degrees and 38.3±9.2 degrees, respectively). Decrease of MSMI was observed in the CLBP group compared to the control group; 31.2±1.7% vs 32.3±1.9% (p=0.008) in men, 26.1±1.9% vs 27.1±2.1% (p=0.02) in women. For both genders, positive correlations were observed between the lumbar lordotic angles and MSMIs; r=0.220, p=0.048 in male, r=0.225, p=0.040 in female. *Conclusion:* Lumbar lordosis and MSMI were decreased in old people with CLBP with a positive correlation between lumbar lordosis and MSMI.

PA764

Premorbid Vigorous Physical Activities Ameliorate Gait Ability after Stroke

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Introduction: Physical activities are important in prevention of arteriosclerotic disease including stroke. However, their influences for post-stroke gait ability are not fully elucidated. We conducted this study to explore any relationship between pre-stroke physical activities and post-stroke gait abilities. *Material and Methods:* One hundred and thirty one patients of cardiac stroke, non-cardiac ischemic stroke and hemorrhagic stroke answered a questionnaire about their pre-morbid physical activities. Physical activities were estimated in metabolic equivalents (METs). Gait outcome was evaluated in accordance with Functional independence measure. We compared patients who regained gait without aid from others with patients who didn't. Confounders were checked from medical records. *Results:* Ninety seven patients regained gait without aid from others. Pre-stroke activity was a significant predictor for gait outcome as well as age, cerebrovascular disease (CVD) history, dementia and driving. Statistic analysis showed bifid threshold at 4METs and 6METs. In patients older than 74 years old, activities equal or stronger than 5METs, age and CVD history were significant predictors. In recurrent stroke patients, activities equal or stronger than 7METs, age, dementia and driving were significant predictors. Other confounders such as diabetes mellitus, hypertension, hyperlipidemia, smoking, orthopedic disease, cardiac disease, malignancy or psychiatric history made no difference in gait outcome. *Conclusion:* Pre-morbid physical activities are important to improve gait ability after stroke. Same tendency was seen in elder patients and patients with recurrent stroke. Intense or vigorous physical activities should be recommended in health education including elderly and stroke survivors after validation of safety.

PA765

Differences of Muscular Activation and Gait Kinematics between the Older and Oldest Adults

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Objective: Muscular activation and kinematic data have proven effective in distinguishing the changes in gait mechanics associated with aging. The objectives of this study were to characterize the

differences in muscular activation and kinematic data of trunk and lower extremity during comfortable walking between older and oldest adults. *Material and Methods:* Seventeen healthy adults (9 older adults (aged 65-74) and 8 oldest adults (aged 75-84)) participated. Dynamic electromyography (DEMG) signals were recorded simultaneously from the right rectus abdominis, external oblique, erector spinae, multifidus, gluteus maximus, gluteus medius, rectus femoris, vastus medius, adductor longus, biceps femoris, tibialis anterior and medial gastrocnemius muscles using the Desktop DTS system (Noraxon, USA), as older adults and oldest adults walked 5 m walkway for 5 trials at preferred speed. Rectified DEMG signals were normalized to mean activities over a gait cycle. Kinematic analysis of the lower extremity and spatiotemporal parameter of gait including the gait speed, cadence, step length, step width, single support were determined by 3D motion capture system (HWK-200RT, Motion Analysis Corporation, USA). *Results:* In spatiotemporal parameters, the older adults showed faster gait speed, more cadence, longer step length, narrow step width and shorter single support compared to the oldest adults. The oldest adults exhibited greater activation of trunk and lower extremity muscles compared to the older adults at preferred speed. In particular, oldest adults exhibited greater coactivation of thigh muscles (rectus femoris, vastus medius, biceps femoris and adductor longus) during mid- and terminal-stance phase. In addition, oldest adults demonstrated less activation of gastrocnemius muscle during push off phase of gait. *Conclusions:* This study demonstrated age-related changes in muscle activation of trunk and lower extremity as well as kinematic data in aged persons. Increased muscular coactivation may be related with age-related walking balance disorder in the oldest adults. (Supported by the NRF grant funded by the Korea government (MSIP) (NRF-2014R1A2A1A01005128) and Samsung Electronics Co., Ltd. Grant, (IO140307-01379-01)).

PA766

Exercise For Sarcopenia in the Elderly: What Kind, Which Role?

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Introduction/Background: Sarcopenia, a progressive and generalized loss of skeletal muscle mass and strength associated with ageing, is a complex medical condition that leads to a decreased functional status. The aims of this study were to review the mechanisms of sarcopenia, to evaluate the role of exercise in the elderly with sarcopenia and the current exercise interventions recommended. *Material and Methods:* Review of the literature published until September 2014 in Medline, Embase, Cochrane Library, Web of Science and Scopus databases. *Results:* Several mechanisms are involved in the development of sarcopenia in the elderly. Literature suggests that the exercise has a significant positive effect on mobility, functionality, decreasing risk of falls and thus decreasing the mortality risk. Different exercise interventions are suggested, namely aerobic exercise, flexibility, progressive resistance exercise and balance training. *Conclusion:* Exercise seems to be the most important tool to prevent and treat sarcopenia. More exercise programs need to be developed and adapted to the elderly. In an increasingly sedentary population, the approach should also focus on lifestyle modifications.

PA767

Measuring Rehabilitation Outcome in Post-Acute Hip Fractured Patients

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Purpose: To present our experience in measuring rehabilitation achievements of post-acute hip fractured patients with the FIM instrument; assess its appropriateness as to the patients' various disability levels and describe our experience with other measuring

tools in patients less sensitive to changes in the FIM instrument. **Methods:** A retrospective study performed in a postacute geriatric rehabilitation center. Three hundred and eighty-seven hip fractured patients admitted from January 2010 to May 2012 were included in this study. Patients were evaluated by the Functional Independence Measure (FIM), the Timed Get Up and Go (TUG) test and “bed to chair” transfer FIM parameter. The study population was divided into three disability groups according to their admission disability level: high (admission FIM score 540), moderate (FIM 40–79) and low (FIM 80). The Mann–Whitney *U*, ANOVA and Chi square tests analyzed the data. **Results:** The FIM instrument was found most sensitive in identifying functional change in patients with moderate disability. Low disability patients received more physio- and occupational-therapy treatment time, yet achieved a lower mean FIM score change compared to moderately disabled patients. The smallest real difference (SRD^{1/4}13) for the FIM score was achieved by 60% of patients with moderate disability. When assessed by the TUG test, most patients (94%) improved their score. The SRD % of 31% was achieved by 71.7% of the patients. Nineteen patients (35.9%) achieved a discharge score of 520 s. The high disability group achieved the lowest mean FIM score change. On admission, 52/64 (81%) patients required considerable help in transferring from bed to chair (FIM 1–2), however, upon discharge, the majority (69.2%) improved to the level of a one man transfer (FIM 3). Forty-one (64.1%) patients were discharged home. **Conclusion:** Post-acute hip fracture patients exhibit variable functional ability. Assessing rehabilitation achievements with a disability measure is limited; therefore, it is advisable to use an instrument most suitable to the patients’ disability level.

PA768

Poor Self-Rated Health and Associated Factors in Older Turkish Adults with Type 2 Diabetes

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Introduction/Background: Self-rated health (SRH) is an independent predictor of health outcomes. Although very few studies have been made in Western countries, no study has investigated SRH in Turkish older patients with type 2 diabetes. The aim of this study was to determine the prevalence of poor SRH and associated factors in older Turkish adults with type 2 diabetes. **Material and Methods:** The study was designed as a cross-sectional survey. A total of 189 patients with type 2 diabetes followed by a diabetes outpatient clinic in Turkey were enrolled in this study. Inclusion criteria were age 60 years or older, diagnosed with type 2 diabetes for at least one month, ability to communicate in Turkish and agreeing to participate in the study. Patients with a history of severe comorbid conditions, major psychiatric disorder, and cognitive impairment and those who were clinically unstable were excluded from the study. One hundred thirteen patients (71.7% female) met inclusion criteria. Data were collected by using a questionnaire form, the Perceived Social Support from Family Scale (PSS-Fa), and the Nottingham Health Profile (NHP). SRH was assessed by a single item question on a five-point Likert scale. Descriptive statistics and logistic regression analysis were computed. **Results:** The mean age of the patients was 68.4±6.8 years (range=60-88) and the median disease duration was 156 months. Ninety-seven patients (85.8%) had poor SRH. Female gender (adjusted odds ratio (OR)=11.48, p=0.002, 95% confidence interval (CI): 2.41-54.66), a low or moderate family income (OR=8.00, p=0.006, 95% CI: 1.80-35.63) and lower scores of PSS-Fa (OR=0.43, p=0.001, 95% CI: 0.26-0.70) were risk factors for poor SRH, after adjustment for the potential confounding factors. However, no influence of the NHP subscale scores on poor SRH was found (p>0.05). **Conclusion:** Poor SRH was prevalent among older patients with type 2 diabetes. Females, patients who had financial difficulties and those who had lower family support were more likely to have poor SRH. Healthcare professionals should be aware of the factors that affect SRH in older adults with type 2 diabetes and should carry out appropriate interventions.

PA769

Acceleration of Vibration Signals in Various Body Parts upon Exposure to Different Whole Body Vibration Protocols in Older Adults

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Background: Whole body vibration (WBV) was shown to have beneficial effects on improving physical functioning in the elderly population. The therapeutic effect of WBV should presumably be highly related to the intensity of vibration reaching target treatment area. Besides, there are potential safety concerns due to undesirable transmission of vibration signals to the upper body. The aim of this study was to examine the transmission of vibration signals at different body parts upon exposure to WBV of different frequencies while assuming different postures. **Materials and Methods:** Forty older adults (mean age: 60.3±5.7 years) participated in this study. While exposing to different vibration signals (Amplitude: 1mm, Frequency: 25, 30, 35, 40 Hz), subjects assumed six different postures (erect standing, semi-squat, deep squat, tip-toeing, forward lunge, single leg standing). Tri-axial accelerometers were used to record the acceleration transmitted to the ankle, knee, hip, lumbar spine (L3) and forehead. For each body part, the main effects of posture and frequency on resultant root-mean square accelerations and their interactions were analyzed using two-way analysis of variance with repeated measures. **Results:** Higher WBV frequencies led to higher acceleration values measured at the platform level. Main effect of posture and frequency x posture interaction were significant in all body parts (p≤0.032). Main effect of frequency was significant at the ankle, knee and lumbar spine (p<0.001), but not at the hip and head. Post-hoc analysis showed that tip-toeing resulted in a significantly lower acceleration than other postures at all body parts (p≤0.023). In contrast, erect standing resulted in a significantly higher acceleration than other postures at hip, lumbar spine and head (p<0.001), except that single leg standing resulted in an even higher acceleration at the hip (p<0.001). Increase in vibration frequency resulted in a higher acceleration at the ankle, knee and lumbar spine. **Conclusions:** Transmission of vibrations to different body parts was influenced by both vibration frequency and body posture. For posture, tip-toeing resulted in the most signal attenuation, whereas erect standing and single leg standing were associated with the highest transmissibility. Higher frequency signals appeared to show more severe attenuation as they were transmitted up the body.

PA770

Squat Movement Differences between the Young and the Elderly

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Introduction: Squat movement is frequently performed during activities of daily living, and is often used in training as well. Only few previous studies have kinematically analyzed the squat movement. The purpose of this study is to investigate the differences in squat movement between the young and the elderly. **Material and Methods:** Ten youth and ten elderly volunteered in this study. The squat was conducted at an independent speed and was performed three times by each subject. Movements were measured using a 3D motion analysis system (VICON). The marker set was used to plug-in gait full body model. Data analysis was performed using a vertical angle in the sagittal plane to include the thorax, pelvis, thigh, and shank. The data obtained for each angle were normalized in trial time. Inter-joint reversal points were calculated by determining the time point of each peak angle value. Additionally, peak angles were calculated from the peak value of each segment angle. The data used

the mean of the three trials. The characteristic difference of the inter-joint reversal point and angle data of the time peak value between the young and the elderly were analyzed using the Mann-Whitney *U*-test. The significance level was set at 0.05. **Results:** The inter-joint reversal point had no significant difference in any segment. The peak value of each angle was significantly different only for the shank segment angle. The shank segment angle of the elderly was significantly large. The differences in the segment angles of three others were not significant. **Conclusion:** Because there were no significant differences in inter-joint reversal points, no temporal characteristic patterns between the young and the elderly were suggested in the squat movement. Instead, the results suggested that temporal characteristic patterns depend on the individual performing the squat movement. However the peak value of each angle was significantly different only for the shank segment angle. In other words, no difference in the temporal pattern between the young and elderly was observed, although characteristic patterns were evident only at the shank segment angle.

PA771

Assess the Impact of Cardiac Rehabilitation on Exercise Capacity and Functional Patients with Heart Failure in the Elderly

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Introduction: With advancing age increased incidence of chronic, progressive disease of the cardiovascular system, eg. heart failure. This means that an expanding population of elderly occur endemic growth of these conditions. The consequence of this will be an increasing demand for care, as it is this age group requires the most help and support from the health care system. The aim of the study was to determine the effect of a 12-week, controlled physical training on exercise capacity and functional in patients with heart failure in the elderly. **Material and Methods:** The study included 72 patients, women and men aged 81.6 ± 6.4 with a diagnosis of heart failure. All patients enrolled in the study were treated pharmacologically according to the standards of Polish Society of Cardiology. Group A patients were examined cardiac rehabilitation program based on exercises, training cycle was 12 weeks, subjects require long-term care. Group B - the comparison, the patients were leading a normal life, characteristic of a particular age group (walking, light housework, and the plot, etc.). Not taking part in the rehabilitation process. Conducted 6MWT, TUG test, the measurement of plasma concentrations of NT-proBNP and the assessment of efficiency in terms of the basic functions of life (ADL - Activities of Daily Living), and self-reliance in the field of complex functions of life (IADL - Instrumental Activities of Daily Living). **Results:** Cardiac rehabilitation has a significant impact on the changes 6MWT test time (group A), the reduction of NT pro-BNP, TUG time of trial. It has been shown a high correlation between the concentration of NT-proBNP and the change in baseline NYHA class higher in group A after rehabilitation and test results TUG and gait speed **Conclusions:** 1. The low-intensity physical training affects the modulation of neuroendocrine and levels of brain peptide natyrytecznego NT pro-BNP levels in patients with chronic heart failure, regardless of gender. 2. The results show the high effectiveness of rehabilitation in improving functional capacity which is shown to shorten the duration of the TUG test and extension of the maximum distance of the defeated during the 6MWT.

PA772

Translation and Validation of the Arab Version of the Late-Life Function and Disability Instrument: a Cross Sectional Study

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Introduction/Background: The Late-Life Function and Disability Instrument (LLFDI) provide a comprehensive, reliable, and valid assessment of physical function and disability in community-dwelling adults. The objective of the present study was to translate and culturally adapt the LLFDI to Arabic, and to determine its test-retest reliability and validity. **Material and Methods:** The LLFDI was translated to Arabic through a forward and backward translation process, and approved by a bilingual committee of experts. Sixty-one (26 male and 35 female) Arabic speaking, healthy, older adults, ages 65–88, living in northern Israel participated in the study. To determine test-retest reliability, the questionnaire was administered twice to 41 subjects with a 6- to 8-day interval. Construct validity was examined by correlating the LLFDI responses with the 10-item physical function (PF-10) subscales of the General Health Survey (SF-36), with the physical component of SF-36 (SF-36 PCS), and with two performance measures, the Berg Balance Scale (BBS) and Time Up and Go (TUG) test. **Results:** Internal consistency (Cronbach's alpha) was good-to-excellent (0.77 to 0.97). Test-retest agreement was good-to-very good (function component: 0.86–0.93, disability component: 0.77–0.93). Correlation with the SF-36 PCS and PF-10 was moderate-to-strong for both LLFDI components (function, $r=0.53-0.65$ and $r=0.57-0.63$, and LLFDI disability, $r=0.57-0.76$ and $0.53-0.73$, respectively). Significant, moderate-to-strong correlations between the LLFDI and BBS ($r=0.73-0.87$) and a significant, moderate, negative correlation between LLFDI and TUG test ($r=-0.59- -0.68$) were noted. The standard error of measure was 6–10%, and the smallest real difference was 17–27%. Discriminative validity for both gender and fall status were also demonstrated. **Conclusion:** The Arabic version of the LLFDI is a highly reliable and valid instrument for assessing function and disability in community dwelling, older adults. The translated instrument is sensitive both to single subject and group changes. The translated Arabic version of the LLFDI may be used in clinical settings and for research purposes.

PA773

Characteristic Differences in the Upper Body Behavior between Young Adults and the Elderly

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Introduction: The elderly often have difficulty with this common movement and rely on upper limb's efforts. The upper body mass comprises most of the body mass. Therefore, upper body behavior is important for efficient movements. The purpose of this study was to compare kinematic characteristics of the upper body between young adults and the elderly during the STS movement. **Material and Methods:** Five young adults and five elderly, healthy subjects participated in this study. The subjects performed the STS movement from a 40-cm high stool three times at voluntary speed. The stool was placed on force plates (FP) 3 and 4. Kinematic data were collected using a three-dimensional motion analysis system and force plates. The marker set was based on the Plug-In-Gait full-body model. The onset of movement was defined by hip angular acceleration (ACC). When the FP3's ground reaction force became 0, it was defined as the instant of seat-off. The end of movement was defined as the moment when the hip ACC became 0 after the seat-off. Then, the following items were calculated: the angle hip and the thorax, angular velocity (AV) and ACC of the thorax, and the intervals between seat-off, AV=0, ACC=0, and the timing of thorax anterior tilt peak. **Result:** The seat-off occurred earlier in the elderly than in young adults ($P<0.05$). The intervals between ACC=0 and the seat-off, between the timing of thorax anterior tilt peak and the seat-off, and between the seat-off and AV=0 were not different, whereas the maximum angle of the thorax anterior tilt showed a significant difference ($P<0.05$) between the age groups. **Conclusion:** In the el-

derly, the seat-off happened earlier than in young adults; however, the angle of the trunk anterior tilt was insufficient. The lack of degree of the trunk anterior tilt angle means that the elderly may not use appropriate trunk torque to turn thighs at the seat-off. Therefore, proper interpretation of these results requires analysis based on interaction torque that shows relationships among segments.

PA774

Influence of Knee Pain on Various Activities of Daily Living May Reduce Physical Activity in Patients with Knee Osteoarthritis According to Disease Severity

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Introduction: Physical activity (PA) is the clinical index that should be maintained in patients with knee osteoarthritis (OA). Many studies have focused on knee pain accordingly. However, little is known about the association between PA and knee pain during activities of daily living (ADLs), especially according to disease stage. Therefore, this study aimed to investigate the ADLs wherein accompanying knee pain is associated with PA in patients with early and severe knee OA. **Material and Methods:** Age, sex, body mass index, Kellgren Lawrence (K/L) grade, and PA (measured with a pedometer) were obtained from 290 outpatients aged ≥ 50 years. We investigated the presence or absence of knee pain during several ADLs (upon waking in the morning, walking on a flat surface, ascending stairs, descending stairs, bending to the floor or standing up, and standing still) using the Japanese Knee Osteoarthritis Measure. Participants were divided into early and severe groups based on K/L grade (grades ≤ 2 and ≥ 3 , respectively) and presence or absence of knee pain during each ADL. Differences in PA between groups were analyzed. Moreover, multiple regression analysis after adjustment for demographic data was used to determine whether knee pain during each ADL was related to PA. **Results:** The early and severe groups included 219 and 71 subjects, respectively. In the early group, the PA of patients with knee pain decreased significantly during the ascending stairs, bending to the floor or standing up, and standing still ADLs ($P=0.01$, $P=0.02$, and $P=0.02$, respectively). Knee pain during the ascending stairs ADL was significantly associated with reduced PA ($\beta=-0.13$, $P=0.04$). In the severe group, the PA of patients with knee pain was significantly decreased during the walking on a flat surface and descending stairs ADLs ($P=0.01$ and $P=0.02$, respectively). Furthermore, knee pain during the walking on a flat surface ADL was significantly associated with reduced PA ($\beta=-0.30$, $P<0.01$). **Conclusion:** Knee pain during the ascending stairs and walking on a flat surface ADLs is associated with reduced PA in patients with early and severe knee OA, respectively.

PA775

Rapid Stepping Time on Virtual Objects Correlates with Measures of Balance and Fear of Falling in Elderly Individuals

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Background: Falls among the elderly are a global health concern. Studies indicate that step execution tests can identify elderly individuals at risk for falls. However, while a force platform is considered the gold standard for assessing step execution, this equipment is not feasible in a clinical setting. Virtual Reality (VR) platforms which are used increasingly within the rehabilitation setting as intervention modalities can also be harnessed for motion assessment. **Purpose:** To determine the correlation between the duration of rapid stepping

responses towards 'virtual' objects assessed by a clinical VR system and clinical measures of balance and fear of falling. **Methods:** Sixty ambulatory elderly individuals (mean age 88.2 years), residing in a retirement center participated in this study. Subjects completed the Activities Specific Balance Confidence (ABC) and a demographic questionnaire. The Mini-Best test and the Timed Up and Go (TUG) were used to assess balance. Subjects participated in a single, virtual reality session with the SeeMe Rehabilitation System, a clinician-controlled exercise system based on Microsoft's Kinect technology. Subjects were asked to perform multiple steps as quickly as possible on a 'virtual ball'. Stance position determined the foot used and the direction of the steps during three, 60-second test periods. Spearman correlations were calculated, with $p \leq 0.05$ considered significant. **Results:** Significant correlations were determined between the step tests in all directions and the Mini-Best test, the TUG and the ABC. The most significant correlations were between the Mini-Best test and the forward and backward steps ($\rho=-0.52$) and between the TUG and the forward and backward steps ($\rho=0.46$ and $\rho=0.42$, respectively). **Conclusions:** The duration of rapid steps in all directions, as determined with SeeMe System, is moderately to strongly associated with clinical measures of balance. While the rapid execution of forward and backward steps is more strongly associated with balance performance than sideways steps, backwards stepping is more strongly associated with fear of falling. **Implications:** The VR rehabilitation platform can be used by clinicians to assess balance capabilities as part of an intervention program.

PA776

Efficacy of Bequine Dance on Balance in Thai Fall Risk-Elderly

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Introduction/Background: To evaluate the effect of a 6-week Bequine dance on balance in Thai fall risk-elderly. **Study design:** Experimental research, pretest-posttest one group design was set at Faculty of medicine Ramathibodi hospital. **Participant:** are Thai elderly aged 60 or older with history of fall and gait instability in the previous year. **Methods:** A 3-minute Bequine dance with simple balance exercise was set as 2 times per week for 6 weeks. At baseline and 6 weeks, participants were tested in their balance by Single-Leg Stance Test with eyes open and close (SLST-EO and SLST-EC), Berg balance Test, Timed Up and Go Test (TUG) and gait velocity were measured. **Results:** Fifteen elderly with mean age (standard deviation) of 79 (7.5) were recruited. The SLST-EO [median (interquartile range (IQR))] of right, left leg for pre and post training were [2.0 (0.6-9)], [1.9 (0.9-9.1)] and [2.5 (0.8-13.3)], [1.5 (0.6-10.1)] s, respectively. The SLST-EC [median, IQR] of right and left leg for pre and post training were [1.2 (0.4-8.8)], [1.2 (0.4-4.8)] and [1.2 (0.3-4.5)], [1.5 (0.6-3.4)] s, respectively. TUG, gait velocity [mean (standard deviation)] of pre training were [13.92 (2.88)] s, [0.93 (0.16)] m/s and post training were [11.80 (2.70)] s, [1.04 (0.19)] m/s, respectively. Berg balance scale [median, (IQR)] for pre and post training were [46 (36-54)] and [50 (41-55)], respectively. There were improvement of Time Up and Go test, gait velocity and Berg Balance Scale ($P<0.05$) but no significant difference in Single Leg Stance Test. **Conclusion:** A 6 week, twice weekly, Bequine dance with simple balance exercise is able to improve dynamic balance and gait velocity in Thai fall risk elderly.

PA777

Reliability of Isometric Trunk Strength Measurements in Chronic Low Back Pain Patients Older than 60 Years

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Introduction/Background: So far no comprehensive reliability study on isometric trunk muscle strength in chronic low back pain (cLBP)

patients older than 60 years was performed. This study sought to investigate these short and long term reliabilities, to compare them with those from younger patients, and to test whether patients' anticipatory feelings, motivation, and pain affect the reliabilities. *Material and Methods:* 210 otherwise healthy cLBP patients were referred to the outpatient rehabilitation clinic. 61 older (37 females; 60-90 years), 76 middle age (44 females; 40-59 years), and 58 younger (31 females; 18-39 years) patients completed Avoidance Endurance Questionnaire and performed isometric trunk extension, flexion, and rotation right/left strength testing, with repetition after 1-2 days (short term) and after 6 weeks (long term). Absolute and relative reliabilities were calculated for groups from days 1 to 2, 1 to 3, and 2 to 3. Mixed ANOVAS with a median split to divide groups with high from those with low scores of positive and negative feelings, motivation, and pain were used to test for the impact of these factors on reliabilities. *Results:* 195 patients completed all testings. Patients older than 60 years revealed no short or long term changes of the mean extension scores. In contrast the youngest patients showed significant changes of the means short (day 1 to 2) and long term (day 1 to 3) in all extension, flexion, and rotation scores but none from day 2 to 3. The smallest real difference relative to the means (SDR%) was lower from day 2 to 3 than from day 1 to 3 in the testings of all age groups. Extension strength scores revealed highest absolute reliability indices (smallest real difference and standard error of measurements) and intraclass correlation coefficients (ICC_{2,1}) were lowest in rotation. There was no relevant impact of feelings, motivation, or pain to the reliabilities of measurements in all ages. *Conclusions:* Findings of this study suggest a second short term strength test after 1-2 days for baseline evaluation of cLBP patients of all ages before treatment to compensate for learning effects and improve the long term precision of measurement results.

PA778

Half Squat for Older Adults and its Relationship with Balance Ability and Walking Parameters

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Introduction/Background: During aging process, it is common much deterioration in number of musculoskeletal and sensory systems that affect balance and walking. This current study was conducted to detect of relationship between half squat (HS) with balance and walking parameters in older adults. *Material and Methods:* A total of 78 active older adults (55 Males; 23 Females) were included. The mean age of the participants was 75, 07±6, 2 years. All participants were evaluated using the following tests; half squat (HS), foot print analysis (step length, step wide, stride length, walking velocity and cadence) and the Tinetti Balance & Gait Assessments. *Results:* Significant moderate positive correlation between Tinetti Balance & Gait Assessments scores, and HS scores was found ($p < 0.01$). Significant moderate positive correlation between HS and walking parameters, except step wide was also found ($p < 0.01$). *Conclusions:* The results of this study indicate that the participants had higher scores in HS showed higher score in terms of Tinetti Balance & Gait Assessments.

PA779

Case Method Teaching through Simultaneous Videoconferencing is an Effective Means of Training Aged Care Staff in Rehabilitation and Restorative Care.

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Introduction/Background: Staff training is a necessary and significant expense. HammondCare, a large rehabilitation and aged care service provider based in Sydney (Australia), has staff widely

dispersed across metropolitan and regional areas. An education program using case method teaching (CMT) was developed and delivered to remote sites, using simultaneous internet videoconferencing. First introduced at Harvard Business School, CMT uses a pedagogy that differs from traditional didactic methods, shifting focus to active participation in learning. This encourages participants to develop new cognitive frameworks, immediately relevant to clinical practice. *Materials and Methods:* Staff were initially surveyed about perceived knowledge gaps, as well as barriers to accessing ongoing education. Using survey data, a curriculum was developed featuring relevant clinical case studies. Internet videoconferencing was used at eight sites across two Australian states, connected to a primary delivery site in Sydney. The program ran over two years. Before each session, staff received relevant clinical materials and the case study for discussion. Sessions commenced with a 30 minute clinical presentation by an invited relevant expert, followed by a 60 minute case discussion facilitated by a rehabilitation physician. Evaluations were completed at the end of each session. Separate focus groups were conducted for qualitative program review. *Results:* To meet identified knowledge gaps, session topics included: frailty and fractures; pain assessment and management; strokes, dementia and cognition; lower limb amputation; and providing the best interdisciplinary care late in life. Travel time and distance were identified as primary barriers to staff education. Program evaluation found that staff engaged well with the CMT format, and sessions met predetermined learning objectives in the four areas of: knowledge; skills; attitudes; and behaviours. This carried over to the workplace, with staff reporting that they were better equipped to identify and implement desirable work practice change within their interdisciplinary teams. Qualitative data from managers validated staff reporting. *Conclusion:* Staff surveys can inform the development of relevant teaching materials that address identified knowledge gaps. Provision of interactive teaching into participants' workplaces via videoconferencing reduces barriers to ongoing education. Engaging staff through CMT can assist in the translation of knowledge into practice.

PA780

Mobility Disorders in Elderly – Fall Prevention and Vitamin D3 Levels

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Introduction: Among common problems in elderly people, falls and impairment of movement are the most studied. Ensuring a safe and healthy environment for elderly is one of the most important factors. This not only prevents the onset of disease, but also promotes a healthy lifestyle, the key-point in the concept of "healthy-ageing". The risk of falling increases due to environmental risks, taking drugs, vision problems, disorders of muscle strength and balance system. The absence or deficiency of vitamin D is common in older people and leads to secondary hyperparathyroidism, bone loss muscle weakness and osteoporotic fractures. *Material and Methods:* We have analyzed the level of vitamin D3, mobility and muscle fatigue for three groups of patients: the first group included patients with chronic muscle weakness and impairments in walking; the second group included the patients after hip arthroplasty; the third group included patients with degenerative hip arthrosis before hip arthroplasty. The patients were admitted in the Rehabilitation Department in the Clinic CF Hospital Iasi, Romania, EU. *Results:* The results showed correlations between the level of vitamin D3, age, sex, nutrition/life style, social condition and quality of life. This hexalic analysis predicts that each case has its own particularities and prevention of falls and muscular weakness can be correlated with the metabolism of vitamin D3 (active metabolite). *Conclusion:* Falls and muscle weakness are common for elderly people. This induces orthopedic conditions that require high cost treatments. Primordial prevention for these cases involves checking the level of vitamin D3 and supplemental vitamin D3 by mouth to achieve the optimum serum level activity.

The ultimate goal of rehabilitation for the patients with hip arthroplasty is returning to normal life levels. *Keyword:* falls, elderly, vitamin D3, hip arthroplasty *References:* 1) Bradley S.M., *Falls in Older adults*, Mt Sinai J Med., 2011 Jul-Aug, 78: 590 to 5. doi: 10.1002/msj.20280. 2) Wang Y, DeLuca HF, *Is The Vitamin d receptor found in Muscle*, 2011 Feb, 152 (on the 2nd): from 354 to 63. 3. WHO Global Report on Falls Prevention in Older Age.

PA781

Case-Control Study of Interdependence between Knee Osteoarthritis and BMI

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Introduction: Osteoarthritis is the most common disease of joints in adults around the world, approx. 10% of the adult population. The frequency of knee osteoarthritis continues to accelerate with whole endogenous and exogenous risk factors for osteoarthritis, like age, but especially because of the increasing of obesity in population in the age over 60 years. Grotle et al. found a significant dose-effect relationship for overweight (BMI >30) as a risk factor for knee osteoarthritis. *Materials and Methods:* We have attended patients with clinically significant osteoarthritis of the knee. These patients have been treated in clinic for PMR during 1/2013 to 9/2014. All of them have been under strictly controlled obesity treatments for some period during past 5 years. Parameters which have been controlled are as follows: age and sex, pain (visual pain scale – VAS), range of movement/walking, activities of daily living measure (Lequesne index), Q.P.F., getting in/out of a car, shopping, putting on/taking off socks, rising from bed, lying in bed, getting in/out of bath, sitting, getting on/off toilet, heavy household duties, BMI index and weight changes (losing). Measuring check-points: before therapy and physiotherapy for knee osteoarthritis and after 3 month. *Results:* Patients observed: 43 patients, ages; 64 and 70 years, sex: 22 women and 21 men. Two groups: group I (BMI 25-30), group II (BMI over 30). Lost weight goals -5 kg. Treatments: exercise therapy, stretching/walking, magnetic and electroanalgesic pain management. Three month later (after the beginning of treatments): range of movement improved for average 20%; Lequesne index improved in group I average 19%, and improved in group II average 14%. *Conclusions:* After this study we can conclude: elderly persons' losing 5 kg weight and making regular exercise plus physical therapy knee OA would decrease in average 18% in the group with initial BMI 26-30 and 14% in the group with initial BMI 30 and more. Lowering BMI leads towards less suffering of osteoarthritis (by Lequesne index). *Reference:* Lequesne M Mery C et al. Indexes of severity for osteoarthritis of the hip and knee. Scand J Rheumatology. 1987; Supplement 65: 85-89.

PA782

The Effect of Elastic Knee Sleeve with Compressive Taping on Balance Control Ability in Patients with Knee Osteoarthritis

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Objective: Knee osteoarthritis is the common joint disorder among elderly people. Balance is a complex function of numerous neuromuscular processes which include sensory, motor, and integrated components. Various deficits in neuromuscular performance have been suggested as important processes in OA. Impairment of knee proprioception has consistently been related to individuals with knee OA. Wearing an knee sleeve for knee OA patients is important for their balance, however the underlying mechanism of bracing effects are unclear. The purpose of this study is to investigate the effect of elastic knee sleeve with compressive taping on static balance ability in knee OA patients. *Methods:* All recruited sub-

jects experienced knee pain and were diagnosed with knee OA. They all met the criteria of the American College of Rheumatology for knee OA. Elastic knee sleeve with compressive taping (MVR korea products) were used for knee balance in this study. The balance control abilities of the subjects were assessed using tetra-ataxiometric posturography system Tetrax(Sunlight Medical Ltd.). Eight different postures (NO, NC, PO, PC, HR, HL, HB, HF) were evaluated for the test and each posture was measured for 32 seconds. A total of 20 patients were recruited. All subjects were performed Tetrax posturography before and after wearing elastic knee sleeve with compressive taping. For postural variable factors, the stability index (ST), Fourier index, weight distribution index (WDI), and the synchronization index (SI) were measured. *Results:* When comparing the postural variable factors, ST and WDI in 4 and 5 postures (NO, NC, HR, HL/NO, NC, HR, HL, HF) were lower in wearing elastic knee sleeve than without elastic knee sleeve. (P<0.05) But, Fourier index and SI score were not yet able to find statistical significance. *Conclusion:* This study indicates that knee OA patients wearing elastic knee sleeve with compressive taping better balance abilities in stability index, weight distribution index than those without knee sleeve. We suppose that elastic knee sleeve with compressive taping can improve the balance of knee OA patients in static conditions. The limits of this study, there are not a large number of patients included.

PA783

Six-Minute Walk Distance Predicts the Readmission due to Decompensated Heart Failure in Elderly Patients with Chronic Heart Failure

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Background: Patients with chronic heart failure (CHF) are frequently readmitted to the hospital. Six-minute walk distance (6MWD) is a clinical measure to assess their exercise capacity and prognosis. However, few reports documented whether the 6MWD can assess the exercise capacity and prognosis in CHF patients. *Purpose:* The purpose of this study was to investigate whether the 6MWD measured at the hospital discharge predicts the readmission due to decompensated CHF in them. *Methods:* Patients who were admitted to the hospital were prospectively followed up for 3 years after the discharge, if they had the first hospitalization due to CHF with NYHA III or IV. Consequently, we studied 177 patients (73.7±6.3 years old, 112 males) and investigated their 6MWD at the discharge and readmission over 3 years. We determined significant factors affecting the readmission due to CHF and their cut-off values middle-age, early elderly and late elderly groups using multivariate logistic regression analysis and the area under the receiver operating characteristics (ROC) curve. *Results:* Of 177 elderly patients, 83 were readmitted within 3 year after the discharge. The multivariate logistic regression analysis detected the 6MWD at the discharge as a significant limiting factor for readmission (P<0.001). The ROC curve showed that the elderly CHF patients' cut-off value of 6MWD was 375 meters. *Conclusion:* This study demonstrated that the 6MWD was the strongest predictor for readmission due to decompensated CHF in patients of CHF. The predictive cut-off values of elderly patients of CHF 6MWD was 375 meters.

PA784

Gender Differences in Intra-Limb Coordination While Walking in Older People

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Introduction/Background: Knowledge about gender differences in intra-limb coordination (ILC) during walking provides insight

into the adaptability of central nervous system (CNS) for controlling gait in older adults. *Materials and Methods:* We assessed the variability and phase dynamic of the ILC in older men and women during walking. Twenty two older people (11 female and 11 male) participated in this study. They were asked to perform walk on a treadmill at their preferred speed. Deviation phase (DP) and mean absolute relative phase (MARP) values -indicators of variability and phase dynamic of ILC, respectively- were calculated using the data collected by a motion capture system. We used independent sample *t*-test for statistical analysis. *Results:* The results showed that women had a significant higher DP in pelvis-thigh inter-segmental relationships on both sides ($p < 0.05$). Additionally, the MARP of left pelvis-thigh, thigh-shank and shank-foot were significantly different between men and women ($p < 0.05$). While women showed a lower MARP in pelvis-thigh, men had a lower MARP in shank-thigh inter-segmental relationships. *Conclusion:* We suggest that gender could affect the ILC variability and phase dynamic during walking in older people. This may be a reflection of the great adaptability of the neuromuscular system to modify control strategies for walking in older women and men.

PA785

Rational Prescribing in an Acute Inpatient Rehabilitation Facility: Findings from a Three Year Quality Improvement Project

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Introduction: Polypharmacy and inappropriate prescribing are associated with increased rates of mortality and morbidity. Vulnerable populations include the elderly and those with complex medical issues. Physical and Rehabilitation Medicine (PRM) physicians manage an array of symptoms utilizing diverse medications with a spectrum of side effects. Practitioners of PRM would benefit from proven strategies to reduce polypharmacy and promote rational prescribing. *Materials and Methods:* The goal of this prospective three year quality improvement (QI) project is to improve rational medication prescribing at an Inpatient Rehabilitation Facility through an education intervention with physicians and pharmacists. Medications for patients age 65 and older were examined with the Medication Assessment Tool (MAT) to identify Potentially Inappropriate Medications (PIM) based on the 2012 Beers Criteria, the Anticholinergic Burden Scale (ACB), and medications associated with Emergency Department visits (ED meds). Residents, attending physicians, and clinical pharmacists discussed PIMs in weekly pharmacy rounds, which included the MAT. The main outcome measures were: 1. Prescribing practices before, during and after the implementation of the educational initiative. - total number of medications, PIM's, the ACB score, and the ED meds. While this abstract contains the pre-intervention and 47 of the projected 100 post - intervention patients, final data will be available at the Congress. *Results:* Analysis on 47 patients was conducted and compared to data collected pre-intervention (n=127). Total number of medications decreased from 12.8 (± 4.9) to 11.7 (± 4.7), but did not reach statistical significance ($p=0.22$). The number of PIM's decreased from 3.89 (± 2.12) to 1.80 (± 1.85), which was statistically significant ($p < 0.001$). The ACB score decreased from 1.70 (± 1.73) to 1.49 (± 1.78), which was not statistically significant. *Conclusions:* Finding support the use of pharmacy rounds in conjunction with the MAT to reduce the number of potentially inappropriate medications for patients age 65 and older. Further research is needed. *Reference:* Geller AI, Nopkhun W, Dows-Martinez MN and Strasser DC. (2012) Clinical Review: Current Concepts - Polypharmacy and the Role of Physical Medicine and Rehabilitation PM&R 2012; 4: 198-219.

PA786

Relationships between Toe Grip Strength, and Dynamic Balance and Functional Mobility in Community-Dwelling Elderly Japanese Individuals

J Rehabil Med Suppl 54

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Background: Toe flexor function was found to be associated with dynamic balance and functional mobility. However, toe flexor function, such as toe grip strength (TGS), was previously measured in different ways. Therefore, few studies have demonstrated an association between toe flexor function measured in a way that could be standardized, and dynamic balance and functional mobility. The present study investigated the relationships between TGS measured using a toe grip dynamometer, which has broad utility in clinical practice, and dynamic balance and functional mobility in community-dwelling elderly Japanese individuals. *Materials and Methods:* The study included 721 community-dwelling Japanese individuals aged 60–79 years (men, n=197; women, n=524; mean [standard deviation] age, 67.2 [4.4] years). This cross sectional study measured TGS, isometric knee extension strength (IKES), functional reach (FR) as an evaluation of dynamic balance, and Timed Up & Go test (TUG) as an evaluation of functional mobility. TGS was measured using a toe grip dynamometer (T.K.K.3362; Takei Scientific Instruments, Niigata, Japan). To assess the relationships between FR and TUG, and TGS and other outcome measures, we calculated Pearson's correlation coefficients. Additionally, we conducted a stepwise multiple regression analysis to investigate whether TGS was associated with FR and TUG independently of sex, age, height, weight, and IKES. The variables with significant correlation in the Pearson's correlation analysis were used as explanatory variables. The significance level was set at 5%. *Results:* The mean TGS was 10.1 (4.8) kg; FR, 36.1 (5.6); and TUG, 5.6 (0.8) s. In the Pearson's correlation analysis, FR was significantly correlated with age, height, weight, IKES, and TGS, and TUG was significantly correlated with age, height, IKES, and TGS. In the multiple regression analysis, FR was significantly associated with sex, height, weight, IKES, but not with age and TGS, and TUG was significantly associated with age, weight, IKES, and TGS, but not with sex and height. *Conclusions:* TGS was associated with TUG independently of sex, age, height, weight, and IKES (functional mobility), but not with FR (dynamic balance). The findings of this study may help improve functional mobility through physical therapy. Exercises for enhancing TGS may help improve functional mobility.

PA787

Complex Assessment and Outpatient Rehabilitation in Elderly Females with Painful Knee Osteoarthritis

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Introduction: In elderly females, painful knee osteoarthritis (PKOA) is often associated with synovitis. This inflammatory process of the surrounding synovium has been associated with the degree of knee pain and the predicted progression of cartilage loss. The purpose of our prospective study was to establish the clinical, ultrasound and functional aspects in elderly females with PKOA and to evaluate the correlation between clinical, ultrasound and functional parameters before and after outpatient rehabilitation program (included hyaluronic acid treatment). *Materials and Methods:* 36 elderly females with OAK were complete examined. Follow-up evaluations (clinical, sonographic and functional) were performed on the day after the last hyalgan injection and 8 weeks later. Measured outcomes were the distance walked in 6 minutes (6MWD) pain index assessment (Visual Analogue Scale) and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain, stiffness and physical function subscales. The outpatient rehabilitation program included sub maximal aerobic exercises, ADL activities and mobile knee orthosis. *Results:* All females were accomplished with the outpatient rehabilitation. By 8 weeks, WOMAC scores and average 6MWD had significantly improved. The association between knee synovitis and joint effusion was highly significant. Multivariate analysis showed

that inflammation seen by US correlated statistically with clinical and functional parameters (6MWD, VAS and WOMAC sub-scale scores). *Conclusion:* Synovitis and effusions are common in PKOA. Ultrasound exam is necessary for assessing periarticular and intraarticular abnormalities. The outpatient kinetic program associated with intra-articular hyaluronic acid in elderly females with PKOA can relieve pain, improve function, and alleviate joint destruction by changing the complex inflammatory joint process.

PA788

Development of Health Enhancing Exercise Program for Physically Handicapped Persons and Participants' Pulmonary Function

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Introduction/Background: Few adequate community-based health-enhancing exercise programs for physically handicapped persons and others dependent on care are available. We have developed a 10 minute exercise program aimed at: (i) maintenance and improvement of pulmonary function for prevention of pneumonia; (ii) relief of dependent edema; (iii) prophylaxis against stiff shoulder and lumbago; and (iv) maintenance of joint function. The purpose of this study was to evaluate the effects of the program, particularly on participants' pulmonary function. *Materials and Methods:* Pulmonary function, foot swelling, and symptoms of stiff shoulder and lumbago (visual analog scale [VAS]) were evaluated twice a year and the findings compared between two groups, namely wheelchair users (13 subjects; W/C group) and ambulant persons (43 subjects; AP group). Findings were also compared at initiation of the program, 3 months, and 6 months in the W/C group (8 subjects). *Results:* There were no significant differences between the groups in sex, age or height. There were significant differences between them in the number of hours working on computers, %forced vital capacity (%FVC; %), % forced expiratory volume in 1 second (%FEV1.0; %), and %peak expiratory flow (%PEF; %) (all $p < 0.05$). For time spent sleeping, PEF (L/sec), and VAS for stiff shoulder (3.2, and 1.8, respectively), the differences between the two groups were nonsignificant (all $p < 0.10$). For the W/C and AP groups, time per day in wheelchair working and time spent sleeping, were 10.2 and 0 (h) and 7.5 and 6.8 (h), respectively. The %FVC, %FEV1.0, and %PEF for the W/C and AP groups were 64.9% and 79.2%, 77.9% and 100.5%, and 62.6% and 88.5%, respectively, all of which are significantly lower for the WC than the AP group ($p < 0.05$). In the W/C group, the initial PEF (L/sec) and that at 3 and 6 months were 3.59, 3.79, and 4.56, respectively: the PEF was significantly greater at 6 months than at initiation of the program ($p < 0.05$). *Conclusion:* Values of %FEV1.0 and %PEF for the aspects of pulmonary function that relate to cough were low in the W/C group. Community-based health-enhancing exercise programs to maintain or improve pulmonary function of physically handicapped persons should be further explored.

PA789

Multimodal Training Intervention – an Approach to Successful Aging

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Introduction/Background: Research has confirmed that physical activity can play a meaningful role in decreasing impairment characteristics of old age. Multimodal training interventions (6-MTI) are of special interest for older individuals, because of their high rate of disability, functional dependence and use of healthcare resources. *Material and Methods:* The aim of this study was to examine effects of a 6 month multimodal training intervention and nutrition and health counseling on elderly people, 71–90 years of

age. The aim was also to evaluate at 6 and 12 months follow-up the effects and sustainability of the intervention. The 6-MTI consisted of daily walking and twice-a-week strength training. The design was a randomized-controlled crossover with four 6-month phases: Baseline assessment, intervention compared with controls, cross-over-phase with intervention by control group and an additional 6-month follow-up. *Results:* The main results concerning physical activity at baseline showed that most of the participants did little physical activity with regard to international recommendations. The results from the dynamic balance were similar. In both these tests the results were maintained for at least one year after the intervention. Changes in body composition, such as BMI and fat-mass changed for the better at the end of the intervention. An increase was also seen in total lean mass, but in the control phase, the lean mass decreased back to baseline and the total fat mass increased at the same time. A decrease was seen in the cardio metabolic factors, waist circumference, systolic and diastolic blood pressure, after the intervention. *Conclusion:* The study shows how important it is to pay attention to the health status of older adults. The research points to the benefit of multimodal training intervention that consists in daily physical activity in form of walking and resistance training twice a week. The research outcome shows clearly that older adults can obtain multiple benefits by participating in systematic physical training where frequency, duration and intensity are well organized. One can assume that training of this sort, as organized in the study, can prevent premature impairment of mobility, work against cardio metabolic risk factors and maintain the quality of life of older adults.

PA790

Analog and Interactive Tests for Training of Selective and Sustained Attention in Older Adults

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Background: Studies expose the inevitable, gradual and progressive general aging of the human being and evidence how attention as a specific cognitive ability entering in deteriorating. Since attention is conditioned by the quality of the stimuli, and theories like Puigs (2001) have demonstrated the ability to recover losses through proper training, particularly in indicators of attention and Aguerre and Bouffard (2003), show that executive functions are not only preserved, but can be improved at any age; cognitive training experience where design where the adult uses an analog and digital interface, developed from the mental disaggregated of using of a technological device. The test is configured to perform basic troubleshooting, using semantic and figurative elements that stimulate selective and sustained attention, and memory. *Materials and Methods:* The research is qualitative for the research on design, where all designed it is a pretext to collect data, by using comprehensive approaches on created experiences. In addition to the assessment protocols, accompanied by ethnographic and narrative techniques based on deep observation. The co-design stage, was performed by experiences of use on an applied prototype to a population consisting of six adults over sixty years, six designers, two therapists work with seniors, and six digital natives who contributed to the adjustment of the design from therapy interests. *Results:* Given the conditions of the study population and under the guidance of ethnographic research, the statistical sample was determined by convenience. Currently the studio is developing fieldwork in Colombia with a group of 15 people over 60 years and a group of 13 elderly people in the city of Mexico, who attend elderly care centers who have signed the protocols of informed consent to participate in activities within the framework of a doctoral research addresses broader issues. *References:* 1) Aguerre C., Bouffard L. Le vieillissement réussi: Théories, recherches et applications cliniques. 2003. Revue Québécoise de Psychologie. 24 (3): 107-129. 2) An effective instrument in preventing cognitive impairment of institutionalized elderly: The preventive program psychostimulation (PPP). Rev Mult Gerontol 2000; 10(3): 146-151.

PA791

EMG Activity of Masseter Muscles According to Rheological Properties of Solid Foods in the Elderly*D.-K. Kim¹, A. J. Kang², H. S. Park¹, K.-H. Park¹, S. H. Kang², K. M. Seo²¹Chung-Ang University, ²Chung-Ang University, College of Medicine, Seoul, KR

Introduction: The purpose of this study is to compare the EMG activities of masseter muscle in accordance with the rheological properties of solid foods in the young and the elderly. **Subject:** 15 elderly and 15 young people who had not have significant past medical history that might affect the function of mastication or swallowing were enrolled. The average age of the elderly group was 76.65±3.48 yrs and that of the young group was 26.56±3.21 yrs. **Methods:** On the upright-seated position, subjects were asked to take the test foods that were prepared for this study. 3 types of solid foods (cooked rice, meat, carrot) were processed as graded hardness. The properties of each food were categorized as grade1 (5x103 N/m² hardness), grade2 (2,104 N/m²), grade3 (5x104 N/m²) and grade4 (5x105 N/m²) and 8 g of each types of food was prepared. 8 channel sEMG device (LXM5308®, Laxtha, Korea) was used for taking masseter activity from the food ingestion point of oral cavity to swallowing the each bolus of the test foods. **Results:** All the suggested results are normalized value from MVC. Peak amplitude had positive correlation according to the grades of rice, meat and carrot in the both groups and it was statistically significant (p<0.05). RMS showed same tendency of positive correlation according to the stages of rice and carrot in the young and rice in the elderly (p<0.05). When we compared sEMG activity of same hardness grade between the foods, there was no statistical difference in the young and elderly group. In the comparisons of the young and the elderly, normalized peak amplitude during whole mastication showed that the mastication of each food in the elderly needs higher percentage of muscle activity than the young and this tendency was significant in the rice grade 1, 2, 3, meat grade 1, 3, and carrot grade 1, 2, 3. (p<0.05). **Conclusion:** sEMG activity of masseter muscles were correlated to hardness of the foods. The elderly required higher chewing force ratio than the young for the same hardness grade of all three foods.

PA792

Care Home Research: Problems and Limitations*J. Mamo¹, J. Gladman²¹Solent NHS, Southampton, ²University of Nottingham, Nottingham, GB

Introduction: There is very limited research carried out in care home populations because of the challenges this particular population presents. Our objective was to analyse the experiences and challenges experienced by researchers conducting research in care homes to assist in the identification of procedures and conditions used to facilitate future research in these settings. **Data Collection:** Face-to-face interviews with the seven healthcare and allied clinical professionals, who had conducted research as part of a post-graduate degree, over a five year period through the University of Malta. **Data Analysis:** Interviews were recorded on digital recorders and transcribed verbatim. Integrative Phenomenological Analysis was used as an analysing technique to identify major categories and subcategories. **Results:** The challenges experienced by the researchers included appropriate sampling of participants, obtaining informed consent, involvement of staff and relatives, obtaining funding, and issues with publication. Main issues included capacity issues, staff involvement and interview techniques. Consent rates and resident involvement were less evident in the Maltese research with participations rates in excess of 97%. **Conclusions:** Lessons learnt from this analysis included involving staff members in the research projects wherever possible; arranging pre-interview sessions and ensuring an in-depth knowledge of internal care home politics (both internal and external) prior to commencing

any research project in a care home. Seemingly overwhelming issues such as care home politics, a “small island syndrome” (secularism of small tight-knit communities) and knowledge of care home research culture are important for future researchers to consider when preparing research methodology for a project in care homes. It is hoped that the experiences of this analysis will assist in improving future endeavours of care home research in small communities both locally and abroad.

PA793

Pausing Before Ascending a Step During Walking: Effects on Standing Balance after Ascending

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Introduction/Background: In community living, it is common to encounter an elevated surface during walking, such as a pedestrian walkway. While young adults typically climb up the step directly, older adults can often be observed to deliberately come to a pause before ascending. This study sought to investigate how having a pause would affect the standing balance immediately after ascending a step stool in older adults. **Material and Methods:** A total of 23 healthy older adults participated in this study and were instructed to walk and then directly step up onto a 9 cm (LOW) or 18 cm (HIGH) step stool which was placed 6 m from the starting position (noPAUSE). In a second condition, subjects were instructed to walk and then pause briefly in front of the stool to stabilize themselves, and then step up onto the step stool (PAUSE). The subjects were instructed to stand quietly after stepping onto the step stool for both conditions. An accelerometer with a sampling rate of 148 Hz was placed at the spinous process of the 3rd lumbar vertebrae to estimate the acceleration of the body's center of mass in the anteroposterior (AP) and mediolateral (ML) directions. The range, root-mean-square (RMS) and standard deviation (SD) of the acceleration in four consecutive 0.25 sec periods during quiet standing immediately after both feet contacted the step stool were analyzed using multivariate repeated measures analysis of variance. **Results:** The results showed that the acceleration decreased markedly after the first 0.25 s period and was significantly smaller in LOW than HIGH. For both LOW and HIGH, PAUSE had significantly smaller ML acceleration in the first period, compared to noPAUSE. The between-task differences in later time periods or the AP direction were nonsignificant. **Conclusion:** Pausing before ascending a step could improve the control of the mediolateral balance shortly after step ascent, and may be included in safety education for older adults. Furthermore, since the effects were not significant in the AP direction, older adults who habitually adopt such a strategy should be advised to pay special attention to balance control in this direction.

PA794

On Question of Geriatric Disability Rehabilitation: a System for the South East Asian Zone*D. Ghosh¹, T. Datta²¹West Bengal State University, ²West Bengal University of Health Sciences, Kolkata, IN

Introduction/Background: The South Asian developing nations are experiencing a trend towards ageing of population (UNESCAP, 2013). Unlike the developed world, this is a relatively recent phenomenon for poorer countries. However, greater longevity has seldom been associated with good health but with long years of disability and dependency. The disability prevalence rate for both severe (12.6%) and moderate (46.2%) disability here has been greater than the world average of 10.2% and 35.9%. This study proposes a system suited for the South-East Asian zone that would go beyond the standard IRH and SNF models. **Material and Method:** To identify the strongest determinant affecting the wellness of the geriatric disabled, a survey was conducted at Kolkata, an Indian mega polis. The first stage sample was drawn from the database of 30 physicians (six

each practicing across five zones). Every third geriatric patient was short-listed (n=84, range=20). On the basis of their activity daily living status (ADL), respondents with ADL<7 (n=32, range=18) were identified as geriatrics with induced disability, while respondents with ADL >7 (n=52, range=20) constituted the control group for the study. The sample with ADL <7 was interviewed and their response on WHOQOL-BREF questionnaire was recorded. The team constituted in four domain Medical, Awareness [family and community], Rehab support and follow-up/sustainability with continuous check up. **Results:** The overall quality of life was low for both groups, lower still for geriatric disabled (always below the mean mark of "neither poor nor good." The F-test (F=38.830) indicated significance of the model at the lowest level of significance. For the sample groups with geriatric disability t-test values were statistically significant 0.0000 (p<0.01) for both physical and environment domains, while statistically significance at 0.000 (p<0.01) was recorded for physical and psychological domains for the control group. **Conclusion:** Improvements in both medical and rehabilitative care have helped to reduce prevalence of old age disability, but it comes with a substantive price in demands for both medical and rehabilitation care which in India. Proposed model established comprehensive geriatric assessment and sustainable support in rehabilitation with affordable cost.

PA795

Effect of Intermittent Normobaric Hypoxia on the Health Status in Older People

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Physical exercise, especially aerobic training, improves physical performance and cognitive function of older people. Furthermore, it has been speculated that age-associated deteriorations in physical performance and cognitive function could be counteracted through exposures to passive intermittent normobaric hypoxia. Thus, the present investigation aimed at investigating the effect of passive intermittent normobaric hypoxic stimulation combined with subsequent aerobic training on hematological parameters and aerobic physical performance (VO_{2max}) as well as peripheral blood protein levels of the neurotrophin brain-derived neurotrophic factor (BDNF) and cognitive function. 34 older participants were randomly assigned to an intervention group (IG) or control group (CG). While IG was supplied with passive intermittent normobaric hypoxic stimulation for 90 minutes, CG breathed ambient air and both groups subsequently performed 30 minutes of aerobic training three times per week for four consecutive weeks. Aerobic physical performance and cognitive function was tested with spirometry and the Stroop test. Blood samples were taken to measure hematological parameters and the peripheral plasma BDNF level. Regarding the hematological parameters, we found increases in the number of red blood cells, hemoglobin and hematocrit, within the IG only. However, in both groups, the VO_{2max} and plasma BDNF level did not increase. Nevertheless, we found an augmented and sustainable improvement in cognitive function in IG solely. Based on these results, hypoxic training seems to be beneficial to enhance cognitive function in older people. While increased hematological parameters indicate hypoxic-induced physiological reaction the potential of non-hematological adaptations to improve physiological performance should be investigated in future investigation.

A.6.2. FRAILTY

PA796

Frailty Level and Health-Related Characteristics in Korean Farmers

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Background: Frailty has been a critically important health problem in farmers due to more aged population than Korean standard population. The aim of this study was to estimate the prevalence of frailty and to identify related factors in Korean farmers: Farmers' cohort for Agricultural work Related Musculoskeletal disorders (FARM). **Material and Methods:** Subjects were 1013 farmers (538 women and 489 men; mean age 57.1±7.5 years) participated. Frailty level was assessed by Korean Frailty Index (KFI). KFI score of 5-8 was considered as frail; 3-4, prefrail; 0-2, nonfrail. The health-related quality of life was assessed using EuroQol Five Dimensional Questionnaire index (EQ-5D index: 0-1), and Visual Analogue Scale (EQ-VAS: 0-100). Muscle mass was identified by bioelectrical impedance analysis. **Results:** The prevalence of frailty was 2.8% (1.7% in men and 3.6% in women); the prevalence of prefrailty was 14.4% (11.0% and 17.4%). Relative risk of overall-frailty (frail or prefrail on KFI) was significantly higher in aged 50-59 years (OR 2.06, 95% CI: 1.18, 3.59), and aged 60+ years (OR 2.27, 95% CI: 1.30, 3.97) compared to aged less than 50 years. Regarding the health-related quality of life, overall-frail subjects showed lower scores in EQ-5D index (0.76±0.22 vs. 0.90±0.10, P<0.001) and EQ-VAS (57.26±21.25 vs. 69.87±17.32, P=0.003) compared to nonfrail subjects. After adjustment for age and sex, EQ-5D index and EQ-VAS were significantly lower in overall-frail subjects than nonfrail. Muscle mass (kg) was significantly lower in overall-frail subjects (40.9±7.4 vs. 42.7±7.8, P=0.005); BMI was not significantly different between overall-frail and nonfrail subjects (25.2±3.4 vs. 25.3±3.2, P=0.662). Comparison of muscle mass in each age groups showed that decreased muscle mass in overall-frail was only significant in 50- to 59-year-olds. **Conclusion:** Overall-frailty was identified to be a common problem in the Korean farmers, and a female gender and older age were associated with overall frailty, related to poor health-related quality of life. Signs of frailty were not rare in the middle-aged population and sarcopenia may be more problematic in middle-age frailty.

PA797

Frailty Syndrome – an Emerging Concept

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Introduction: Frailty is a common and important geriatric syndrome characterized by multisystem dysregulations, leading to a loss of dynamic homeostasis, decreased physiologic reserve, and increased vulnerability for subsequent morbidity and mortality. This is often manifested by maladaptive response to stressors, leading to a vicious cycle toward functional decline and other serious adverse health outcomes. The authors provide an overview of the current state of knowledge about the frailty syndrome: its definitions and pathogenesis, as well as potential preventative and therapeutic interventions. **Material and Methods:** A systematic review was performed through an extensive search in the following databases (MEDLINE, The Cochrane Library, Guidelines finder, National Guideline of Clearinghouse) using the keywords frailty syndrome, frail elderly, rehabilitation, frailty scales. Articles written in English, Portuguese and Spanish and published from 2000 to 2014 were included. **Results:** Significant progress has recently been made in understanding the pathogenesis of frailty. Chronic inflammation is likely a key pathophysiologic process that contributes to the frailty syndrome through other intermediate physiologic systems, such as the musculoskeletal, endocrine, and hematologic. Identification of older individuals who are frail or at risk of becoming frail at an early stage, with appropriate subsequent evaluation and targeted intervention aiming to prevent, delay, reverse, or reduce the severity of frailty, and prevent or reduce adverse health outcomes in those whose frailty is not reversible, can improve their health and quality of life as well as utilization of

health care resources. Disability or comorbidity, though distinct clinical entities, are important confounding factors that deserve careful consideration in frailty assessment. Major clinical applications include risk assessment and stratification. Frailty may also be useful for risk assessment in surgical patients and those with cardiovascular diseases, or cancer and as a clinical instrument in the geriatric field. Currently, exercise (including muscle strength and functional mobility) and comprehensive geriatric interdisciplinary assessment and treatment are key interventions for frailty. **Conclusion:** Physical Medicine and Rehabilitation within its interdisciplinary assessment and care team (consisting of physiatrist, gerontologically trained nurses, social workers, and occupational and physical therapists) has a major role in planning effective interventional strategies that would likely have large benefits for elderly individuals, their families, and the whole society.

A.6.4. RISK OF FALLS IN THE ELDERLY

PA798

Falls in Rehabilitation Medicine Clinic: Why Create a Workshop?

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Introduction: The falls, by their incidence, their physical, psychological and social consequences, represent a major issue in public health. Falls are responsible for almost 9,000 deaths per year in elderly aged of 65 and more. In preventing falls and offering rehabilitation, the medical literature holds as an effective intervention the muscle strengthening, the balance exercise and reviewing the patient's treatment. The intervention must evaluate, correct the environmental risk factors using support from an occupational therapist and offer multidisciplinary. **Material and Method:** The aim of our study is to determine the role of a Preventing Falls Cell in the healthcare and rehabilitation of patients at risk of falling admitted in our clinic. The idea of a workshop came as a multidisciplinary and multifactorial intervention that includes the assessment and the correction of the risk factors related to falls. The workshop calls for the association of several rehabilitation professionals such as a physical therapist, an occupational therapist, a psychologist, an athletic trainer and a physiatrist in a Cell for the Prevention of Falls which gathers patients at risk of falling in programmed meetings for discussion and exercise. We focused on the followings: advices for home and polymedication readjustment, correction of environmental obstacles, balance exercise and psychological support. **Results:** Over one year of monitoring, 128 falls occurred among our residents, of which 17 on the technical platform of rehabilitation, 67 in the patient's room, 4 in the lunchroom and 4 in the hallway. We worked on establishing inclusion criteria for the patients admitted in the groups of discussion and exercise, on the prediction of the risk of falling and the implementation of an educative programme for the caregivers and the patients. **Conclusion:** Effective intervention on the environmental risks is performed, as recommended by the High Health Authority in our country. The monitoring of the number of falls in our residents discharged at home is carried on by addressing specific questions by phone at 6 months interval.

PA799

Falls in Portuguese Elderly Might Be Associated with Dual Forms of Malnutrition: Preliminary Results

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In older adults, fall-related injury is a serious public health problem. Inadequate nutrition and falls are both frequently identified in the elderly. However, the nutritional status of older adult fallers is not routinely assessed, and no previous studies were found regarding the nutritional status of Portuguese community-dwelling older adult fallers. The aim of this study is to explore the putative relationship between nutritional status and falls among older adult outpatients. A sample of 30 community-living older adults, aged 65 or more, was recruited from the population followed in the physical and rehabilitation medicine service of a Portuguese central and university hospital. Trained interviewers (MD) administered a standardized questionnaire which included (1) socio-demographic, anthropometric, health and falls parameters; (2) a functional evaluation (Functional Independence Measure (FIM); Grip Strength Test (GST); Fatigue Scale (FS); Activities-specific Balance Confidence (ABC) and Timed Up & Go Test (TUG)) and (3) a nutritional status assessment, which was evaluated using the Mini Nutritional Assessment Short Form (MNA-SF). Participants were men (16.7%) and women (83.3%) aged 70.80±4.72 years old. In the previous year 53.3% have fallen at least once, but only 18.75% of them were hospitalized. Functional evaluation presented the following **Results:** FIM 122.23±8.99; GST 10.27±10.32; FS 30.83±13.35; ABC 71.95±16.13%; and TUG 9.18±2.85 seconds. According to the MNA-SF, 26.70% of participants (n=8) were "at risk" of malnutrition. However, 53.30% of the population were overweight or obese according to their BMI (31.07±3.07 kg/m²). Among those who have fallen, 37.5% were "at risk" of malnutrition and 68.8% were overweight or obese. In this stage of the study the nutritional status seems to present a significant association with both the TUG ($p<0.001$) and FIM ($p<0.01$) tests. Both undernutrition and overnutrition diminish physical capabilities and increase fatigue in older adults, leading to an increased risk of falls in the elderly population. The majority of older adult fallers in this preliminary study were either underweight or obese. These findings suggest that routine nutritional assessment of older adults might be useful as a fall prevention strategy. Further investigation is necessary to assess the benefits of nutritional intervention among older adult fallers.

PA800

Technology Meets Medicine for Falls Prevention

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Introduction/Background: Prevention of falls is important to prevent disability in old people. Municipality of Kifissia in Attica region participates as a pilot implementer, in a European project with distinctive title: I DON'T FALL (Integrated prevention and Detection solutions Tailored to the population and risk factors associated with falls) which aims to develop, implement and evaluate individualized services for old people for the prevention of falls, with the application of physical and cognitive exercise programs, using modern technologies. **Material and Methods:** The Social Welfare (SPC) of Kifissia's municipality implements a clinical trial started in May 2012 involving 500 users across seven pilot sites in four countries. Subjects (fallers or sedentary old people aged all above 65 years), were randomized into 4 groups of 125 subjects (including placebo group) in the form of individual sessions twice weekly of cognitive and/or motor training according to the subgroup to which they were randomized (each one 24 sessions/in 3 months). The principal outcome for the study is reduction of numbers of falls, risk of falling and fear of falling between experimental and control group, together with evaluation of usability of the system and user satisfaction with respect to the applied training program. **Results:** On outcome of fear of falling measured by Falls Efficacy Scale (FES) we found a significant reduction for groups that per-

formed the mixed and motor treatment ($p=0.05$; $p=0.004$) On the outcome of risk of falling measured by Tinetti scale we found a significant reduction for groups that performed the mixed treatment ($p=.04$;) Mobility measured by 6 minutes walking test (6MWT) and cognitive executive functions measured by Trail Making Test part B (TMT B) were generally improved by any kind of treatment ($p=0.06$; $p=0.04$) but not by the placebo. Finally, we observed no changes on global cognition and functional abilities for any condition. *Conclusion:* In conclusion, preliminary analysis suggests that a period of distributed treatment of three months contribute to reduce fear of falling and risk of falling that represent the primary outcomes of the project. Moreover, it contributes to improve motor and cognitive abilities that represent secondary outcomes of the study.

PA801

Early Detection for Old People with Risk of Fall and its Prevention

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Introduction: Falls are one of the most dangerous problems among older people. Approximately 30% of community-dwelling people, 65 years and older have at least one fall each year. A number of studies have been conducted to determine the risk factors associated with falls in older people. The identified risk factors for falls included demographic characteristics. The aim of our study was to identify the risk for fall by old people over 65 years, with assessment activities of daily living. *Material and Method:* The research was made on population of 400 old people over 65 years, who have lived in the capital city Skopje, in urban area. We have used questionnaire with personal data and Berg Balance Scale for assessment of daily activities. The risk for falls was assessment with score of Scale. *Results:* The most of the people 52% were 65-70 years, 40% male and 60% female, with neurological disease comorbidity of 20%. They have middle score of deficit 35%, from maximum function. *Discussion:* Old people from urban towns, in our population, still live in their own home. They have participated in aging association with each commune. In those aging associations with the commune they can organize recreate gymnastic programs with exercises for balance and fall prevention. *Conclusion:* Risk for falls in old people can be recognized and prevent with special exercises for balance and orthoses. *Keyword:* old people, assessment of risk for falls, prevention.

A.7. REHABILITATION ADDRESSING TO SPECIFIC ISSUES

PA802

Patients' Perspectives on Lower Limb Amputation Outcomes

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Introduction: Clinical Practice Guidelines (CPG) are recommendations based on scientific evidence to give information for decision making on health care. As part of the development of a CPG for the rehabilitation and prosthesis' prescription for amputees, a survey was done in order to identify patient's priorities on the outcomes related to prosthetic fitting. These priorities are crucial to develop the guideline, especially when there is scarce evidence to make the recommendations. *Methods:* A cross-sectional study was conducted on 28 people with transtibial or transfemoral amputation, secondary to trauma or vascular disease, between ages 18 and 65 years, that had had a prescription for a prosthesis or a prosthetic component between 2012 and 2014. Patients evaluated the relevance of different outcomes using the GRADE scale (1 to 3 as non-important; 4 to 6 major-non critical and 7 to 9 critical). Possible outcomes were selected from prosthesis adaptation evaluation tools (Trinity Amputation & Prosthesis Experience Scales Revised and Prosthesis Evaluation Questionnaire) and the priorities of the guideline development group. Categorical variables were reported as percentages and continuous variables as averages or medians. A subgroup analysis of Chi² tests was performed. *Results:* The study showed that the most critical complication reported by the patients is stump infection (8 on the GRADE scale). The most important activity is to walk (8 on the GRADE scale). And the main variables that may affect prosthesis adaptation are lesions of the skin of the stump (9 on the GRADE scale). Other critical outcomes reported were quality of life, independence for basic and complex activities, the ease of using the prosthesis and the use of shoes. There were no statistically significant differences on the subgroup analysis. Median satisfaction with the prosthesis was 61 mm (On a 1-100 scale). *Conclusions:* The identification of the priorities and perspectives of patients on prosthesis adaptation and rehabilitation allows us to make recommendations to improve prosthetic fitting and quality of life related to health in the people with amputation. *Reference:* Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach. 2013. <http://www.guidelinedevelopment.org/handbook/>.

Introduction/Background: In recent years, botulinum toxin A (BoNTA) has been used widely to reduce spasticity. Although many studies show the beneficial efficacy of the BoNTA injections for lower limb spasticity in hemiplegic patients, the spasticity was evaluated only at rest. Few reports have evaluated motion in addition to the MAS, and no reports have quantitatively evaluated pes varus during gait following a BoNTA injection. The purpose of this study was to investigate the efficacy of BoNTA injections on pes varus during gait using a three-dimensional motion analysis system. *Material and Methods:* Subjects were 24 chronic hemiplegia who could walk without an orthosis. They showed pes varus deformity getting worse during the swing phase of gait. The average time from onset was 2,075 days. They underwent the injections of BOTOX® (GlaxoSmith Kline, Tokyo, Japan) to their tibialis posterior (all patients), flexor digitorum longus (19 patients), gastrocnemius (13 patients), flexor hallucis longus (6 patients), and soleus (1 patient). The Modified Ashworth Scale (MAS), comfortable overground gait velocity, and the varus angle during treadmill gait by a three-dimensional motion analysis system (Kinema-Tracer®: KISSEI COMTEC) were assessed before, at 2, 6, and 12 weeks after the injection. *Results:* The median MAS score of the tibialis posterior and the ankle plantar flexors at 2 and 6 weeks after the injection and the comfortable overground gait velocity at 2, 6 and 12 weeks after the injection significantly improved from those of before the injection. The maximum varus angle during the swing phase of gait at 2, 6 and 12 weeks after the injection was significantly lower than before the injection. However, two patients experienced pain during gait and their varus angle got worse despite the decrease of the MAS in the follow-up period. *Conclusion:* The BoNTA injection into the tibialis posterior muscle reduced the spasticity and the pes varus angle during the swing phase of gait. To evaluate not only changes in muscle tone at rest but also in motion are important and strongly recommended because improvements in limb function do not always show parallel improvements in muscle tone at rest.

PA803

The Changes in Pes Varus during Gait Following Botulinum Toxin A Injections

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Introduction/Background: In recent years, botulinum toxin A (BoNTA) has been used widely to reduce spasticity. Although many studies show the beneficial efficacy of the BoNTA injections for lower limb spasticity in hemiplegic patients, the spasticity was evaluated only at rest. Few reports have evaluated motion in addition to the MAS, and no reports have quantitatively evaluated pes varus during gait following a BoNTA injection. The purpose of this study was to investigate the efficacy of BoNTA injections on pes varus during gait using a three-dimensional motion analysis system. *Material and Methods:* Subjects were 24 chronic hemiplegia who could walk without an orthosis. They showed pes varus deformity getting worse during the swing phase of gait. The average time from onset was 2,075 days. They underwent the injections of BOTOX® (GlaxoSmith Kline, Tokyo, Japan) to their tibialis posterior (all patients), flexor digitorum longus (19 patients), gastrocnemius (13 patients), flexor hallucis longus (6 patients), and soleus (1 patient). The Modified Ashworth Scale (MAS), comfortable overground gait velocity, and the varus angle during treadmill gait by a three-dimensional motion analysis system (Kinema-Tracer®: KISSEI COMTEC) were assessed before, at 2, 6, and 12 weeks after the injection. *Results:* The median MAS score of the tibialis posterior and the ankle plantar flexors at 2 and 6 weeks after the injection and the comfortable overground gait velocity at 2, 6 and 12 weeks after the injection significantly improved from those of before the injection. The maximum varus angle during the swing phase of gait at 2, 6 and 12 weeks after the injection was significantly lower than before the injection. However, two patients experienced pain during gait and their varus angle got worse despite the decrease of the MAS in the follow-up period. *Conclusion:* The BoNTA injection into the tibialis posterior muscle reduced the spasticity and the pes varus angle during the swing phase of gait. To evaluate not only changes in muscle tone at rest but also in motion are important and strongly recommended because improvements in limb function do not always show parallel improvements in muscle tone at rest.

PA804

Involuntary Movements in Below Knee Amputation Stump***H. Tanikawa¹, H. Kagaya¹, E. Saitoh¹, K. Ozaki², K. Inagaki³, Y. Kanada¹**¹Fujita Health University, Toyoake, ²National Hospital for Geriatrics Medicine, Obu, ³Fujita Health University Hospital, Toyoake, Aichi, JP

Introduction: We present the case of a middle aged gentleman who underwent a non-traumatic transtibial amputation and developed involuntary jerking movements of his amputation stump on the background of phantom limb sensation and pain. Jumping stump is defined as a movement disorder that is usually seen after amputation of limbs. It can present as myoclonic spasm or jerky or tremulous movements. One of the widely accepted, proposed mechanism is that a peripheral deafferentation and loss of afferent information could modify the neuronal circuits resulting in an enhanced motor output and cortical remapping. **Case Report:** A 55-year-old male admitted with right ankle abscess and underwent right transtibial amputation. He had background medical history of hypertension, hyperlipidemia, and gout. Patient had complaints of phantom limb sensation with phantom limb pain. Patient was noted to have involuntary jerking movements of the stump which were noticed to be starting after stretching exercises. Variable frequency of jerking was noted with auto-resolution approximately 30 seconds later. His neurologic examination was normal except the movement disorder. Nerve conduction study revealed normal findings. Gabapentin helped to reduce the frequency of the episodes but not alleviate it. **Conclusion:** The pathophysiology of this jumping stump condition is still unknown. Cortical, peripheral and also spinal mechanisms may play a role. Neuropathic pain is commonly seen in jumping amputation stumps. Peripheral nerve injury may lead to pain. Moreover, damaged peripheral nerves can disturb afferent inputs to spinal cord and cortex, and this might trigger persistent involuntary movements consisting of myoclonus, chorea, tremulousness or spasms.

PA805

Use of Game Console for Rehabilitation of Parkinson's Disease***L. Ozgonenel¹, S. Cagırcı², M. Cabalar², G. Durmusoglu³**¹Istanbul Bilim University, ²Bakirkoy Dr Sadi Konuk Training and Research Hospital, Gunesli Medicine Hospital, Istanbul, TR

Objective: Parkinson's Disease (PD) predisposes to falls due to postural instability and decreased coordination. Postural and coordination exercises could ameliorate the incoordination and decrease falls. In this study, we explored the efficiency of game console as an adjunct to an exercise program in treating incoordination in patients with PD. **Design:** In this single-blind, randomized, prospective clinical trial, rehabilitation with X-box game console was used as an adjunct to standard rehabilitation program. 33 patients with PD at stages 1-3 were enrolled in the study. All patients received the three-times weekly exercise program and electrotherapy to back and hip extensors for 5 weeks. Study patients played catch the ball and obstacle games on Xbox™ in addition to the standard exercise program. Patients were evaluated based on the scores from Up & Go test, Berg Balance Scale (BBS), and Unified Parkinson's Disease Rating Scale-II (UPDRS-II). Post-treatment scores were compared among groups. **Results:** 33 patients were enrolled in the study (15 in game-console group, 18 controls). Patients in both groups had improvements in all scores. The end-of-treatment scores were significantly better in the study group compared to the control group in all parameters: UPDRS (10±5 vs 16±6, p=0.002); BBS (53±4 vs 47±8, p=0.004); and TUG (11±4 seconds vs 20±8 seconds, p<0.001). **Conclusion:** Game-console was noted to be a significant adjunct to the exercise program in patients with PD in this study.

PA806

Punding Behaviour in Parkinson's Disease Is Transiently Reduced by rTMS: a Preliminary Study***M. Christova¹, P. De Blasi², Y. Höller³, F. Tezzon⁴, E. Trink⁵, F. Brigo⁴, R. Nardone⁴**¹Medical University Graz, Graz, AT, ²University of Turin, Turin, IT, ³Department of Neurology, Christian Doppler Klinik, Paracelsus Private Medical University, Salzburg, AT, ⁴"F. Tappeiner" Hospital, Meran, IT, ⁵Department of Neurology, Christian Doppler Paracelsus Private Medical University, Salzburg, AT

Background: Punding is a repetitive, complex, stereotyped behaviour which belongs to the impulse-control disorders (ICDs) and it is associated with dopamine-replacement therapy in patients with Parkinson's disease (PD). Disruption of the reciprocal loops between the striatum and structures in the prefrontal cortex (PFC) following dopamine depletion may predispose patients with PD to these behavioural disorders. The purpose of the present study was to assess the effects of repetitive transcranial magnetic stimulation (rTMS) over the dorsolateral PFC (DLPFC) on punding in PD. **Materials and Methods:** This preliminary study was performed on four PD patients with punding after dopaminergic medication and nine age-matched healthy control subjects. Low-frequency (LF) rTMS was delivered in three series (total of 1.800 stimuli, duration 32 min). Patients and control subjects were given real rTMS to the right DLPFC and the left DLPFC and sham rTMS to the right DLPFC on separate days, with an intersession interval of 4 days. The primary outcome measures were changes in the Punding Scale Score and in scores on the distress subscales of the Obsessive-Compulsive Inventory induced by rTMS. **Results:** Punding was transiently reversed by LF-rTMS over the DLPFC without enhancing motor impairment. The effect was more sustained after right DLPFC rTMS. Therefore, LF-rTMS produced a transient beneficial effect in PD patients with punding, similar to that reported in PD patients with levodopa-induced dyskinesias. **Conclusion:** The modulation of punding in PD patients after long-term dopaminergic treatment via inhibiting the dorsolateral prefrontal cortex with LF-rTMS is probably based on the long-lasting decrease in the motor cortex excitability that might antagonise glutamatergic hypersensitivity by reducing the response of the striatum to glutamatergic excitatory inputs. LF-rTMS over the DLPFC might have therapeutic potential for the treatment of punding and perhaps other ICDs in PD.

PA807

Acoustic Analysis of the Sound Produced by Dysphagia Patients Swallowing Carbonated Drinks***M. Morishita¹, J. Sota², M. Kobayashi², M. Mizutani¹**¹Kibi International University, Takahashi, ²Watanabe Hospital, Shiseikai Medical Corporation, Niimi, JP

Introduction: Carbonated drinks have been reported to promote swallowing movements by stimulating the oral cavity and pharynx. The present study compared the duration of the swallowing sound and pharyngeal retention level when swallowing different volumes of drinks between dysphagia patients and healthy individuals to provide a basis for rehabilitation addressing dysphagia. **Methods:** Eight patients with dysphagia admitted to a hospital (mean age: 79.7±9.1, dysphagia group) and 9 healthy individuals (20.7±0.7, control group) were studied; in the dysphagia group, those with a Modified Water Swallow Test score of 3 to 4 were included. On measurement, both groups swallowed tap water and a carbonated drink of 5, 10, 20, and 30 mL to record laryngeal movements with a strain gauge attached to their laryngeal prominences and analyze sounds during swallowing and the subsequent expiratory phase with a microphone attached to the anterior part of their necks. Through the acoustic analysis, the duration of the swallowing sound and mean amplitude (MAF) and power frequencies (MPF) were calculated. A two-way repeated measures analy-

sis of variance was also performed to statistically compare the dysphagia and control groups with each swallowing volume. **Results:** There was a significant main effect was observed on the durations of the laryngeal movement and swallowing sound, as well as the MPF during the expiratory phase. On multiple comparisons, the durations of the laryngeal movement and swallowing sound were significantly shortened, and the MPF during the expiratory phase was significantly reduced in the dysphagia group when swallowing a carbonated drink compared to tap water at each volume. On comparison between the 2 groups, the duration of the laryngeal movement was significantly longer, and the MAF during swallowing and MAP and MPF during the expiratory phase were significantly higher in the dysphagia group when swallowing tap water. **Conclusion:** The results of acoustic analysis when swallowing a carbonated drink and exhaling after the swallow suggest that such drinks may improve pharyngeal retention levels. Furthermore, compared to tap water, they may also contribute to the shortening of swallowing in dysphagia patients. These findings support the possibility of carbonated drinks being applicable to swallowing rehabilitation for those with mild dysphagia.

PA808

Development and Validation of Virtual Box and Block Test (BBT) and Fugl-Meyer Assessment (FMA) Using a Kinect

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Background: Objective functional assessment in home-based stroke rehabilitation is essential but a rehabilitation specialist has to observe patient's motion. However, Kinect can capture and record the patient's functional data, which can be transformed to functional scores, if specific algorithm is made. We developed the virtual BBT and FMA, and validated their usefulness in stroke patients. **Materials and Methods:** Virtual BBT environment was realized using Kinect and its SDK. Specific hand motion sensing algorithm developed for virtual BBT. For virtual FMA scoring, patients' upper limb motion data during motions in 6 selected items in real FMA were recorded using Kinect. The score was calculated by distance measure of hemiplegic side based on normal side sequence data with weighted combination method of euclidean distance of body joints. Patients with unilateral hemiplegic stroke were enrolled for virtual BBT (n=9, ranges of arm and hand Brunnstrom stage: 4-6) and virtual FMA (n=19, ranges of arm and hand Brunnstrom stage: 0-6). Virtual and real tests were performed in a random order and correlations between real and virtual test scores were statistically analyzed. **Results:** There were strong correlations between the numbers of blocks in real BBT and virtual BBTs in both non-hemiplegic (Pearson's $r=0.904$, $p=0.001$) and hemiplegic sides (Pearson's $r=0.788$, $p=0.012$). Percent ratios [(the number of boxes moved by the hemiplegic side)/(number of boxes moved by the normal side)*100%] in the virtual BBT also correlated strongly with those in the real BBT (Pearson's $r=0.860$, $p=0.003$). However, numbers of blocks moved was significantly less in the virtual BBT compared to those in the real BBT ($p<0.001$ in both hemiplegic and non-hemiplegic sides). Virtual FMA scores were also strongly correlated with real FMA scores (Pearson's $r=0.651$, $p=0.005$). **Conclusion:** Virtual BBT and FMA may be used as useful assessment tools in virtual home-based rehabilitation system. Further validation in the home-based telerehabilitation setting is required and sensory feedback using haptic devices can improve the virtual BBT.

PA809

Early Rehabilitation of Patients after Endovascular Treatment of Spinal Arteriovenous Malformation

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Case Diagnosis: Spinal arteriovenous malformations (AVMs). **Case Description:** The patient S.S. aged 19 was admitted to the Clinic for Neurosurgery KCS for endovascular treatment of spinal AVM. Previous hospitalization was on Emergency department of Neurology for a period of three days due to the rapid onset of paralysis of the right leg with intense numbness of the same leg, and sphincter control disorder. On admission to the Clinic for Neurosurgery: UE finding neat, at LE flaccid plegia of the right leg, hypoesthesia and extinguished MTR, muscle strength left leg 4/5 according to MMT. Placed urinary catheter, unable to stand and walk. During hospitalization underwent additional diagnostics - spinal angiography, which indicated the intradural AVM in the projection of Th11 vertebral body. After two weeks, the patient was embolized with liquid embolism agent. Rehabilitation treatment was initiated preoperatively. After embolization, early rehabilitation immediately continued. On the third day of the intervention, appearance of initial active movements in right leg. After two weeks of intervention, improved strength of the right leg, according to MMT 3/4, except foot - 0, sphincter control set up. The patient had the capacity for independent transfer bed - pilot elevator, and walk the medium long distance. According to the modified Aminoff-Logue scale disability, on admission the score was 8, and at discharge 3. She was advised to continue the rehabilitation treatment of stationary type. **Discussion:** (AVMs) are rare anomalies that make up 10% of all spinal lesion. Although surgical or embolic treatment has improved significantly in the last years, the ambiguity of the symptoms may delay the diagnosis. The potential for good functional outcome is poor, despite prolonged rehabilitation treatment, in late diagnosis. **Conclusions:** Timely and highly sophisticated diagnostics and treatment techniques appropriately selected (in this case- endovascular), with timely and adequately dosed rehabilitation, can lead to a relatively fast recovery with fewer complications.

PA810

Use of Prostheses in Amputees Patients Due to Peripheral Arterial Disease at the Lar Escola São Francisco - São Paulo

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Introduction/Background: Mostly of lower limb amputations occurs in people over 65 years due to vascular causes. Rehabilitation's program for this group of patients aim to recover functional independence for ADL and locomotion, if possible with prosthesis. This can become a challenge, considering the presence of others diseases associated to vascular problems, mainly diabetes and cardiologic implications, that interfere in patients' survival. **Objectives:** evaluate the indication of prosthesis during rehabilitation and the maintenance of their use or abandonment's index after discharge and causes, and the mortality of lower limb amputees due to peripheral arterial disease. **Methods:** retrospective and transversal study done with vascular lower limb amputees patients, transfemoral and transtibial level. Sample was composed from 310 patients (205 men, 105 women, mean age 61.8 years), Transfemoral (142) and Transtibial (150) levels, unilateral or bilateral (18). 217 were fitted with prosthesis and 93 did not. Statistical nonparametric tests with equality of two proportions, confidence interval for mean of 95% e P-value <0.05 were used. **Results:** 195 patients were found and, of them, 151 were fitted with prosthesis and 44 not. Of those that were fitted with prosthesis, 54 still use it, 80 abandoned and 17 died. In the group without prosthesis, 27 were using wheelchair and 17 died. Mortality is statistically higher between patients who were not fitted with prosthesis and 34 death occur, at mean, 3,91 years after amputation. Survival time of patients who were not fitted with prosthesis was smaller than those were fitted. **Conclusion:**

At the Lar Escola São Francisco, fit with prosthesis lower limb amputees due to peripheral arterial disease during rehabilitation is high, but the use's maintenance is small after discharge. Mortality is elevated and precocious, mainly between patients with diabetes. *References:* 1) Dillingham TR, Pezzin LE. Rehabilitation setting and associated mortality and medical stability among persons with amputations. *Arch Phys Med Rehabil.* 2008; 89 (6): 1038-45. 2) Ingham SJ, Chamlian TR, de Souza JM, Stefanini E, Azevedo R, Mussi A, Carvalho AC. Transitory myocardial ischemia in patients with vascular lower limb amputation: relationship with long-term atherothrombotic events. *Am J Phys Med Rehabil.* 2009; 88 (2): 114-8.

PA811

Anxiety and Depression in Lower Limb Amputees Treated at AACD-Lar Escola - São Paulo

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Introduction/Background: Lower limb amputees patients participate in rehabilitation treatments aiming to recover locomotion, if possible with a prosthesis. However, they frequently present symptoms of anxiety and depression, that interfere negatively in the therapeutic programs and reduce their participations in social life. *Objectives:* Evaluate the prevalence of anxiety and depression among lower limb amputees and verify if there is association between these symptoms and the use of prosthesis and also among others variables of quality of life and function. *Methods:* Transversal study done with 61 lower limb amputees (45 men, 16 women mean age 57.2 years) in rehabilitation program with application of Beck's scales of anxiety and depression. Patients were evaluated by age, sex, level, etiology and time since the amputation, number of comorbidities, literacy, Activities of Daily Living and leisure and separated in 2 groups (36 fitted with prosthesis) and 25 (not fitted) with the variables analyzed and compared. The method to analyze the data was done through absolute and relative values and statistical nonparametric tests with equality of two proportions, qui square, confidence interval for mean of 95% e P-value<0.05. *Results:* One patient (1.6%) had severe anxiety, ten patients (16.4%) had light anxiety and 50 (82%) had minimal anxiety (p<0.001). Six patients (9.8%) had moderate depression, seven (11.5%) had light depression and 48 (78.7%) had minimal depression (p<0.001). There was statistically significance association between anxiety and amputation's etiology and Activities of Daily Living and between depression and Activities of Daily Living and stump's pain. There wasn't association between the use of prosthesis and anxiety and depression. *Conclusion:* Anxiety and depression were few prevalent among lower limb amputees patients in this study and there was no influence by the use of prosthesis. *References:* 1) Belon HP, Vigoda DF. Emotional adaptation to limb loss. *Phys Med Rehabil Clin N Am.* 2014; 25(1):53–74. 2) Horgan O, Maclachlan M. Psychosocial adjustment to lower-limb amputation: a review. *Disabil Rehabil.* 2004; 26(14-15):837–50. 3) Yoo S. Complications following an amputation. *Phys Med Rehabil Clin N Am.* 2014; 25(1):169-78.

PA812

Search about Pain (Related With Amputation) and Function in Lower Limb Amputees Rehabilitated at AACD-Lar Escola - São Paulo

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Introduction: The presence of persistent pain, of the stump, phantom pain or in the contralateral lower limb may negatively interfere to obtain gait with prosthesis in amputee patient. *Objectives:* To investigate the presence of pain related to amputation in lower limb amputees patients at rehabilitation treatment, evaluate their

functional status, without and with prosthesis and verify if there is association between presence of pain and gait. *Methods:* Transversal study with 60 unilateral lower limb amputees in treatment at a rehabilitation center in São Paulo, to investigate: age, gender, time since amputation, level and etiology of amputation, number of comorbidities, presence of pain in the stump, or phantom pain or in contralateral limb, and in positive case, kind of pain, intensity, frequency, improvement or worse factors, use of medication, fit with prosthesis, pattern gait (community, therapeutic or at home), use of gait assistant and apply of Functional Independence Measure (FIM). Method to analyze data was done with absolute and relative values and parametric tests (ANOVA) and non parametric tests (equality of two proportion), qui square and confidence interval to mean of 95% and P-value <0.05. *Results:* 73.4% men, one year since amputation, transtibial, vascular etiology with two comorbidities composed the sample in a way statistically significant (p<0.001). There is no difference between patients fitted and not fitted with prosthesis for stump pain and phantom pain, but there is difference for contralateral limb, statistically significant in that patients not fitted with prosthesis. Although there is mean difference between patients fitted and not fitted with prosthesis for the 3 FIM's scores, it was not statistically significant. *Conclusion:* Mostly of unilateral lower limb amputees patients in rehabilitation at AACD-Lar Escola, at the time of the study, had low prevalence of pain related to amputation and it didn't interfere in acquisition of gait with prosthesis. *Reference:* Yoo S. Complications following an amputation. *Phys Med Rehabil Clin N Am.* 2014; 25 (1): 169-78.

PA813

Use of Prostheses for Bilateral Lower Limb Amputees Patients: Ten Years Experience from Association for the Assistance of Disabled Children-AACD

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Introduction: The rehabilitation with prostheses of individuals who have undergone bilateral lower limb amputation with prostheses is a challenging, unique and controversial process. *Objective:* This study aimed to verify the percentage of maintenance of prostheses's use and the predictive factors correlated with their use in bilateral lower limb amputees patients submitted to rehabilitation. *Methods:* retrospective and transversal study, initially done with the review of 189 records of patients who had undergone bilateral amputation of the lower limbs and participated in the rehabilitation program at AACD (Association for the Assistance of Disabled Children) between December of 1999 and December of 2009. Forty six (46) records were excluded because they were either incomplete or because patients were still in rehabilitation. Of the 143 remaining records, 81 patients were fitted with prostheses (G1). Of those, 53 were men and 28 women, with mean age of 40 years (SD=23.7), being 30 patients amputated above the knee, 36 below the knee and 15 above and below the knee. These patients were interviewed to verify whether they continued using prostheses or not. Fisher's statistical test and logistic regression were applied; confidence interval for mean of 95% and P-value <0.05 were used. *Results:* Of the 81 patients who were fitted with prostheses, 35 (43.2%) continued using the prostheses, of which (16) 33.33% were vascular amputees and (19) 57.6% were non-vascular amputees. It was found correlation between giving up on prosthesis use and diabetes mellitus, high blood pressure, gender, number of complications, etiology and level of the amputation and age at the time of fitting with prostheses. However, after logistic regression, only age at the time of fitting with prostheses and the number of amputation stump complications correlated with the use of prostheses for G1. When analyzed separately, G2 had association with the number of amputation stump complications and G3 had association with age at the time to fit with prostheses. *Conclusion:* The maintenance index of use of prostheses among bilateral lower limb amputees treated at AACD was low, especially among patients of vascular etiology. Younger individuals and individuals

with fewer complications in amputation stumps presented a lower percentage of abandon the prostheses.

PA814

The Clinical Observation of the Regiment of Ultrasound and Ultraviolet-C on the Stage I Pressure Ulcer

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Background: Pressure ulcers have been recorded as occurring in 30% of patients in the hospital, 15 to 20% in the community and about 50% in the long-time care home in China. They represent a major burden of sickness and reduced quality of life for patients and their carers, and are costly to health service providers. The usual measures for preventing and curing the early pressure ulcers, such as relief of local pressure and the usage of medicine on local skin, are not so satisfied. **Objective:** To assess the effect of the regiment of ultrasound combined with ultraviolet-C on the stage I pressure ulcer. **Subjects:** 56 patients with stage I pressure ulcers (according to 2007 NPUAP) were assigned to the study. **Methods:** All patients received the treatment of ultrasound and violet at the same time. The ultrasound protocol was a continued pulse with an output power of 0.3 to 0.6 w/cm². The dosage level of ultraviolet was E1 or E2, according to the condition of the pressure ulcer. The treatment frequency was once a day until the pressure ulcer was cured. The normalization of the local skin (color, elasticity and temperature) of the previous pressure ulcer, the decrease of pain and numbness and the disappear of the subcutaneous knots were the criterions of cure. The improvement of any items in the above-mentioned criterions was regarded as effectiveness. The cure time of each patient was recorded and the average cure time were calculated and analysed by SPSS16.0. **Results:** In this study, the longest cure time was 4 days, the shortest cure time was only 1 day and the average cure time was 2.16±0.93 days. The effective percentage was 100%. **Conclusion and Discussion:** The study showed us that the regiment of ultrasound and ultraviolet-C was very effective in curing the stage I pressure ulcer. Its effective percentage is higher than ultraviolet alone on stage I pressure ulcer (98.3%) in another report, and its cure time is also shorter than ultraviolet alone (4.01±1.04 days). So we may have the conclusion that the regiment of ultrasound and ultraviolet-C can restrain and reverse the early pressure ulcer quickly and effectively.

PA815

Clinical Vignette – Neuroendocrine Disorders Post Acquired Brain Injury

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Objective: To review neuroendocrine disorders post acquired brain injury complicated by previously undiagnosed male karyotype. **Background:** Causes of neuroendocrine abnormalities may include: hemorrhage, shear injury, compression, fracture, vascular damage, and swelling. The prevalence of traumatic brain injury (TBI) related neuroendocrine disorders have recently been quoted between 20-70%, and research has shown that chronic hormone deficit occur in 30-40% of patients. Hypopituitarism and growth hormone deficiencies are common amongst TBI patient who sustain moderate – severe traumatic brain injury. **Methods:** This case report describes a 36 yo male, who was involved in a head-on motor vehicle collision in 2012. GCS at the scene was 3. The patient was found to have multiple injuries including closed head injury, left femur, left tibia, and right scapular fracture. MRI showed diffuse axonal injury and intracerebral hemorrhage. At the time to transfer to rehabilitation unit patient had severe cognitive impairment (7/30 MoCA score), depressed and labile mood, and was dependant for self care and transfers. On examination it was noted that he looks younger than his stated age and has no facial hair. The hospital course was complicated by episodes of agitation, verbal

aggression, irritability and decreased mobility. **Results:** Neuroendocrine screen showed decreased level of testosterone, bioavailable testosterone, but elevated LH, FSH and prolactin level. Primary hypogonadism was suspected, genetic chromosomal analysis was done, endocrinology was consulted and patient was started on testosterone. Genetic testing showed an extra X chromosome in a male karyotype associated with a clinical features of Klinefelter syndrome. **Conclusion:** Hormonal testing is recommended for all patients with moderate or severe traumatic brain injury. Routine endocrine testing should be conducted on traumatic brain injury population throughout their recovery as deficiencies may impair recovery. Hormonal screening should include LH, FSH, testosterone (male), estradiol (female), cortisol level, TSH, ft4,ft3, prolactin and IGF-I. Treatment should be considered, however it is important to capture and interpret full clinical picture.

PA816

Using the International Spinal Cord Injury Datasets to Assess Neurogenic Bladder and Bowel Dysfunction

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Introduction/Background: The International SCI Datasets are based on the International Classification of Function, Disability and Health (ICF) and describe the impact of SCI on particular organ systems function such as urinary bladder and bowel. A questionnaire, the Bowel and Bladder Treatment Index (BBTI) was created based on these datasets to be administered by clinicians and researchers. **Materials and Methods:** The BBTI includes 60 questions regarding methods of management, complications and impact on patient's quality of life (QOL). Dataset questions were adapted for questionnaire format; the measured was tested and cognitive interviewing conducted to ensure appropriateness. The final version was administered to a sample of 127 persons with SCI who received rehabilitation at one of the 14th SCI Model Systems in the US. **Results:** The sample was 71.7 males; 42% had tetraplegia ABC; 36% were over 20 years since injury. The most frequent method of bladder management was intermittent catheterization (69.3%) and for bowel management digital stimulation (43.3%). The use of oral laxatives, rectal suppositories and digital evacuation were individually reported at 30% rate. Chronic constipation was reported by 19% of the sample. Urinary incontinence was rated as a problem by 45.7%; 49.5% reported no urinary tract infections; 19% reported at least three UTIs during last year. For bowel, hemorrhoids were reported by 38.6% while abdominal bloating was 46.5%. Bowel dysfunction was viewed as having a significant impact on QOL by 57.2% of participants. **Conclusions:** The BBTI provides clinicians with a succinct overview of methods of management and complications. It also offers the patient's perspective about how problems in these areas affect their QOL. The BBTI is currently being tested with a larger sample and a scoring system is being developed, allowing for comparisons across time and based on patient's characteristics.

PA817

Response Shift and Perceptions of Quality of Life (QOL) in Newly versus Long-Term-Injured Persons with Spinal Cord Injury (SCI)

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Introduction/Background: Defining QOL after disability has implications for long-term adaptation and treatment readiness. The concept is highly subjective varying for same person over the life trajectory. "Response shift" captures individual changes over time,

as influenced by patterns of coping, reframing expectations, and meaning-making. Understanding patients' changing perceptions of their own QOL is important for clinicians in assessing and implementing treatment plans and assisting patients in coping with their injury long-term. **Materials and Methods:** A mixed method approach was used to study perceptions. Using qualitative interviews, data were collected on the impact of neurogenic bowel and bladder on quality of life for veterans and non-veterans with SCI. Participants also completed a series of questionnaires within two weeks of their interview (BBTI, PROMIS, SCI-QOL) to assess bladder and bowel management, complications and QOL. Data was analyzed using NVivo software, Chi-square and ANOVA. Participants (n=29) were recruited from registries at a large medical center and the local VA clinic. **Results:** The average time since injury was 21.3 years with 9 participants with injuries of less than a year. Conceptualizations of "physical independence" emerged as a salient theme across participants. Comparing group responses revealed significant conceptual and meaning-driven differences in the nature and place of independence in participants' QOL. Newly injured participants characterized loss of independence as a negative influence on their QOL. Those injured more than ten years described independence as something once challenged and now regained, having an overall positive influence on their QOL. References of bladder and bowel effects on QOL were presented among 45% of those newly injured. Differences were noted with respect to QOL ratings ($p < 0.04$) and with social role activities ($p < 0.001$). There were no differences between military and civilian participants. **Conclusions:** Notions of "independence" appear to change over time, reflecting a response shift as those living longer with SCI learn to adapt and redefine their independence as it relates to QOL. Recognizing these patterns can assist clinicians by signaling patient readiness to treatment that can best improve QOL.

PA818

A Profile of Acquired Brain Injury Survivors Attending an Outpatient Dizziness and Vestibular Rehabilitation Triage (DIVERT) Clinic

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Introduction: A specialist area of Acquired Brain Injury (ABI) rehabilitation is the management of dizziness. Dizziness after ABI is widely reported, with incidence ranging from 25% to 80%. Vestibular rehabilitation (VR) has a strong research base as shown in recent Cochrane reviews (Hillier and McDonnell, 2011; Hilton and Pinder, 2004). **Material and Methods:** Attenders to the DIVERT clinic with subjective complaints of dizziness were profiled. All individuals completed a full oculomotor, gait and balance assessment. Where vestibular deficits were identified an individualised VR programme was offered. **Results:** From January-November 2014, 31 ABI survivors (21 male, 10 female, average age of 46 years) were referred to the DIVERT service. Primary pathologies were traumatic brain injury (49%), stroke (32%), neuro-oncology (13%), anoxic brain injury (3%) and multiple sclerosis (3%). All individuals were able to complete the necessary assessments. 3 individuals did not have an identifiable vestibular impairment and were discharged after the initial assessment. Of the remaining 28 individuals, vestibular diagnoses were as follows: multiple vestibular pathologies (25%), central vestibular disorder (18%), psychological dizziness (21%), benign positional paroxysmal vertigo (14%), unilateral peripheral hypofunction (14%), bilateral peripheral hypofunction (4%), and cervicogenic dizziness (4%). Three individuals were linked in with local services and referred back with advice to the treating therapist. The average number of individual VR sessions was 4, with no adverse effects reported. Significant improvements were noted in patient reported outcome measures and objective balance and gait measures in all diagnostic categories. A service satisfaction questionnaire showed high satisfaction with regards to accessibility, location, explanation of assessment and findings, and outcome from VR. **Conclusion:**

ABI survivors presenting with dizziness have complex needs. More than 50% of individuals presented with multiple vestibular pathologies, psychological dizziness or BPPV. The DIVERT clinic has improved outcomes for ABI survivors presenting with dizziness. **References:** 1) Hillier, S.L., McDonnell, M. (2011) Vestibular rehabilitation for unilateral peripheral vestibular dysfunction. *Cochrane Database of Systematic Reviews*, Issue 2. Art. No.: CD005397. DOI: 10.1002/14651858.CD005397.pub3. 2) Hilton, M.P., Pinder, D.K. (2004) The Epley (canalith repositioning) manoeuvre for benign paroxysmal positional vertigo. *Cochrane Database of Systematic Reviews*, Issue 2. Art. No.: CD003162. DOI: 10.1002/14651858.CD003162.pub2.

PA819

Investigating the Difference between Rectangular and Exponentially Climbing Neuromuscular Electrical Stimulation Waveforms Using Knee Extension Torque

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Introduction: Neuromuscular Electrical Stimulation is widely used for the treatments of orthopedic and central nerve systems disorder for patients and also for muscle training in the case of able-bodied individuals. Electrical stimulations are pulses characterized by parameters such as waveform, frequency and pulse width. While the difference of electrical stimulation waveforms is investigated in previous paper, a few of the studies have applied different electrical stimulation waveforms of strictly similar properties such as frequency or pulse width. Therefore, we considered the application of two electrical stimulation waveforms, rectangular and exponentially climbing, with strictly similar properties for assessing knee extension torque. **Material and Methods:** Thirty able-bodied individuals (15 males and 15 females) participated in our study. The mean and standard deviation of age, height and weight of male participants were respectively 26 ± 3 years old, 173 ± 5 kg, and 67 ± 11 kg. Those of female participants were 24 ± 3 years old, 158 ± 5 cm, and 54 ± 10 kg. In one session, the two electrical stimulations were applied up to the tolerable extent of the participants and their knee extension torques was recorded using Biodex System 3. The order of the applied electrical stimulations was randomly changed and each electrical stimulation was applied for three times. **Results:** While rectangular electrical stimulation yields a torque of 58 ± 35 Nm, that of the exponentially climbing electrical stimulation was 69 ± 33 Nm. Paired *t*-test analysis was used for the comparison of the torques. At a significance level of 0.05, the torques produced by the exponentially climbing electrical stimulation was found to be significant. **Conclusion:** While rectangular electrical stimulation is widely used in clinical treatment, we verified that the electrical stimulations with exponentially climbing waveform could yield a higher torque compared to that of the rectangular one. For our future research, we wish to investigate the effect of exponentially climbing electrical stimulation in the treatment of patients.

PA820

Effects of Therapeutic Ultrasound in Knee Osteoarthritis

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Osteoarthritis is a degenerative articular pathology characterized by progressive destruction of the cartilage. Clinically it is manifested by pain, which is worsened by movement and progressive failure functional and reduced quality of life. Therapeutic Ultrasound (US) is one of the managements used in treatment of knee OA. **Aim of the study:** A randomized study, to determine the effectiveness of ultrasound therapy in knee osteoarthritis. **Methods:** 87 patients (mean age=54.8) were randomized to receive 1

MHz frequency and 1 watt/cm² power continuous ultrasound for 5 min (47) or sham US (40) as a placebo. 10 sessions of treatment were applied to the target knee of patient. Home exercise program for quadriceps muscle were given to each patient. An evaluation at baseline and after treatment was made. Primary outcome was pain on movement (assessed by visual analog scale), osteoarthritis (OA) Index (WOMAC) scores, 50 meters walking time, knee range of motion (ROM). **Results:** Both groups showed significant improvements in knee pain on movement. Pain reduction averaged 47.76% in US group which is statistically significant ($p=0.013$) than placebo group. All secondary outcomes improve in both group. WOMAC scores, 50 meters walking time measurements were statistically significant in US group when compared with placebo group ($p=0.006$; $p=0.041$) ROM degrees improved significantly in both groups. **Conclusions:** Results suggest that therapeutic US is safe and effective in pain relief and improvement of functions in treatment modality in patients with knee OA.

PA821

Examination of Relationships between Sitting Ability, Eating and Swallowing Function, and Urinary Incontinence

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Introduction/Background: Aspiration pneumonia often follows functional decline of eating and swallowing function because it becomes diminished with age. On the other hand, there is a great frequency of urinary incontinence in the elderly. Sitting ability is important to presence or absence of urinary incontinence and eating and swallowing function. Purpose of this study was to analyze the relationships among sitting ability, eating and swallowing function, and urinary incontinence. **Material and Methods:** The subjects were 128 hospital patients, 51 men and 77 women, who were receiving physical therapy from 2010 to 2012 and had a mean age of 81.63 years. There were 81 ones with motor system disorders and 47 ones with cerebrovascular diseases. This study was approved by the ethics committee of Ssn-ikukai Hospital. We collected data on sitting ability, eating and swallowing function, and urinary incontinence from physical therapy assessments and nursing records, and analyzed relationships between all combination pairs. Sitting ability was classified by Hoffer's classifications of sitting ability, which was JSCC edition. Evaluated by 10 grades designed by Fujishima, eating and swallowing function was simplified and categorized into 3 groups as follows: category 1 was severe, category 2 was moderate, and category 3 was mild and normal. Statistical analyses were performed by using Kruskal-Wallis test with Steel-Dwass test and Mann-Whitney *U* test. **Results:** Sitting ability category 3, had a low level of eating and swallowing function, and the sitting ability categories and 10 grades of eating and swallowing function were the same. Furthermore, urinary incontinence was often seen when sitting ability category was low, and those in the urinary incontinence group had low levels of eating and swallowing function. However, those with sitting ability category 1 had good eating and swallowing function, and few of them had urinary incontinence. **Conclusion:** It was suggested that both eating and swallowing function, and urinary incontinence were associated with the degree of sitting ability. It is important to first address sitting ability, when trying to improve eating and swallowing function and urinary incontinence.

PA822

Effects of Aquatic Treadmill Exercise on Gait Symmetry and Balance in Acute Stroke Patients

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Introduction: Aquatic treadmill training based on its biological effects of immersion can be an alternative for gait training for the patients unable to train on land treadmill. The purpose of this study was to determine efficacy of the aquatic treadmill program on gait symmetry between the paretic and non-paretic limb in acute stroke patients and hence improvement in balance and balance confidence. **Material and Method:** First onset stroke patients in acute phase (within 6 months from onset) who can walk independently were included. Patients with skin lesion, cardiovascular, neurological and musculoskeletal problems, MMSE of 20 or less and symptoms of incontinence were excluded. For the intervention, 15 sessions of 20 minutes of aquatic treadmill exercise were carried out for 3 weeks. Comfortable 10-m walk test (CWT), gait symmetry, Berg balance test (BBS), Activities-specific balance confidence (ABC) scale were measured before and after intervention. Gait symmetry was evaluated with paretic to non-paretic spatiotemporal ratio using step length, swing time and stance time. Pre- and post- intervention measurements were compared using Wilcoxon-signed rank test. **Result:** 10 patients were recruited (mean age, 58.1yrs; mean 63.6 days from stroke onset; 7 male; 4 right hemiparesis). Significant improvements in CWT of paretic limb (pre-mean 0.519 m/s, post-mean 0.590 m/s, $p=0.058$) were found. Changes in spatiotemporal symmetry ratios of paretic to non-paretic, including step length (pre-mean 0.894, post-mean 0.926, $p=0.445$), stance time (pre-mean 0.909, post-mean 0.951, $p=0.047$) and swing time (pre-mean 1.121, post-mean 1.079, $p=0.237$) did not show significant differences. BBS (pre-mean 35.70, post-mean 41.70, $p=0.013$) and ABC (pre-mean 36.69, post-mean 47.81, $p=0.01$) showed significant changes. **Conclusion:** In conclusion, despite the training program failed to show significant changes in body coordination as measured by spatiotemporal symmetry ratio, gait speed, balance and balance confidence showed significant improvement. The results suggest that intervention may not have been sufficient to bring about the significant improvement in gait symmetry, in terms of may be duration, intensity, or time of the treatment. Future studies with control group and larger sample size would further demonstrate the effect of aquatic treadmill in gait symmetry and other measurements.

PA823

Evaluation of the Effectiveness of Preoperative Physiotherapy Using the Lysholm Scale in Patients Prepared for Surgical Arthroscopic Anterior Cruciate Ligament Reconstruction - Pilot Study

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Introduction: There is a noticeable increase in the number of people experiencing total damage ACL in the knee joint in recent years. Researchers are seeking to optimize the treatment of surgical and rehabilitation. **Aim of the Study:** Evaluation of the effectiveness of preoperative physiotherapy by the Lysholm scale, in patients prepared for surgical, arthroscopic ACL reconstruction. **Material and Methods:** The study included a random 30 people diagnosed with complete rupture of ACL, qualified for its surgical reconstruction. The respondents were divided into two groups. The study group consisted of 15 patients (mean age 41.0±7). The control group consisted of 15 patients (mean age 39.0±9). Patients in the control group received a recommendation from the doctor and instruction exercises from a physiotherapist. Assessment of knee function was performed twice - the qualifications for surgery and just before surgery by the Lysholm scale. Physiotherapy in the study group based on recognized models of rehabilitation for patients after complete ACL rupture, with author modifications. **Results:** The results in both the test and reference group were improved. In the test group in the first measurement was obtained average value 46 points (SD=18), which mean the weak result. Before surgery

(second measurement) an average 66 points (SD=18), the result satisfactory. The resulting difference was statistical significant $p=0.002$. In the control group baseline measurement was an average 59 points (SD=9) which mean weak result. Final measurements presented a mean score 64 points (SD=10) also weak result
Conclusions: 1) Preoperative physiotherapy in that observation confirmed the high preparation of therapeutic value in patients with complete ACL rupture for reconstruction surgery, resulting in a significant improvement in the functional status of the damaged knee joint. 2) Reduce the symptoms of edema, volatility and pain may (probably) positively affect on the ACL reconstruction surgery and after surgery physiotherapy. 3) Individual patients preparing to ACL reconstruction surgery it seems to be insufficient. 4) It's important to analyze the impact of preoperative rehabilitation on the final outcome of patients after complete ACL rupture.
Keywords: anterior cruciate ligament, preoperative physiotherapy, rehabilitation, the Lysholm scale.

PA824

The Influence of Interaction Torque Squatting in the Elderly

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Introduction/Background: Multi-joint structure causes motion-dependent mechanical interactions, and it is referred to as interaction torque (INT). During whole-body movements, such as squatting, greater INT may be produced compared with that during arm movements because INT greatly depends on segment weight and angular acceleration. However, the contribution of INT to net torque (NET) during squatting has not yet been explored in the elderly. The purpose of this study was to analyze how aging affects INT during squatting. We tested the hypothesis that the elderly demonstrate a relatively larger contribution of muscle torque (MUS) and smaller contribution of INT to NET during squatting compared with that demonstrated by young adults. **Material and Methods:** The subjects were 10 healthy young adults and five healthy elderly people, with a mean age of 21.1 ± 1.2 and 71.2 ± 4.1 years, respectively. Three-dimensional kinematics and ground reaction force data were collected. We set up two conditions: preferred speed and high speed. NET, INT, MUS, and gravity torque (GRA) were determined according to the Lagrange's equation, with three-segment model. NET in a joint that is responsible for joint kinematics will be an algebraic sum of torque components: $NET = MUS + G + INT$. Dynamic muscle torque (DMUS) was also calculated ($DMUS = MUS + GRA$), and contributions of the INT impulse and DMUS impulse to the NET impulse were examined. Student's *t*-test was used to assess the differences between the two groups. **Results:** INT greatly contributed to producing NET in both the groups. The relative contribution of INT to NET was similar in every joint between the groups. The elderly showed a high torque value in the anti-gravity phase. **Conclusion:** This study suggesting that the ability to employ INT during the squatting did not differ between the two groups. However, in the anti-gravity phase, the elderly showed a characteristic torque wave pattern. **References:** 1) H Fujisawa, et al. Contribution of interaction torque in the sit-to-stand motion (Japanese). Journal of the Society of Biomechanics 34.3, (2010): 240-247. 2) H Yamasaki et al. Interaction torque contributes to planar reaching at slow speed. Biomedical engineering online 7.1 (2008): 27.

PA825

Seven Years Experience of Intrathecal Baclofen for the Treatment of Spasticity in Severely Disabled and Vegetative Patients after Severe Head Injury

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Introduction: Intrathecal baclofen (ITB) infusion is a widely accepted therapy for the treatment of severe spinal spasticity. There is increasing evidence that ITB has similar effects on patients with spasticity of cerebral origin resulting from traumatic brain injury, without the side effects of its oral counterpart. We present our results of this specific treatment in a series of severely head-injured patients with unfavorable neurological outcome. **Material & Methods:** We reviewed 26 severely disabled or vegetative head-injured patients which have been treated with ITB pump between 2006 and 2013. All patients had severe tetraspasticity, making nursing and mobilization hardly impossible. Patient selection criteria were severe disabling spasticity refractory to oral antispastic agents, and positive response to a previous ITB test. The interval between brain injury and bolus test varied between 6 and 27 months. **Results:** Of the 26 patients, 67% were male and 33% female, with a mean age of 46 years. Spasticity was reduced significantly in all patients and twenty of them could soon be sent for rehabilitation. Doses of ITB varied from 120 to 600 $\mu\text{g}/\text{day}$. The mean follow up was 19 months and there were no major operative complications. Furthermore, three patients, initially classified as vegetative, reached later the minimally conscious state. **Conclusions:** ITB administration is a relatively easy, safe, and effective procedure for treating spasticity in severely disabled and vegetative patients after head injury. Although our observations are based on a small sample size, further studies are needed to investigate a possible beneficial influence of baclofen on the consciousness state of these patients.

PA826

Influence of Age, Education and Employment on the Access to Physiotherapy of Patients with Multiple Sclerosis

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Background: People with Multiple Sclerosis (MS) experience disabling impairments like muscle weakness, spasticity, lack of core strength or poor balance. The access to rehabilitation and medical aid seems to be influenced by age, education, employment and kind of insurance. To get information in which way rehabilitation, remedy and medical aid is influenced by the above mentioned items, we developed a questionnaire which is designed with 9 demographical questions (place of birth, country of origin, family status, education, employment, kind of insurance, persons living in household, children and children living in household) and questions about medical aid, remedy (e.g. physiotherapy, ergotherapy, logopedics), level of care and kind of care. We plan to evaluate the data of 1,000 MS patients of our outpatient clinic. So far 217 questionnaires are analyzed. **Objectives:** Observation of relation between consumption of Physiotherapy and patient's age, duration of disease and/or disability degree measured in Kurtzke's Functional Systems and Expanded Disability Status Scale in Multiple Sclerosis (EDSS). **Methods:** Bottom-up analysis of so far 217 patients of the Multiple Sclerosis Centre of the Jewish Hospital Berlin. **Results:** The so far mean age is 51.75 years, the disease duration amounts to 27.2 years and the mean EDSS is 3.16. The population consists of 72% women and 28% men. In total EDSS distribution: 147 patients were found with an EDSS between 0 and 3.5, 57 patients with an EDSS between 4.0 and 8.5. 62 patients of 216 are consuming physiotherapy. 25 patients receive physiotherapy with an EDSS between 0 and 3.5, 31 patients with an EDSS between 4.0 and 8.5. Mostly patients of age between 40 and 60+ are using physiotherapy. **Conclusions:** So far we found only 28% of our patients receive physiotherapy and rehabilitation. The prescription of physiotherapy is not limited by budget, so we have to analyze why patients refused or had no access to physiotherapy. Furthermore the analysis of demographical items and baseline data concerning medical aids will be done and presented.

PA827

Chronic Neck Pain and Exercise Interventions: Frequency, Intensity, Time, and Type Principle

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Background: Chronic neck pain (CNP) is a common musculoskeletal condition worldwide, affecting up to 20% of the population at any one time. Many forms of treatment modalities are offered by physiotherapists with varying degrees of success. This meta-analysis was undertaken to identify the most effective components in an active exercise physiotherapy treatment intervention for chronic neck pain based on the frequency, intensity, time, and type (FITT) exercise method of tailoring physical activity recommendations to the individual needs and goals of patients. **Methods:** Databases, including the Allied and Complementary Medicine Database, Cumulative Index to Nursing and Allied Health, MEDLINE, SPORTDiscus, Biomedical Reference Collection, and Academic Search Premier, were searched for relevant articles. **Study Selection:** Quantitative design studies that included active exercise as part of a multimodal or stand-alone approach were selected. Only studies scoring ≥ 6 on the Physiotherapy Evidence Database Scale were included in the review because this reflected a good level of evidence. **Study methodologies and relevant outcome measures,** including isometric strength, Neck Disability Index scores, and pain scores, were extracted from relevant articles and grouped together for appraisal and synthesis. Evidence from selected articles was synthesized according to the FITT exercise principle to determine the most effective exercise type, frequency, and intensity in the treatment of chronic neck pain. **Results:** Conducting resistance +/- or endurance based exercises at a frequency of at least three times a week, at a minimum intensity of 50% of an individual's maximum voluntary contraction (MVC), for between 12-45 minutes for 6-12 week periods was found most beneficial for reducing pain intensity, increasing strength and reducing global disability. **Conclusions:** Physiotherapy interventions using a multimodal approach appear to produce more beneficial outcomes in terms of increased strength, improved function, and health-related quality of life and reduced pain scores. Active strengthening exercises appear to be beneficial for all of these outcomes; the inclusion of additional stretching and aerobic exercise components appear to enhance the benefits of an exercise intervention.

PA828

Utilization of Functional Electrical Stimulation to Facilitate Pre-Running, and Return to Running, in a Young Adult Male After a Stroke

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Rehabilitation after stroke for younger adults differs in multiple areas as compared to elderly individuals, especially with quality of life and community reintegration, which may include pre-running/running activities. Currently, minimal research describes effects of functional electrical stimulation (FES) to assist and improve a person's ability to run after a stroke. The purpose of this case report is to review the utilization of FES to facilitate with pre-running activities and return to running. Patient was a 27 year old male status post stroke secondary arteriovenous malformation rupture. On evaluation, patient required assistance to negotiate the environment while using straight cane and without orthosis, due to decreased motor control and spasticity to the left extremities, repeated falls due to drop foot, homonymous hemianopsia, decreased coordination, and poor endurance. Patient unable to participate in recreational activities, such as baseball, which includes jumping and running. Patient underwent approximately 6 months of physical therapy in an outpatient setting which included 60 minutes 1:1 PT session once to twice a week, 30 minute supervised class for cardiovascular and progressive resistive exercises, and extensive home exercise program. Pa-

tient used toe-off brace for everyday use and FES during sessions. Treatment sessions included task-specific training, treadmill with Lite Gait, and intensive mobility exercises. Initially, 6 Minute Walk Test (6MWT) 1,218 ft/50 Foot Gait Speed 3.44 ft/sec completed while incorporating a toe-off brace and straight cane. At discharge, 6MWT 2,056 ft/Gait Speed 4.68 ft/sec/50 Foot Run 8.69 ft/sec using FES. Two month follow up, 6MWT 1376 feet/50 Gait Speed 4.44 ft/sec/50 Foot Run 5.54 ft/sec without foot orthosis. Minimal research is available in the literature highlighting combination FES and motor learning principles for progression of ambulation to pre-running/running. However, principles applied in gait training can be utilized to facilitate pre-running/running while incorporating FES during task-specific training, treadmill training, and intensive mobility exercises. Further research is necessary to target younger population who have experienced a stroke, and are ready to return to higher level of function and improve their quality of life, which has not typically been focused upon in traditional rehabilitation.

PA829

Quad-Amputation Rehabilitation in Unilateral Blinded PatientJ. M. Park¹, T. J. Park¹, *J. Park¹, H. Kim², I. D. Kong¹¹Yonsei University Wonju College of Medicine, Wonju, ²Konyang University, Daejeon, KR

Quad-amputation is a rare disability and people with quad-amputation experience difficulties in rehabilitation. People with visual loss in one eye have trouble with depth perception and in order to prevent a fall, compensation by proprioception of hands and feet are essential. For septic shock treatment due to pancreatitis from blunt abdominal trauma, vasoconstrictor (Norpin) was applied to a 69-year-old unilaterally blind male patient. Gangrene had progressed in both hands and feet as complications, and both wrist disarticulation, amputation at right transtarsal joint, and disarticulation at left metatarsophalangeal joint were performed. Thirteen weeks after amputation, bilateral transradial prosthesis with hook terminal device (TD) were applied to ensure the visibility of the patient during upper extremity movement. For lower limb amputation, cast shoes were initially worn, Then Special Foot Prosthetic Shoes (SFPS) were fitted fifteen weeks later and he started standing balance training and walking training with donning them. The prosthetic training was carried out postop fifteen weeks, and the patient, having received pre-fitting training adapted rapidly to the prosthetic actions and was able to use the utensils manufactured for eating, which led to his successful discharge. In order to examine the extent of functional recovery in upper extremities of the patient, we performed evaluations on ADL, hand function, dexterity every 2 months during his hospital stay and the upper extremity function showed progressive improvement. For objective assessment of lower extremity function, treadmill test with VO_2 monitoring and the 10 m shuttle walking time were conducted in three conditions of bare foot, cast shoes, and foot prosthetic shoes. Difference in energy consumption while utilizing cast shoes and SFPS was not significant, but discomfort and 10m shuttle walking time reduced in the order of SFPS, cast shoes, and bare foot. We report a case of successful rehabilitation up to independent ADLs by applying 1) special shoes for amputation of forefeet and 2) early rehabilitation which compromise the proprioception and tactile senses of the foot stumps to a patient with unilateral visual loss and quad-amputation with the relevant literature review.

PA830

Botulinum Toxin for Anismus: Re-Establishing the Spontaneous Defecation*J. Leal, J. Gomes, J. Cunha, A. Alves, F. Melo, C. Branco
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Case Diagnosis: Anismus. **Case Description:** Anismus in a 43 year-old woman, refractory to rehabilitation treatment. Puborec-

talis BTX-A (30 U) injection was done and repeated 4.5 months later (100 U) due to evacuatory difficulty persistence. There was a significant subjective and objective parameters improvement after the second administration, with clinical stabilization, although BTX-A injection (100 U) was repeated 4.5 months later. Signs and symptoms became 7 months after this last infiltration, with proctalgia, fecal diameter reduction, anal pressure elevation at sphincter relaxation attempt and elevation of anal resting pressure. The fourth BTX-A (100 U) injection took place 8 months after the previous one, with symptomatic improvement, with 3 episodes of spontaneous defecation with simple digital stimulation for the first time in 18 years. A new clinical worsening came out seven 7 months later, and she underwent a new injection (100 U), with complete restoration of the spontaneous defecation (even with no need of digital stimulation). Since the beginning of the toxin treatment, there was a significant and progressive improvement in objective evaluation as well as in subjective items, including the quality of life, returning to her previous constipation condition. *Discussion:* Anismus is a defecatory obstruction-type, with failure of relaxation or even paradoxical puborectalis or external sphincter contraction during attempted defecation. There is some cluster of symptoms associated, including prolonged repeated straining, incomplete evacuatory sensation, rectal pain, need for manual disimpaction, laxative or enema abuse. Its diagnosis is based on both physical examination and anorectal physiologic testing. Treatment is highly variable, ranging from biofeedback, botulinum toxin type A (BTX-A), division of the puborectalis muscle, colectomy, end ileostomy/colostomy. The primary modality for treatment is biofeedback (BFB), with bowel management reported to have success rates ranging from 40-90%. If patients fail or refuse biofeedback, they are generally then offered BTX-A puborectalis muscle injection, considered extremely successful for temporary treatment of anismus, that is refractory to BFB treatment. *Conclusion:* The authors present this case report because of its scientific innovation. BTX-A was effective in anismus treatment, avoiding the surgical decision, with its permanent sequelae risks.

PA831

Complication of the Lymphapress Treatment

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Introduction: Intermittent pneumatic compression (IPC) is a frequently prescribed physical therapy in the prevention of deep vein thrombosis. Less common use of IPC includes the treatment of venous ulcers, venous insufficiency and lymphedema. But there is no consensus in the protocol of IPC treatment. Pressure over 60 mmHg can squeeze the lymphatics according to animal study. Therapeutic range, between 30 and 60 mmHg and 30 minutes-session is recommended for adjunctive therapy for complex lymphatics physical therapy. *Case Description:* 53 year old post-mastectomy breast cancer patient visited out-patient clinic for recent onset right upper extremity heaviness and swelling. Pathologic diagnosis was invasive ductal carcinoma. She had got right partial mastectomy with axillary lymph node dissection, chemotherapy and radiation therapy. After 2 years of operation cancer recurred at right axillary lymph node and lung and they were treated with repeated dissection. Less than one year after right clavicular lymph node metastasis was treated with salvage radiation therapy and chemotherapy. And one more year later, right upper and lower arm swelling started and physical exam showed 2 cm different arm circumference compared to unaffected arm. Stemmer sign is negative. At first physical therapy session, she felt discomfort at antecubital area during the lymphapress treatment and maximum pressure at that time was 60 mmHg. Pain intermittently sustained thereafter because of that she refused to maintain daily intensive therapy including manual lymphatic drainage. There was no difference in physical exam but some hardness in right antecubital area skin. Pre-scheduled PET scan was taken and showed no active lesion expect previous right axillary lymph node uptake. She had got intermittent 3 more sessions but felt little discomfort also. Fol-

low up lymphoscintigraphy showed newly onset dermal backflow at antecubital area which signifies 60 mmHg lymphapress therapy might cause impairment of focal superficial lymphatic drainage. *Conclusion:* Lymphoscintigraphy is a useful method which displays the pathophysiological changes of lymphedematous limb through easily visualized images of the lymphatic system. Special caution for high pressure lymphapress usage is necessary especially for focal lymphatic drainage blockade site.

PA832

Ability to Drive Safely and Confidently of Individuals Who Have Undergone Driver Assessment Following Stroke

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Background: A serious neurological event such as a stroke can significantly impair the driving ability. Patients who have suffered a stroke can become overly confident regarding their driving skills and not realize that this ability is impaired. This study suggests that most people who pass a multidisciplinary driver assessment after stroke continue driving safely and confidently in the medium to long term. In addition no significant difference was found in accident rates between drivers following stroke and general population. (1) *Study Objective:* to evaluate the ability to drive safely and confidently of individuals who undergone assessment by the Medical Institute for Road Safety in patients who have suffered a stroke, and compare driver's self-assessment with their family member's assessment. (2) *Methods:* We identified 507 patients after stroke. Sixty seven patients resumed driving after stroke and 28 completed the survey. The participants were asked to provide demographic data, and complete the questionnaires by CMA Drivers's Guide 2006, FIM (BALD) and Lawton (IADL). *Results:* We found that patients that are "very confident" in their drivers' skills had suffered a stroke a longer time ago (in years) as compared to patients feeling "confident", only. In addition, patients driving in more diverse conditions are older, a longer time has passed since their assessment by the Medical Institute for Road Safety and the FIM and Lawton scores are higher. No significant differences were found between patients' self-assessment and their family assessments regarding driving skills. *Conclusions:* Patients who have suffered a stroke are safe drivers following the assessment by the Medical Institute for Road Safety. Confidence in driving skills is increased with time passed after stroke, age, and better basic and instrumental daily activities functional activities. *References:* 1. Pearce, A. M., Smead, J. M., Cameron, I. D. Retrospective cohort study of accident outcomes for individuals who have successfully undergone driver assessment following stroke. *Australian Occupational Therapy Journal*, (2012) 59, 56-62. 2. Sakira, T., Zlasov, O., Gotfried, N., & Goldenberg, K. A Comparison between Post-stroke Drivers' Self Assessment, Regarding their Driving, and Their Caregivers' Assessment. Poster presentation ISPRM Congress Porto Rico 2012.

PA833

An International, Prospective Cohort to Document the Effectiveness of One Cycle of BoNT-A Based on Attainment of Individual Person-Centered Goals in Adult Subjects Suffering from Upper Limb Spasticity Following Stroke (ULIS II) – Sub-Analysis of the South

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Introduction/Background: A total of 456 patients were recruited for the ULIS II study globally. To compare the data from South Korea (SK) with the global results (GLB), a sub-analysis was performed. **Materials and Methods:** 28 patients from South Korea were included in the sub-analysis. This sub-analysis is a description of the differences between the two sets of data as the original ULIS II trial was not powered statistically to perform such sub-analysis. **Results:** The mean age was 50.4 years (range 19-72 years) in SK versus a mean age of 56.7 years (range 18-88 years) in GLB. Male to female ratio is 1:1 in SK versus 3:1 in GLB. 26 patients received Dysport and 2 patients had Botox. The mean time from onset of stroke to treatment was 35.5 months in SK versus 61.4 months in GLB. Patients in SK (10.7%) had less fixed contracture versus GLB (25%). SK patients experienced less significant and severe soft tissue restriction than GLB patients. The mean dose of Dysport per patient used in SK was 873.1 units (median: 1,000 units) versus 748.3 units (median: 700 units) used in GLB. EMG and electrical stimulation were more often used to locate muscles for injections in SK than in GLB. More patients set reducing involuntary movements as their primary and secondary treatment goals in SK. **Conclusion:** A limitation of this sub-analysis is the small SK sample size. The variation in practices observed between SK and GLB could be due to the differences in the culture, social stigma associated with spasticity, local medical practices and the reimbursement of BoNT-A.

PA834

Dysphagia after Unilateral Hemispheric Stroke: Incidence in Patients in a Rehabilitation Phase

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Introduction: Dysphagia is a commonly documented morbidity after stroke. In acute studies the reported incidence for dysphagia ranges from 30% to 55% whereas the incidence for dysphagia among rehabilitation studies ranges from 40% to 81%. Studies enrolling only patients with hemispheric lesions tend to report lower dysphagia incidence (40%) than those enrolling patients with mixed lesions (51%). The purpose of this study is to determine the incidence of dysphagia in patients with unilateral stroke in the rehabilitation phase and to identify potential association between dysphagia severity, treatment outcome and side of hemispheric stroke. **Material and Methods:** Five hundred six patients with unilateral hemispheric stroke were admitted in rehabilitation center Euromedica Arogi of Thessaloniki from 1/1/2011 to 30/6/2014. Eighty five patients were excluded due to incomplete data. 421 patients were finally included in this retrospective study. Bedside Swallowing Evaluation (BSE) was used to establish the presence or absence of dysphagia. The Functional Oral Intake Scale (FOIS) was used to document the ability to consume food/liquid by mouth on the day of admission and at discharge. **Results:** A total of 292 (69.30%) of the patients had dysphagia at the time of initial BSE. 132 patients had right-hemisphere stroke and 160 had left-hemisphere stroke. The mean FOIS on admission was 3.81±1.9 indicating tube dependency whereas at discharge it improved to 4.67±2.19 indicating total oral diet. The mean duration of the dysphagia rehabilitation program was 52.46±48. 154 patients exhibited improvement in the FOIS after treatment, 98 were stable in FOIS independent to treatment and 40 showed deterioration in FOIS. No statistically significant association between FOIS scores, FOIS difference, days of dysphagia, age, gender and the side of hemispheric lesion was found. **Conclusion:** The incidence of dysphagia was relatively high in our study population. Normal aging effects on swallowing might be a possible explanation for this high incidence rate. Results indicate a significant improvement in swallowing function in patients with unilateral hemispheric stroke being treated by speech therapy sessions in a rehabilitation center.

PA835

Intrathecal Baclofen for Spasticity: Effects on Bladder Function

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Introduction: Traumatic brain injury (TBI) is very often associated with spasticity. Medical interventions may include medications as baclofen, a GABA-receptor agonist of poor lipid solubility. High doses are administered orally in order to achieve a satisfying level into the cerebrospinal fluid, to prevent the response of the motor neurons. Adverse effects such as sedation or somnolence, excessive weakness, vertigo and psychological disturbances make the treatment intolerable. Intrathecal administration of baclofen is a contemporary treatment option which minimizes adverse effects even the high doses of the drug which are very often needed. Regarding low urinary tract dysfunction, TBI, as a suprapontine lesion, results in overactive bladder syndrome due to neurogenic detrusor overactivity, with synergic voiding. Urgency and urge incontinence are the predominant signs and symptoms of this condition. **Material and Methods:** We report two cases of traumatic brain injury whose spasticity responded well to intrathecal baclofen administration. We evaluated retrospectively our medical reports referring to bladder function, before and after baclofen pump implantation. We compared bladder diaries, urodynamic parameters and the doses of anticholinergics which were needed. **Results:** Considering their bladder function these patients were better as regards incontinence episodes and the doses of anticholinergics which were needed. Urodynamic parameters were also improved. There was higher reflex volume and lower maximum detrusor pressure. **Conclusion:** Spasticity treatment is extremely important for these patients as it is a factor of poor life quality: it provokes pain, discomfort, difficult care delivery, muscle complications. Although baclofen pump is implanted to treat spasticity, it is possible that detrusor's activity is also affected. Therefore, patients' urologic profile should also be reexamined after the baclofen intrathecal administration. Further studies are required in order to investigate the effect of intrathecal baclofen administration on bladder function.

PA836

Return to Work After Program of Exercise Training in Chronic Low Back Pain in Tunisian Military Hospital

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Introduction: It has been demonstrated in chronic low back pain a deconditioning syndrome with physical, mental and social impact. The aim of this study is to demonstrate the effectiveness of training exercise in the management of chronic low back pain. **Material and Methods:** Prospective study of 50 adults patients, with chronic low back pain lasting for more than six months resistant to medical treatment without any indication of surgical treatments. Clinical and instrumental evaluation is performed before and after a rehabilitation program for five weeks. Our evaluation program is based on: A clinical evaluation specifying demographics, spinal mobility using shober index, the measurement of endurance of tenth muscle using shirado and sorenson test, an assessment of the intensity of pain using visual scale evaluation and psychological evaluation using the HAD scale. **Results:** Fifty patients, 66.7% male, mean age 41 years are included. The work stoppage was observed in 80% of patients since three months. After the program, the results of different clinical parameters showed a significant improvement in mobility parameters and muscle performance of the trunk. At the same time there was a significant decrease in pain intensity both at rest and effort, and improves in the scales of depression (HAD D) and anxiety (HAD A). At the end of the program 70% of the patients returns to work. **Conclusion:** The benefit of different func-

tionnal restoration programs is demonstrated, an improvement in all the parameters is noted with return to work.

PA837

Specification of Muscle Groups Responsive to the Autologous Peripheral Blood Stem Cell Transplant or Derived from Disuse Syndrome in a Sporadic Late Onset Nemaline Myopathy Case. A Case Report on Long-Term Outcome

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Background: Sporadic late onset nemaline myopathy (SLONM) with monoclonal gammopathy of undetermined significance (MGUS) is a rare progressive neuromuscular disorder. At present there is no curative treatment but immunosuppressant and immunomodulating therapies were partially effective in cases. Clinical changes accompanied by the disappearance of gammopathy were reported following autologous stem cell transplant (auto-PBSCT). Primary symptoms being progressive muscle weakness, physical therapy (PT) goals should focus on muscle strength managements. Permanent treatment and rehabilitation intervention methods are unspecified and there have not been reports concerning muscle strength preservation methods in an auto-PBSCT recipient cases of SLONM. **Methods:** A 27 year-old man presented proximal muscle weakness. Symptoms progressed to head drop, weight loss, long distance gait and stair-climbing difficulties. Atrophy and muscle weakness of neck extensors and shoulder muscles were observed. No benefits seen through IVIG and steroid therapy, he underwent auto-PBSCT. Exercise intervention was adjusted upon Subjective Fatigue parameters and objective evaluation including hematological, biochemical data, physical symptoms and vital statistics. Adjustments were performed in Fatigue recovery time, repetition, duration, region, intensity and order of performed region. **Results:** Adaptation of moderate-high intensity exercises during the progressive phases posed difficulty complying under the termination criteria and fatigue, but post auto-PBSCT interventions resulted to muscle strength improvements. There was a differentiation of specific recovering muscles. The severely damaged muscle group showed instant recovery but plateaued while moderate-slightly damaged group, which was predicted to be derived from disuse syndrome, detected slower recovery but mildly continued to elevate post auto-PBSCT. Though quantities decreased post auto-PBSCT, the gammopathy remained. Symptoms did not see progression but he was eligible to return to work one year later. The disease progressed, reversing the recovery and caused total body disuse effects post 18 months of auto-PBSCT **Conclusion:** A single case can rarely indicate an exemplary intervention direction, but this report highlights the wide spectrum of intervening methods and muscle strength development in an auto-PBSCT recipient of a SLONM case. At this stage it is hoped that therapists will employ treatment approaches based on presentation and context of the individual but further researches, gathering of intervention outcome reports and breakthroughs in the understanding of the pathological dysfunction is needed.

PA838

Rehabilitation Needs of Women with Non-Metastatic Breast Cancer

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Introduction: Breast cancer has become a survivable chronic disease due to improvements in early detection and therapy. Breast cancer survivors experience a number of sequelae such as limitation of shoulder mobility, lymphedema, pain, fatigue, weight gain, depression and reduction in levels of physical activity and health-related quality of life. The aim of this study was to evaluate the impairments in breast cancer survivors. The relationship of quality of life (QOL) with fatigue, lymphedema and depression were also identified. **Materials and Methods:** The study included 100 patients (age: 55±10.8 years, disease duration: 4.9±4.4 years) with non-metastatic breast cancer. Disease and treatment specific data were obtained. Patients were screened and examined for the presence of upper extremity impairments such as motion restrictions, lymphedema, pain, numbness and loss of strength. The presence of lymphedema was noted as in three stages of severity and shoulder range of motion (ROM) was measured using a goniometer and a difference of ≥20° between both sides was considered as impaired ROM. Fatigue Severity Scale (FSS), Short-Form 36 Health Survey (SF-36) and Beck Depression Scale (BDS) were administered to all patients. **Results:** The majority of patients had at least one impairment. Fifty-nine (59%) patients had shoulder pain and 31 (31%) had shoulder ROM limitation. Fifty-five (55%) patients had moderate to severe upper extremity lymphedema. Weight gain after the disease was common and forty-six patients (46%) were obese. Forty-one patients (41%) had moderate to severe fatigue as assessed by FSS. Only, seven patients did not report fatigue. Health-related quality of life scores in all domains were significantly lower (p>0.001) in patients with moderate to severe fatigue. BDS scores showed that 59 (59%) patients had symptoms of depression and SF-36 scores were significantly lower in these patients. **Conclusion:** Our results show that women with breast cancer patients face many physical impairments and functional limitations. These limitations reduce the levels of health-related quality of life. Inclusion of rehabilitation services in the care of breast cancer patients is needed.

PA839

Improving the Patient Journey towards Enhanced Management of Spasticity

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Introduction/Background: Spasticity is a debilitating condition experienced by patients with central nervous system damage. With variations in aetiology and presentation, management of spasticity is complex. The current research aimed to provide a holistic understanding of the patient spasticity pathway, via insights from healthcare professionals (HCPs) and patients. **Material and Methods:** Interviews were conducted with HCPs experienced in managing spasticity in Germany, Spain, Russia, US, UK and Brazil (total n=170). Additionally, interviews were conducted with post-stroke (n=8), multiple sclerosis (n=5) and brain trauma/spinal cord injury (n=5) patients receiving treatment for spasticity in Germany, Russia, US and Brazil (total n=72). Findings were analysed using thematic analysis. **Results:** HCPs and patients underlined the considerable impact of spasticity on quality of life and daily living activities. HCPs highlighted the need for early recognition and treatment to prevent complications. Spasticity, however, often remains undetected with patients ignoring/failing to report symptoms due to stigma surrounding spasticity and a perceived lack of importance to HCPs. When diagnosed, management is challenging due to heterogeneous presentation and complex, evolving patient needs. Typically perceived as a symptom, spasticity lacks recognition as a distinct entity and is often considered a secondary priority. Across countries, HCPs noted the lack of defined steps and responsibility for treating spasticity, leading to delays in the treatment pathway. A lack of treatment options was also noted by HCPs and prohibitive costs/reimbursement, waiting lists, lack of

injectors, identified as significant challenges in some countries (e.g. US, Russia and Brazil). This is mirrored in patients by a lack of awareness of available treatment options. Preliminary research outcomes were presented to an ad board where experts discussed strategies to overcome existing barriers to an ideal patient journey (abstract submitted to the AAN). **Conclusion:** While spasticity is important to HCPs and patients, a clear treatment pathway is often lacking. As such, considerable gaps in the management of spasticity and opportunities for improving patient outcomes throughout the patient journey are evident. Education and communication to raise awareness and knowledge of spasticity and appropriate treatment are important for facilitating earlier detection/intervention and for the development of clear treatment pathways.

PA840

Uncommon Cause of Ataxia or Areflexic Bladder, Tabes Dorsalis: a Case Report

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Case Diagnosis: Tabes dorsalis with sensory ataxia and sudden areflexic bladder. **Case Description:** A 61-year-old man was referred from urology department to our electrodiagnostic laboratory for evaluation of a sudden onset urinary difficulty and gait disturbance. Before visit our laboratory, urodynamic study was performed, and the result of urodynamic study was areflexic bladder. On neurologic examination, he showed positive rhomberg test, positive heel to shin test and ataxic movement. Muscle power of bilateral lower extremities was good grade checked. There were perianal sensory discrimination and bilateral L2-S1 dermatome sensory discrimination on all sensory modality including vibration and proprioception. There was no upper motor neuron sign. On L-spine MRI, there was no abnormality and on brain MRI, no acute brain lesion but, old left pontine infarction was observed. On electrodiagnostic study, there was no abnormality on nerve conduction study and needle electromyography except absent bulbocavernosus reflex. And posterior tibial and pudendal somatosensory evoked potentials were absent. At this point, as differential diagnosis of acute onset sensory ataxia and areflexic bladder, we considered about subacute combined degeneration, hypocupric myelopathy, tabes dorsalis and retrovirus-associated myelopathies. So we performed laboratory studies including vitamin B12, folate, HIV viral marker, hepatitis B and C viral markers, CSF analysis, non treponemal and treponemal test. Then the results of laboratory studies were reactive VDRL – RPR, TPHA, FTA-Abs Ig G on serum and CSF. And CSF analysis showed lymphocytic pleosytosis. So we diagnosed him for Tabes dorsalis. **Discussion:** The term “neurosyphilis” refers to infection of the central nervous system (CNS) by *Treponema pallidum*. General paresis and tabes dorsalis are considered “tertiary” forms of neurosyphilis. Tabes dorsalis, uncommon in the modern era, is a disease of the posterior columns of the spinal cord and of the dorsal roots. The frequency of the late forms of neurosyphilis has declined in the antibiotic era, with the result that these forms, particularly tabes dorsalis, are now uncommon. **Conclusions:** Patients presenting with lower urinary tract obstructive symptoms or sensory ataxia, we should considering about neurosyphilis. This case report emphasize the need for remaining alert to syphilis in patients with ataxia or areflexic bladder.

PA841

The Neural Mobilization as a Treatment Approach for Patients with Stroke: a Randomized Blinded Trial

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Introduction: Neural mobilization is a manual therapy technique characterized by mechanical stretching on the nervous system, which is performed with the objective of decreasing tension, pain, and improve flexibility. Most of the analyzed papers show the benefits brought by the technique of neural mobilization, but there is a shortage in the quantity of work. Stroke is a global health problem due to impacts on quality of life, which makes the physical capacity of individuals post stroke 40% lower when compared to normal individuals of the same age. To evaluate the applicability and efficacy of neural mobilization in patients with stroke. **Methods:** The study is a randomized blinded clinical trial. The study included twelve volunteers, aged 20 to 80 years, diagnosed with ischemic stroke or hemorrhagic stroke. Five mobilizations of 60 seconds was performed in bilateral sciatic nerve. Checking the degree of balance and gait of volunteers, besides the immediate post-muscle strength and flexibility of the quadriceps and hamstrings before the intervention and after 10 sessions 3 times a week. To determine the normal range of values found were used the Shapiro Wilk test. For data with normal distribution, ANOVA with post hoc Tukey were used. **Results:** By analyzing the results, we can realize the efficacy of neural mobilization in neurological patients, their applicability in flexibility, muscle strength in the lower limb, gait and balance in these patients. **Conclusion:** According to this study it was possible to verify the applicability of neural mobilization in patients with neurological sequelae of AVE stroke was effective. However, it is necessary that further studies are conducted with a larger amount of voluntary on the approach of this technique in patients with neurological sequelae.

PA842

Developing a Protocol with Virtual Reality for a Cardiorespiratory Fitness in a Healthy Man: Preliminary Results

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Background: The Virtual Reality (VR) is defined as an immersive, three-dimensional interactive generated by a computer system, which occurs in real time, being the seventh generation of video game (VG) a resource of RV. The new VG has proposed to promote cardiorespiratory fitness (CF) simulating the practice of physical activities of their users, but many questions remain whether these VG are capable of promoting cardiorespiratory fitness as well as there are no established protocols for this type of intervention. The American Heart Association and the American College of Sports Medicine recommend low-intensity physical activity to promote health and vigorous physical activity to promote CF. We know that sedentary subjects undergoing regular physical activity promotes a CF, so it is expected that performing physical activities with VG is also possible to obtain. **Objective:** Evaluate by a previously established protocol the frequent and regular exposure to exercises using a VG promote cardiorespiratory fitness. **Setting:** Physical Medicine and Rehabilitation Institute of Clinical Hospital, São Paulo University, Brazil. **Materials/Methods:** The present study shows the preliminary results of male voluntary with 53 years old which was subjected an experimental protocol using the Nintendo® Wii console. Initially all the games have been tested by the researchers using a frequency meter, measuring the games that had higher heart rates (HR). Three games were selected: FreeRun, FreeStep (Wii Fit) and Boxing (Wii Sports). Before starting the protocol, the volunteer was assessed by cardiopulmonary exercise test (treadmill ergometer and electrical Inbramed Millenium® serial interface RS-232 - Micromed Biotecnologia®) and reassessed after 15 weeks. During interventions volunteer used a frequency counter to monitor the FC. Blood pressure was measured before beginning the exercise protocol and after 5 minutes. **Results/Conclusion:** Through the protocol was observed that there was a significant increase in HR, with one possible CF and the home use of VG.

PA843

Early Neurorehabilitation in Patients with Stroke

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The incidence of stroke in different regions of Kazakhstan on average 2.5-3.7 cases per 1,000 people, the mortality rate from stroke ranged from 1.0 to 1.8 cases per 1,000 people per year. Primary stroke averages 75%, re - about 25% of all strokes. After 45 years every decade, the number of strokes in the relevant age group doubled. Analyzed the results of 2,072 patients Rehabilitation Hospital ambulance service. At that ischemic stroke was diagnosed in 1,399 cases (67.5%), hemorrhagic stroke 257 (12.4%), transient ischemic attack 395 (19.1%), stroke, not specified as haemorrhage or infarction 21 (1.0%). In 829 patients (40%) recorded the "syndrome of painful shoulder," in 311 (15%) arthropathy. In 140 (45%) patients with arthropathy they spread on the elbow and shoulder joints, in 171 (55%) on the paretic leg joints. By the end of stroke acute period aphasia observed in 744 (35.9%), dysarthria, 278 (13.4%). The very process of restoring movement occurs on average in the first 3-6 months after the stroke, in this period was the most expedient to the active motor rehabilitation and restoration of complex motor skills noted a year later started the rehabilitation field. Rehabilitation begins with the first days after a stroke, patients motor deficit is not stopped until the end of the first month, the recovery of motor function was poor in 767 (37.7%). Classes are held not more than 15-20 minutes several times a day, starting with a passive verticalization. The recovery process of movement and speech disorders recovery occurs on average in the first 3-6 months after the stroke, in this period was the most expedient to the active motor rehabilitation and restoration of complex motor skills noted a year later started the rehabilitation field. Thus, rehabilitation after ischemic stroke is faster and easier than after hemorrhagic. The outcome and consequences of stroke not only depend on the timing of rehabilitation, but also on perseverance and desire to recover from a stroke on the part of the patient and his family.

PA844

Correlation of the Score in Balance Games of Nintendo Wii® with Scores on Berg Balance Scale in Patients Post Stroke: Preliminary Results

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Introduction: Videogames on the balance platform (VGP) has gained prominence in the acquisition of postural control in post stroke patients. At the end of each game the VBP promotes a score according to the ability of each user but this score is not validated and can not be used as a quantitative parameter of clinical outcome being necessary for therapists to use already validated scales such as Berg Balance Scale (BBS) to quantify the clinical outcome of their patients. **Objective:** To correlate the score balance games VBP with a score of Berg balance scale in patients after stroke. **Setting:** Physical Medicine and Rehabilitation Institute of Clinical Hospital, São Paulo University, Brazil. **Interventions:** Performed with the Nintendo® Wii® VBP twice a week for twenty-three weeks associated with conventional physiotherapy in the days of the interventions. **Methods:** Participated in the experiment 06 volunteers of both sexes, average age of 48.33 (± 12.58) years, with a diagnosis of ischemic stroke and/or bleeding more than six months. Intervention was used for the game Penguin Slide® in VBP, where the average score of five interventions initially and after twenty-three weeks was obtained as well as BSE. Obeying a normal distribution was performed Pearson's coefficient for the correlation of average scores with BSE. Subsequently compared the initial and twenty-three weeks after the Student *t*-test score. For statistical analysis we used the Excel®

software with $p < 0.05$. **Results:** Observed amoderate correlation using Pearson's ($p = 0.56$) between the initial scores of the Game Penguin Slide® and BBS, and moderate correlation ($p = 0.59$) with the final scores. There was a significant difference between the scores of BBS before and after the intervention ($p = 0.006$) as well as the average scores of the Game Penguin Slide® ($p = 0.002$). **Conclusions:** In this analysis it is possible to observe that there was a significant difference in scores and that this increase was also significant in the acquisition of the balance, but the variables do not show significant correlations so, which demonstrates that BBS is even more effective than the score.

PA845

Post-Concussion Syndrome at 1, 3 and 6 Months after Mild Traumatic Brain Injury

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Introduction: This study investigates the incidence and pattern of post-concussion syndrome (PCS) in mild traumatic brain injury (MTBI) patients within the first six months and its association with quality of life (QOL). **Material and Methods.** Patients admitted for MTBI were recruited prospectively from a single center. Rivermead Post Concussion Questionnaire (RPQ) and Quality of Life after Brain Injury (QOLIBRI) scores between MTBI patients with and without PCS were compared at different intervals. **Results.** Fifty-three patients were included in the study. PCS incidence reduced from 37.7% at one month to 16.7% at six months post injury. Somatic symptoms were reported early after MTBI whereas cognitive symptoms were more common at a later stage but total symptom resolution was not achieved at six months. Patients suffering from PCS documented a lower QOLIBRI score ($p < 0.001$) and there was a significant negative correlation between RPQ and QOLIBRI score both at three months ($p < 0.001$, $r = -0.785$) and six months ($p < 0.001$, $r = -0.777$). **Conclusion.** The incidence of PCS after MTBI was highest at one month and declined with time. Patients suffering from PCS showed a negative effect on their QOL. Early detection of PCS and a longer follow up beyond six months may be required to ensure optimal management of MTBI patients with PCS.

PA846

Chemodenervation in Cerebral Palsy GMFCS V for 8 Years - Pain Relief and Weight Gain: a Case Report*N. Y. Kwon¹, Y.-T. Kim²¹Seoul, ²The Catholic University of Korea, Seoul, KR

Botulinum toxin and phenol nerve block are methods of the therapeutic options for spasticity of cerebral palsy. Decrement of spasticity is announced from many studies, but effects of other quality of life were few examined closely so far clearly. We report the case of an adult with cerebral palsy GMFCS V, who experienced effects on pain relief and weight gain after repeated chemodenervation for 8 years. A 25-year-old cachectic female patient weighing 42kg visited our clinic with complaints of increasing spasticity and pain on all extremities. The patient received 9 sessions of chemodenervation including botulinum toxin A (Botox® or Dysport®) and phenol injections into affected muscles and nerves during 8 years follow up period with intervals of approximately 1 year. Along with the reduced muscle tones, improved pain score from about VAS 8 to 4, and the weight gain to 60 kg were achieved.

PA847

Developing a Protocol with Virtual Reality for a Cardiorespiratory Fitness in a Healthy Guy: Preliminary Results

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Background: The Virtual Reality (VR) is defined as an immersive, three-dimensional interactive generated by a computer system, which occurs in real time, being the seventh generation of video game (VG) a resource of RV. The new VG has proposed to promote cardiorespiratory fitness (CF) simulating the practice of physical activities of their users, but many questions remain whether these VG are capable of promoting cardiorespiratory fitness as well as there are no established protocols for this type of intervention. The American Heart Association and the American College of Sports Medicine recommend low-intensity physical activity to promote health and vigorous physical activity to promote CF. We know that sedentary subjects undergoing regular physical activity promotes a CF, so it is expected that performing physical activities with VG is also possible to obtain. **Objective:** Evaluate by a previously established protocol the frequent and regular exposure to exercises using a VG promote cardiorespiratory fitness. **Setting:** Physical Medicine and Rehabilitation Institute of Clinical Hospital, São Paulo University, Brazil. **Materials/Methods:** This study presents the preliminary results of a voluntary male of 53 years underwent an experimental protocol using the Nintendo® Wii console. Initially all the games have been tested by the researchers using a frequency meter, measuring the games that had higher heart rates (HR). Three games were selected: FreeRun, FreeStep (Wii Fit) and Boxing (Wii Sports). Before starting the protocol, the volunteer was assessed by cardiopulmonary exercise test (treadmill ergometer and electrical Inbramed Millenium® serial interface RS-232 - Micromed Biotechnologia®) and reassessed after 15 weeks. During interventions volunteer used a frequency counter to monitor the FC. Blood pressure was measured before beginning the exercise protocol and after 5 minutes. **Results/Conclusion:** Through the protocol was observed that there was a significant increase in HR, with one possible CF and the home use of VG.

PA848

Effect of Different Frequencies in Low-Frequency Repetitive Transcranial Magnetic Stimulation on Non-Fluent Aphasia in Patients with Stroke

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Background: Low-frequency repetitive transcranial magnetic stimulation (rTMS) has been recently reported to be clinically beneficial for post-stroke patients with non-fluent aphasia. But the best frequency of rTMS has not been settled yet. The aim of this pilot study was to compare the effect of two low frequencies of rTMS on non-fluent aphasia in patients with stroke. **Methods:** Sixty patients were randomly assigned into 0.5 Hz group, 1 Hz group and control group. All three groups received traditional language therapy. Subjects in 0.5 Hz group received 0.5 Hz rTMS over the Broca's area of unaffected hemisphere and the intensity was set at 90% motor threshold (MT), 16 s' stimulation with an interval of 3 s' for 48 times (384 pulses). Subjects in the 1 Hz group received 1 Hz, 90% MT, 8 s' stimulation and 3 s' interval for 82 times (656 pulses) rTMS over the Broca's area of unaffected hemisphere. All group received 3 weeks therapy for 5 sessions per week. Before and after the treatment, subjects were assessed by the first 4 items of Western Aphasia Battery (WAB), including spontaneous speech, auditory comprehension, repetition, naming and Communicative Abilities in Daily Living (CADL) test. **Results:** Subjects in the rTMS groups showed significantly improved ($P < 0.05$) in first 4 items of WAB and CADL after training while subjects in control group only improved in the item "spontaneous speech" after the three weeks training. When compared among groups after training, the two rTMS training groups got higher scores than the control group in the first 4 items of WAB and CADL ($p < 0.05$) while there is no statistical difference between the two rTMS groups. **Conclusion:** The two frequency of rTMS combined with traditional therapy could improve the language function in patients

with non-fluent aphasia after stroke. 0.5Hz rTMS could be the priority choice in clinical treatment since the total number of stimulus pulse of was the little.

PA849

Effectiveness of Low-Frequency Repetitive Transcranial Magnetic Stimulation for Upper Limb Function in Patients with Chronic Stroke

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Background: Recent reports demonstrated that low-frequency repetitive transcranial magnetic stimulation (rTMS) over the unaffected hemisphere improved the affected upper limb function in chronic stroke patients. We investigated whether 0.5 Hz subthreshold rTMS improved the affected upper limb functions in patients after stroke. **Objective:** To investigate the effect of low-frequency rTMS on upper limb function recovery of patients with chronic stroke. **Methods:** 30 patients were randomly assigned to control group, sham rTMS group and rTMS group, ten participants per group. All patients were treated with conventional medical treatment and rehabilitation training. rTMS group received 0.5 Hz, 90% MT rTMS over the Primary motor cortex area (M1) of the unaffected hemisphere for four weeks. The indices of neural electrophysiology and upper limb function in the affected brain area were evaluated at pre-treatment and post-treatment (Post 1: After 2 weeks treatment. Post 2: After weeks treatment), including the MEP latency, CMCT, FMA and FTHUE-HK. **Results:** There is no significant difference among all indices in control and sham rTMS groups in any period ($P > 0.05$). At Post 1, CMCT of rTMS group was improved and was much better than control and sham rTMS groups ($P < 0.05$). At Post 2, CMCT of control and sham rTMS groups showed significant improvements compared with pre-treatment. MEP latency and CMCT in rTMS group were shorter than control and sham rTMS groups ($P < 0.05$). FMA score in rTMS group was improved after treatment ($P < 0.05$). **Conclusions:** Sub-threshold 0.5 Hz rTMS on the unaffected hemisphere provides the most effective treatment for enhancing the excitability of motor cortex of affected brain area and motor function of paretic upper limb.

PA850

Exoskeletal Gait Rehabilitation with the HAL® Robot Suit in Patients with Chronic Stroke – Preliminary Results of a Crossover Study

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Introduction/Background: Chronic stroke is one the most common causes of acquired disability and of impact on gait function. A lot of exoskeletons have been developed as medical aids or in order to support gait rehabilitation in patients with disabilities. A pilot study with the exoskeleton Hybrid Assistive Limb (HAL®, Cyberdyne) could demonstrate that locomotor training is feasible for chronic stroke patients I. The aim of our recent trial was to assess HAL®-based rehabilitation and conventional physiotherapy in a crossover study. We hypothesized that both interventions would lead to improvement of gait functions parameter. We present our preliminary results. **Material and Methods:** 5 patients with chronic stroke and incomplete paresis of the leg participated so far. All patients took part in body-weight supported treadmill training (BWSTT) with HAL® robot suit and conventional physiotherapy (CPT) training programs each over 30 sessions (30 min/day within 5 days/week). All 5 subjects received HAL®-based training first, followed by a 1-week break, and then received CPT (sequence A). Ongoing sub-

jects will participate in CPT first, followed by a 1-week break and then participated in HAL®-based training (sequence B). Primary outcome parameters were time, walking speed, cadence, number of steps recorded during 10-meter-walking-test (10MWT), distance in 6-minute-walking-test (6MWT) and time during timed-up-and-go-test (TUG). All outcome measures were evaluated without wearing HAL® assistance before, at crossover and after intervention. **Results:** All patients completed training with no adverse events. HAL® exoskeleton BWSTT led to an improvement of gait speed, time, cadence, number of steps during the 10MWT. Treadmill parameters improved (walking distance, speed), too. After subsequent CPT, functional parameters increased further. Improvement did not depend on time since stroke. **Conclusion:** Preliminary results show that subsequent HAL®-based treadmill training and CPT are feasible to improve gait parameters in chronic stroke patients. Improvement does not depend on time since stroke. A predominance of one training method could not be stated so far. More patients will be included in our ongoing study. **Reference:** Kawamoto, H. *et al.* Pilot study of locomotion improvement using hybrid assistive limb in chronic stroke patients. *BMC Neurol* 13, 141 (2013).

A.7.1. SENSORY AND MOTOR CONTROL (INCLUDING POSTURAL CONTROL)

PA851

Influence of Different Types of Mastication on Postural Control in Health Subjects and Temporomandibular Disorder Patients

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Background: Several studies have focused on the possibility of a potential functional link between trigeminal afferents and other systems related to balance control in humans however, this relationship is still controversial. **Objective:** This study investigated whether bilateral and unilateral mastication influences the postural control in health subjects and TMD patients. **Material and Methods:** Following ethical approval, 14 healthy adults and 14 TMD patients volunteered to participate in the study. Stabilometric and kinematic data were recorded during quiet standing and after 40 s (pre-mastication) individuals were requested to perform mastication for 35 s (mastication) and remain in a static position for 40s (post-mastication) (total=125 s). For each trial moment a period of 30 s was selected and the three periods then were compared. In stabilometric analysis, area, velocity and frequency parameters of the center of pressure displacement were analyzed. In kinematic analysis, bilateral joint (hip, knee and ankle) and head position data was acquired to establish the amount of wobble and the strategies of movement used to maintain balance during tests. The root mean squared (RMS) was used to represent the variability of joint angle and head position during the three conditions analyzed (pre, during and post-mastication). **Results:** The different mandibular positions during mastication did not show consistent effects on the stabilometric and kinematic measurements assessed in the present study in health subjects and TMD patients regardless of visual input (eyes open and eyes closed). The lack of consistency in the differences in stabilometric and kinematic parameters among the experimental masticatory conditions reinforces possibility that the trigeminal sensorial afferences do not have an influence on balance control. **Conclusions:** The results reported in the present study show that the static balance in health subjects and TMD patients is not amended during bilateral and unilateral mastication (The study is funded by FAPESP: 2013/16386-5).

PA852

Influence of Sensory Motor Activity Protocol on Hand Writing Skills of Children with ADHD

***V. Devan, S. K. Mathangi**

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Introduction: Hand writing is an important task learned during the early school years. Elementary school children typically spend up to 65% of the school day engaged in the paper and pencil tasks. When children with Attention Deficit Hyperactive Disorder (ADHD) were compared with the children without the disease, they showed a poor handwriting as characterized by illegible written material and inappropriate speed of performance. The most common reason for a student to be referred to school-based occupational therapy services is handwriting difficulties. **Method and Material:** 30 children, diagnosed with ADHD using ADHD rating scale IV were assigned randomly to experimental and control group with 15 children in each group. Conventional occupational therapy program was common for both groups. The experimental group received the sensory motor activity protocol for one hour 5 days in a week for 8 weeks in addition to conventional occupational therapy program. The main outcome measure used was Minnesota Handwriting Assessment (MHA) and SPSS 16 was used for statistical analysis. **Result:** Using MHA scale we could assess hand writing skills like rate, legibility, form, alignment, size, space which was evident from the *t* value are as follows for experiment group Rate 8.34, Legibility 6.20, Form 7.71, Alignment 7.90, Size 6.63, Space =8.08. Experimental group demonstrated significant improvements in all components when compared to the control group which was strongly statistically significant. (P value>0.05) **Conclusion:** In our study the Sensory motor activity protocol improved the handwriting skills. Therefore, the sensory motor activity protocol is an effective adjunct to conventional occupational therapy in handwriting skills for children with ADHD. **Bibliography:** 1) Nadine Mackay, Annie McCluskey, Rachel Mayes; The Log Handwriting Program Improved Children's Writing Legibility: A Pretest-Posttest Study, *AJOT*; 2010 Jan/Feb Vol 64, number 1, pg 30 -36. 2) Marie Rossard Racine, Annette Majnemer, Michael Shevell, Laurie Snider ; Hand writing performance in children with Attention deficit hyperactivity disorder (ADHD), *Journal of Child Neurology*; 2008 Apr; vol 23, number, pg 399 – 406.

PA853

Size Principle in Recruitment Patterns of Human Soleus H and M Waves: Evidences from Acute Ischemia to Motor Nerve Fibers

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Objectives: To observe the effects on the soleus H-reflex and associated M-wave during acute compression/ischemia to motor nerve fibers distal to the knee. **Introduction:** The H-reflex is used in the clinical setting to test the stretch reflex of the S1 nerve via electrical stimulation of the Ia sensory fibers from soleus muscle spindles, which involves central recruitment of the alpha motor neurons. The M wave is recruited by electrical nerve stimulation to the motor fibers in the tibial nerve. This study aims to observe the effects of acute compression/ischemia to the motor nerve fibers at distal to the knee during soleus H reflex testing. **Methods:** This prospective study measures the H-reflex on 5 volunteer PM&R resident physicians. Electrical stimulation to the tibial nerve at the popliteal fossa was titrated to elicit both M and H waves, with ratios of amplitudes at 1:1. Compression by a blood pressure cuff was applied at the proximal tibia distal to the recording electrodes on the soleus muscles. Stimulations at intervals of 2 seconds were delivered to the tibial nerve at the popliteal fossa: before, during, and post cessation of compression. **Results:** These testing results displayed significantly decreased or loss of the M-wave during

compression/ischemia. This was present throughout all intervals of compression. Following cessation of compression, the M-wave, immediately, returned to baseline amplitude, waves form and latency. The H-reflex through these studies showed no significant change in wave form and amplitude. **Conclusion:** A focal compression of sufficient to produce rapidly reversible conduction blocks affects the fast-conducting large myelinated motor nerve fibers producing M waves before the slower conducting small motor fibers. This disassociation between the decrement of M-waves and H-waves during acute partial ischemia, (which affects mostly larger nerve fibers), reflects their different motor neuron compositions. M waves recruit larger motor nerve fibers and are more susceptible to ischemic blockade applied. By contrast, the H-reflex, like voluntary contraction, firstly recruits small motor neurons with their nerve fibers less affected by ischemia. These findings are of important significance in the recognition and application of size principle in motor rehabilitation with therapeutic and functional NMES.

PA855

Size Principle and the Motor Units Recruitment of the Soleus H And M Wave: Evidence from an Experiment of Acute Ischemia and Significance for Motor Rehabilitation

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PA856

Size Principle and the Motor Units Recruitment of the Soleus H and M Wave

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Objectives: To observe the effects on the soleus H-reflex and associated M-wave during acute compression/ischemia to motor nerve fibers distal to the knee. **Introduction:** The H-reflex is used in the clinical setting to test the stretch reflex of the S1 nerve via electrical stimulation of the Ia sensory fibers from soleus muscle spindles, which involves central recruitment of the alpha motor neurons. The M wave is recruited by electrical nerve stimulation to the motor fibers in the tibial nerve. This study aims to observe the effects of acute compression/ischemia to the motor nerve fibers at distal to the knee during soleus H reflex testing. **Methods:** This prospective study measures the H-reflex on 5 volunteer PM&R resident physicians. Electrical stimulation to the tibial nerve at the popliteal fossa was titrated to elicit both M and H waves, with ratios of amplitudes at 1:1. Compression by a blood pressure cuff was applied at the proximal tibia distal to the recording electrodes on the soleus muscles. Stimulations at intervals of 2 seconds were delivered to the tibial nerve at the popliteal fossa: before, during, and post cessation of compression. **Results:** These testing results displayed significantly decreased or loss of the M-wave during compression/ischemia. This was present throughout all intervals of compression. Following cessation of compression, the M-wave, immediately, returned to baseline amplitude, waves form and latency. The H-reflex through these studies showed no significant change in wave form and amplitude. **Conclusion and Discussion:** A focal compression of sufficient to produce rapidly reversible conduction blocks affects the fast-conducting large myelinated motor nerve fibers producing M waves before the slower conducting small motor fibers. This disassociation between the decrement of M-waves and H-waves during acute partial ischemia, (which affects mostly larger nerve fibers), reflects their different motor neuron compositions. M waves recruit larger motor nerve fibers and are more susceptible to ischemic blockade applied. By contrast, the H-reflex, like voluntary contraction, firstly recruits small motor neurons with their nerve fibers less affected by ischemia. These findings are of important significance in the recognition and application of size principle in motor rehabilitation with therapeutic and functional NMES.

A.7.2. SPASTICITY MANAGEMENT

PA857

Arm Spasticity Can Be Reversible Even After Decades: a Case Report Treated with Local Vibration

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Introduction/Background: To report the clinical effect of Local Vibration (LV) on spasticity of the right arm in a patient with long-term hemiplegia. Spasticity is one of the main secondary effects of stroke, and it can be modulated by peripheral and central inputs and physical therapy. However, it's not clear whether the effects of spasticity could be reversible even after more than two decades. **Material and Methods:** Patient 62 years old had right hemiplegia, long-lasting for more than 20 years after a juvenile hemorrhagic stroke in the left fronto-parietal cortex. The patient presented flexor hypertonia of the upper extremity with severe limitation in the range of motion (ROM) of the elbow. He was evaluated before starting treatment (T0), after the last session (T1) and 4 months after the last session (T2). The spasticity of the biceps brachii was evaluated using the modified Ashworth scale (MAS) and the Dr-Gonometer® for elbow ROM. Rehabilitation program focused on passive mobilization, muscle stretching and LV (30 Hz) applied on triceps brachii, the upper limb antagonist of the flexor biceps brachii. The treatment lasted 10 sessions, 3 times a week. **Results:**

Clinically significant reduction of flexor hypertonia occurred, with increased range of motion of the upper extremity and improvements in daily living activity. LV (30 Hz) applied on the upper limb extensor triceps brachii induced clinically significant and long-lasting reduction of flexor hypertonia, with increased range of motion of the upper extremity and improvements in daily living activity. *Conclusion:* Flexor hypertonia of the upper extremity is a functional phenomenon involving neural and muscular plastic changes, which can be reversible, at least in part, even after decades if osteomuscular structural changes had not secondarily occurred. This study confirms the relevance of reciprocal inhibition induced in the agonist muscle when a vibratory stimuli is applied to the antagonistic muscle.

PA858

Botulinum Toxin Therapy for Spasticity: Objective Measures to Predict the Best Time for New Application

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Introduction: Spasticity is characterized by an increase in muscle tone due to hyperexcitability of the stretch reflex. Clinically, patients may experience muscle tightness that is often painful and limits function. Conservative management is essential, but alone is often inadequate to effectively control it. Therefore, local injections of botulinum toxin (BTX) – a potent biological toxin that blocks neuromuscular transmission via inhibiting acetylcholine release - have become the first choice for the treatment of focal spasticity. The main objective of this study was to evaluate the need and the best timing for repeat administration of BTX to obtain gains in reducing spasticity, gaining range of motion (ROM) and achieving muscle strength. *Material/Methods:* Retrospective study. Included patients with focal spasticity. Data were collected from medical files and included: injury etiology, number and moment of BTX applications, pre and post-intervention values for spasticity (Modified Ashworth Scale), ROM (goniometry), muscle strength (Medical Research Council scale). Patients were reevaluated at months 3, 6, 12 and 18. Data were computerized and analyzed using SPSS17.0. *Results:* 106 patients; 58.9% men; mean age 53.1±18.4 years. Regarding the etiology, 76.8% were secondary to spinal cord injury, 17.9% stroke, 3.6% multiple sclerosis and 1.8% traumatic brain injury. For the three aforementioned parameters - spasticity, ROM, muscle strength - the proportion of individuals who improved from time 0 to time 1 was statistically significant ($p < 0.01$, $p < 0.001$, $p = 0.001$, respectively). In 55.4% of subjects, just one application of BTX was made, keeping the initial favorable results, at month 12. For those who needed to repeat treatment, the average months until new application was 13.84±8.09. *Conclusion:* This study was performed because in our clinical practice we found improvement in parameters analyzed under few applications or applications more spaced in time, than in literature. A careful application and a good technique followed by rehabilitation treatment may mean a decrease in the number of applications. This highlights the effectiveness of BTX, with less stress and costs to the patient. The intervention should not be based on the timings mentioned in the literature, the evaluation of the patient should be individualized, focusing on their goals and gains.

PA859

Focused Low Energy Shock Waves in the Rehabilitation of Spasticity, Dystonia and Muscular Stiffness in Children and Adults. An Overview

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Focused extracorporeal shock wave therapy (ESWT) promotes endothelial nitric oxide production, is stimulating angiogenesis and neurogenesis. Former investigations with rats show that ESWT of the damaged spinal cord and crushed peripheral nerves improves

the motor activity and the sensitivity. From 1996 till today, ESWT evolved into several fields of the neurological rehabilitation of mainly Italian and German authors. There will be given an overview of the results (12 publications up to november 2014) of different authors treating the symptoms of spasticity, dystonia and muscular stiffness in children suffering from cerebral palsy and adults suffering from stroke and multiple sclerosis. The quality of the investigations is very different. The numbers of the patients treated are still small, some studies deal only with casuistics. But the results obtained so far open a fascinating horizon for the ESWT in the field of neurological rehabilitation. The purpose of this overview is to encourage more investigations in this interesting field.

PA860

The Preferences of Physical Medicine and Rehabilitation Residents for BoNT-A Injection Guidance

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Introduction: Focal treatment of spasticity with botulinum toxin type A (BoNT-A) is a highly effective and safe treatment method if applied with the right technique. Manual palpation without guidance, electrical stimulation (ES) guided and ultrasonography (US) guided interventions are commonly used in BoNT-A injections. In this study, we aimed to learn preferences of physical medicine and rehabilitation residents (PMRr). *Materials and Methods:* Twelve PMRr who have applied at least five times each of these techniques completed survey questionnaire. *Results:* The application techniques are preferred for their following features; practicality, reliability, effectiveness, size and location of the muscle to be applied. The most common preferred technique in upper extremity (UE) application is US. Reliability was in the forefront of the first preference of ultrasonography. However, in lower extremity injections, the PMRr's first choice was palpation, and US was the second. In pediatric patients, the first choice was US. The choice of the applied intervention technique was also differing depending on the muscle location and size. Residents preferred palpation for gastrocnemius-soleus and biceps; US for tibialis posterior, forearm and hand muscles. The percentage of rated effectiveness of each technique for lower and upper extremities separately. *Conclusion:* The residents preferences were affected with the muscle size and location, practicality, the time required for, the reliability of the methods. Accordingly, they preferred US for small forearm and hand muscles, and difficulty localized leg muscles. For easily localized leg muscles, they preferred palpation technique because they found it a practical and quick method. *Keywords:* botulinum toxin, spasticity, techniques of application.

PA861

The Assessment of Medical Adherence of Neuro-Rehabilitation Patients to Anti-Spasticity Drugs

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Introduction: Spasticity is a motor disorder, characterized by a velocity-dependent increase in muscle tone resulting with motion limitation and contractures. It may occur in cerebral and spinal disorders such as stroke, cerebral palsy (CP), multiple sclerosis (MS), traumatic brain injury (TBI), spinal cord injury (SCI). It is important to ensure the medication adherence in patients with chronic diseases. Medication compliance is affected in the treatment of spasticity because of long term use and additional drug use. The aim of the current study is to explore the medication adherence in patients treated with oral antispasticity drugs in Turkish population. *Material and Methods:* The patients diagnosed with stroke, CP, MS, TBI and SCI with spasticity applying to Afyon Kocatepe University Physical Medicine and Rehabilitation inpatient and outpatient clinics were included in the study. Demographic data age, gender,

education level were recorded. Oral antispasticity medication, dose and duration, the number of other drugs received, and associated complications were evaluated. Patients were also asked for if they use their drugs themselves or anybody else takes care of it, and how often they forget to receive. **Results:** Totally 100 patients were included in this study; 31 stroke, 15 CP, 7 MS, 5 TBI and 42 SCI. Of the patients, 61% were male. Medication adherence was widely poor; 52% of patients were non adherent. There was no statistically significant relationship between medication compliance and gender, education level, type of disease, dose of the drug, duration, and caregiver (p values: 0.681, 0.287, 0.694, 0.369, 0.345, and 0.385 respectively). The spasticity medication adherence was decreased with the increase in number of the drugs used ($p=0.042$, $r=-0.344$). **Conclusion:** Drug compliance; usually refers to whether patients take their medications as doctors prescribe to patients. Active, collaborative participation of patients is required to achieve effective treatment. However, using multiple medications may affect patient compliance. Physicians who treat spasticity; must keep in mind that nearly half of the patients are non-adherent with oral antispasticity medications before making changes in their treatment regimen. **Keywords:** Spasticity, anti-spasticity drugs, medical adherence

PA862

Static and Dynamic Balance Modifications after Treatment of Focal Spasticity with Botulinum Toxin

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Introduction: the aim is to evaluate and quantify the effects on balance, posture and postural compensation strategies of Botulinum Toxin inoculation in adult's leg muscle with spasticity through the observation of changes in barycentre (BCG), postural oscillation and in somatosensory, visual and vestibular afferences. **Material and Methods:** 14 patients with spasticity in the leg's muscle as to interfere with the posture and balance, static and dynamic, underwent injection of Botulinum Toxin with an average dose of 300 IU. Before and 20 days after treatment, patients were evaluated in a study in cinematic and stabilometric and built environment through the use of the Smart Balance Master. The parameters taken into consideration were: assessment of BCG with his eyes closed, opened and during the oscillation of platform stabilometric or walls of the system; sensory analysis through the study and differentiation of afferent somatosensory, visual and vestibular; joint strategies of compensation; analysis of the clue of the postural oscillations and the study of the trajectories and speed to achieve an end-point in stable situation and dynamized. **Results:** after injection has seen an overall improvement of the data considered. There has been a better control of BCG, both with eyes closed and open, and a decrease of postural oscillations as demonstrated by the analysis of balls. The trajectories for reaching end point are improved and, in some patients, it has recovered the ability to achieve the target in the injured side and a reduction of compensation strategy in the exercise execution were observed. The sensory analysis showed an improvement of somatosensory components in the recovery of balance compared to the visual and vestibular one, but difficulties during the dynamic situation persisted. **Conclusion:** now demonstrated the efficacy of Botulinum Toxin in reducing spasticity and the disappearance of foot clono destabilizing in this study is also supported by the higher center of gravity and postural control. At the physiological support of the foot to the ground follows a best set-up and control the balance shown by a decrease in the number and velocity of postural oscillations and the best ability to achieve a predetermined end point resulting in improved functional abilities of the patients.

PA863

The Effectiveness of the Robotic Reconstruction Walk on "Lokomat" in Patients with Spastic Hemiparesis

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Study the effectiveness of multiple inclusion robotic reconstruction walk (PX) in comprehensive programs of patients with spastic hemiparesis. **Materials and Methods:** The study included 264 patients with spastic hemiparesis (181 after stroke and 83 patients after TBI), patients were randomized into three groups - one group of patients treated with the multiplicity of procedures PX 6 times a week, in group 2 patients received PX 3 times week 3 was a control group - patients did not receive the procedure PX. Patients were divided into subgroups based on duration of the disease: 11 (n=32), 21 (n=36) and 31 (n=27) - TDOA diseases in patients, 12 (n=58), 22 (n=61) and 32 (n=50) - in the PVP. All patients underwent physical therapy sessions with an instructor training of the stereotype walk further in groups 1 and 2 were performed procedures PX. The course of treatment - 21 days. **Results:** At the end of treatment as a result of the testing on scales Fugl - Meyer, Ashworth and Perry in all groups, we observed a significant decrease in general motor deficit, the degree of motor impairment in the leg extensors decrease spasticity in the legs, with the degree of improvement in these parameters was significantly greater in groups 1 and 2 compared to group 3. We observed a significant improvement in functional mobility, increasing the period of support, reduction of the period of the transfer to the paretic leg in subgroup 11 compared with the subgroup 21. On the efficiency of a gradual increase in the axial load on the paretic leg trajectory analysis indicates migration center (TMC) feet under pressure at the end of a course of training in the comparison between subgroups 12 and 21: $702.89 + 591.54$ g/cm and $978.02 + 1,206.51$ g/cm, respectively ($p=0.008839$). Thus significant differences described above kinematic parameters in a comparative analysis 12, 22 we did not observe. **Conclusion:** PX "Lokomat" is an effective technique in relation to the recovery of the stereotype walk in patients with spastic hemiparesis in RAH and PVP.

PA864

Utilization Patterns and Effectiveness of OnabotulinumtoxinA for the Treatment of Spasticity: the Adult Spasticity International Registry on BOTOX® Treatment (ASPIRE) Study Methods

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Introduction/Background: Spasticity is a chronic and debilitating neurological condition, caused by various etiologies, that has a negative impact on physical functioning and overall quality of life. OnabotulinumtoxinA is approved for the treatment of spasticity; however, treatment is individualized, variable, and dependent on numerous factors. In order to optimize treatment, more data is needed to understand effective administration strategies. **Material and Methods:** This is an international, multicenter, prospective observational study being conducted at select sites in North America, Europe, and Asia (NCT01930786). The primary study objectives are to assess treatment administration patterns, evaluate patient and physician satisfaction with onabotulinumtoxinA treatment, and estimate incidence of botulinum toxin treatments for other indications among patients treated with onabotulinumtoxinA for spasticity. Additional objectives include examining onabotulinumtoxinA usage patterns for the treatment of additional therapeutic/cosmetic indications among spasticity patients treated with onabotulinumtoxinA, estimating incidence of adverse events, evaluating the impact of spasticity on patient-reported outcomes, and assessing caregiver burden through outcomes data. Treatment schedules are not mandated by the study protocol and are determined by the participating physician based on clinical judgment and patient preferences. Spasticity patients of multiple etiologies (eg, stroke, traumatic brain inju-

ry, spinal cord injury, multiple sclerosis, and cerebral palsy) treated with onabotulinumtoxinA for spasticity, including those who have received treatment in the past, are eligible. Demographic and clinical characteristics are reported at baseline. OnabotulinumtoxinA administration, adverse events, and physician satisfaction information are collected at the first treatment and every follow-up thereafter (approximately every 12 weeks). Patient- and caregiver-reported outcomes data are collected at the first treatment and at 5 ± 1 weeks follow-up. **Results:** This study is targeting enrollment of ≥ 500 patients across approximately 25 US and 15 international sites over an estimated 15 month period. As of October 2014, the following patients were recruited: 146 US, 123 Germany, 19 Italy, 14 Taiwan, 15 UK, 4 Spain. Recruitment in France is pending initiation. **Conclusion:** ASPIRE is designed to assess real-world utilization patterns, safety, and effectiveness of onabotulinumtoxin A for the treatment of spasticity. By providing real-world data on the management of spasticity with onabotulinumtoxinA, results from ASPIRE will help inform physicians on optimal treatment administration strategies to achieve maximum effectiveness.

PA865

Spasticity Management Using Two Different Intra-thecal Drug Delivery Devices – the Pinderfields Way!

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Background/Objective: Spinal cord injury (SCI) is a traumatic life altering event. It is associated with loss of motor and/or sensory function. Spasticity occurs as a secondary complication and is frequently associated with SCI. It is known to cause further functional impairment. Spasticity can be managed by preventative measures/pharmacotherapy/surgical intervention-implantation of intrathecal drug delivery device (IDDS). Although this is popular and promising, it has technical flaws which can be fatal. We have been using a second type of IDDS as we encountered complications with a previously used IDDS. This can complicate management of spasticity difficult with two different IDDS. The objective is to share our experience of managing spasticity using two different IDDS. **Materials & Methods:** Retrospective review (January 2013 and June 2014); patients attending for IDDS review. Used medical case notes and IDDS database; collected demographic data, clinical diagnosis, and purpose of pump implantation, drugs used and doses delivered and pump details. We also noted complications documented. **Results:** Using the first IDDS, female to male ratio of 1:2; Total 81 pumps with a majority using 20 ml pumps (n=59); baclofen only (n=77); 3,000 mcg/ml concentration in 54 patients and least concentration used 1,000 mcg/ml in 7 patients. Nearly 41% of the patients were on daily dose between 301-600 mcg/day. Complication of pocket refills occurred in 5 patients and catheter and pump failure in equal number (n=4 each). Using the second IDDS, majority were males; total 19 pumps implanted, majority using baclofen only (n=15) with 9 of these using 2000mcg/ml concentration. Nearly 50% of them were on an average daily dose between 300 and 600 mcg baclofen; we have had no complications reported as of now. Majority were tetraplegic. **Conclusions:** Regional intractable spasticity can be safely managed even with shortcomings in technology as long as vigilant and diligent follow-up is in place. Introduction of the new IDDS is a positive step towards improving the much needed design changes. Design changes may result in improved therapy and better outcomes and patient benefits. This is however too early to comment.

PA866

Injection of Botulinum Toxin Type A into the Palmaris Longus Reduces Hyperactivity of Thumb Palmar Abduction and Opposition Caused by Stroke Spasticity: a Case Report

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Case Diagnosis: Spastic left hemiplegia after cerebral infraction. **Case Description:** An 80-year-old man had developed spastic left hemiplegia after cerebral infraction 32 years ago. Brunnstrom stage was Upper limb III and Finger II. He could hang a 2 kg bag to his fingers because of flexor spasticity of the left index, middle, ring, and digit fingers. He could not move his thumb by radial abduction and it was difficult to put a bag on the fingers. The position of his left upper limb was in front of his left inguinal region due to wrist plantar flexion and forearm pronation, making walking difficult. The initial treatment target was the spasticity of the forearm pronator. We injected Botulinum toxin type A (BTA, Botox®) to the pronator teres (PT) and pronator quadratus (PQ). Each muscle was identified using ultrasound (US)-guided (M-turbo®, linear probe 15 MHz) and electrical stimulation. As the spasticity of the forearm pronator improved, the patient wanted a reduction in wrist plantar flexion. We injected BTA into the flexor carpi radialis (FCR), flexor carpi ulnaris (FCU), and palmaris longus (PL) in addition to the PT and PQ as the second treatment. Following this, along with a reduction in the spasticity of wrist flexion and forearm pronation, he could move his thumb by radial abduction while sitting. After the fourth treatment, his left upper limb was at the side of his body and his thumb radially abducted on standing. This made it easy to hook prehension. **Discussion:** PL function is only supplementary for wrist flexion. Some reports suggest PL function in palmar abduction and opposition of the thumb. It is difficult to distinguish the PL from the FCR using only electrical stimulation. In our experience, the PL is relatively easy to identify by its shape and location using US guidance. This case suggests that hyperactivity of the PL causes hyperactivity of thumb palmar abduction and opposition. **Conclusions:** BTA treatment of wrist plantar flexor spasticity by targeting of the FCR and FCU along with the PL reduces hyperactivity of wrist plantar flexion and thumb palmar abduction and opposition.

PA867

Effects of Botulinum Toxin-A on the Muscle Architecture in Stroke Patients: an Ultrasonographic Study

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Introduction: Muscle architecture is main determinant of muscle function and there was no study about the change of muscle architecture in spastic upper extremity after botulinum toxin-A (BoNT-A) injection. The aim of this study was to evaluate the effects of BoNT-A injection on the hemiplegic upper extremity muscle architecture of stroke patients using ultrasonography. **Material and Methods:** Fifteen consecutive hemiplegic patients (mean age: 60.3±8.8 years) who were injected with BoNT-A for the treatment of upper extremity spasticity in April to June 2014 were enrolled. Flexor carpi radialis muscle of hemiplegic side was evaluated using ultrasonography. Muscle length, anterior and posterior pennation angle, muscle thickness, cross-sectional area of muscle and muscle volume were measured. Ultrasonographic evaluations were performed before BoNT-A injection and repeated 1 month and 3 months after injection. **Results:** Muscle thickness at a neutral position and posterior pennation angle at maximal extension significantly decreased 3 months after injection (p=0.001, p=0.023, respectively), fascicle length increased at neutral, maximal flexion and maximal extension positions after 1 month (p=0.001, p=0.004, p=0.002, respectively) and this increase was maintained at neutral and maximal extension after 3 months (p=0.041). Proximal muscle volume around the injection site significantly decreased after 3 months (p=0.036) and distal volume from injection site increased 1 month and 3 months after injection (p=0.002, p=0.027). **Conclusion:** These results confirm the change in muscle architecture in spastic upper extremity hemiplegia after BoNT-A injection, elucidating the effects of BoNT-A injection on spastic muscle of stroke patients.

PA868

Intrathecal Baclofen for Treatment Of Spasticity On Spinal Cord Injury – a Ten Years Experience

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Introduction: Spasticity is a sign of upper motor neuron lesion, frequent in spinal cord injury patients. It can have positive or negative effects on functionality and should be treated when provoking patient dysfunction or discomfort. Usually non-pharmacological measures are not enough and pharmacotherapy should be initiated. Intrathecal pathway avoids blood-brain barrier and allows higher doses with less adverse effects than oral administration. **Material and Methods:** Retrospective data analyses and cross-sectional survey including spinal cord injury patients treated with intrathecal baclofen therapy (IBT) in a Physical and Rehabilitation Medicine department. Retrospective data included patient and injury characterization, IBT information (indication, doses, refills, re-implants and complications) and clinical assessment (spasticity, functionality and vesical discharge) before and after therapy. The survey evaluated patient and physiatrist assessment of response to IBT. **Results:** Twenty-one patients were included. The mean age was 55 years and 81% were male. More than two thirds were classified as quadriplegic, predominantly AIS A and B. The main indication for IBT was severe spasticity despite oral medication. The first pump implant was in 2005 and a global growth was observed, with five pump implants in the last year. Mean follow-up since the pump implant was 1,232 days. The mean initial dose was 192 µg/day, with a mean increase of 5.8% per year. The mean dose of the last refill was 259 µg/day and mean concentration was 1,340 µg/mL. After IBT a statistical significant ($p < 0.001$) decrease of two degrees in Modified Ashworth and Spasm Frequency scales was verified. SCIM increased 15 points and FIM 17 points after IBT, both with statistical significance difference ($p < 0.001$). Five complications were registered (three catheter dysfunctions, one infection and one abstinence syndrome), which means 0.15 complications per pump and 0.08 per year of therapeutic. The majority of patients and physiatrists assumed a maximum response to therapy in the assessment used scale. **Conclusion:** In association with non-pharmacologic treatment, IBT results in spasticity reduction and functional improvement. The therapeutic effect has been satisfactory to patients as well as to their physiatrists. This may have influenced the increasing adherence to the ITB therapy in this center throughout the last ten years.

PA869

Mapping of Existing Spasticity-Related Outcome Measures to an ICF Spasticity Set for Spasticity Following Spinal Cord Damage*P. Ertzgaard¹, A. Nene², C. Kiekens³, S. Thavaneswaran⁴, N. Wickert⁵, The ABILITY Network⁵¹University Hospital Linköping, Linköping, SE, ²Roessingh Rehabilitation Center, Enschede, NL, ³UZ Leuven, Pellenberg, BE, ⁴Medtronic International, Tolochenaz, CH, ⁵DE

Introduction: The ICF provides a standardized framework for the description of functioning and disability. WHO "ICF Core Sets" exist for various health conditions & contexts. However, selection of categories specifically relevant to spasticity and its impact on functioning may be more useful than the full ICF. Ongoing work by the ABILITY Network has resulted in the development of an ICF Spasticity Set - a selection of ICF concepts specifically relevant to spasticity. We aimed to "map" existing spasticity-related outcome measures for traumatic spinal cord injury (SCI) and non-traumatic spinal cord injury (SCD) to the current ICF Spasticity Set to assess coverage and gaps of existing tools. **Materials and Methods:** Key outcome measures were identified by a panel of experts. Employing ICF linking guidelines by Cieza (2002 & 2005) items from the SF-36, EQ-5D, Spinal Cord Injury Spasticity Evaluation Tool (SCI-

SET), Spinal Cord Injury Measure (SCIM), Patient Reported Impact of Spasticity Measure (PRISM), and Modified Ashworth Scale (MAS) were mapped to the ICF Spasticity Set by two researchers. Discrepancies were discussed and appropriate linkages agreed on. **Results:** First analyses indicate that with respect to Activity & Participation, the SF-36 appears to provide the most comprehensive coverage of spasticity-related concepts, followed by the SCI-SET. Regarding Body Function, the SCI-SET appears to provide the best coverage. The spasticity concept with the poorest coverage by existing outcome measures was 'major life areas', (relating to education/employment participation). The MAS has only limited coverage. **Conclusions:** Preliminary results indicate that the most common spasticity assessment tool, the MAS (an impairment measure), is not sufficient to holistically assess the patient impact of spasticity. Generic and condition-specific quality of life measures seem to provide better coverage and may be better suited outcome measures. These analyses will contribute to the ABILITY Network's ongoing efforts to provide recommendations on patient assessment and relevant outcome measures for use in SCI/SCD-related spasticity.

PA870

Therapeutic Switch from Onabotulinum Toxin A (Botox®) to Incobotulinum Toxin A (Xeomin®) in Post Stroke Spasticity*G. Ianieri¹, R. Marvulli², E. Romanelli², L. Mastromauro², G. B. Marzò², A. Dantone², R. D'Argento², M. G. Ricchiuti²
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Introduction and Objectives: Botulinum toxin A (BoNT-A) is an effective and well-tolerated treatment for post stroke spasticity. Lack of response to BoNT-A treatment can occur for many reasons eg inadequate dose, inappropriate muscle selection, dynamic disease changes after BoNT-A injection or, over time, development of antibodies versus complexing proteins. In this study we highlight efficacy of Xeomin® (free complexing protein) in patients poorly responsive to Botox® at the same doses and dilution. **Methods:** 35 hemiparetic patients treated with Botox® since 6 years in Palmaris Longus (PL) and Biceps Brachii (BB) that showed clinical and instrumental reduced efficacy evaluated by outcome, MAS, Myotometry (MYO, a noninvasive way to characterize the viscoelastic properties-tone, stiffness and elasticity-of skeletal muscle) and CMAP. We treated same muscles with Xeomin® at the same doses and dilution for three years and we evaluated clinical and instrumental improvement. Data was analyzed with t-student (CMAP and MYO), and Kruskal-Wallis (outcome) **Results:** The tone and cMap reduction, as well as the improvement of patients satisfaction (outcome) comparing the last injection cycle with Botox® and the first with Xeomin® was greater for the latter $p < 0.01$ **Conclusions:** Over time complexing proteins may be associated with a secondary nonresponse due to the development of neutralizing antibodies even if they do not contribute to the stability of BoNT-A drugs and do not contribute to their therapeutic effects. This study shown that using Xeomin® in patients poorly responsive to Botox® is effective to produce a meaningful therapeutic effect. **References:** 1) P. Kaňovský, J. Slawek, Z. Denes, T. Platz, G. Comes, S. Grafe, I. Pulte Efficacy and safety of treatment with incobotulinum toxin a in post-stroke upper limb spasticity J Rehabil Med 2011. 2) M. Naumann, L. M. Boo, A. H. Ackerman, C. J. Gallagher - Immunogenicity of botulinum toxins - J Neural Transm - 2013.

PA871

Influence of 3-Month Physical Therapy Using the Atlant Neuro-Othopedic Pneumosuit in Preschool Children with Spastic Cerebral Palsy: Changes in Muscle Tone CharacteristicsH. Gapeyeva, P. Mitt, J. Erelina, M. Pääsuke
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Cerebral paralysis (CP) causes different impairments in musculo-skeletal system like spasticity, dystonia, joint contractures, as well

as selective motor control and bone growth impairments (Gormley 2001). Frequently during physical therapy programme neuro-orthopedic suit therapies are included. Using the neuro-orthopaedic suits creates a possibility for muscular framework based on dynamic proprioceptive stimulation, which stabilises the trunk and the extremities, reduces pathological synergies and normalises motor activity (Alagesan, Shetty, 2010). In the present study the influence of 3-month physical therapy using the Atlant neuro-orthopedic pneumosuit (NOPS) (Dynaforce, Russia) (Kochuneva, Zotov, 2013) on gait and muscle tone characteristics in preschool children with spastic cerebral palsy (CP) was investigated in CP children aged 3-7 year (n=6) with spasticity of lower extremities Physical therapy was performed by educated physiotherapist in one nursery school, from which all children were recruited. Muscle tone characteristics (frequency of natural muscle oscillation, Hz) of erector spinae (ES), rectus abdominis (RA), rectus (RF) and biceps femoris (BF), gastrocnemius medial head (GM) and tibialis anterior (TA) were measured bilaterally by MyotonPRO device (Myoton Ltd, Estonia) (Gapeyeva, Vain 2007). After 3-month therapy using the NOPS Atlant, the muscle tone ratio significantly decreased between trunk muscles (RA:ES) and increased between thigh muscles (BF:RF) and calf muscles (TA:GM) after the therapy period. Re-balance of skeletal muscle tone after 3-month therapy using the Atlant NOPS was noted in preschool children with spasticity caused by cerebral palsy. Future studies for elucidation of mechanisms of neurodevelopmental therapy effect on motor function are need in children with CP. *References:* 1) Alagesan J, Shetty A. Online J Health Allied Sciences 2010, 9(4):1-3. 2) Gapeyeva, H.; Vain, A. Proc of the 4th Congress of the ISPRM; Seoul, Korea; June 10-14, 2007. Bologna: Monduzzi Editore, 37 – 42. 3) Gormley ME Jr. *Pediatr Rehabil*, 2001, 4(1): 5-16. 4) Kochuneva OY, Zotov VA. In: 7th Congress of Baltic Association for Rehabilitation, Abstracts; Sept. 17-18, 2010, Tallinn, Estonia, Estonian Society of PRMD, 61.

A.7.3. REHABILITATION AFTER LIMB AMPUTATION

PA872

Walking Ability and Quality of Life in Subjects with Transfemoral Amputation: a Comparison of Osseointegration with Socket Prostheses

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Introduction/Background: To investigate walking ability and quality of life of osseointegrated leg prostheses compared to socket prostheses. *Material and Methods:* Prospective case-control study. *Setting:* University Medical Centre. *Participants:* Twenty two subjects with transfemoral amputation (one bilateral) referred to our centre because of socket related skin and residual limb problems resulting in limited prosthesis use, mean age 46.5 yrs (23-67 yrs) mean time since amputation 16.4 yrs (2-45 yrs). Cause of amputation: trauma (n=20), tumor (n=2). *Intervention:* Implantation of an osseointegration prosthesis (OIP). *Main outcome measures:* Global score of the Questionnaire for persons with a Transfemoral Amputation (Q-TFA), prosthesis use, six minute walk test (6MWT), timed up and go test (TUG) and oxygen consumption during treadmill walking. *Results:* With the socket prosthesis the Q-TFA global score, prosthesis use, 6MWT, TUG and oxygen consumption were: 39 points (SD 4.7), 56 hours per week (SD 7.9), 321 m (SD 28), 15.1 s (SD 2.1) and 1,330 ml/min (SD 310), respectively, and significantly improved with OIP to 63 points (SD 5.3), 101 hours per week (SD 2.4), 423 m (SD 21), 8.1 s (SD 0.7) and 1,093 ml/min (SD 361), respectively. *Conclusions:* Osseointegration is a suitable intervention for persons that suffer from reduced prosthesis use as a result of socket related problems. Subjects with OIP significantly increased their walking ability and prosthesis related quality of life.

PA873

Periprosthetic Cortical Bone Remodeling in Patients with Osseo-Integrated Leg Prosthesis

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Introduction/Background: In subjects with osseo-integrated prosthesis, stress shielding may lead to decrease of periprosthetic cortical bone increasing the risk on periprosthetic fractures and decreasing bone stock for future revision surgery. Quantification of periprosthetic bone changes is needed for safety purposes. *Methods:* Population: 27 patients with transfemoral amputation who underwent implantation of osseo-integrated leg prosthesis (ILP system, Ortho Dynamics GmbH Lübeck Germany). *Outcome measures:* Periprosthetic cortical thickness was analyzed from standard antero-posterior radiographs taken directly post-operative and at 12 months and 24 months follow-up. The area around the implant was divided into 6 zones of equal length (3 medial and 3 lateral) and the periprosthetic cortical thickness was digitally measured in the middle of each zone and corrected for radiologic distortion. Dual X-ray absorptiometry (DXA) scans were used to measure bone mineral density (BMD) at the femoral neck of healthy and amputated leg before surgery and at 12 and 24 months follow-up. Outcomes were analyzed by the two-sided paired Student *t*-test in SPSS software. *Results:* The mean age at ILP implantation was 48 years (23-68). One amputation was caused by infection, four by tumor and 22 by trauma. The average time between amputation and treatment with ILP was 18 years (2-45). Significant increase of the mean cortical thickness of all six zones was found at 12 and 24 months follow-up. The largest increase of cortical thickness, 18.60%, was observed in the distal medial periprosthetic zone (p=0.016) with a mean increase of 9.44% of all six zones (p=0.001). There was a trend towards an increase of the bone mineral density of the femoral neck at the amputated side but this did not reach the significance threshold at 24 months post surgery. *Conclusions:* Significant periprosthetic cortical bone growth was observed in patients with a femoral osseo-integrated leg prosthesis. No additional risk of periprosthetic fractures is to be expected and bone stock is guaranteed for future revision surgery when indicated.

PA874

The Effect of the First in-Patient Rehabilitation after Lower Limb Amputation

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Introduction/Background: The aim of our study was to investigate the effect of the first in-patient rehabilitation in the below- and above-knee amputees. *Material and Methods:* The tested group consisted of 36 below-knee and 29 above-knee amputees (52 men and 13 women, age >49 years, hospitalization >11 days). The Functional Independence Measure scale (FIM) was performed at the admission (A) and the discharge (D), and the difference/improvement (D - A=I) was calculated. We used Man-Whitney test to compare both the amputees groups: 1) in age (Age), the interval from the surgery to the first admission for purpose of in-patient rehabilitation (Delay) and the length of hospital stay (Hosp), 2) in selected FIM items (Walk, Stair) or group of the items (Self-care=ADL). Spearman correlation was used to find out relations among the above described parameters. Moreover, Wilcoxon test was used to find out the significance of FIM scores change. *Results:* We did not find significant difference between the below- and above knee amputees in Age (67.5 and 69.5 years, respectively), Delay (145 and 162 days, respectively) and Hosp (20 and 20.5 days, respectively). The only significant difference was found between the below- and above knee in the Walk_A

(mean score=3.2 and 1, respectively), Walk_D (mean score=5.6 and 4.9, respectively), Stair_D (mean score=4.9 and 2.7, respectively) and Stair improvement (mean improvement in score=3.3 and 1.7, respectively). In the below-knee amputees, the correlation was significant between Age and Stair_D (-0.41) or Stair_I (0.38), Hosp and Walk_I (0.48) or Stair_I (0.38). In the above-knee amputees, the correlation was significant between Hosp and Walk improvement (0.39), Delay and Stair_A (-0.38) or Stair_D (-0.41) or ADL_D (-0.38). The differences between Walk_A v. Walk_D, Stair_A v. Stair_D and ADL_A v. ADL_D were significant in both the amputees groups. *Conclusion:* The in-patient rehabilitation is beneficial in all amputees, not only in locomotion but in self-care too. The negative effect of the delay between surgery and rehabilitation is only moderate. The group size will be enlarged during continuing testing.

PA875

Use of Mirror Therapy for the Reduction of Phantom Limb Pain in a Patient after Bilateral Transfemoral Amputations

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Intro/Background: Phantom limb pain (PLP) is the sensation that a person's amputated limb is still present. It is often treated unsuccessfully with pharmacological agents. Mirror therapy (MT) has been shown effective in this population. There are several theories why this is effective including remapping of the limb's sensory/motor cortex and the presence of mirror neurons in the contralateral brain hemisphere. The current literature is limited to unilateral injuries. The prevalence of bilateral (B) injuries is rising and so is the need for a technique to use with these pts. The purpose of this case report is to describe the use of MT in the acute rehab setting for the reduction of PLP after B transfemoral amputations (TFA). *Material/Methods:* A 57 yo F s/p B TFA admitted to adult rehab for pre-prosthetic training with reports of R sided "burning" PLP of 9+/10 in her knee/foot. MT was used in PT sessions to reduce PLP after desensitization techniques were unsuccessful. MT sessions consisted of the patient sitting on a mat in longsit with a PT sitting between her and a large wall mirror with the PT's L leg up on the mat. The pt and PT had a sheet draped across both of their thighs. The PT performed straight leg raises with her L leg in sets of 10, while the pt watched the PT's leg in the mirror. MT was performed with patient for 4 consecutive days. *Results:* Patient's reported pain level decreased from 9+/10 to 4/10 in 4 sessions. The patient was also able to tolerate longer durations of therapy since the PLP did not interfere with her function. *Conclusion:* This case suggests MT can be used in a cost and time efficient way to reduce or eliminate PLP s/p B amputations. More research is needed to determine on what level these changes are occurring, i.e. physiological changes. In addition, there is a lack of evidence to suggest a specific protocol or proper method of administration of MT for PLP after B lower limb amputations to ensure effectiveness.

PA876

Mobility with Lower-Limb Prostheses and Orthoses among Users in Malawi and Sierra Leone

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Introduction: Malawi and Sierra Leone are low income countries in sub-Saharan Africa. In Malawi and in Sierra Leone more than half of the population lives under the 'absolute poverty' line. Sierra Leone has a history of conflict and large violations of human rights that occurred during the country's civil war, which took place between 1991 and 2002. *Aim:* Investigate patients' mobility with their lower-limb prosthetic or orthotic device and related service delivery in Malawi and Sierra Leone, and to compare groups

of patients regarding type and level of device and demographics. *Methods:* Questionnaires were used to collect self-reported data from 83 patients in Malawi and 139 patients in Sierra Leone. *Results:* The majority of patients used their prosthetic or orthotic devices (90% in Malawi, and 86% in Sierra Leone), but half of the assistive devices in use needed repair. Approximately one third of patients reported pain when using their assistive device (40% in Malawi and 34% in Sierra Leone). Patients had difficulties, or could not walk at all, with their prosthetic and/or orthotic device in the following situations; uneven ground (41% in Malawi and 65% in Sierra Leone), up and down hills (78% in Malawi and 75% in Sierra Leone), on stairs (60% in Malawi and 66% in Sierra Leone). In relation to mobility, orthotic patients and patients using above-knee assistive devices in Malawi and Sierra Leone had the poorest results. In Sierra Leone, women had poorer results than men. *Conclusion:* The majority of lower-limb prosthetic and orthotic patients reported being mobile while using their device, although a third often experienced pain and more than half had difficulties walking on uneven ground, walking up and down hills, and on stairs while using their assistive device. *References:* 1) Magnusson L, Ahlström G, Ramstrand N, Fransson EI. Malawian Prosthetic and Orthotic Users' Mobility and Satisfaction with their Lower-Limb Assistive Device. *Journal of Rehabilitation Medicine* 2013; 45:385-391. 2) Magnusson L, Ramstrand N, Fransson EI, Ahlström G. Mobility and satisfaction with lower-limb prostheses and orthoses among users in Sierra Leone: a cross-sectional study. *Journal of Rehabilitation Medicine* 2014; 46:438-446.

PA877

Orthotic and Prosthetic Rehabilitation in a Siamese, after Separation of Ischiopagus Conjoined Twins

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Case Diagnosis: Female 5 years old, diagnosis in utero of ischiopagus conjoined twins at 6 months of pregnancy, born at 38 weeks gestation, the other twin was female, a separation of ischiopagus conjoint was performed when they were 13 months of age, during surgery the other twin died, and the patient was made a hemipelvectomy amputation of the right limb, and suffered a ischemic stroke, with sequelae of left hemiparesis. Also developed thoracolumbar scoliosis left convexity. *Case Description:* The patient has the surgical scar hemipelvectomy in good condition, thoracolumbar scoliosis left convexity, without cardiopulmonary disorders, Strength: Upper limbs, left normal in all muscle groups, right upper limb with proximal muscles 3+/5, distal muscles 3+/5, in left lower limb: hip abductors, adductors 3/5, hip flexors and extensors 3/5, knee flexors and extensors 3+/5, dorsiflexors and plantarflexors 1/5, without sensory involvement, normal tone. No urinary or fecal incontinency. With impaired learning and attention as a sequelae of ischemic brain damage. *Discussion:* In conjoined twins, ischiopagus variety is the second most uncommon after craniopagus, approximately 1 in 50,000 or 60,000 births, and it has always attracted considerable interest, not only because of their rarity and often exotic appearance, but also because of the inherent challenge they present to restore functionality after surgical management and preserve individuality. In our clinical case only one of the twins survived, and was made a hemipelvectomy amputation of the right limb and has sequelae of left hemiparesis due to ischemic stroke during surgery, scoliosis, also impaired learning and attention. This represents an even greater challenge in their rehabilitation. *Conclusion:* The patient received physical therapy to strengthen muscles of the left side of the body, and also a orthosis TLSO for scoliosis, made of polypropylene covered in foam rubber, molded on pelvic basket, with a 4-point support, with a modular prosthesis for hip disarticulation, stance phase control knee, uniaxial foot; and posterior leaf spring AFO in the left limb, to correct the muscle weakness and improve gait pattern, achieving a good rehabilitation, improving her gait pattern.

PA878

Diabetic Lower Limb Amputation in a Multiethnic Asian Population

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Introduction/Background: Diabetic complications vary with ethnicity. Major lower limb amputation is one of the most disabling diabetic complication as it affects physical and psychosocial function. Apart from loss of limb, the diabetic amputee may have complications which affect body function such as retinopathy, nephropathy, stroke and heart disease. We examined the relationship between ethnicity and clinical characteristics of the diabetic amputee. *Material and Methods:* An audit of diabetic patients with major lower limb amputation attending outpatient clinic over a 3 year period was conducted at the Department of Rehabilitation Medicine at a tertiary referral hospital in Malaysia. We reviewed age, gender, ethnicity, level of amputation, K-level, medical comorbidities and duration of diabetes mellitus. *Results:* Ninety-nine diabetic amputee were referred for rehabilitation. There were 61 men and 38 women. The mean age was 57.6 years±10.73. The median age (IQR) of amputation amongst Malay, Chinese and Indian were 57 years (13), 62 years (19), 50 years (8) P<0.001. The mean number of comorbidities was 1.57±1.072 for Malay, 1.05±0.911 for Chinese and 1.53±0.964 for Indian. The median duration of diabetes amongst Malay, Chinese and Indian were 11 years (14), 18.5 years (10) and 10.5 years (17). The most common comorbidity was neuropathy (73.7%) followed by retinopathy (27.3%), nephropathy (19.2%), ischaemic heart disease (18.2%) and stroke (8.1%). There were 29 above-knee amputation and 70 below-knee amputation. Forty-eight patients were K-level 2 followed by 34 in K-level 1, 12 in K-level 3 and 5 in K-level 0. Twenty-one patients died during follow-up. *Conclusion:* Our data show that the Malaysian population of diabetic patients experience major lower limb amputation at a younger age group, with Indians being the youngest. It is important to ensure provision of optimal resources for specialist care in vascular surgery, rehabilitation, endocrinology, podiatry and prosthetics particularly in a population where majority of the amputees are young. Further research on control of risk factors for diabetes amongst different ethnicity groups will guide preventive measures to mitigate the risk and complications associated major lower limb amputation.

PA879

Prosthetic Restoration after Major Lower Limb Amputation in Diabetic Patients in a Newly Set Up Rehabilitation Medicine Service

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Introduction/Background: Major lower limb amputation affects body function, activity and participation. The amputee patient with diabetes is often also afflicted with microvascular and macrovascular complications which lead to physical impairment such as reduce vision and poor effort tolerance. These comorbidities may affect the suitability of prosthesis use. In an upper middle income country where funding for prosthesis is limited, the decision for a prosthesis is often prioritized for a patient who demonstrates the ability to utilize a prosthesis for stand transfer or mobility. *Material and Methods:* We conducted an audit of diabetic patients with major lower limb amputation attending outpatient clinic in the first 3 years since rehabilitation medicine physician services started at a tertiary-referral 704 bedded hospital in Malaysia. We reviewed the demographic data and clinical characteristic of amputation and prospectively followed up these patients with regard to suitability for prosthesis, waiting time for prosthetic restoration, default status and those who died over the next 2 years. *Results:* Ninety-nine diabetic amputee were referred for rehabilitation. Male: female ratio was 1.6:1. The mean age was 57.6 years±10.73. Seventy-

nine (79.8%) were deemed suitable for a prosthesis. Sixty-five were prosthetically restored. The mean waiting time for prosthetic restoration was 13.61 months±11.986. Ninety-one percent of patients above 45 years waited more than 6 months for a prosthesis compared to 50% of patients who were younger. (P=0.01). Seven patients deemed suitable for prosthesis died before prosthetic restoration. Nine patients who died after prosthetic restoration used the prosthesis for mean duration of 25.5 months±13.42. Eighteen patients defaulted follow up with most common reason being poor support or moving to other districts. Thirty-four patients were uncontactable. Twenty-six patients continued followed up of which twenty-four were prosthetically restored. *Conclusion:* Most patients waited more than a year to get a prosthesis due the need to ascertain suitability of prosthetic restoration and justification of funding. In a scenario of economic constraint and a newly set-up Rehabilitation Medicine service, judicious efforts need to be made to ensure patients receive prosthesis within an appropriate period to allow optimal return to activity and continue specialized rehabilitation follow up.

PA880

Effect of Diabetes on Postoperative Ambulation Following below Knee Amputation

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Background: Ambulation forms an important part of rehabilitation program after lower limb amputations. Diabetes Mellitus and its complications are commonly associated with below knee amputation. In spite of this, there is an absence of studies on the effect of diabetes on the post operative ambulation of an amputee. This study analysed the role of diabetes as an independent factor affecting post operative ambulation and compared it with non diabetics in below knee amputation. *Material and Methods:* In this study a total of 105 below knee amputation patients were followed. Out of them, 48 amputees were diabetics and 57 non diabetic. Their post operative ambulatory level was compared by using Pinzur et al ambulation scale. Both groups were age, sex and BMI matched.

Level	Walking capacity
6	Independent community ambulator
5	Limited community ambulator
4	Unlimited household ambulator
3	Limited household ambulator
2	Supervised household ambulator
1/0	Transfer- bedridden

Results: There was a worsening of ambulatory level in 33.3% diabetics as compared to 10.7% in non diabetics postoperatively. Of the prosthetic users, 78.4% were in non diabetic group and 21.6% were in diabetic group. 17.6% of prosthetic users required additional support, of whom 66.7% were diabetics. *Conclusion:* Diabetes Mellitus is an independent factor which has an adverse effect on the functional outcome of a patient after below knee amputation. *References:* 1) Pinzur M S, Larsen J, Smith D: Functional outcome of BK amputation in peripheral vascular insufficiency: Clin Orthop Relat Res: 1993: 286: 247- 249. 2) Attinger CE, Brown BJ: Amputation and ambulation in diabetic patients: function is the goal: Diabetes Metab Res Rev 2012: 28 (Suppl 1): 93-6.

PA881

Mobilization Status of Diabetics Versus Non-Diabetics after below Knee Amputation: a Comparison

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Background: Mobility following below knee amputation has a direct impact on the quality of life. Early and independent mobilization develops confidence in the below knee amputee. This helps the patient to become psychologically, socially and economically independent. In this study we compared mobilization status of dia-

betics versus non-diabetics amputees. We also prepared a note of type of supports used and duration of prosthetic usage by both the groups postoperatively. **Material and Methods:** This was a 2 years prospective and 10 years retrospective study. A total of 144 below knee amputees using various supports for mobilization were included in this study of which 63 were diabetics and 81 non diabetics. They were followed for a minimum period of 1 year. On follow up they were observed for the type of support used for mobilization. **Results:** Of 144 amputees, 92 patients initially used crutches for mobilization. 40 patients used walker, 7 used wheelchair and 5 remained bed ridden before they died. Of 92 patients who were using crutches, 22 were in diabetic group and 70 in non diabetic group. 31 patients of diabetes and 9 patients of non diabetic group used walker. 5 patients in diabetic group and 2 patients in non diabetic group could mobilize only on a wheelchair. 104 patients started using prosthesis for mobilization once their stumps had healed adequately of which 30 were in diabetic group and 74 in non diabetic. The result was statistically significant. Of 104 prosthesis users, 43 were using it for less than 6 hours per day, 55 were using 6-12 hours per day and 6 patients were using it for >12 hours per day. **Conclusions:** Non diabetics preferred crutches and prosthesis for mobilization in comparison to diabetics. More diabetics were bedridden or on wheel chair after amputation. Non diabetics were using prosthesis for longer time in comparison to diabetics. Major causes for this difference was preoperative lower ambulatory grading in diabetics, weaker muscle mass, old age, comorbid conditions, increased incidence of infection and prolonged stump healing time. **Reference:** Basu NN. Mobility one year after unilateral lower limb amputation. *Interact Cardiovasc Thorac Surg.* 2008 Dec;7(6):1024-6.

PA882

Do Transfemoral Amputees Face Worse Consequences?

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Background: During orthopedic surgery, efforts are made to preserve as much of the lower limb as possible as the amputation level has an influence on future mobility and rehabilitation extent. It is presumed that patients with transfemoral (TF) amputation might face more difficulties in regaining physical health and mobility than patients with transtibial (TT) amputation. This might also concur with a decrease in health-related quality of life (HRQoL) and mental health. **Material and Methods:** 33 TT amputees and 17 TF amputees were assessed at admission (T1) and at discharge (T2) during their stay at an orthopedic rehabilitation center regarding mobility, activities of daily living (ADLs), prosthesis use, pain, HRQoL, depression and body-image. **Results:** Both groups enhanced their performances in the different measurements significantly from T1 to T2. However, TT amputees performed better in all conditions right from the start. Furthermore, TF amputees reported significantly higher pain sensation, especially phantom limb pain. Both groups improved most regarding their physical health. Increased physical health was a predictor for increased mental health. **Conclusion:** Results concur with former findings that TF amputees face more difficulties in regaining mobility and physical health. The results underline the importance of physical health for an improved mental health.

PA883

Long Term Outcome Following Above and Below Knee Amputation

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Introduction: Amputation of the lower limb is performed for a variety of reasons. This is a traumatic procedure with important functional and psychological sequelae significantly influencing the quality of life. There is limited information on the long term con-

sequences of lower extremity amputation in patients with vascular disease or diabetes (1, 2). The aim of our study was to check functional independence at five years following lower extremity amputation. **Methods:** Sixty two patients with above and below low knee amputation treated at the Rehabilitation Department, Bnai-Zion Medical Center, Haifa between 2004-2008 were identified. Thirty two patients (52%) participated in the survey. Functionality was assessed using the functional independence measurement (FIM) score. Frenchay Activities Index (FAI) was used for measuring before and after amputation instrumental activities. Houghton Scale (HS) was used to evaluate prosthetic use. **Results:** Modified physical independence was found among the participants in basic activities of daily living (mean score of 113.2+10.2 on FIM). The instrumental activities score was low (mean score of 10.53 + 8.6 on FAI), with a significant decrease from the pre-amputation period. (26.25+6.83). We found a significant correlation between the degree of daily independence and participation in instrumental activities. ($r=0.48$, $p<0.01$). Nineteen participants (59%) had resumed driving, while only 5 (16%) returned to work. A significant correlation was found between the daily independence and driving ($p=0.043$). Twenty eight patients (88%) had a lower limb prosthesis with 23 (82%) of them using it. There was a significant correlation between using the prosthesis and independence in activities of daily life ($r=0.41$, $p<0.05$) as well as instrumental activities ($r=0.50$ $p<0.01$). **Conclusions:** Lower limb amputation is associated with a decreased quality of life and impaired social life. However, use of prosthetic limb enhances physical independence and participation in daily life activities. **References:** 1) Stineman MG, et al. Survival analysis in amputees based on physical independence grade achievement. *Arch Surg* 2009. 144(6): 543-552 2) Hawamdeh Z.M et al. Assessment of anxiety and depression after lower limb amputation in Jordanian patients. *Neuropsychiatric Disease and Treatment.* 2008. 4; 627-633.

PA884

Proposal for a Pathology-Oriented Multidisciplinary Rehabilitation Centre for Amputees

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Introduction: The annual incidence of major amputations is 1.2/1,000 new cases. With a foreseen incidence in 2,050 of about 10/1,000. Although the high number of patients still amputated and the foreseen increase in their number there is still a lack in the integrated and multidisciplinary rehabilitation approach to these patients. **Material:** The purpose of this poster is to present a new model of a multidisciplinary pathology-oriented rehabilitation unit centered on amputees where the classical integrated 5 phases of the amputees "prise en charge" (Prosthesis – fit ; walking-fit, everyday routine-fit, work-fit and leisure-fit) are integrated in a single expressly designed residential unit where different specialties, patients and families are working in close contact for the better protesization and empowerment of patients. The team includes physiatrists, neurologists, surgeons, pain medicine specialists, psychologists and therapists. The presence of certified prosthetists with an on-site production of the prosthesis, allows a continuous evaluation, treatment and adjustment of the prosthesis and the choice of the better types of phase-related device with the final goal of a better patient's outcome. **Conclusion:** Points of novelty are that the architectural structure of the rehabilitation unit has been designed expressly to match the global needs of amputated people where families can be also hosted, and that a resident multidisciplinary team is dedicated to their treatment so that amputees can be followed immediately after amputation toward the protesization. **References:** 1) <http://www.prothefit.com/5-phase-model.html>. Casale R, et al. Motor and sensory rehabilitation after lower

limb amputation: state of art and perspective of change. *G Ital Med Lav Ergon.* 2013;35(1):51-60. 2) Casale R, et al. Phantom limb related phenomena and their rehabilitation after lower limb amputation. *Eur J Phys Rehabil Med.* 2009;45(4):559-66.

PA885

Falls and Static Balance Control in Transfemoral Amputees

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Introduction: Accidental falls are a considerable health and community problem. They are a main source of injury, decline in function and handicap. Approximately half of the individuals with a lower limb amputation experience at least one fall each year. Computerized posturography (CP) is a measure that detects postural sway by measuring shifts in the center of gravity. It has previously been used to assess balance and fall risk in various populations, but it is unclear whether CP can detect fall risk in amputees. The aim of this study was to evaluate static balance in fallers and non-fallers transfemoral amputees. **Material and Methods:** We enrolled 14 unilateral transfemoral amputees attending to an outpatient rehabilitation medicine department. In order to assess fall status participants were asked about falls in the past 12 months. Other variables like age, body-mass index, gender, years since amputation, cause of amputation, walking aids use and comorbidities were assessed. Postural stability was assessed by CP using the Biodex Stability System. Overall Stability index (OA) scores were obtained from the mean scores of three trials at the platform most stable level. **Results:** Half of our subjects experienced at least one fall in the past year. No significant differences were observed between the fallers and non-fallers groups in terms of age, gender, body-mass index, time since amputation, cause of amputation, comorbidities or use of walking aids. The fallers group showed a significantly higher OA score in CP (OA: 3.82 vs. 2.47, $p < 0.05$). The OA score demonstrated good overall accuracy in detecting participants with a history of falls, with a cut-off score of 3.54, a positive likelihood ratio of 6 and a negative likelihood ratio of 0.16. **Conclusion:** The findings suggest that CP is a useful instrument for detection of individuals with falls antecedents. A bigger sample and a prospective study would be valuable to test CP accuracy for fall risk prediction in individuals with transfemoral amputation.

PA886

Mobility in Persons with Lower Extrimity Amputations: Using the ICF to Quantify Expert Views

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Background and Aims: The International Classification of Function, health and Disability (ICF) provides a common framework and universal language for rehabilitation professionals across the globe. One way to increase its use among professionals is to develop ICF based assessment tools. An international collaboration has been set up to develop an ICF based mobility assessment tool. The aim of this paper is to identify problems in functioning and mobility important to patients with lower limb amputation from an expert's point of view and quantify these problems using the ICF. **Methods:** An electronic or paper survey was done across six countries targeting expert clinicians involved in pre and post amputation care including medical, nursing, physiotherapist, occupational therapist, prosthetics, social worker, psychologist and

experts from prosthetic manufacturing industry. Meaningful concepts were extracted from the responses and linked to suitable 2nd level and where applicable 3rd level ICF categories (Cieza et al, 2002, *J Rehabil Med*, 34(5), 205-10). ICF categorical frequency were analysed to represent the prevalence and spread of ICF categories by location and of the collated tables. **Results:** A total of 183 experts from 6 different countries responded to the survey. A total of 2,358 concepts were identified. 82 percent of the concepts could be linked to a 2nd level ICF category. The linked categories included 29 2nd level categories in the domain of body function, 7 in the body structure domain 31 in the domain of activity and participation, and 33 in the environmental factors domain. The categorical frequency analysis revealed that the categories of walking, design and construction of buildings for public and private use and sensation of pain were the most frequently occurring concepts and was similar across the six countries. **Conclusion:** The ICF can be used as a framework to communicate between rehabilitation professionals across the globe as most of the concepts identified by International panel of experts to affect functional mobility of a lower limb amputee could be matched to various ICF categories. The most important factors that were identified by experts in amputee rehabilitation working in different health care settings were similar across the six countries.

PA887

Successful Prothetization: Is It Possible after 42 Years Since Hip Desarticulation?

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Diagnosis: Male, 55 years old, with a left hip desarticulation. **Description:** At the age of 13, after a knee infectious disease that progressed to gangrene, the patient was submitted to a left hip desarticulation. An exoskeletal Canadian hip-desarticulation socket was used. Due to discomfort and prosthesis weight, he left it at the age of 18. He worked in a sales-counter company, where he walked with the help of two crutches. He returned to rehabilitation after disability retirement when he was 48 years old. He had shoulder pain, paresthesia and numbness of the hands. A bilateral carpal tunnel release was performed and rehabilitation techniques in rotator cuff tendons and neck muscles to reduce pain and inflammation. He always refused a new prosthesis until February 2014, when he started to need a wheelchair for outdoor activities. We prescribed a carbon endoskeletal prosthesis with the following components: monocentric hydraulic hip 7E9, mechanical knee 3R60 and 1C30 Trias foot. After only 15 days of training he was able to walk without or just with one crutch. His everyday life improved significantly. The table compares functional outcome measures.

Test	2 Crutches before	Prosthesis + 1	Prosthesis
	prosthesis	Crutch	Only
Timed up and go (sec)	7.22	11.03	11.30
Timed get up and go (sec)	9.77	12.44	14.69
2 Minutes Walk (2MWT)	Stopped after 1	126	100
(mts)	min.		
HR (resting=72) after 2MWT	102	91	10
Borg scale after 2MWT	7	1	2

The Locomotion capabilities index, LCI-5 was quoted 47/56. Videos with activities performed with prosthesis will be presented. **Discussion:** Fitting an amputee with hip disarticulation or hemipelvectomy has been difficult and often unsuccessful. The weight and discomfort when seated caused by the exoskeletal prosthesis made the amputee to quit. As a result of walking with crutches, musculoskeletal pathology involving the joints of the upper limbs and even the contralateral hip was expected. Here, a new prosthesis significantly improved the quality of life and functional independence. **Conclusion:** Even after many years without a prosthesis, the advanced components including socket, hydraulic hip and various types of knee and feet enhanced the suspension, the prosthetic acceptance and overall mobility.

PA888

Balance Confidence and Community Ambulation among Community-Dwelling Patients with Lower-Limb Amputation*T. Pauley¹, A. Mandel², K. Paul²¹West Park Healthcare Centre, ²University of Toronto, Toronto, CA

Introduction/Background: Individuals with a lower-limb amputation face a number of challenges re-integrating into the community, including maintenance of a healthy level of physical activity while simultaneously managing the risk of falling. Compared to other patient populations, those with lower-limb amputation tend to be at a particularly high risk of falls in the community, with fall rates exceeding 50% annually. However, little is known about non-fallers, particularly whether their apparent low risk of falling is an accurate reflection of functional capacity or whether a lower rate of falling is an artifact of the adoption of a sedentary lifestyle as a mitigation strategy to reduce fall risk. The purpose of this study was to describe self-perceived balance confidence and the amount/intensity of ambulation among community-dwelling patients with a unilateral lower-limb amputation who did not report a fall in the past 6-months. **Material and Methods:** 20 subjects completed the Activities specific Balance Confidence scale (ABC) and were provided with a StepWatch activity monitor (SAM) to wear for seven consecutive days in the community. Based on SAM data, subjects were stratified as low (<3,000 steps/d) or high (>2,999 steps/d) activity groups. **Results:** Balance confidence was significantly lower among the low activity group (74.1±14.0 vs. 93.8±4.2; t(18)=-2.7, p=0.02). This suggests that 'non-fallers' may include a subgroup that erroneously presents as a low risk group due to a balance confidence-related sedentary lifestyle. **Conclusion:** While clinicians routinely enquire about falls in the community among patients with lower-limb amputation, the results of this study emphasize the importance of contextualizing apparent fall risk relative to actual exposure to fall risk. Such an approach would distinguish patients who are truly at low risk of falling due to high ambulatory capacity versus those that may be at an elevated fall risk which remains undetected due to their errant inclusion in a low risk group. In addition, this approach would allow targeted fall risk reduction and/or physical activity intervention strategies for the latter group. **References:** 1) Kulkarni et al. *Physiotherapy* 1996; 82, 130-5. 2) Miller et al. *Arch Phys Med Rehabil* 2001;82:1031-7.

PA889

Major Limb Amputations among Civilian Population at a Military Amputee Rehabilitation Center*Z. A. Gill¹, S. B. Ayaz², A. A. Khan²¹CMH Hospital Malir Cantt, Karachi, ²AFIRM Rawalpindi, Rawalpindi, PK

Introduction: Losing a limb is a major public health concern resulting in significant social, psychological and economic burden to the patient, family and the society as well. The demographic data regarding amputations is sparse in developing countries like Pakistan. In this country health care is under-developed and quality prosthetic services are not available to majority of the population. This study describes the epidemiological pattern of major limb amputations among civilian population presenting at a military rehabilitation center in Pakistan. **Material and Methods:** A cross-sectional study carried out in the amputee clinic of Armed Forces Institute of Rehabilitation Medicine (July 2007 to December 2013). Consecutive sampling technique was used and 146 individuals were enrolled. Patients of all age groups and gender with one or more limb amputations due to any cause, reporting for the first time for provision of prosthesis, were registered on initial visit after informed consent. Demographic data including age, gender and ethnicity based on provinces and clinical data comprising: level, side and cause of amputation were recorded. Data was analyzed with SPSS V 20. **Results:** A total of 146 patients were en-

rolled. The age was 1-80 years (mean 37±19). Majority were male (70.5%) and hailed from Punjab province 88 (60.3%). Lower limb amputation was more common (78.8%). Trauma (road traffic accidents, crush injury) was the most common cause of amputation (62.3%) followed by diabetes mellitus. Amputees younger than 40 years were more likely to have a traumatic amputation involving upper limb while amputees more than 40 years were more likely to have a non-traumatic etiology resulting in lower limb amputation. Transtibial and transradial was the most common level of amputation in lower and upper limb respectively. **Conclusions:** Trauma still remains the leading cause of amputation in developing countries. Poor adherence to road safety measures brings the RTA ahead of surgical amputations. Younger age group is increasingly affected posing a serious concern for health services. **Keyword:** Civilian, Etiology, Pakistan, Trauma Amputation.

PA890

Importance of Tying the Sciatic Nerve in Above Knee Amputation to Prevent Neuroma Formation

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Background: Sciatic nerve is the thickest nerve in human body. Neural sheath of sciatic nerve is rich in microvasculature. In this study we compared neuroma formation after tying the sciatic nerve to leaving its cut end open in patients who undergo above knee amputation. **Material and Methods:** In this study we followed a total of 90 patients who underwent above knee amputation. In half of these patients, cut end of sciatic nerve was left open and in other half, the nerve was tied. Patients in both the groups were age, sex and BMI matched. Neuroma formation in the stump was assessed one year after surgery. This assessment was done by measuring the diameter of sciatic nerve ending using sonogram. Sciatic nerve diameter was measured bilaterally at the same level, and the value of the normal limb was taken as control. **Results:** Out of 45 patients who underwent tying of sciatic nerve, only 10 patients developed thickening of the cut end of sciatic nerve in comparison to opposite limb. On the other hand, 45 patients in whom the cut end was left open, 35 patients developed neuroma formation. This result was statistically significant. **Conclusion:** Rich microvasculature of sciatic nerve results in the formation of haematoma beneath the cut end, if it is left open. This haematoma eventually results in growth of neural fibres. As a result of this, neuroma formation occurs at cut end of sciatic nerve in above knee amputation. We thus conclude, it is always wise to tie the cut end of sciatic nerve in above knee amputation to prevent neuroma formation. **Reference:** Göktepe AS, Ozçakar L, Kömürçü E, Safaz I, Yazicioğlu K. Sonographic evaluation of the sciatic nerve in patients with lower-limb amputations. *Muscle Nerve*. 2010 Jun;41(6):763-6.

PA891

Functional Results Measured with Houghton Scale during Fitting Process Are Influenced by Different Factors.M. R. Ortega¹, M. Ariño², C. F. García¹¹Universitary General Hospital Foundation Jiménez Díaz, ²Universitary General Hospital La Paz, Madrid, ES

Objective: To analyze which factors influence in Houghton Scale score in patients with an unilateral transtibial amputation. **Design:** A retrospective study in unilateral transtibial amputee in Physical Medicine and Rehabilitation Department at a General Hospital (1/1/2005 to 31/12/2012). **Material and Methods:** We collect 64 patients and apply Houghton scale. Data were collected from medical history in Microsoft Excel database (age and gender, lower limb amputee, etiology, date, prosthetics prescription date, score in Houghton Scale, external insertion, internal insertion, foot, stump length, phantom limb presence). Analyzed by SPSS version 15.0 for Windows with this test: chi-square, Kruskal Wallis and lineal regression **Results:** Our patient had a mean age of 56.74.

Male 75%. The most frequent lower limb amputee was lower left (54.7%). Etiology: vascular (68.8%), traumatic (14.1%), tumoral (9.4%) and infectious (7.8%). The mean days from amputation to prosthetic prescription 115.53. The mean points in Houghton Scale were 8.8. We obtained results in 40 patients, the rest were lost. The 55% of patients had a score equal or less than 9 points in final score in Houghton Scale. In 69.4% of the patients was prescribed a 3S external insertion without knee pad, 67.7% internal insertion without pin and 72.6% articulated foot. The mean stump length was 13.7 centimetres. 50% presented Phantom limb. Patients with non vascular etiology have a better score in Houghton scale (more than 9 points) (p 0.034) and age has an influence on Houghton scale final score (p 0.001). In multivariate analysis and linear regression we observed that age is the only factor that has an influence to have a better score in Houghton scale (more than 9 points). **Conclusions:** The younger is the patient we assess, the better is the result that we obtain (more than 9 points) and we can consider a satisfactory rehabilitation.

PA892

Hyperbaric Oxygen in the Amputee Rehabilitation

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Background: To explain the mechanisms of action of Hyperbaric Oxygen, its effectiveness in wound healing in the lower limb and influence in the rehabilitation of the amputee. **Material and Methods:** Medline and Cochrane Library databases research with the keywords Hyperbaric Oxygen AND Rehabilitation; Hyperbaric Oxygen AND Amputation; Hyperbaric Oxygen AND Wound Healing and relevant articles were selected. **Resultados:** Hyperbaric oxygen (HBO) therapy is defined by Hyperbaric Medical Society as a treatment in which the patient intermittently breathes 100% oxygen in a pressurized treatment chamber at pressures greater than one atmosphere, being more commonly used in tissue hypoxia or gas embolism conditions. Local hyperoxia seems to induce vasoconstriction, reduce vasogenic post-traumatic swelling and accelerates ischemic injury repair. Peripheral vascular disease is the cause of more than 90% of amputations, more than half due to Diabetes Mellitus. Many studies showed the effectiveness of HBO in wound healing of lower limbs even seeming to be the most effective treatment of “diabetic foot”. In animal studies, the use of HBO seems to improve local metabolic processes delaying the progression of acidosis in the amputated limb. Studies confirm that the HBO treatment accelerates the healing rate, reduce the incidence of amputation and as an adjunct therapy seemed to reduce the costs of hospitalization and treatment of ulcers. In addition of these effects, there appear to be clear positive effects on the rehabilitation of the amputated patient. For this, it is crucial to define an individualized rehabilitation program that incorporates HBO, prosthesis as indicated and adequate cardiovascular risk factors, psychological and pain/phantom sensation control **Conclusion:** The amputation of the lower limb causes a devastating effect on the patient’s life, both physically and emotionally. Thus, a rehabilitation program is necessary in all its dimensions in order to restore the patients’ lost capacity and the quality of life. Treatment with HBO seems to be a relatively safe and non-invasive method that accelerates wound healing becoming useful in the rehabilitation of amputated lower limbs. If in one hand it appears to reduce the incidence of amputation, the benefits in post-amputation injuries are not so obvious and therefore further investigation is needed.

PA893

Post Total Contact Casting Healing Pattern in Leprotic Chronic Plantar Foot Ulcer

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Introduction: Role of TCC in diabetic foot ulcer is well established in literature. Hansen’s disease is very common in the tropical country like India but rarely seen in developed world. That’s why there is scarcity of literature about the efficacy of TCC in leprotic neuropathic ulcer. **Objective:** To observe overall improvement pattern of plantar foot ulcer after doing Total Contact Casting; 2) to look for the time duration to heal the ulcer. **Study design:** Longitudinal analytical study. **Sample size:** 22. **Place of study:** Department of Physical Medicine and Rehabilitation, IPGME & R, SSKM Hospital, Kolkata. **Study duration:** 7 months. **Inclusion criteria:** Grade 1 and grade 2 plantar ulceration (WAGNER classification). Age more than 18 years. Ulcers treated previously with local dressing, antibiotics and orthosis but no improvement. Ambulatory patients. **Exclusion Criteria:** Grade 3 ulcer (WAGNER) Age less than 18 years. Unwilling patients. Patients unsafe in mobility while in cast. Grossly deformed foot. **Methodology:** After taking institutional ethical committee clearance the patient fulfilling the above criteria the assessment of ulcer was done by Wagner’s grading, site and size of the ulcer after getting the patient’s consent. Then the ulcers were debrided off under aseptic condition and TCC (Total Contact Casting) was done. **Outcome measures:** Duration to heal, improvement in the size of the ulcer, downgrading of WAGNER classification. **Assessment:** At 0 wk, 1st wk, 3rd wk and 6th wk. **Results:** As per the statistical analysis by Statistical version 6 [Tulsa, Oklahoma: Stat Soft Inc., 2001] and Graph Pad Prism version 5 [San Diego, California: Graph Pad Software Inc., 2007] it was shown that the surface area and width of ulcer were improved with statistical significance due to TCC. Interestingly there was no difference noted in improvement of hind foot and fore foot ulcers. **Conclusion:** TCC is helpful in improvement of size of ulcer in short period of time without any anatomical variation of site of ulcer. **Keyword:** Leprosy, neuropathic foot ulcer, TCC, plantar foot ulcer, wagner grade, neuropathy.

A.7.6. MANAGEMENT OF FATIGUE AND SLEEP DISORDERS

PA894

Electromyography Study of Medial Gastrocnemius Muscle Following Low Frequency Current Stimulation in Normal Subjects

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Background: Fatigue varies at great extent and a lot of parameters could participate in the fatigue process, so muscle fatigue is to be considered one of the most important factors that affect exercise performance and has an impact on function in many clinical situations. **Purposes:** To investigate the effect of fatiguing protocol of high and low frequency on compound action potential (CMAP) of medial Gastrocnemius muscle over time. **Study Design:** (2 x 1) pre-Test post-Test design. **Materials and methods:** sixty healthy male subjects from were involved, aged between 18– 40 years. They were divided into two equal groups. Subjects in the first group underwent 80 Hz frequency stimulation while Subjects in the second group underwent 40 Hz frequency stimulation. Subjects were required to tolerate a fatiguing protocol for 20 minutes. **Results:** There were significant decrease in the amplitude CMAP of medial Gastrocnemius muscle following high and low frequency stimulation protocol. There were no significant differences between high and low frequency stimulation on the amplitude of CMAP **Conclusion:** Decline in the amplitude of CMAP do exist between individuals before and after high and low frequency stimulation (fatiguing protocol). It was recommended to use low frequency stimulation rather than high frequency stimulation to avoid rapid fatigue of the muscle.

A.8. SPORTS IN REHABILITATION AND SPORTS REHABILITATION

PA895

Age and Gender Differences in Weights Lifted in a Gravitational Wellness Gym

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In a previous study, we reported on a new weightlifting technique which allowed individuals to lift extremely high weights, with significant progression through weekly 30 min. sessions. In a follow up study, we found significant improvement in musculoskeletal complaints, with an extremely low rate of injury. This study expands was designed to better understand the differences in the effects of this weightlifting system by age and gender. This retrospective study included the records of individuals participating in a gravitational wellness center in Atlanta Georgia. A weightlifting program included free weights in four separate stations including a belt lift, hand lift, chest lift and leg lift. The belt lift involved the patented belt system, allowing for free weights to be lifted with the belt placed over the individuals pelvis. In all stations, the subjects were asked to with until the form of their weightlifting was judged to be faltering. Patients returned for 20 min. sessions every week for the first 10 weeks. 161 individuals including 100 males and 61 females completed at least 10 sessions. The participants ranged in age from 17 to 74 years. Despite the short weekly sessions, significant weekly gains were found for both genders and in all age groups ($p < 0.001$). At the 10th session, the mean weight lifted at the belt lifting station was 949 pounds for females and 1,336.7 pounds for males. For the hand lift the average weight lifted at the 10th session was 321 pounds for females and 525.7 pounds for males. For the chest press these values were 235.4 pounds for females in 418.2 pounds for males. For the leg press, these values were 750 pounds for females and 1,006.5 pounds for males. For both males and females, the 31 to 40 year age group consistently lifted heavier weights than the other age groups.

PA896

Age and Gender Differences with Gravitational Free Weightlifting

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A growing number of strength and power training studies have demonstrated that weight lifting can deliver significant health benefits. When using strength and power lifting programs, studies have shown that individuals you into their 70 s and 80 s can be expected to see improvements in strength, power mobility and agility in as little as 10 weeks. This study reviewed the effects of a once weekly extreme weightlifting technique, the Gravitational Wellness technique for improving strength. 161 participants included 100 males and 61 females enrolled in a gravitational, wellness gymnasium. At this facility, participants were asked to lift free weights, using four separate weight stations including a belt lift, a hand lift, a chest press, and a leg press. The initial belt lift exercise involved in a patented belt system that allowed lifting with the legs, without holding a barbell. Participants lifted progressively larger weights until the instructor determines that their form was faltering, and then reduced the weight by 30% for additional repetitions. Time at each station was 10 min. The average weight lifted for females and males at the initial lift was 462.5 pounds and 654.3 pounds respectively in week one, increasing to 149.4 and 1,336.7 pounds at week 10. For the hand lift, in the first week, females lifted an average of 184.1 pounds while males lifted an average of 297.2 pounds, increasing to an average of 297.2 and

525.7 pounds respectively. The chest press, the and waits for the females were 235.4 pounds and for the men were 418.2 pounds. Finally, for the leg press, at week 10, a women lifted 758.0 pounds in the men 1,006.5 pounds. Significant differences were noted in week two week gains for both males and females ($p < 0.001$). *Conclusion:* this study demonstrates that heavy weightlifting for 30 min. per week could produce significant and dramatic weights lifted over a 10 week training period

PA897

Heart Dimensions in Elite Sci Paralympians Competing in Throwing and Swimming

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Introduction/Background: Athletics include running, jumping and throwing events. The later are considered to be more anaerobic events. On the other hand in swimming, athlete makes more aerobic effort. The aim of this study is to investigate the myocardial adaptation in these two paralympic sports (throwings and swimming) of elite, wheelchair bound, athletes with spinal cord injury. *Materials and Methods:* Forty-seven athletes took part in this study. They were competing in 2 paralympic sports, sitting throwing (Group A, n=34) and swimming (Group B, n=13). They had undergone a thorough cardiologic examination included ECG and Heart ultrasound. The purpose of the examination was to obtain Athlete's License that was a rule of The Panhellenic Sports Federation for People with Disabilities. All these athletes are considered to have a normal examination. The purpose of this examination was to exclude athletes with heart disease. Statistical analysis were performed with *t*-test *Results:* Field athletes had duration of disability 21.6±19.3 years, mean age 41.1±10.6 years, years competing in sports 10.4±5.4. Heart ultrasound showed aortic root 31.1±4.2 mm, Left sinus 33.4±4.2 mm, Ventricular Septum Wall 9.6±1.2 mm, Left Ventricular Posterior Wall 9.2±1.1 mm, Left Ventricular Diastolic Cavity 47.2±8.3 mm, Left Ventricular Systolic Cavity 31.9±4.9 mm, and Ejection Fracture 66.9±5.6%. Compared with throwers, swimmers had duration of disability 26.4±15 years ($p=0.2$), mean age 36.3±9.4 years ($p=0.1$), years competing in sports 8±4.1 ($p=0.1$). Heart ultrasound showed aortic root 31±3 mm ($p=0.9$), Left sinus 33.6±2.6 mm ($p=0.8$), Ventricular Septum Wall 9.6±1.1 mm ($p=0.9$), Left Ventricular Posterior Wall 9.6±1.2 mm ($p=0.4$), Left Ventricular Diastolic Cavity 49.2±3.8 mm ($p=0.3$), Left Ventricular Systolic Cavity 30.1±4.1 mm ($p=0.2$), and Ejection Fracture 68±4.5% ($p=0.3$). *Conclusion:* Heart dimensions of spinal cord injured athletes competing in swimmers are not different of those competing in throwing events.

PA898

The Effect of a Decrease Plantar Loading Tape on a Height of Medial Longitudinal Arch in Amateur Basketball Players

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Introduction/Background: Repetitive jumping and running promote a decline in a height of the medial longitudinal arch (MLA) or an excessive foot pronation which is known as one of the risk factors for foot and ankle injury. A decrease plantar loading tape (DP) could maintain the height of the MLA after jogging. However, the evidence is limited in basketball players. The aim of the present study was to investigate the effect of the DP on changes in the height of MLA after basketball game. *Materials and Methods:* A crossover design was performed in thirty male amateur basketball players aged between 18-25 years. At baseline and post-

10-min basketball game with or without DP application (barefoot condition), navicular height (NH) and navicular drop (ND) were measured as indices of the height of MLA using a card-board and an Oxford precision dial caliper. **Results:** Barefoot condition, the 10-min basketball game demonstrated a decline in NH compared to baseline (mean differences are 1.71 mm ($p=0.02$) and 1.67 mm ($p=0.06$) for the right and left sides, respectively). Surprisingly, there were no significant changes in ND. The data showed that DP application during the basketball game demonstrated a potential intervention to maintain the height of MLA. The DP application demonstrated a tendency for maintaining the height of MLA on a dominant side (right foot), however, there was no significant difference (mean difference 1.48 mm; $p=0.07$). On a non-dominant side (left foot), the DP application demonstrated a significantly greater NH compared with the barefoot condition (mean difference 2.55 mm; $p=0.008$). After the game, there were no significant differences in ND between conditions. **Conclusion:** Our findings revealed that the 10-min basketball game decreased the height of MLA. It could imply that a plantar arch support should be applied to basketball players. The DP taping demonstrated the potential intervention to stabilize the plantar arch. However, a long term study remains to be elucidated.

PA899

Functional Rehabilitation after Operative Treatment of Acute Achilles Tendon Rupture

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Introduction: Total Achilles tendon rupture appears at middle age persons, but partial ruptures are common for well trained sportsmen. The treatment may be conservative or operative. Operative treatment is preferred for sportsmen, young and active persons. **Aim.** Aim of the study is to present an outcome after rehabilitation of patients with surgically treated Achilles tendon rupture. **Material and Method:** In the study 18 patients were included (2 women and 16 men). 16 patients had sports injury (football, basketball, running), while 2 patients had other type injury related to traffic accidents. Their assessment was made with clinical examination, measurement of ankle range of motion (ROM), calf circumference and analysis of the gait at the baseline, at discharge, and at follow up. Rehabilitation treatment includes exercise therapy (range of motion exercises, strength resistance exercises, proprioception and balance exercises, and stationary bicycle), some currents like interferential currents or iontophoresis, therapeutic ultrasound, heat therapy (paraffin baths), hydrotherapy, low frequency electromagnetic field and occupational therapy. Rehabilitation protocol was tailored individually, according the subjective signs, clinical and functional status. These treatments were performed 10 to 20 days, 5 days in the week. For statistical analysis Students *t*-test for dependent variables was used. **Results:** Most of the patients (16/18) began with rehabilitation treatment 6-7 weeks after surgery. At the baseline they all had limited ankle ROM, calf muscle hypotrophy, and 13 had gait with partial weight bearing with crutches. Improvement in muscle trophy and strength, significant improvement in ankle range of motion and gait with gradually weight bearing were noticed. Patients satisfaction at the end of rehabilitation and at follow-up were high. **Conclusion:** Exercise therapy and other rehabilitation methods contribute to the significant improvement of ankle range of motion, muscle strength and functional status of patients after surgery of Achilles tendon rupture.

PA900

Sonographic Evaluation of the Plantar Fascia in Runners

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Background: The plantar fascia is a band of connective tissue originating in the medial tuberosity of the calcaneus bone and distally attached to the plantar plates of the metatarsophalangeal joints. With a normal thickness ranging between 2-4 mm, this aponeurosis maintains the longitudinal arch of the foot providing support during walking and running activities. Most of the previous studies evaluating sonographic changes of plantar fasciitis address the comparison of findings between symptomatic patients and asymptomatic individuals. The purpose of this study was to determine if the sonographic measurement of the plantar fascia is thicker in runners than the reported value for the general population and evaluate different factors that might have an impact in this measurement. **Material and Methods:** Plantar fascia thickness was measured in 40 patients who run an average higher than 10 kilometers a week. Sonographic measurements of the plantar fascia (long-axis and short-axis), along with various intrinsic (age, body mass index, gender) and extrinsic (foot strike, surface, time and distance each person ran per week, history of heel pain) factors were determined. **Results:** The average thickness of the plantar fascia measured 3.9 mm in long axis, while the average thickness was 3.8 mm in the short axis. The thickness in different sonographic planes was analyzed with Pearson correlations to study the possible relationships with some intrinsic and extrinsic factors associated with plantar fasciitis and exposure to activity revealing no statistically significant correlation within the compared variables. **Conclusion:** The sonographic measurement of the plantar fascia in habitual runners does not present a significantly increased value when compared to the general population. This study does not justify using a higher cut-off value for runners when using sonographic measurement as diagnostic criteria for plantar fasciitis.

PA901

Sequential Injury of Bilateral Suprascapular Nerves after Vigorous Parallel Bar Exercise: Case Report

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Background: The suprascapular nerve (SSN) is derived from the upper trunk of brachial plexus and innervates the supraspinatus (SSP) and infraspinatus (ISP) muscles. The SSN injury is rare, therefore, usually overlooked in the patients with shoulder pain. Bilateral SSN injury is thought to be more rare conditions. We report a rare case of sequential bilateral SSN injury restricted to the ISP muscle following vigorous parallel bar exercise and try to figure out the pathomechanism of this neuropathy. **Case Report:** A 22 year-old man complained right shoulder pain and weakness since 6 month ago without trauma history. Physical examination showed profound atrophy of right ISP muscle. The strength of external rotator was grade 3/5 and abductor grade 4/5. The MRI revealed atrophy of SSP and ISP muscles in right shoulder. Electrodiagnostic studies were performed. The compound muscle action potential (CMAP) recorded from right SSP muscle showed normal amplitude and latency but the CMAP from right ISP muscle showed lower amplitude than left side. On needle EMG, abundant denervation potentials were present only in right ISP muscle. He improved slightly since surgical decompression of right transverse scapular ligament which was hypertrophied on arthroscopy. After 4 month, the same symptoms appeared in the left shoulder. We investigated his personal activities in detail and found out that he did always vigorous parallel bar exercise before each shoulder pain developed. Electrodiagnostic studies were performed again and revealed lower CMAP amplitude of ISP branch of bilateral SSN and abnormal spontaneous activities of left ISP muscle on needle EMG. In this case, patient denied any experience of trauma. And ganglion or cyst was not found in shoulder MRI. Parallel bar exercise consisting of repeated dips and swings can put pressure on shoulder girdle. We assumed that SSN damage was caused by increase of compartment pressure over the shoulder muscles around scapula. And, the sequential nerve damage on the opposite side developed by restarting the parallel bar exercise in the state of incomplete recovery.

PA902

A Study on Factors Causing Groin Pain in Adult Male Soccer Players**T. Sugano*¹, *H. Hori*², *S. Hayashi*³¹Fukui, ²Fukui College of Health Sciences, ³Fukui General Hospital, Fukui, JP

Introduction/Background: Groin pain (GP) generally affects the performance of soccer players and is often reported to become chronic. In Japan, the main causes of GP syndrome-related pain in athletes are thought to be an imbalance between the muscle strength and muscle tone around the hip, and they are primarily treated with conservative therapy. Therefore, the aim of the present study was to elucidate the physical characteristics related to the factors causing GP in male soccer players. **Material and Methods:** We divided 16 adult male soccer players (32 hip joints) who are members of a regional league into two groups according to their history of groin pain (HGP): an HGP group and a non-HGP group. In the two groups, physical function measurements comprised the hip range of motion measurements (flexion, extension, abduction, adduction, external rotation, internal rotation) and hip muscle strength measurements using an isokinetic strength measurement device (flexion, extension, abduction, adduction, external rotation, internal rotation), at angular velocities of 60°/s and 180°/s. The maximal strength and muscle strength ratios were then calculated and compared. For the statistical analysis, unpaired *t*-test using univariate analysis was performed, with the level of significance set at less than 5%. **Results:** The HGP group comprised 12 hip joints (37.5%) and the non-HGP group comprised 20 hip joints (62.5%). Compared with the non-HGP group, the HGP group exhibited significantly higher values for the hip abduction strength (180°/s; $P=0.0097$), hip internal rotation strength (180°/s; $P=0.0197$), and hip external rotation strength 180°/s to hip internal rotation strength 180°/s ratio ($P=0.017$). **Conclusion:** The cause of hip muscle imbalance appears to be triggered by the specific natures of playing soccer; hip abductor and adductor muscles play an important role in the kicking motion in soccer, and the supporting and kicking legs predominantly use a different group of muscles. Moreover, it appears that the difference in alignment during the kicking motion increases the moment of the lower limbs, increasing the load applied to the soft tissue surrounding the groin, thereby causing GP.

PA903

Pianists' Hand Biomechanics: Streaming Heritage and New Knowledge**S.-H. Lee*, *A. Luciano*

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Pianists' heritage embraces finger technique, arm weight, relaxation, and physiological mechanics. The principal component of skilled pianists' hand dexterity remains in the finger-touch control. History reveals that famous pianists had varied hand size and shape. We wonder whether large hand has advantage over small hand and if small hand poses injury risk. We tested four groups of skilled pianists ($N=31$) applying comprehensive hand measurements, motion capture at 14 finger joints, and quantified performance outcomes to examine systematically relationships among hand biomechanics, music performance outcomes, and motion capture. Skilled pianists are classified into four categories: artists ($n=9$), graduate pianists ($n=8$), undergraduate pianists ($n=5$), and injured professional pianists ($n=9$). We defined hand biomechanics per hand length and width, composite finger lengths, composite finger spans, hand and arm weights, weight ratio between them, and ulnar deviation at the wrist. Performance outcomes in playing seven tasks were measured by temporal and dynamic evenness touch control on the piano keys, quantified in MIDI data generated from a hybrid acoustic-electronic piano. DataGlove 5DT was used to capture motion at 14 finger joints to compare an injured and a healthy pianists' joints motions in playing a rapid scale. There were NO differences in hand bio-

mechanics among the four pianist groups. Significant differences in hand size, shape and weight were observed between male ($n=16$) and female ($n=15$) pianists. There were, however, no significant differences between male and female in finger spans 1-5, 2-4, 3-5, ulnar deviation, and hand-arm weight ratio. In Legato playing, artists, graduate and injured pianists were similar in articulation evenness ($p=0.83$, $p=0.523$) as well as in tempo evenness ($p=0.60$, $p=0.15$), while undergraduate pianists showed significant differences in both temporal and articulation evenness control ($p=0.045$, $p=0.045$). But, both injured ($p=0.024$) and undergraduate pianists ($p=0.042$) showed significant differences in tempo evenness in Staccato playing. An injured and healthy pianists' mocap data showed significant differences in both MCP and PIP joints. Our study demonstrates relationships between hand biomechanics and touch control, essential to injury-preventive pedagogy and rehabilitation.

PA904

Statins: Controversies and New Trends in Sports Medicine**J. Leal*, *J. Gomes*, *J. Cunha*, *R. Marques*, *C. Branco*

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Introduction: The debate whether statins are safe to use has been raging since their introduction. They are generally well tolerated and are believed to have minimal adverse effects, such as elevations of liver enzymes, muscle aches, rhabdomyolysis and, recently, cognitive decline, increase in the incidence of cancer and diabetes mellitus. The muscular effects of statins in individuals who maintain an active lifestyle remains equivocal. Recent evidence indicates that statins have beneficial effect in promoting tendon healing via stimulation of the cyclooxygenase 2 (COX2)/prostaglandin E2 (PGE2) pathway, in opposing to COX2 selective inhibitors (coxibs) that are commonly prescribed in orthopaedic patients and have been suggested to affect tendon healing. **Material and Methods:** Meta-analysis (research on Medline database). **Results:** Studies reported that 10% of statin treated patients have muscular symptoms leading to discontinuation of treatment in 30% of symptomatic patients. It is not known the precise mechanism of statin-induced myopathies, and the predictors are various. Fluvastatin may be associated with a lower risk of muscular symptoms. Muscular symptoms were managed by switching the patient to a different statin, lowering the dosage, or discontinuing statin therapy completely; supplementation with CoQ10 has been controversial. In Sports Medicine literature, many authors reported statin intolerance in athletes, due to muscular symptoms (including increment in serum creatine kinase produced by exercise), lowest peak exercise capacity and more fatigue; however, other authors concluded that statins do not cause enough fatigue or pain to require a decrease in the duration or intensity of workouts. A study by Dolkart *et al* raise the hypothesis of a positive role of PGE2 in tendon healing during the acute inflammatory phase that follows tendon surgical repair. They found a significant beneficial effect of atorvastatin in promoting tendon healing via stimulation of the COX2/PGE2 pathway. However, this is the first study that points to the therapeutic potential of statins in tendon healing. More studies are needed to further establish this proposed treatment modality. **Conclusion:** Physicians must weight relative benefits of statins in active individuals, and their use should be continued only if it does not interfere with exercise. A new role of statins in tendon healing may be raising.

PA905

Relationship between a Player's Physical Characteristics and the Drive Pattern of Wheelchairs in Wheelchair Basketball**N. Shida*, *T. Yamada*, *Y. Furukawa*, *Y. Ikeda*, *H. Kuruma*

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Introduction: This study aims to clarify the relationship between a player's physical characteristics and the drive patterns of wheel-

chairs in wheelchair basketball games based on the kinematic analysis of the drive motions utilizing a three-dimensional motion analyzer. *Methods:* Eighteen male players from the national wheelchair basketball team (age: 26.3/SD 5.7, height: 173.0 cm/SD 9.4, and weight: 68.6 kg/SD 12.7) participated in the study. Their disabilities are classified as follows: class 1; 5, class 2; 4, class 3; 3.5, and class 4; 4. The motion analysis was conducted using Vicon Nexus 1.7.1. We applied 27 reflective markers on the players with wheelchairs and set the camera's sampling frequency to 100 Hz. Measurements were taken of the drive pattern of the players when they started moving and stopped moving. Analytic data were calculated utilizing Body Builder Ver.3.6.1 as follows: the ground reaction force, the maximum speed of the wheelchairs, the rim position at initial drive, the rim position when they were released, the maximum angle of the mid-section, the elbow's angle when they started moving, and the maximum angle of elbow joints. The data were analyzed using ANOVA utilizing SPSS Ver.21. The ethical committee of the Tokyo Metropolitan University approved this study, and each participant gave written informed consent before participating. *Results:* Results showed significant differences between the severity of an individual's disabilities and the angle of the elbow when they started moving ($p=0.006$). The mean ground reaction force for traveling direction (start/stop) [N] was class 1; 79.5 (SD 11.2)/-363.0 (SD 61.5), class 2; 152.5 (SD 61.2)/-331.3 (SD 110.6), class 3; 200.5 (SD 108.2)/-446.0 (SD 80.0), class 4; 128.8 (SD 48.0)/-368.8 (SD 106.8). The ground reaction force did not differ between the four groups ($p=0.087$). *Conclusion:* It was proven that the angle of the elbow joints increased in proportion to the severity of the disability. Although we have yet to incorporate this information into a guideline for wheelchair prescriptions for sports, it is clear that the relationship between the severity of the player's disability and the elbow angle at the initial push will be important factors.

PA906

Core Muscle Strengthening with Suspension Device

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Introduction: Suspension exercise is popular to improve core stability in individuals with and without musculoskeletal complaints. However, the activity of core muscles during suspension exercises has not been reported. The level of activation of core muscles during suspension exercises in healthy adults was investigated. *Material and Methods:* The study was conducted in a controlled laboratory setting. Surface electromyographic (sEMG) activity of various core muscles (rectus abdominis, external oblique, internal oblique/transversus abdominis, and superficial lumbar multifidus) during four suspension workouts (hip abduction in plank, hamstring curl, chest press, and 45° row) was examined. *Results:* Different levels of muscle activation were observed during the hip abduction in plank, hamstring curl, and chest press. Hip abduction in plank generated the highest activation of most abdominal muscles. The 45° row exercise generated the lowest muscle activation. *Conclusions:* Among the four workouts investigated, the hip abduction in plank with suspension was found to have the strongest potential strengthening effect on core muscles. Also, suspension training was found to generate relatively high levels of core muscle activation when compared with that among previous studies of core exercises on stable and unstable support surfaces.

PA907

Myofunctional and Postural Rehabilitation, Posturology and Posturometry in Neuromuscular Rehabilitation

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Posturology is the medical science that studies the body's static posture while Posturometry is the medical science used to measure the results. In medical rehabilitation they are of crucial importance

from the holistic point of view in both the diagnosis and treatment. The M.P.R. (Myofunctional and Postural Rehabilitation) is a method that uses both posturology and posturometry, for a complete diagnosis, planning and treatment, in medical sciences, to treat patients with neuromuscular diseases. Posturology allows medical sciences, to have a global and holistic approach, where as posturometry is used to scientifically measure posturology, transforming it into Science. By using posturology and posturometry in combination, this method allows medical sciences, to reach at the root of the problem. Combining both the results in rehabilitation will be permanent, and longlasting. The aim of this poster, is to show the basis of posturology and posturometry, applied in the M.P.R.

PA908

The Fatigue Fracture of the Calcaneus. A Clinical Case in a Triathlon Athlete

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Case Diagnosis: Fatigue fracture of the calcaneus. *Case Description:* 29 years old male, triathlon athlete, referring mechanical pain in rear left foot, with 12 days of progression. An earlier increase in daily training intensity was recorded. There was no history of musculoskeletal and nutritional problems or corticoid therapy. Inspection and neurovascular examination were normal. Passive and active range of motion of talocrural, subtalar and talometatarsal joints were regular, with pain at ankle extension, resisted foot inversion and palpation of calcaneus body/fibular sheath. Initial radiologic study (12 days after pain-onset) presented an abnormal bone integrity image in calcaneus body. MRI (13 days after pain onset) showed calcaneus transversal discontinuity with oedema, suggesting recent fatigue fracture. Immobilization and no weight-bearing was introduced for an initial period of 4 weeks. Progressive weight-bearing was introduced between 4th and 8th weeks. Sports activity started at 12th week, focused on core and upper limbs training. Swimming and cycling were initiated. CT scan confirmed complete calcaneus fracture consolidation. Boundaries to sports activity were eliminated by 24th week, without pain or functional limitation. *Discussion:* Calcaneal stress fracture is the second most common stress fracture in the foot, following metatarsal stress fracture and it's caused by repetitive overload to the heel. For instance, triathlon athlete is exposed to intense axial weight-bearing in association to repetitive concentric/eccentric gastrocnemius contraction. X-rays have poor sensitivity, particularly in the first weeks. When visible, any fracture pattern is possible, but it is almost always linear and located in the posterior half of the calcaneal body. MRI is highly sensitive and relatively specific in diagnosing stress fractures, especially on T2 and STIR images. Differential diagnosis must be done with plantar fasciitis, Baxter nerve entrapment, insertional Achilles tendonitis, atrophic heel pad, retrocalcaneal bursitis and Sever disease. Early treatment involves PRM plan, decreasing activity level and possibly no weight-bearing. *Conclusions:* Stress fractures are frequently underdiagnosed and undertreated. Early diagnosis is crucial so high index of clinical suspicion is required. Calcaneal stress fractures can be adequately treated with activity modification, without casting or surgical intervention. When in the presence of bilateral stress fractures, metabolic and nutritional issues must be considered.

PA909

Development and Application of New-Sports Program on People with Chronic Stroke

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Introduction: The study was to develop a new-sports program including interest and competitive factors for stroke patients and to apply it. New-sports exercise can modify exercise intensity and difficulty, has the advantage of creating a special material for stability

on disabled. *Methods:* This study was composed of the pre test- post test control design. The subjects were randomly divided into two groups (New-sports program group (n=12), Conventional therapy group (n=11)). Both groups received a conventional physical therapy. The new-sports program group received a total of twenty-four sessions, sixth minutes per session, and three times a week during eight weeks. This new-sports program consists of a warm-up exercise for ten minutes, a main exercise for forty minutes and a cool-down exercise for ten minutes. A main exercises in new-sports program were as follows: curolling, tchouk-ball, disc golf, form gate, soft volley ball, hook ball, shuffle board, sports stacking, chipping target, ball-robball, ladder, mimongi. Primary outcome measures were balance ability and confidence (Berg Balance Scale, BBS, Timed-up and Go test, TUG, Activities-specific Balance Confidence, ABC), strength (Motricity-Index, MI). Secondary outcome measures were walking capacity (6-Minute Walk, 6MWT and 10-meter Walk Test, 10MWT), depression (Beck Depression Inventory, BDI). *Results:* There was significant improvement by new-sports program group that the ABC, BBS, MI and BDI score ($p < 0.05$). TUG, 10MWT and 6MWT score in new-sports program group was improvement, but not significant. *Conclusion:* The New-sports program on chronic stroke improves depression, muscle strength, balance ability and confidence. These results suggest that it is useful as a rehabilitation program of chronic stroke patients. *Reference:* 1) Durstine, J.L., Moore, G.E. ACSM's exercise management for persons with chronic diseases and disabilities. (2009) Human Kinetics Champaign, IL. *Acknowledgements:* This work was supported in part by the Korea national rehabilitation.

PA910

Effect of Low-Level Laser Therapy on the Muscular Activity of Amateur Athletes

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Introduction: Muscle fatigue can be characterized by reduced strength and endurance during exercise. In order to optimize performance during sports, many therapeutic resources have been used, including low-level laser therapy (LLLT). The aim of this study was to investigate the possible effect of LLLT on muscle fatigue during activity practitioners, through biomechanics analysis. *Material and Methods:* The double-blind crossover placebo-controlled study was conducted on 12 healthy female between 18 and 30 years that practice regular physical activity. One used the following parameters for the application of LLLT (780 nm, 30 mW, 0.81 J/point beam area of 0.2 cm², 27 seconds and about 29 points) in the tibialis anterior muscle occurred after the delimitation of 4 points per cm². *Results:* The subjects had the following anthropometrical characteristics: mean age 20.8±7.4 years, mean height of 1.64±0.04 m, body mass 66.3±14.5 kg. The decrease of torque values was calculated by linear regression, which determined the slope of the straight line (b). As observed in torque decay into two groups: control (b=-0.1311), placebo (b=-0.1371) and laser (b=-0.1331). The values found in linear regression analysis are very close in all groups without demonstrated the efficiency of laser therapy with regard to fatigue. *Conclusion:* According to this study, we conclude that infrared laser therapy, with parameters used, did not influence the delay muscle fatigue of the tibialis anterior muscle.

A.9. SOCIAL INTEGRATION PROGRAMMES AND REHABILITATION FOR SPECIFIC

PA911

Application of Modified Community-Based Rehabilitation Program

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Introduction: This study is an existing community-based programs for stroke were modified to depending on the purpose of the exercise effect. The modified community-based rehabilitation program (mCBRP) was developed so that it can be used universally for dissemination in organizations and communities. This study was to investigate whether mCBRP would increase the amount and rate that people with chronic stroke exercise capacity (VO₂max, VO₂ peak, R etc), balance (Berg balance scale, Trunk impairment scale), gait ability (6 minute walk and 10 meter walk test) and quality of life (stroke impact scale), depression (beck depression inventory). *Methods:* This study was composed of the pretest-posttest control design. The subjects were randomly divided two groups (mCBRP group n=13 and Control Group n=14). The mCBRP is a one hour program consisting of four parts (strength, flexibility, gait, aerobic). We used a band and soft weight ball exercise to promote muscle strength, and in order to promote flexibility was a yoga mat exercise. In addition to a walking obstacle for promoting gait ability, aerobic capacity enhancement was used to arm&leg bicycle. This mCBRP group received a total of twenty-four sessions, three times a week during eight weeks. *Results:* The mCBRP is currently in progress, were up to 18 times out of 24 times. At the end of the program, a post test will be conducted. *Conclusion:* The mCBRP is expected to be a positive effect on balance ability, exercise capacity and quality of life in chronic stroke. *Reference:* 1) Janice J, Kelly S Chu & Maria Kim et al. A community-based group exercise program for persons with chronic stroke. Med Sci Sports Exerc. 2003 35(8):1271-1278. 2) Suzie Mudge, Alan Barber & Susan Stott. Circuit-based rehabilitation improves gait endurance but not usual walking activity in chronic stroke: A randomized controlled trial. Arch Phys Med Rehabil. 2009 90:1989-1996. *Acknowledgements:* This work was supported in part by the Korea national rehabilitation.

A.9.2. VOCATIONAL REHABILITATION

PA912

Occupational Reintegration One Year after Moderate and Severe Traffic Accidents in Medellin and the Metropolitan Area

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Introduction: Trauma from traffic accidents is a major cause of disability in persons of working age with negative consequences on their ability to return to work. In Medellin Colombia, there were 23,835 injuries by traffic accident, with 411 accidents per 10,000 vehicles in 2011. However, despite the importance of this health issue, we don't know how many patients return to an occupation and how it affect the functioning and quality of life. *Material and Methods:* We conducted a prospective cohort study of patients with moderate or severe trauma from traffic accidents according to the New Injury Severity Score. We enrolled patients between 2009 and 2010 and followed them until 2011. We assessed their occupational reintegration, functioning (WHODASII); quality of life (SF-36), depression (PHQ-9) and pain (VAS). We used bivariate and multivariate methods to analyze the results. *Results:* Of the 451 patients 367 (81.4%) returned to work 12 months after trauma and 84 (18.6%) did not. Patients who were not reinstated at 12 months had a lower quality of life scores compared to normal population and those who reinstated showed even higher than normal average scores on general health, emotional functioning and mental health. There were statistical significant differences in all WHODASII domains of those who were reinstated compared who did not. The lowest domains in those who were not reinstated, were: activities outside the home 44.1 (DE:28.6); participation 35.8 (DE: 35.4), mobility 34.7 (DE:31.2). No depression was observed in 84.2% of those who were reinstated and 80.1% of those who did not, and PHQ-9 score correlated most with the subscale of emotional func-

tion in those who were reintegrated and the physical performance in those who did not. The severity of the injury and pain affected various of SF-36 subscales. The trauma severity explained 32% of does not get occupational reintegration. *Conclusion:* Functioning condition, disability and Quality of life in patients who are not occupationally reintegrated after a traffic accident is lower than if they do, and it is affected by injury severity.

PA913

Prevocational Rehabilitation in the Czech Republic

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Introduction: Prevocational rehabilitation is performed by members of the rehabilitation team to get a functional assessment of the psychosensomotor potential for employment purposes. Methodologies of Prevocational Rehabilitation: Project “Initiative of the EQUAL EU - Rehabilitation-Activation-Work (RAW) was conducted from 2005 until 2008. We have divided prevocational rehabilitation to the first and second tier methodologies. First tier methodologies were selected so that they are sufficiently broad and cover most of the work activities. First tier methodologies included tests to evaluate physical exercise, balance, dexterity, orientation in unfamiliar situations, cognitive functions, working position, working equipment. Second tier methodologies were used only by selected facilities based on their experience and focus on the age groups of patients with disability or for various functional diagnoses. EQUAL project continued by a project “Regional networks of cooperation in prevocational and vocational rehabilitation (PREGNET). The tender was announced by the Ministry of Labour and Social Affairs (MLSA) virtually as a continuation of the RAW project, provided that this project will be spread to the national regions that were not involved in the RAW project, with the objective to create prevocational rehabilitation facilities in each region (the Czech Republic has 13 regions) with standard personnel, material and supply equipment. At the end of the project, we will propose that the MLSA issue accreditations for facilities that will perform prevocational rehabilitation, based on standardization of the prevocational rehabilitation procedures, methods. The prevocational rehabilitation should be reimbursed from the resources in the employment field. Standard methodologies were divided into basic, recommended and special methods for determining the psychosensomotor potential for employment. *Conclusion:* The discharge paper is send mostly to general practitioner. The prevocational evaluation result is sending to Labour office. The Labour offices follow the conclusions of the prevocational rehabilitation. According results they continue with vocational rehabilitation. The final report also recommends, on an individual basis, the necessary and appropriate long-term social support and services. The social worker is the member of the inter-professional rehabilitation team and he advice the social benefits.

PA914

Cardiac Rehabilitation in Perioperation

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Background: Following a cardiac event patients are at risk for deficits in mobility and function. The purpose of this study was to determine the effect of early cardiac rehabilitation on the patients who received cardiac surgery in perioperation. *Material and Methods:* Sixty patients who have cardiac disease participating in a cardiac rehabilitation program were randomly divided into treatment group and control group before and after cardiac operation. Preoperative education, respiratory function training, cough and expectoration training, aerobic training, and discharge education were held on the day before and 1st day to 7th day after surgery. 6-minutes walk test (6MWT) and Borg-scale were measured over the exercises training. *Results:* 6MWT results showed that, the patients in treatment group

had a longer distance than the control group, however, there was no significance between the two groups ($p > 0.05$). In treatment group, compared with pre-operation, the patients improved the 6MWT distance before they were discharged ($p < 0.05$). The Borg-scale also showed a significantly difference between treatment group and control group ($p < 0.05$). *Conclusion:* Among patients with cardiac disease, early cardiac rehabilitation in perioperation can give an effective impact to exercise tolerance and aerobic capacity of recovery.

PA915

Quality of Life as an Outcome Measure of Vocational Rehabilitation Process

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Measuring the effects of vocational rehabilitation (VR) usually refers to the outcomes in employment, while ignoring the importance of individual's changes regarding quality of life (QoL), which has long been recognised as an important outcome. To measure the QoL we have used Shallock model, widely validated instrument at EU level, with multidimensional structure (3 main dimensions and 8 sub-dimensions): personal development (interpersonal relations, self-determination), social inclusion (employability, citizenship, rights), well-being (emotional, physical, material). A sample of persons with disabilities (PwD), who were completing the VR process in 2012, 2013 and 2014, was used to obtain the data regarding short and long-term effects of VR on QoL. More than 60% of PwD consider the VR process to have positive effect on the improvement of all sub-dimensions. Employability, self-determination and emotional well-being were identified as most improved, while physical well-being was recognized as least, yet significant area. Regardless of the period of fulfilment the questionnaire (immediately after VR or after certain time), there were no differences in results. Statistically significant differences between sub-dimensions' means among demographic factors were analysed (t-test, one-way ANOVA, Mann-Whitneyjev U-test, Kruskal-Wallis test). Sub-dimension Employability showed to be statistically significant regarding employment status: unemployable achieved statistically significant lower mean values than employed ($nZ=93$; $MeZ=83.00$; $SDZ=22.68$; $UZ=35.63$; $pZ=0.035$) and participants in education ($nIZ=12$; $MeIZ=92.50$; $SDIZ=16.69$; $UIZ=51.46$; $pIZ=0.017$). Unemployed participants ($nNEZ=29$; $MeNEZ=61.00$; $SDNEZ=22.64$) achieved lower means values than participants in education ($UIZ=-39.14$; $pIZ=0.041$). No other statistically significant differences with respect to various demographic factors were found. Findings of the study show the VR effects on improving QoL and also the usefulness of the questionnaire for measuring its improvements. No differences in self-perception of improvements regarding the time of participating in the study may indicate that VR has long lasting positive impact on the people with disabilities' QoL. For more reliable results an additional measurement of the effects of VR would be required with a more precise definition of the period and a sufficient sample.

PA916

Effect of Combined Training of Resistance and Aerobic Training on Body Composition in Female Students

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Background: The purpose of this study was investigate the effect combined resistance training with food restriction on body composition of normal weight obesity in female students. *Material and Methods:* The subjects were 39 female students (age 19–22 years, BMI 23.6 ± 2.3 kg/m²) who were classified into two groups, the self-selection of dietary sessions on weight loss. The students were assigned to

the weekly group (n=20) or the bi-weekly group (n=19). The training program in the weekly group consisted of combined resistance training and aerobic training for 16 weeks. The self-selected weekly class group attended a 2-hours instructional session every week, whereas both the bi-weekly class groups received 1-hour sessions twice a week. We measured the body weight, body fat mass, the skeletal muscle mass with In Body 730 (Body Composition Analysis), before and middle and after the 16-week training period. **Results:** The body fat mass showed a significant decrease after the training period compared before, and the muscle showed a significant increase after the training period compared before in the both group. Differences in physical activity were not significant among the groups. **Conclusion:** These results suggest that combined training in normal weight obesity students improves body composition. Therefore, dietary session tailored to the needs of the participants might decrease the dropout.

PA917

Participation of Family Members during the Rehabilitation Program as an Inpatient in PRM Unit

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Introduction: To evaluate the participation of the family members during the rehabilitation program of consecutive inpatient patients. **Material and Methods:** A retrospective study from a total of 214 admissions of patients of the last two years (1/1/2013 to 15/10/2014), where 197 of them were fully data based. They were mainly diagnosed with CVA, TBI and SCI with a mean age of 58.84 years old. **Results:** Results showed that 53.3% of the patients had family members fully participating at their rehabilitation program, 27.41% were been only visited by close relatives for a few hours, 10.15% preferred an exclusive nursing care and 4.57% had both exclusive nursing care and relative visits. More specifically 60.26% of patients with SCI were fully supported by their family. In contrast, in patients suffering of CVA and other diagnosis full time family participation was significantly lower. **Conclusion:** The participation of the family members in functional rehabilitation program in severe injured patients during their hospitalization is very satisfactory, indicating the close family relationship.

PA918

Intensified Work-Related Rehabilitation Aftercare: Long-Term Results of the Randomised Controlled Multicenter Trial

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Background: There is evidence that rehabilitation in patients with musculoskeletal disorders focusing multidisciplinary on work-related demands effectively supports work ability and return to work. There could be benefits to transfer work-related components into rehabilitation aftercare. We examined the efficacy of an intensified work-related rehabilitation aftercare program (IWORAC) in comparison to standard intensified rehabilitation aftercare (IRAC) as it is provided in Germany. **Materials and Methods:** We randomly assigned 307 patients with musculoskeletal disorders and severe limitations in work-related functioning from 11 rehabilitation centers to the IWORAC (intervention group), or the IRAC (control group). The IWORAC replaces part of the standard exercise therapy in IRAC by work-related functional capacity training, work-related psychosocial groups, social counseling and relaxation training. Data were assessed by questionnaire the beginning and twelve months after the intervention. Primary outcome was the Work Ability Index (WAI). Secondary outcomes were, among others, duration of sick leave and the scales of the Short Form Health Survey (SF-36). **Results:** About half of the participants (55%) were female (mean age 46.5 years; SD=10.2). Sick leave duration in the three months

prior to the rehabilitation was, on average, 9.4 weeks (SD=4.7). 199 persons (64.8%) completed the follow-up questionnaire. There was no statistically relevant between-group difference in follow-up work ability and secondary outcomes. Both groups improved significantly in quality of life and work ability. This was particularly evident in duration of sick leave (SES=1.60; 95% CI: 1.37-1.85) and the sub-scale physical role of the SF-36 (SES=1.46; 95% CI: 1.14-1.78). **Conclusions:** A partial replacement of standard exercise therapy by stronger work-related treatments has no benefit on work ability. Improved aftercare treatment might require a more basic change focusing on employer participation and work modification. Due to the missing control group without any intervention, no conclusions regarding the effectiveness of aftercare can be drawn, although the reported effects are more favourable than the known long-term benefits of solely medical rehabilitation in Germany (Hüppe, Raspe, 2005). **References:** Hüppe, A., Raspe, H. (2005): Efficacy of Inpatient Rehabilitation for Chronic Back Pain in Germany: Update of a Systematic Review [German]. Rehabilitation, 44. 24-33.

PA919

Mentors' Training to Support Entrepreneurs and Potential Entrepreneurs with Spinal Cord Injuries

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Introduction: To make a proposal for a Mentors training intervention to help experienced entrepreneurs to understand how to act as mentors in order to facilitate persons with severe disabilities to undertake entrepreneurial activity. **Material and Methods:** We design a training plan, where Mentors will be trained on a) the role of the mentor, b) development of required mentor skills, c) the characteristics and needs of the mentees, d) the mentor-mentee relationship, e) the mentoring process, f) special needs of persons with disabilities. In all of the above special emphasis will be placed on addressing the particular needs of persons with disabilities able to follow the program, in order to give them motivation and interest for living, mainly for improving quality of life. The program should include: a) education about mentoring in entrepreneurship, b) information about the special problems of persons with disability, c) give motivation and interest for additional opportunities in the light of entrepreneurship, d) using a face to face approach in order to achieve all of the above purposes. **Results:** Mentors are experienced entrepreneurs or professionals willing to support and counsel inexperienced potential or new business owners who are at the startup phase. They are expected to possess a number of qualities typically credibility, integrity and wisdom as well as the ability to share their knowledge. To be a mentor requires a distinction between different roles with mentors sometimes acting as leaders, models, and coaches and at other times as teachers, advisors, counselors and "buddies". In addition, they relate their experience in business, share their views and opinions of current issues and trends, counsel mentees on business decisions and provide a knowledge perspective. **Conclusion:** Our proposal based on the main concept of mentoring philosophy and aims to assist persons with severe impairment to start up their own business in order to enable them to act more effectively and efficiently with their every day problem solving and eventually improve quality of life.

PA921

Community Based Rehabilitation in Bangladesh, Health Component Need to be Integrated with Primary Health Care.

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Background: Community based rehabilitation (CBR) is defined as a strategy within general community development for the rehabili-

tation, equalization of opportunities, poverty reduction and social inclusion of people with disabilities. The role of CBR is to work closely with the health sector to ensure that the needs of people with disabilities and their family members are addressed in the areas of health promotion, prevention, medical care, rehabilitation and assistive devices. In this review we have tried to explain the importance of integrating health component of CBR with primary health care as Bangladesh is a low resource country where WHO guided CBR program can be tough to reach. *Methods:* This was a conceptual opinion based review study of CBR activities at low resource setting. We have gone through world health organization's CBR guidelines especially health components, CBR activities in Bangladesh and government policy in this regard. We have also searched literature and international publications in Bangladesh's health care development and primary health care delivery system. *Results:* We found that health component of CBR as per WHO guidelines are grossly neglected in Bangladesh. We observed that primary health care if integrated with medical rehabilitation of disabled will better address the need and help bring the disabled into mainstream of development. We also observed that government health care providers at grass root level are not aware of or trained in disability management. *Conclusion:* Medical rehabilitation of disabled at low resource and at rural outset has not been incorporated in primary health care deliveries. We need to address underprivileged poor disabled at rural outset to bring them to mainstream of development by treating their medical disability, improving quality of life and quality adjusted life years. Some organizations are working independently on different component of CBR but health components are inadequately addressed. Community based approach to different component of primary health care should be integrated with CBR's structured medical care. These concepts will be more financially viable than establishing separate CBR services in Bangladesh. Health care providers at grass root level need to be trained in CBR activities.

PA922

Quadruple Amputation: Report of Two Cases

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Introduction: We present two cases of quadruple amputation. The purpose of this study is to investigate the functional benefit of inpatient rehabilitation. The program has interested several sides: orthopedic functional and prosthesis. The aim of the study is to evaluate the level of mobility and autonomy reached after inpatient rehabilitation by functional independence measurement (FIM), Get and Go test and walking speed. *Case Report:* 1st case: 13 year-old boy who has a post-traumatic quadruple amputation: bilateral transtibial amputation and bilateral trans-radio-ulnar amputation. He has a prosthetic knee joint. The median of FIM score on admission was 45 and at discharge it was 98. At discharge, he was independent with feeding using adaptive equipment. He was also able to write using dorsal elbow splint and pencil holders. Get up and go test on admission was 11 points and at discharge was 6 points. The walking speed was improved from 0, 18 m/s to 0, 42 m/s. 2nd case: 28 year-old man who has a congenital quadruple amputation: bilateral transtibial amputation and bilateral transverse amputation. The median of FIM score on admission was 60 and at discharge it was 110. At discharge, he was independent with feeding and he was also able to write using the thumb of the hand. Get up and go test on admission was 11 points and at discharge was 6 points. The walking speed was improved from 0,30m/s to 0, 46 m/s. *Conclusion:* our cases study demonstrates that inpatient rehabilitation can improve functional scores in quadruple amputation. Patients with this dual limb impairment present a challenging clinical situation for the rehabilitation team.

PA923

Make the Mother Independent First

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Introduction/Background: Birth of a child with congenital anomalies is a traumatic event for the parents as well as the community. Treat well number of such children in our centre with different experience in rehabilitation, social life and functional ability. In Indian subcontinent the mother is a house wife and has to shoulder other responsibilities in the family and community which is lacking due to the larger involvement and engagement with the child and the parents becoming non supportive in the event of treatment. Philosophy of treatment is to make the mother independent first to overcome the social discrimination. *Material and Methods:* We prepared a multifunctional ADL supportive seat with a developmental reflex assist and coordination. The plastic moulded seat is attached with a specially design duralumin frame with very small casters and the height of the seat is kept very low considering the height of the Childs residual foot so that the child can feel the touch of his toes to the ground. It is important that all possible sensory contact with the feet be stimulated. The infant should be permitted to see his feet uncovered and encourage playing with them. *Results:* To train the child for input acute sensory control we used simple baby piano switches attached with the residual limb ends and a speaker. So from very flicker to mild and mild to moderate movement of limbs creates different sound and music which the child take it as an amusement and develop movement/function as well. The whole treatment and rehabilitation process of the child were performed at home with continuous follow up and reminder by specially design tool and we observed significant functional improvement. *Conclusion:* We identified ten different categories of limb deficient child under this method we observed significant outcome and improvement in access to rehabilitation as well as fulfilment of our goal that is to make the mother and the child independent. Our experience working in SAARC nations like India, Bhutan, Bangladesh and Nepal that sustainable individual appropriate Rehabilitation is the answer. This is our holistic approach to rehabilitation for the limb deficient child in the Indian sub continent.

PA924

Are Two-Year Vocational Retraining Programs Really Better Than One-Year Programs? A Propensity Score Matched Analysis

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Background: Vocational retraining for people with disabilities aims on supporting them in obtaining competitive employment that is consistent with their physical or psychological functioning. Traditionally, retraining programs in Germany provide a new job certificate after two years of professional training. More recently, shorter one-year programs were established. It is unclear if these one-year programs are similarly effective on employment as the traditional two-year programs. *Material and Methods:* Analyses were performed with longitudinal administrative data. We included persons aged 18 to 59 years, who started their training between January and June 2005 and matched participants of one- and two-year programs by propensity scores. The propensity scores were determined by logistic regression including 23 explaining variables. Outcomes were regular income between 2005 and 2009, length of unemployment and sickness benefits as well as rates of disability pensions. *Results:* The propensity score matched sample comprised 1,028 persons (one-year training: n=514; two-year training: n=514). The sample was balanced regarding all baseline scores (mean age: 43.5 years; 31.8% female). 67% had musculoskeletal disorders; 14.1% had mental disorders. Four and five years after start of the vocational retraining program, annual income and annual length of welfare benefits did not differ between one- and two-year training participants. The risk of a disability pension was

also comparable (one-year vs. two-year: 7% vs. 8.4%). However, the cumulative income between 2005 and 2009 was 9,294 EUR higher (95% CI: 3,656 EUR to 14,932 EUR) in one-year training participants. Differences were also observable regarding the cumulative length of welfare benefits. Participants of one-year programs received more regular unemployment benefits (one-year vs. two-year: 24 days; 95% CI: 3 days to 45 days) and long-term unemployment benefits (one-year vs. two-year: 103 days; 95% CI: 39 days to 166 days) though less sickness benefits (one-year vs. two-year: -310 days; 95% CI: -345 days to -274 days). *Conclusion:* The negative effect of traditional two-year programs is probably due to the longer period of locking out participants from regular employment. The current preference of two-year programs might generate more costs without additional benefits.

PA925

Vocational Rehabilitation & Cerebrovascular Accident: an Analysis of Process & Outcomes

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Vocational rehabilitation (VR) outcome following CVA is a subject that has gained increasing attention in the medical literature. While return to work (RTW) is deemed an essential outcome measure of the neuro-rehabilitation process, few studies have systematically addressed the correlation between general stroke characteristics (severity, localization and psychosocial factors) and RTW potential. This presentation will provide a broad overview of the VR process and its associated outcome measurements. Beginning with a brief review of demographic factors associated with stroke, the discussion will review factors impacting on successful stroke survivorship and RTW. An elaboration of the VR process will be offered along with an in depth discussion of assistive technological solutions that can optimize workplace return after a neurological event. A review and analysis of data pertaining to the vocational rehabilitation process in CVA will be presented, along with select illustrative vignettes of CVA survivor outcomes.

PA928

Implementation of a Return to Work Strategy of a Regional Pension Insurance – a Routine Data Analysis

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Introduction: Demographic changes and the increasing incidence of chronic diseases require rehabilitation programs with a greater focus on the demands of the workplace. A regional German statutory pension fund recently introduced a Return-To-Work Strategy (RTW Strategy) with Work-Related Medical Rehabilitation (WMR) and Case Management (CM). The aim of this study was to determine the degree of implementation of the strategy. The extent to which it has resulted in work-related return-to work measures and to identify which sub-parameters are influential. *Material and Methods:* RTW Strategy was assessed based on insurance data. According to the guidelines of WMR, categorization was performed in consultation with representatives of the pension insurance and German classification of treatments during medical rehabilitation. Severe Restrictions of Work Ability (SRWA) were defined by Müller-Fahrnow and Radoscheski (2009). A new graduated Index of Return to Work (I-RTW) was developed, which was scored between 0 and 1. Statistics were calculated by using logistic regression models in SAS 9.3. *Results:* The overall sample (46% female) consisted of 5,883 insurees. More than half of all rehabilitees in both groups had SRWA (54.5% in 2008 vs. 52.3% in

2012). Approximately 15% of insurees with SRWA used WMR in 2008, compared to 77% in 2012. CM was initiated in about 20% of rehabilitees treated in 2012. WMR lowered the risk of a decreased I-RTW: OR 0.81, 95% CI: 0.71-0.93. The presence of SRWA had a negative effect on return to work (OR 5.06, 95% CI: 4.50-5.70). No positive effect of CM was observed in this sample (OR 2.29, 95% CI: 1.84-2.87). *Conclusions:* The RTW Strategy was successfully introduced in the clinic. More WMR measures were provided in 2012 than in 2008. It is recommended to continually evaluate the implementation of WMR and CM.

A.10. MISCELLANEOUS

PA929

Recovery Time and Distribution after Cold Immersion Test with Induced Transient Ischemia as a Standardization of Digital Infrared Thermography

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Introduction/Background: To examine the distribution and effectiveness of skin temperature recovery by performing both induced transient ischemia using arterial compression and cold immersion test in normal Korean people. To standardize the test as a diagnostic method of Raynaud's syndrome and vascular lesion. *Material and Methods:* The Challenge test was conducted in both hands of forty-five healthy participants (male: 34, average 25.2±3.1 years, female: 7, average 24±0.58 years). Participants were seated in a chair with their both hands located in a non insulated plate. Before recording the DITI, participant's radial and ulnar artery were compressed for a minute with a soft plastic block and Tourniquet. Participants soaked their hand in the 15°C water bath for a minute. The DITI was recorded before test and 1 minute, 5 minutes, 10 minutes, and 20 minutes after the test by the Iris XP®. *Results:* Temperatures of the hands of all participants were restored within 10 minutes. The part of the hand that showed the largest temperature drop in the Cold immersion test was the 3rd fingertip, and the lowest was the center of palm. Among the participants, 36 people (88 percent) showed larger temperature recovery after 5 and 10 minutes than performing conventional cold immersion test. *Conclusion:* The cold immersion test with induced transient ischemia may be a useful method for the differential diagnosis of raynaud syndrome and vascular lesion. The mechanism of larger recovery degree than performing the conventional cold immersion test may be the reflex hyperemia. Standardizing the method by applying the challenge test for a group of patients with raynaud's syndrome is necessary in the future.

PA930

A Rare Cause of Upper Extremity Paresthesia and Weakness: Pseudoaneurysm of Subclavian Artery

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Introduction: Common cause of a broken clavicle include falls onto shoulder or outstretched hand, sports injuries, and birth injury in newborns. Most broken clavicles heal without difficulty. Clavicle fractures are important because of very close proximity of neurovascular structures. *Case:* A 19-year-old man presented to our outpatient clinic with neurological symptoms on his left upper extremity. According to his medical history, he was firstly treated non-operatively with a figure-of-eight bandage for 5 days. After 5 days following the fracture, the clavicle was fixated surgically because of inability to tolerate painful closed treatment. About 9 months after the accident, he noticed left upper extremity weakness with a swelling in the same side supraclavicular region

to the lateral aspect of the arm, increases by the left upper limb movement. On physical examination, a pulsatile, smooth surfaced, painful mass on the left supraclavicular fossa was inspected and palpated with a diameter of 5 cm. There was no murmur with auscultation. The distal pulses were normal. The muscle strength of the shoulder abductors, the elbow flexors and extensors scored 4/5 with manual muscle testing. Paresthesia of the upper extremity was observed on the lateral side. The radiographs showed clavicle fracture, fixated with a plate and screws. The subclavian ultrasound and magnetic resonance imaging showed subclavian artery pseudoaneurysm. Contrast computerized tomography was correlated pseudoaneurysm and a hematoma circulating the vessel, at the posterior side of fixation screw. His electromyogram was in the normal range. **Conclusion:** Iatrogenic pseudoaneurysm is a complication of clavicle fractures, fixated with a plate and screws. A subclavian artery pseudoaneurysm can clinically present with neurological symptoms of upper extremity. Brachial plexus can be affected and the neurological symptoms can be noticed first, because of the close relationship between brachial plexus and subclavian artery. As a result, in patients who developed neurological symptoms of brachial plexus after a fixated clavicle fracture, the diagnosis of pseudoaneurysm should be kept in mind and the patient should be consulted with cardiovascular surgery as soon as possible.

PA931

Comparing the Effect of Botulinum Toxin Injection at Different Dosages for Patient with Brain Lesion

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Introduction: Botulinum toxin has been reported to be effective in reducing drooling in patients with brain lesion who suffer from severe drooling. But there are few studies on proper injection method and dose of botulinum toxin for reducing drooling in patients with brain lesion. The purpose of this study is to evaluate the efficacy and duration of effect of botulinum toxin in patients who suffer from excessive drooling caused by brain lesion, checking two dose levels injected into salivary glands. Botulinum toxin was injected under the guidance of ultrasonography for confirmation of precise injection sites. **Material and Methods:** 21 patients with brain lesion and severe drooling were included and divided into three groups. All patients received conventional dysphagia therapy. Group A patients (n=7) received an injection of 1,500 units and group B patients (n=7) received an injection of 3,000 units of BNT-B in parotid gland under ultrasound guidance. Group C patients (n=7) received conventional dysphagia therapy. Saliva secretion was assessed quantitatively at baseline and at weeks 1, 2, 4, 8, and 12. The severity and frequency of drooling was assessed using the Drooling Quotient (DQ) by patients and/or caregivers. **Results:** Group A and B reported a distinct improvement of the symptoms within 2 weeks after BNT-B injection. Compared to the baseline, the mean amount of saliva decreased significantly throughout the study. However, there was no meaningful difference between the two groups. The greatest reductions were achieved at 2 weeks and lasted up to 8 weeks after BNT-B injection. Group C did not show any differences. **Conclusion:** Local injection of 1,500 units of BNT-B into salivary glands under ultrasonic guidance proved to be a safe and effective dose for drooling in patient with brain lesion, as did 3,000 units.

PA932

Relationship between Acute Hematoma Information and Lower-Limb Orthosis after Thalamic Hemorrhage in Post-Acute Rehabilitation Hospital

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Introduction: Using lower limb orthosis is important for hemiplegic patient for acquiring ability to walk. While putting hemiplegic patients on lower limb orthoses, it is sometimes hard to decide what orthosis should be put on patient. There is a report which reported that acute hematoma type and volume affect type of prescribed lower limb orthosis for thalamic hemorrhage. However it is still unclear these information affect type of lower limb orthosis in sub-acute rehabilitation hospital. The aim of this study was to examine relationships between the type and amount of hematoma and lower leg orthoses in thalamic hemorrhage patients who received rehabilitation in a post-acute rehabilitation hospital. **Material and Methods:** Subjects were 64 patients (26 females and 38 males, Mean age 70.2±10.3 years). Patients were classified using CT classification (Type I: hematoma located in thalamus, Type II: extending into internal capsule, Type III: extending into midbrain) and amount of hematoma at onset was also measured. We investigated the type of prescribed lower limb braces (Knee-Ankle-Foot Orthosis: KAFO, Ankle-Foot Orthosis: AFO, prescribed no brace: N_Br) and patients were divided into these three groups. Chi square test and analysis of variance were calculated in comparing between hematoma type, hematoma volume and type of lower leg brace. **Results:** Among CT classification at onset, Type I was 13, Type II was 52 and Type III was 9. Mean hematoma volume was 7.7±5.1ml. For type of prescribed orthosis, KAFO was 13, AFO was 14 and N_Br was 37. There was no significant differences between CT classification and type of prescribed lower limb orthosis; however Type I had the highest ratio of N_Br. Among types of prescribed lower limb orthosis, KAFO had larger hematoma volume than other two groups. **Conclusions:** There is less destruction of pyramidal tract in Type I, and in case of Type II, type III and larger hematoma, hematoma can cross the pyramidal tract. Hence Type I had the highest ratio of N_Br and KAFO had larger hematoma volume. Information about type and amount of hematoma at onset can help deciding type of lower limb orthosis with thalamic hemorrhage patients in sub-acute rehabilitation hospital.

PA933

Unusual Median Nerve Neuropathy Due to Compartment Syndrome

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Case Diagnosis: Median nerve neuropathy. **Case Description:** 62 year-old male. Previous history of COPD, Submitted to endovascular treatment of thoracic aorta aneurism. On second day post-op: extense left limb hematoma, radial pulse not palpable. **Angio-CTscan:** contrast leakage on left braquial artery with an associated ruptured aneurism and hematoma. Patient went urgent surgery for aneurism correction, obtaining good distal perfusion. On following visits, complaints of pain and sensory deficit on 1st-3rd digits on left. Pain medication and hand splinting was performed for comfort and patient was referred to PMR consultation. On examination: atrophy of antebrachial flexor compartment and thenar eminence with thumb externally rotated. Hyposthesia, dysesthesia and pain described as “electrical shock” on 1st-3rd fingers (lateral half). Elbow range of motion was complete, wrist showed 60° flexion and 50° extension. Muscle strength was normal for elbow and wrist/finger extension. Wrist flexion was graded 4-/5 MRC scale and grade 3 in thumb and index fingers. Thumb, index and middle finger remained partially extended with attempted grip. Digits-digital prehension was not possible with 4th-5th digits. Gabapentin was started for neuropathic pain. EMNG revealed a moderate compressive median nerve neuropathy at proximal forearm level. Patient started a comprehensive rehabilitation including physiotherapy and occupational therapy. At 6 months the patient presented clear improvement of pain complaints, partial improvement of hyposthesia with near normal range of motion movements and submaximal strenght (graded 4/4+ in most affected muscles). Hand dextrity was in slow but steady improvement. **Discussion:** Median nerve originates from roots C5-T1. It innervates flexors in

the forearm except flexor carpi ulnaris and flexor digitorum profundus supplying 2nd-3rd digits. In the hand, innervates 1st-2nd lumbrical and thenar muscles. Provides sensory innervation to lateral palm and radial 3+1/2 digits. Common compression syndromes include carpal tunnel syndrome, pronator syndrome and anterior interosseous neuropathy. *Conclusion:* A rare cause of median nerve neuropathy due to iatrogenic compartment syndrome is described. It permits the revision of its anatomy, the findings resulting from a proximal compression syndrome and the therapeutic modalities that were offered, providing satisfactory clinical and functional results.

PA934

The Effect of Regular Self-Measurement of Limb Circumference on Adherence to Lymphoedema Therapy – a Pilot RCT

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Background: Guideline-based therapy of lymphoedema with complex decongestive therapy (CDT) is a life-long, expensive therapy that can, due to additional efforts, burden the quality of life of patients. The WHO estimates the adherence rate to long-term therapies by 50%. Adherence is regarded as the key factor in successful lymphoedema treatment. Self-measurement in the treatment of arterial hypertension increases adherence. As an analogy self-measurement of limb circumferences in patients with lymphoedema was investigated as an intervention to improve adherence to CDT. *Materials and Methods:* A prospective randomised-controlled pilot study was conducted over a period of 26 weeks. While keeping the regular maintenance therapy (CDT phase two) in the control group, the intervention group performed weekly self-measurement of limb circumferences and documentation in addition to the regular therapy. The adherence rate was assessed by a modified Morisky Scale in the CDT categories *compression, skin care and exercise*. An overall adherence rate was calculated as the average adherence to those categories. Secondary outcome measures were oedema volume (measured by perometer) oedema related pain, feeling of tension (numeric rating scale), and quality of life (SF-8). *Results:* While the overall adherence rate of the control group (n=25) maintained stable on a level of 68%, the self-measurement group (n=25) showed an improvement of adherence from 48% to 61% during the study period. The improvement was based on an improvement in all three monitored CDT categories. Significant changes in the secondary outcome measures (oedema volume, oedema related pain and feeling of tension and quality of life) could not be identified. Values of self-measured limb circumferences differed considerably from the objectively assessed measures. *Conclusions:* Taking into account the methodical limitations (pilot study; differing baseline adherence rates in the study groups), self-measurement of limb circumferences can be recommended as an intervention to improve adherence to lymphedema therapy. Self-measured values are not reliable and thus should not substitute objectively assessed measurements of health professionals.

PA935

An Unusual Bilateral Presentation of Frey's Syndrome Treated with Botulinum Toxin

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Introduction: Frey's syndrome or auriculotemporal syndrome includes facial gustatory sweating, mainly after surgery of the parotid gland. We describe the case of a bilateral Frey's syndrome after a unilateral surgery and its subsequent successful treatment with incobotulinum toxin type A. *Case Report:* A 54 year-old woman was referred for treatment to our PMR department 2 years after

parotid gland surgery complaining of sweating while eating in her ipsilateral cheek. When assessing the affected area with starch-iodine test, hyperhydrotic areas were revealed in both cheeks, greater in the ipsilateral to surgery. Both areas were treated with incobotulinum toxin, 100 unit reconstituted with 2ml sterile saline solution. Injections were performed following recommended protocols every 1 cm². At 6 months follow up, the patient remains asymptomatic. *Conclusion:* Our patient presented an unusual form of Frey's syndrome and was treated successfully with incobotulinum toxin. To the best of our knowledge this is the first bilateral case documented beginning in adulthood after a unilateral noxa. Further discussion is warranted to clarify the pathophysiology of this syndrome. *References:* 1) de Bree R, Duyndam JE, Kuik DJ, Leemans CR. Repeated botulinum toxin type A injections to treat patients with Frey syndrome. Arch Otolaryngol Head Neck Surg 2009; 135(3): 287-90. 2) Islam S, Hoffman GR. Two rare causes of Frey syndrome. J Maxillofac Oral Surg 2010; 9(1): 107. 3) Sethuraman G1, Mancini AJ. Familial auriculotemporal nerve (Frey) syndrome. Pediatr Dermatol 2009; 26(3): 302-5.

PA936

A 12-Week Weight Training Program to Improve Forearm Muscle Strength and Bone Mineral Density in Young Women

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Introduction: Forearm is one of the common sites for fractures and osteoporosis. Muscle mass and strength exert an important impact on bone strength. Therefore, the mechanical loading by weight training applied to the bone can stimulate its development and adaptation leading to increase bone strength and prevent fracture. The purposes of this study were to assess the effects of weight training program on forearm muscle strength and bone mineral density in healthy young women. *Material and Methods:* Sixteen female volunteers, aged 19-23 years, were participated in weight training program (biceps curl with a dumbbell; 70-85% of one repetition maximum (1RM), 8-12 times/set, 3 sets/day, 3 days/week) for 12 weeks. Program was performed in non-dominant arm and reassessed 1RM every 2 weeks. Changes in muscle strength were measured as maximal voluntary isometric contraction (MVIC) using digital dynamometer and bone mineral density (BMD) was assessed by dual-energy X-ray absorptiometry at before and after training at 4, 8, and 12 weeks. *Results:* Both of MVIC and BMD showed significant increases after training compared to before training ($p < 0.05$). The MVIC of elbow flexors, wrist flexors and wrist extensors at the end of training were increased 47.28%, 39.62%, 44.08% whereas BMD of radius and ulna were increased 13.24% and 16.53%, respectively. *Conclusion:* Results indicated that the 12 weeks weight training program (biceps curl with a dumbbell) increased forearm muscle strength and bone density. We believe that these changes may reduce the risk of forearm fracture and osteoporosis. However, our study investigated only the short-term effects of weight training program, so the long-term effects and other parameters should be explored for more clinical information. *Reference:* ACSM. American College of Sports Medicine position stand. Progression models in resistance training for healthy adults. Med Sci Sports Exerc 2009; 41:687-708.

PA937

The Effect of Nebulized Glycopyrrolate on Posterior Drooling in Brain Injured Patient: Case Series

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Introduction: Posterior drooling refers to saliva that is spilled over the tongue through the faucial isthmus, and it may lead to congest-

ed breathing, coughing, gagging, vomiting, and aspiration. The risk of posterior drooling can be increased in patients with severe brain injury taken care in a supine position for a substantial part of the day. The drug treatment includes antimuscarinics such as atropine, scopolamine, and glycopyrrolate, and they can be given orally, transdermally, intramuscularly, or intravenously. But such methods are poorly tolerated due to frequent side effects including constipation, urinary retention, orthostatic hypotension, bradycardia, irritability and drowsiness. In the following cases, glycopyrrolate was administered via nebulizer to patients with posterior drooling and we identified the salivary aspiration and the effect of nebulized glycopyrrolate using radionuclide salivagram. *Case Series:* Case 1 - A 82-year-old bed-ridden male patient with tracheostomy due to cerebral infarction had been troubled with recurrent aspiration pneumonias. Radionuclide salivagram was conducted for detecting salivary aspiration, and Radionuclide uptake was observed in trachea and bilateral bronchial tree. He was started on nebulized glycopyrrolate (Tabinul®, 0.2 mg/1 ml ampules) at dose of 0.2 mg once daily. For 2 weeks, the dose of glycopyrrolate was gradually increased up to 0.4 mg twice daily. Both the numbers of suction and the amount of saliva were significantly decreased. Also he experienced no anticholinergic side effects. After 3 weeks, radionuclide uptake seen on the previous study was not visible on follow up salivagram. Case 2 - A 1-year-old female child with spastic quadriplegic cerebral palsy presented salivary aspiration via tracheostomy tube. Her care-giver reported that the patient had been suffering from suction every several minutes during all day. In radionuclide salivagram, radionuclide uptake was observed in trachea and bilateral bronchial tree. She was treated with nebulized glycopyrrolate (Tabinul®, 0.2 mg/1 ml ampules) at dose of 0.1 mg once every night. After the treatment, the frequency of suction had decreased remarkably during her sleep, at most once or twice during the night time. She also experienced no side effect. *Conclusion:* Nebulized glycopyrrolate can be an effective method in the management of posterior drooling in patients with severe brain injury.

PA938

Analysis of Kanji Reading in a Case of Alexia with Agraphia of Kanji in the Lesion of the Left Inferior Temporal Gyrus – Using the Sophia Analysis of Language in Aphasia (SALA)

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Introduction: We report a case of alexia with agraphia of Kanji in the lesion of the left inferior temporal gyrus caused by a left occipital lobe hemorrhage. We analyzed the results of the Kanji reading using the Sophia Analysis of Language in Aphasia (SALA). *Case:* An 81-year-old right-handed woman was admitted because of Kanji reading disorder. Magnetic resonance imaging (MRI) demonstrated tumorous lesions under the left occipital cortex and edematous changes from occipital lobe to the left posterior part of the inferior temporal gyrus and to the fusiform gyrus. Auditory comprehension was preserved, in addition, naming difficulty was moderate. She could read and write Kana but not Kanji. With regard to writing Kanji, the error types were non-responses, neologic characters, and so on. On the other hand, concerning reading Kanji, the most error types were partial reading. Furthermore, there were word frequency effect, no imageability effect, and no consistency effect for reading Kanji. *Discussion and Conclusion:* The characteristic error types of reading Kanji were partial reading. The error types indicated that the patient had impairments at the character recognition level. In addition, the patient had impairments at the orthographic input lexicon level due to low performance on reading low frequency words written in Kanji. The semantic system was assumed to be easy to be functional in reading high frequency words written in Kanji. Therefore, the reading task with high frequency words written in Kanji showed high perfor-

mance. Furthermore, we speculated that not only the function of the character recognition and the orthographic input lexicon but also the function of the semantic system had an effect on reading high frequency words written in Kanji.

PA939

The Importance of Primary Prophylaxis of Venous Thromboembolism in the Hip and Knee Surgery

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Introduction: Orthopedic surgeries such as hip and knee arthroplasty, lead to a high risk (40% - 60%) for the occurrence of venous thromboembolism (VTE). Prophylaxis reduces the risk of 10% to 30%. The aim of this paper is to show the incidence of VTE in patients operated from the hip and knee and the importance of primary prophylaxis. *Material and Methods:* In the period from 2009 to 2012, was performed study of 100 patients, who were hospitalized at the Clinic for Orthopedic Surgery and Traumatology, Clinical Center, and had surgery of the hip (50) and knee (50). *Results:* Elastic stockings, as a form of mechanical prophylaxis, was used by only 6.7% of patients operated of the hip, and 14.5% of patients operated of the knee (Chi-square=1.569, p=0.177). Primary pharmacological prophylaxis was correctly dosed (per kg/bw) in the 26.8% of patients operated of the hip, and in 39.0% of patients operated of the knee (Chi-square=1.032, p=0.207). From the patients operated of the knee (50), two of them developed a deep vein thrombosis (DVT), while 48 were without DVT. From the patients operated of the hip, 2 developed DVT, and 48 were without this complication (Chi-square=0.021, p=0.884). After knee surgery three patients had pulmonary embolism (EP), while 47 were without this complication. After hip surgery two patients had EP and 48 were without this complication (Chi-square=0.176, p=0.674). *Conclusion:* By applying recommendations for diagnostic and treatment of acute and chronic venous disease we can contribute that at least reduce high risk of VTE in patients operated of the hip and knee. *Reference:* Geerts B, Carrier M, Crowther M. Clinical Guide-VTE prophylaxis in Major Orthopedic surgery: Thrombosis Interest Group of Canada; 2009; 1-3.

PA940

Hospital Infections Due to Multi Drug Resistant Bacteria in PRM Inpatients: a Retrospective Study

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Introduction: To investigate the rate of hospital infections due to multi drug resistant bacteria, the last two years in our clinic *Material and Methods:* It is known that nosocomial infections are one of the most serious problems that a clinician has to deal with. They result in prolongation of hospitalization which increases the financial burden of the hospital and the psychological burden on the patient. We reviewed the records from the total hospitalized patients those who were infected with *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*. Samples for anal cultures were collected from 11 patients and sent to the microbiology laboratory. The swabs were cultured on the appropriate media and meropenem disks were placed in order to detect resistant isolates. Isolation and susceptibility testing were performed via Vitek 2 automated system (Biomerieux, France). *Results:* In 2014 from a total of 94 patients we sent 9 samples and one male patient yielded a positive result with *Pseudomonas aeruginosa*. In 2013 from a total of 120 patients we sent 2 samples and one female patient yielded

a positive result with *Klebsiella pneumoniae*. **Conclusion:** Strict infection control measures were taken, the patients were isolated the hospital staff was informed so the hospital nosocomial bureau for infections. There was no microbial dispersion.

PA941

Compliance of the Discharged PRM Patients to Regular Instruction in Follow Up Evaluation: a Retrospective Study

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Introduction: In physical medicine and rehabilitation practice is very important the reevaluation of the patients after their discharge from PRM units. In our clinic among the medical instructions that are given to our patients after their discharge, is the standard instruction for reassessment from 30 days time and later. The aim of the current study is to ascertain the number of the discharged patients that followed this instruction in regular intervals. **Material and Methods:** from the total of the consecutive admitted inpatients for the years 2010-2014 and the patients who followed as outpatients. Data was collected from the clinic's archives and calculated with excel files and spss system. From the total of 638 inpatients, 544 of the had full information, so only them have been studied, where $m=387$ and $f=157$, with mean age 52.8 years. Their diagnosis was TBI's =37, ischaemic strokes 70, haemorrhagic strokes 44, paraplegias 128, tetraplegias 74, cauda equina syndromes 17, trauma patients 10, polyneuropathies 16 and 148 mainly with musculoskeletal problems. Of all inpatients 396 were with severe disability (72.8%). **Results:** From 544 inpatients that we had full information, 228 (41.91%) of them followed our instructions. From them 170 were men and 58 were women with average age 48.8 years and 20 (8.75%) of them visited the outpatient unit more than one time. In details their diagnosis were TBI's 20, ischaemic CVA's 34, haemorrhagic CVA's 18, paraplegias 64, tetraplegias 33, cauda equina syndromes 11, trauma patients 7, polyneuropathies 10, and 31 mainly with musculoskeletal problems. Of all inpatients 197 (36.2%) were with severe disability. **Conclusion:** We estimate that the compliance of our inpatients was poor because we treated 396 patients with severe impairments and only 197 followed our instructions.

PA942

Diagnosis and Clinical Course of Unexplained Dysphagia

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Introduction: Diagnostic evaluation and differential diagnosis could be challenging due to various etiology of dysphagia. Investigation on the characteristics of patients with unexplained dysphagia may provide useful information for clinicians to approach to the cause of dysphagia. **Methods:** Subjects who underwent a video fluoroscopic swallowing study (VFSS) with unclear etiology of dysphagia in Seoul National University Hospital from January 2007 to December 2012 were retrospectively analyzed. By a thorough review of medical records, patients who had previous history of diseases that could affect swallowing function at the time of the study were excluded. Then, the patients were divided into two groups based on the VFSS findings; normal VFSS group and abnormal VFSS group. Clinical course and final diagnosis of each patient were examined. **Results:** Of the 143 subjects, 63 (44%) had previous history of disease that could affect swallowing function before VFSS. Most of them ($N=55$, 87%) had CNS problem. From the 80 subjects who were included for further analysis, 58 (72.5%) showed normal VFSS findings and no pathology was found in more than half of them ($N=33$, 57%). Reflux disease was most common cause of dysphagia in this patient group ($N=11$, 19%). Abnormal VFSS findings were observed in 22 patients (27.5%). A clear cause of dysphagia was not found

in 3 of them, and 7 had complex medical history without disease directly affecting swallowing function. In the patients in which the cause of dysphagia was determined, myopathy was most common cause ($N=6$), which was followed by laryngeal neuropathy ($N=4$). Thyrotoxicosis was the cause of dysphagia in one patient. The age was significantly different between the normal and abnormal VFSS groups (62.52 ± 15.00 vs 76.86 ± 10.48 ; $P < 0.001$ by student T-test). **Conclusion:** Careful history taking, neurologic and physical examination is the most important approach in evaluation of patients with unexplained swallowing difficulty. Even though VFSS finding is normal, some patients may be need additional gastroenterological and otorhinolaryngological workup. Electrodiagnostic study should be considered for patients with abnormal VFSS findings. Laboratory test, such as TFT, CK, and LD, also may be useful as screening tests for these patients.

PA943

Botulinum Toxin to Decrease Stump Hyperhidrosis in Amputees: a Case Series

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Introduction: The hyperhidrosis is one of the most common complaints in patients with limb amputation. There are different treatments for hyperhidrosis. **Objectives:** To determine the effectiveness of intradermal botulinum toxin type A (BTX-A) injection for stump hyperhidrosis. 2) To evaluate if it improves the use of prosthesis and quality of life in limb amputees. **Material and Methods:** We developed a retrospective study. Inclusion criteria: adults amputees with stump hyperhidrosis, without contraindication for injection with BTX-A. Our technique consists on using the Minor Test to determinate the severity of the hyperhidrosis and the trigger points to inject the BTX-A. We evaluated the following variables: age, sex, level of amputation, etiology, residual limb pain, date in which the patients undergo to this technique, how long it is successful, Houghthon scale and quality of life by Spanish adapted COOP/WONCA charts. A descriptive statistical analysis was performed. **Results:** 5 patients were included, all males with lower-limb amputation. The middle aged was 43,4 years. The etiology was traumatic in 80% and just one was caused by vascular disease. 3 transfemoral amputations and 2 transtibial. None of them related residual limb pain. A dose of 90-100 UI intradermal BTX-A was injected in around fifty points, according to the Minor Test. A great satisfaction because of the treatment is related for patients one month later follow-up. Any adverse effect was reported. We get a clinically significant WONCA chart decreased, between 2-5 points, in four patients. Houghthon scale is around 7 points before and after the treatment, improving only one point in one patient. **Conclusion:** BTX-A may be an effective and safe treatment for stump hyperhidrosis, improving quality of life and avoiding side effects. **References:** 1) Charrow A, DiFazio M, Foster L. Intradermal botulinum Toxin Type A injection Effectively Reduces residual Limb Hyperhidrosis in Amputees: A case Series. Arch Phys Med Rehabil. 2008; 89: 1407-9. 2) Kern KU, Kohl M, Seifert U. Effect of botulinum toxin type B on residual limb sweating and pain. Is there a chance for indirect phantom pain reduction by improved prosthesis use?. Schmerz. 2012; 26(2): 176-84.

PA944

Functional Outcomes of Complex Stroke Patients Who Sustained Stroke Following Cardiac Intervention

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Introduction: A complex stroke, or stroke occurring in the context of a cardiac intervention, is a well recognised entity but has

not been studied before. The implications for prognosis and rehabilitation services is uncertain. Here, we describe the outcomes of complex stroke patients following rehabilitation compared with stroke patients in the absence of cardiac intervention. *Methods:* A retrospective observational cohort study aimed to compare the outcomes post stroke in post cardiac intervention patients with non-cardiac intervention in the rehabilitation setting. Measures of function [Functional Independence Measure (FIM) scores], rate of recovery [Length of Stay (LOS)], complications, and markers of outcome [discharge destination and level of care support upon] were collected and analysed. *Results:* Total 94 stroke patients were included in this study (74 non-complex strokes and 20 complex strokes). Median age of patients was 59 years for patients with complex strokes and 75 for non-complex strokes. Apart from age, there were no significant differences in co-morbidities which are considered risk factors for stroke between the two study cohorts. Functional profiles on admission of complex patients were non-significantly lower than non-complex patients; however, functional profiles on discharge of complex patients were slightly higher than non-complex patients. There were no significant differences in LOS between non-complex and complex stroke patients with or without adjustments for age. *Conclusion:* A non-significant trend towards better functional profiles on discharge and greater improvement from baseline was observed in the complex stroke group as compared with the non-cardiac intervention group. Complex stroke patients are an emerging population in the rehabilitation setting and further prospective studies are warranted.

PA945

Folliculitis Associated with Intermittent Pneumatic Compression

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Case Report: A 23-year-old man was seen due to his complaint of mild global swelling in the lower extremities. On detailed questioning he told that he was diagnosed with bilateral lower extremity lymphedema and suffering from it for the past 2 years. He was using compression stockings for the treatment of lymphedema, but no drugs. He had no history of skin allergy. The medical and family histories were otherwise non-contributory. He underwent IPC treatment for 30 minutes once a day. On the fifth day of the treatment, he complained of skin lesions on both legs. The patient was consulted at the Dermatology Department and a diagnosis of folliculitis was made. IPC treatment was terminated and after receiving antibiotherapy for 7 days his skin lesions disappeared completely. *Discussion:* There are two types of lymphedema: primary lymphedema without etiological factors, and secondary lymphedema resulting from lymph node dissection for malignant disorders. Peripheral lymph transportation is interrupted because of the lymph vessel hypo-function, leading to lymphedema. Although there is no recently developed advanced effective treatment technique, IPC is recommended by the International Society of Lymphology 3 for the treatment of lymphedema and it is one of the commonly used physical modalities in daily practice. On the other hand, as the lymph vessel function is damaged, bacterial infection may become more troublesome because of increased capillary permeability due to inflammation in the affected limbs. To prevent infection of affected limb, it is important to clean the skin and the cuff of the device. Furthermore, considering the risk of lymph vessel injury, strong compression for a long duration should be avoided. *Conclusion:* Therefore, when IPC device is applied to patients with lymphedema, skin condition of the limbs should frequently be checked during the application.

PA946

Interventionism in a Rehabilitation Unit: Descriptive Study

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Introduction: Medical specialities paradigm, including physical medicine and rehabilitation, is changing with an increase in interventionist therapeutic approach. Although, interventional techniques with botulinum toxin have been performed in our department since 1998, a specific Interventionism Unit has been constituted since January 2014. *Objectives:* The main objective is to describe the clinical and epidemiologic characteristics of patients referred to the unit. *Material and Methods:* Descriptive and retrospective study from January to May 2014. *Results:* The target population was 115 patients (66 women, 49 men), with an average age of 45 years old. According to the age, men's distribution was more homogeneous, with the leading group in the eighth decade of life. Female's group was superior in number, mainly in the fifth decade. The procedures were classified as products injected: botulinum toxin, hyaluronic acid and corticosteroid associated with local anesthetic injection. *Conclusions:* Population was mainly composed by women. 64% of them were in fifth, sixth and seventh decade. The leading pathologies treated with botulinum toxin injections were movement disorders as spasticity caused by cerebral palsy and stroke. Pain due to myofascial syndrome or headaches injected with local anesthetic and steroid were located in second place followed by hyaluronic acid injections employed in arthropathies.

PA947

Life Satisfaction in Stroke Patients during Rehabilitation

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Introduction/Background: Stroke is the third leading cause of death in developed countries and one of the main causes of acquired disability. This acute-onset health condition has physical, psychological and social long term consequences for approximately one third of all stroke patients. Therefore, optimization of long term care and successful rehabilitation is required. This study aims to identify possible factors which influence life satisfaction, which is important for successful rehabilitation. We hypothesize that participation (perceived involvement) of stroke patients influences their life satisfaction positively. Furthermore, health literacy and subjective perceived financial status are also believed to enhance life satisfaction. *Material and Methods:* Forty stroke patients were selected by physicians in the Centre of Rehabilitation in Oldenburg and interviewed face to face during their rehabilitation program. Four standardized questionnaires were chosen: Satisfaction With Life Scale (SWLS), Life Satisfaction Questionnaire, Perceived Involvement and Care Scale (PICS) and the short version of the European Health Literacy Survey (HLS-EU) (16 items). All interviews were performed in September 2014. In this study population, the mean age was 66,2 years with 47.5% male and 52.5% female participants. Linear regression analysis was done using SPSS version 22 (SPSS, Chicago, IL, USA). *Results:* Results showed, that perceived involvement in care did not significantly influence life satisfaction ($t=0.019$; $p=0.985$). However, life satisfaction seemed to be influenced by subjective perceived financial status ($t=5.372$; $p=0.000001$) and health literacy ($t=2.337$; $p=0.027$) positively. Comparing standardized betas showed twice as much effect of subjective perceived financial status than the other variables. Furthermore, subjective perceived financial status and health literacy explained 63% of life satisfaction variance. All variables remained stable after controlling for age, gender, Bartels Index and perceived social support. None of the control variables had significant influence on life satisfaction in this population. *Conclusion:* Results of this study suggest that life satisfaction was mainly influenced by subjective perceived financial status followed by health literacy. Perceived involvement did not affect life satisfaction. Because the study population was quite small, a follow-up study with more patients is planned to get more reliable results.

PA948

Indicators in the NHS Outcomes Framework and NHS Safety Thermometer in Phoenix Centre For RehabilitationS. Pun¹, *H. Osman²¹Royal Liverpool and Broadgreen Hospitals, ²Walton Centre NHS Foundation Trust & Royal Liverpool and Broadgreen NHS Trust Hospitals England, Liverpool, GB

Background: The audit aim is to look at indicators of inpatient safety as outlined by NHS Outcomes framework and NHS safety thermometer in patients whom discharged from Ward 5. We identified six indicators which are included in the study - hospital -related venous thromboembolism - healthcare associated infection C.Difficile (CD) - newly -acquired category 2, 3 and 4 pressure ulcers - medication errors causing serious harm - inpatient falls - new catheter related UTI. From June 2013 till March 2014 (nine months) 45 patients were discharged from Ward 5. The mean age of the patient is 55 and the average length of the stay in ward is 56 days. Among these patients, neurosurgical patient comprised 34% followed by trauma 32%, neurology 22% and the others 12%. **Methodology:** Retrospective study, data collected by looking into evidences in the patient case notes, electronic prescribing, ICE for investigations, fall incident reporting system. **Results:** In this nine month period of time, CD incidence was non-existent. All patients had initial VTE assessment performed, despite this, one patient developed PE (2.2%). Over the same period, there was 12 incidents of falls reported (26%), 5 patients had catheter related UTI (11.1%) which were treated, drug reaction noted in 4 patients (8.8%) and pressure sore in 1 (2.2%). **Conclusion:** Ward 5 performed well in prevention of CD infection. There were very low incidents of PE and pressure sore ulcers. Ward 5 need to improve on the incidences of falls and catheter related UTI as compared to national incidence rate, it is slightly higher. For this the following could be advised. Ward staff to be aware of the fall prevention and catheter related UTI and their prevention. All the ward staff to follow the guidelines in relation to the fall and catheter related UTI. Early screening and measures to minimize should be in place and followed for example implementation of FRAT for fall screening on admission escalate to fall specialist nurse if risk identified in the screening tool. Need for catheterization to be identified and to avoid unnecessary catheterization. Early TWOC to be consider Re-audit.

PA949

The Progression of Morbidities (Lymphedema, Range of Motion, Constant Shoulder Score, and Quality of Life) in Oral Cancer Patients after Radiotherapy*H.-W. Tang, S.-F. Liao, T.-H. Chang, K.-Y. Tsai
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Introduction/Background: Oral cancer is the most common cancer in middle-age men in Taiwan. Radiation fibrosis syndrome and lymphedema were the leading side effects in oral cancer patients, and will deteriorate their quality of life (QOL). The aim of this study is to prospectively follow the course of lymphedema, neck-shoulder range of motion (ROM), Constant shoulder score, and QOL. **Material and Methods:** The oral cancer patients who received surgery and radiotherapy in Changhua Christian Hospital between Oct, 2012 and Sep, 2013 were recruited. Every patient received clinical evaluations including VAS pain scale, lymphedema scale, face distance measurement for lymphedema, maximal interincisal distance(MID), ROM, Constant shoulder score, and EORTC QLQ (QLQ C30, H-N 35) when the patients receiving radiotherapy, finished radiotherapy, and every 3-month follow-up. **Results:** 26 patients completed 1st follow-up, 13 patients completed 2nd follow-up, and 9 patients completed 3rd follow-up. Their mean age was 56.5±10.4 years, and BMI was 21.4±2.8. The number of removed lymph nodes was 39.9±16.7, the radiation

dose was 6,526 cGy. Lymphedema was detected in all patients. The VAS pain score (p=0.001), Foldi scale (p<0.001), Miller scale (p<0.001), maximal interincisal distance (p=0.013), shoulder Constant shoulder score (right: p=0.001, left: p=0.003), the range of neck flexion and extension (p=0.004 and p=0.048, respectively), and right shoulder abduction (p=0.041) were the worst when finished radiotherapy, and significantly improved 3 months later. The limitation of right shoulder adduction (p=0.018) and left shoulder extension (p=0.021) improved 6 months after radiotherapy. The scores of nausea and appetite loss of QLQ-C30 (p=0.009, p=0.046), weight loss, use of pain killers and nutritional supplement in QLQ-H&N35 (p=0.012, p=0.004, p<0.001) were highest when finished radiotherapy, and decreased during the later followups. **Conclusions:** Lymphedema occurred in all advanced oral cancer patients after radiotherapy. Most morbidities of oral cancer improved 3 to 6 months post-radiotherapy.

PA950

Muscle Weakness and Botulinum Toxin Type A in Palmar Hyperhidrosis*J. Carvalho¹, M. J. Silva², I. Natario², J. Carvalho², E. Tamegão², G. Borges²¹Leça da Palmeira, ²Hospital da Prelada, Porto, PT

Introduction/Background: Hyperhidrosis is a disorder of excessive sweating beyond what is expected for thermoregulatory needs and environmental conditions. Primary hyperhidrosis has an estimated prevalence of nearly 3% and is associated with significant medical and psychosocial consequences. Botulinum toxin is one of the medical treatments available. Temporary muscle weakness has been reported to occur after botulinum toxin type A injection in patients with palmar hiperhidrosis, especially on the hands, due to diffusion to underlying muscles, mostly of the thenar eminence. **Material and Methods:** The authors searched for Mesh terms botulinum toxin and palmar hyperhidrosis in pubmed database. The language (english), species (human) and abstract availability filters were applied. The 53 abstracts were evaluated. **Results:** Prevalence and importance of hand or finger weakness vary according to doses of BTX-A injected and to how weakness is defined and measured. It was reported to occur in up to 77 percent of patients. It was self-limited and reversible, lasting between 10 and 42 days. Subcutaneous injections, although less painful than subepidermal injections, could induce more weakness due to diffusion of the toxin to the underlying muscles. **Conclusion:** Despite careful technique and small doses of BTX-A injected subepidermally, the toxin may still cause weakness.

PA951

Early Intervention of Rehabilitation of Stroke Patients in Acute Care Setting*W. Al Yazeedi¹, L. Venkatachalam²¹Doha, ²Hamad Medical Corporation, Doha, QA

Introduction/Background: Truscott (1) cited the relationship between early intervention care and functional recovery was shown to be beneficial in both improved function and in decreased mortality. Hayes (2) remarked as establishment of a coordinated team effort for early evaluation and rehabilitation within the first 48 hours after admission would contribute to a patient's shortened hospital stay, increased ambulatory ability and independence and improved quality of individual life. After reviewing the above mentioned articles, we decided to conduct retrospective study of analyzing the benefits of early rehabilitation intervention (ERI) to stroke patients in acute care (Hamad General Hospital -HGH) in Qatar. **Methods and Measurement:** We collected data of length of stay in acute care (LOSa) of stroke patients in Rumaiallah hospital (RH) files, that were obtained from medical record RH for period from 2008 to 2013 and data of LOSa in acute care from acute stroke team coordinator office for the period from January to

December 2014. We compared data of mean of LOSa, for period from 2008 to 2014 with data of mean of same domain for period from 2004 to 2007 which is available in our previous published original article (3). *Results:* LOS (days) acute care in GHG: 2004-2007: 22; 2008: 47; 2009: 46; 2010: 39; 2011: 55; 2012: 43; 2013: 36; and 2014: 17. *Conclusion:* The data indicated early rehabilitative intervention in the acute care setting dramatically reduced the LOSa and ERI care has a positive effect on the recovery of the stroke patient as well as the reducing cost effective in acute care setting. *References:* 1) Early rehabilitative care in community hospitals effect on quality of survivorship followed by stroke Trustcott et al. Stroke. 1974. 5;:623-28. 2) Early intervention care in the acute stroke patient. Hayes SH, Carroll SR. Arch Phys Med Rehabil. 1986 May;67(5):319-21. 3) Length of stay in in-patient rehabilitation after stroke in Qatar. Venkatachalm L Georgievski AB, Al Yazeedi W, Singh R, Garrido HU. ScientificWorldJournal. 2008 May 23;8:547-55. doi: 10.1100/tsw.2008.8.

PA952

Comparison of Median Sensory Nerve Ulnar Motor Nerve Latency Difference Method with Combined Sensory Index in Diagnosing Carpal Tunnel Syndrome

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Introduction: Our goal is comparing the sensitivity and specificity of median sensory nerve ulnar motor nerve latency difference (MSUMLD) method with combined sensory index (CSI) method, in order to distinguish the one which is more accurate and early diagnosis for confirming carpal tunnel syndrome (CTS). *Methods:* We studied 97 hands having symptoms and signs of carpal tunnel syndrome enrolled in this study; 47 hands had normal conventional nerve conduction study (NCS), and other 50 hands were confirmed as CTS, with abnormal conventional NCS. Then for those two groups, MSUMLD and CSI were performed and the results were analyzed by using statistical package the social sciences (SPSS) version 18 and student's *t*-test. *Results:* The MSUMLD method, had the sensitivity of 86% and specificity of 70%, however; CSI had a sensitivity and specificity of 72% and 92%. By the means of MSUMLD method, from 47 hands diagnosed normal with NCS method; 14 hands (29%) showed abnormal results. *Conclusion:* The MSUMLD method has a good sensitivity and needs less stimulation and is more simplified than CSI method; however, it doesn't have a higher specificity.

PA953

Skin Temperature Changes in Below Level Neuropathic Pain after Spinal Cord Injury – Preliminary Study

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Introduction: In spinal cord injury, neuropathic pain below the injury level is common, but there are no measures to objectively monitor its severity. In this study, we clarified the relationship of a difference in the skin temperature to the clinical visual analog scale score of persons who, after a spinal cord injury, experienced neuropathic pain below their injury level, using digital infrared thermal imaging. *Material:* In this preliminary study, two persons who had a spinal cord injury and later experienced neuropathic pain below the injury level were assessed. First, in accordance with international standards for the neurological classification of spinal cord injury, a physical examination was performed and each subject's neurological level was determined. The thermal pattern results of the digital infrared thermal imaging performed on the upper trunk and the lower extremities were analyzed. By sensory segment, the local temperatures in the regions of interest were evaluated, and the temperature difference between the up-

permost segment without neurologic injury, the C3 sensory area, and the most painful spot was confirmed. Using VAS, the pain degree was determined and the pain characteristics were confirmed. *Results:* One of the subject had incomplete AIS-D with a single neurological level of C5, and complained of pain in 4(VAS) at the L5 dermatome on both sides. C3 dermatome temperature was 34.77°C on the right side and 34.94°C on the left side, thereby showing temperature differences of 5.58°C and 5.67°C, respectively. The other subject had incomplete AIS-A with a single neurological level of C5, complained of pain in 8(VAS) at the right C8 dermatome. C3 dermatome temperature was 34.29°C on the right side and C8 dermatome temperature was 26.8°C on the same side, thereby showing a temperature difference of 7.49°C. *Conclusion:* The temperature at the spot with the most serious below-injury-level neuropathic pain differed from the temperature at the spot without a neurological injury. We found that the higher VAS, the greater difference in temperature when comparing two individuals. To confirm the relationship of such temperature difference with the VAS score, more patients should be tested, and patients without neuropathic pain must be compared with normal subjects.

PA1394

A Longitudinal Follow Up of Developmental Functions in Children with Cerebral Palsy of Different Motor Severities

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Introduction/Background: Cerebral palsy (CP) is often accompanied by developmental problems, such as cognition and speech problems. Different CP subtypes present various developmental profiles. However, few studies investigated longitudinal follow up of developmental function in these children. This study aims to investigate longitudinal changes of developmental function in these children of different motor severities. *Material and Methods:* Seventy-seven preschool children with CP (age 34.31±12.87, 51 boys and 26 girls) were collected and classified into two groups: mild (levels I-III, n=49) and severe (levels IV-V, n=28) based on Gross Motor Function Classification System (GMFCS). Developmental outcome was assessed by comprehensive Developmental Inventory for Infants and Toddlers (CDIIT) at baseline and 6 months later (follow-up). CDIIT included five developmental subtests: cognition, language, motor, social skills and self-help. The developmental age (DA) and developmental quotient (DQ) for five subtests and global test were obtained at baseline and follow-up. The change score was calculated by differences between DA at follow-up and corresponding DA at baseline. *Results:* Mild group had higher DQs in all subtests and global test at baseline and follow-up than severe groups (p<0.001). Furthermore, mild groups had greater DA changes in cognition, language, motor, social skills, self-help subtests (p<0.05) and global test at follow-up (p<0.001). *Conclusion:* Children with GMFCS levels I-III had greater developmental functions and developmental changes than children with GMFCS levels IV-V. These findings suggest developmental profiles and developmental changes in children with CP were associated with motor severity.

PA1395

Epidemiology and Contemporary Risk Profile of Traumatic Spinal Cord Injury (TSCI) in Switzerland

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Introduction/Background: Traumatic spinal cord injury (TSCI) is a rare, albeit oftentimes life-altering condition with long-term physical, psychological, social and financial implications. The effectiveness of public health policy prevention measures that aim to reduce this burden are reliant on contemporary information of the risk and underlying causes of TSCI. We here compare exemplary evidence on the incidence and cause of TSCI in Switzerland with evidence from other European settings. **Material and Methods:** TSCI cases that occurred in the years 2005 to 2012 were identified in context of the Swiss Spinal Cord Injury (SwiSCI) cohort study through a population-based study of local medical files. Classification of neurological loss was based on the ASIA Impairment Scale (AIS); TSCI etiology following the guidelines of the International Spinal Cord Society (ISICOS). Incidence rates were calculated using Poisson regression modelling with reference to the Swiss population as well as the WHO World Standardization. **Results:** Over the eight-year study period there were 932 cases of traumatic SCI, indicating an annual incidence of approximately 117 cases. Most cases were male (N=693; 74.4%) and the median age was 47 years (interquartile range: 31, 65 years). Paraplegia (N=524; 56.2%) was more common than tetraplegia and the majority of injuries were incomplete (AIS B, C, and D; N=635; 68.1% versus 28.3% complete lesions; N=264). Falls represented the predominant etiology (N=346; 37.1%). Estimates for crude incidence rate (IR) of TSCI for study period was 18.0 (95% confidence interval 16.9-19.2) per one million population; standardized to the WHO world population IR was 21.7 (20.3-23.1) population. The IR of TSCI in Switzerland was intermediate in comparison to estimates for other European countries, which ranged from around 8 in the UK and the Netherlands to 33.6 per million in Greece. Males exhibited consistently higher IRs than females, with a highest IR ratio (IRR) of 3.9 (2.8-5.5) in young adults (aged 16-30). Sports and leisure and transport-related accidents were the predominant causes of TSCI in the youngest age group (age 16-30); falls were the predominant cause among the oldest age group (76 years or over). **Conclusion:** TSCI is preventable and the current evidence suggests for sports/leisure- and transport-related accidents in young men and falls among the elderly as prime targets in establishing effective prevention policies.

PA1396

Secondary Prevention for Nursing Staff and Care Workers Pursuant to BK 2108 – How Effective Is the Back College? Initial Findings

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Due to typical professional tasks that impose a strain on the spinal column, nursing staff and care workers run a heightened risk of intervertebral disc-related illnesses resulting from heavy lifting and carrying as defined in Occupational Illnesses Regulation Leaflet No. BK 2108 on intervertebral disc-related illnesses of the lumbar spine. Nearly 2,000 cases of suspected occupational illnesses of this kind are reported yearly to the Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Services (BGW). If relevant symptoms are observed, if the persons in question are still employed there, the BGW offers its insured persons the opportunity to attend a three-week inpatient "Back College" to help prevent them from having to give up their professions due to a BK 2108 illness. The core of the Back College course is intensive practical teaching of job-specific movement and work techniques to ease the burden on their spines. The curriculum also includes sports medicine training therapy with individual muscle develop-

ment training and, if required, various physical therapy measures. The programme is intended to promote the participants' individual competence at keeping their backs healthy and reducing the strain on them by means of the back-friendly movement sequences they have learnt and by making greater use of aids and appliances in nursing and care work. The effectiveness and sustainability of the Back College concept is reviewed in a full survey of all 2013 participants at the three locations (Hamburg, St. Peter-Ording and Halle). Short-, medium- and long-term effects are established by means of single-group pre-post measurements taken at four times: the beginning (t0) and end of rehabilitation (t1) and after 6 and 24 months (t2 and t3). A standardised questionnaire is used in which, along with socio-demographic data, questions are asked about the following: 1. General state of health including fitness for work, 2. Back-friendly behaviour at work and in everyday life. 3. Existing skills and action strategies. 4. Parameters relating to self-monitoring, understanding of the illness and the emotional strain, and Satisfaction with the course. The Back College will be presented and the findings of around 500 data records from the first year of the survey (reference dates t0 – t2) will be presented and discussed.

PA1397

Very Early Verticalization and Mobilization in Patients with Severe Brain Injury: a Safety and Feasibility Study

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Introduction: An early rehabilitation is known to induce a better outcome in patients with disorders of consciousness (DOC) due to acquired brain injury (ABI). However, a very early (since the first days of hospitalization) and intensive out of bed mobilization of these patients is still a matter of debate. Aim of our study was to evaluate safety and feasibility of a very early robotic verticalization of Intensive Care Unit (ICU) patients with ABI and related DOC. **Methods:** Consecutive patients with ABI and a prolonged Glasgow Coma Scale score ≤ 8 hospitalized in our ICU were enrolled on the third day after the injury-determining event. They underwent fifteen daily sessions of gradual verticalization using a tilt table with an integrated robotic stepping device. Cardiovascular and respiratory parameters were continuously monitored and recorded. Primary and secondary safety outcomes were the number of interrupted procedures and the trend of the cardiovascular parameters respectively. Primary and secondary feasibility outcomes were the total time receiving the intervention and the time and personnel needed for the treatment. **Results:** Out of seven patients enrolled, four had a traumatic brain injury and three had cerebral or cerebellar haemorrhage. The procedure was started 13.0 \pm 8.2 days from the event, after patient stabilization. None of the patients had to discontinue the treatment and all the cardiovascular parameters showed minimum and maximum values inside the safety range: Cardiac Output 3-12.3 L/min, Heart Rate 53-147 bpm, Mean Arterial Pressure 51-170 mmHg. Each session had a mean duration of 46 \pm 4 minutes (transfer: 12 \pm 3 min; setting: 4 \pm 1 min; treatment: 30 min) and was completed and supervised by a nurse and a physiotherapist. **Conclusions:** Our results show that an intensive rehabilitation of patients with severe ABI in the early stage, carried out using a tilt table with robotic stepping device, is safe and feasible in ICU. This evidence represents the first step towards future investigations that would help to define whether this treatment could be even useful to improve patients' outcome and to reduce the social assistance charge. Fibromyalgia symptoms showed significant improvements after LLLT compared to placebo (FIQ, $p=0.0003$; McGill, $p=0.0078$; and VAS $p=0.0020$). **Conclusion:** LLLT provided relief from fibromyalgia symptoms in patients and could be an important therapeutic tool to lessen the impact of the disease, decrease pain, and improve quality of life for patients.

PA1398

Prospective Study on Effectiveness of Vestibular Rehabilitation in Postsurgical Patients

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Objective: Evaluate the effectiveness of Vestibular Rehabilitation (VR) in unstable postsurgical patients. **Design:** Prospective study of patients after vestibular pathology intervention, and who were referred for instability between November 2011 and March 2015. **Material and Methods:** 15 patients with incapacitating vestibular pathology who had undergone surgery less than three months previously. We evaluated the Dizziness Handicap Inventory (DHI) and LOS limits of stability (LOS) during the first visit. Criteria for discharge were DHI under 50 and LOS greater than 50. These parameters were repeated at discharge, and at one and three month post-treatments. We observed a distribution by sex, etiology, age and treatment sessions. R Development Core Team (2008). **Results:** 64,3% were women with an average age of 50.86 years (SD: 13.89). The most common pathology was neurinomas (26,6%). The mean number of treatment sessions was 31.85 (SD: 11.68). Statistically significant improvement in the parameters measured after the VR were, DHI decrease 42 points (SD: 23,68) and LOS improvement 33,71 (SD: 14,59; $p < 0,05$) ,relative to the beginning of the treatment, increase of 45,2 points DHI (SD:18,65; $p > 0,05$) and 20,67 in the LOS(SD: 28,11; $p < 0,05$) which remained the same at 6 months) both the last results reached statistical significance. **Conclusions:** The VR is a useful intervention in postsurgical patients with disabling vertigo.

PA1399

Effect of Serial Low-Dose Radon and Hyperthermia Exposure in Patients with Ankylosing Spondylitis and Osteoarthritis – a Prospective Study

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Introduction and Background: Secondary osteoporosis is a frequent complication in ankylosing spondylitis (AS). Loss of bone mass in AS is the result of an imbalance of catabolic and anabolic mechanisms in bone metabolism in response to different factors. **Material and Methods:** The effects of serial low-dose radon and hyperthermia exposure in a therapeutic adit (12 visits to the adit in 3 weeks) on pain (VAS), disease activity (BASDAI, BAS-G) and serum levels of the cytokines osteoprotegerin (OPG), receptor activator of NF kappa-B ligand (RANKL), and tumor necrosis factor (TNF)- α were investigated in 24 patients with chronic AS (mean age 58 years) and an age-matched group of 24 patients with osteoarthritis (OA). Evaluation of pain and disease activity was performed at baseline, after serial treatment and again 3 month after cessation of the treatment, whereas cytokine measurements were realized only at baseline and after completion of the serial treatment. Medication in both groups was limited to non-steroidal anti-inflammatory drugs (NSAIDs) as needed, whereas treatment with TNF inhibitors or any drugs, which could potentially influence bone metabolism, was excluded. **Results:** AS-patients showed a significant reduction of pain after serial treatment ($p < 0.005$) and also prolonged for 3 month ($p < 0.005$), while OA-patients presented a reduction of pain only 3 month after treatment ($p < 0.003$). Furthermore the AS-patients showed an amelioration of the disease activity scores BASDAI and BAS-G. In addition the AS-patients presented a tendency towards decrease of TNF- α serum levels, whereas OA-patients achieved a significant decrease ($p < 0.0005$). Both groups showed significantly decreased levels of RANKL (AS: $p < 0.0005$, OA: $p < 0.004$). Only the AS-patients presented a significant increase of OPG ($p < 0.0005$) and a significant decrease of the RANKL/OPG ratio ($p < 0.005$). **Conclusion:** In patients with chronic AS, serial low-dose radon and hyperthermia exposure in

a therapeutic adit results in an attenuation of pain, amelioration of disease activity, reduction of osteocatabolic and an increase of osteoanabolic cytokine levels, which is according to an inhibition of osteoclastic activity in secondary osteoporosis of inflammatory disease. Thus, serial radon(adit)therapy has an important role in a multimodal treatment strategy for AS.

PA1400

Transurethral Application of Sodium Hyaluronate: a Case Study of a Patient with Rheumatoid Arthritis under Immunosuppressive Medication*M. Pyrgeli¹, V. Kalabokis²¹Medical Rehabilitation Center - Lamia's Clinic, ²Lamia's Clinic - Internal Medicine Department), Lamia, GR

Case Diagnosis: A 77 years old female patient was admitted to our medical rehabilitation center in March 2014, having been diagnosed for rheumatoid arthritis since last 5 years under immunosuppressive medication (methotrexate) due to her disability, suffering from recurrent cystitis-urinary tract infections and secondary septicaemia. **Patient's comorbidities:** Diabetes mellitus type II, chronic renal failure, atrioventricular block (Mobitz II), pulmonary hypertension (nasal O2 catheter at 2lt), total knee replacement (2004), L3-L5 laminectomy (2012). **Case Description:** Patient with recurrent urinary tract infections-cystitis-pyelonephritis and septicaemia during the last 6 months. We planned four weekly instillations of sterile sodium hyaluronate solution during May 2014: We instilled 50 ml sterile solution of 40 mg sodium hyaluronate directly into the bladder, through a transurethral catheter, after the residual urine had been removed and solution was retained to the bladder for 2 hours. Patient remained urinary tract infection free from June 2014 till October 2014. **Discussion:** Sodium hyaluronate is a derivative of hyaluronic acid, which occurs naturally in the glycosaminoglycan (GAG) layer of the bladder lining, the principal protective barrier (the GAG layer) between urine and the bladder epithelium. Repeated urinary tract infections (UTI) caused by bacteria entering the bladder, results in the inflammation and degeneration of the bladder wall. It has been suggested that the more UTIs a patient has the more severe and irreversible the damage to the bladder lining because of a deficient GAG layer and moreover deficiencies in this GAG layer of the bladder epithelium may destroy its barrier function and allow the adherence of bacteria. Sodium hyaluronate replenishes the GAG layer on the bladder epithelium to provide the bladder wall with a protective coating against irritants. **Conclusions:** The four weekly bladder instillations of sterile sodium hyaluronate were well tolerated and accepted by the patient. The occurrence of UTIs was reduced and there was no need for treatment with intravenous antibiotics for a period of four months, possibly through the protective effect on the GAG layer.

PA1401

Patients with Malignant Brain Tumours – Outcome after Operation

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Background: The number of patients with malignant brain tumours is on the rise. The survival rates have increased due to early diagnostics and up to date multidisciplinary treatment. Timely and appropriate rehabilitation is an important aspect of patient treatment. The aim of the study was to evaluate the functional status of the patients operated on due to malignant brain tumour in acute settings. **Method:** The study was prospective. All patients with malignant brain tumour who were operated at the Department of Neurosurgery UMC Ljubljana in the period of three months were included. All patients were evaluated before the surgery and at discharge. We collected demographic data, all patients had neu-

rological examination, we evaluated independence in activities of daily living and for evaluation of functional abilities we used Karnofsky scale. **Results:** We evaluated 53 patients, 23 female (43%) and 30 men (57%) with the average age 57. 27 patients (51%) had glioblastoma multiforme, three were operated more than once. 16 patients (30%) had metastatic lesions in brain, five among them from lung cancer, four from breast cancer and three from bowel cancer. The average length of stay was 9 days. 33 patients (62%) had neurological deficits before the operation and 16 (46%) at discharge. Among them 14 had received less than 60 on Karnofsky scale. All patients were included in early rehabilitation procedures; none was transferred after discharge from acute hospital to rehabilitation institution. **Conclusion:** We believe that the more precise evaluation of the patients' functional status should be performed before discharge from acute hospital and regardless to additional treatment more patients should be directed to the complex rehabilitation treatment. To establish the effect of inpatients postoperative rehabilitation on the quality of life a well-designed study should be carried out in our country. **Literature:** 1) Smrdel U, Kovac V, popovic M, Zwitter M. Glioblastoma patients in Slovenia from 1997 to 2008. *Radiol Oncol* 2014; 48: 72-9. 2) Bartolo M, Zucchella C, Pace A, Lanzetta G, Vecchione C, Bartolo M et al. Early rehabilitation after surgery improves functional outcome in patients with brain tumours. *J Neurooncol* 2012; 107: 537-44.

PA1402

Interdisciplinary Team Supervised Rehabilitation after Aortic Valve Replacement in Acute Phase of Rehabilitation

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Case Diagnosis: Symptomatic aortic stenosis, Rehabilitation after aortic valve replacement – presentation of the programme. **Case Description:** Degenerative aortic stenosis has become the most frequent type of valvular disease in Europe. In patients with symptomatic aortic stenosis, the gold standard for treatment is surgical aortic valve replacement, most commonly with a mechanical or a bioprosthetic aortic valve. The introduction of transcatheter aortic valve implantation (TAVI) has revolutionized the management of aortic valve disease in the elderly and high-risk population. Rehabilitation professionals must be aware of new surgical approaches and advances. **Discussion:** All patients after aortic valve replacement in Department of cardiovascular surgery of University Medical Centre Ljubljana are included in postoperative rehabilitation programme. The main goals of our rehabilitation programme in acute phase of rehabilitation is to prevent postoperative complications and improve pulmonary function, early mobilisation, independence of patients in activities of daily living and to promote physical activity after discharge of the hospital. All our patients get preoperative information about physical activity after valve replacement and 2 minute or 6 minute walking test is performed before surgery and at discharge. For outcome measure we use FIM and Barthel Index. Clinical pathway is used for patients undergoing aortic valve replacement and planning and evaluation of the rehabilitation programme is part of it. **Conclusions:** Limited published data are available on how patients are mobilized and exercised during acute phase of rehabilitation after aortic valve replacement. In our department patient is the center of a multi-professional approach. There are regular exchanges of information between team members on daily basis and in acute phase of rehabilitation we also promote family involvement.

PA1403

Role of Urodynamics in Paediatric Patients with Spina Bifida – Retrospective Study

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Introduction: Urological complications affect 24-94% of adults with spina bifida. Urodynamics are important in understanding the type and severity of the bladder situation. We aimed to evaluate the importance of urodynamic studies (UDS) in the diagnosis/control of vesico-sphincteric alterations. **Material and Methods:** Retrospective, inferential study of patients followed in a Spina Bifida consultation. Results of the first urodynamic study were compared with those of the most recent one. Data were analysed with SPSS. **Results:** 96 patients were studied (57% male) with a mean age of 14 years. The neural tube malformation and the injury level most frequent were, respectively, myelomeningocele (77%) and lower lumbar (35%). The neurogenic bladder was present in 94 patients, a quarter of these had recurrent urinary tract infections. Of the 87 who underwent renal scintigraphy, half showed scar nephropathy. About two thirds were treated with anticholinergic drugs and 69 % were using intermittent catheterization (IC). The first UDS showed: 56% spontaneous emptyers, half low age-related bladder capacity (BC) and 70% overactive detrusor. It was suggested the introduction of: IC in 12%, anticholinergic drug therapy in 44% and both in 39%. Of the 67 patients who repeated the UDS, there was an increase in bladder capacity in 18, while in 23 patients there was absence of signs of overactive detrusor. Considering the proposed therapy, on patients who started/increased anticholinergics: 27% increased BC to normal values ($p=0.125$), 30% gained a regular bladder compliance ($p=0.031$), 60% had no more terminal detrusor hypertonia ($p=0.004$) and 40% had no more detrusor overactivity ($p=0.004$). On patients who initiated/increased anticholinergics associated with the start/increase of IC: 57% increased BC to normal values ($p=0.039$), 32% improved bladder compliance ($p=0.125$), 77% had no more terminal detrusor hypertonia ($p=0.039$) and 53% had no more detrusor overactivity ($p=0.012$). **Discussion:** IC introduction is an effective therapeutic in hyperactive bladders with low BC, and may be combined with drug treatment (anticholinergics), if appropriate. This was particularly evident in the 53% patients who stop presenting detrusor overactivity. **Conclusion:** UDS is significant in the assessment of bladder behaviour, allowing adjustment, introduction and evaluation of therapeutic measures.

PA1407

Chronic Unspecific Back Pain Revealed as Specific one by Enlarged Orthopedic Assessments Combined with Manual Therapy. Clinical Observations.

Anselm Model

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Introduction/Background: May the diagnosis "chronic unspecific back pain" be transformed into "specific back pain" by enlarged diagnostic assessments and so patients with this widespread kind of back pain may be treated specifically with success? **Material and Methods:** In the past ten years all patients of us (about 1800), who came with the diagnosis "chronic unspecific back pain" into the orthopedic rehabilitation had been checked up not only in standing, in the usual clinical orthopedic assessment, but in an enlarged unusual manner by looking also for the position of the upper line of the pelvis in sitting position excluding so the influence of the length of the lower extremities on the position of the pelvis. We have further carefully looked at the form of the total spine noting also minimal derivations. In addition all patients had been explored in aspects of manual therapy and if needed treated. **Results:** There was an asymmetric upper line of the pelvis in all patients with chronic unspecific back pain at sitting position, but this was seldom seen at standing position. All patients had a scoliosis of the spine mostly discreet about ten degrees. There was further a segmental somatic dysfunction in the midst of the thoracic cage, which was seldom seen in patients who suffer from unspecific back pain only occasionally. The pain disappeared totally or at

large degrees by treating the somatic dysfunctions successfully. **Conclusion:** A large part of chronic unspecific back pain seemed to be specific and may be treated specifically with success. A special form of the pelvis and the spine and a segmental somatic dysfunction in the midst of the thoracic cage seemed to be involved into the etiopathogenesis of this kind of pain.

B. BIOSCIENCES IN REHABILITATION

PB954

From Space to the Hospital

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Introduction: Prior to the beginning of manned space flight, the potential problems related with microgravity on the musculoskeletal system were recognized as the most difficult to mimic in an experimental setting. The research led to the design of a bed rest study as an analog for space flight in which healthy people stay in a head-down tilt position during a large period of time, without ever standing. Bed rest study is characterized by immobilization, inactivity, confinement and elimination of Gz gravitational stimuli. In terms of musculoskeletal effects, calcium excretion is increased, from the beginning of the bed rest, leading to a sustained negative calcium balance that leads to decrease in bone density, stiffness and architecture's modification of bones of the lower limb and spinal cord. Besides, muscle mass and muscle strength are reduced. In the other hand, many older individuals decline functionally during hospitalization, and the deleterious consequences of bed rest may be one of the major causes of "Immobility Syndrome". **Methods:** Bibliography research and collected data and lived experience from the author's internship in NASA-UTMB. **Results:** The objective of this research was to define ways to understand and reduce these effects, developing countermeasure's protocols, like exercise, nutrition and pharmacological, based on the data from bed rest studies and transporting the knowledge to the regular hospitalized people. Findings from these studies not only will help future space explorers but also will broaden our understanding of the regulation of bone and calcium homeostasis on Earth. Exercise countermeasures designed to mitigate muscle atrophy during long-duration spaceflight involve isometric, isotonic and aerobic exercises. The challenge is to establish a parallelism between the cases already studied and designed for spaceflight into some adaptable to hospital environment. The same is valid to pharmacological countermeasures. **Conclusion:** In both conditions, there are modifications in bone and muscle architecture that lead to disfunction, loss of autonomy and incapacity. But some countermeasures can be applied to reduce this consequences. Knowing that, it is important to join information and create standard protocols to be used in hospitalized people confined to bed.

PB955

The Effect of Cyclooxygenase-2 Inhibitors on Tendon-To-Bone-Healing using Soft Tissue Autografts in a Rabbit Model of Acl Reconstruction

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Introduction: Nonsteroidal anti-inflammatory drugs (NSAIDs) and selective Cyclooxygenase-2 (COX-2) inhibitors are commonly prescribed following anterior cruciate ligament reconstruction because of their presumed reduction of pain and inflammation. Selective COX-2 inhibitors have been found to impede fracture healing¹. The effect of selective COX-2 inhibitors on tendon-to-bone healing, however, is unknown. **Methods:** 20 New Zealand White rabbits were used to investigate the effect of selective COX-2 inhibitors (celecoxib) using pQCT (peripheral quantita-

tive computed tomography) and biomechanic measures. To assess indirectly the effect on local COX-2 activity Prostaglandin E2 (PGE2) synovial fluid content was measured by Enzyme-linked Immunosorbent Assay (ELISA). **Results: Enzyme Immunoassay:** PGE2 increased more than twofold in the COX-2 group, while in the controls there was a decrease in PGE2 between week 3 and 6 of about 20%. (13,024±6,859 pg/ml; 9,920±5,815 pg/ml). **pQCT:** In the COX-2 group pQCT-Scans showed an increase in bone mineral density (week 3: 454.0±41.9 mg/cm³ BMD; week 6: 503.1±50.5 mg/cm³ BMD) and of the cross-sectional area of new bone around the grafted tendon (week 3: 5.1±0.98 mm² CSA; week 6: 7.0±3.4 mm² CSA). In the same period the controls revealed a slight tunnel enlargement with a decrease in CSA from 6.4±1.4 to 5.0±2.1 mm², and a decline in BMD from 509.9±34.4 to 446.3±82.4 mg/cm³. **Biomechanical Testing:** At 6 weeks the controls exhibited an increase of 23.6% (68.5±54.3 N) in maximum load to failure, whereas the COX-2 inhibitor treated specimens decreased by 37.9% (37.4±16.8 N). Thus, controls exhibited a nearly twofold higher mean maximum load to failure graft stability compared to the COX-2 group 6 weeks after surgery. Maximum load to failure values correlated with PGE2 changes in the synovial fluid. An increase in PGE2 was associated with lower maximum load to failure values (r=-0.546, p=0.066). **Discussion:** Our study demonstrated that after treatment with selective COX-2 inhibitors specimens exhibited increased, maybe reactive, PGE2 concentrations and decreased graft stability. Untreated controls appeared to have a more physiological healing course with a continuous decrease in PGE2 and an increase in graft stability with time.

PB956

Is There an Association between Articular Cartilage Changes and Type of Meniscal Tear ?

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Introduction: To evaluate whether horizontal cleavage and complex meniscus tears, which supposed to be degenerative tears, are associated with an increase of selected Matrix Metalloproteinases and an increased incidence of cartilage damage, in comparison with patients having other patterns of meniscal injury. **Materials and Methods:** Data were collected prospectively from 30 knee arthroscopies, patients were randomized by intra-operative findings due to their meniscal tear in "degenerative meniscal lesions" (horizontal cleavage and complex tears; n=18) and "traumatic tears" (longitudinal and radial tears; n=12). Samples of knee joint fluid were analyzed for MMP-1, -3 and pro-MMP-13. Cartilage changes were classified by Outerbridge (grade 0-4). Praeoperative bone morphology of the knee joint was graduated by Kellgren-Lawrence (K-L; Stadium 0-4). The Knee Injury and Osteoarthritis Outcome Score (KOOS) was used to quantify knee-related symptoms prae- and 1.5 years post-operatively (0=extreme knee problems; 100=no knee problems). **Results:** Degenerative meniscus lesions appeared predominantly at the end of fifty years of age (58.5±13.9 years), whereas other patterns of meniscal lesions happened around 30 years of age (28.7±8.1 Jahre; p<0.05). A comparison of patients with horizontal cleavage and complex meniscal tears ("degenerative tears") to patients with longitudinal or radial ("traumatic") tears showed for the former increased severity of chondral lesions (Outerbridge: 2.9±1.4 vs 1.1±0.9; P<0.001) and radiographic osteoarthritis (Kellgren-Lawrence: 1.9±1.5 vs 0.4±0.5; P<0.05). The KOOS improved after arthroscopic treatment and specific physical therapy in the degenerative-meniscal-tear group as well as in the traumatic-tear group significantly (prae OP: 36.5±30.7 and 38.1±24.8; 1.5 years post OP: 87.8±6.7 and 49.2±21.9; p=0.043 and p=0.012). Pro-MMP-13 correlated significantly with an increase of chondral lesions and radiographic osteoarthritis (r=0.534; p=0.003; r=0.457; p=0.02). **Conclusion:** Complex and horizontal cleavage meniscal tears are not as benign as was previously thought and are highly associated with an increased severity of cartilage degeneration and radiographic osteo-

arthritis. The knowledge about the interrelation between specific meniscal lesions and cartilage damage may be a helpful hint for the specific setting of physical therapy in patients with knee pain.

PB957

Vitamin B12 Levels in Chronic Pain & Neurologically Disabled Patients

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Background: Cohort in the Framingham study of adults 67 to 96 years of age found that 5.3% vit B12 levels <148 pmol/L. A study of Swedish elderly showed that low levels of vitamin B12, increased from 4.6% to 7.2% as the subjects aged from 70 to 81 years. No studies about this topic in Saudi Arabia, neither in General population nor specific patients population. **Objective:** Find the prevalence of low and border line vitamin B12 level among chronic pain and neurologically disabled patients. **Design & Setting:** King Abdulaziz Medical City- Riyadh. Retrospective cross-sectional study. Examined the level of vitamin B12 among out patients who attended the our Rehab/chronic pain clinics. **Results:** 993 patient-visit from Jan 2012-Jan 2013. Total of 378 patient. Twenty were excluded being <18 years. 358 patient were included, however; 87 patient did not have Vit B12 levels (24%). 271 patients were included in the analysis. **Results:** Multiple logistic regression was done to identify predictors for low Vit B12 (dependent variable). Independent variables were: Age, sex, Hgb, MCV, MCH. Sex, Haemoglobin level, MCV, MCH did not predict low vit B12 (statistically not significant). Age was the only significant predictor, with OR 1.03, C.I (1.005-1.05), at P value 0.017. Meaning that the risk of having low B12 increases by 3% every year. **Conclusion:** Low and border line Vit B12 level is common (36%) in chronic pain and neurologically disabled patients. Screening and treating patients with low and border line Vit B12 is cheap, has no side effects, and may alleviate patients symptoms.

PB958

A New Technique to Develop a Rotator Cuff Tear Rat Model – a Pilot Concept

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Introduction: Shoulder pain is a common problem of all ages. One of the common reasons of shoulder pain is rotator cuff tear. A rotator cuff tear that goes untreated commonly leads to associated alterations or injuries of the surrounding tissues. Therotator cuff repair is an often procedure to treat rotator cuff tear and improved the shoulder pain and function. No acceptable rat model to rotator cuff full thickness tear was developing for study. Therefore, we develops a new concept to induce rotator cuff tendon full-thickness tear rat model. **Materials and Methods:** We open the bilateral SD rat skins and use the electrical drill to induce a small full thickness hole (0.7 mm) at one side supraspinatus tendon then close the skin bilateral and follow up 21 days .We sacrificed the rat and separated the bilateral supraspinatus tendon. Used the tension tensile test, which we develop it to define the strengthening of bilateral supraspinatus tendon. **Results:** The full thickness tear supraspinatus tendons in SD rat that induce by electric drill can spontaneous recovery its tendon strengthening as no injury side. **Conclusion:** We can use this model to study treatment strategy is effective or not in the healing process of full thickness tear of supraspinatus tendon.

PB959

Autophagy, a Novel Mechanism Which Can Explain Therapeutic Effects of Ultrasound in Osteoarthritis

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Introduction: Oxidative stress (OS) plays an important role in osteoarthritis (OA) pathogenesis. Previous studies demonstrated that autophagy protects human chondrocytes from stresses and may prevent chondrocytes from undergoing OA changes, possibly through modulation of the intra-cellular level of reactive oxygen species[i]. **Aim of the Study:** was to investigate the effects of ultrasound (US) on ultrastructure of cultured human chondrocytes exposed to oxidative stress (OS). **Objectives:** to determine ultrastructural changes in human chondrocytes exposed to US and OS, compared to human chondrocytes exposed only to OS. **Material and Methods:** Human chondrocytes (Promocell, Germany) were cultured in monolayer, in standard culture medium, at 37°C, in a humidified atmosphere, 5% CO₂, to 80% cell confluence. Chondrocyte cultures were randomized in: control group, group exposed to OS and group exposed to US and OS. OS was induced in chondrocytes by exposure to hydrogen peroxide 0.1 µmol/l, 30 minutes. In the group exposed to US and OS, prior to induction of OS, chondrocytes were exposed to continuous ultrasonic waves with 850 KHz ±5% frequency, 100 mW/cm² intensity, for 3 days, 5 minutes/day. At the end of the experiment chondrocyte ultrastructure was assessed by transmission electron microscopy (TEM). **Results:** TEM showed: in control group - chondrocytes with normal aspect; in the group exposed to OS - necrotic chondrocytes and chondrocytes with a high degree of vacuolation, dilated endoplasmic reticulum, mitochondria with condensed matrix; in the group exposed to OS and US chondrocytes had cvasinormal aspect, abundant glycogen, normal appearance of mitochondria and autophagosomes in cytoplasm. **Conclusion:** US can protect chondrocytes from necrosis and ultrastructural changes induced by SO through stimulation of the autophagy by autophagosome formation. **Reference:** Sasaki H, Takayama K, Matsushita T, Ishida K, Kubo S, Matsumoto T, Fujita N, Oka S, Kurosaka M, Kuroda R. Autophagy modulates osteoarthritis-related gene expression in human chondrocytes. *Arthritis Rheum.* 2012 Jun; 64(6): 1920-8.

PB960

Correlation between the Expression of Heat Shock Protein 70 and Beta-Endorphin in Wet-Cupping Therapy

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Background: In Indonesia, wet-cupping therapy has been used as alternative in releasing pain but the mechanism still unclear. We hypothesize that negative pressure and scarifies to skin in the wet-cupping therapy can cause expression heat shock protein 70 and beta-endorphin. The objective of this study is to correlate the expression of heat shock protein 70 and beta-endorphin. **Material and Methods:** This is an experimental study with randomized control group post test only design. Twenty four Wistar rats (*Rattus norvegicus*) was assigned to two groups of 8 subjects, which were group undergoing Complete Freund's Adjuvant (CFA) only (control group) and group undergoing CFA and wet-cupping (negative pressure: - 200 mmHg for 5 minutes and 10 scarifies to the skin). Samples was retrieved from skin and performed immunohistochemical of monoclonal antibody anti rat heat shock protein 70 and monoclonal antibody anti rat beta-endorphin. Quantitative assessment done visually with a light microscope with magnification 1000 times. Data was statistically analysed by Independent-Sample *t*-test and Pearson Correlation analysis using SPSS version 17. **Results:** This study found that expression of heat shock protein 70 increase (20.25±3.53; p<0.05) compared with control group (10.50±2.44; p<0.05) and the expression β-endorphin increase (22.37±3.52; p<0.05) compared with control group (5.12±1.72; p<0.05). There was significant correlation between expression of heat shock protein 70 and expression beta-endorphin (β=0.864; p=0.000). **Conclusion:** There was correlation between expression heat shock protein 70 and expression beta-endorphin in wet-cupping therapy **Keyword:** wet-cupping therapy, pain, heat shock protein, beta-endorphin.

PB961**Effects of Chronic Stress and Oxytocin Stress during Lactation on Maternal Aggression in Rats*****L. Song***Jiamusi University, Jiamusi, CN*

Objective: To obtain observation of oxytocin (OT) effects on maternal aggression in the stress model pregnant rats. **Methods:** 40 Wistar rats amid pregnancy are randomly divided into control group (10) and model group (30) and the latter group comprises NaCl group (10) and OT group (20). OT group includes low-dose OT group (10.20 IU/ml/d) and high-dose OT group (10.40 IU/ml/d), NaCl group is injected with normal saline 1ml/d. Model group with reference to the classic forced swimming replication stress animal model, the control was given with normal breeding. Apply VHS16 camera system to monitor all the pregnant rat, during the days from the 3rd to 10th prior to delivery of maternal aggression and elevated cross maze; the brain was executed immediately after Behavioral experiments, using HE staining to observe the changes in brain tissue, electron microscope applied to check supraoptic and paraventricular nuclei OT expression. **Results:** Pressure behavior in 3 days began to stress group was obviously higher, peak, 5 days to 7 days just a little lower, comparison difference significantly in the group, was statistically significant ($p < 0.05$), significant difference at each time point between groups, with statistical significance ($p < 0.05$); Control group there was no significant difference each point in time, no statistical significance ($p > 0.05$). Then, OT the number of neurons in different degree in model group is less, have statistical significance ($p < 0.05$); Electron microscopy, the model group OT neurons micro structure change significantly with statistical significance ($p < 0.05$). **Conclusion:** High-dose OT is adjustable to maternal aggression, and surely improves the abnormal behavior; provides guidance to anxious mother and clinical pregnant. mother lack of love. **Keywords:** Maternal aggression ; stress model; oxytocin; behavioral test; SON; electronic microscope. **References:** 1) Oliver J. Bosch. Maternal aggression in rodents: brain oxytocin and vasopressin mediate pup defence. *Biological Science* 2013, 25: 1-8. 2) Stephen C. Gammie, Sharon A. Stevenson. Effects of Daily and Acute Restraint Stress During Lactation on Maternal Aggression and Behavior in Mice. *Stress*. 2006, 9(3): 171–180.

PB962**Examining Shock Wave Therapy as a Treatment for Spasticity: a C. Elegans Worm Model Shows Dose-Dependent Effect on Movement Following Treatment*****N. Angstman, M. Kiessling, H.-G. Frank, C. Schmitz***Ludwig-Maximilians-University of Munich, Munich, DE*

Extracorporeal shock wave therapy (ESWT) has been shown to be an effective treatment method in the reduction of muscle spasticity. It is not yet understood, however, why and through what mechanisms the application of shock waves affects tissue involved in spasticity. *C. elegans* worms offer a unique platform for the investigation of such mechanisms, as they are well known in the neurobiology field, containing a simple, fully mapped nervous system. Here we demonstrate a dose-dependent effect of shock wave exposure on *C. elegans* using therapeutic extracorporeal shock waves produced by a device used in medical practice. Increased exposure to shock waves resulted in an increase in the proportion of worms rendered paralyzed while decreasing mean speed of movement. Recovery of these two behavioral symptoms was observed during increasing post-treatment waiting periods. Application of shock waves in polyvinyl alcohol resulted in a reduced effect, implicating cavitation as a factor in the observed loss-of-function. These data, combined with the accessibility of *C. elegans*, demonstrate an intriguing model as a starting point for further research into the effect of shock waves on muscle spasticity.

PB963**Stimulation According to Vojta Method in fMRI****P. Hokl¹, *P. Hlustik¹, M. Kutin², J. Opavsky¹, Z. Tudos¹, P. Kanovsky¹**¹*Palacky University Olomouc, ²KM KINEPRO PLUS s.r.o., Olomouc, CZ*

Introduction/Background: The aim of this study was to assess the effects of stimulation according to Vojta on the brain activation in healthy volunteers. Despite 50 years of clinical use of the Vojta therapy, its underlying neurobiological basis remains a speculation. We hypothesize that the stimulation-driven response induces brain plasticity which can be detected using functional magnetic resonance imaging (fMRI). **Material and Methods:** Two groups of healthy volunteers were included (17 females and 5 males in each group, mean ages 24.5 and 24.7, respectively): Group A receiving stimulation at the Vojta right heel zone and Group B receiving control stimulation at the right ankle. All subjects underwent a single fMRI session using a 1.5T Siemens scanner, employing twice 3 different conditions: rest (6 min); dominant hand finger tapping alternating with rest (6 min); intermittent pressure stimulation applied by an experienced therapist (10 min). Both rest and finger tapping conditions were tested before and after two consecutive stimulation runs. Statistical analysis was carried out using FSL version 5.0. The resulting maps were thresholded at corrected significance level $p < 0.05$. **Results:** In finger tapping task, diffuse activation decrease within sensorimotor system was observed in both groups. However, there was significant activation increase mainly in motor nuclei of left thalamus detected only in group A. Additionally, group A showed significant decrease of functional connectivity within the bilateral sensorimotor resting-state network. **Conclusion:** Our findings provide evidence that the stimulation according to Vojta is associated with specific and persistent changes of the brain activation occurring at cortical and subcortical level. The involved structures may play a key role in mediating the effect of the therapy. Study supported by: Grant GACR 14-22572S.

PB964**A Review of the Effects of Progesterone in the Treatment of Peripheral Neuropathy****S. Shahraeeni¹, *S. A. Raeissadat²**¹*University of Social Welfare and Rehabilitation Science, ²Shahid Beheshti University of Medical Sciences, Tehran, IR*

Peripheral neuropathies are structural and functional disorders of peripheral nerves that emanate from the brain and spinal cord. Patients with peripheral neuropathy may present with symptoms such as numbness and unusual sensations, weakness, burning pain that can affect the quality of life. Recent empirical studies have been conducted on the peripheral nerves, suggested that neuroactive steroids such as progesterone and its derivatives could have therapeutic effects on symptoms and pathogenesis of peripheral neuropathies. Most cases have been investigated in these studies including diabetic neuropathies, peripheral neuropathies induced by aging process and nerves damage caused by chemical agents or trauma. In diabetic neuropathy, prolonged administration of progesterone or its metabolites protect nerve conduction velocity and increase skin density and improve the activity of Na/K ATPase and can increase production of myelin proteins that this solution may reduce pain and paresthesia. In neuropathies that caused by aging, progesterone administration can reduce apoptosis, prevent degeneration of axons and increase production and thickness of myelin sheath. In neuropathies caused by trauma or chemotherapy, local administration of it, offsets the transmission of pain signals through regulation of receptor P2X3 (receptors associated with pain), increases proliferation of Schwann cells and myelin by stimulating expression of myelin proteins such as P0 glycoprotein and peripheral myelin protein 22 (PMP22), decreases cytokines production and inflammation so that accelerates

the healing process and reduce the symptoms of pain and paresthesia. Therefore, in all studies, progesterone administration named as a promising new treatment .

PB965

Pericytes Possess Superior Capabilities in Revascularizing Injured Muscle (encore)

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Objective: To compare the angiogenic and vasculogenic capabilities of three different human blood vessel derived stem/progenitor cell populations—pericytes (PC), myogenic endothelial cells (MEC), and umbilical vein endothelial cells (HUVEC)—in injured muscle tissue in order to find the most effective candidate for future cell therapies. **Design:** Randomized, controlled animal study **Setting:** Animal Laboratory. **Subjects:** 12 6-week-old immunodeficient mice, randomly assigned to 1 of 4 groups: PC (n=3), MEC (n=3), HUVEC (n=3), or saline control (n=3). **Interventions:** Gastrocnemius muscles of the animals were injured with cardiotoxin, 4hrs prior to implantation with either MEC or PC (purified from one human skeletal muscle biopsy by flow cytometry) or human umbilical vein endothelial cells (HUVEC, purchased from Lonza). The 4th group was injected with saline and served as a control. After 3 weeks, the muscles were harvested, cryosectioned, and analyzed by immunohistochemistry. **Main Outcome Measures:** Immunohistochemical identification and quantification of the following: 1.) number of CD31+ cells (a marker for endothelial cells), 2.) alpha smooth muscle actin (aSMA)-positive structures (larger vascular structures) and 3.) actin+ cells (recruitment of vascular smooth muscle cells) at the cell engraftment area). Significance between groups was assessed using one way ANOVA. **Results:** Muscles injected with PC, MEC, or HUVEC all had significantly more CD31+ endothelial cells and aSMA+ blood vessels than the saline control (all p<0.05). Specifically, PC-injected muscles had significantly more aSMA+ cells than MEC-, HUVEC-, or saline-injected control (all p<0.05). **Conclusions:** Although all 3 stem/progenitor cell subsets promote angiogenesis in the injured muscle, PC implantation recruited more aSMA+ cells and showed the highest vasculogenic capabilities. Since revascularization represents a critical step for healing injured muscle, PC thus represents a promising candidate for future cellular therapies.

PB966

Overlipid Triggers Oxidative Stress in Human Chondrocytes

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Introduction: The osteoarthritis (OA) is a chronic disease with multifactorial origin characterized by the progressive loss of the joint cartilage. The obesity modifies the cartilage composition and its metabolism. The objective of this experimental work is to evaluate the oxidative stress generated by lipotoxic damage in human chondrocytes in development of OA. **Methodology:** Primary cell cultures of human chondrocytes were obtained, those were put under a fatty acids treatment with different concentrations 100, 250 and 500 uM of palmitic acid and oleic acid during 12, 24 and 48 hours. The cellular lipotoxicity was evaluated by the incorporation of lipids, cellular viability and the detection of oxygen and nitrogen reactive species. **Results:** It was observed that the incorporation of fatty acids in the cells in the different times, however the greatest quantification was in the 48 hours. At this time, we identified the highest production of O₂⁻, H₂O₂ and NO; compared to those without stimulus. Even though the oxidative stress is present in the cells caused by the li-

pototoxicity, their viability was not modified. **Discussion:** Our results were similar with the studies of Egnatchik et. al. (2014), Haeiwa et. al. (2014) y Wei et. al. (2006); where they found that the lipotoxicity caused by fatty acids in the cultured cells induces the production of oxygen reactive species. **Conclusions:** Based on the experimental results it is possible to conclude that the fatty acids have an important role in the generation of oxidative stress in chondral cells. This oxidative stress was mediated by the formation of superoxide anion, hydrogen peroxide and NO by different methodologies and detection kits. **References:** 1) H Haeiwa, T Fujita, Y Saitoh, N Miwa. Oleic acid promotes adaptability against oxidative stress in 3T3-L1 cells through lipohormesis. Mol Cell Biochem. DOI 10.1007/s11010-013-1846-9. 2) R A. Egnatchik, AK. Leamy, Y Noguchi, M Shiota, JD. Young. Palmitate-induced Activation of Mitochondrial Metabolism Promotes Oxidative Stress and Apoptosis in H4IIEC3 Rat Hepatocytes. Metabolism clinical and experimental (2014): 63: 283-295. 3) Y Wei, D Wang, F Topczewski, and MJ. Pagliassotti. Saturated fatty acids induce endoplasmic reticulum stress and apoptosis independently of ceramide in liver cells. Am J Physiol Endocrinol Metab (2006); 291: E275–E281.

PB967

The 2014 WHO Clinical Molecular and Pathological (WHO-CMP) Criteria and the Molecular Etiology and Classification of Myeloproliferative Neoplasms: From Dameshek 1950 to Vainchenker, Green and Kraloviccs 2005-2013 and Beyond

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Myeloproliferative neoplasm is a rather benign chronic blood disorder in adult and elderly patients with a near normal or compromised life expectancy. The WHO classifications distinguished the Philadelphia (Ph1) chromosome positive chronic myeloid leukemia (CML) from the Ph1-negative myeloproliferative neoplasms (MPN) essential thrombocythemia (ET), polycythemia vera (PV) and primary myelofibrosis (MF) or primary megakaryocytic granulocytic myeloproliferation (PMGM) in adult and elderly patients. Half of WHO defined ET patients show low serum erythropoietin (EPO) levels, and carry the JAK2V617F mutation, indicating prodromal PV. The positive predictive value of a JAK2V617F PCR test is 95% for the diagnosis of PV, and about 50% for ET and MF. The WHO defined JAK2V617F positive ET comprises three phenotypes of ET at clinical and the bone marrow level when the integrated WHO and European Clinical, Molecular (2014 WHO-CMP) criteria are applied: normocellular ET (WHO-ET), hypercellular ET due to increased erythropoiesis (prodromal PV) and ET with hypercellular megakaryocytic-granulocytic myeloproliferation (EMGM). Five main molecular types of clonal MPN can be distinguished in adults and elderly during lifelong follow-up: JAK2V617F and exon 12 mutated PV, JAK2V617F mutated ET; MPL515 mutated ET and MF and calreticulin (CALR) mutated ET and MF; and a small proportion of triple negative ET and MF patients. The JAK2V617F mutation load is low in heterozygous normocellular ET. The JAK2V617F mutation load in hetero/homozygous PV and EMGM is clearly related to MPN disease burden in terms of splenomegaly, constitutional symptoms and fibrosis. The JAK2 wild type ET carrying the MPL515 mutation is featured by clustered small and giant megakaryocytes with hyperlobulated stag-horn-like nuclei, in a normocellular bone marrow, and lacks features of PV. CALR mutated hypercellular ET associated with PMGM featured by dense clustered large immature dysmorphic megakaryocytes and bulky (cloud-like) hyperchromatic nuclei, which are never seen in WHO-CMP defined JAK2V617F mutated ET, EMGM and PV, and also not in MPL515 mutated ET. Two third of JAK2/MPL wild type ET and MF patients carry one of the CALR mutations as the cause of the third distinct MPN entity. WHO-CMP criteria are recommended to diagnose, classify, stage the broad spectrum of the MPNs of various molecular etiology.

PB969

Treadmill Exercise Promotes Angiogenesis in the Ischemic Penumbra of Rat Brains through Caveolin-1/VEGF Signaling Pathways

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The purpose of this study was to investigate the role of caveolin-1 in treadmill-exercise-induced angiogenesis in the ischemic penumbra of rat brains, and whether caveolin-1 changes correlated with reduced brain injury induced by treadmill exercise, in rats after cerebral ischemia. Rats were randomized into five groups: sham-operated (S, n=7), model (M, n=36), exercise and model (EM, n=36), inhibitor and model (IM, n=36), and inhibitor, exercise, and model (IEM, n=36). Rats in the model groups underwent middle cerebral artery occlusion (MCAO). Rats in the inhibitor groups received an IP injection of the caveolin-1 inhibitor, daidzein (0.4 mg/kg), every 24 hours following reperfusion. Rats were killed at 7 or 28 days after the operation. The exercise group showed better neurological recovery and smaller infarction volumes compared with the non-exercise group. Correspondingly, significant increases of caveolin-1 and vascular endothelial growth factor (VEGF) protein expression were observed compared with the non-exercise group. Additionally, the number of Flk-1/CD34 double-positive cells towards the ischemic penumbra was increased in the exercise group. Furthermore, the induction of VEGF protein, microvessel density, decrease of infarct volumes and neurological recovery was significantly inhibited by daidzein. This study indicates that treadmill exercise reduces brain injury in stroke. Our findings suggest that the caveolin-1 pathway is involved in the regulation of VEGF in association with promoted angiogenesis in the ischemic penumbra of rat brains after treadmill exercise. The caveolin-1/VEGF signaling pathway may be a potential target for therapeutic intervention in rats following MCAO.

PB970

FTY720 Effects the Neurofunctional and Permeability of Blood-Spinal Cord Barrier after Acute Spinal Cord Injury in Rats

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Introduction: Spinal cord injury (SCI) is a frequently-occurring damage and is a leading cause of permanent disability in young people. FTY720 (Fingolimod) as a novel immunosuppressor has showed its talents not solely dependents on immune modulation but also on some immune-independent functions, such as decreasing vascular permeability in traumatic diseases. **Objective:** To observe the therapeutic effects of FTY720 on neurofunctional and blood-spinal cord barrier in rats after acute spinal cord injury. **Material and Methods:** 144 adult Sprague-Dawley (SD) rats were randomly divided into 4 groups on average: Group A (normal control), Group B (sham operation), Group C (hemisection injury) and Group D (FTY720 treated). The neurofunction was assessed by Basso Beatle Bresnahan (BBB) scores, grid walking, motor evoked potential (MEP) and somatosensory evoked potentials (SEP). The blood-spinal cord barrier permeability was determined by Evans blue stain through OD values and fluorescence microscope. **Results:** The BBB locomotor scores in Group D were lower than those in Group A and B (P<0.01) from Day 1 to 28, but higher than those in Group C (P<0.05). The grid walking test showed that the percent of missteps of hind paws in Group D were higher compared to Group A and B from Day 7 to 28 (P<0.01), but lower compared to Group C (P<0.05). The potential period of MEP-N1 and SEP-P1 in Group D were extended than Group A and B (P<0.01), but shorten than Group C (P<0.05). Compared Day 14 and Day 28, the number of chronic inflammatory cells, the reaction of glial cells and the size of syringomyelia cavities in gray matter in Group D were significantly less than Group C. In addition, the leakage of Evans Blue from the damaged BSB

in Group D were increased than Group A and B (P<0.01), but reduced compared to the Group C (P<0.05). **Conclusions:** FTY720 mainly promotes the neural functional recovery at subacute phase of acute spinal cord injury. Meanwhile it decreases the permeability of blood-spinal barrier at acute phase. We demonstrate that FTY720 has some potential neuroprotective effects.

PB971

Traumatic and Degenerative Knee: A-PRP (Autologous Platelet Rich Plasma) Treatment. Case Studies

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Introduction: The A-PRP treatment involves intra-articular injections containing autologous platelet rich plasma concentrate. It is based on releasing of growth factors by the platelets and stem cells that potentiate the membrane molecules for tissue regeneration and favorable influence in local inflammation. **Material and Methods:** We used A-PRP concentrate, which respects European standards for treatment with autologous products. The patients involved in this case studies had traumatic and degenerative knee (arthrosis). We analyzed pain and functionality of the knee before and after our treatment in correlation with orthopedic surgery procedures (cruciate ligament reconstruction). **Results:** We present our results, documented by Imagistics (X-ray, IRM, CT) and VAS for pain and mobility, treated in our clinic using A-PRP. We correlated the treatment with patient's age, history of illness and associated co-morbidities and trauma. **Conclusions:** For each case, the treatment was individualized. Methodology of treatment with A-PRP was done in concordance with the technical procedures cited in literature. The results showed that for young patients with cruciate ligament reconstruction the treatment was excellent in terms of pain and mobility of the knees, concerning standing, walking and climbing as it is associated with orthopedic treatment. In degenerative knee arthrosis, the results were not as we expected for pain and mobility. **Keyword:** A-PRP (autologous platelet rich plasma), degenerative knee arthritis. **References:** 1) PRP Forum, sponsored by AAOS Now and held on Feb. 14, 2011, in San Diego, 2) Thanasis C, Papadimitriou G, Charalambidis C, Paraskevopoulos I, Papanikolaou A, Platelet-rich plasma versus autologous whole blood for the treatment of chronic lateral elbow epicondylitis: a randomized controlled clinical trial, Am J Sports Med. 2011 Oct; 39(10): 2130-4.

B.1. MECHANISMS OF TISSUE INJURY AND DEVELOPMENT OF ORGAN DYSFUNCTION

PB972

Changes in the Histopathological and Morphometrical Findings of the Adipose Cell of Infrapatellar Fat Pad after Spinal Cord Injury in Rats*I. Kitade¹, M. Hoso², T. Matsuzaki², S. Yoshida³, I. Takahashi⁴¹University of Fukui Hospital, Yoshida-gun, Fukui-pref, ²Kanazawa University Graduate School of Medical Science, Kanazawa, ³Kanazawa University Hospital, Kanazawa, ⁴Houju Memorial Hospital, Noumi, Ishikawa-pref, JP

Introduction/Background: The fat pad acts as lubrication of joints. However, As reported in our previous study, atrophy and the fibrosis of the adipose tissue were observed in the fat pad around the synovial membrane, in particular under the patellar ligament region in 2 weeks after spinal cord injury (SCI). The purpose of this study was to examine histopathological and morphometrical changes of the adipose cell of infrapatellar fat pad at five different time points after SCI in rats. **Material and Methods:** Thirty adult, nine-week-old female Wistar rats were used in this study. Fifteen experimental rats

underwent a spinal cord transection at the level of Th8-9 and the other fifteen control rats were raised normally. The animals were assessed at 1, 2, 4, 8 and 12 weeks after surgery. Formalin fixed sagittal sections from knee joints were morphologically examined after hematoxylin and eosin staining. Alterations of infrapatellar fat pad were evaluated under a microscope. The area of adipose cells was measured a randomly selected 50 cells/1-sample using DP controller (OLYMPUS) and image software Image J 1.37 (National Institutes of Health). **Results:** Adipose cells in the SCI-1w group were unchanged, compared with the control-1w group. Atrophy and fibrosis of adipose tissue were observed at 2 weeks after SCI. And area of adipose cells at 2weeks after SCI ($751\pm 268 \mu\text{m}^2$) was decreased, compared with the SCI-1w group ($826\pm 197 \mu\text{m}^2$). Area of adipose cells at 4 weeks after SCI ($872\pm 306 \mu\text{m}^2$) was increased. And area of adipose cells and grade of atrophy had stayed at 8 or 12 weeks after SCI. **Conclusion:** Atrophy, fibrosis and reducing the cross-sectional area of adipose cells of infrapatellar fat pad after SCI are not progressive lesion. **Optional: References:** Kitade I, et al.: Histopathological changes in knee joint components after spinal cord injury in rats. *J Phys Ther Sci* 24; 31-35. 2012.

PB973

Study of the Effect of Joint Stability on Articular Cartilage and Biomarkers Using the Rat Osteoarthritis Model

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Introduction/Background: Abnormal joint movements have been implicated in osteoarthritis (OA). In particular, articular cartilage damage occurs due to knee joint laxity after anterior cruciate ligament (ACL) injury. Our hypothesis is that prevention of knee joint laxity is beneficial for osteoarthritis. The aim of this study was to elucidate the impact of abnormal joint movement on articular cartilage using histological and biochemical analysis. **Material and Methods:** Forty-five Wistar rats were randomized into three groups: Joint Laxity (JL) (ACL transection), Joint Stability (JS) (ACL transection and surgery of joint stiffness), and Control. Articular cartilage from the knee joint and blood were harvested 1, 2, and 4 weeks after surgery. Histological observations of the cartilage from the knee joint were evaluated by toluidine blue staining, and type II collagen was visualized by immunohistochemistry. In biochemical analysis, the mRNA levels of matrix metalloproteinase-13 (MMP-13), tissue inhibitor of metalloproteinase-1 (TIMP-1), collagen type 2A1 (Col2A1), vascular cell adhesion molecule-1 (VCAM-1), and cartilage oligomeric matrix protein (COMP) studied as a potential serum marker for cartilage processes in osteoarthritis were evaluated by means of real-time PCR. **Results:** The histological observations showed cartilage surface structure degeneration in the JL group at 4 weeks. Immunohistochemical observations of type II collagen showed surface layers of the articular cartilage. In biochemical analysis, the JL group showed higher mRNA levels of COMP and MMP-13 than the JS group at 2 and 4 weeks. However, there was no difference in the mRNA levels of VCAM-1 in the blood between JS and JL group during the 4 weeks. **Conclusion:** In this study, joint instability was considered as a biomarker for OA; it provided prophylactic benefit. However, histological and histochemical analyses showed no significant differences. The ACL transection model has been the most commonly used animal model for osteoarthritis. The results of this study indicated that the progression of post-traumatic osteoarthritis has deeply implicated the period and lesion of articular cartilage degeneration. The treatment for maintaining joint stability such as using a knee brace and ACL reconstruction may therefore be important in the prevention of knee OA.

PB974

Curcumin and Human Mesenchymal Stem Cells in the Treatment of Spinal Cord Injury in Rats

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Transplantation of mesenchymal stem cells (MSC) as well as curcumin treatment improves the functional recovery of experimental models of spinal cord injury (SCI). The aim of this study was to compare the anti-inflammatory effects of mesenchymal stem cells with those of curcumin on the functional recovery, morphometric analysis and levels of inflammatory cytokines in rats, using balloon-induced spinal cord compression lesions. Human mesenchymal stem cells (500,000/10 ul) were implanted 7 days after spinal cord compression via subdural injection at the L4 spinal cord level. The second group received daily injection of curcumin (6 mg, i.p.), and curcumin applied directly on the spinal cord surface 30 minutes, 7, 14 and 21 days after SCI (20 mg). The control group was treated in the same regime with saline. Basso, Beattie, and Bresnahan (BBB) locomotor functional test confirm that functional recovery was enhanced in the MSC-treated group and curcumin-treated group compared to the control group. This finding was confirmed by the flat beam test as well. The BBB test showed a statistically better motor performance of curcumin treated rats vs. MSC treated rats 1 week after SCI. Higher restoration of white matter after MSC and curcumin treatments compared to the saline treated group was observed in cranial part of the spinal cord lesion. The amount of cytokines – TNF α , IL-4, IL-1 β , IL-2, IL-6 and IL-12, MIP-1 α , and RANTES (Luminex platform) – was measured 1, 7, 10, 14, and 28 days after SCI. Transplantations of MSC treatment reduce levels of IL-4, IL-1 β , IL-2, IL-6 and IL-12, however, curcumin treatment significantly elevates level of IL6 and IL12. Intrathecal implantation of MSCs as well as curcumin modulates the inflammatory reaction, improves functional recovery and preserves spinal cord tissue after traumatic spinal cord injury. This work was supported by GAČR 13-15031P, 13-00939S, LH12024, GAUK 521712, CZ.1.07/2.3.00/30.0018, BIOCEV² (CZ.1.05/1.1.00/02.0109).

PB975

Specific Contraction Types Induce different Responses in Skeletal Muscles and Tendons in Rats

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Introduction: Exercise induces collagen synthesis in skeletal muscles and tendons; however, this mechanotransduction mechanism is not clear. Furthermore, differential adaptive responses to specific contraction types have not been investigated; here, we aimed at investigating these responses. **Materials and Methods:** Eighteen Wistar immature rats were made to run on a treadmill on a 0° incline (ISO; similar amounts of concentric and eccentric contractions), up a 16° incline (CON; primarily concentric contractions), and down a 16° incline (ECC; primarily eccentric contractions) at 18 m/min for 60 min for 4 weeks (n=6 per group). After running, the weights and the area per muscle fiber of the supraspinatus muscle-tendon unit (SSP) were measured. Total RNA was extracted, and mRNA levels for collagen I and III, transforming growth factor- β 1 (TGF- β 1), lysyl oxidase (LOX), interleukin-1 β , -6, and vascular endothelial growth factor (VEGF) in the SSPs; VEGF and interleukin-6 of the infrapatellar fat pad (IFP) and patella tendon (PT); the fibroblast growth factor-2 (FGF-2) of the IFPs; and the LOX of the PTs were measured by real-time PCR and analyzed by $\Delta\Delta\text{Ct}$. **Results:** The weights in the ECC group were significantly higher than those in the CON group. The gaps between the each muscle fibers in the ECC group were the narrowest. In the SSPs, the expression of collagen I (up to 2.8-fold) and LOX (up to 3.3-fold) increased in the CON group. In the PTs,

there was an increase in the expression of interleukin-6 (up to 2.6-fold) in the CON group and of LOX (up to 1.3-fold) in the ECC group. In the IFPs, VEGF expression increased (up to 6.5-fold) in the CON group. **Conclusion:** The weights of and the gaps between the each muscle fibers suggest that ECC induced hypertrophy in the muscle fibers. The mRNA expressions indicate that the low loading muscle-tendon units of the CON group and the tendons of the ECC group showed early adaptive responses. Inflammatory responses were found in high loading tendons and fat pads of the CON group. These suggest that CON and the decrease of loads may induce adaptive responses in skeletal muscle and tendon.

PB976

HDAC6 Regulates the Chaperone-Mediated Autophagy to Prevent Oxidative Damage in Injured Neurons after Experimental Spinal Cord Injury

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Increasing evidence suggests that the histone deacetylase-6 (HDAC6) plays an important role in cell homeostasis in both normal settings and abnormal, stressful conditions. Here, we found the expression of HDAC6 dramatically increased in the damaged neural tissue and induced chaperone-mediated autophagy (CMA) after an acute spinal cord injury (SCI) model in mice. Then we treated PC12 cells with serum-free and hypoxia condition for 24h, a marked elevation of the lysosome-associated membrane protein type 2a (LAMP-2a) and the lysosomal heat shock cognate protein of 70 kDa (HSC70), two essential components of CMA, were found. Inhibition of HDAC6 by RNAi resulted in CMA activity decreased, although the level of LAMP-2a and HSC70 compensatory increase in response to stressful condition. In addition, the deficiency of HDAC6 led to the exacerbation of reactive oxygen species (ROS) generation and cell damage. Further studies revealed that the inhibition of HDAC6 interfered with the interaction of heat shock protein of 90 kDa (HSP90) with LAMP-2a and HSC70 by regulating the level of acetylated HSP90, resulting in the obstacles of chaperone-mediated autophagic degradation pathway. These results demonstrate for the first time that a positive correlation between HDAC6 and CMA induced by the SCI and by regulating HSP90 acetylation, HDAC6 disrupts the activity of the CMA degradation pathway, thereby exacerbating the accumulation of ROS and cellular damage coming from hypoxia-ischemia (HI). The findings may provide some clues to the potential therapeutic targets for acute SCI.

PB977

Effect of Balance Exercise Training on Neuromuscular Function after Peripheral Nerve Injury of Adult Rats

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Background and Purpose: Peripheral nerve injuries result in loss of motor, sensory and autonomic functions of the denervated limb. Injured peripheral axons have the ability to regenerate, but the regenerative process is slow and functional recovery is generally very poor. Various forms of exercise and electrotherapy are used in rehabilitation to help maintaining muscle properties during denervation. In this study, we show the effects of balance exercise on damaged the peripheral nerve and muscle. **Materials/Methods:** Adult Wistar male rats (10 weeks old) were randomly assigned to four groups, Sciatic crushed nerve injury (NI; n=6), exercised after these nerve injuries (Exe+NI; n=6), exercised with non-treated (Exe; n=6) and sedentary groups (Sed; n=6). The bilateral sciatic nerves were crushed for

3 minutes using a frozend surgical clip. Animals were trained on a moving platform (angle of inclination, ±7degree; number of revolutions, 25 rpm) for 5 days a week for 4 weeks. Sections of the nerve were stained with Toluidine Blue, observed by light microscopes. Cyostat cross-sections area (CSA) of soleus muscles were stained with hematoxylin and eosin, measured the total area ranged 100 fiber per muscle. Quantitative analysis for GAP43 were performed using realtime PCR. Our University Animal Care Committee and the Institutional Ethics Committee approved the experimental design for this study. **Results:** NI showed paralytic gait, but abnormal gait in Exe+NI changed for the better. The number of Myelin in NI observed more than other groups. The expression of GAP43 was 6.3 fold higher in NI than Sed, Exe+NI was 2.7 fold higher than Sed. Exe was 0.4 fold lower than Sed. Mean fiber CSA in Exe+NI, Exe, Sed was remarkably increased when compared with NI (P<0.01). **Conclusions:** Muscle activity induced by stimulation result in an autocrine release of neurotrophic factor, avoiding the disuse effect following nerve lesions. Moderate exercise results in accelerated functional recovery, because exercise might be beneficial for axonal outgrowth, recovery of muscle contractile properties, whereas forced intense exercise tends to have a detrimental effect, especially on muscle function, and overwork may even damage partially denervated muscles. This exercise is beneficial for neuromuscular functional recovery.

PB978

Mechanotransduction in Anterior Cruciate Ligament Spontaneous Healing

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Introduction/Background: Anterior cruciate ligament (ACL) injuries are currently treated by reconstruction with a tendon graft. Recent studies report alternative treatment methods with repair and regeneration of injured ACL. These studies focused on the intra-articular factors, without considering the extra-articular factors, including the biomechanical aspects of ligament-deficient knees. We hypothesized that the biomechanical aspects of ACL-deficient knees were critical with respect to the low capacity for spontaneous healing of the ACL. The objective of this study was to elucidate the effects of controlled abnormal joint motion and early protective joint motion on acute ACL complete rupture using histological and biochemical analysis. **Methods:** All experiments of this study were approved by the Animal Research Committee of Saitama Prefectural University (Saitama, Japan). Thirty-six complete skeletally mature male Wistar rats were randomly assigned to three groups: Intact group (IN), Sham-Operated (SO) group, and Control abnormal joint motion and Early protective joint motion after ACL transection (CE) group. The animals were allowed full cage activity until sacrifice at 2, 4, 6, and 8 weeks after surgery. ACL samples were collected each time-point and downstream analysis. We quantified gene expression for fibroblast growth factor 2 (FGF-2), transforming growth factor-β (TGF-β), vascular endothelial growth factor (VEGF), alpha smooth muscle actin (αSMA) using real-time polymerase chain reaction. In addition, protein expression for same factors using immunoblotting. **Results:** All ligaments of the CE-group healed spontaneously by bridging the gaps of the remnant ligament with scar tissue. This healing occurred until 2 weeks after injury, as the defect became filled with granulation tissue. The mRNA expression of VEGF and αSMA was higher in the CE group than that in the other groups (p<0.05) on the 2 weeks postoperative day. However, there are no significant differences in result of others. **Conclusion:** Our results shows biomechanical change of ACL-deficient knees were key role of ACL spontaneous healing. Mechanical stress with abnormal joint motion was influences on the intra-articular environment through the process of mechanotransduction. In this study, we changes intra-articular environment after ACL injured knee with control abnormal joint motion and early protective joint motion. These results suggest that great implication for the rehabilitation after ACL complete injuries.

PB979

The Biomodulation Effect on the Microcirculation Due to the Balneology Treatment Measured by the Laser Doppler

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Introduction: In static muscles work, when muscle contracts, the intramuscular pressure increases and the blood flow worsens. Insufficient flow can lead to oxygen deficiency in the muscle and in this way to a number of biochemical processes, that can produce a pain. Balneology treatment could be useful in the case of musculoskeletal pain. It is important to understand the effects of the balneology treatment on the microcirculation in the prevention and treatment of the overuse syndroms in working age persons with the professional overuse of the upper extremities. **Materials and Methods:** the study included 85 factory workers with upper extremities overuse who passed balneology treatment in outpatient clinic 10 times. The work-place risk analyses, pain Visual Analogue Scale (VAS) and Laser-Doppler Flowmetry are used to plan the study. The microcirculatory signals of the hands were monitored before and after balneological therapies and during post-occlusive reactive hyperaemia test. The provocations tests like post occlusive reactive hyperemia is used to facilitate data interpretation because of the large normal variations observed in the microcirculatory blood flow in laser doppler measurements. **Results:** the individual reactions of the microcirculation due to the balneology treatment are rather wide. There is a correlation between tissue perfusion measurements by laser-doppler and pain VAS. Tissue perfusion increased the most due to the balneology treatment in the medium pain group as well as the peak flow in the post reactive hyperemia test. The relatively lower rest flow in the beginning showed the best positive reaction after the balneology treatment. **Conclusions:** A better understanding of the microvascular status and screening the pain by VAS could be helpful to plan an appropriate balneology treatment for the persons with the overuse syndroms.

PB980

Mechanism of Hypoxia Stimulus on Rabbits Post Myocardial Infarction

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Background: Our previous studies showed that hypoxia could protect cardiac function after myocardial infarction. However the mechanism of hypoxia on the cardiac function post myocardial infarction is still unclear. This study aims to investigate the mechanism of hypoxia effects on left ventricular function after myocardial infarction. **Methods:** Twenty-four adult male rabbits were randomly divided into three groups: group SO (sham operated), group MI (myocardial infarction only) and group MI-HT (myocardial infarction plus hypoxia stimulus). Myocardial infarction was induced by left ventricular branch ligation. Hypoxia stimulus was performed in a hypobaric chamber (equivalent to an altitude of 4,000 m, PO₂ 12.94Kpa) for 1 h/day, 5 days/week for 4 weeks. Vascular endothelial growth factor (VEGF) and levels of MMP-9 mRNA were detected. The capillary density and Left ventricular performance were assessed. **Results:** After four weeks intervention, VEGF levels were increased significantly in groups MI and MI-HT, when compared to group SO. Group MI-HT showed higher VEGF levels than group MI. MMP-9 mRNA levels were raised in group MI significantly (p<0.01). At the endpoints, the increase of capillary densities were observed remarkably in group MI-HT. Echocardiography revealed the enlargements of left ventricular end-diastolic and end-systolic diameters but the declines of left ventricular ejection fractions both in groups MI and MI-HT. **Conclusions:** Hypoxia stimulus improves left ventricular function and reduces remodeling, which may contribute to the enhancement of angiogenesis.

PB981

Role of Macrophage Migration Inhibitory Factor in Diabetic Peripheral Neuropathy

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Introduction/Background: Diabetic peripheral neuropathy (DPN) is a common complication of diabetes mellitus which accompanied with distressful sensory symptoms, initially in the feet. With its dual proinflammatory and metabolic effects, macrophage migration inhibitory factor (MIF) has been recently suggested to be a logical target in the field of diabetes. In this study, we attempted to investigate the peripheral changes that elicit pain symptom in DPN rat model, and then we assessed the expression of MIF to the footpad skin. Also, we determined whether this MIF expression is correlated with the expressions of intraepidermal nerve fiber (IENF) and glyoxalase (GLO1). **Material and Methods:** Experimental DPN was made in male SD rats streptozotocin (STZ) injection. Body weights (BW) and blood glucose (BG) levels were checked. To compare the pain symptom between DPN and sham group, we weekly evaluated mechanical threshold and serially analyzed footpad thickness for 24 weeks. At the last day, all the footpads were excised and prepared for the following procedures; quantitative RT-PCR, western blot, and immunohistochemistry of MIF, IENF and GLO1. **Results:** As compared to sham group, DPN group significantly increased BG levels within one week after STZ injection, after BW decreased progressively, and occurred hyperglycemia until the 24th week. Likewise, the DPN group also developed significantly lower mechanical threshold as early as 7-8 weeks after the induction of diabetes, at which time the footpad thickness became reduced. On the immunohistochemical staining, the DPN group markedly diminished the expressions of IENF and GLO1, while increased MIF on the footpad skin lesions. Similarly, mRNA and protein levels of IENF and GLO1 were significantly down-regulated as the levels of MIF up-regulated on the lesions of DPN group. As hyperglycemic state was continuously maintained until the 24th weeks, the differences between two groups grew prominent. **Conclusion:** These results demonstrated that MIF may play a role in the pathogenesis of DPN. To our knowledge, this is the first to investigate MIF expression on the DPN-like footpad skin lesions and its potential role in the correlation with IENF and GLO1. Taken together, it is suggested that MIF can be a therapeutic target to control DPN in footpad skin.

B.2. CELL AND TISSUE ADAPTATION AND MALADAPTATION

PB982

Effect of Exercise on the Expression of μ -Opioid Receptor of Rostral Ventromedial Medulla in Neuropathic Pain Rat Model

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Introduction/Background: Neuropathic pain has been defined as pain caused by a lesion or disease of the somatosensory nervous system. Regular exercise has beneficial effects on physical and mental health such as depression and stress reduction, mood elevation and reduced pain perception. Exercise may serve as an alternative for the effective and healthy pain management. Rostral ventromedial medulla (RVM) is critical for the modulation of nociceptive transmission. The aim of this study was to investigate the effects of aerobic exercise on neuropathic pain and verify whether regular treadmill exercise could alter the μ -opioid receptor (MOR) expression in RVM in a neuropathic pain rat model. **Materials and Methods:** Thirty-two male Sprague-

Dawley rats were used. All rats were divided into 3 groups: group A, sham group (n=10); group B, chronic constriction injury (CCI) group (n=11); group C, CCI + exercise group (n=11). Regular treadmill exercise was performed for 30 minutes a day, 5 days a week, for 4 weeks at the speed of 8 m/min for 5 min, 11 m/min for 5 min, 22 m/min for 20 min. Withdrawal threshold and withdrawal latency were measured before and after regular exercise program. Immunohistochemistry and Western blots analysis were performed using antibodies against μ -opioid receptor (MOR). *Results:* Body weight of group C was the lowest among all groups. Withdrawal thresholds and withdrawal latencies were increased with time in groups B and C. There were significant differences of withdrawal thresholds between group B and group C at 1st, 2nd, 3rd, 4th weeks after exercise. There were significant differences of withdrawal latencies between group B and group C at 3rd, 4th weeks after exercise. MOR immunoreactive neuronal perikarya were seen in the RVM and spinal cord. MOR expression of group C was significantly decreased compared to that of group B in the RVM and spinal cord. *Conclusion:* Neuropathic pain improved and MOR expressions of RVM and spinal cord were decreased after regular treadmill exercise program. Exercise induced analgesia in neuropathic pain could be mediated by desensitization of central MOR by endogenous opioids, leading to the shift of RVM circuitry balance to pain inhibition.

PB983

Heat Stress Attenuates Skeletal Muscle Fiber Atrophy in Diabetic Rats

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Introduction: Diabetes is characterized by hyperglycemia, which induces skeletal muscle atrophy. Heat stress increases the expression of heat shock proteins (HSPs), which have preventive effects against disuse muscle atrophy. We hypothesized that heat stress also prevents muscle atrophy induced by diabetes. The purpose of this study is to determine the preventive effect of heat stress against skeletal muscle atrophy induced by diabetes. *Materials and Methods:* Twelve-week-old male Wistar rats (n=24) were used in this study. The rats were randomly divided into four groups of six animals each: control (Con), heat treatment (HT), streptozotocin (STZ)-induced diabetic (DM), and STZ-induced diabetic/heat treatment (DM + HT). Diabetes was induced with a single intraperitoneal injection of STZ (50 mg/kg body weight). The lower half of the body of anesthetized rats in the HT and DM + HT groups was immersed in hot water at 42°C for 30 min. Heat stress was started at 7 days after the injection of STZ, performed once a day, five times a week for 3 weeks. At 4 weeks after STZ injection, the rats were euthanized and then the extensor digitorum longus muscle was removed and weighed. The expression of HSP72 and HSP25 in the muscle was analyzed with western blot. The muscle tissues were stained with hematoxylin and eosin, and then the muscle fiber cross-sectional area was measured. *Results:* The expression of HSP72 in the muscle of rats in the HT and DM + HT groups was significantly higher than that in rats in the Con and DM groups. HSP25 expression was significantly higher in the DM + HT group than in the Con and DM groups. Muscle wet weight and muscle fiber cross-sectional area were decreased in the diabetic groups compared with the nondiabetic groups. Muscle wet weight was not significantly different between the DM and DM + HT groups, whereas the muscle fiber cross-sectional area was significantly smaller in the DM groups than in the DM + HT group. *Conclusion:* Heat stress increased HSP70 and HSP25 in skeletal muscle of diabetic rats, resulting in the attenuation of skeletal muscle fiber atrophy.

PB984

Randomized, Sham Controlled Trial of Transcranial Direct Current Stimulation for Patients with Paretic Hand

in Chronic Stroke

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Introduction: To investigate if transcranial direct current stimulation (tDCS) combined with motor training (MT) was effective in treating paretic hand in chronic stroke victims. *Material and Methods:* A total of 15 patients (38.8±23.8 months; range 12-84) were randomly assigned to active or control group in a double-blinded, sham-controlled, parallel design. Each group received intensive MT for 30 min/day, 5 days/week, for 2 weeks, which was preceded by 20 minutes of 2 mA anodal tDCS over the ipsilesional M1 vs. sham. Paretic hand function was estimated with Jebsen Taylor Hand Function Test (JTHFT), pre- (T0), and post-intervention at 1st (T1), 10th (T2) and 30th (T3) day. *Results:* The time necessary to perform JTHFT at study baseline (T0) was 81.65±26.5 for paretic and 33.00±3.59 for non-affected hand, respectively. Normalized total JTHFT for affected hand after two weeks of treatment (T2) was significantly shortened in group with anodal tDCS compared with sham (0.75±0.15 and 1.01±0.11, respectively, P<0.01). During follow up period (T3) improvement at total JTHFT was sustained (0.79±0.09; p=0.008), with emphasis on tasks JTHFT-1 (p=0.048), -2 (p=0.016) and -5 (p=0.016). *Conclusion:* Our findings suggest that functional ability consequences of chronic hand motor impairment among stroke survivors, could be improved with anodal tDCS over ipsilesional cortex coupled with intensive motor training.

PB985

The Effect of Restricting Anterior Displacement of the Tibia after Anterior Cruciate Ligament Injury

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Introduction/Background: Generally, the anterior cruciate ligament (ACL) is known to have poor capacity for self-healing, and the knee joint after ACL injury has an increased chance of developing osteoarthritis due to joint instability and altered kinematics. However, there are the findings that knee joint instability after ACL injury inhibits its natural healing, and restricting anterior displacement of the tibia induces ACL self-healing. The purpose of this study was to examine the changes in gene expression during the process of ACL healing. *Material and Methods:* A total of 26 adult male Wistar rats were randomly assigned to two groups: ACL transection (ACLT) and ACLT + experiment (EX). The EX group was treated by restricting anterior displacement of the tibia. ACL were harvested at 2 and 4 weeks after surgery. Knee joints were harvested at 4 weeks after surgery. mRNA expression levels of nuclear factor-kappa B (NF- κ B), tumor necrosis factor- α (TNF- α) and interleukin-1 β (IL-1 β) were determined by real-time polymerase chain reaction. Histological analysis was performed using haematoxylin and eosin staining. *Results:* NF- κ B mRNA levels of the EX group were 0.4 fold and 2.0 fold those of the ACLT group at 2 weeks and 4 weeks, respectively. TNF- α mRNA levels of the EX group were 0.5 fold and 0.2 fold those of the ACLT group at 2 weeks and 4 weeks, respectively. IL-1 β mRNA levels of the EX group were 0.5 fold and 1.3 fold those of the ACLT group at 2 and 4 weeks, respectively. There were no significant differences in gene expression between the EX group and ACLT group at each time point. Histologically, we observed self-healing of ACL at the cellular level in the EX group at 4 weeks. *Conclusion:* In this study, restricting anterior displacement of the tibia after ACL injury reduced TNF- α mRNA expression and increased NF- κ B mRNA expression, as observed in the EX group at 4 weeks. Histologically, ACL was retracted in the ACLT group and was healed in the EX group at 4 weeks. These results suggest that NF- κ B plays a role in preventing apoptosis during the ACL healing process.

PB986

The Effects of Hypoxia Exposure on Rabbit after Myocardial Infarction

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Background: It was demonstrated that hypoxia preconditioning could protect cardiac function against subsequent myocardial infarction injury. However, the effect of hypoxia on left ventricular after myocardial infarction is still unclear. This study therefore aims to investigate the effects of hypoxia exposure on the heart function in rabbits after myocardial infarction. **Methods:** Adult male rabbits were randomly divided into three groups: group SO (sham operated), group MI (myocardial infarction only) and group MI-HT (myocardial infarction plus hypoxia training). Myocardial infarction was induced by left ventricular branch ligation. Hypoxia exposure was carried out in a hypobaric chamber (having equivalent condition at an altitude of 4,000 m, FiO₂ 21.4.9%) for 1 h/day, 5 days/week for four weeks. At the endpoints, vascular endothelial growth factor (VEGF) in the plasma was measured. Infarct size and Left ventricular function were assessed, respectively. **Results:** After the 4-week experiment, compared with the group SO, plasma VEGF levels in groups MI (130.27±18.58 pg/mL, *P*<0.01) and MI-HT (181.93±20.29 pg/mL, *P*<0.01) were significantly increased. Infarct size in Group MI-HT (29.67%±7.73%) was decreased remarkable. The left ventricular end-diastolic and end-systolic dimensions were increased and the left ventricular ejection fraction was decreased in groups MI and MI-HT. However, group MI-HT diminished left ventricular end-diastolic and end-systolic dimensions significantly and improved left ventricular ejection fraction as well. **Conclusions:** Hypoxia exposure may improve left ventricular function in rabbits post MI.

PB987

Repetitive Transcranial Magnetic Stimulation (rTMS) with Different Frequencies Modulates Expression of Various Growth Factors and Regulates Proliferation in Neuronal Cell*S. H. Kim¹, J. Y. Lee², Y. H. Lee¹, J. H. Kim¹, J. H. Lee¹, T. J. Park¹¹Yonsei University Wonju College of Medicine, Wonju, ²Yonsei University College of Medicine, Seoul, KR

Introduction: Repetitive transcranial magnetic stimulation (rTMS) is a neuropsychiatric and neuro-rehabilitation tool that can be used to investigate the neurobiology of sensory and motor function. High-frequency (>3 Hz) stimulation generally results in facilitation, while low-frequency (<1 Hz) rTMS induces reduction of synaptic efficiency. Few studies have examined the effects of the frequency change rTMS on modulation of growth/neurotrophic factors of neuroblastoma cells in vitro, thus, the current study examined its effects on neuronal cell and proliferation, as well as various growth/trophic factors with respected to cell proliferation. Immortalized mouse neuroblastoma cells (ATCC, no. NIE115) were used as cell model in this study. **Material:** Dishes of cultured cells were randomly divided into control, sham, low frequency (0.5 Hz, 1 Tesla) and high frequency (10 Hz, 1 Tesla) groups (n=6 dishes/group), and were stimulated for 3 days. Expression of neurotrophic/growth factors was investigated by western blotting analysis 3 days after rTMS application. Also, the proliferation of neuroblastoma cells was determined by cell counting assay. **Results:** There was difference of cell proliferation between different stimulus frequencies. Low frequency did not alter the proliferation relative to control, while high frequency elevated the proliferation (*p*<0.01) relative to control group. The expression levels of brain-derived neurotrophic factor (BDNF), glial cell line-derived neurotrophic factor (GDNF), neurotrophin-3 (NT-3) and platelet-derived growth factor were elevated in high frequency magnetic stimulation (10 Hz) group (*p*<0.01). **Conclusion:** In conclusion, we infer that high frequency magnetic stimulation participates in cell proliferation of neuronal cells via up-regulation

of various growth/trophic factors.

PB988

The Locomotor Recovery Secondary to Neural Stem Cell Transplantation Combined with Treadmill Training in Chronic Phase Spinal Cord Injury Model Mice*S. Tashiro¹, S. Nishimura¹, H. Iwai¹, G. Itakura¹, K. Hori¹, L. Zhang¹, M. Mukaino², M. Shinozaki¹, A. Iwanami¹, Y. Toyama¹, H. Okano¹, M. Nakamura¹, M. Liu¹¹Keio University School of Medicine, Shinjuku-ku, ²Fujita Health University, Aichi, JP

Background: Previous study demonstrated the effectiveness of neural stem-cell (NSC) transplantation at the sub-acute phase of spinal cord injury (SCI), but not at the chronic phase (Nishimura et al, Mol Brain 2012). It is partly because of the nature of microenvironment in chronically injured spinal cord and the long time disuse after SCI. Since treadmill training after SCI up-regulate the expression of neurotrophic factors and can modify the behavior affected by disuse, the treatment resistance could be, at least partially, overcome by training. Here, in this study, we investigated the effect of combination therapy with NSC transplantation and training for chronic SCI. **Methods:** In 40 adult C57/BL6J mice, severe contusive SCI was induced at T9 level using an IH-impactor. NSC transplantation was performed at 49 days post injury (DPI). Partial body weight supported bipedal gait treadmill training was performed from 42 to 105 DPI. The animals were randomly separated into following 4 groups: 1) NSC transplantation with training (TP-TMT); 2) NSC transplantation without training (TP); 3) PBS injection with training (TMT); and 4) PBS injection without training (Control). Locomotor function was assessed with Basso Motor Scoring scale, and survival of the transplanted cell was evaluated with bio-imaging (IVIS spectrum system) up to 133 DPI. NS/PCs differentiation, spared fibers, axonal regeneration and synapse formation were immunohistologically assessed at 133 DPI. **Result:** Locomotor function assessed by BMS was significantly improved in the TP-TMT group than the control group. Grafted NS/PCs predominantly differentiated into neurons and oligodendrocytes, and less astrocytes. Interestingly, axonal regeneration and synapse formation were significantly enhanced in the TP-TMT group compared to the TP group. Survival of the grafted NS/PCs and spared fibers that are immunoreactive to 5HT and NF-H were not different between the TP-TMT and TP groups respectively. **Discussion:** The locomotor function was significantly recovered when stem-cell therapy was combined with rehabilitation. This result would be achieved via several mechanisms, such as the re-organization of neuronal network, the up-regulation of neurotrophic factors and the overcome of disuse. Further investigation is needed to clarify the background of this synergistically effect of NSC transplantation and rehabilitation for chronic SCI.

PB989

Low Frequency Electromagnetic Field regulated Hair Follicles Growth at Anagen Phase in Depilation-Induced Hair Cycle*X. Li¹, X. Wang², L. Bai¹, Y. Ye², M. Zhang¹¹Guangdong Academy of Medical Sciences and Guangdong General Hospital, ²Jinan University, Guangzhou, CN

Object: Many studies suggested that low frequency electromagnetic field (EMF) was useful for early healing of wound. Wound healing involve in cutaneous appendage neogenesis such as hair follicles (HF). But low frequency EMF bioeffects on HF's growth have not been fully elucidated. This present study was designed to determine the effects of low frequency EMF on hair growth in anagen phase. **Methods:** C57BL/6 mice were used to make the model of depilation-induced HF cycling, and divided at random into the control group and low frequency EMF group, and then harvested the skin specimens to assess for hair growth and hair anagen pro-

gress. We also measured KGF expression patterns by Western Blot and immunofluorescence staining. Keratinocytes proliferation was evaluated by immunohistochemistry staining. **Results:** The results showed that, compared to the control, the length of HF's clearly increased at 9 day and 16 day, and anagen progression prolonged in 1–3 days in depilation-induced hair cycle progression, and Ki67 expression increased in the out root sheath in the low frequency EMF group. Location of KGF expression was in inner root sheath. After low frequency EMF treatment, KGF expression had a higher increase compare to the control group. **Conclusions:** Low frequency EMF was shown to participate in the regulation of the mouse hair growth cycle, which associated with low frequency EMF enhancing keratinocytes proliferation in the out root sheath and increasing KGF expression in the inner root sheath.

B.3. BIOLOGICAL MECHANISM OF INTERVENTIONS

PB990

The Effects of Low Level Laser Therapy on Stroke Rats

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Introduction: The great majority of patients presenting in the clinic are stroke. Stroke has been for many years and remains to be one of the top ten causes of mortality. Patients suffering from stroke require rehabilitation to improve and/or restore their lost function. Current breakthroughs in rehabilitation therapy remain limited. Low level laser therapy (LLLT) can affect neural regeneration. However, the effects of LLLT on stroke recovery and possible mechanisms remain unclear. The purpose of this research plan is to reveal the discovery. **Materials and Methods:** Rat stroke model was used with permanent middle cerebral artery occlusion (MCAO). Rats were divided into the sham, stroke and stroke with LLLT groups. In the LLLT group, the irradiation with 808nm laser and 8 J/cm² for used. The rat behavioral expression, brain infarction volume, inflammation factors and neuron growth factors of brain tissues were measured. **Results:** LLLT reduced the syndromes of ischemic stroke and the infarction volume. The tumor necrosis factor- α was decreased and the expression of growth associated protein 43 was enhanced after LLLT on rat brain tissue. The brain-derived neurotrophic factor also increased after LLLT **Conclusion:** These results have provided specific effects of LLLT to inhibit inflammation and improve brain recovery and learning ability on stroke rats. From this study, we hope to develop an alternative treatment for the stroke patients. **References:** 1) Steiner AB, Huisa BN, Zivin JA. The evolution of transcranial laser therapy for acute ischemic stroke, including a pooled analysis of NEST-1 and NEST-2. *Current cardiology reports* 2010; 12(1): 29-33. 2) Xuan W, Vatansever F, Huang L, Wu Q, Xuan Y, Dai T et al. Transcranial low-level laser therapy improves neurological performance in traumatic brain injury in mice: effect of treatment repetition regimen. *PloS one* 2013; 8(1): e53454.

PB991

The Effect of Transcutaneous Electrical Nerve Stimulation on Hyperalgesia and Spinal Glial Activation in Mice with Neuropathic Pain

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Introduction: Although transcutaneous electrical nerve stimulation (TENS) is widely used for the treatment of neuropathic pain, its effectiveness remains uncertain. We investigated the effects of TENS in mice with neuropathic pain on hyperalgesia and glial cell activation in the lumbar spinal cord dorsal horn. **Material and**

Methods: Experiments were conducted in 45 adult male ICR mice, aged 9 weeks, with a mean body weight of 39.6±3.0 g (±SD). Mice were subjected to spared nerve injury (SNI) surgery. In the SNI surgery, the left hind limb was incised at mid-thigh level. The common peroneal and tibial nerves were tightly ligated by a 6-0 silk suture. TENS and behavioral tests (mechanical and thermal hyperalgesia) were performed every day. TENS was applied daily for 30 minutes, through self-adhesive surface electrodes using a TENS stimulator device. The surface electrode was placed on the skin overlying the left paraspinal muscle, which is innervated by the dorsal rami of the left L1 to L6. The frequency of TENS was set at 100 Hz and the intensity was defined by the less than motor threshold. Immunohistochemical analysis (microglia and astrocytes) of the lumbar spinal cord dorsal horn was performed after 8 days. **Results:** Early TENS (starting from the day after surgery) reduced mechanical and thermal hyperalgesia, and decreased the activation of microglia and astrocytes ($p < 0.05$). In contrast, the application of TENS at 1 week (TENS-1w) or 2 weeks (TENS-2w) after injury was ineffective in reducing hyperalgesia (mechanical and thermal) or activation of microglia and astrocytes. **Conclusion:** The results suggested that the application of early TENS relieved hyperalgesia in mice model with neuropathic pain by inhibiting glial activation. The findings indicate that TENS treatment is more effective when applied as early after nerve injury as possible.

PB992

Pulsed Electromagnetic Fields Inhibit Bone Loss in a Rat Model of Diabetic Osteopenia through Modulating MicroRNA-29a

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Introduction/Background: Pulsed electromagnetic fields (PEMFs) have been shown to prevent bone loss in streptozotocin (STZ)-induced diabetic rats. However, the precise mechanisms by which PEMFs elicit these favorable biological responses are still not fully understood. Evidences have shown that MicroRNA-29a modulates osteoblast differentiation. The purpose of this study was to investigate whether PEMFs protect against bone loss in STZ-induced diabetic rats through regulating MicroRNA-29a expression. **Material and Methods:** Thirty 3-month-old Sprague Dawley rats were randomly assigned to one of three groups: control group (injection of saline vehicle), DM group (injection of STZ), and PEMFs group (injection of STZ +PEMFs exposure). One week following injection of STZ, rats in the PEMFs group were received PEMFs exposure for 40 min/day, 5 days/week, and lasted for 12 weeks. Dual x-ray absorptiometry, micro-computed tomography, biomechanical examination and quantitative real-time PCR analysis were performed to evaluate bone mass, microarchitecture, bone strength and MicroRNA-29a expression. **Results:** STZ-induced diabetic rats showed lower bone mineral density, deterioration of bone microstructure and strength compared to control group in association with reduced miR-29a expression. After 12-week intervention, the results showed that PEMFs increased bone mineral density, and inhibited deterioration of bone microarchitecture and strength in STZ rats. Furthermore, PEMFs up-regulated MicroRNA-29a expression. **Conclusions:** The results demonstrated that PEMFs can prevent the diabetes-induced bone loss and reverse the deterioration of bone microarchitecture and strength, at least partly, through modulating MicroRNA-29a expression. However the direct target genes of MicroRNA-29a need be further investigated.

PB993

The Effects of Prenatal Stress on the Molecular Biology at Different Periods of Offspring Rats

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Objective: To observe the prenatal stress effects on the molecular biology at different periods of offspring rats. **Methods:** The prenatal restrained-stress model was adopted. The dams in moderate pregnant and later stage were restrained respectively. The corticosterone (COR) and Interleukin - 6 (IL-6) of the offspring rats of embryonic period, childhood and adulthood were examined in Enzyme-linked immunosorbent method. **Results:** The expression of IL - 6 from embryonic stage to maturity gradually rise ($P < 0.05$). But CORT expression from embryonic stage to maturity gradually reduced ($P < 0.05$). **Conclusion:** Late prenatal stress can affect the offspring of HPA axis and immune system at different periods of offspring rats.

PB994

Perlecan Effect on Proliferation of Muscle Satellite Cell through Adjusting Downstream Signal Pathways of Myostatin

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Objective: To investigate the effects of perlecan that is a component of the basement membrane regulate Myostatin signal transduction pathway on the proliferation and muscle satellite cell (MSC) in mice. **Methods:** In vitro, The MSC component in the skeletal muscle was cultured, different concentrations of perlecan (50, 100, 200 $\mu\text{mol/L}$) were given to the incubation with MSC and real time PCR assay was used to test the effect of perlecan on the expression of Myostatin's downstream signal pathways as Smad, p-Smad in MSC. **Results:** By real time PCR analysis showed that different concentrations of perlecan significantly increased expression of p-Smad mRNA ($P < 0.05$). The expression of Smad mRNA in perlecan treatment MSC was not significantly different ($P > 0.05$). In 72 hour, the expression of p-Smad mRNA in perlecan treatment groups was higher than that in model group ($P < 0.05$) in a dose-dependent promotion with perlecan. **Conclusion:** Consequently, perlecan may regulate the balance of proliferation in MSC of mice through adjusting Myostatin's downstream signal pathways in MSC. **Funded Projects:** Youth Project of the National Natural Science Foundation of China (81101455)

PB995

Neuro-Cognitive Rehabilitation among Patients with Spinal Cord Injury Who Treated with Stem Cell

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Background: Discovery of the potential use of stem cells in neural repair and regeneration on patients with Spinal cord injury (SCI) is a noteworthy development in the neurosciences. In this review, several ongoing studies are presented that aim to provide neurobiology spinal cord injury, role of stem cell therapy in neural repair and importance of neuro-cognitive rehabilitation (NCR) among patients with SCI who treated with stem cell. **Result:** NCR is a group of designed techniques that is for the promotion of cognitive domains. It is a science of restoring cognitive processing and it affects the molecular and cellular recovery rehabilitation by integration of behavioral and cognitive changes. Neuro-cognitive deficits are potential side effects of stem cell therapy (SCT). The promotion of rehabilitation science of cognitive neuroscience has made it a priority by the help of full range of effected interventional procedures. Cognitive impairment after SCT in patient with SCI is huge health challenges and intervention in the passive skills can lead to NCR that includes designed experience on the basis of nerve and brain function and structure. This method on the basis of neu-

roplasticity, reorganization of damaged cortical through morphological and physiological responses of nerve reconstruction ways by techniques in neuro-cognitive disorders due to illness, injury or disability which are affected by environment, the complexity of stimulation, repeated tasks and motivation. **Keywords:** Neuro-cognitive, rehabilitation, spinal cord injury, stem cell.

PB996

Effect of different Oxygen Time of Hyperbaric Oxygen Therapy on the Expression of AQP4 and SOD around the Hematoma in Rats with Intracerebral Hemorrhage

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Objective: To study the effect of different oxygen times of hyperbaric oxygen therapy (HBOT) on the expression of Aquaporin (AQP4) and superoxide dismutase (SOD) around hematoma in intracerebral hemorrhage (ICH) rats. **Methods:** 125 ICH rats (25, without HBOT) and the experimental group (100, with HBOT) and the normal group (5 rats); According to different times of oxygen uptake, 100 ICH rats were divided into 4 groups: HBO 40 min, HBO 60 min, HBO 80 min and HBO 100 min, each group of 25 rats. All experimental rats accept HBOT after 6 h ICH, 2 ATA of pressure, once a day, then all rats (each group 5 rats) were executed respectively after HBOT 1 d, 3 d, 5 d, 7 d, 14 d using wet/dry method to measure brain tissue water content, using immunohistochemical method to detect AQP4 protein expression in brain tissue surrounding the hematoma, xanthine oxidase method to determine SOD vitality. **Results:** 1) The control group rats brain tissue water content is higher in ICH 1 d, 3 days to peak, then gradually decline than normal rats. That of four experimental group rats were reduced each point in time comparing with control group. The difference was statistically significant ($P < 0.05$), but there was no difference between the experimental group S ($P > 0.05$). 2) The control group rats AQP4 expression in ICH 1 day began to rise, 3 days to peak, 5 days after declining gradually than normal rats. AQP4 expression in 4 experimental groups each time point were lower than the control group ($P < 0.05$). HBO 60 min group after HBOT 1d, AQP4 expression decreased significantly, and until HBOT 3d, 5d, comparing with HBO 40 min and HBO 100 min groups ($P < 0.05$), but the difference was not statistically significant d ($P > 0.05$) comparing with HBO 80 min group. SOD expression was similar with AQP4, only just the opposite, and the difference of HBO 60 min group was more obvious than HBO 80 min group ($P < 0.05$). **Conclusion:** HBOT can improve secondary brain edema after ICH, and oxygen uptake 60 min, 80 min HBOT effect was better than 40 min and 100 min. its mechanism may be related to HBO reduced AQP4 expression level and increase SOD expression in brain tissue surrounding the hematoma.

PB997

Effects of He-Ne Laser on Activation of ERK-1/2 in Cultured Mouse Fibroblast

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To investigate the effects of He-Ne laser with different radiation time on activation of ERK-1/2 in cultured mouse fibroblast in vitro, the cells from mouse skin were directly radiated by He-Ne laser with different time. After radiation with He-Ne laser (5 mW, spot diameter, energy density in 373.9 mJ/mm^2) for 3 min, 5 min, 10 min, and 15 min, anti-phosphorylation extracellular-regulated kinase (ERK-1/2) antibody were introduced in western blot analysis to observe the phosphorylation changes of ERK. Our results showed that after radiation in 5 min and 10 min, the activation of ERK-1/2 was increased significantly ($P < 0.05$). However, the activation of ERK-1/2 was decreased significantly in 15 min ($P < 0.05$). It is concluded that He-Ne laser irradiation could induce different activation in MAPK signal conductive gateway.

PB998**Motor Control of Bimanual Versus Unimanual Movements in Right Handedness and Converted Left Handedness after TBI: a Pilot fMRI Study***Q. Lin¹, *D. Huang¹, *Y. Mao¹, H. Li¹, B. O'Young²¹Sun Yat-Sen University, Guangdong, CN, ²New York University, New York, NY, US

Objective: Most of everyday tasks require coordinating movements of both upper limbs. Sustained traumatic brain injury (TBI) can result in persistent neurobehavioural impairment, especially severe upper limb dysfunction. Injury-induced neural plasticity is intricately involved in motor recovery and influenced by behavioural compensation. This study aimed to explore the mechanism of bilateral hemisphere cooperation and find the clue of neuroplasticity after TBI in converted left-hander TBI subject. **Methods:** Fifteen right handedness and one left handedness normal subject were recruited as control subjects. One 23-year-old male subject with seven-year TBI was also recruited. The TBI subject was right handedness before TBI. TBI led to severe dysfunction of his right hand. However after seven years of exercises by himself at home, the patient can write, eat, even draw picture with his left hand (He is an art student right now). All subjects performed functional magnetic resonance imaging (fMRI) plus the diffusion tensor imaging (DTI) and clinical assessments including the Fugl-Meyer Assessment (FM) and the Wolf motor arm Test (WMAT). The block design fMRI scanning was performed during unilateral (clenching the hand and flexion/extension of the elbow joint) and bilateral (simultaneously and alternately flexion/extension of the elbow joint) tasks. **Results:** For the unimanual and bilateral movement, the right handedness normal subjects showed a general predominance of left-hemisphere activation relative to right hemisphere, whereas the left handedness normal subject showed reversed pattern. The switched left handedness TBI subject showed similar bilateral activation. 2) The more bilateral activation was showed during the alternately bilateral movement. 3) DTI result showed significantly less fractional anisotropy (FA) value in left brain of converted TBI patient than other normal subjects. 4) The clinical assessment of this TBI subject indicates obvious right-hand dysfunction. **Implications on Rehabilitation:** Our study suggested that the handedness could influence the laterality of brain activation during the bilateral movement and complex cooperation movement cause more bilateral brain activation to promote neuroplasticity. And then the recovery of switched handedness patients after TBI may related to the enhancement of bilateral hemisphere cooperation.

PB999**Protective Effects of Ethyl Pyruvate on Expressions of 12-Lipoxygenase and Apoptosis in Neonatal Rats with Cerebral Brain Injury Induced by Intrauterine Infection**X. Kong¹, *X. Li¹, F. Song¹, R. Kumar²¹The Third Affiliated Hospital of Jiamusi University, ²Rehabilitation College of Jiamusi University, Jiamusi, PK

Objective: To study the effect of Ethyl Pyruvate (EP) in the expression of 12-lipoxygenase (12-LOX) and apoptosis changes on rat's offspring's damaged brain caused by intrauterine infection. **Methods:** Lipopolysaccharide (LPS) group pregnant Wistar rats were consecutively injected with lipo-polysaccharide (380 µg/kg/day) intraperitoneally. EP group pregnant Wistar rats were consecutively injected with lipopolysaccharide intraperitoneally, and EP was administered intraperitoneally at a dose of 40 mg/kg immediately. 12 pregnant rats were injected with normal saline intraperitoneally as control group. After the delivery of pups, every group selected thirty-six pups randomly. placenta from rats of LPS group was taken for hematoxyline-eosin (HE) staining to confirm its intrauterine infection. 12-lipoxygenase expression in brain tissue was studied through immunohistochemical and western-blot analysis. use TUNEL to observe the pathological changes of the brain tissue. **Results:** Obvious

pathological changes were observed in the placenta in the infection groups. The expression of apoptosis was lower in EP group and NS group than in the LPS group (P<0.01), in NS group than the EP group (P<0.01). The expression of 12-lipoxygenase was lower in EP group and NS group than in the LPS group (P<0.01), in NS group than the EP group (P<0.01). **Conclusion:** Ethyl Pyruvate confers potent protection against LPS-induced brain injury via significantly reduced the expression of 12-LOX and anti-apoptotic properties.

PB1000**Therapeutic Effect of Cinacalcet on Diabetic Peripheral Neuropathy**

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Introduction: The calcimimetic, cinacalcet, which activates Ca²⁺-sensing receptor (CaR), is used to treat hyperparathyroidism. Interestingly, the CaR also modulates ion-channel/transporter activity, peptide secretion, cell proliferation and apoptosis, chemotaxis, and oncogene modulation. In cardiovascular system, the CaR is also present on endothelial cells and simulated the production of NO through eNOS activation. A decrement of eNOS bioavailability and increased the generation of potentially toxic reactive oxygen species are critical to the pathogenesis of diabetic peripheral neuropathy. We investigated whether cinacalcet would improve diabetic peripheral neuropathy in db/db mice an animal model of type 2 diabetes. **Material and Methods:** Male C57 BLKS db/db mice and db/m controls at 8 weeks of age were divided to receive either a regular diet chow or a diet containing cinacalcet (25 mg/kg, n=8, respectively). Mice were followed for 8 weeks and were evaluated about sensorineural functional, pathologic change. For the functional neuropathic changes, we evaluated sciatic motor nerve conduction studies (MNCS) and tactile responses (50% g threshold) to stimulation with flexible von Frey filaments. The histopathological changes of sciatic nerves were investigated with electron microscopy. **Results:** The db/db mice showed sciatic motor conduction delay, increased tactile threshold, disorganized myelin with axonal shrinkage and degeneration, and fewer unmyelinated fibers in the sciatic nerve compared to d/m mice. These findings were ameliorated with cinacalcet treatment. **Conclusions:** The results suggest that calcimimetic cinacalcet may be a potentially therapeutic modality for type 2 diabetic neuropathy.

PB1001**Treatment of Muscle Trigger Points and Myofascial Pain with Extracorporeal Shock Waves***N. Stakes¹, N. Boden², C. Schmitz³¹Singapore, SG, ²Global Physical Medicine Services, Kuala Lumpur, MY, ³Ludwig-Maximilians-University of Munich, Munich, DE

Background: Extracorporeal shock wave therapy (ESWT) has become one of the most important treatment modalities for trigger points and myofascial pain syndrome. A comprehensive understanding of the molecular and cellular mechanisms of shock waves on muscles seems useful to the optimal use of this treatment method. It was therefore the purpose of this study to identify the molecular and cellular mechanisms of ESWT on muscles and fasciae reported in the literature. **Material and Methods:** A systematic review of the literature was performed studying the mechanism of action of ESWT on muscle trigger points and fasciae. **Results:** Extensive research activities during the last years have revealed at least five different, synergistic mechanisms of shock waves on muscles: (i) Mechanical loosening effect - this mechanism may explain the immediate relaxation of overly contracted muscles during ESWT. (ii) Activation of C pain fibres in the muscle - this basic mechanism of shock waves on the musculoskeletal system not only leads to a rapid pain relief, but inhibits a key mechanism in the pathophysiology of trigger points. (iii) Activation of gene expression of lubricin - this mechanism leads to an improved lubricity of fasciae and explains in par-

ticular the long-term effects of ESWT on the muscle. (iv) Increased blood flow - this effect directly kicks in during ESWT (triggered by the mechanical impact of shock waves on the muscle, but also by the activation of C pain fibres), but remains after repeated ESWT over the long term (mediated by the formation of new capillaries in the tissue). (v) Activation of muscle stem cells - this mechanism can be used successfully especially at the elite athletes level in the treatment of muscle fibre and muscle bundle cracks. **Conclusion:** ESWT acts on the muscle via a whole bunch of molecular and cellular mechanisms of action. No other treatment modality for muscles with a comparable unique and highly effective combination of working mechanisms is known.

PB1002

The Effect of Treadmill Exercise on Denervation Induced Muscle Atrophy in Aged Rat

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Introduction: Exercise has been reported to reduce denervation induced atrophy of skeletal muscle in young rats. However, the effect of exercise on denervated muscle atrophy in aged rat has not been well known. The purpose of this study is to investigate the effect of treadmill exercise on denervation induced muscle atrophy in aged rat. **Methods:** Aged male Sprague-Dawley rats (22 months) were randomly assigned to normal control (NC, n=7), denervation exercise (DC, n=8), denervation control (DC, n=8). Partial denervation was performed by temporary compression of right sciatic nerve. Treadmill resistance exercises were given for two weeks after rest for two weeks after injury. At four weeks muscle wet weight (MWW) ratio, myosin heavy chain (MHC) isoform from muscle homogenate and single muscle fibers and the expression of atrogene (Muscle RING Finger-1 (MuRF1)) and calpain-3 were measured in gastrocnemius and soleus muscle. Fiber cross sectional area (FCSA) were measured in gastrocnemius muscles. **Results:** In denervation groups, MWW ratio of and FCSA were significantly smaller than in NC and those were no significantly differences between DC and DE. In gastrocnemius, MHC types I and IIx isoforms in denervation were significantly higher than NC and no differences were found between DC and DE. Hybrid fiber (IIx/IIb) was higher in DE and another hybrid fiber (IIx/I) was higher in DC. In soleus, there were no differences of MHC isoforms among all groups. Calpain-3 in gastrocnemius and soleus was not significantly different among all groups. MuRF-1 in gastrocnemius was significantly higher in DC than NC and showed decreased tendency in DE without no difference with DC. MuRF-1 in soleus was higher in DC and lower in DE. **Conclusions:** In aged rats with atrophied skeletal muscle caused by partial denervation, treadmill resistance exercise induced down-regulation of MuRF-1 with small features of muscle plasticity but failed to make significant morphologic changes. We suppose that treadmill exercise after partial denervation in aged rats can attenuate the degradation of muscle protein on the molecular level under the surface at 4 weeks after injury. Further studies with longer training duration are necessary to identify gross changes following treadmill exercise in denervated old rats.

PB1003

Pulsed Electromagnetic Fields Inhibit Bone Loss in Ovariectomized Rats through Modulating MicroRNA-21

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Introduction/Background: Pulsed electromagnetic fields (PEMFs) have been shown to alleviate ovariectomy-induced osteoporosis.

However, the precise mechanisms accounting for these favorable effects are unclear. Evidences have shown that MicroRNA-21 modulates osteoblast differentiation. The purpose of this study was to investigate whether PEMFs inhibit bone loss in ovariectomized rats through modulating MicroRNA-21. **Material and Methods:** Thirty 3-month old female Sprague-Dawley rats were randomly divided into three groups (n=10): sham-operated control (Sham), ovariectomy (OVX), and ovariectomy with PEMFs treatment (PEMFs). One week following ovariectomy surgery, rats in the PEMFs group were exposed to PEMFs for 40 minutes/day, 5 days/week, for 12 weeks. The stimulus parameters of PEMFs were as follows: field frequency of 8Hz, intensity of magnetism of 3.8 mT. Bone mineral density (BMD), bone microarchitecture, bone strength and MicroRNA-21 expression were determined by Dual x-ray absorptiometry, micro-computed tomography, biomechanical examination and qRT-PCR, respectively. **Results:** After 12-week PEMFs intervention, BMD of the femur (P<0.05) and the fifth lumbar vertebral body (P<0.05) also increased in the PEMFs group. PEMFs improved trabecular bone volume ratio (P<0.01), trabecular width (P<0.05), and trabecular number (P<0.01); and reduced trabecular separation (P<0.01) compared with the OVX group. PEMFs increased maximum load (P<0.01) and energy to failure (P<0.05) in the fifth lumbar vertebral body. PEMFs increased MicroRNA-21 expression in ovariectomized rats. **Conclusions:** Pulsed electromagnetic fields can prevent ovariectomy-induced bone loss and deterioration of bone microarchitecture and strength, at least partly, through modulating MicroRNA-21 expression. However the direct target genes of MicroRNA-21 need be further investigated.

PB1004

The Effect of Excitability of Ventral Horn Motor Neurons after BTXA Treatment

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Objective: To observe the effect of excitability of ventral horn motor neurons after treatment of BTXA, and learn more about the mechanism of management of spasticity after BTXA injection. **Methods:** Establish model of spinal cord injury, randomly divided into two groups of 10 and 40, respectively. Randomly choose 10 rats after 3 weeks of spinal cord injury, take soleus BTXA injection (saline injection into right leg gastrocnemius, BTXA injection into leg gastrocnemius), test H reflex after 3 days, 7 days, 14 days and 21 days. another 40 rats take fifth toes muscle BTXA injection (saline injection into leg fifth toes muscle, BTXA injection into leg fifth toes muscle), test H reflex after 3 days, 7 days, 14 days and 21 days. Then detection the gastrocnemius muscle acetylcholinesterase **Result:** There are have no affect in H/M of fifth toes muscle, neither BTXA injected in gastrocnemius nor fifth toes muscle, P>0.05. **Conclusion:** The experiments show that after BTXA treatment in local muscle has no affect in hyperexcitability of anterior horn motor neurons on spinal cord injury rates. **Keywords:** H-reflex spasm spinal cord injury BTXA.

PB1005

Beneficial Effects of Pelvis Lifting at Supine Position on Diaphragm Mobility and Respiration Pattern

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Introduction/Background: Malfunction in respiration like increased respiration rate and overloaded breathing muscles might be related to worsening of diaphragm function due to the faulty posture as observed in many patients with respiration disorder. Our preliminary experiments apparently showed that respiration was improved when

pelvis was lifted up. This study is aimed to understand the mechanism of beneficial effects of pelvis-lifted posture on the easiness of respiration by assessing the diaphragm position and respiration pattern. **Material and Methods:** Subjects were 11 healthy men (24.9±23 yo). They were laid at supine position, using redcord® (redcord, Norway), hip and knee joints were flexed at 90° (rest posture; Rest) and then the pelvis was lifted as posterior superior iliac spine was away from bed by 3 cm (Pelvis-lifted posture, PL). Diaphragm position and respiration pattern were compared between those two postures. Using ultrasonography by transverse scanning at subcostal arch along right midclavicular line (HI VISION Preirus, Hitachi Medical, Japan), diaphragm position and excursion from expiratory to inspiratory states were measured. Using exhaled gas analyzer (AE-300S, Minato, Japan), tidal volume (TV), respiration rate (RR), minute ventilatory volume (MV), oxygen uptake (VO₂), expiration time (Te) and inspiration time (Ti) were measured. Respiration easiness was assessed by visual analog scale (VAS). Statistical analysis: paired *t*-test. **Results:** Diaphragm was placed more cranially and diaphragm excursion was greater at PL than Rest ($p<0.05$). Values of TV, Te and Ti were bigger at PL than Rest ($p<0.01$). RR was smaller at PL than Rest ($p<0.01$). MV and VO₂ were not significantly different between two postures. VAS was higher at PL than Rest ($p<0.01$). **Conclusion:** When pelvis is lifted at supine position, pelvis tilted backwardly and is placed relatively higher than chest. Then, visceral organs may move cranially to push diaphragm also cranially, presumably leading to support abdominal muscle contractility, then, finally bringing about the easiness of expiration. Improvement in expiration may provide the easiness of entire respiration as indicated the increase in TV, Te and Ti or the decrease in RR. Positioning of PL may be clinically useful for the intervention in respiration disorder.

PB1006

Restriction of Thoracic Motility Induced by Lateral Deviation of Upper and Lower Thorax

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Introduction/Background: Most people have lateral difference in thoracic shape. Here we investigate the relation of the thoracic lateral deviation to thoracic motion, considering how the lateral deviation affects the respiration. **Material and Methods:** Subjects were 9 healthy men, 27.7±3.9 yo. Resting expiration, maximum inspiration and expiration states were taken for following measurements. Using 3-D analysis system (QM-3000, Topcon, Japan), left and right halves of the planer horizontal area at upper or lower thoraxes and were estimated to deduce lateral difference and motility of the thorax. The motility of middle level of thorax was estimated using the measure tape and the substernal angle was measured using goniometer for lower thoracic motility. Expansion and shrinkage rates of thorax were estimated using values of maximum inspiration and expiration states. **Statistics:** paired *t*-test or Pearson's correlation coefficient. **Results:** At resting expiration state, the planer area of the left half was bigger in the left half than the right half of upper thorax, but smaller in the left than the right of lower thorax ($p<0.01$). These increased lateral area differences in upper and lower thoraxes were negatively correlated with the reduced motility of whole thorax ($r=-0.69 \sim -0.74$). Increased lateral difference in lower thorax generally had negative correlation with expansion rates ($r=-0.60 \sim -0.73$) and positive correlation with shrinkage rate ($r=0.62 \sim 0.73$) in upper, middle and lower levels of thorax, suggesting the decreased thoracic motility at increased lateral difference in lower thorax. Increased lateral difference in upper thorax correlated negatively with expansion rate ($r=-0.61$ and -0.75) and positively with shrinkage rate ($r=0.76$ and 0.70) at thorax middle and lower levels, respectively, suggesting the restriction in middle-lower thoracic motility due to the increased lateral difference in upper thorax. **Conclusion:** The increased lateral difference in thorax mostly restricted the thoracic motility, i.e., the

respiration. Even partial increase in lateral difference either upper or lower thorax induced restriction of thorax partly or generally. Although restriction of thoracic motility might be dependent on altered function in associated muscles and ribs, understanding the relation between lateral difference and thoracic motility provides an insight into the clinical intervention for respiratory disorder.

PB1007

Characteristic Lateral Changes in Upper Thoracic Shape and Sitting Ground Reaction Pressure Associated with Lateral Neck Bending

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Introduction/Background: Thoracic shape is intimately associated with the movement of neck as well as other parts of the body. Flexion and extension of the neck has been investigated in relation to vertebra function. Here we investigate effects of lateral neck bending on the thoracic shape and ground reaction force with special attention to the thoracic horizontal plane, and found lateral bending affects upper body function in a side dependent manner. **Material and Methods:** Subjects were 9 healthy men, 27.1±3.3 years old. Using VICON MX 3D-motion analysis system (Vicon Motion Systems), changes in thoracic shape (occipitofrontal circumferences) upon cervical lateral bending were measured with 8 makers on spinous processes at the same level of the frontal plane of upper thorax, and concomitantly lateral sitting pressure was measured using a ground reaction meter (Zebri). Subjects were at sitting posture, and bended the neck left or right maximally without affection by body trunk, scapular arch and upper extremities. Statistical analyses with paired *t*-test using SPSS18J (IBM) with $p<0.05$. **Results:** Lateral circumference of upper thorax and lateral ground reaction pressure were changed with some relation among cervical positions of resting, leftward and rightward bending of the neck. Both circumference and ground reaction pressure were bigger in the left part than the right one at resting. The lateral difference was increased or decreased by bending neck leftwards or rightwards, respectively. **Conclusion:** Lateral difference, bigger in the left than the right, in the thorax circumference and ground reaction force may be represented by the leftward deviation of upper thorax associated with the backward rotation of the left rib and forward rotation of the right rib. Leftward neck bending may potentiate the left deviation of the center of trunk mass, and, inversely, rightward neck bending attenuates the trunk deviation, leading to the laterally neutral state of the upper thorax. Neck lateral bending is appeared to affect the shape change of upper trunk, and vice versa. Neck region is a common original part of stress by soring muscle or trauma, so that the coordination between neck and thoracic movements may be better to consider in the interventions.

PB1008

Relation Between Deviation of Trunk and Rectus Abdominis Muscle Thickness and Respiratory Function

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Introduction: Background Bilateral asymmetry of rectus abdominis muscle (RA) or body trunk may affect the respiration. The severe asymmetry is often observed in patients with respiratory dysfunction. Here we investigate the relation of asymmetry of RA (muscle thickness) or body trunk (lateral area) to respiratory function by

changing the body trunk position at supine posture to find a better intervention for breathing problem. **Materials and Methods:** Subjects were 12 healthy men (27.7±4.5 yo), laid at supine posture between two beds side by side. Sliding beds along trunk axis made three states of bilateral asymmetry, resting without sliding, increased asymmetry and neutralized even symmetry. Bilateral asymmetry was measured by estimating left and right areas of back surface of the trunk divided by the trunk axis using ImageJ. Thickness of RA, center of the 3rd muscle compartment, was measured using ultrasonograph (Hitachi, Japan). Respiratory function at resting and forced breathing was measured using gas analyzer (TM, MV and RR; Minato, Japan) and spirometer (VC, FVC, and PEFR; Minato). Data were analyzed by paired *t*-test or multiple comparison using SPSSver18J. Approved by the Ethnic Committee of Bunkyo Gakuin University. **Results:** At rest, body trunk was asymmetrically deviated to the left ($P<0.01$). At forced breathing, RA thickness was smaller in the left than the right at the increased asymmetric state ($P<0.05$), but not at the neutralized state. TV and RR, but not MV, in respiration were reduced in the increased asymmetric state compared with the neutralized state ($P<0.05$). VC, FVC, and PEFR were smaller in the increased asymmetric state than the neutralized ($P<0.05$). **Conclusion:** Results suggest that increasing in the left deviation of the trunk, though inherently deviated at rest, reduces the RA thickness, leading to the reduction in expiratory function, since RA may affect respiration due to the insertion to ribs as affecting the costal arch angles. While, at neutral trunk position, RA thickness becomes bilaterally even and respiratory function is improved, compared to asymmetric trunk states. Thus, the intervention to bring the trunk to bilaterally neutralized state may be an effective strategy for treatments of pulmonary dysfunction.

PB1009

Urinary Tract Infection Prevalence and Management on Phoenix Centre (Trauma and Neurological Rehabilitation Unit)

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Introduction: To perform a baseline review of prevalence of urinary tract infection UTI and the management of patients admitted to Phoenix centre (Trauma and Neuro-rehabilitation unit). To compare the result with national standard management such as NICE and Royal college of Physicians guidelines to improve the quality of care on Phoenix rehabilitation unit. **Methods:** Retrospective study of last 30 discharged patients. Patients discharged from Phoenix centre for rehabilitation from April, 2014 to September, 2014. The collecting Data was anonymised on paper proformas and collated in an Excel Spread sheet. Audit was conducted over a Three week period. Total number of patient 30 (15 male and 15 female patients). Patients categorised by sex, age, admission diagnosis (example neurology, trauma or other) if they had UTI. **Results:** Patients with UTI were categorised by sex, age, diagnosis, organism responsible, treatment given and urology referral due to repeated UTIs. 50% (15 out of 30) patients had UTI. Out of 15 patients, 10 were male (67%) and 5 were female (33%). Age distribution: UTI was most common in the following age groups.

71-80 years	51-60 years	41-50 years	81-90 years	20-30 years	Less than 20 years
27%	20%	13%	13%	7%	7%

Patient type: Majority of UTI patients had neurological conditions (54%), 33% had Trauma and 13% had other conditions.

Organism responsible

E.coli	Enterococcus	Coliforms	Coagulase negative staphylococcus aureus
35%	35%	18%	12%

Management plan majority were treated with Nitrofurantoin (40%). 33% were treated with Trimethoprim and the rest were treated with

Cefalexin according to Trust antibiotic guidelines. Urology referral only 2 out of 15 patients were referred to Urology for repeated UTI. They were started on prophylactic dose of antibiotics after urology review. **Conclusions:** Comparison was done with the NICE guidelines on treatment of UTI in adults. All patients were managed according to NICE guidelines. Recommendations continue to follow the Trust guidelines and NICE guidelines to improve quality of care. Refer all patients for urological investigation if symptoms of upper urinary tract infection, fail to respond to appropriate antibiotic treatment and have recurrent UTIs. **References:** <http://cks.nice.org.uk/urinary-tract-infection-lower-men#!topicsummary>, <http://cks.nice.org.uk/urinary-tract-infection-lower-women#!topicsummary>, <http://rcpjournals.org/content/11/1/80.full>, <http://bsac.org.ukx>.

PB1010

Development of a Finger Joint Extension Orthosis for Integrated Volitional Control Electrical Stimulation of Upper Extremity of Stroke Patients with Hemiplegia

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Background: Many patients tend not to use hemiplegic upper extremity because of its requirement of exquisite movement, which results in progression of its disuse. Therefore, it is important to increase its frequency of use and its momentum. From October 2010, the use of botulinum toxin type A in the treatment of upper and lower extremity spasticity has been approved in Japan. Since then, for the purpose of improvement of the function and ability in the upper extremity (U/E) with hemiplegia, combination therapy of botulinum toxin type A and integrated volitional control electrical stimulation (IVES) or therapeutic electrical stimulation (TES) has attracted attention. The muscle tonus of paralyzed U/E in acute stroke patients was flaccid and do not show respond to TES in some cases. It is often seen that paralyzed U/E has synergic movement in the wrist and fingers in patients with mild spasticity. Currently, we apply IVES to stroke patients in order to improve upper extremity function at an early stage. When the wrist's extensor muscles were stimulated by IVES, it is one of the problem that inaccurate electrode placement could cause tenodesis action. The electrode placement is difficult for patients who have no idea about medicine and anatomy. Consequently, it may increase the risk of intensifying spasticity in finger flexor muscles. **Objective:** We developed a dynamic splint which is easy to wear by patients themselves and enables simultaneous extension of wrist and finger joints during the application of IVES on wrist extensor muscles at self training. **Subject and Methods:** A male patient with hemiplegia for stroke whose MMT of paralyzed U/E was 1. Modified Ashworth Scale was following: wrist extension 1+, wrist flexion 1+, finger extension 1, finger flexion 1 We trained him how to put on/off the dynamic splint and operation of IVES system. **Results:** Simultaneous extension of wrist and finger joints without tenodesis action was enabled by the dynamic splint during IVES. After 7 days, the patient was able to wear the splint by himself. **Conclusion:** The dynamic splint which we developed controlled synergic movement, and the patients receive the electrical stimulation therapy more easily and correctly by oneself.

B.4. MISCELLANEOUS

PB1011

Lateral Differences in Rib Part-Latissimus Dorsi Thickness and Costovertebral Joint Stiffness

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Introduction/Background: We previously found that the thickness of the latissimus dorsi muscle (LD) at the rib part was greater in

the right than the left, suggesting the laterally dependent motion of the thorax. This study is aimed to clarify the structural and functional difference between movements of left and right ribs, thereby elucidating the role of costovertebral joint in rib movements. **Material and Methods:** Subjects were 11 healthy men (24.6±3.2 yo). Informed consent was obtained after explained the object of the present experiments. LD thickness near the 10th rib at resting expiratory state and prone position were measured on ultrasonography images using the ultrasonography system (HI VISION Preirus, Hitachi Medical, Japan). A wide probe was perpendicularly placed over ribs. Stiffness of costovertebral joints was estimated as the 10th rib deviation to inward and craniad directions, when forwardly and rotationally pressed the 10th rib by a hand-held dynamometer (micro FET2, Biometrics Europe, Netherland). Statistics: Wilcoxon signed-rank test and paired t-test for lateral differences in LD thickness and rib deviation, respectively. **Results:** Thicknesses of LDs at rib part were 7.5±1.0 and 6.2±1.1 mm in the right and left ($p<0.01$), indicating significantly greater thickness in the right LD. Inward deviations of the 10th rib when pressed were 1.6±1.0 and 2.3±1.5 mm in the right and left ($p=0.05$). Craniad deviations were 3.5±1.8 and 6.2±1.8 mm in the right and left ($p<0.01$). The inward-craniad vectorial deviations were 4.1±1.4 and 6.8±1.8 mm in the right and left ($p<0.01$). Results suggest that the 10th rib movement is smaller in the right than the left. **Conclusion:** The result shows that the stiffness of 10th costovertebral joints is greater in the right than the left rib. Since the origin of LD is the rib, the greater thickness of right LD may contribute the greater rigidity of the right rib, presumably leading to the greater stability in the movement of right rib than that of the left. Awareness of these lateral differences in rib movements might be a good reference for clinical intervention of thorax dysfunction.

PB1012

Improved Bladder Emptying in Chronic Spinal Cord-Injured Rats by Electrical Stimulation of Pudendal Afferents

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Introduction/Background: Electrical neuromodulations such as sacral anterior root neuromodulation have been successfully introduced to treat patients with SCI and voiding dysfunction. Despite its clinical efficacy, sacral neuromodulation is not widely accepted by such patients. Therefore, a more effective neuroprosthesis is required to restore bladder functions patients with SCI and voiding dysfunction. The present study aimed to determine the feasibility of electrical activation of the sensory branch of the pudendal nerve in improving voiding functions in rats with 6 weeks after spinal cord injury (SCI) and explore its underlying neuromodulatory mechanisms. **Material and Methods:** Two urodynamic measurements were used to assess the effects of electrical stimulation (ES) on bladder and urethral functions: simultaneous recordings of intravesical pressure (IVP) during continuous isotonic transvesical infusion (isotonic IVP) and external urethral sphincter-electromyography (EUS-EMG), and simultaneous recordings of transvesical pressure under isovolumetric conditions (isovolumetric IVP) and urethral perfusion pressure (UPP). **Results:** The results revealed abnormal cystometric measurements, including an increase in the volume threshold, contraction amplitude, and residual volume as well as decreased voided volume, which indicated voiding dysfunction in rats with 6 weeks after SCI. The voiding efficiency (VE) decreased to 13% after SCI, which increased to 22%-34% after applying pudendal afferent stimulation. In addition, pudendal stimulation significantly increased the EUS burst period, and the difference between the UPP and the high-frequency oscillation (HFO) baselines, and changed the time offset between the bladder and the EUS activities. These findings suggest that pudendal afferent stimulation improved the VE by prolonging the micturition interval, decreasing the urethral resistance, and recovering the de-

trusor-sphincter dysynergy during the voiding phase. **Conclusion:** This study demonstrates the feasibility of pudendal neuromodulation in rats with chronic SCI. These results could aid in developing an advanced neural prosthesis to restore bladder function in clinical settings.

PB1013

Effects of the Study on BMD and Bone-Related Hormones in the Postmenopausal Women with a Long-Term Shuttlecock Kicking Practice

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Introduction: To test the hypotheses that a long-term shuttlecock kicking (SCK) exercise changed the serum level of bone related hormones in the post-menopausal women so as to having an positive and better effects on BMD of them than those with a long-term walking (WAL) exercise. **Material and Method:** Sixty post-menopausal exercise women were selected through questionnaires and eligibility screening. 30 were experimental group with long-term shuttlecock kicking exercise and 30 for control group with long-term walking exercise. Bone mineral density (BMD) with dual energy X-ray scan and serum 25(OH)D, PTH, CT, and E2 proteins by ELISA were measured. SPSS statistical software was used for analyses the data. $P=0.05$ was set a statistic significant level. **Results:** The BMD of the orthotopic D-spine, bilateral femur neck, and whole body of the women in the SCK group were higher than those in the WAL group. The serum level of 25(OH) D, CT in the SCK group are higher than those in the WAL group. The serum PTH in the SCK group is lower than those in the WAL group. No change were found for serum E2 in both groups. The positive relationships were found between the BMD of the spine, bilateral femur neck, and whole body and serum 25(OH)D and CT. The relationship between the BMD of whole body and serum PTH was negative. **Conclusion:** A long-term shuttlecock kicking exercise protects post-menopause women from osteoporosis by way of changes of bone related hormones serum level, even better than walking exercise. **Optional:** [1] Finkelstein JS, Brockwell SE, et al. Bone mineral density changes during their enopause transition in a multiethnic cohort of women[J]. J Clin EndocrinolM etab, 2008, 93 (3):862-868. [2] Reginster JY, Collette J, et al. Role of biochemical markers of bone turnover as prognostic indicator of successful osteoporosis therapy [J]. Bone, 2008, 42: 831-835.

PB1014

Effect of Electrical Stimulation on Motor Cortex Excitability upon Muscle Release from Tonic Muscle Contraction

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Introduction: The timely onset of muscle relaxation following muscle contraction is an important aspect of motor control and is a common clinical therapeutic exercise for patients with pain and stroke. It is also necessary for various daily activities in healthy subjects that require muscle activity by central motor control, especially activities requiring precise temporal modulation and force output such as reaching. If the onset and release of a muscle contraction are delayed, grip force scaling during grip-and-lift tasks will be difficult or impossible. Therefore, such delays are important considerations in assessing clinical motor dysfunction for patients with stroke, Parkinson's disease, and dystonia. **Material and Methods:** Motor cortex excitability was investigated following the onset of

muscle relaxation from muscle contraction in a timely manner using motor-evoked potentials (MEPs). Furthermore, the effect of afferent input by neuromuscular electrical stimulation (NMES) during muscle contraction was also investigated. Two stimulus strengths were tested: 1.2 times the sensory threshold and 1.2 times the motor threshold (MT). Fifteen healthy individuals participated in the study. They were asked to constant wrist extension, and following an auditory "GO" signal, they were asked to release muscle contraction. MEPs were recorded from the flexor carpi radialis (FCR) and the extensor carpi radialis (ECR), and transcranial magnetic stimulation was applied during the tasks at three different time intervals (30, 60, and 90 ms) after the presentation of "GO" signals. **Results:** Motor cortex excitability was greater during voluntary relaxation in the ECR and FCR with high-intensity NMES, while the relaxation time was shorter. Each parameter showed significant changes between 30 ms and 60 ms. **Conclusion:** In this study, motor cortex excitability was investigated following the onset of muscle relaxation from muscle contraction in a timely manner, and the responses to an auditory stimulus in terms of MEPs were measured. Furthermore, the effect of afferent input by NMES during muscle contraction was also investigated. Our results suggest that the termination of muscle contraction mechanisms is a necessary trigger for transient facilitation by increasing motor cortex excitability preceding the onset of relaxation. High-intensity NMES could serve as this transient trigger for prime mover muscles.

PB1015

Kinematic Analysis of Tongue and Hyoid Bone in the Oropharyngeal Phase of Swallowing Using Videofluoroscopy

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Introduction: We examined the motion of the tongue and hyoid bone in the oropharyngeal phase of swallowing, with attention to the "squeeze back" movement of the tongue against the palate. **Methods:** Videofluoroscopy was performed in lateral projection while 13 healthy participants (mean age 22 years) ate 6g pieces of banana, cookie and tofu. We evaluated the motion of 4 measuring points during swallowing: the anterior tongue marker (ATM) glued on the tip of tongue, the posterior tongue marker (PTM) glued on the dorsum of tongue, the jaw and the hyoid bone. Subsequently we measured the temporal order of motion of each measuring point and evaluated the elevation of tongue markers in relation to motion of the hyoid bone. **Results:** The ATM and hyoid bone started moving upward almost simultaneously at the time of mouth closing at the beginning of swallow. The PTM started moving upward immediately afterwards. The ATM contacted the palate before the PTM. The hyoid bone started moving forward just after the PTM contacted the palate. The ATM and PTM kept contact with the palate until the hyoid bone reached its maximum upward and forward positions. The elevation of the PTM was more highly correlated with the hyoid bone moving upward ($r=0.27$; $P<0.05$) than forward. The duration of the PTM-palate contact were correlated with the duration of the hyoid forward movement ($r=0.47$; $P<0.01$). **Conclusion:** There was a significant time lag between the times that the ATM and PTM contacted the palate. This sequential tongue-palate contact created the 'squeeze back' propulsive mechanism of the tongue. As the hyoid moving upward was correlated with the elevation of the PTM during this period, this movement had a temporal relation with the squeeze back movement. Immediately after the PTM contacted the palate, the hyoid bone started moving forward, signaling onset of the transition from oral to pharyngeal phase of swallow. This means that the hyoid moving forward had a relation with the phase of pharyngeal swallow. The tongue-palate contact continued after the hyoid bone reached its maximum upward and forward positions. This tongue elevation maintained would make the swallow pressure strengthened during the pharyngeal phase.

PB1016

Effects of Left or Right Pendular Motion of Upper Extremities on the Stability of Body Trunk and Lower Extremities

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Introduction/Background: Our preliminary experiments revealed that lateral deviation of the thorax was promoted by the left shoulder flexion, but was diminished by the right shoulder flexion. Specifically, pendular movements (PM) of upper extremities might have the laterally different role in stabilizing posture at walking. This study was aimed to understand the manner of lateral difference in the left and right PM of upper extremities by measuring trunk movements and center of pressure (COP). **Material and Methods:** Subjects with informed consent were 14 healthy men (25.5±3.2 yo). Task was repetitive PM for upper extremities to swing in flexion-extension direction around shoulder joint at standing. Movements of thorax and pelvis (total traces of midpoint movements (TTM) and rotation angle with standard deviation (SD) variation) were measured using three-dimensional motion analysis system (ViconMX). COP was assessed using force platforms (AMTI). Obtained values were compared between left- and right-swings. **Results:** COP at the standing position was deviated 3.9±8.7 mm leftward from the center. Left and right swings of upper extremities shifted COP to 7.9±16.9 and 1.5±10.2 mm left from the center, respectively. Pelvic rotation angle was greater in the left swing (3.7±1.0°) than the right (2.8±0.9°), $p<0.05$, and the SD variation was also greater in the left (1.0±0.3) than the right (0.6±0.2), $p<0.01$. TTM of thorax center was longer in the left swing (161.5±24.4 mm) than the right (146.5±11.3 mm), $p<0.05$. Those of pelvic center was also longer in the left swing (132.8±51.6 mm) than the right (106.6±16.6 mm), $p<0.01$. **Conclusion:** Results suggest that the left swing apparently increases the load to the left foot, presumably leading to the increased bearing of the left lower extremity, but to the decreased movement of the left foot with compensation of increased movements of thorax and pelvis. But the right swing inversely decreases the load to the left, leading to the reduced bearing of the left foot. Thus, results apparently indicate that lateral PM of upper extremities has a balancing effect on the loading to the lower extremities with compensation of trunk movements, thereby providing a smooth walking.

PB1017

Segmental Movements between Cervical Rotation and Lateral Thoracic Shape Change: the Manner of Increased or Decreased Deviation in Thoracic Shape upon Cervical Rotation

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Introduction/Background: Thoracic shape is affected by movements of other parts like upper extremities. Here we investigated the cervical rotation-induced changes in the thoracic shape with a special view of lateral difference of thorax and segmental movements between cervical and thoracic components, leading to the understandings of lateral difference of body trunk. **Material and Methods:** Subjects were 9 healthy men, 27.1±3.4 years old. Using 3-D analysis system (QM-3000, Topcon, Japan), the planar horizontal area at upper thorax (3rd limb level) or lower thorax (xiphoid level) and the position of the thoracic vertebra were estimated at 3 cervical spine postures of resting, rightward and leftward rotated positions.

The thorax planar area was divided into left and right. Measured values for cervical spine rotated leftward or rightward were obtained as the deviation from values at the resting cervical spine position. Statistical analysis with Wilcoxon signed-rank test with $p < 0.05$, using SPSS18J (IBM). **Results:** The planar area of the left half was bigger than that of the right half at upper levels of thorax. When the cervical spine was rotated the difference between left and right areas were decreased in the leftward rotation and increased in the rightward rotation. The position of thoracic vertebra deviated left upon rightward rotation and right upon leftward rotation of the cervical spine significantly. **Conclusion:** Changes in the difference between left and right thorax area may be dependent on the rotation angles of the rib. The rightward rotation of the cervical spine increased difference in the planar area, presumably due to the increased forward and backward rotations of right and left ribs, respectively. In contrast, the decreased difference in the planar area upon leftward rotation may bring about the symmetrical alignment of left and right ribs. On the other hand, the inverse movements of thoracic vertebra against the rotation direction of the cervical spine suggests that the segmental movement of the thorax against the cervical rotation controls the load of head mass. This segmental coordination between cervical and thoracic movements observed in the healthy subjects may be a worth factor for intervention in patient treatments.

PB1018

Preliminary Investigation of Association between VII R353Q Genotype and Premature Birth and Chinese Cerebral Palsy Children

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Objective: To Preliminary investigation of association between VII R353Q genotype and premature birth and Chinese cerebral palsy children. To provide strong basis for CP early prevention, early diagnosis, early treatment. **Methods:** The design method is the case control study. The subjects were divided into four groups (A1, A2, B1, B2) according to the paired grouping method. Group A: CP children (n=160). A1: preterm children with CP (n=90, <37weeks); A2: full-term children with CP (n=70, ≥37weeks). Group B: healthy children (n=137). B1: preterm healthy children (n=70, <37weeks); B2: full-term healthy children (n=67, ≥37weeks). 2ml peripheral venous blood was collected from each children. PCR-RFLP was used to determine genotype and allele of R353Q of the eighth exon in FVII. Hardy-Weinberg equilibrium was used to check population balance, χ^2 test was used to analysis genotype and allele, and OR and 95%CI were used to estimate the strength of association between genotype and allele and the disease. **Results:** 1. The distributions of genotype of FVII R353Q in four group were all consistent with the Hardy-Weinberg equilibrium ($P > 0.05$). 2. The total distributions of genotype of FVII R353Q in preterm group and full-term group were statistically significant ($P = 0.005$), among which the RQ and QQ carriers had less likely to be premature ($P = 0.001$), OR=0.329; The differently distributions of R and Q alleles in preterm and full-term groups were statistically significant ($P = 0.005$). This prompted that Q allele may be the genetic protective factor to reduce preterm birth. 3. The relationship between RQ and QQ genotype and CP was not found through the comparison of the association between different genotypes and CP; there was no significant difference in R and Q alleles between CP groups and control groups ($P = 0.182$), and this may revealed that Q allele had nothing to do with CP. **Conclusions:** VII R353Q genotypewas associated with preterm birth and the Q allele was the genetic protective factor and had negative correlation with preterm birth. 2. VII R353Q genotype had no significant correlation with CP.

PB1019

Breast Cancer-Related Lymphoedema, 12 Years Later, after Fracture

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Case Diagnosis: Breast cancer-related lymphoedema is one of the main complications and most dreaded sequela of breast cancer and its therapies, and can have long-term physical and psychosocial consequences for patients. It consists of the accumulation of lymph in the interstitial spaces, principally in the subcutaneous fatty tissues, caused by a defect in the lymphatic system. **Case Description:** 69-year-old female patient diagnosed left breast cancer 12 years ago. She had modified radical mastectomy, chemotherapy, radiotherapy and 5 year hormonal therapy. She had left humeral shaft fracture after falling 12 years later the breast cancer operation. Her left arm has began to swell 10 days later after the humeral fracture operation. She had pain, discomfort and heaviness, difficulties with physical mobility due to lymphoedema. Body mass index was 43.72 kg/m². Stage 3 lymphoedema was detected in the left arm in examination. Upper extremity arterial-venous doppler ultrasonography was normal. Lymphedema was also detected in lymphoscintigraphy. Complete decongestive therapy including; skin care, manual lymph drainage, compression bandages, and exercise; was administered to the patient and treatment was achieved by reduction in circumferential measurements. **Discussion:** Although risk factors for lymphedema after breast cancer treatment are related primarily to the axillary dissection or radiation therapy, other risk factors may play a role in lymphedema development. Thus trauma due to fracture lead to lymphedema in our patient. **Conclusion:** Breast cancer related lymphoedema may rarely occur even years after the operation with the influence of various trigger factors. Therefore, patients should be informed comprehensively in terms of risk factors for lymphedema and preventive methods should be explained.

PB1020

Psychomotor Reactions and Hemodynamic Parameters Change of Men with Hearing Impairment

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Research aim was to evaluate psychomotor reactions and hemodynamic indices of sportmen and male persons with hearing impairment who did not go in for sport. **Research Methods:** There were 10 deaf national basketball team players in the searching group age 23.8±2.6. People with hearing impairment who do not go in for sport were 12 in a control group age 21.7±1.7. Research was made in Lithuanian sports university using analyser (DPA – 1) of human hands and legs movements dynamic parameters in the laboratory of movement control. **Research Results:** Complex reaction time of athletes was 0.22±0.06 ms and control group was 0.30±0.01 ms. Simple and complex reaction time in sportmen with hearing impairment and who do not go in for sport was statistically different ($p < 0.05$) only after physical strain. Having tested simple psychomotor time reaction in deaf since birth and those with the acquired hearing impairment before and after strain sample, it was found that there was no significant difference ($p > 0.05$), but the time of complex reaction in subjects with acquired hearing impairment before and after strain sample was quicker than in people deaf since birth. However, there was also no significant difference ($p > 0.05$). There was also no significant alteration in simple and complex reaction time and hemodynamic parameters (double product) in sportmen deaf since birth after 6 - minutes walking test. **Conclusion:** We recommended for young people with hearing impairment go in for sports if they want to improve their quality of life. **References:** 1) Bavelier, D., Dye, M. W. G., & Hauser, P. C. (2006). Do deaf individuals see better? *Trends in Cognitive Sciences*, 10, 512–518. 2) Gurkan, A. C. (2013) A comparative study of static and dynamic balance in hearing-impaired national basketball and taekwondo sportmen. *International Journal of Academic Research Part A*; 5(3),124-128. DOI: 10.7813/2075-4124.2013/5-3/A.17. 3) Hartman, E., Houwen, S., Visscher, S. (2011). Motor Skill Performance and Sports Participation in Deaf Elementary School Children. *Adapted Physical Activity Quarterly*, 28, 132–145.

PB1021

The Effects of Various Air-Filled Cushions and Sitting Posture Change in Spinal Cord Injured Patients

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Introduction: To investigate the effects of air mattress and sitting posture change on seat interface pressure in spinal cord injured patients and normal subjects. **Material and Methods:** Ten spinal cord injured patients and ten normal subjects were included. Peak pressure on seating area was measured in upright sitting posture on a wheelchair using CONFORMat® System (Tekscan, Boston, USA). We measured pressure in each conditions, without air cushion, with low-priced air-filled cushion, low-priced air-filled cushion covered with newspaper, 5cm and 10cm air-filled cushion (ROHO®). We also measured pressure in three kinds of sitting postural conditions, upright sitting posture, 20° posterior leaning posture, 20° trunk forward flexion posture in the condition of each air-filled cushions. All subjects went through body composition test. We used repeated measure ANOVA, Mann-Whitney test and Spearman correlation coefficient for statistical analysis. **Results:** In upright sitting position with no cushion, average of peak pressure on buttock were significant higher in spinal cord injured patient compared with normal subjects ($p < 0.05$). In upright sitting position, there were significant decrease in peak pressure on buttock after applying all kind of air-filled cushion except low-priced air-filled cushion covered with newspaper. The largest extent of peak pressure relief in upright sitting posture was leaded by 5cm air-filled cushion (ROHO®). But there was no statistical difference between the air-filled cushions. The extent of pressure relief in all kinds of air-filled cushions was higher in spinal cord injured patients compared with normal subjects. But there was statistically significant only in 5cm air-filled cushion (ROHO®). There was no statistical difference between three kinds of sitting posture. The peak pressure on buttock without cushion and skeletal muscle mass was strongly negatively correlated in normal subjects ($-1.0 < R < -0.7$, $P < 0.05$). **Conclusion:** In this study, we confirmed that peak pressure of spinal cord injured patients on buttock in sitting posture is much higher than normal persons. Air filled-cushion can reduce the peak pressure on buttock in sitting posture significantly regardless of kinds of cushion. Also, we could be aware that peak pressure on buttock in sitting posture is negatively correlated with skeletal muscle mass.

C.1. PHYSICAL AND REHABILITATION MEDICINE DIAGNOSTICS AS RELATED TO ORGAN SYSTEMS AND BODY FUNCTIONS

PC1022

Assessment of Cognitive Function in Arabic Speaking Population

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Introduction/Background: The Cognistat is a commonly used cognitive screening tool that has been developed to detect cognitive deficits among patients with neurological and psychiatric conditions. The Cognistat examines different major ability areas including level of language, construction, memory, calculations, and reasoning. The evaluation of consciousness, orientation and attention is also included in the Cognistat. Since the Arabic countries are considered behind in the field of adaptation/development of cognitive tools, the aim was to translate, culturally adapt and test the validity of the Cognistat from English to Arabic to be used with Arabic-speaking population. **Material/Methods:** The guideline for the cross-cultural adaptation process suggested by Guillemin et al. (1993) was followed. The stages of the Arabic cross-cultural

adaptation process included forward translation, translation synthesis, backward translation, expert committee review and pre-testing. Here we report the data of the pre-testing study in which 22 healthy Arabic speaking adults participated. Participants were tested using the Arabic Cognistat. **Results:** The mean scores of the Arabic Cognistat were compared to those of the original English Cognistat and were found to be similar to those of the English participants except for the calculation, memory and similarities subtests, although reaching a satisfactory level for their screening purpose. **Conclusion:** Data collected so far suggests that most adapted items produce similar responses from Arabic-speaking healthy adults as compared to English-speaking participants. The next step is to modify the items that do not produce similar results and engage into the validation data collection process with 75 to 100 healthy adults and 30 patients with stroke. It is anticipated that the Arabic Cognistat will be widely used in the Arabic speaking countries, allowing a very precise evaluation of stroke patients' cognitive deficits, but also opening up the road to the assessment of other categories of cognitive impairments. **Reference:** Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *Journal of clinical epidemiology*, 46(12), 1417-1432.

PC1023

Test-Retest Reliability of an Accelerometer-Based Short-Distance System in Measuring Spatiotemporal Gait Parameters in Healthy Subjects*C.-Y. Hsu¹, Y.-S. Tsai², C.-M. Wu¹, H.-H. Shie¹¹Ten-Chan General Hospital, Chung-Li, TW, ²Chung Yuan Christian University, Chung-Li, TW

Introduction: Objectively quantitative measurement of gait parameters is crucial to evaluate balance control, functional ability, and risk of falling in clinical setting. The aim of this study was to assess the test-retest reliability of an accelerometer-based short-distance system in measuring spatiotemporal gait parameters in healthy subjects. **Material and Methods:** Participants were 35 healthy adults without any systemic disease or previous surgery. A wearable wireless tri-axial accelerometer was worn centrally on the lower back between L2-L4. The sensor was operated using a remote control application on a laptop and a wireless connection. Two measurements of walking speed, step length, and cadence in a 5-meter length comfortable walk were done within 1-2 weeks. Test-retest reliability was determined by calculating the interclass correlation coefficient (ICC), standard error of measurement (SEM), and smallest detectable difference (SDD). **Results:** The test-retest reliability was good for walking speed (meter/second) {ICC, 0.77 (95% confidence interval 0.55-0.89); SEM, 17.4%; SDD, 48.2%}, fair-to-good for step length (centimeter) {ICC, 0.60 (95% confidence interval 0.20-0.80); SEM, 13.10; SDD, 36.31}, and poor for cadence (step/minute) {ICC, 0.35 (95% confidence interval -0.30-0.67); SEM, 8.78; SDD, 24.34}. **Conclusion:** Good reliability, small measurement error, and minimal clinical detectable change of the accelerometer-based short-distance system in measuring walking speed of healthy subjects suggests its possible future application in the clinical setting. Further modification of the device is needed to improve its reliability in measuring step length and cadence.

PC1024

Bifid Median Nerve in Carpal Tunnel Syndrome through Ultrasonographic Assessment

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Introduction/Background: The aim of this study was evaluation of bifid median nerve (BMN) in patients with carpal tunnel syn-

drome (CTS). **Material and Methods:** 113 wrists of 59 patients (50 female, 9 male) with a clinical diagnosis of CTS were evaluated by ultrasound (US) morphologically for a BMN presence in the elbow-palm segment. Also cross-sectional area (CSA) of all median nerves was measured at radio-ulnar junction. Electromyographic studies (EMG) were performed to all patients in addition to clinical evaluation including Boston Carpal Tunnel Questionnaire (BCTQ), visual analog scale (VAS). In accordance with EMG results, all wrists were categorized into 5 stages; minimal, mild, moderate, severe and extreme CTS. The frequency of BMN, relationships between CSA of median nerve (MN), clinical evaluation and severity of CTS were analyzed. **Results:** Mean age of population was 49.38 (range 21-72). BMN was observed in 7 of 113 wrists (6.2%). There was no significant difference in BMN frequency when analyzed according to CTS severity ($p>0.05$). There were 50 wrists with minimal CTS, 22 with mild CTS, 31 with moderate CTS, 10 with severe CTS and none with extreme CTS. Prevalence of BMN in CTS subgroups were 6.0% in minimum, 4.5% in mild, 6.5% moderate, 8.5% in severe CTS. No significant difference noted in CSA measurements between BMN and no BMN groups ($p>0.05$). Mean CSA value was 0.1386 cm² (min:0.09-max:0.20) in wrists with BMN and 0.1164 cm² (min:0.01-max:0.40) in wrists without BMN. There was no correlation of age, BCTQ or VAS scores with BMN presence ($p>0.05$). Severity of CTS was found correlated with older age, female gender, BCTQ and VAS scores ($p<0.05$). **Conclusion:** Prevalence of BMN was found 6.2% and presence of BMN was not correlated with CTS severity or CSA measurements. **References:** 1) Bayrak KI, Bifid median nerve in patients with carpal tunnel syndrome. *J Ultrasound Medicine* 2008;27:1129-36. 2) Granata G, Caliandro P, Pazzaglia C, Minciotti I, Russo G, Martinioli C, Padua L, Prevalence of bifid median nerve at wrist assessed through ultrasound. *Neurol Sci*. 2011 32:615–8.

PC1025

Functional Phenotype in Limb-Girdle Dystrophy LG-MD2d Type: Case

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The article describes the functional phenotype of a 12-year-old girl who was diagnosed with a limb-girdle muscular dystrophy LG-MD2D type, which is a sarcoglinopathy caused by a homozygous mutation in A sarcoglycan gene. The disease began at the age of 4 with a gait disturbance. Hip dysplasia was seen by diagnostic imaging that then required surgical correction, presenting injury of the left sciatic nerve. The patient required medical consultation at the age of 11 for frequent falls, difficulty climbing stairs, as well as manual skills difficulties such as managing keys, writing, and dysphagia for solids and liquids. The initial CPK was 381 U/dL and subsequent verification of 4260 u/dl. The Electromyography showed short- duration, small- amplitude motor units, with early filling pattern. NGS panel was performed to limb - girdle dystrophy where pathogenic variant homozygote SGCA: c.229C> T was identified in exon 3 of the gene SGCA which is a missense variant that has predicted leads to substitution of an arginine by a cysteine. These findings are consistent with the clinical diagnosis LGM-D2D. The measure of motor function (MFM) showed a total score of 80; lowest score in domain 1=56 limitation for standing and transfers such as inability to run and jump on one foot. In self care (PEDI)=69; limitations were found in activities like dressing, inability to putting on socks and buttoning his pants, unable to climb and down stairs. In quality of life (PODSI) the patient scored 79.55 for transfer and basic mobility, given by the restriction to wash her hands and face while standing. In sport and physical functioning the score was 84.03; which meant a deficiency in biking and walking 3 blocks. In the 6-minute walk test she had a total length of 308 meters, Up and Go test=10.25 seconds, test cubes box and left=64, right 52. An appropriate clinical approach was achieved based in the evolution of the patient, its correlation between the genotype of the disease, symptoms and functional measures.

PC1026

The Use of Morse Code Input Device in People with High-Level Spinal Cord Injuries

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Introduction: People with high-level spinal cord injuries (SCI) have limited access to computers. Our team developed a Morse code input device that patients can use mouth biting to generate sequence of short and long signals to transmit text information including English and Chinese. This paper described the use of Morse code input device in two SCI patients through interdisciplinary team approach. **Methods:** Two male patients with C5, C6, C7 incomplete injuries participated in this project. One was 3-month post injury, and the other was 27-year post injury with no computer experience. Occupational therapists evaluated their physical capabilities to determine the appropriate interface and positioning. Medical engineers enhanced the sensitivity of the device by adjusting the threshold of short and long signals according to the patient's ability. Special education teachers taught the patient how to use the device to operate the computer step-by-step. Assessments, including Canadian Occupational Performance Measure (COPM), Taiwan Version of Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST-T), and World Health Organization Quality of Life (WHOQOL-BREF), were used for goal setting and outcome evaluation. **Result:** The COPM indicated the patients' desire of using computer for leisure activities and social network. The results of QUEST-T showed that the patients felt moderately satisfied with the Morse code input device and our service. The WHOQOL-BREF showed the patients' enhanced quality of life, especially in the social relationship domain. **Conclusion:** The results support the use of Morse code input device to operate computer for patients with high-level SCI to enhance their participation in leisure and social activities. An interdisciplinary team approach is important to customize the device and service for the patient's need and interest. Future work should apply the Morse code input device to other populations with severe physical disabilities. **References:** Wu, C. M. (2004). Morse Code-Based Mouth Controlled Input Device with Fuzzy Recognition for the Severe Spinal Cord Injuries. Department of Electrical Engineering, National Cheng Kung University, doctoral dissertation.

PC1027

The Finite Element Analysis of Lumbar Traction: a Preliminary Study

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Introduction: The lumbar traction has been used for decades in treating low back pain. The physiological effects of traction include: stretch muscles and ligaments, enlarge the intervertebral space, and increase diameter of intervertebral foramen. Uptodate, there has been no biomechanical study of lumbar traction to determine the most efficacious magnitude, angle or duration of pull. Therefore, the purpose of this study is to investigate the biomechanical mechanism of lumbar traction by finite element analysis. **Material and Methods:** A three-dimensional finite element model of lumbar spine was reconstructed from CT images of a 39-year-old male without lumbar spine disorders. Finite element analysis softwares were used for simulation of lumbar traction. The radiographs of lateral view of lumbar spine during traction were taken as clinical validation. **Results:** The finite element simulation of lumbar traction revealed decrease of disc angle in L34, L45, L5S1 and increase of disc angle was noticed in L12 while minimal change was noticed in L23. The changes of angles were -3.92 de-

degrees (L5S1), -3.07 degrees (L45) and -2.27 degrees (L34). This analysis could be validated by X-ray image, which showed the changes of angle were -3.1 degrees (L5S1), -2.4 degrees (L45) and -1.5 degrees (L34) respectively. In the other simulation, decreasing of anterior disc height was noticed in L34 (-0.66 mm), L45 (-0.87 mm) and L5S1 (-1.22 mm), and increasing of posterior disc height was noticed in L34 (0.51 mm), L45 (0.8 mm) and L5S1 (0.96 mm). This analysis could be validated by X-ray image, which showed decreasing anterior height in L34 (-0.55 mm), L45 (-0.8 mm) and L5S1 (-0.9 mm) and increasing posterior height of L34 (1.25mm), L45(1.3 mm) and L5S1 (1.85 mm). **Conclusion:** According to our results, changes of disc angle and increases of disc space during lumbar traction were noticed by finite element analysis. The same results could be validated by lumbar spine X-ray image during traction. Therefore, our finite element model of lumbar spine could be used to analyze the effect of lumbar traction. Further studies could be conducted with this model to understand the biomechanical effect of lumbar traction in different magnitude, angle or duration of pull.

PC1028

The Effect of Cardiac Rehabilitation in Patients after Coronary Artery Bypass Graft Surgery on Heart Rate Variability

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Introduction: A reduced heart rate variability (HRV), one of the indices of the cardiac autonomic regulation, has been repeatedly observed in patients after coronary artery bypass graft surgery (CABG). This reduction is associated with a higher risk for new cardiac events. Therefore, methods leading to an increase in cardiac autonomic modulation are studied. Cardiac rehabilitation was, for this reason, repeatedly used to increase HRV in patients with coronary artery disease. The aim of this study was to assess the effect of cardiac rehabilitation on indices of HRV in patients after CABG. **Material and Methods:** Thirty patients after CABG (mean age 63.1±7.1 years; 21 men and 9 women) entered the study. All belonged to NYHA Class II. A predominantly exercise-based cardiac rehabilitation program lasting for 4 weeks was performed in a medical spa. Heart rate variability was assessed in the time domain (the mean R-R interval, in msec, and MSSD – mean squared successive differences between R-R intervals, in msec²), and in the frequency domain. In the latter one the spectral analysis of heart rate variability (SAHRV) was performed in an orthoclinostatic test („supine-standing-supine test“), in which every body position lasted for about 5 minutes. The power spectra of the low-frequency (LF) and high-frequency (HF) bands and the total power (TP) spectrum (in msec²) were used for the assessment. Baseline and final values (after 4 weeks of cardiac rehabilitation) of the SAHRV indices were statistically compared. **Results:** A statistically significant increase for the index MSSD (p=0.04), for the mean R-R interval (p=0.006) and for the spectral power of the HF band (p=0.03) was observed at the end of cardiac rehabilitation. All these results reflect an increase in cardiac vagal activity. **Conclusion:** An increase in vagal cardiac activity was observed after cardiac rehabilitation lasting 4 weeks. The short-term recordings of the SAHRV in an orthoclinostatic test can help in the clinical practice to assess the effect of therapy on autonomic modulation. The assessment of HRV can help differentiate between patients with or without positive effects of the exercise rehabilitation program on cardiac autonomic regulation.

PC1029

Walking Performance and Cortical Activity while Turning in Young Healthy Adults

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Introduction: Turning is an important functional ambulation task in our daily living. Neural modulation mechanism of turning is still unclear. Central neural system modulates the gait, especially when conducting complex tasks. Many lines of evidence suggested that premotor cortex, prefrontal cortex and supplementary area have increased activation while walking. The purpose of this study is to explore the change of gait performance and cortical activity between straight walking and circuit turning in healthy young adults. **Methods:** Ten healthy young adults were recruited in the present study. All participants had to perform two tasks, including straight walking and clockwise circuit turning, with comfortable walking speed and the fastest speed. Brain activation was measured during performing each task using functional near-infrared spectroscopy to monitor the hemodynamic response over premotor area, prefrontal area and supplementary motor area. Gait parameters including speed and cadence were also collected. Data were analyzed with SPSS 19.0 software. Pair *t*-test was used to analyze independent variables. A *p* value of less than 0.05 was considered to indicate statistical significance. **Results:** Our results showed that both walking speed (p=0.019) and cadence (p=0.014) decreased significantly during turning when compared with those during straight walking in the fastest speed condition. In the comfortable speed condition, oxygenated hemoglobin over right prefrontal cortex and right premotor cortex increased at the beginning of straight walking, in the contrast, decreased at the beginning of circuit turning. In the fastest speed condition, oxygenated hemoglobin over both right and left premotor cortex decreased at the beginning of straight walking and increased at the beginning of circuit turning. However, there were no differences for oxygenated hemoglobin over supplementary area between straight walking and circuit turning. **Conclusion:** The present study demonstrated a different walking performance and cortical activity during turning when compared with straight walking especially in the fastest speed condition among young healthy adults.

PC1030

Posture Control Capability Analysis during Pregnancy

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Background: Previous studies using a stabilometer to examine changes in the balance ability during pregnancy have reported that sway in quiet standing increases during the third trimester. The purpose of this study was to quantify the change in posture control at the postural limit between the second and third trimesters. **Materials and Methods:** Participants were 13 healthy pregnant women (mean age, 31±3.6 years; mean height, 157.8±4.1 cm; mean weight, 56.4±3.9 kg; mean gestational week, 27±1 week). A stabilometer was used to measure postural stability. The women were asked to remain in a quiet standing position in which both feet were placed 100 mm apart on the stabilometer. After maintaining the quiet standing, the participants were instructed to move their weight as much as possible forward, backward, right, and left, and to maintain each position for 10 seconds. The center of gravity trajectory at each position was extracted from 10 seconds of data once the woman's motion subsided at the new position. These five tasks were repeated three times. Each of these analysis parameters were measured in the posture rectangular area for 10 seconds at each position using the index of postural stability (IPS). Measurements were conducted in the second and third trimesters to determine the changes between these two time points. The Wilcoxon signed-rank test was used to analyze the parameter changes from the second to the third trimester (P<0.05). **Results:** In regard to the rectangular area at each position, the forward rectangular area significantly increased in the third tri-

mester (second, $119.35 \pm 66.87 \text{ mm}^2$, third, $150.12 \pm 105.27 \text{ mm}^2$; $P=0.46$). IPS significantly decreased in the third trimester (second, 2.08 ± 0.17 , third, 2.02 ± 0.18 ; $P=0.007$). There was no significant difference in the rectangular area at each position except the forward position. Conclusions: Previous studies have reported that the toe muscles are important for maintaining stability when leaning forward. The present results suggest that posture control capability is decreased in the third trimester. Therefore, it is recommended that toe gripping force training be provided as an intervention for the expansion of the postural limit of the forward position during pregnancy.

PC1031

Can the Carpal Compression Test Determine Severity of Carpal Tunnel Syndrome?

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Introduction/Background: The carpal compression test yields high sensitivity and specificity for the diagnosis of carpal tunnel syndrome (CTS). However, its correlation with severity has not been thoroughly investigated. This study explored the carpal compression test by attempting to find pressure and time needed to distinguish between severe CTS and milder CTS. **Material and Methods:** Subjects with clinical CTS were confirmed and graded their severity by nerve conduction study; they were allocated into two groups as severe CTS and milder CTS (mild and moderate CTS). A digital algometer was used to applied constant pressure at 2 and 3 newtons per square-centimeter (N/cm^2) over carpal tunnel area until the patients report numbness or paresthesia at median nerve distribution. The cut-off times for positive tests were set at 15, 30, and 45 seconds; Fisher's exact test was used to assess severity difference between the groups with positive and negative tests for each of the cut-off times. **Results:** Thirty-six hands of 20 patients with clinical CTS were confirmed by electrodiagnosis; there were 16 severe CTS and 20 milder CTS. For the carpal compression test at 2 N/cm^2 , there were no significant differences between severe CTS and milder CTS when using 15 and 30 seconds as the cut-off times. For the carpal compression test at 3 N/cm^2 , no statistical differences were found for any cut-off times. Only significant difference ($p < 0.05$) was found for the carpal compression test at 2 N/cm^2 using 45 seconds as cut-off time with trends of positive results towards milder CTS (the tests were positive in 10 severe CTS versus 19 milder CTS). **Conclusion:** The carpal compression test applying pressure at 2 N/cm^2 can distinguish between severe CTS and milder CTS when use cut-off time at 45 seconds. Subjects with severe CTS were less likely to have positive tests.

PC1032

Thoracoabdominal Dynamics with Mechanical Insufflation-Exsufflation on Healthy Subjects as Evaluated with Optoelectronic Plethysmography

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Introduction: To mobilize rib cage and to clear airway properly is very important goals for most patients in pulmonary rehabilitation. Mechanical insufflation-exsufflation (MI-E) is a useful device for these purposes in patients with respiratory muscle weakness. This study was planned to know the thoracoabdominal dynamics when MI-E was applied, and to obtain basic data for application for patients with neuromuscular weakness. **Material and Methods:** Twenty healthy males were participated as volunteers. The subjects were laid supine on the bed and 45 reflective markers were

attached on the chest and abdominal wall. Optoelectronic plethysmography was performed with 5 infrared cameras placed around the subject. First, the subjects were asked to breathe deeply to obtain vital capacity (VC). Then, they were asked to be relaxed and not to breathe voluntarily, MI-E was applied through face mask with the insufflation and exsufflation pressure of $\pm 20 \text{ cm H}_2\text{O}$, $\pm 30 \text{ cm H}_2\text{O}$, $\pm 40 \text{ cm H}_2\text{O}$ and $\pm 50 \text{ cm H}_2\text{O}$. The optoelectronic data were collected with 100 Hz resolution and analyzed for calculating the change of the volume of upper and lower parts of chest and abdomen. To identify the respiratory pattern of each procedure, the slope which is the change of the volume of upper thorax divided by that of abdomen was calculated (slope $\Delta\text{UT}/\Delta\text{AB}$). This study was approved institutional review board and written informed consent was obtained from each subject. **Results:** The mean age of the subjects was 31.0 years, and the mean height was 171.4 cm, the mean weight was 66.8 kg. The total thoracoabdominal volume change by MI-E with $\pm 30 \text{ cm H}_2\text{O}$, $\pm 40 \text{ cm H}_2\text{O}$ and $\pm 50 \text{ cm H}_2\text{O}$ exceeded that of VC. The slope $\Delta\text{UT}/\Delta\text{AB}$ of VC was higher than that of MI-E at all insufflation/exsufflation pressure. **Conclusion:** The MI-E expands effectively the chest and abdominal wall even in healthy subjects when the pressure of $\pm 30 \text{ cm H}_2\text{O}$ and more is applied. The abdominal expansion contributes for increase in the volume change more than chest expansion.

PC1033

Developing a Test to Quantify Dysmetria

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Introduction: To assess dysmetria, neurological examinations such as finger to nose test or finger to finger test are usually performed clinically. These examinations can be used to evaluate the existence and degree of dysmetria but they cannot quantify the severity and detect minor changes during disease course. To quantify dysmetria, Notermans measured the distance from the tip of the nose to the tip of the finger tested using a transparent plastic panel. Lee quantified dysmetria with digitizer. Digitizing method can evaluate the whole course of movement, it is time-consuming and need to use digitize r^2 . So in clinical purpose more handy tool is needed to quantify dysmetria. **Material and Methods:** So a test was developed to measure dysmetria with PC and touchscreen. In this test, a point is appeared on the center, right, left, upper, lower part of the screen serially and the subjects point the target on the screen. The distance from the target to the touching point is calculated automatically. Six subject who had dysmetria due to cerebellar of brain stem stroke performed finger to nose test and classified them by clinical severity. They also performed Purdue test, and this pointing test. **Results:** The mean distance measured in this pointing test was $3.4 \pm 3.6 \text{ cm}$ and the mean Purdue score of each side was 2.2 ± 4.6 . The Kendall rank correlation coefficient between the clinical severity of dysmetria and pointing test was 0.71 and that between the Purdue test side score and pointing test was 0.69. **Conclusion:** The test result of this pointing test showed good correlation with clinical tests to evaluate dysmetria and measure the severity of dysmetria. So this test could be a useful and convenient tool to quantify dysmetria. **References:** 1) Measuring ataxia: quantification based on the standard neurological examination. Notermans NC, van Dijk GW, van der Graaf Y, van Gijn J, Wokke JH. J Neurol Neurosurg Psychiatry. 1994 Jan; 57(1): 22-6. 2) A study on implementation of evaluation system of ataxia using a touchscreen. Lee W, Hwang j, Lee K, Kim I. Lecture Notes in Computer Science. 2001 Oct; 2105:411-26.

PC1034

Analyzing Extrasystolic Frequency in Osteoarthritic Patients Undergoing Physiotherapy

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Introduction: Research is scarce regarding the effects of physiotherapy on patients with associated arrhythmias, conduction defects or ischaemic heart disease. The purpose of the present study is to evaluate whether physiotherapy is a valid influence in inducing extrasystolic arrhythmia in patients without cardiac pathology, as well as in those with known arrhythmias, conduction defects or ischaemic heart disease. **Materials and Methods:** The present study is analytical, experimental, transversal comparing the data of two paired groups. A total of 46 patients with degenerative osteoarthritis and indication for physiotherapy have been included. Each patient has been clinically evaluated and monitored by Holter ECG in 2 separate days, one of which without physiotherapy (day 1), the other undergoing physiotherapy (day 2). Any increased physical activity had been excluded, no change in medication had been allowed for the whole duration of the study. Statistical analysis has been performed using SPSS. The distribution normality of the data has been tested using Shapiro-Wilk test. The Wilcoxon Paired Signed-Rank test has been used to verify whether there is a statistically significant change between the recorded data of the two days. Physiotherapy modalities included electrotherapy, heat therapy, exercise and massage therapy. **Results:** There was no significant increase in total extrasystolic count from day 1 (median=55) to day 2 (median=41) (Wilcoxon Signed-rank test: $p=0.40 >0.05$). Neither was there any significant increase in ventricular extrasystoles from day 1 (median=3) to day 2 (median=3.5) (Wilcoxon Signed-rank test: $p=0.97 >0.05$), nor in supraventricular extrasystoles from day 1 (median=36) to day 2 (median=29.5) (Wilcoxon Signed-rank test: $p=0.64 >0.05$). **Conclusion:** The current research shows no significant difference in extrasystolic count between measurements in 24 hours with physiotherapy and 24 hours without physiotherapy, regardless of the presence or absence of associated arrhythmias, conduction defects or ischaemic heart disease. The present analysis suggests a need for further research, in order to potentially reevaluate the general cardiac contraindications for physiotherapy.

PC1035

Application of Computer-Assisted Neutral Zero Method of the Shoulder Joint in Vojta Therapy

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Introduction: The neutral zero method (Neutral-Null-Methode, NNM) provides a standardized and well known assessment test to evaluate the range of motion. We conducted motion recordings of patients before and after Vojta treatment, automatically evaluating the range of motion using NNM. Our goal was to estimate the short-term effects of the rehabilitation based on digitally measured shoulder angles. **Materials and Methods:** The patients (n=13, 4 women) were instructed to perform the exercises for abduction, flexion, extension, pronation, and supination in a standing position while facing the recording device (Microsoft Kinect). Both arms should be moved simultaneously in a slow speed until the threshold of pain. The observing therapist paid attention to the proper execution of the exercises concerning body posture, speed, and evasive or compensatory movement. A recording system consisting of a Microsoft Kinect Sensor, a mid-class laptop computer and our specifically designed software ensured the consistent order of the exercises and calculated the values for mobility at the shoulders. The recordings were conducted directly before and after a Vojta treatment and were accompanied by a survey of the health condition (anamnesis). **Results:** In this field study we show the suitability of a 3D recording system for motion measurements according to the NNM procedure and have developed our own measurement protocol. This protocol comprises about 5 minutes per measurement, and reports the

maximum shoulder angles. In addition it provides to the therapist accurate insights into the spatial and temporal progression of the exercise execution. Even when compensatory spinal movement occurs our software calculates shoulder mobility robustly. **Conclusion:** Compared to the orthopedic NNM we measured the patients' movement contact-free, without a goniometer, and continuously based on documented motion data. Due to the simple but precise and fast analysis method, our procedure seems very promising for a wider use in practice. It is sensitive to the assessment of motion involving compensatory movements and accurate at quantitative (angular) measurements. Furthermore it uses a threshold corridor to detect deviations from the zero-level and evasive movements, thus ensuring objective, consistent measurements for further analysis and comparison of the treatment progress.

PC1036

Limits of Agreement (Bland-Altman Method) between Direct and Indirect Sonographic Methods of the Median Nerve Measurements in Carpal Tunnel Syndrome

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Introduction/Background: Neuromuscular ultrasound has emerged as a non-invasive and useful tool for the diagnosis of peripheral nerve disorders, such as median nerve in Carpal Tunnel Syndrome (CTS), on a routine basis. One of the diagnostic criteria is based on an increase in the median nerve cross-sectional area (CSA), using direct or indirect sonographic method. Previous studies showed that the two methods had significant correlation. However, this is not evidence that the two methods of measurements agree. This is the first study to analyse agreement of the two methods. The purpose of this study is to assess the level of agreement between direct and indirect sonographic methods to measure the median nerve CSA in clinically suspected CTS. **Material and Methods:** Seventeen consecutive wrists with clinically suspected CTS, that fulfilled the inclusion criteria in between July to September 2014, were chosen for this study. One wrist was excluded due to the presence of bifid median nerve. The sonographic measurements were performed by a single physiatrist, trained in neuromusculoskeletal ultrasound. CSA of the median nerve were measured using 2 methods: direct or tracing method, and indirect method using ellipsoid formula. A Bland-Altman assessment for agreement was used to compare the two methods. A range of agreement was defined as mean bias \pm 2 SD. **Results:** Mean of sixteen median nerve CSA was $15.68 \pm 3.45 \text{ mm}^2$ with direct method, and $14.30 \pm 2.41 \text{ mm}^2$ with indirect method. The Bland-Altman plot showed that the mean difference between the two methods was 1.4 mm^2 , with 95% limits of agreement range from -3.77 to 6.53. The difference between methods tend to get larger as the average increases. **Conclusions:** The Bland-Altman analysis indicates that poor agreement exists between the two methods of sonographic measurement of median nerve CSA in clinically suspected CTS. There is level of disagreement that includes clinically important discrepancies of up to 6.5 mm^2 .

PC1037

Self Limitation by Pain with EFL-Test According to Isernhagen

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The safe execution of motions sequence and handling of loads including the extent of the activation from auxiliary musculature observed by particularly trained therapists are the crucial parameters of the performance review according to Isernhagen. The subjectively perceived pain remains opposite subordinate in the

performance evaluation. It always comes back nevertheless in the routine everyday life to the self limitation of the evaluated person. During the retrospective evaluation of 310 EFL reports of the Orthopaedic Rehabilitation Center Bad Pyrmont of the German Pension Insurance Braunschweig-Hanover the perform readiness 79%, the subject of the study was judged as reliable and in 7% of cases as unreliable. Self limitations by pain stepped reliably with 17% of the cases on. With 81% the readiness to perform of the men was better than those of the women with 67%. The consistencies of the test results were good with 77% of the cases. The dismissal took place in 100% of all cases able to work for the general job market. With 67 and/or 90% of descriptive reliable test procedures there were clearly deviating only in two cases therapist readiness estimates. Self limitation by pain must be considered with EFL-Test. The consistent application of the given inconsistency parameters is necessary to identify negatively distorted results. The founded training of the EFL therapists and regular application of the Test lead to higher inter-individual conformity of the reports.

PC1038

Rehabilitation Effect in Heart Failure Patients Listed for Heart Transplant

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Introduction: It is known that physical inactivity in heart failure (HF) patients is associated with peripheral muscles atrophy, venous thrombosis, working capacity decrease and HF severity growth. Recent evidence indicates the importance and positive impact of adequate physical training on HF patients. However despite international guidelines training rehabilitation programmes are still not a routine in HF departments, and the effect and safety of physical training in terminal HF patients are almost unknown. The aim of this study was to assess effect and safety of physical training in HF patients listed for heart transplant. **Materials and Methods:** The study investigated 19 terminal HF patients placed on the heart transplant waiting list (89% males), age range from 26 to 61 years, left ventricular ejection fraction 16.5±2.6%. Affective disorders, fatigue, quality of life were assessed using Hospital Anxiety and Depression Scale, Fatigue Scale, 10-score Visual Analogue (VAS) and 10-score Borg's scale. Physical tolerance was investigated with the help of cardiopulmonary stress-test (CPT) and 6-minute walk (6MW). All patients participated in long-term (2-12 months) everyday interval training (using treadmill, cycle and elliptical trainer). The duration of training session was adequate to patient's individual working capacity and subjective condition and ranged from 6 to 60 minutes. **Results:** The long-term training programme was safe and lead to benefit in peakVO₂: data increased from baseline 6.3±5.4 ml/kg/min to 15.1±2 ml/kg/min (p<0.02). Maximal walking speed increased from 1.6±0.7 km/hour to 4.1±1.5 km/hour (p<0.01). According to Borg's scale dyspnoea score while CPT decreased from 10±2 (at baseline) to 5±2 at the end of the training programme. At baseline 6MW distance was very low (105±52m), the training programme helped to increase it up to 350±130 m (p<0.01). According to VAS quality of life modified positively from 5±0.3 at baseline to 6.2±0.4 at the end of the training period. **Conclusions:** long-term trainer-based programme is safe and beneficial in terminal HF patients placed on the heart transplant waiting list: it demonstrates working capacity increase and quality of life improvement.

PC1039

Measurement of the Uniaxial Mechanical Properties of the Elastic Tape

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Background: Kinesio tape is one type of the elastic tape with least movement restriction and has been widely used in multiple clinical settings during recent years. In 1976, Kenzo Kase invented the kinesio tape and posed the definition of tape tension which is a percentage calculated by the available stretch over the maximum available stretch. Based on the different tension of taping, Kenzo Kase had proposed diversely physiological effects such as correcting joint mal-alignment while using high tension taping technique and increasing blood and lymphatic circulation, supporting muscle movement while using low tension taping technique. According to those principle, the tension of taping is one of the most critical factors in the clinical practice. However, the mechanical properties of the kinesio tape is not measured and defined distinctly. The purpose of this study was to quantify the elastic recoil of kinesio taping using stress-strain concept and compare with the definition raised by Kenzo Kase. **Materials and Method:** The kinesio taping (KT-X-050, Tokyo, Japan) was cut into 10x5, 15x5 and 20x5 square centimeters as the specimens and subjected to the tensile test for 3 times per size. The same experimenter conducted the tensile test via the computer servo control material testing system (HT9102, Taichung, Taiwan), sampling rate is 1,000 Hz with a 25 cm/min fixed pull speed. The samples are fixed by two jaws with rough surface of the material testing machine to avoid slippery. The true stress-strain definition was used to do the stress-strain analysis to retrieve the elastic modulus, maximum stress and maximum strain data. **Results:** The stress-strain curve of kinesio tape with different size showed that the maximum stress is correlate with the length of kinesio tape positively. The modulus of kinesio taping is 27MPa. **Conclusion:** The maximum stress and maximum strain of kinesio tape is in direct proportion to the tape length and the elastic module is relative small to the skin tissue module.

PC1040

Mediolateral Knee Acceleration is Highly Correlated to Tibiofemoral Adduction Angle during the Stance Phase of Gait

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Introduction/Background: Arthro-kinematic alterations in the frontal plane of the tibiofemoral joint often are associated with knee pathologies. For example, an abrupt lateral thrust during the early stance phase of gait is commonly observed in individuals with medial knee osteoarthritis that is usually linked to excessive tibiofemoral adduction. Using 3D accelerometry may help to assess the arthro-kinematic behaviors of the tibiofemoral joint during functional activities. However, the relationships between knee acceleration and arthro-kinematic behaviors were still not clear. The purpose of this study was to correlate mediolateral knee acceleration with the frontal-plane arthro-kinematic behaviors of the tibiofemoral joint. **Material and Methods:** 14 young adults (mean age: 22.8±1.6) were recruited for this study. Two 3D accelerometers were attached to the lateral femoral epicondyle and lateral tibial condyle to collect mediolateral acceleration data of the femur and tibia while the subjects walked barefoot at self-selected speeds. In addition, reflective markers were attached to bony landmarks according to the Plug-in Gait module of the VICON motion analysis system. The knee arthro-kinematic parameters collected with the VICON system included adduction angle, angular velocity and angular acceleration of the tibiofemoral joint. **Results:** Mediolateral acceleration difference of tibia and femur as measured by 3D accelerometry was correlated highly to tibiofemoral adduction angle (r=0.829) and moderately to angular velocity and angular acceleration (r=0.503 and r=0.530, respectively) as measured by the VICON system during the stance phase of gait. **Conclusion:** Mediolateral acceleration difference of the tibia and femur as measured by 3D accelerometry is correlated to frontal plane arthro-kinematic behaviors of the tibiofemoral joint. The results indicates 3D ac-

celerometry may serve as a simple and valid tool to detect frontal plane arthro-kinematic behaviors of the tibiofemoral joint.

PC1041

Effect of Biomechanical Foot Orthosis on Children with Flatfoot

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Objective: To investigate the effect of biomechanical foot orthosis (BFO) on children with flatfoot using clinical and radiologic parameters. **Methods:** This study is a retrospective chart review of 35 children (male: 25, female: 10) with flatfoot who were applied with BFO. We measured the patients' resting calcaneal stance position angle (RCSPA) on physical examination and calcaneal pitch (CP) and navicular height (NH) on lateral view of foot in standing radiograph, before and after BFO application. Paired *t*-test was performed to evaluate the effect of BFO. **Results:** Patient's age was 7.29 ± 2.93 years old. Average follow-up period was 21.00 ± 9.11 months. RCSPA of right and left feet before treatment were $-7.20 \pm 3.44^\circ$, $-8.66 \pm 3.83^\circ$, respectively. Post-treatment RCSPA were $-3.83 \pm 2.96^\circ$, $-4.66 \pm 2.79^\circ$ respectively. CP and NH of right and left feet before treatment were $11.23 \pm 4.51^\circ$, $10.72 \pm 4.01^\circ$ and 13.33 ± 4.46 mm, 12.71 ± 4.4 mm, respectively. Post-treatment CP and NH were $13.50 \pm 5.68^\circ$, $13.09 \pm 4.99^\circ$ and 15.84 ± 5.25 mm, 15.07 ± 5.3 mm, respectively. There were significant improvement in RCSPA, CP and NH after the BFO application compared with before the BFO application ($P < 0.05$). **Conclusion:** This study suggest that BFO would be an effective treatment method for children with flatfoot.

PC1042

Imaging of Denervated Muscle Using 18F-FDG PET Scan: Glucose Hypermetabolism in Muscle Denervation

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Background: Recently, increased 18F-FDG uptake in the denervated muscle was reported incidentally (1). This study aimed to confirm glucose hypermetabolism in denervated muscle and to investigate the feasibility of 18F-FDG-PET scan for the detection of muscle denervation. **Material and Methods:** A sciatic neuropathy model in rats was created by nerve resection of the left sciatic nerve and sham operation on the other side. Eight days after denervation, micro PET/CT scans of the hindlimbs were acquired. Muscle denervation was confirmed by electrophysiologic and histologic study. **Results:** We calculated the maximum lesion-to-normal counts ratio (LNRmax), defined as the maximal count of lower leg muscle compartment ROIs (Regions of interest) divided by the average of mean count of both upper thigh ROIs. All rats showed increased 18F-FDG uptake in the muscles of the left (denervated) lower legs. The calculated maximum lesion-to-normal counts ratio (LNRmax) of the left lower leg anterolateral (left, 11.02 ± 2.08 ; right, 1.81 ± 0.40 , $n=6$, $p < 0.01$) and posterior (left, 9.81 ± 4.58 ; right, 1.87 ± 0.44 , $n=6$, $p < 0.01$) compartment were significantly increased. The electrophysiologic and histologic study verified muscle denervation. **Conclusion:** Glucose hypermetabolism in muscle denervation is an peculiar phenomenon. 18F-FDG PET scanning can be used to visualize muscle denervation. **Reference:** Behera D, Jacobs KE, Behera S, Rosenberg J, Biswal S. 18F-FDG PET/MRI can be used to identify injured peripheral nerves in a model of neuropathic pain. *J Nucl Med.* 2011; 52: 1308-1312.

PC1043

Clinical Characteristics of Central Cervical Spinal Cord Injury in Early Stage and Outcome of Medical Rehabilitation

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Cervical cord injured 636 patients of the national spinal cord injury database were classified into 3 groups, which were upper limbs paralysis predominance (U) type, lower limbs paralysis predominance (L) type, and the balanced type by 5 point difference subtraction of the upper motor scores from the lower motor scores. We defined that U type is the central cervical cord injury. U type was 24% of all cases of cervical cord injury, 33% of incomplete quadriplegia and 35% of invisible cervical injury. Age distribution of L type was two peaks which were 20 and 50 years old. On the other hand, U type was the one peak of 50 years old. The most numerous of the functional level was C4 in U type, and C6 in L type. In U type, C and D of the impairment scale was about 50 to 50 percent. The percentage of the fall and the fall on the ground of U type was 60% higher than 40% of L type. The functional improvement of U type was good compared with L type and the final ADL of U type was a high score compared with L type in all the items of motor FIM, the average of five items was correction independence. Care was still required at 30% of U type even at the time of the final assessment. Aftermath of U type was good compared with L type, and 20% was return to work, 60% was return to home, and 20% was moving to another hospital.

PC1044

To Observe the Effect of Individualized Exercise on Cardiac Autonomic Nerve Function

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Background: To explore the effect of exercise therapy based on the implementation of individualized exercise prescription on cardiac autonomic function. **Material and Methods:** Including 30 cases of coronary heart disease, hypertension, diabetes patients combined with cardiac autonomic neuropathy diagnosed by cardiovascular reflex tests (CRT, in our cardiopulmonary rehabilitation department and implemented exercise therapy, developed individualized exercise prescription, regular treatment for 4 weeks. Before and after each exercise, implementing CRT, including orthostatic test (in this study, denoted CRT1) and orthostatic hypotension test (in this study, denoted CRT2), calculated the scores. **Results:** CRT1+CRT2 (in this study, denoted the sum of CRT1 and CRT2), CRT1, CRT2 scores after exercise were lower than before, the difference was statistically significant ($t = 4.73, 4.10, 2.60, P < 0.01$). CRT2 scores before exercise was lower than CRT1 scores before exercise, the difference was statistically significant ($t = 15.15, P < 0.01$). Used the CRT1's/CRT2's difference before and after exercise to react the degree of parasympathetic/sympathetic function's improvement, we found that the difference of CRT2 was lower than the difference of CRT1, it was statistically significant ($t = 2.42, P < 0.05$). **Conclusion:** 1) Exercise therapy based on individualized exercise prescription have immediate effect on cardiac autonomic neuropathy; 2) Exercise rehabilitation on the improvement of the parasympathetic nerve function is superior to the improvement of sympathetic nerve function. **References:** 1) Rolim LC, Chacra AR, Dib SA. Diabetic Cardiovascular Autonomic Neuropathy: Risk Factors, Clinical Impact and Early Diagnosis [J]. *Clinical Update.* 2008, 90(4): e23-e31. 2) American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription [M] 6th Ed. Philadelphia: Lippincott Williams & Wilkins, 2000:145-147. 3) Cabezas-Cerrato J, Gonzalez-Quintela A, Perez-Rodriguez M, et al. Combination of cardiorespiratory reflex parameters and heart rate variability power spectrum analysis for early diagnosis of diabetic cardiac autonomic neuropathy [J]. *Diabetes Metab.* 2009 35:305-311.

PC1045

Evaluation of Elasticity of Biceps Brachii Muscles of Stroke Patients with Spasticity by Ultrasound Shear Wave Imaging

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Introduction: Spasticity is an important complication in stroke patients, which interferes with motor function and quality of life. However, there is no objective tool for evaluation of spasticity. This study aimed to measure biceps brachii muscle elasticity in the normal and stroke population with ultrasound shear wave velocity (SWV) imaging. **Material and Methods:** Healthy population and stroke patients with unilateral hemiplegia were recruited. SWV of biceps brachii muscle was measured in elbow flexion 90° and full extension. Surface electromyography was used to confirm there was no voluntary contraction. The results was expressed as the mean±standard deviation values. **Results:** In 21 healthy volunteers, biceps brachii muscle SWV on the left and right side in elbow full extension were 2.91±0.27 m/s and 3.00±0.18 m/s, respectively; SWV in elbow flexion 90° were 1.85±0.21m/s and 1.87±0.32 m/s, respectively. There are no significant differences between gender and bilateral elbows, but the SWV was higher in elbow flexion 0° than in elbow flexion 90° ($p<0.001$). In 31 stroke patients, biceps brachii muscle SWV on the spastic and sound side in elbow full extension were 3.43±0.76 m/s and 0.98±0.24 m/s, respectively; SWV in elbow flexion 90° were 2.33±0.66 m/s and 1.91±0.44 m/s, respectively. The SWV was higher on the spastic side than on the sound side ($p<0.05$), and it was also higher in elbow flexion 0° than in elbow flexion 90° ($p<0.001$). **Conclusion:** Spastic biceps brachii muscles were stiffer than normal biceps brachii muscles in stroke patients.

PC1046

Validation of Kinect™, AHRS Compared to Optical Motion Capture System for Measurement of Cervical Motion

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Introduction: Cervical range of motion (ROM) was conventionally measured using goniometer or cervical range of motion device (CROM). Although these conventional methods are accurate enough for measuring static state, continuous monitoring during dynamic motion is impossible. Here we compare three interfaces, optical motion capture (MC) system, attitude and heading reference system (AHRS), and Microsoft Kinect™, for continuous measurement of cervical ROM. **Material and Methods:** Fifteen healthy adult subjects without neck pain or limitation of cervical motions were recruited. Optical markers and AHRS sensors were attached to them. Subjects were placed in a room equipped with optical motion capture cameras and Microsoft Kinect. Subjects were seated in front of Microsoft Kinect and instructed to perform independent movements, axial rotation followed by flexion/extension and lateral bending, each repeated five times to their maximum range while being measured simultaneously by optical MC system, AHRS, and Microsoft Kinect. Setting optical MC system as the gold standard, validity was assessed by calculating intraclass correlation coefficient (ICC) of the absolute agreement for the two-way mixed model between MC and AHRS, MC and Kinect. Reliability of AHRS, Kinect was determined using 95% limit of agreement (LoA) with MC. **Result:** AHRS showed excellent ($ICC>0.9$), and Kinect™ showed good agreement ($ICC>0.8$) with optical MC system for measuring cervical motion. 95% LoA of difference between MC and AHRS for flexion was <10 degrees for all range of flexion. 95% LoA of difference of maximal range of motion measured by MC and AHRS was <10 degrees for all movements. **Conclusion:** These results illustrate the feasibility of the AHRS, Microsoft Kinect for monitoring cervical ROM. Although somewhat imprecise, these systems are ubiquitous, easily applicable device with minimal contact and relatively low cost compared to optical motion capture system and can be used as methods for monitoring various diseases and activities continuously in everyday practice.

PC1047

Validation of a Wearable Wireless Upper Limb Sensor Network System for Quantitative Evaluation of Upper Limb Function

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Introduction/Background: We developed a wearable wireless upper limb sensor network system for quantitative evaluation of upper limb function. We validated this system by comparing it with a motion capture system (VICON system) for measuring the motion variations of hand during task-specific training in rehabilitation and the active flexion and extension of the elbow joint. **Material and Methods:** The wearable wireless system consists of four inertial sensing modules. Each inertial sensing module is composed of an accelerometer, a gyroscope, a magnetometer, and a radio-frequency module. The VICON motion capture system composed of six cameras was utilized to provide reference measurements for the comparison with the wearable system during validity trials. Ten healthy subjects (6 males and 4 females, mean age of 25.4±4.7 years, mean height of 166.6±7.2 cm, and mean body mass of 68.2±18.6 kg) and one patient with stroke (age of 48, height of 182 cm, and body mass of 72 kg) joined the trial. The wearable system was mounted on the chest, upper arm, forearm, and the dorsal hand of participants. They were instructed to execute the drinking task and the active flexion and extension of elbow, which were measured by the system and VICON motion capture system simultaneously. The root mean square (RMS) errors were calculated to obtain the differences between the measurements by the system and VICON motion capture system. **Results:** Our wearable wireless system showed good validity. The RMS errors are 3.85±1.50 degrees for the right hand during drinking task, 2.55±1.16 degrees for flexion of right elbow, 3.24±1.40 degrees for right elbow extension, 3.61±1.64 degrees for the left hand during drinking task, 2.62±1.42 degrees for flexion of left elbow, and 2.21±0.57 degrees for left elbow extension for the healthy subjects. For the stroke patient, the RMS errors are 2.94 and 8.66 degrees for affected and unaffected hand during drinking tasks. **Conclusion:** The wearable wireless system shows good concurrent validity as compared to the VICON motion capture system in the measurement of the motion variations of hand and the active elbow joint motions for the healthy subjects and patient with stroke.

PC1048

Reliability of Quantitative Ultrasound Evaluation of the Suprahyoid Muscles

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Introduction/Background: The suprahyoid muscles play an important role in swallowing, therefore, it is clinically important to assess the condition of these muscles. Recently, it has been reported that the submental muscles can be investigated using ultrasonography, which is suitable for assessing dysphagia patients because it is noninvasive and can be used at the bedside. However, previously reported ultrasonography methods had low reliability and have not been standardized for clinical use. This study aimed to develop a quantitative method and standard setting for evaluating the suprahyoid muscles using ultrasonography. **Material and Methods:** Ten healthy volunteers participated in this study. Each participant was seated on a chair with a pillow for fixation of the neck and head. In a single sonogram, each participant's hyoid bone, mandible and geniohyoid muscle were imaged using a 3.5 MHz ultrasound probe placed submentally in the midsagittal plane. Each participant was ordered to swallow 3 ml jelly during which a tester recorded moving images of muscle contraction. The length (mm), thickness (mm) and contraction ratio (%) of the geniohyoid muscle and speed (mm/sec) of the hyoid bone displacement during

swallowing measured and calculated from the recorded ultrasound image. As an evaluation of the intra-rater reliability, the procedure was repeated on the same participant 2 days later. **Results:** The mean length of the muscle was 40.71 ± 4.55 mm, the mean thickness of the muscle was 7.50 ± 1.26 mm, and the mean contraction ratio of the muscle was $26.40 \pm 7.49\%$. The mean speed of the hyoid bone displacement was 47.71 ± 15.85 mm/sec. The intra-rater reliability was 0.90 for the length of the muscle, 0.98 for the thickness of the muscle, 0.88 for the contraction ratio of the muscle and 0.96 for the speed of hyoid bone movement. **Conclusion:** This is the first study to test the reproducibility of the ultrasound evaluation of the suprahyoid muscle during swallow using a test-retest method. The present results indicate that the parameters of this hyoid bone movement method have high reliability and are suitable for clinical application.

PC1049

Platform Cobs Associated Neuromuscular Electrical Stimulation in the Rehabilitation of Children with Cerebral Palsy

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Background: The platform Cobs Biofeedback is an informative response equipment and training that can be used in early diagnosis, prevention assessment and rehabilitation of balance disorders. Balance problems in children with cerebral palsy are common, caused by muscle imbalance between agonists and antagonists. Neuro-muscular electrical stimulation in these children can be of great help in muscle strengthening. **Objective:** To evaluate the therapeutic efficacy of Cobs Platform associated neuromuscular electrical stimulation in the balance of cerebral palsy patients treated at the "Julio Díaz" Hospital. **Material and Method:** A longitudinal, prospective and applied for during the period from February to December explanatory study 2013. The universe consisted of all patients admitted to the pediatric rehabilitation with a diagnosis of cerebral palsy was made. The sample consisted of 45 patients, aged between 5 and 12 years of age, classified in levels I, II, III of the gross motor function classification system, which studies a control group and two groups using the random method simple. The rehabilitation program was used according to the protocol for the service for the control group and patients in the study groups were added to the training program Cobs platform and NMES on the tibialis anterior for the group I and NMES single with rehabilitation program for the group II. GMFCS and Ashworth Spasticity were applied static equilibrium besides the Cobs platform assessed at baseline and at the end. **Results:** 100% of the subjects showed alterations in some of the measured parameters, the variables most affected were the load and the symmetry index which improved in 15% and 20% respectively. Prevailed for the female groups with 62% and the age group of 7-8 years with 38% overall. **Conclusions:** The high sensitivity of the Biofeedback Cobs platform is demonstrated as a tool for the diagnosis of balance disorders in children with spastic cerebral palsy and its therapeutic efficacy associated with electrical stimuli in training them in a comprehensive rehabilitation program.

PC1050

Evaluation for the Recovery of Walking Capacity Using Acceleration Time-Series Data Analysis: a Pilot Case Study

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Introduction/Background: Acceleration time-series data are highly reproducible with high intra-rater reliability and useful to identify changes of gait dynamics by task-loads. The purpose of this study

was to investigate whether the acceleration time-series data analysis could detect the change with regard to the recovery of walking capacity in patient with subarachnoid hemorrhage. **Material and Methods:** Participant was a female (69 years old) 3 months post-subarachnoid hemorrhage, without cognitive disorders, mild lower extremity motor impairment and gait speed 0.74m/s. The participant received physical therapy and occupational therapy two hours a day for three weeks. Ten-meter walking test (10MWT) and Dynamic gait index (DGI) were performed to assess the walking capacity. Trunk acceleration was recorded during 10MWT using a tri-axial accelerometer attached to the L3 spinous process. Using the peak AP accelerations of the non-paralyzed side at heel contact, ten gait cycles were extracted from time-series data. Each gait cycle data was divided into seven 64-sample sections with 50% overlapped portions. Within each section, root mean square (RMS) and power spectrum entropy (PSEn) were calculated as parameters representing the magnitude of motion and smoothness of motion, respectively. **Results:** There were little differences between pre- and post-intervention with regard to time-distance parameters. Pre- and post intervention DGI scores were 14 and 19 points, respectively. Post-intervention RMS values in each axis were smaller than pre-intervention during heel-contact to terminal-stance phase of paralyzed leg. Post-intervention PSEn values in each axis were also smaller than pre-intervention, particularly during terminal-stance phase of paralyzed leg. **Conclusion:** The results suggested that the acceleration time-series data analysis could detect the changes with regard to the recovery of walking capacity, which time-distance parameters couldn't detect. The acceleration time-series data analysis may be helpful to evaluate the recovery of walking capacity. Further studies using larger sample size are needed to assess its value.

PC1051

Application of Devices to Assess Pulse Wave Velocity in Cardiac Rehabilitation

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Introduction: Aortic stiffness is a prognostic marker of aging and disease. It may be measured by pulse wave velocity (PWV). Its value has a strong correlation with cardiovascular events and all-cause mortality. The aim of this study was to compare two devices measuring PWV. **Material and Methods:** The PWV of 26 male patients (age: 58.9 ± 6.9 years, BMI: 28.0 ± 3.9 kg/m²; mean \pm SD) was investigated in addition to the standard procedure in a cardiac rehabilitation clinic. Exclusion criteria were i.e. absolute arrhythmia, pacemaker, treatment with insulin, and acute inflammation. The Mobil-O-Graph (IEM, Stolberg, Germany) is a portable 24 h blood pressure recorder working on an oscillometric cuff-based principle with the ability to calculate central blood pressure and PWV by curve analysis. It was applied once in the first week (PWV₁) and once in the third week (PWV₃). The stationary boso ABI-system 100 PWV (boso, Jungingen, Germany), which was applied only once, has four cuffs to measure blood pressure simultaneously. It is mainly used to calculate the ankle-brachial index. However it is also possible to determine the time differences between the pulse waves at the four extremities and to estimate carotid-femoral PWV (cfPWV) using a mathematical function. **Results:** PWV₁ (8.1 m/s (95% confidence interval (CI): 7.6 – 8.6)) and PWV₃ (8.0 m/s (CI: 7.6 – 8.5)) were not significantly different ($p=0.157$). The calculated value cfPWV (7.5 m/s (CI: 7.0 – 7.9)) was significantly lower compared to PWV₁ ($p<0.01$) and PWV₃ ($p<0.05$). Correspondingly, Spearman's rank correlation coefficient was high between PWV₁ and PWV₃ (0.944 ($p<0.01$)), but lower between PWV₁ and cfPWV (0.498 ($p<0.01$)) and also between PWV₃ and cfPWV (0.476 ($p<0.05$)). **Conclusions:** The PWV obviously was unchanged during cardiac rehabilitation. The very good correlation between two measurements with the Mobil-O-Graph therefore may indicate a high

reproducibility. The correlation between the two different methods of PMV measurement was however only moderate.

PC1052

Changes in Nerve Conduction Velocities of the Femoral Nerve in Patients with Diabetes Mellitus

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Background: Diabetic polyneuropathy is a chronic complication of diabetes mellitus which occurs in over 60% of patients and has a significant impact on the quality of life of the patient. Our objective was to evaluate nerve conduction velocities of the femoral nerve in diabetic patients without clinical signs of femoral nerve involvement. **Material and Methods:** Nerve conduction studies (NCSs) were performed in 38 patients of both sexes, mean age 55.7±12.24 years, with type 2 diabetes mellitus without clinical signs of femoral nerve involvement. Benfotiamine estimation score (BES) and modified Total neuropathy score (MTNS) were calculated for each patient on the basis of subjective complaints and clinical findings. These findings have been compared with NCSs findings of 32 healthy subjects of both sexes, mean age 45±14 years with no symptoms and proper clinical findings on the tested limb. **Results:** A significant difference between diabetic patients and the controls was observed with respect to their femoral nerve motor latencies ($p<0.01$). The femoral nerve motor latencies in diabetic patients were significantly correlated with the duration of disease ($p<0.05$), and the value of BES and MTNS score ($p<0.01$). **Conclusion:** Our study shows that study of femoral nerve conduction velocities may increase sensitivity of the diagnosis of polyneuropathy in patients with diabetes.

PC1053

Application of Neuro-Cognitive Assessment and Rehabilitation (NCAR) Computerized Test in Working Memory Defect

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Introduction: working memory changes is important, so individuals need rehabilitation and treatment. The purpose of current study is to determine the effect of neuro-cognitive assessment rehabilitation computerized test (NCAR CT) on these impairments. **Methods:** The present cross-sectional study was conducted on 120 healthy adults and neuro-cognitive rehabilitation computerized test were used for assessment (before) and rehabilitation (after) in persons in 15 minutes. **Result:** Before and after neuro-cognitive rehabilitation, a significant difference was identified in neuro-cognitive rehabilitation computerized test scores ($P<0.000$). **Conclusions:** This technique can rehab in persons with working memory disorders associated with neurological conditions to facilitate the acquisition. **Keyword:** neuro-cognitive, assessment, rehabilitation, working memory

PC1054

Diagnostic Ultrasound in Spontaneous Bilateral Bicipital Tendon Rupture

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Case Report: A 60-yr-old man was seen with the complaint of

swelling for 6 months in the left arm and for 1 year in the right arm. He had no pain, weakness, or functional loss. On detailed questioning, he declared no history of an initiating cause such as trauma. However, he stated that he was working in his garden and, from time to time, was lifting heavy objects. His medical history was unremarkable. On physical examination, there was no abnormal finding except symmetric swelling in the middle of his arms. All laboratory findings were normal, including erythrocyte sedimentation rate and C-reactive protein. X-ray examination was consistent with bilateral shoulder osteoarthritis. Musculoskeletal ultrasound (US) was selected as a further imaging method. US revealed that the long head of the biceps tendon was not in its expected place bilaterally (empty groove sign). He was presumptively diagnosed as having spontaneous bilateral bicipital tendon rupture. To further differentiate from a possible tendon dislocation, the authors searched for the tendon that could not be found at the most encountered dislocation site, medial to the tendon groove. Sonography of the swelling was also consistent with the biceps muscle. There was no evidence of the tendon anywhere, and it was considered that the tendon had fully retracted. The patient was given a surgical option, but he declined. **Discussion:** Spontaneous rupture of the long head of the biceps tendon is most frequently associated with degenerative changes within the tendon and often occurs with underlying rotator cuff tendinopathy. Differential diagnosis includes dislocated biceps tendon, pectoralis major muscle rupture, rotator cuff pathology, hematoma, and tumor. Spontaneous bicipital tendon rupture is an uncommon condition. Bilateral rupture is very rare, and there are few reports of using US as a diagnostic tool. **Conclusion:** US is a convenient imaging tool for the diagnosis and follow-up of relevant patients.

PC1055

Choosing the Right Imaging Method in Muscle Hernias: Musculoskeletal Ultrasonography

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Introduction: Muscle hernia (MH) is a focal protrusion of muscle into the overlying subcutaneous tissue through an acquired or congenital facial defect. Herniation in the thigh muscles is not common and there are limited reports on US in evaluating this pathology. **Case Report:** A 28-year-old amateur football player presented with a palpable mass on the anterior aspect of his right thigh. Sonographic examination (with a 6-11 MHz linear probe) demonstrated a muscle herniation through a fascial defect, which is called mushroom-appearance. Based on the clinical and sonographic findings, the diagnosis of a muscle hernia in the rectus femoris muscle was established. **Conclusion:** Today, there is no doubt anymore on the role of MSUS in the field of sports injuries. Therefore, with its various advantages (non-invasive, practical and convenient, inexpensive etc.), US is the key imaging method in the diagnosis of MHs.

PC1056

An Overlooked Partial Tear of Rectus Femoris Muscle: Value of Ultrasonography

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Introduction: The rectus femoris muscle is one of the four muscle bellies that compose the quadriceps muscle which is located in the anterior compartment of the thigh. Rupture of this muscle is an uncommon but frequently overlooked injury. The maximum contraction of the muscle is seen during kicking and landing after a jump. Therefore, quadriceps muscle is more commonly injured in athletes, particularly in sports which require repetitive kicking and/or jumping. Musculoskeletal ultrasound (MSUS) has gained

a considerable importance in the field of sports medicine and rehabilitation practitioners in identifying structural changes within tissues and joints. *Case Report:* We report a 32 year-old man who presented to our clinic with a mild pain in the right anterior thigh since 3 months. A diagnosis of an old and healed partial tear was made with MSUS. *Discussion:* Clinically, tears of the quadriceps muscle should be suspected in patients with pain and oedema in the anterior compartment of the thigh and with limited extension of the knee. However, the diagnosis is often overlooked as in our case. In addition to muscle rupture, sarcoma or haemangioma should also be considered in such cases, as soft tissue sarcomas are most commonly located in the lower extremities. Complications can develop if a muscle lesion is overlooked. The most common complications of direct trauma to a muscle are cicatricial fibrosis, calcification, fluid collections and pseudocyst formation. On the other hand, muscles are one of the most common application areas of MSUS. As the muscles lie over the bony structures, all types of injuries can technically be evaluated with ultrasonography (US). Previously, it has been proven that US is a reliable alternative tool to magnetic resonance imaging (MRI) in the visualization of quadriceps muscle traumas. *Conclusion:* US is not only helpful for detecting the tears, it is also useful in the healing period as a follow-up tool with its ability of imaging old tears. Therefore it should be the first imaging technique for evaluating suspected tear of the quadriceps muscle.

PC1057

Cubital Tunnel Syndrome Caused by Hypertrophic Burn Scarring: Sonographic Envisage

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Introduction: Postburn nerve entrapment syndromes can cause significant morbidity. They can be seen acutely by direct compression due to edema; however, they may also occur in a delayed period due to the scar tissue formation and/or heterotopic ossification. While acute cases can often be diagnosed and managed easily; in delayed cases it is less clear, which makes the diagnosis and treatment difficult. Cubital tunnel syndrome (CUTS) is the second most common peripheral nerve entrapment neuropathy in the upper limb, following carpal tunnel syndrome. The diagnosis of nerve entrapment syndromes is mainly based on clinical findings combined with electrodiagnostic tests. But ultrasonography (US) can confirm the diagnosis morphologically and be helpful to eliminate secondary causes such as space-occupying lesions (ganglion cyst, synovial cyst, lipoma, hemangioma tenosynovitis) or a fibrous band. Given this, a patient *Case Report:* We present a 22-year-old man with a late cubital tunnel syndrome caused by hypertrophic burn scarring, along with its sonographic features. *Discussion:* In nerve entrapment syndromes, upon physical examination an electrodiagnostic study would usually suffice to make an interpretation on localization of injury. However, seeing is believing. In daily clinical practice, sometimes it may be necessary to depict the insight, in other words to use an imaging tool. From this point of view, US is superior to other imaging such as magnetic resonance imaging (MRI), with its manifold advantages (higher spatial resolution, fast, cost-effective, allows comparison and dynamic evaluation). Furthermore, according to a study, US increased the sensitivity of electrodiagnostic studies from 78% to 98%. *Conclusion:* Herein, we would like to highlight the complementary role of US in nerve entrapment syndromes in confirming the entrapment, as well as the usefulness of it in the follow-up period of burn patients.

PC1058

Similarities and Differences of Perception of Disabilities between Patients and General Practitioners after a Stroke, a Pilot Study

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Introduction: lots of patients go home after a stroke without rehabilitation, and only their general practitioner (GP) defines management of disabilities. A standardized assessment of activity limitations (AL) and participation restrictions (PR) is rarely used by GP. Therefore, a difference of perception between the patient and the GP could be present. The aim of this pilot study was evaluating AL and PR for patients after a stroke, and comparing these results to GP perception. *Material and Methods:* monocentric pilot study, blind. Were included patients younger than 75 years who had a first stroke, which presented disabilities, and went home with no rehabilitation. AL, PR, environmental and social evaluation of patients was performed by standardized assessment: GMAP [1] (Grid for Measurements of Activity and Participation) composed of 24 items (related to six ICF sections). We also phoned their GP, whom we asked their feeling about disabilities concerning these 24 items. *Results:* 17 patients and their GP were included. GP's perception of AL and PR were close of patients' concerning 21 items. There was a statistically significant difference for 3 items: love relationships ($p=0.038$), sexual relations ($p=0.016$) and group's hobbies ($p=0.026$). *Discussion:* GP have a good perception of their patients' disabilities, except in the areas of privacy - such as love and sexual relationships - and group's hobbies. This difference is due to the difficulty of talking about love and sexuality with patients, for reasons related to both the practitioner that the patient. Concerning group's hobbies, the presence of an "invisible handicap" is added to known impairment. *Reference:* Belio C, Prouteau A, Koleck M, et al. Participation restrictions in patients with psychiatric and/or cognitive disabilities: preliminary results for an ICF-derived assessment tool. *Annals of physical and rehabilitation medicine* 2014; 57(2): 114-37.

PC1059

Motor Control and Learning for More Efficient Rehabilitation Therapies

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Introduction/Background: Motor control may become very complicated for people having stroke, traumas or neurological diseases. Patients need to restore their motor control functions and motion performance to the best possible level. Control functions (neural signals to muscles) have to achieve optimal trade-off between, at least, three important performance indices: speed, movement accuracy, and energy consumption. Various assistive devices may be used for restoration of human movement abilities: FES, prostheses, passive and active orthoses, etc. *Material and Methods:* We have been developing a generic design approach for goal-directed motion tasks. For dynamic goal-directed movements, we can apply an efficient control learning (CL) scheme which has the following main stages: 1) Choose a set of appropriate test control functions. 2) Define the most relevant pairs of control parameters and controlled outputs. 3) Perform control parameter optimization in training exercises. Optimal control (driving) functions have a 3-step (burst-pause-burst) shape and a set of key parameters is found for describing them. Of primary importance is to define a set of variables that best characterize the dynamic performance in the required motion task. We make corrections in the control parameters until reach the target, applying optimal, convergent and natural learning algorithms. *Results:* Our CL approach was applied to dynamic models of human body/limbs with two, three, and six degrees of freedom. We have found that that our approach is very promising and could be efficiently applied to the more complex task of human walking. Performing a step in dynamic biped locomotion is characterized mainly by three phases: taking-off, flying, and landing. The bipedal motion can be considered as a composi-

tion of several goal-directed movements with different dynamics structures, which implies different control structures for the corresponding phases. In the computer simulations, we verified that the control learning converges and the number of trials is very small. In addition, we did some real (able-bodied) experiments with aiming movements of the arm and they confirm the feasibility of the proposed approach. *Conclusion:* As the above proposed control concepts are biologically plausible, they could also be very useful in designing and controlling leg prostheses as well as in neuromuscular rehabilitation of disabled people.

PC1060

Do Quantitative Ultrasound Parameters Reflect the Level of Physical Activity in Women and Men Aged 40 Years and Over?

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Introduction/Background: The aim of study was to assess the effect of level of physical activity on quantitative ultrasound (QUS) parameters. *Material and Methods:* In this cross-sectional study, a total of 139 subjects (62 women and 77 men) aged between 40 and 81 years without any disease or medication known to affect bone metabolism were included in the study. We measured acoustic parameters of bone [Quantitative Ultrasound Index (QUI), Broadband Ultrasound Attenuation (BUA), Speed of Sound (SOS) and estimated heel Bone Mineral Density (hBMD)] using a calcaneal acoustic bone densitometer as well as radial and tibial SOS using a multisite ultrasound bone sonometer. We used International Physical Activity Questionnaire (IPAQ) to calculate metabolic equivalent minutes per week and to define physical activity levels of the participants accordingly. *Results:* The number (%) of the subjects with low, moderate, and high level of physical activity, including mostly walking, were 57 (41%), 64 (46%), and 18 (13%), respectively. One-way analysis of variance revealed no statistical significant difference between mean calcaneal QUI, BUA, SOS, hBMD or radial and tibial SOS of the subjects engaged in these three levels of physical activity [p values ranging from 0.056 (for left tibial SOS) to 0.639 (for BUA)]. Multiple regression analysis including age and body mass index (BMI) as covariates and gender and physical activity level as fixed factors in the model created revealed significant effects of age ($p=0.003$), BMI ($p=0.010$), and gender ($p=0.001$) on QUS variables, but not that of physical activity level ($p=0.858$). *Conclusion:* In this small sample of women and men aged 40 years and over, no significant effect of the level of physical activity as assessed using IPAQ seemed to be reflected by QUS variables. The effects of many other lifestyle factors with a potential to affect bone properties in this age group need to be clarified in larger study samples.

PC1061

Toe Clearance is Determined by an Ability of Changing the Functional Leg Length and Hip Hiking

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Introduction: The toe clearance of a paretic limb in the swing phase of gait is related to tripping, which is considered a major cause of falls. In stroke patients, both the extent of the impaired limb movement and the ability of compensation are related to the toe clearance. The purpose of this study is to clarify the critical indexes related to the impairment and compensation that determines the toe clearance from the kinematic analysis. *Materials and Methods:* Thirty-four patients with hemiparesis after a stroke participated in this study. A simplified motion analysis system, KinemaTracer (Kissei Comtec, Nagano), is used for the kinematic analysis of the

hemiparetic gait. The indexes relating to the swing phase of the paretic limb includes the extent of the shortening of the functional leg length (the distance from hip to toe marker), the change of angles of the hip, knee, and ankle joint, the hip hiking distance, the lateral shift of shoulder and the circumduction. Stepwise linear regression analysis was conducted to identify the factors that determine the toe clearance. A correlation between the functional leg length and the other index was also examined. *Results:* In the stepwise linear regression model, using the toe clearance as a dependent variable, the distance of the shortening of the functional leg length and the hip hiking distance are retained. A coefficient of determination was 0.96. A significant negative correlation between the shortening of the functional leg length, and the hip hiking and circumduction was observed ($r=-0.69, -0.43$). The functional leg length was significantly correlated ($r=0.86$) with the angle of the knee flexion during the swing phase. *Conclusion:* The toe clearance of a paretic limb was mainly determined by the change of the functional leg length reflecting impairment and the hip hiking distance, which represents the indexes related to the compensation.

PC1062

Gait Disorder Assessment Using a Treadmill and a Low Cost Vision System

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The main objective of this research project is to develop a computerized system to characterize and automatically assess gait disorders severity. The system uses a treadmill and 2 low cost cameras connected to a personal computer to provide 3D position and trajectory acquisition of the joints involved in the walking. The system calculates 17 gait joint trajectories at the sampling frequency of 30 Hz. This system is an important low cost new medical diagnosis tool, overcoming the limitations of the present subjective gait diagnosis tools. It will allow a much more objective understanding of the clinical evolution of patients, enabling a more effective functional rehabilitation of a patient's gait. The system can be used in several medical areas particularly in stroke (CVA) recovery patients, mobility assessment of aged population, lower leg amputation and lower leg post-surgery. Experiments of the proposed system were performed with 4 people with similar physical characteristics, in a Physical and Rehabilitation Medicine Department of a Portuguese central and university hospital. One of the persons has no gait problems (NP), while the others have a prosthesis (a passive one, without motor) (PP) and a bionic prosthesis (BP), from the upper left leg, and the last person had a CVA 3 years ago, having paralyzed partially his left side (PCVA). In the person without gait problems it was induced a gait asymmetry by making he using a load of 3kg (NP1) just above the left ankle, which was considered to correspond to 20% degradation of the gait performance. The experiments were performed in a treadmill at 3 different velocities (1, 2.5 and 3.5 km/h). The average of the "gait disorder severity index" value of PP, BP and PCVA for the left leg is 27%, 20% and 9% respectively. This means that the PP severity is greater than that of NP1 (20%) and, as expected, BP has better performance than PP. PP and BP will continue the physiotherapy and/or prosthesis adjustments. PCVA presents a good recover but needs to continue the rehabilitation. The developed system will be helpful in the assessment of the rehabilitation process and/or prosthesis adjustments, during a patient recovering.

PC1063

The Importance of a Good Physical Examination

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Introduction: Hip pathology is not always easy to diagnose. Sometimes, it can give clinical of referred pain which leads us to confusion. Our clinical case talks about a patient who had been seen by several specialists. The reason for consultation had always been knee pain. When the patient arrived at the rehabilitation consultation, there was a change in the diagnostic approach. **Material and Methods:** Description Of The Case Reason for visit: Patient of 34 years old referred from traumatology for posttraumatic left knee pain during childhood. Used to practice rhythmic gymnastics. Present Illness: The patient suffered trauma to the knee; by mechanism of hyperextension and internal rotation, 3 months ago. The traumatologist had requested a MRI of the knee that showed no important degenerative meniscal lesions. Physical Examination: Significant amyotrophy of the whole left lower limb. Dysmetria of the left lower limb of 3 cms. Knee joint balance: -10/140°. Painfull Hip joint balance: Flexion-extension 70°-10°, rotational range of motion of the hip: 30°. Gait analysis: significant decrease of the left lower limb stance phase, knee and hip flexion and equinus support. Additional Tests: We requested an X-ray of the hip and found ankylosis of the hip joint. There was no femoral head. Then we requested a MRI of the hip and a Bone Scintigraphy. **Results:** Case Resolution. The first one confirmed the ankylosis and the important amyotrophy. However, the second one didn't show any tracer capitation. **Clinical Trial:** Ankylosis Hip Joint. Treatment: We started doing physiotherapy with the goal of improving joint range and muscle strength. After, we sent the patient to traumatology again to put a hip prothesis. **Discussion:** We raised the differential diagnosis between an old hip fracture and an avascular necrosis of the femoral head, but tests didn't allowed us to determine the cause **Conclusion:** Physical examination is essential to suspect the origin of the pathology. In PMR, we usually try to examine not just the painful part of the body but its function. Additional tests lead us to confusion if they are not well targeted. A right diagnosis allows us to properly treat a disease.

PC1064

Assessment of Cardiopulmonary Exercise Test (CPET) Parameters in Patients with Coronary Heart Disease and Chronic Obstructive Pulmonary Disease (COPD)

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Introduction: Chronic obstructive pulmonary disease (COPD) appears to be relatively frequent in coronary heart disease patients (CHD). Cardiopulmonary exercise test (CPET) ramp incremental is a gold standard for an exercise intensity assessment and prescription in patients with cardiovascular and pulmonary disease. In stable clinical conditions, when available, it is proposed to conduct functional evaluation through exercise testing prior to starting and after completed cardiopulmonary rehabilitation program. **Aim:** The study aims were to assess cardiopulmonary exercise test (CPET) parameters testing prior to starting rehabilitation program in patients with coronary heart disease (CHD) and chronic obstructive pulmonary disease (COPD). **Methods:** We studied 54 inpatients at the Institute for Rehabilitation in Belgrade, divided into 2 groups. Group 1, included 30 patients with stable myocardial infarction (MI), (26 men, mean age 54.93±8.39 years) and group 2, included 24 patients (21 men, mean age 57.93±7.27 years) with stable myocardial infarction (MI) who had chronic obstructive pulmonary disease (COPD), which was confirmed in clinical and spirometry findings (FEV1 61.3±21%, and FEV1/FVC 60±9%), for CPET as part of their functional evaluation, before cardiopulmonary rehabilitation programs. We measured and compared CPET parameters at

the baseline of inpatients cardiopulmonary rehabilitations. **Results:** Peak VO₂, expressed in ml/kg/min was significantly higher in group 1, (17.27±3.34 vs. 14.02±4.6; p<0.001), ventilatory anaerobic threshold (VAT) was significantly higher in group 1 (11.71±2.4 ml/kg/min vs. 10.01±3.2 ml/kg/min; p<0.05). Slope of minute ventilation vs. carbon dioxide production (VE/VCO₂), significantly lower in group 1, (26.01±4.7 vs. 28.47±7.2; p<0.001). There was no significant difference in peak heart rate (HR) (115.77±16.94 vs. 115.65±12.32; p> 0.05). The work rate (WR) was significantly higher in group 1 (105.35±22.03 W vs. 88.5±12.2 W; p<0.001). **Conclusions:** In patients with myocardial infarction associated with chronic obstructive pulmonary disease, the functional capacity, workload and ventilatory efficiency are significantly reduced.

PC1065

The Influence of Inclined Surfaces on Multi-Segment Foot Kinematics

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Background: There is a clear paucity of information on the foot and ankle kinematics during various activities of daily living, which includes negotiating steps and walking up or down an inclined surface. This is particularly important for designing clinical intervention for rehabilitation. Whilst previous clinical studies have often analysed the foot as a single rigid segment during gait, given the advances in modeling techniques and data capture, it is important to employ a multi-segment kinematic foot model. This approach to understand the kinematics of the foot provides the clinician with more in-depth information when compared to the analysis of the foot as a single rigid segment. As pathological gait is often associated with reduced walking speed and it requires negotiating various surfaces and other environmental factors this study aims to investigate the foot kinematics on inclined surfaces. In addition, a vector coding technique will be utilised to quantify the refoot to rear-foot coordination. **Material and Methods:** An optoelectronic motion capture system (Vicon, OMG, UK) was used to collect the trajectory of reflective markers that corresponds to the configuration proposed by Leardini and colleagues. Patterns and range of motion of relative rotations of the rear-foot, mid-foot, forefoot and hallux were investigated during gait in an inclined surface. Angular statistics was used to average the coordination angles between trails and individuals. **Results:** The investigation revealed distinct differences in forefoot to rear-foot coordination patterns between walking over ground and in an inclined surface. **Conclusion:** This investigation provides a further insight into the complex structure of the foot and contributes to the existing database of normative values. A quantitative dynamic assessment of the foot and lower limbs is essential for both conservative and surgical management of patients. Incorporating measures of coordination and movement variability can have major implications in the diagnosing process and may assist clinicians in the design of intervention programs during rehabilitation for the purpose of restoring normal patterns of walking.

PC1066

Instrumented Shoes for Analysis and Characterization of Human Gait Disorders

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The main objective of this research project is to develop a computerized system connected to instrumented shoes to characterize and automatically assess gait disorders severity. The system uses low cost instrumented shoes, connected to a personal computer, that pro-

vide 3D Ground Reaction Forces (in X, Y, Z) and the location of the Center of Pressure. It also computes a “gait disorder severity index” value that quantifies gait disorders. The communication between the shoes and the personal computer is wireless and the sampling rate of the acquisition system is 100 Hz. This system may become an important low cost new medical diagnosis tool, overcoming the limitations of the present subjective gait diagnosis tools. It will allow a much more objective understanding of the clinical evolution of patients with gait disorders, enabling a more effective functional rehabilitation of a patient’s gait. The system can be used in several medical areas particularly in stroke (CVA) recovery patients, mobility assessment of aged population, lower leg amputation and lower leg post-surgery. The first experiments of this system were performed with 3 people with similar physical characteristics in a Physical and Rehabilitation Medicine Department of a Portuguese central and university hospital. One of the subjects has no problem in his gait (NP), while the others have prosthesis below the knee of the left leg, for 12 months (P1) and for 6 months (P2). In the person with the normal gait (NP) a gait disorder has been induced by making him use a load of 3kg (NP-W) just above the left ankle, which was considered to correspond to 20% degradation of the gait performance. The average of the “gait disorder severity index” value of P1 and P2 for the left leg is 24% and 40% respectively. This means that P2 severity is higher than that of NP-W and that P1 has a similar severity. As expected, P1 has better gait performance than P2. Both persons need to continue the physiotherapy or adjust the prosthesis. This system will be helpful for physiatrists to choose the right exercises that patients have to perform for a faster and more effective recovery and to accurately adjust prosthesis.

PC1067

Long-Range Autocorrelations in Parkinson’s Disease as a Reflect of Disease Severity and Dynamic Stability

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Introduction/Background: Stride duration continuously fluctuates in a complex manner over time, displaying long-range autocorrelations (LRA). The presence of such temporal dynamics is thought to be a critical marker of health and their breakdown as an index of pathological condition, especially associated to dynamic stability in locomotion. However, neurophysiological mechanisms generating such correlations remain a matter of debate. *Material and Methods:* To further investigate their origin and the influence of pathological locomotion, we studied LRA from 20 parkinsonian patients walking on treadmill and overground at a comfortable speed. The presence of LRA was based on scaling properties of the series variability (Hurst exponent) and the shape of the power spectral density (α exponent). Functional status of each patient was assessed using MDS-UPDRS and modified H&Y scale. Furthermore, to precise the relationship between LRA and the dynamic stability, objective and subjective measures of balance was collected using BESTest and ABC Scale. Spearman’s correlation coefficients were calculated. *Results:* LRA were highlighted in all patients. However, Hurst and α exponents were significantly higher during treadmill walking ($p < 0.001$). For each exponent, strong correlations were observed on overground walking between H&Y scale and LRA (Hurst: $r = -0.831$; α : $r = -0.907$), and BESTest score and LRA (Hurst: $r = 0.745$; α : $r = 0.906$), while no significant correlations were observed between MDS-UPDRS and ABC Scale with LRA obtained on overground walking. On treadmill, no correlations were observed between functional and balance measures with LRA. *Conclusion:* This study demonstrates the presence of LRA in parkinsonian gait on overground walking jointly evolving with balance status (BESTest) and supporting the relationship with dynamic stability. Furthermore, the modulation of LRA by treadmill and disease severity (H&Y scale) could suggest further participation of basal ganglia in control mechanisms of LRA.

PC1068

Safety and Feasibility of a Novel Microsensor for Suprapubic Cystometry in Patients with Spinal Cord Injury

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The aim of the study is to assess the feasibility and safety of a novel system for percutaneous measurement of bladder pressure. The system allows for a minimally invasive procedure and high-quality recordings with a higher than conventional sampling rate and synchronization, and with physiological filling. Due to a sensor tube with a diameter less than 1.0 mm, it is possible to perform the suprapubic cystometry using a simple minimally invasive technique. The pressure sensor system has potential for being developed into a low-cost method with mass production. The core component in the system is a sensor tube with an integrated pressure sensor element made by Micro Electro Mechanical Systems (MEMS) technology. In this study, we will present the results of a clinical study with a 24-hour recording using the novel technique. Subjects will be recruited from patients with chronic spinal cord injury. The subjects will not have any restrictions on activity during the recording, except for paying attention to the recording equipment. A questionnaire and urine sample will be collected during the time of recording. At the end of the examination, but before the percutaneous pressure sensor system is removed, a conventional transurethral technique will be performed. The simultaneous recording with the novel and the conventional method will provide a direct comparison of simultaneous recording of pressure between the two methods. Subjects will be examined for subjective or objective adverse events. Time consumption and costs of the two alternative techniques will be compared. The results from this initial study will be the basis for further studies with sufficient power to validate transurethral versus percutaneous technique.

PC1070

Integration of fMRI, NEMG, and MIDI Data in a Professional Pianist with Focal Dystonia

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Focal dystonia is a debilitating neurological condition that often afflicts pianists in the prime of their career. Disruptions in sensory integration and motor planning lead to involuntary movements, or “misfires” of certain muscles during piano playing. Despite the severity of the condition, questions remain unanswered. To examine systematically the biomechanics, neurophysiology, and music performance outcomes in a pianist with focal dystonia in order to gain insights into correcting the misfire. We examined a 50-year old professional pianist with focal dystonia in the left hand manifesting as involuntary 3rd finger extension. Biomechanics of the hand and arm were examined. Performance of temporal and dynamic touch control on the piano keys was quantified using MIDI data generated from hybrid acoustic-electronic piano. Functional MRI was captured while: (1) tapping on a flat board on his chest; and five-finger scale with the (2) affected and (3) unaffected hands. Intramuscular needle EMG (nEMG) was used to examine the activation pattern of the left extensor digitorum communis (EDC), and compared to the left extensor indicis proprius (EIP). Dystonic posturing of left 3rd finger extension was observed during fMRI and nEMG testing. Analysis of MIDI performance data showed decreased evenness of touch control, both temporal and dynamic. fMRI analysis demonstrated enhanced activity in contralateral (right) primary sensorimotor cortex, supplementary motor area and parietal-occipital regions during simulated playing with the left hand. Ipsilateral (left) sensorimotor activity and parietal-occipital activity is also increased with the left hand. Conversely, simulated playing with the right hand revealed markedly diminished activation of the contralateral (left) sensorimotor cortex and no activation of the ipsilateral (right) sensorimotor and parieto-occipital cortices. Indwelling nEMG analysis revealed hyper-activation of

the left EDC with a distinct periodic oscillatory pattern during and persisting after playing which coincided with the dystonic posturing. These patterns were not demonstrated in the EIP. Our case demonstrated that our pianist's focal dystonia was associated with increased activity in the contralateral sensory and supplemental motor areas and a distinct oscillatory EMG activity in the affected muscle (EDC). Incorporating multiple modality data sets will provide novel insights into sensory integration and motor planning.

PC1071

Clinical and Urodynamic Evaluation of Urinary Dysfunction in Multiple Sclerosis

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Introduction: Multiple sclerosis is a chronic inflammatory demyelinating disease of the central nervous system. lower urinary tract dysfunction is often observed during evolution of this disease. its prevalence is estimated between 32 to 96.8%. bladder disorders are a significant cause of restriction of social participation and poor quality of life of patients. Management of urinary disorder must be preceded by full clinical evaluation, completed by urodynamic investigation in order to specify the type of neurologic bladder dysfunction, identify risk of urological alteration and guide the therapeutics. **Patients and Methods:** Retrospective Study including patients followed up during 2014 for multiple sclerosis and having bladder disorders. Each patient had full clinical examination completed by urodynamic investigation. We studied epidemiological data, neurological data, urological symptoms and results of urological investigations. **Results:** We included 20 patients, 32.5 years old. Urgency, frequency, dysuria, and urge incontinence, were the most common symptoms reported. uroflowmetry was abnormal in 14 cases. cystometry showed detrusor overactivity in 12 cases and sphincter dyssynergia in 4 patients. self intermittent catheterization was indicated for 14 patients. **Conclusion:** Clinical evaluation is still the main step in the management of urinary disorders in MS. Urodynamic investigation allows a better understanding of pathophysiology of urological symptoms and choose the best treatment.

PC1072

The Role and Importance Plantar Pressure in Patients with Diabetes Mellitus in Effort of Preventing Diabetic Foot Condition

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Introduction: Diabetic foot is an interdisciplinary medical condition, requiring interdisciplinary approach to its treatment. Early assessment, such as assessment of sensory disorder and/or corresponding symptoms of polyneuropathy, and plantar pressure are of importance for diabetes patients. **Materials and Methods:** Prospective research of the Health Centre Sarajevo Canton examined 100 patients with diabetes mellitus Type 2. To assess diabetic polyneuropathy, to determine the dynamic function of the foot, by using pedobarography (Group I, N=45) with parameters of plantar pressure: Peak pressure, Force, Area, and after six months the use of individual robot made orthopedic insoles with help of pedobarography (Novel Inc. EMEDTM platform). The Group II (N=55) did not have test pedobarography. To determine the connection between the risk factors: deformity of the foot, diabetic polyneu-

ropathy, plantar pressure in prevention diabetic foot. **Results:** The average age of subjects was 59.4, SD 11.38. The average HbA1c was 7.78% SD 1.58. Combining 10 g monofilament and tuning fork of 128 Hz tests, the diagnosis of polyneuropathy have 65% of patients. Comparing Test Symptom Score individual parameters between the first and second measurement, using pedobarography, in Group I, statistically significant difference was found for all of the assessed parameters: pain, burning sensation, paresthesia and insensitivity ($p < 0.05$). All examinees in Group I (45) after the first and after the second measurement of Peak pressure have values above 200 kPa, or they are in the designated zone of Peak pressure that needs to be corrected. Correlation between diabetic polyneuropathy and Peak pressure recorded a higher Peak pressure by patients with pronounced polyneuropathy, although this connection isn't statistically significant ($p > 0.05$). The results have shown the correlation between foot deformities, diabetic polyneuropathy and plantar pressure ($p > 0.05$). **Conclusion:** Timely diagnosis with pedobarography, control of plantar pressure and use of individual robot made orthopedic insoles could delay the progression of clinical symptoms of polyneuropathy and prevent changes in the diabetic foot. **Reference:** Sicco A. Bus, Antony de Lange. A comparison of the 1-step, 2-step, and 3-step, protocols for obtaining barefoot plantar pressure data in the diabetic neuropathic foot, *Clinical Biomechanics*; 2005: Volume 20, issue 9; 892-899.

PC1073

How Much Load Is Applied in Identified Locations of the Plantar Fascia in Static and Locomotion

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The purpose of this research is quantifying the amount of the load/body weight applied in identified/equivalent locations of the plantar fascia in both feet. It has been accepted that plantar fascia thickness is a biomechanical variable to understand the concentration of the amount of the applied load in identified locations of the plantar fascia. This research was done through a four-step method. Step 1, literatures were reviewed to search the results, gaps and problems within previous studies about plantar fascia evaluation with ultrasound. Step 2, plan of investigation was designed to recognize each location of the plantar fascia along its length and to identify equivalent locations of the plantar fascia in both feet with ultrasound 2D measuring. Step 3, pressure markers were put on identified locations of the plantar fascia. The amount of the applied pressure was assessed with E-med, through the ground reaction force, in static and locomotion. Step 4, the percentage of the body weight was calculated in identified locations. It was found that quantifying plantar fascia thickness (1.2 ± 0.7 mm) < longitudinally > (1.3 ± 0.3 mm) and (1.1 ± 0.6 mm) < transversely > (1.4 ± 0.2 mm), evaluating (74 ± 1.6 mm) < the length > (166.4 ± 4.7 mm) and (22.2 ± 4.7 mm) < the width > (48.3 ± 3.6 mm) of the plantar fascia location under pressure, the amount of (43.3 ± 4.7 mm) < the applied pressure > (78.3 ± 19.5) on the plantar fascia and computing the (0.6 ± 0.18) < percentage (1.1 ± 0.27) of the body weight (70 Kg) exerted on the plantar fascia is achievable along its length. Relying on quantitative information of this research; insole, shoes and foot orthosis can be designed more accurate to relief pain, to prevent/to stop progression of foot and ankle deformity and to prevent plantar fascia injuries. **Keywords:** Plantar fascia thickness, Mechanical load, Ultrasound image, E-med.

PC1074

Is the Translated, Culturally Adapted and Validated Bangla WHODAS 2.0 (36-Item Version, Interviewer Administered) Reliable

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Background: WHODAS 2.0 Generic assessment instrument for health and disability, used across all diseases, including mental, neurological and addictive disorders; Short, simple and easy to administer (5 to 20 minutes); applicable in both clinical and general population settings; produces standardized disability levels and profiles; applicable across cultures, in all adult populations, direct conceptual link to the International Classification of Functioning, Disability and Health (ICF). It provides a global measure of disability and 6 domain-specific scores. **Objectives:** To develop a culturally adapted Bangla version of WHODAS 2.0 (36- item version, interviewer administered) and to test its acceptability, validity and reliability in patients with disability. **Methods:** The original, 36 item version of WHODAS 2.0 was translated into Bangla following international guidelines Beaton et al. “forward backward” procedure. Pre-final Bangla version was tested on 10 twelve years boys and girls for understandability and in 30 adult respondents for pretest. Most of the items were well understood by the participants. The instrument was found to have good content validity in the evaluation by three expert physiatrists. After taking informed written consent, the Bangla version of WHODAS 2.0 was administered to 44 patients with disabilities. The patients’ sociodemographic data were collected. The WHODAS 2.0 was administered again after seven days to determine its intra-class correlation. Construct validity was evaluated by correlating the WHODAS 2.0 and SF -36 domains. **Results:** The Bangla version of the WHODAS 2.0 is easily understood and has good internal consistency (Cronback’s alpha=0.955), as well as, very good intra-class correlation ICC 0.975 (0.962-0.985). For assessing construct validity of WHODAS 2.0 showed good correlations ($r=-0.900$) with Physical functioning, ($r=-0.749$) with role of limitation due to Physical problem, ($r=-0.665$) with role of limitation due to emotional problem, ($r=-0.761$) with Social functioning subscale of SF-36, ($p<0.01$) indicating that it has construct validity. **Conclusion:** The Bangla version of WHODAS 2.0 has shown to be reliable and valid when administered to Bangla speaking patients with disability.

PC1075

Inertial Sensor Based Gait Analysis: Effects of Different Sampling Rates on Gait Variability Measures

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Introduction: The assessment of gait variability might entail the potential for diverse kinds of early diagnoses in clinical settings and the usage of inertial sensors has the potential to feasibly measure gait variability. In order to investigate which sample rate would be required to precisely measure gait variability of different gait parameters, this study analyses the outcome of gait variability measures as a function of sample rates. **Material and Methods:** Kinematic gait data of 11 healthy subjects were recorded during continuous overground walking using an inertial sensor attached to the subjects’ feet. Gait variability parameters were calculated on the basis of the original time series (sample rate: 512 Hz) as well as of each down sampled time series (256 Hz, 128 Hz, 75 Hz) using an evaluated algorithms (Hamacher et al., 2014). To quantify the measurement error, the original data set (512 Hz) was used as the best estimate of the true gait variability. Furthermore, the errors of each of the down sampled data sets were calculated as the absolute differences between the original and the respecting down sampled time series. Furthermore, the relative errors, expressed as percentage of each down sampled gait variability values, were calculated. **Results:** A systematic reduction in the values of all variability measures with increasing sample rates results due to the decreasing measurement error. With 256 Hz, the relative error is smaller than 5% for all gait variability parameters. **Conclusion:** Since with 256 Hz the relative error is smaller than 5%, we suggest using inertial sensors with sample rates of at least 256 Hz to assess gait variability. So, a higher sta-

tistical test power can be acquired and particularly small individual treatment effects are less likely a result of the measurement error. **Reference:** Hamacher, D., Hamacher, D., Taylor, W.R., Singh, N.B., Schega, L. (2014). Towards clinical application: Repetitive sensor position re-calibration for improved reliability of gait parameters. *Gait and Posture* 39, 1146-1148.

PC1076

Walking with Eyes Closed is Easier Than Walking with Eyes Open Without Visual Cues: the Goggle Task Versus the Romberg Task

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Introduction: The Romberg test, with the subject standing and with eyes closed, gives diagnostic arguments for a proprioceptive disorder. Closing the eyes is also used in balance rehabilitation as a main way to stimulate neural plasticity with proprioceptive, vestibular and even cerebellar disorders. Nevertheless, standing and walking with eyes closed or with eyes open in the dark are certainly 2 different tasks. We aimed to compare walking with eyes open, closed and wearing black or white goggles in healthy subjects. **Methods:** A total of 50 healthy participants were randomly divided into 2 protocols and asked to walk on a 5-m pressure-sensitive mat, under 3 conditions: 1) eyes open (EO), eyes closed (EC) and eyes open with black goggles (BG) and 2) EO, EO with BG and with white goggles (WG). Gait was described with: velocity (m.s-1), double support (% gait cycle), gait variability index (GVI/100) and exit from the mat (%). **Analysis:** Repeated measures ANOVA was used for analysis, Holm-Sidak’s multiple comparisons test for the parametric parameter (GVI) and Dunn’s multiple comparisons test for non-parametric parameters. **Results:** Walking with BG produced lower median velocity, by 6%, than walking with EC (EO 1.26, BG 1.01 vs EC 1.07 m.s-1, $p=0.0328$) and lower mean GVI, by 8% (EO 91.8, BG 66.8 vs EC 72.24, $p=0.009$). Parameters did not differ between walking under the BG and WG conditions. **Conclusion:** The goggle task easily differentiates the difficulty in the walking Romberg test and balance rehabilitation exercises in visual deprivation.

PC1077

Electrodiagnostic Study of Common Nerve Injuries Among Kickboxing Athletes

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Sport medicine includes a wide range of medical services. Each sport has its intrinsic dangers for participants. Peripheral nerve injuries are among the common traumas in various sport fields. And often are neglected by the athletes support systems which focus mainly on large traumas or life threatening conditions. Martial arts which many of them are born from East Asia now becoming familiar among young population. Insufficient knowledge about the biomechanics and true skills in these sports can expose the athletes to many neuromusculoskeletal injuries including peripheral nerve injuries. The goal of this research is assessment of the kinds and existence of these injuries among participants in kickboxing. The research was done on 30 athletes. All male which were selected among the population of 60 persons of participants in this sport field in Shiraz. Age ranges between 17-28 years. Ulnar nerves (left & right) tibia nerves (left & right) and median nerve (left & right) was investigated for ulnar entrapment in elbow tarsal tunnel syndrome and carpal tunnel syndrome. Ulnar entrapment neuropathy was detected in 12 athletes (40%) with 50% involvement in (61.5%). median entrapment in carpal tunnel was not detected in any of the participant and nerve entrapment. The ulnar nerve entrapment had a correlation with the duration of exercise.

PC1078

Comparison of Thessaly with Joint Line Tenderness and McMurray Tests in the Diagnosis of Meniscal Tears

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Introduction: To investigate the accuracy of the Thessaly test and to compare the results with those of McMurray and Joint-line tenderness tests for the diagnosis of meniscal tears. **Material and Methods:** A cross-sectional study was conducted in an outpatient clinic. We recruited 106 Patients with knee pain and 82 participants for comparison. MRI was performed for all participants and arthroscopy for 68 with knee pain and check Diagnostic parameters of three clinical Tests. **Results:** Thessaly was the most sensitive with MRI as the basis for the diagnosis of medial meniscus tears (56.2%), while McMurray and joint-line tenderness were more specific (89.1% and 88.0%, respectively). For lateral meniscus tears, McMurray was the most sensitive (56.2%) and all the three were highly specific (McMurray 89.6%, Thessaly 88.4%, and joint-line tenderness 90.2%). With arthroscopy, Thessaly was the most sensitive for medial meniscus tears (76.6%), while McMurray and joint-line tenderness were more specific (81.0%, and 81.0%, respectively). Agreement with arthroscopy was the highest with McMurray test (for medial meniscus $\kappa=0.40$, $p<0.001$, and for lateral meniscus $\kappa=0.38$, $p=0.002$). **Conclusion:** The Thessaly test can be used to screen for the presence of medial meniscus tears. McMurray and joint-line tenderness should be used for the tears in patients with related clinical manifestations. For lateral meniscus tears, McMurray test is appropriate for screening and all the three tests are useful in clinic. Overall, we did not find important difference and prefer to use the tests combined.

PC1079

FMRI Study of the Brain's Neuroplasticity as a Basis for Movements Recovery after Traumatic Brain Injury*E. Sharova¹, G. Boldyreva¹, L. Zhavoronkova¹, A. Smirnov², M. Chelyapina¹, A. Azarov³, E. Troshina², V. Kornienko²

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Severe traumatic brain injury (TBI) is almost always accompanied by movement disorders. In our previous studies in healthy subjects found that 1) the clenching a fist is the most universal motor test for norms and cerebral pathology, causing reproducible most local and comparable fMRI responses; 2) identity of the major topographical areas of cortical activation during active and passive (using the experimenter) performing this movement allows to recommend the use of passive motor paradigm for study the central regulation of movements in patients with the rudest movement disorders and depression of consciousness [Boldyreva et al., 2014]. The objective of this work was to conduct a pilot study of functional anatomy passive hand movements in patients with varying degrees of hemiparesis after TBI, compared with normative data. The studies were performed in 25 patients with TBI aged 18 to 48 years. Movement defect in form of hemiparesis evaluated according scale of muscle strength [McPeak LA, 1996]. Control group consisted of 17 healthy right-handed subjects aged 21 to 39 years. Investigated fMRI responses during passive clenching a fist right hand, that performed with the eyes closed. FMRI images were obtained by MRI GE Healthcare c intensity of 3T. Data processed by the programs SPM8 in medium MATLAB 7.0. To determine the brain's activated areas coordinates and their volume use Automated Anatomical Labeling. Analysis of fMRI responses during passive motor trials in patients with TBI showed that in the majority cases without hemiparesis or with mild hemiparesis neuroanatomy of the movement is close to normal. However, even

in these samples, and especially in the moderate hemiparesis we observed a more diffuse fMRI response with activation of brain regions, non-specific to this movement load, such as temporal cortex or cerebellar vermis. In patients with severe hemiparesis the percent of inclusion in fMRI response the "atypical" for normal movement brain areas increased, while the amount of activation was reduced. Comparison between the identified variants of the functional anatomy of passive movement in TBI and topographic anatomy of the motor system indicate variability compensation mechanisms of impaired motor activity on the basis of possible inclusion of different "functional stand-ins" to ensure this function.

PC1080

Balneo-Climate Therapy (Dead Sea-Jordan)

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A complete study for climate factors and natural agents available in Jordan which may be used in Balneo-Climatic Therapy. -Concerning the climate in Jordan, classified in general as Mediterranean climate (Macro Climate) and particular as local climate (Micro climate). Four types of climate have been mentioned (under sea level, sea level, mountain, desert climate). -concerning natural agents they are classified as two types (Natural Mineral Water and Mud). As for mineral water it has been classified from the physical point of view as the following: Hypothermic, thermic, hyperthermic water and from the chemical point of view as: Sulfanic water, carbonic water, Radon water. The Mud has been classified into two types (organic mud and inorganic mud). Special characteristics of the Dead Sea Region it has been proved their positive benefit results for psoriasis, certain rheumatic diseases, certain locomotor & respiratory system.

PC1081

Development and Reliability of an Inventory to Assess Posture Awareness and Movement Freedom

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Introduction: Motor control exercise training was proved to be effective in dealing with pain and physical function in back pain patients, but whether these patients did experience ease or control over movement after training was unclear. The purpose of this study was to develop a new instrument, the freedom of movement inventory (FOMI), to assess the self-perceived perception and awareness in posture, proprioception, and movement. **Material and Method:** This inventory was designed in three stages. First, the preliminary version of the FOMI items were developed from collecting opinions from several physical therapists, movement experts as well as from the movement-related literature. Second, a Delphi consensus process with researchers and physical therapists specialized in movement therapy was undertaken to determine the applicability of the instrument. Third, the inventory was piloted to general population to determine its reliability. **Results:** The first version of FOMI was composed of 24 items grouped by 4 subscales. Twelve experts (3 males and 9 females) were invited to score each item from 1 (inapplicable) to 5 (applicable). Items with median scores ≤ 3.5 were excluded and wording statements were clarified. Through two-round of Delphi consensus, 5 items were removed and 1 item was added. The finalized FOMI was a 20-item instrument consisted of 4 subscales: "physical function and pain", "body perception", "posture and awareness" and "daily life". Each item was scored by a 10-point Likert-type response, ranging from 1 to 10 corresponding to "totally disagree" to "totally agree". Psychometric evaluation of the test-retest reliability was good with intra-class correlations coefficient ranging from 0.79 to 0.90 (N=15). Excellent internal consistency with Cronbach's alpha ranging between 0.83 to 0.95 (N=22). **Conclusion:** FOMI was a reliable instrument to assess self-perceived perception and

awareness in movement. The development of this inventory may be useful to evaluate self-perceived effect after motor control exercise training.

PC1082

Challenge of Choosing Assessment for Upper Limb Motor Function in Stroke Rehabilitation Trial

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Introduction/Background: There are several stroke Rehabilitation trial for new therapies aiming to improve motor function in upper limb. Consequently, it is important to have a reliable evaluation of the treatments in order to give an objective numerical value for abstract concept of disability and to determine the efficacy of the interventions to better understand the benefits of new approaches for clinical practice, such as robotic treatment and non-invasive brain stimulation (NIBS). Our goal is to discuss the possible options of assessment considering psychometric and clinical considerations in the light of ICF. Besides discuss about possible solution to measure the fragmented aspects of motor function and the future directions. **Material and Methods:** We performed a search of MEDLINE and PubMed to select the upper limb assessment that has clinimetric proprieties defined and is use in stroke rehabilitation trials. For a more efficiently search we use a controlled vocabulary thesaurus of indexing terms the Medical Subject Headings (MeSH)4 and we selected the following **Keyword:** Stroke AND “upper extremity” AND rehabilitation AND (“reproducibility of results” OR psychometrics) AND (“outcome assessment” OR “disability evaluations” OR “outcome treatment”). **Results:** were found and analyzed 115 articles published between the years 1994 and 2013. After examination of these, we identified 96 publications that met the inclusion criteria: (1) studies including subjects with diagnosis of stroke, (2) assessment of upper limb measurement, (3) evaluation of clinimetric propriety of at least one instrument and/or variable. **Conclusion:** The findings of our search results in 34 assessment tools. The large number of assessment in a way reflects the absence of a single scale that gives precise information of stroke disability. It is recommended to use assessment with quality determined by psychometrics proprieties, which essential are validity and reliability. However there are others characteristics of a test that can be important and are not addressed for these two aspects, such as appropriateness, responsiveness, precision, interpretability, acceptability and feasibility. A consistent method to tests administration is critical to true score interpretation. It is important to have a common language and standard assessment in order to compare different centers.

PC1083

Effects of Vibration Stimulation on Activity of Low Limb Muscles and Spinal Motor Neuron

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Introduction: The vibration stimulation which affects the neuromuscular activation has been a hotspot in the related researches. Although there were some indirect evidences prompting that the neuromuscular activity was related to the vibration frequency, the role of the frequency still was not definite. The aim of this study is explore optimum vibration frequency by evaluating the effects of vibration stimulation on activity of low limb muscles and spinal motor neuron. **Subjects and Methods:** Twenty healthy young people (10 females, 10 males) received 5min vibration stimulation of

distal left leg fibula in the supine position with each frequency (10 Hz, 20 Hz, 30 Hz, 40 Hz, 50 Hz). The surface electromyography of low limb muscles was collected for the RMS (root mean square, RMS) before and during the vibration. The tibial nerve F wave before and immediately after the vibration and the tibial nerve M wave before vibration were detected to calculate the average amplitude of F wave and the F/M max ratio. The activity characteristics of low limb muscle and spinal motor neuron in different vibration stimulation frequencies had been access to through analyzing the datas. **Results:** The study indicated that different frequencies of vibration stimulation had a significant impact to the values of the tibialis anterior muscle RMS ($p < 0.05$), but not to the values of the gastrocnemius muscle's ($p > 0.05$). The peak RMS values of the tibialis anterior muscle obtained in the frequency of 30 Hz, 40 Hz, 50 Hz, differed from the baseline significantly. The difference in the average amplitude of F wave and F/M max ratio resulting from different vibration frequencies was statistically significant ($P < 0.05$), especially 30Hz value differed from the baseline significantly ($P < 0.05$), but no statistical significant difference exist compared with that of 20 Hz, 40 Hz ($P > 0.05$). **Conclusion:** There are characteristics of rhythmic in the healthy lower limb neuromuscular system. The optimum vibration stimulation frequency range of the tibialis anterior muscle is concentrated from 30 Hz to 50 Hz, while the optimum one for spinal motor neurons is 30 Hz.

PC1084

Reliability and Validity of Pittsburgh Rehabilitation Participation Scale (PRPS) for Patients with Stoke in China

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Background: In clinical work, we notice that motivated patients make progress faster in ability of daily life than unmotivated patients. Defining and quantifying motivation is difficult, but MD Eric J. Lenze designed the Pittsburgh Rehabilitation Participation Scale a clinician-rated measure that quantifies individuals' participation in their inpatient therapy. Their study presented that PRPS is a measure of participation in rehabilitation therapies that is reliable and predictive of rehabilitation outcome. The purpose of this study, therefore, was to test the reliability and clinical utility of the PRPS in a group of patients with stroke in China. **Methods:** Stroke hospitalized patients with stroke who received rehabilitation training were evaluated with PRPS, Barthel index (BI), the United States national institutes of health stroke scale (NIHSS), From 2010 August to 2012 October. The devotion of PRPS to ability of daily life prognosis, predictive validity and reliability of PRPS were analysed with SPSS 17.0 version statistics software. The analysis results using the rehabilitation in scoring on to improve rehabilitation in value the influence of predictive validity and reliability (interrater and intrarater reliability). **Results:** The devotion of PRPS to ability of daily life prognosis was proved by multiple regression analysis (standard coefficient is 0.248, $P < 0.05$). The PRPS average was highly correlated with BI ($r = 0.786$, $P < 0.01$). The PRPS score of assessment officer A was highly correlated with that of assessment officer B ($r = 0.856$, $P < 0.01$). The PRPS score of occupational therapy was highly correlated with that of physical therapy for assessment officer A 0.926 ($P < 0.01$). **Conclusion:** PRPS has good predictive reliability and validity in the assessment of rehabilitation participation ability of Chinese patients with stroke. **References:** 1) Maclean N, Pound P. A critical review of the concept of patient motivation in the literature on physical rehabilitation [J]. Soc Sci Med, 2000, 50(4): 495-506. 2) Lenze EJ, Munin MC, Quear T, et al. The Pittsburgh Rehabilitation Participation Scale: reliability and validity of a clinician-rated measure of participation in acute rehabilitation [J]. Arch Phys Med Rehabil, 2004, 85(3): 380-384.

C.1.7. DIAGNOSIS AND ASSESSMENT OF NEUROLOGICAL, MUSCULOSKELETAL AND MOVEMENT RELATED FUNCTIONS (INCLUDING GAIT ANALYSIS, POSTUROGRAPHY)

PC1086

Determination of the Median Nerve Residual Latency Values in the Diagnosis of Carpal Tunnel Syndrome in Comparison with Other Electrodiagnostic Parameters

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Background: Along with conventional electrodiagnostic studies, several other indexes including residual latency (RL) were introduced in patients with different types of peripheral neuropathies. RL is the time difference between measured and predicted distal conduction times. This study was performed to determine the values of the median nerve RL and to investigate its sensitivity and specificity in the diagnosis of carpal tunnel syndrome (CTS). **Material and Methods:** The study was carried out among 100 hands of 75 healthy volunteers and 64 patients who had a positive history of pain or paresthesia in upper extremities and 2 of 3 signs suggesting CTS. Information including age, gender and results of sensory and motor nerve conduction velocity, compound motor action potential of proximal and distal stimulation and RL were recorded for analysis. **Results:** Normal range of the median nerve RL was found to be 1.03-2.65 (mean=1.84±0.41). The cut-off point of median RL was 2.37 for CTS diagnosis with sensitivity of 85.9% (95% of confidence interval [CI]: 84.4-87.5%) and specificity of 91.1% (95% CI: 87.8-92.2%). **Conclusion:** In mild cases of CTS, which conventional nerve conduction studies (NCSs) shows abnormalities only in sensory studies, RL may better demonstrate the effect on the median nerve motor fibers. We conclude that RL measurement of the median nerve may raise the sensitivity of NCSs for the diagnosis of CTS. **References:** 1) Uzar E, Tamam Y, Acar A, Yucel Y, Palanci Y, Cansever S, et al. Sensitivity and specificity of terminal latency index and residual latency in the diagnosis of carpal tunnel syndrome. *Eur Rev Med Pharmacol Sci* 2011; 15: 1078-84. 2) Karata M, Sozay S, Bayramo LU. Terminal latency index and residual latency in Carpal Tunnel Syndrome. *Romatizma* 2000; 15: 105-11. 3) Kraft GH, Halvorson GA. Median nerve residual latency: Normal value and use in diagnosis of carpal tunnel syndrome. *Arch Phys Med Rehabil* 1983; 64: 221-6.

PC1087

Analysis of Swallowing Maneuvers by Using 3D Dynamic Computed Tomography. Healthy Subjects

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Introduction: Swallowing maneuvers are designed to change the process of swallowing under voluntary control and learning for safety swallow. However, the kinematics and effect mechanism of maneuvers have not been fully understood. The purpose of this study was to analyze the mechanism of Mendelsohn maneuver and Super-supraglottic swallow influencing on the larynx and pharynx in three dimensional kinematics using 320-row area detector computed tomography (320-ADCT). **Methods:** Six healthy adults (23-34yrs), experienced SLPs, all proficient in swallowing maneuvers, underwent 320-ADCT during three swallows 4-ml nectar-thick liquid in 45 degree reclining position using: 1) regular swallow (RS), 2) Mendelsohn maneuver (MM), and 3) Super-supraglottic swallow (SSGS). 3D images were created at an interval of 0.10 seconds (10 frames/s). The parameters measured were: (1) critical events' timing, (2) hyoid and larynx displacement, (3) cross sectional area of

UES, and (4) length from origin to insertion of thyrohyoid muscle. **Results:** Comparing with RS, in MM, pharyngeal phase duration was prolonged and the duration of velopharyngeal and laryngeal closure increased; however, the duration of UES opening was not significantly affected. The hyoid and larynx were positioned higher at swallow onset; the duration and extent of their displacement were also increased. In SSGS, arytenoid adduction was earlier, producing early closure of the true vocal folds (TVF). Thyrohyoid shortening was earlier and produced earlier closure of the laryngeal vestibule (LV). The upper esophageal sphincter (UES) opened earlier and bolus transit was earlier. **Conclusions:** We postulated that the MM maneuver would increase duration of UES opening, but to our surprise it did not. Rather, pharyngeal phase duration and hyolaryngeal displacement both increased significantly, implying a possible effect of enhancing contraction of swallowing muscles. Higher hyoid position at the beginning suggested an anticipatory movement of swallowing. SSGS increased thyrohyoid muscle contraction (shortening), facilitating LV closure and (perhaps) UES opening. It suggested SSGS increased safety of swallow as well as facilitated a clearance of pharynx. The 320-ADCT provides new insights into the mechanism of swallowing maneuvers.

PC1088

Neurorehabilitation, Innovation of Modern Technology – Accelerometer for Paretic Upper Arm

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Introduction: Modern neurorehabilitation should be closely connected with using of new modern technology for objective diagnostics and therapy. One frequent consequence of brain damage is hemiparesis, which also causes a disorder of the upper extremity movement pattern. **Material and Methods:** Clinical study was conducted among 55 selected patients after brain damage with central hemiparesis. Two groups of patients were studied, one group with an accelerometer (30 patients - Group A) and one group without an accelerometer (25 patients - Group B). Patients in group A were measured by sensor - accelerometer for 7 hours per day of first week after admission and the last week in the care center. The following parameter was all-day percentage movement activity of paretic and healthy upper arm activity. **Results:** Using of sensor - accelerometer in the experimental group (group A) significantly improved upper arm movement activity, can objectively detected the positive changes in movement spastic pattern. The accelerometer has the role of virtual therapist for the idea of permanent monitoring by the therapist. The patients were more motivated for active cooperation during the whole rehabilitation process. **Conclusion:** The results of the study confirmed that brain plasticity can be activated by intensive interprofessional rehabilitation even several years after brain damage, rather than just one or two years after the injury or disease. Modern technology is used in diagnostics and therapy by all members of interprofessional rehabilitation team: physician, physiotherapist, occupational therapist, psychologist, speech therapist, special teacher, biomedical engineer. **Keyword:** upper arm paresis, brain damage, accelerometer. **References:** 1) Svestkova O, Angerova Y, Sladkova P, Bickenbach JE, Raggi A, Functioning and disability in traumatic brain injury. *Disability and Rehabilitation* 2010; 32: S68-S77. 2) In TS, et al. Virtual reality reflection therapy improves motor recovery and motor function in the upper extremities of people with chronic stroke. *Journal of Physical Therapy Science*. 2012, vol. 24, issue: 4, s. 339-343. 3) Lindemann U, Hock A, Stuber M, Keck W, Becker C. Evaluation of a fall detector based on accelerometers: A pilot study. *Med. Biol. Eng. Comput.* 2005, 43, 548-551.

PC1089

Establish the Quantitative Assessment of Limb Ataxia

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Introduction: Cerebellar disease is one to cause the movement disorder. Patients with cerebellar disease demonstrate ataxia which can cause poor coordination, motor control, and functional performance. Most researches on ataxia used the scale for the assessment and rating of ataxia (SARA) or international cooperative ataxia rating scale (ICARS) to assess the ataxia. The alternate nose-to-finger and heel on shin test are commonly used in clinical assessment for ataxia of upper extremity and lower extremity respectively. However, there is no quantitative assessment for ataxia. The purpose of this study was to establish a quantitative assessment for limb ataxia. **Methods:** We used the Liberty electromagnetic tracking system (Polhemus, Colchester, VT, USA) and The Motion Monitor® (TMM; Innovative Sport Training, Inc., Chicago, IL, USA) to record the alternate nose-to-finger and heel on shin test. The deviations from the straight line during the testing movements were calculated and summed up to indicate the degree of ataxia. The sensor was attached to 1 centimeter below the second metacarpophalangeal joint for the alternate nose-to-finger test and to the dorsal first metatarsal base for the heel on shin test. The assessor first guided the testing movement and then asked the subjects to repeat the test for 5 times as smooth as possible. The test-retest reliability was expressed using the intraclass correlation coefficients (ICC) with two-way mixed model and absolute type. P values less than 0.05 were considered statistically significant. **Results:** The ICCs of the path deviations of alternate nose-to-finger and heel on shin test are 0.944 and 0.719 respectively. **Conclusion:** The path deviations of alternate nose-to-finger and heel on shin test may provide quantitative information for ataxia, and may be used for outcome measurement of ataxia.

PC1090

New Method for 3D_Testing of Spinal Stabilizer Muscles

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Data on testing of spinal stabilizer muscles using isokinetic dynamometer are presented. It is shown that achieved test results enable to detect muscular imbalance even at subclinical level and to elaborate individual rehabilitation programs. **Introduction/Background:** Our 40 years' experience proved that the peak torque is the most informative indicator for dynamic force assessment, other indicators are very variable and do not have significant clinical value. **Material and Methods:** BioniX sim3D Pro allows implementing of both dynamic and static force assessment in three dimensions in sitting and standing position with the possibility of isokinetic testing i.e. movement assessment in three dimensions at rotation, flexion/extension, lateral flexion. We have conducted 56 tests of subjects aged between 16 and 62 years with BioniX Sim3 Pro system. The study group consisted mainly of men except one woman. The subjects have medical history of lower back pain of different intensity and duration. At the moment of the examination no one complained about pain at rest. X-ray examination data have not indicated any destructive changes in spine structures. **Results:** Isokinetic tests of movement around three axes were executed within predefined range of movement. Several variants of test were performed i.e. with angular speed of 90, 45, 30 and 15° per second. As the result of tests a report with graphs, mathematic analysis results and comparison of agonists and antagonists was generated. Graphical data about motion in each direction and average force data around other axes were presented in the report separately. Absolute values of both static and dynamic force in isometric and isokinetic tests (peak torque) varied in a wide range and were highly individual. Synergist compensatory force comparison was of main interest. **Conclusion:** 1) Functional assessment of spine stabilizing muscles can be performed with the help of BioniX Sim3 Pro 3D technology, allowing both isometric and isokinetic tests. 2) The results of isometric and isokinetic spine stabilizing muscle tests help to reveal not only severe pathology and certain muscular insufficiency, but also detect subclinical muscular imbalances, which is the base for individual rehabilitation program development.

C.2. PRM INTERVENTIONS RESEARCH

PC1091

Balance and Gait Analysis in Neurorehabilitation

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Introduction: Although the main problem, in CNS lesions, is pathophysiological, the great amount of brain plasticity, allow us to modify atypical motor schemas and to stabilized motor control at level that allow exerts of volitional movements. Tinetti index [TI] shows, as useful assessment tool, in neurorehabilitation. The aim was evaluation of qualities and characteristic of balance and gait, at pre/post treatment, by [TI], in analyses of approximation of patient ergonomic potential. **Material and Methods:** In quantifying and qualifying patients stance and locomotion, we deal with balance (static and dynamic), spacioperception and spacial orientation (measurements of spatio-temporal gait parameters: gait velocity, cadence and stride length), biomechanical control (range of motion, muscle tone, muscle power, etc), synergies and selective motor drive, such as quality and flexibility of locomotor patterns. As Upper Motor Neuron Disorders is heterogenic cohort, data collected on this way, are eligible as criteria for methods of choice in threatment. **Results:** Group of 25 patients, with brain injury (caused by gun shoots/traffic accident), were considered, aged 22-44, interval till the neurophysiologic rehabilitation in ½ casies were 18-24 months. When human body acts in gravitational field by contraverted motor control, [TI] enhances analysis, which lead to optimal therapy, that adapts, according estimated biomechanical and sensorimotor characteristics of stance and external conditions, such as support surface, actual locomotor drive. Through reeducation, in seria of interactive, by stretch reflexes, internally, arranged, ergonomically coordinated, with minimal number of affected muscle bellies, e.g. synergies, multimuscular motor schemas, resolves body balance and efficient gait. **Conclusions:** During balance testing we scope also competence of A and B, such as group III of fibers, neuronal pathways. Deficits of postural adjustment, which expressis in worse balance, needs proprioceptive based therapies, while lost of motor schemas, such as hemiplegic gait, required mainly locomotor reeducation. Thus, we managed to restore motor skills and reintegrate patients in environment, e.g. to help them to become effective, efficient in social stuffs and eventually, economically independent. Behind as clinical measurement instrument, [TI], in neurorehabilitation, own predictive value, even differential diagnostic, according proposals of evidence based medicine.

PC1092

Mechanical Ventilation and Mobilization: Comparison between Genders

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Early mobilization plays a key role in the functional recovery of these individuals, enabling the negative impact of neuromuscular patients undergoing mechanical ventilation (MV) being minimized or even reversed. Processes involved in functional mobility such as rolling over, sitting, standing, and walking are consolidated and strengthened during physiotherapy. The purpose of this study was to investigate the impact of gender on mobilization and mechanical ventilation in hospitalized patients in an intensive care unit (ICU). A retrospective cross-sectional study was conducted. The medical records of 105 patients admitted to a general ICU were evaluated retrospectively. The length of MV, length of ICU stay, weaning, sitting out of bed, time to performing active exercises, and withdrawal of sedation exercises were evaluated in addition to the characteristics of individuals, reason for admission and risk score. Women had significantly lower values for APACHE II scores ($p < 0.001$), duration

of mechanical ventilation ($p=0.03$), time to withdrawal of sedation ($p=0.001$) and time to onset of active exercises ($p=0.0016$). When performing multiple regression (R^2) analysis of the independent variables compared to APACHE II, for women 66.2% ($p<0.001$) of the APACHE II score were explained by withdrawal of sedation, and for men 41.5% ($p=0.047$) were explained by time to sit out of bed. Women have a better functional response when admitted to the ICU, spending less time ventilated and performing active exercises earlier.

PC1093

Cryotherapy and Extensibility of Hamstrings

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Background: The combination of cryotherapy to stretching programs has been used with the objective of providing greater gains in range of motion. Previous use of low temperature in the stretching program is suggested for best results provide extensibility and decrease discomfort during stretching sessions. The hypothermia induces reduced stretch reflex, reduction of muscle spasms, reduction of inflammation and pain sensitivity during stretching, resulting in increased extensibility. Despite the knowledge of the physiological effects of cryotherapy, there is still no consensus on the prior application on a program of stretches. The aim of this study was to determine the hamstring muscles extensibility gain, comparing the contraction-relaxation type stretching with the same stretch preceded by cryotherapy. **Material and Methods:** The research was conducted at the State University of West Paraná (Unioeste), after approval by the Ethics Committee on Research with Human (331/2011-CEP). The sample consisted of 25 subjects, divided into three groups: G1 (control), G2 (stretching) and G3 (cryotherapy + stretching). The volunteers were assessed in the pre-stretching (EV1), after a week of intervention (EV2) and finally after 1 week of follow-up (EV3). Cryotherapy was used for the plastic bag containing water and ice for 15 minutes in the posterior thigh. The stretching protocol, contraction-relaxation type, was carried out with 15 seconds to 15 seconds of contraction and relaxation, four times in each member. **Result:** For G2 and G3 there was significant gain, but, following one week to G2 was returned to baseline values. Comparing the groups, there were significant only for EV2, when G1 was compared with G2 and G3. Both the stretch, as the same preceded by cryotherapy, were equally effective in gaining extensibility. **Conclusion:** As a result, cryotherapy had better results in maintaining the gains of extensibility.

PC1094

Pain Evaluation in Healthy Individuals Submitted to Interferential Current

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Background: The interferential current therapy has been widely used as a method of analgesia, but there is controversy on its effectiveness, make it necessary studies regarding the effectiveness of the technique on different types of pain thresholds and parameters therapeutic use. So, in order to be improving, showing and working with new studies and protocols on the interferential current, the aim of this study was to evaluate the pain threshold to mechanical stimulation and cold front to interferential current therapy in healthy subjects, using a bipolar application technique on the nerve root. **Material and Methods:** The study included 20 volunteers, divided into two groups of 10 each. What one group did the first day, the other did the second. We evaluated the pain threshold with a pressure algometer pain threshold and cold by the time the VAS to reach the pain threshold. As a form of electrical stimulation was used interferential current with the parameters predefined by the researchers and

individuals were assessed on three occasions: soon after, 20 minutes and one hour after stimulation. **Results:** The comparison between the assessments with the algometer, the results were not statistically significant, both in the placebo group, and in the group stimulated. Since the assessments of pain threshold to cold by the time the placebo group showed no significant difference. In the treated group, there is a significant decrease in pain threshold between the pre-and post-interferential immediately, and an increase from the immediate post-assessment and one hour after interferential, restoring the initial values. What about the comparisons between the ratings of the VAS, was observed in the placebo group a significant increase between the pre-interferential and one hour after stimulation. In the treated group there was a significant increase in the assessments pre-and post-interferential immediate, and also an increase between the pre-interferential and one hour after the current. **Conclusion:** With the methods used in this study, interferential current produced momentary increase sensitivity to cold reversible, and did not alter the pressure sensitivity.

PC1095

Experimental Osteoarthritis Treated with Low Level Laser Therapy

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Background: The osteoarthritis is a chronic disease, which leads to multiple functional incapacity progressive, with pain presence influencing the functional activity level. The aim of this study was to evaluate the effect of laser, 660 nm, in the development of pain and swelling in rats subjected to experimental osteoarthritis. **Material and Methods:** Ten female rats were used, divided into two groups: GS-induction of arthritis in the right knee and sham treatment; GL-induction of arthritis in the right knee and laser irradiated with 10 J/cm². For the induction of arthritis was injected 0.1 ml of Freund Complete Adjuvant of the femoral-tibial articular space. The pain evaluation occurred through Paw Elevation Time (PET), when the animal walking for one minute in a metal cylinder in motion, at times before injury, after 10 days of the injection, after the 5th therapy, prior to 6th therapy and the end of the 10th therapy. The edema evaluation was performed with metallic caliper medium-laterally to the knee joint, at times similar to PET. Treatment with laser began in the 10th day after the arthritis induction on the medial interline joint. The procedure was daily, for 10 days, intervals of two days between the 5th and 6th sessions. **Results:** The results showed that for PET to GS there was significant increase after injury, with a tendency to increase in subsequent time, without significant diminishing compare post-injury with subsequent moments, to GL there was increased in the post-injury, which decreased significantly in subsequent periods. For the edema, GS presented significant appearance of it, which has not diminished; for GL the edema was also present, but there was a significant reduction of the same. **Conclusion:** We concluded that the laser produce effects on pain and edema, with diminishing of them.

PC1096

Naloxone Interference on Effect of Continuous Therapeutic Ultrasound on Wistar Rats

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Background: The pain is defined by the International Association for the Study of Pain as an unpleasant sensory and emotional experience associated with present or potential tissue damage, or described in relation to this injury. The analgesic effect of the ultrasound is credited by increasing the pain threshold, which occurred due to changes in the concentration of intracellular Na²⁺, and by the thermal action,

although the mechanisms of action are still uncertain. The aim of this study was to evaluate the effects of the ultrasound use in knees, of rats, irritated chemically, analyzing the pain and swelling, and if these effects suffer interference by the naloxone application. **Material and Methods:** We analyzed 21 Wistar rats divided into: GC – hyperalgesia and untreated; GU – hyperalgesia and treated with ultrasound, and GUN – hyperalgesia, with prior injection of naloxone and subsequent ultrasound. Hyperalgesia was induced with 100 µL of 5% formalin in right tibiofemoral space. In the animals of GUN was injected naloxone 1 µg in right tibiofemoral space, 15 minutes before the hyperalgesia. Treatment consisted of two applications of ultrasound. For hyperalgesia assessment was used Von Frey Digital filament, and to the edema metallic caliper. The evaluations were performed: pre-injury (EV1), after 15 (EV2), 30 (EV3), 60 (EV4) and 120 (EV5) minutes of hyperalgesia. **Results:** The results showed an increase in knee diameter and decreased the threshold to nociceptive stimuli in all groups, and only for GU nociception showed a threshold increase in the EV5. **Conclusion:** It is concluded that ultrasound analgesia suffer interference with naloxone.

PC1097

Low Intensity Laser and Ultrasonic Therapy in Joint Pain of Wistar Rats

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Background: In cases of joint pain the low intensity laser therapy and the ultrasound therapy has been used as therapeutic modality, with reports of benefits, which may occur by reduction of inflammation, changes in neurotransmission and also by release of endogenous opioids. Both therapeutic ultrasound as a low level laser therapy are used to control musculoskeletal pain, despite controversy about its effects, yet the literature is poor and also presents conflicting results on possible cumulative effects of techniques association. The objective was to compare the antinociceptive effects of laser therapy, therapeutic ultrasound and the association. **Material and Methods:** 24 Wistar rats were separated into: GPL – induction of hyperesthesia in the right knee, and untreated; GUS – treated with therapeutic ultrasound (1 MHz, 0.4 W/cm²) GL – low intensity laser (830 nm, 8 J/cm²); GL+US – treated with both techniques. To produce the hyperesthesia 100 µl of 5% formalin solution were injected into the tibiofemoral joint space, which was assessed by von Frey filament digital before (EV1), 15 (EV2), 30 (EV3) and 60 (EV4) minutes after induction. **Results:** in comparison within groups, for the withdrawal threshold when the filament was applied to the knee, the back to baseline was observed only for GUS. **Results:** Comparisons between groups were not different in EV3, and GL was higher than GPL. In EV4 the three groups effectively treated were higher than placebo. On withdrawal threshold on the plantar surface, GL showed return to baseline values already in EV3, and GUS and GL+US returned in EV4. Comparing the groups in EV3 there was a significantly lower threshold to compare GPL with GL and GUS (p<0.05), and there was only EV4 differences when comparing GPL with GUS. **Conclusion:** both modalities showed antinociceptive effects, but the therapeutic ultrasound was superior to laser and the combination.

PC1098

Long-Term Effects of an Exercised-Based Patient Education Program

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Introduction: People with MS (pwMS) have to cope with disease-related problems, such as fatigue, gait disturbances and both phys-

iological and psychological disfunctioning each day. Although, physical exercise is one option to minimize physical and psychological symptoms, pwMS often show a reduced exercise behavior, which can be explained by various reasons [1, 2]. In order to counteract inactivity and related neurodegeneration [2, 3], we conducted an exercised-based patient education program (ePEP) aimed at a long-term integration of physical exercise in daily life. The program combines specific training sessions, theoretical aspects and competence transfer, which empowers patients to a self-regulated training management. **Methods:** 14 PwMS attended in a 6-week ePEP twice a week, followed by a 12 week self-regulated training phase. Psychometric (MusQoL, WEIMuS) and physical tests (Timed-Up-and-Go-Test, 6-Minute-Walk-Test, Functional Gait Assessment) were measured pre (T0), post (T1), 12 weeks (T2) and one year after the intervention (T3). **Results:** Patients improved significantly in gait speed, gait distance, gait quality and quality of life in T1 and T2 compared to T0. Fatigue decreased non significantly from 22.9±14.7 (T0) to 18.6±12.8 (T1) and increased again to 20.6±14.9 (T2). Improvements in gait distance and speed in T2 have been significantly maintained in T3. Quality of life and fatigue decreased slightly from T2 to T3, however results were still better compared to T0. **Conclusions:** The results of this study demonstrate that an ePEP in PwMS causes positive short-term and long-term effects in gait performance and quality of life. With respect to the chronic and neurodegenerative character of MS, keeping up motor performance is a key factor for patients' mobility, independence and quality of life. A notably advantage of this ePEP is the consideration of different patients' characters to ensure an individual and high quality training management. We conclude, the ePEP is an important non-pharmacological option to integrate physical exercise in daily life with the consequence of maintaining mobility. **References:** 1) Kersten et al (2014). *Akt Neurol*, 41, 100-106. 2) Beckerman et al (2010). *Phys Ther*, 90, 1001-1013. 3) Tillerson et al (2002). *J Neurosci*, 22, 6790-6799.

PC1099

Effectiveness of Combined Lumbrical Muscle Splints and Stretches on Symptoms and Function in Carpal Tunnel Syndrome

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Introduction: The Objective is to evaluate the effectiveness of an intensive lumbrical splint/stretch combination on carpal tunnel symptoms and function. **Material and Methods:** Prospective observational study. Outpatient (N=35) with mild to moderate carpal tunnel syndrome. A 6-week home regimen of nocturnal splints combined with stretches performed 2 times daily. The effect of the intervention on carpal tunnel symptoms and function was examined with Self-Administered Questionnaire of Brigham (SAQB). We also evaluated whether subjects obtained surgery at 36 months. **Results:** There were significant main effects over time for all outcome measures at 6 weeks. There was a significant interaction effect for the SAQB. By 36 months only few percentage of subjects had elected to undergo surgery. **Conclusion:** A combination of lumbrical splint with lumbrical intensive stretches was effective for improvements in functional gains at 6 weeks postbaseline. Our findings support further evaluation of this combination as a method of conservative carpal tunnel syndrome treatment.

PC1100

Outcome of Treatment of Work Related Musculoskeletal Disorders in On-Site Clinics in Information Technology Companies

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Introduction/Background: Work related musculoskeletal disorders (WRMSD's) are a constellation of disorders common in computer users which involves muscle, fascia, tendon and/or neurovascular structures of neck and upper limb; also affects other body parts. In India, several epidemiological studies have reported prevalence of musculoskeletal discomfort in 75% of Information Technology (IT) workers. The purpose of this study was to analyze risk factors, clinical features and outcome of treatment of WRMSD among IT professionals in onsite clinics. **Materials and Methods:** Medical records of 8160 IT professionals who complained of musculoskeletal pain and discomfort were analyzed. All the subjects reported their symptoms to a single orthopedic and rehabilitation physician at the onsite clinic present in their respective office premises. The physician performed the clinical assessment and diagnosis. After diagnosis all the subjects received a sequenced, multidisciplinary treatment protocol. Visual Analog Scale (VAS) for pain and employee's subjective feedback on functional recovery was collected. Reports from 2006 to 2013 were analyzed statistically. **Results:** Age of the participants varied from 20 to 60 years (Mean – 30 years). 85.9% of the participants were aged 25 to 45 years. The participants were predominantly males (72.6%). The commonest body parts involved were neck and upper back (58.5%), lower back (47.5%), followed by shoulder (30%) and wrist (19%). Pain was reported by all categories of participants which included Managers, Software Engineers, Application Engineers, Analysts, HR, Receptionists and other office workers. Myofascial Pain Syndrome was the commonest diagnosis (45.9%). 96% of the subjects felt reduction in pain and improved function and productivity following the sequenced rehabilitation protocol. **Conclusion:** The on-site clinic discussed in this study is unique because of the comprehensive methodology of assessment, diagnosis, treatment, and follow-up that it provides to the employees at their workplace. On-site employee health clinics are recommended for the effective prevention and management of WRMSD in view of the high prevalence of successful outcomes seen in this study.

PC1101

Assistive System to Regain Functional Mobility of the Shoulder Joint

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The mobility of the upper extremities is crucial for activities of daily living (ADL) and independent housekeeping [1]. For most ADL such as cooking, washing or combing hair both hands are needed and a range of motion of up to 120° abduction or flexion is required [2]. An assistive system can be helpful for people with an impaired shoulder joint caused by illness or injury, e.g. to compensate for reduced muscle forces. Post-operative rehabilitation and neurorehabilitation of stroke patients are further fields of application. Therefore, a portable prototype of an assistive system for the shoulder was developed. Ease of use, low weight and an appealing design are essential for the acceptance of an assistive system. Besides, safety aspects are highly important for a device interacting with the human body. A first prototype served as concept verification and was presented at the World Congress of Biomechanics 2014 [3]. The prototype was further optimized in terms of weight reduction and distribution, safety, wearing comfort and usability. The operability was improved by adding electromyography (EMG) and voice control. The revised prototype will be presented at the ISPRM congress. The system has been realized as exoskeleton for the right or left arm. Rigid links bear the occurring forces, thus preventing additional load in the shoulder. It consists of three serial joints: the first replicating the rotation of the scapula, so that the axes of the second and third are aligned with the glenohumeral joint. Each joint is driven by a DC motor that is placed ergonomically on the back of the user. The system supports 120° abduction, 120° flexion and 50° extension and can be controlled intuitively using surface EMG signals or alternatively using voice control. In

EMG mode, the device detects the muscle activity and adjusts the level of assistance accordingly. Initial user studies on acceptance, satisfaction and suitability for everyday life will be performed with the revised prototype. Considering the demands and desires of patients, physiotherapists and medical staff will be important for establishing an assistive system. [1] J. C. Lin et al., 2008, [2] S. Namdari et al., 2012, [3] E. Scheuner and B. Heinlein, 2014.

PC1102

Avoidance of Skin Lesions by Chemical Burns by Electrodes during Electrotherapy and Improvement of the Hygiene and Economy by Using Disposable Electrode Films in Electrotherapy

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Introduction/Background: The disadvantages of the so far used fasteners are the following: a) elastic straps: different contact pressure in the various areas of the electrodes leads to skin lesions. Cleaning and alcoholic or thermal/chemical disinfection necessary; b) short stretch bandages made from elastic fabrics: due to absorption of humidity the coefficient of elasticity and the contact pressure can be reduced chemical/thermal disinfection, drying and winding is required crinkles between the electrodes (skin lesions!) are in default of visibility not recognisable. **Material and Methods:** We developed a fixing agent without these disadvantages. Width, thickness, coefficient of extension and smoothness such as other important physical parameters were determined through experiments and clinical tests. The material is free of TNPP, to avoid skin sensitisation. After testing on myself and volunteers, a comparison with conventional fasteners was performed in a randomized, controlled and prospective study with 56 informed patients, who agreed to the test. After each application the patients were questioned if they had itchiness, redness and how they felt (comfortable/not comfortable). The therapists made a visual inspection and an estimation of the amount of time to fix the electrodes. Thereafter 145,000 single treatments were carried out using the film in a period of 30 months. All results were analysed descriptively. **Results:** There was no single skin lesion in the collective of patients treated with the film. The patient's assessment was the same as with conventional fastening methods. The amount of time to fix the electrodes and disposal as well as the elimination of recycling were considered advantageous from the therapists. **Conclusion:** By using the film an affordable, according to the legal regulations safely tested disposable medical device for the fixation of the electrodes is available. So far, no skin lesions or other adverse events have occurred after extensive use. The patients are universally satisfied with the usage of the film. Using the disposable film is an improvement to the previously used methods to fix electrodes.

PC1103

Focused Low-Energy Extracorporeal Shock Wave Therapy (ESWT) with Chronic Foot Ulcers. 5 Cases

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Introduction: There are some publications dealing with ESWT of wounds in an animal model and burns in humans. Only a few describe the healing of long lasting ulcers due to diabetic polyneuropathy and none deals with the disturbances of the autonomous after paraplegia. **Methods and patients:** 4 patients with an average age of 82.3 years suffering from diabetic polyneuropathy and microangiopathy had had foot ulcers for 6-12 years. 3 of them had already had toe phalanges amputations. Another 72 year-old patient suffered from posttraumatic incomplete paraplegia, American Spine Injury Association classification C-D for 22 years. There was a 4 cm in diameter undermined malum perforans under the right calcaneus for these years. Many surgical interventions including two

skin transplantations 20 years and 8 years before had failed. All patients received one weekly session with ESWT (Duolith, Storz Medical) of 0.10 mJ/mm² energy flux density in the focus. **Results:** After 2 to 7 months for the diabetics and 11 months for the patient with paraplegia the ulcers were closed. There were no undesirable side effects. The documentation of the healing process will be presented in pictures. **Discussion:** The treated chronic wounds were due to a diabetic microangiopathy and the posttraumatic disturbance of the autonomous as well. ESWT releases many useful neurotransmitters. Amongst others the endothelial vascular growth factor, the endothelial nerve growth factor and the endothelial nitric oxidase. ESWT is also anti-inflammatory and antibacterial efficient. This may explain the healing of chronic multibacterially infected microangiopathic wounds. **Conclusion:** ESWT may be an additional instrument to treat chronic diabetic ulcers and chronic wounds due to disturbances of the autonomous.

PC1104

An Interdisciplinary, Staged Audit of Hemiplegic Shoulder Pain (HSP) Management on a Brain Injury Rehabilitation Unit

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Background: Shoulder pain is a common consequence of hemiplegia complicating acquired brain injury. It is associated with poorer outcomes and extended hospital stay. Timely and effective management by an interdisciplinary team (IDT) can reduce its impact. The first audit examined the incidence of HSP and the thoroughness of physiotherapy evaluation. Two years later a re-audit by the IDT was extended to evaluate staff training. We used the Northwick Park shoulder pain integrated care pathway (ICP) published in 2002 as the practice gold standard. **Methods:** *Chart review.* In 2013 a physiotherapy audit of HSP and subluxation in 20 patients demonstrated good recognition of shoulder pain amongst clinical staff but significant gaps in treatment. Documentation was altered as the first stage in developing a local ICP. In 2014 re-audit of HSP management by several IDT members examined 20 patients' records. Use of drugs, injections and imaging was determined. **Clinical staff survey.** In addition a questionnaire was circulated to 30 IDT members to establish the extent of their knowledge about management of hemiplegic shoulder pain. **Results:** In our audit we found that imaging is rarely carried out, analgesics and injections are used in an unsystematic way although assessment documentation of shoulder pain and subluxation is generally good. Some patients and their families receive training in how to manage HSP. An interdisciplinary group has been convened to develop and implement a local ICP in management of HSP. It will be trialled on one ward, and education and rollout will occur through the hospital's interdisciplinary teaching framework. **Conclusion:** Staff education about HSP prevalence and treatment is sub-optimal. Annual intensive updates may be the most effective way to ensure a consistent approach to management of HSP among rehabilitation clinicians. **Reference:** Shoulder pain after stroke: a review of the evidence base to inform the development of an integrated care pathway. Lynne Turner-Stokes, Diana Jackson. *Clinical Rehabilitation* 2002; 16: 276–298.

PC1105

Acceptance and Usability of the Brain-Machine Interface: Focus Group Findings

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Introduction: it has long been described that the Brain-machine interfaces (BMI) enable individuals with severe motor disabilities, such as high cervical spinal cord injury or neuromuscular diseases, to communicate with or to control their environment. This study investigates how to determine the barriers and mediators of the

BMI acceptance and the priorities of people with severe physical disabilities in terms of BMI design. **Materials and Methods:** A focus group interview was conducted with tetraplegic individuals with high cervical spinal cord injury (n=4) and those with severe neuromuscular diseases (n=4). An example of video clip showed that invasive BMI technologies included electrode implantation and robot-arm training. Non-invasive BMI technologies were consecutively showed by another video clip. This study discussed the needs and applicable areas of the participants for the BMI technology. Then, the participants were asked about their preferences in domains of usability, which include accuracy, time delay for operation, setup time, training period, size, safety issue, and acceptable cost, in order to explore barriers and mediators of the BMI acceptance. **Results:** Three categories of the BMI application appeared from the mutual discussion among the participants: to cope with life-threatening situations, to assist with ADL and social activities, and to realize oneself with the BMI. In terms of the BMI design, the participants prioritized in the order of accuracy of movement, time delay of operation, safety, error rate, and setup time. While nine of respondents preferred to use an electrode cap, one accepted to undergo surgery in order to implant the electrode for the BMI. Participants made their consensus about 7 domains of BMI usability: 80% in accuracy; 2 minutes delay in response; 2 months with five-time-a-week training period; 20 minutes set-up time; one major complication in 10 years; comparable size with home ventilator for powered wheelchair, ~2 thousand dollars for expense. **Conclusions:** This study investigates perceived applicable area and preferences involved in designing and evaluating the BMI systems for individuals with severe motor disabilities. By applying participatory research paradigms and qualitative methods, these results would guide the BMIs to meet end user needs in development.

PC1106

Applying Biomechanics to Evaluate the Effectiveness of Pre and Post Hydrotherapy Treatment on Adults with Cerebral Palsy

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Introduction/Background: Several studies have reported the effectiveness of hydrotherapy programs for individuals with cerebral palsy (CP); however, these studies have excluded the adult population. The objective of this research is to investigate the effectiveness of a hydrotherapy program on two ambulatory adult females (GMFCS I) with CP. Physiotherapy and biomechanical assessments were performed before and after an aquatic intervention program to evaluate each participant's functional mobility. **Materials/Methods:** Both before and after a ten week hydrotherapy program, each participant was scored using the timed-up-and-go, 6 minute walk test, GMFM-66, and Berg's Balance. Motion trajectories using a Vicon Corp. infrared camera system were collected to calculate spatiotemporal and kinematic gait parameters. A Bertec force plate was synchronized to collect ground force reactions for the calculation of kinetics. Hydrotherapy sessions were held twice weekly at a community pool for 45 minutes. Water walking was performed for 30 minutes each session, and leg strengthening exercises for 15 minutes. **Results:** Spatiotemporal measures revealed no differences in one participant between pre and post-therapy, but for the other, an increase in step length (66 to 74±3 cm) and walking speed (1.34 to 1.54±0.05 m/s) was observed. Both participants showed improvements in the timed up and go, the 6 minute walk test, and the Berg's balance test, while the GMFM was maintained for one, and decreased slightly for the other (decreased ability to balance on affected leg). The kinematics of motion in the sagittal plane resulted in an increase in the range of motion at the ankle on the affected side of one participant, while the other participant increased range of motion at the hip of the affected side and the knee of both affected and unaffected limbs. Finally, the kinetics in the sagittal plane showed a decrease in the peak moment at the ankle of the affected side for both participants. **Conclusion:**

Hydrotherapy appears to increase function for these participants. However, the biomechanics reveal that the two participants have different methods of compensation to achieve this function. Larger studies are required to better assess the effectiveness of hydrotherapy for adults with CP.

PC1107

Influence of Cryotherapy Application Time on Skin Sensitivity

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Background: Cryotherapy is a treatment modality with several therapeutic effects, of low cost and easy to apply and access. This study aimed to observing whether there are changes in sensitivity according to cryotherapy application time, in addition to skin sensitivity behavior after treatment. **Material and Methods:** Participated in the study 21 individuals (14 females and 7 males, mean age 23.8±4 years) who were randomly distributed in three groups with 7 individuals each. Groups received cryotherapy application for 10, 20 or 30 minutes and were called groups C10, C20 and C30, respectively. All participants were previously submitted to skin sensitivity evaluation by Semmes-Weinstein monofilament and were evaluated immediately after cryotherapy application, 5, 10 and 15 minutes after application. Data were analyzed with Friedman's test complemented by multiple comparisons post-test (Dunn's post hoc). **Results:** All individuals had hypoesthesia in the evaluation immediately after cryotherapy application. There has been significant difference in sensitivity recovery of group C20 as compared to C10 and C30 10 minutes after the intervention (p=0.0498). For groups C10 and C30, sensitivity has returned 15 minutes after the end of application. **Conclusions:** There has been lack of tactile sensitivity five minutes after the end of application, regardless of intervention time. Normal sensitivity recovery was observed after 10 minutes when cold was applied for 20 minutes, and after 15 minutes when cold was applied for 10 or 30 minutes.

PC1108

Factors Influencing the Applied Torque During Manually Applied Plantarflexor Stretches in People with Multiple Sclerosis

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Background: Increases in stiffness in people with Multiple Sclerosis (pwMS) are commonly managed with stretching; however there is minimal evidence about the stretch-related parameters, such as applied torque, that effectively reduce stiffness. This study determined the magnitude of ankle plantarflexor torques pwMS can achieve during commonly prescribed manual stretches. **Methods:** Four stretches were investigated; stretching in step standing (WALL); using a step (STEP); pulling the ankle into dorsiflexion (PULL) and standing in a frame (FRAME). Joint position and the forces applied through the foot were measured using 3D motion analysis and torque transducers. Slow (5°/s) and fast (170°/s) stretches were applied via a motor and used to quantify the degree of passive stiffness and stiffness related to stretch reflex activity. **Results:** PwMS (n=27, EDSS 4.5-7.0, 54±8.08 yrs, 12 progressive MS, 15 Relapsing Remitting MS) were compared to age and gender matched controls (n=15 53.4±6.5 yrs). PwMS has higher stretch reflex-associated ankle stiffness. PwMS achieved less lengthening of the gastrocnemius compared to matched controls when stretching (P<0.05) but similar ankle torques reflecting increased activation of the plantarflexor muscles during the stretch. Stretches in weight bearing positions (WALL AND STEP) produced higher plantarflexor torques. The plantarflexor torque during manual stretches was not correlated with functional ability or ankle stiffness. PwMS with lower functional ability pre-

ferred the more supported PULL and FRAME stretches **Conclusion:** Higher torques were achieved with ankle stretches in weight bearing. Determining the torques achieved during commonly prescribed stretches will guide studies exploring the effects of applied torque on muscle stiffness.

PC1109

The Effect of Applied Torques on Plantarflexor Stiffness and Range of Motion in People with Multiple Sclerosis

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Background: The optimal parameters of stretching to alleviate symptoms of hypertonia and contracture in people with Multiple Sclerosis (pwMS) remain unclear. This study assessed the effect of varying the applied torque on hypertonia and contracture and the impact of the participant's baseline characteristics. **Methods:** A constant torque stretch of the ankle plantarflexor was applied for 30 minutes in 14 pwMS. A servomotor applied 3 levels of stretch (0.42; 0.30; 0.18 Nm/kg). Ankle range of motion (ROM) was monitored during each stretch. Stereotyped ankle plantarflexors stretches at 5 o/s and 175o/s assessed passive and stretch-mediated stiffness pre- and post-stretch and at 10 minute periods over a 30 minute post-stretch interval. **Results:** Fourteen pwMS were assessed (age 57.2±10.0 yrs, BMI 26.9±6.9 Kg/m², 11 female, 4=Relapsing Remitting; 4=Primary Progressive; 6=Secondary Progressive). Their baseline characteristics were compared to 13 matched healthy controls (age 55.2±5.9 yrs BMI 26.9±6.5 Kg/m², 11 female). At baseline pwMS had reduced ankle ROM and higher passive stiffness compared to matched healthy controls. In pwMS higher applied torques led to a significantly greater increase in ROM. Passive stiffness decreased with stretching and remained reduced for the 30 minutes post-stretch period but there was no effect of applied torque. Stretch reflex mediated stiffness was not affected by stretching. People with higher baseline passive or stretch-reflex mediated stiffness achieved larger reductions in these parameters with stretching. **Conclusions:** Higher applied torques improves range of movement and the effects on hypertonia depend on participant's baseline characteristics.

PC1110

Malawian and Sierra Leonean Prosthetic and Orthotic Users' Satisfaction with Their Lower-Limb Assistive Device

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Introduction: Assistive technology is required to implement the Convention of Rights of Persons with Disabilities which asserts that all people with disabilities have the right to personal mobility and available and affordable assistive technology **Aim:** Investigate patients' satisfaction with their lower-limb prosthetic or orthotic device and related service delivery in Malawi, and to compare groups of patients regarding type and level of device and demographics. **Methods:** Questionnaires, including QUEST 2.0, were used to collect self-reported data from 83 patients in Malawi and 139 patients in Sierra Leone. **Results:** Patients were quite satisfied or very satisfied with their assistive device (mean 3.9 in Malawi and 3.7 in Sierra Leone out of 5) and the services provided (mean 4.4 in Malawi and 3.7 in Sierra Leone out of 5, p<0.001), but reported many problems (418 comments made in Malawi and 886 in Sierra Leone). About half of the patients did not, or sometimes did not, have the ability to access services (71% in Malawi and 40% in Sierra Leone). Patients using above-knee devices were less satisfied with the services received than patients with below-knee devices. Women in Sierra Leone had poorer results when compared to men in terms of satisfaction of assistive device and service. **Conclusion:** Lower-limb prosthetic and orthotic patients were quite satisfied with their assistive devices. The patients in

Malawi were very satisfied with the service received, while patients in Sierra Leone were quite satisfied in spite of the fact that more than half of the assistive devices were in need of repair. Access to repairs and follow-up services were important to patients, and should be addressed by both professionals operating within the rehabilitation field and policymakers. *References:* 1) Magnusson L, Ahlström G, Ramstrand N, Fransson EI. Malawian Prosthetic and Orthotic Users' Mobility and Satisfaction with their Lower-Limb Assistive Device. *Journal of Rehabilitation Medicine* 2013; 45: 385–391. 2) Magnusson L, Ramstrand N, Fransson EI, Ahlström G. Mobility and satisfaction with lower-limb prostheses and orthoses among users in Sierra Leone: a cross-sectional study. *Journal of Rehabilitation Medicine* 2014; 46: 438–446.

PC1111

The Use of Gloreha Idrogenet in the Clinical Setting: a Retrospective Analysis of 18 Months Experience

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Purpose: Gloreha Idrogenet is a robotic device (RD) for assisted rehabilitation in patients with upper limb (UL) impairment. In the attempt to clearly define the different strategies and modalities of its use, we retrospectively evaluated the clinical experience in the use of that RD. *Methods:* 80 patients, 34% female (mean±SD age: 50.1±17.1 years, Range 15–86 years) were extracted from the RD database of 18 months use. The total amount of sessions, number and type of exercise done were determined. Patients were stratified according to type of disability, affected side, sex and age. *Results:* patients were affected by a Central Nervous System (stroke, brain injury) in 69.2% of the cases, in 4.2% by Peripheral Nervous System, in 6.7% by Spinal Cord Injury and in 9% by musculoskeletal injury. Each patient performed, on average, 14.1±2.3 sessions. RD was effectively used for a total amount of 1,112 sessions (3.1±0.2 sessions/day, corresponding to 90 minutes/day). Every session was performed with 5 different exercises (“Numbers”, “Handle”, “Wave”, “Fist”, “Pinch”) for a total amount of 7,787 exercises done. In 95% of the patients we applied the “Sequential” modality with all the 5 different exercises, 4% of the patients were not able to effectively being treated. Generally that was due to wrist and fingers spasticity ≥3/4 according to Ashworth score. No side effects (discomfort, pain) were registered during all the sessions. In the 49% of the cases the tutor size was XS-S, in the 48% M-L, XL in the remind of the cases. The hand size was XS-S in the 10.7%, S in 27.3%, M in 41.4%, L in 15.2% and XL in 5.2%. The thumb size XS in the 8.7%, S in 24.9%, M in 37.4%, L in 19.4% and XL in 9.5%. *Conclusions:* in clinical setting the RD Gloreha can be used for a wide range of UL disabilities. Dropout rate is negligible and determined exclusively by severe spasticity. Gloreha showed high mechanical resistance along with time even when exposed to a few hours of use for many consecutive days.

PC1112

The Perceived Effectiveness after Gloreha Treatment in Patients with Stroke: a Comparison with Physical Therapists Judgment.

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Background: We evaluated the perceived effectiveness of robotic assisted mobilization (Gloreha Idrogenet) as an adjunctive intervention to traditional standard rehabilitation in patients with upper limb dexterity impairment after stroke. *Material and Methods:* We conducted a single center clinical trial on 25 patients, 43% female (mean±SD age: 60.4±13.1 years), and 30 physical therapists (PTs)

(mean±SD age: 34.9±7.7 years, job experience: 10.3±2.1 years). Patients received explanation about device functioning and one session of assisted mobilization of the hand through the robotic device Gloreha (RD, experimental group), while PTs (control group) received explanation about device functioning and treatment modalities (technical presentation, short movie and practical demonstration). A Likert questionnaire (0=not at all; 4=very much) with 14 questions was created to explore patients and PTs opinion about the effectiveness of Gloreha according to ICF principles. The opinion was asked about the potential clinical and functional benefit on hand and wrist (HW): mobility, strength, pain, stiffness, grab-release of objects, grooming, dressing, daily life duties, job-family and social participation. A specific question was about the opportunity to use the device as a home rehabilitation tool. *Results:* A significant difference in PTs and patients opinion was found about the possibility to receive advantage on HW strength (2.2±0.8 vs 2.3±1.1, p<0.05), grab-release (2.1±0.9 vs 2.7±1.05, p<0.05), dressing (1.4±0.8 vs 2.4±0.9, p<0.05) and grooming (1.4±0.8 vs 2.2±0.8, p<0.05). Between the two groups, the level of agreement about the eventual effectiveness on HW mobility, pain, stiffness and smoothness was not different (p>0.05). About pain treatment, the PTs showed a better opinion than patients on the possibility to have good benefit from the robotic treatment (2.9±0.8 vs 1.1±1.2, p>0.05). Patients' opinion about the opportunity to use the RD at home was the slightly higher when compared to the control group (2.6±0.9 vs.

PC1113

Robot-Assisted Therapy Integrated with Virtual Reality for Rehabilitation of Hand Function After Stroke: A Clinical Case Study

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Case Diagnosis: The patient, F.M., was a 68-year-old woman with left hemiparesis secondary to a right hemispheric stroke occurred 8 months prior to examination. *Case Description:* This clinical case study describes a tailored rehabilitative intervention with Gloreha®hand rehabilitation glove in a chronic stroke patient. Robot-assisted therapy was administered in outpatient setting and consisted of 5 sessions of 25 minutes each per week for 4 weeks overall. During the same period the patient also performed daily mirror box therapy and physical therapy (2 sessions/week). Neither transcranial magnetic stimulation nor botulinum toxin injections were administered to the patient. Clinical outcomes for this patient were measured by the same operator before and after 20 sessions of robotic therapy. The most significant improvements were observed in the following tests: MRC (flexion and extension of fingers and wrist, pronation and supination of forearm); Ashworth Scale (wrist and finger flexion); Motricity Index (pincer grip, elbow flexion, shoulder abduction); WMFT (before treatment 30/85, after treatment 52/85); Fugl - Meyer (23/66 - 43/66); ARAT (14/57 - 25/57); CMSA (arm stage 5 – stage 6; hand stage 3 – stage 4); SS-QOL (80/245 – 147/245); Barthel Index (80/100 – 90/100). *Discussion:* Paresis of distal upper extremity is a major cause of disability after stroke: robot-assisted therapy integrated with virtual reality is an innovative rehabilitation approach that can be used in combination with conventional therapy. Robotically-assisted integrated rehabilitation devices can provide high intensity repetitive training which may affect functional recovery after stroke. For rehabilitation of hand motor function, either end-effector and exoskeleton devices showed similar or additive effects relative to conventional therapy in patients with chronic stroke. Gloreha® hand rehabilitation glove is an exoskeleton device that provides customizable sensorimotor robotic training through both single and synchronous mobilization of the metacarpophalangeal and interphalangeal joints. Movement of the hand is associated with digitally enhanced visual and auditory

feedback to deliver sensory reinforcement. *Conclusions:* A customized program of robotically facilitated rehabilitation was associated with short-term improvements in several measurements of upper extremity function in a patient with chronic hemiparesis after stroke.

PC1114

Improved Physical Functioning from Yoga after Stroke

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Introduction: Complementary and alternative medicine (CAM) is becoming increasingly popular, and people with functional limitations or neurological conditions are more likely to engage in CAM when compared to individuals without such limitations or conditions. 1, 2 Yoga is a CAM technique which traditionally addresses the physical body, using postures, diaphragmatic breathing, and meditation. *Methods:* The purpose of this study was to assess improvement in pain, range of motion (ROM), strength, and endurance after 8 weeks of therapeutic-yoga. Inclusion criteria for the pilot study were; chronic stroke (>6 months); >18 years old; completed all stroke rehabilitation; able to stand with or without a device; able to speak and understand English; scored a >4 out of 6 on the short 6 item Mini-Mental State Examination (MMSE); 3 and agreed to commit to two assessments and 16 sessions of group therapeutic-yoga. The following variables were assessed: demographics, pain, cervical and hip range of motion, bilateral hamstrings passive ROM (PROM), hip flexion active ROM (AROM), upper extremity strength, and endurance. Therapeutic-yoga sessions were delivered in group sessions with no more than 10 people per group. Sessions were one hour long, twice a week, for 8 weeks (16 sessions). The therapeutic-yoga intervention was taught by a certified yoga therapist (CYT). *Results:* 47 people were enrolled in the study. In the control group, upper extremity strength improved, however significance was not maintained after Bonferroni correction. People randomized to yoga experienced significant improvement in pain scores ($p=0.004$), bilateral neck ROM (all $p<0.001$), passive hamstring ROM bilaterally ($p<0.001$). Upper extremity strength significantly improved ($p=0.002$), while lower extremity strength did not. Endurance improved, as individuals randomized to the therapeutic-yoga group demonstrated an increase in the Average Number Of Feet Walked In 6 Minutes. *Discussion:* In this sample of people with chronic stroke, we found significant improvements in multiple aspects of physical functioning after 8 weeks of therapeutic-yoga. Such improvements are important as people with chronic stroke are living with multiple physical impairments that negatively impact many aspects of daily functioning and participation in society.

PC1115

The Influence of Direct Current over Proliferation of Cancer Cells in “In Vitro” Assay

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Introduction: The rehabilitation after cancer diseases is rather difficult. Knowledge of influence physiotherapeutic method over proliferation process is insufficient. It is considered that physiotherapeutic methods could accelerate neoplastic process. Thus using this methods are very limited in treatment patients with cancer anamnesis. Among of them are electrotherapeutic methods. Unfortunately, there are in literature not a lot of results of base researches in this area. It is much more difficult to exclude possibility proneoplastic activity of this methods than confirm this action. However, it is very interesting, that in experimental oncology direct current is used with chemotherapy, what is known as electrochemotherapy. This study in base research area. Aim of the study is checking the influence of direct current over proliferation

and cell cycle of cancer cells in “in vitro” assay. *Materials and Methods:* The following human cell lines were used- A549 (non small cell lung carcinoma), ES-2 (ovary carcinoma), HT29 (colon carcinoma), MCF-7 (breast carcinoma). The cells were plated twenty-four hours before treatment. Then the cells were exposed to direct current (0.1 mV up to 1 mV) during 10 or 20 min. The in vitro cytotoxic effects were examined after 96 h in SRB assay or in cell-cycle analysis using the Cell Quest program (Becton Dickinson, San Jose, CA, USA). *Results:* In this assay it wasn't observed the acceleration of proliferation of cancer cells. On the contrary, it was shown that direct current inhibit proliferation in much situations. It is better visible after longer exposition to direct current. In cell cycle analysis were not occur any significant changes. *Conclusion:* It wasn't prove that direct current accelerate proliferation of cancer cells. The research was supported by Polish National Science Center Grant No. UMO-2012/05/D/NZ7/02263.

PC1116

Treatment of Post-Stroke Lymphedema with Compression Bandaging: a Feasibility Study

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Introduction/Background: Between 10-33% [1] of the patients with hemiparetic stroke will encounter a lymphedema of the upper limb. This lymphedema, which is mostly present in the fingers- hand – forearm; hampers the neurological rehabilitation. Treatment options for lymphedema are numerous but compression is a cornerstone. Therefore, we evaluated the addition of a compression bandage for the treatment of post-stroke lymphedema. *Material and Methods:* Three patients with stroke were prospectively included in the current study. All patients gave consent after being informed about the study objective. A compression bandage was added to the neurological rehabilitation program given in the rehabilitation center. All patients wore a compression bandage during the day and night except during neurological and occupational rehabilitation. The bandages were worn for three weeks and an additional two week follow-up was implemented. The bandages were applied by means of short-stretch bandages on the fingers, hand and fore-arm. Hand and arm volumes were assessed by means of jeweler rings and by circumference measurement, more specific a ‘figure-8-method’ was used. Comparisons with baseline measures and contralateral arm volumes were analyzed by means of a Friedman test. Additionally, patients en therapist were surveyed about the clinical use of the bandage. *Results:* A significant volume reduction was demonstrated during the first two weeks of treatment. The volume reduction was not persistent during the third week of treatment and follow-up period. Two patients experienced an allergic reaction to the bandages. To cope with the allergic reaction, a tubular cotton bandage was applied underneath the short-stretch bandage. Despite, the allergic reactions, all patients as well as all therapists underlined the clinical importance of the bandage. *Conclusion:* It seems that compression bandaging has a positive influence on post stroke upper limb edema volume. However, the effect is not persistent when the therapy is stopped after three weeks. A prolonged use of compression, for instance by compression stockings, might be beneficial. *Reference:* 1) Gebruers N, Truijen S, Engelborghs S, De Deyn PP. Incidence of upper limb oedema in patients with acute hemiparetic stroke. Disability and rehabilitation. 2011; 33(19-20): 1791-6.

PC1117

Reversal Time of Postprandial Changes of the Thickness of Abdominal Muscles Employing Ultrasound Measurements

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Introduction/Background: Low thickness of Transversus Abdominis, Internal Oblique and External Oblique muscles may play a role in development of low back pain. Ultrasonography is increasingly utilized to measure the thickness of these muscles. Prandial state has recently been proposed as a confounding factor in such measurements. We aimed to compare the reversal time of the postprandial thickness of these muscles with preprandial values. The measurement errors of ultrasonographic values were also assessed in both immediate preprandial and postprandial states. **Material and Methods:** Design: Interventional cross-sectional study. The ultrasonographic thickness of lateral abdominal muscles was measured at rest and during abdominal drawing-in maneuver in 20 healthy participants before and after consumption of a specific meal. Postprandial ultrasound measurements continued every 15 minutes until their thickness reached 95% of their preprandial values. **Results:** There was a statistically significant reduction in postprandial thickness of these muscles (all p-values <0.001 on both sides). The reversal times were 1.5, 1.3 and 1.2 hours for Transversus Abdominis, Internal Oblique, and External Oblique muscles, respectively. Standard Error of Measurement and Smallest Detectable Change were in the range of 0.007-0.013 mm and 0.020-0.035 mm, respectively. **Conclusions:** To limit the effects of prandial state on the sonographic thickness of lateral abdominal muscles, we recommend measuring these values at least 1.5-2 hours after food consumption. For the future studies, controlling the participants according to their prandial state is recommended.

PC1118

Efficacy and Safety of Repeated IncobotulinumtoxinA Injections for Upper-Limb Post-Stroke Spasticity

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Introduction/Background: Botulinum toxin injections are a recommended treatment option for upper-limb, post-stroke spasticity. Here, we investigate the efficacy and safety of repeated incobotulinumtoxinA (Xeomin, Merz Pharmaceuticals GmbH) injections for this indication. **Material and Methods:** Subjects who completed a 12-week randomized, double-blind, placebo-controlled, Phase III trial of incobotulinumtoxinA 400 U (NCT01392300) [1] could receive 3 further incobotulinumtoxinA treatments (400 U fixed dose; fixed 12-week intervals) in a 36-week open-label extension (OLEX). Outcome measures included muscle tone (Ashworth Scale; AS), Disability Assessment Scale (DAS) and Carer Burden Scale. Only results from the OLEX are presented here. **Results:** Of 299 subjects who completed the main period, 296 were treated in the OLEX, and 248 completed the study. During the OLEX, the percentage of subjects who achieved ≥ 1 point improvement in AS score from each incobotulinumtoxinA treatment to the respective 4-week control visit was 52.3-59.2% for the wrist flexors, 49.1-52.3% for elbow flexors, 59.8-64.5% for finger flexors, 35.5-41.2% for thumb flexors, and 37.4-39.9% for forearm pronators ($p < 0.0001$ for all). Significant improvements were also seen from each incobotulinumtoxinA treatment to the 4-week assessment in the mean DAS score for the principal target domain ($p < 0.0001$ for all). From the main period baseline to the study-end visit, significant improvements in carer burden were seen for the Carer Burden Scale items ‘cleaning palm’ (58/108 subjects [53.7%]; $p < 0.0001$), ‘cutting fingernails’ (65/125 subjects [52.0%]; $p < 0.0001$), ‘cleaning armpit’ (50/112 subjects [44.6%]; $p = 0.0023$), and ‘putting arm through sleeve’ (59/116 subjects [50.9%]; $p < 0.0001$). ‘Applying splint’ improved in 8/14 subjects (57%; $p = 0.1484$). Throughout the 3 treatment cycles, treatment-related adverse events (AEs) were reported by 9/296 subjects (3.0%). Of these, only pain in the

extremity and constipation were reported by > 1 subject (both in 2/296 subjects [0.7%]). Serious AEs were reported by 22 subjects (7.4%); none were related to treatment. **Conclusion:** For subjects with upper-limb, post-stroke spasticity, repeated incobotulinumtoxinA treatments were well tolerated and led to reductions in muscle tone that translated into meaningful clinical improvements, as demonstrated by improvements in disability and carer burden assessments. **Reference:** Elovic et al. PM&R 2014; 6(9): S324.

PC1119

A One Year Pilot Study of Circuit Class Outcomes in Outpatient Neurological Population

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Introduction/Background: Circuit Class therapy has been widely studied, and has been shown to be an effective means of Physiotherapy treatment for patients who are post-stroke. Significant improvements have been found for walking distance, gait speed, leg muscle strength, balance, and length of hospital stay. Although Circuit Class effectiveness has been shown in persons post-stroke, there is a lack of evidence for potential benefits for persons with other neurological diagnoses. The purpose of this pilot project is to quantify the effectiveness of Circuit Class Physiotherapy in the outpatient neurological population. **Materials and Methods:** Circuit Class therapy at the Stan Cassidy Centre for Rehabilitation (SCCR) is held twice weekly for 8 weeks. After a brief warm-up, patients are divided into groups and rotate through 4 stations focusing on cardiovascular endurance, leg strength, arm strength and postural balance. Each Circuit Class session at SCCR is supervised by 2 Physiotherapists and 2 Physiotherapy Assistants with a maximum staff to patient ratio of 1:3. Exercise programs are tailored to the needs of each individual at the onset of the 8 weeks, and they are progressed on an individual basis when deemed appropriate by the supervising therapist. **Results:** Outcomes were assessed at baseline, after the 8 week class and a follow-up at 12 weeks. Outcomes included the Six-Minute Walk Test (6MWT), Timed Up-And-Go (TUG), Gait Speed, Community Balance and Mobility Scale (CB&M), Muscle Strength and Chair Stand Test. A total of 19 subjects were included in the study, with 17 subjects completing all outcome assessments. All of the outcome measures were significantly improved following the 8 week class, and improvements were maintained at the 12 week follow-up. **Conclusion:** The subjects in this pilot study showed improvements in endurance, muscle strength, balance and gait speed after 8 weeks of training. A follow-up study looking at the effectiveness of a community based circuit class for individuals in the neurological population to see if improvements will carry over to a different exercise setting.

PC1120

Effects of EMG Biofeedback Training on Patients with Bell's Palsy

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Introduction and Background: Bell's palsy, also termed idiopathic lower motor neuron type of 7th cranial nerve paralysis, is one of the most common neurologic disorders involving cranial nerves and the most common cause of facial paralysis worldwide. It is commonly treated by number of physical therapy modalities with various therapeutic strategies and devices. EMG Biofeedback training are also used but there are many questions about the efficacy and effectiveness of this modality of therapy. **Objectives:** To evaluate the effects of EMG Biofeedback training on patients with Bell's palsy. **Materials and Methods:** A hospital based randomized controlled study was done in the department of Physical Medicine and Rehabilitation, BSMMU, Dhaka during the period between February 2013 to January 2014. A total of 90 diagnosed patients with Bell's palsy enrolled into the study, based on the inclusion and exclusion criteria and di-

vided into two groups randomly by lottery. Group-A (intervention) received Biofeedback, IRR with PNF exercise and group-B (control) received IRR with PNF exercise. **Results:** 34 patients in Group-A and 37 patients in Group-B have completed the study. The results were expressed as percentage, mean±SD and $P=0.05$ were considered as the level of significance. Student's *t*-test and chi-squared (X²) test were done. In House-Brackmann (HB) outcome measuring scale shows $p=0.030$ (73.5% in group A & 54.1% in group B) which was significant and higher in group-A than group-B. **Conclusion:** EMG Biofeedback training produced early recovery and prevents complications of delayed recovery in the study patients with Bell's palsy. **Keywords:** Bell's palsy, Biofeedback, Rehabilitation.

PC1121

Use of Robotic Devices in Neurorehabilitation in Czech Republic

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Neurorehabilitation in Czech Republic is undergoing in last years big development. Main role in this movement had creation of the Stroke Units and them support and funding from The Ministry of Health of the Czech Republic and European Union. Robotic devices for neurorehabilitation have been purchased together with other equipment for many of Stroke Units all over our country. Therapists of Stroke Units are learning how to use them appropriately. Rehabilitation robotics include end-effector and exoskeleton systems, both for upper and lower extremities, treadmill systems for walking as well as balance training systems. They use principles of motor learning as repetitive movements and positive feedback (visual, auditive, virtual reality...) to simulate everyday activities. European Society for Physical and Rehabilitation medicine established a Committee for Robotic in rehabilitation and invented a Questionnaire on Innovative Technologies in Rehabilitation to compare use of those technologies in different places of Europe and cooperate on multicentric studies to prove an evidence for example for timing and intensity of training. In Czech Republic si 44 Stroke Units. Many of them participate now in sharing experience through this questionnaire. The exact results from this questionnaire will be available till the time of the Congress. First results are showing very variable use of those technologies in different rehabilitation settings with different types of patients, different intensity and timing of training, because there are no guidelines. Most of the places combine robotics with classical physiotherapy to improve quality of movement and physiological movement patterns, but also in variable quantity. The mean principles of stroke rehabilitation are early, intensive and task-specific training. From available studies we know, that robot assisted and computer-aided therapy can help to improve patient motivation, intensify the training and quantity of repetitive movements, can help therapists to work with more patients together or let patients to train independently. It seems to be cost effective. But for appropriate use of the rehabilitation robotics more cooperative studies should be done focusing on selection of patients, timing, intensity etc. The basic ground for those studies is cooperation and coordination of rehabilitation centers.

PC1122

Making of a New Electric Wheelchair for a Child with Spinal Muscular Atrophy

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Introduction: The molded type bucket seating system is often ordered for serious handicapped children in Japan. A portion of the bucket seat is removable and can be attached or removed on various frames for manual attendant controlled wheelchair car, and indoor easily. However, there has not been a frame of electric wheelchair until now and they were not able to do practice of operation enough. So we made frames of electric wheelchairs for practice, in order to

promote the spread of electric wheelchairs. **Material and Methods:** The first case A patient was diagnosed with SMA at age 1, and he was functionally dependent in all activities of daily living. Since age 2 he had been moving by manual attendant controlled wheelchair with the molded type bucket seating system but he had normal intelligence and hoped to move by himself. We made two frames small and big size of electric wheelchair as an object for practice in which molded type bucket sheets can be carried. The frame was specially constructed from the Kawamura gi-shi corporation. Besides the muscular power of his fingers was weak and operation was difficult with the ordinary joy stick. Therefore, the small joy stick box of high sensitivity was installed on the desk. **Results:** Since he mastered electric wheelchair operation using the frame for practice, he passed the driving test and got his very own electric wheelchair. He was able to operate by own strength, through the special wheel chair frame and the small joy stick box of high sensitivity. So, he could go now to a satisfactory place and the sphere of activity spread. **Conclusion:** The early introduction of power mobility has potential to enhance development and mitigate disability 1) For physically handicapped children with a good intellectual level, introduction of an early electric wheelchair is desirable. The frames for practice contributes to the spread of electric wheelchairs. **Reference:** Dunaway S, Montes J, O'Hagen J, et al. Independent Mobility after early introduction of a power wheelchair in spinal muscular atrophy.

PC1123

Use of Electrical Muscle Stimulation for Preventing Sceletal Muscle Weakness in Critically Ill Patients in Surcical ICU at University Medical Centre Ljubljana

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Introduction: Severe muscle weakness is common among critically ill patients and is associated with prolonged length of stay, prolonged time on mechanical ventilation and increased mortality. Early rehabilitation of critically ill patients in the first days in the ICU could improve functional status at hospital discharge. Neuromuscular stimulation is one of the complementary therapies in rehabilitation programs for critically ill patients in surgical ICU at University medical Centre Ljubljana. The aim of the study was to assess the efficacy of electrical muscle stimulation in preventing severe muscle weakness. **Material and Methods:** Twelve critically ill patients (APACHE II: 14 ± 7 , mean SOFA 5) started the electrical muscle stimulation of both quadriceps muscles 48 hours from admission in the surgical ICU. The electrical muscle stimulation was administrated once a day for 55 minutes at a stimulation frequency of 40 Hz, pulse width of 0.3 msec and 6 sec on and 6 sec off. A control group of eleven critically ill patients (APACHE II: 17 ± 6 , mean SOFA 8) without electrical muscle stimulation were also included in the study. All the patients in the study had standard rehabilitation programme for critically ill in our surgical ICU. At the discharge from the ICU the muscle strength was evaluated with MRC scale. **Results:** Eighteen patients could be evaluated with MRC scale at the discharge from the ICU, nine in the group with electrical muscle stimulation and also nine in the control group. The MRC score was higher in the patients with electrical muscle stimulation compared to the control group [55 (43 to 60) vs. 42 (18 to 48)]. **Conclusion:** The study suggested that electrical muscle stimulation was associated with an increase of muscle strength and may be useful in preventing severe muscle weakness in critically ill patients. Further studies are needed to evaluate the role of electrical muscle stimulation of critically ill patients.

PC1124

Effects of Pelvic Biofeedback Electrical Stimulation on Neurogenic Bowel in Patients After Spinal Cord Injury

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Introduction: The frequency of Spinal cord injury (SCI) is getting higher and higher in China. Most of these patients suffer perennial bowel dysfunction which varies with the injured spinal level. Numerous treatment options are available, such as bowel management program and surgical treatment. In our previous study, we demonstrate that the pelvic biofeedback electrical stimulation improves the neurogenic bladder function in SCI patients. Whether the bowel dysfunction can also get benefits from it? **Objective:** To investigate the therapeutic effects of pelvic biofeedback electrical stimulation on neurogenic bowel in patients with spinal cord injury. **Material and Methods:** 32 SCI patients with neurogenic bowel dysfunction were randomly divided into two groups: 16 patients (treatment group) were given pelvic biofeedback electrical stimulation and standard bowel management program (BMP) every day for 8 weeks; other 16 patients (control group) were only received BMP once a day for the same course. The bladder diary, quality of life (WHOQOL-BREF), anorectal manometry (ARM) and Wexner continence grading scale were recorded during the whole treatment. **Results:** Patients in both groups got a significant recover of their bowel function, and ARM showed that the rectanal inhibitory reflex (RAIR) were improved ($P < 0.05$). Patients who received pelvic biofeedback electrical stimulation had a more obvious improvement in bowel movement frequency, RAIR, WHOQOL-BREF scores and Wexner scores compared with those of control patients ($P < 0.05$). **Conclusions:** Pelvic biofeedback electrical stimulation can significantly improve the neurogenic bowel function in SCI patients, and consequently improved the patients' quality of life.

PC1125

Preliminary Kinetic and Kinematic Study to Evaluate the Push-Off Movement During Gait with a Hinged Ankle-Foot Orthoses

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Introduction/Background: Ankle-foot orthoses (AFO) with an oil damper improve heel-rocker function during the loading response phase of gait; however, an incomplete push-off movement with an AFO during the pre-swing (PSw) phase remains a major issue (Ohata, 2011). Therefore, the aim of this preliminary study was to investigate the effects of a hinged AFO on the push-off movement during gait in healthy adults. **Materials and Methods:** A convenience sample of 10 healthy adults aged 18–24 years (mean age, 20.5±0.7 years) participated in this study. Approval for the study was obtained from the Osaka Prefecture University research ethics committee (2012-PT11). The push-off movement during gait at a self-selected speed was tested in random order while walking barefoot or wearing a hinged AFO, which was set at 15° plantarflexion and worn on the right lower limb. The temporal, kinetic, and kinematic data from heel-strike to toe-off (stance phase [ST]) were collected using a motion analysis system, a force plate, and electromyography (EMG). Statistical comparisons between the barefoot and hinged AFO trials were conducted using paired *t*-tests. $P < 0.05$ was considered statistically significant. **Results:** The total ST duration was not significantly different between the 2 conditions. Although the peak ground reaction force (GRF) from the heel-strike phase to mid-stance phase was also not significantly different, the GRF from the terminal stance to the PSw phase was lower with the AFO than with barefoot walking ($P < 0.01$). The maximum ankle dorsiflexion angle and tibialis anterior (TA) amplitude on EMG during the PSw phase were higher with the AFO ($P < 0.01$). **Conclusion:** These findings indicate that an incomplete push-off movement is observed with a hinged AFO, supporting previous findings (Ohata, 2011). This phenomenon would cause not only excessive ankle dorsiflexion in the mid-stance phase but also excessive TA amplitude on EMG in the PSw phase. *Ac-*

nowledgement: This study was supported by a Sukoyaka grant for maternal and child health. **Reference:** Ohata K, et al. Effects of an ankle-foot orthosis with oil damper on muscle activity in adults after stroke. *Gait Posture*, 33: 102-107, 2011.

PC1126

The Effect of Different Force Direction and Resistance Levels During Resistive Static Contraction of the Lower Trunk Muscles on the Soleus H-Reflex

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Introduction/Background: Neurophysiological remote after-effects (RAE) of the ascending effects of resistive static contraction of a pelvic depressors (RSCPD) using the proprioceptive neuromuscular facilitation pattern in the mid-range of pelvic motion in side-lying on the flexor carpi radialis H-reflex exhibit reflexive inhibition during RSCPD, followed by gradual excitation after completion of the RSCPD (Arai et al., 2012). The purpose of this study was to compare the neurophysiological effects of descending RAE of the RSCPD on the soleus (SOL) H-reflex comparing different resistive exercises with respect to the strength and direction of the resistance. **Materials and Methods:** Four different RSCPD in different directions of traction (neutral and diagonal) and strength (10% of the isometric maximum voluntary contraction (MVC); weak, 20% of MVC; strong) were performed randomly in thirteen normal subjects. Right SOL H-reflexes and M-waves were measured before, during and after the RSCPD. For each reflex recorded in this study, repeated H-reflexes and M-waves (1 Hz) were elicited sequentially for a period of 240 s. Condition-C1 (three trials; 60 s) represented the rest phase, condition-C2 (20 s) the phase of each resistive exercise, conditions C3 (20 s)-C12 (20 s) represented the rest phase after each resistive exercise. For comparison, each of the H-reflex amplitudes were normalized to the corresponding maximum M-waves (Mmax), which were then expressed as the ratio of H/Mmax (H/Mmax). Three-way ANOVA was used to determine the time-course (thirteen conditions: conditions-C1~C13), RSCPD (four levels: neutral-weak, neutral-strong, diagonal-weak, and diagonal-strong) and individual effects. **Results:** Three-way ANOVA for the H/Mmax demonstrated significant effects for the technique and individual (technique; $F(3.564)=10.37$, $p=0.000$), time course ($F(11.564)=1.403$, $p=0.167$), and individual ($F(12.564)=327.954$, $p=0.000$). Interaction showed no effect ($F(33.564)=0.83$, $p=1.00$). Post-hoc comparisons (Bonferroni) indicated significant depression following the diagonal-strong RSCPD, in comparison with the diagonal-weak and neutral-weak RSCPD. **Conclusion:** The neurophysiological effect of descending RAE of the RSCPD included movement direction- and load-dependent activity in the soleus H-reflex. **Reference:** Arai M, Shiratani T: Neurophysiological study of remote rebound-effect of RSCPD on the flexor carpi radialis H-reflex. *Current Neurobiology* 2012; 3(1): 25-29.

PC1127

A Comparison of the Movement Directional Related Activity of Antagonist Resistance Exercises Using fMRI

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Introduction/Background: The differences between the brain activity effects of resistive static contraction of the pelvic depressors (RSCPD) and the pelvic anterior elevators (RSCAE), using a proprioceptive neuromuscular facilitation pattern in the mid-range of pelvic motion while side-lying, remain uncertain. Functional

magnetic resonance imaging (fMRI) was used to determine the directional regional brain activities during RSCPD vs. RSCAE for antagonist resistive static contraction. *Materials and Methods:* Each antagonist resistance exercise (RSCAE vs. RSCPD) on the right side of the pelvis in a left side-lying position was performed for 30 sec in fMRI to investigate the different areas of brain activation. The effects of order were controlled by randomly assigning the resistive static contraction approach among eighteen normal subjects. Each subject resisted the traction force, which was 5% of the subject's weight, applied by the corset without movement to induce RSCPD or RSCAE. Region of interest (ROI) based measurements of the percent signal change were examined during RSCPD or RSCAE. Two-way ANOVA was used to determine the exercise and region of brain effects on the difference in percent signal change. *Results:* The ROI were identified, corresponding to sensorimotor areas (SMC), basal ganglia, inula, thalamus, anterior and posterior cerebellum, and the supplementary motor area (SMA), based on the group random effect analysis, to compare the percentage signal change. ANOVA revealed a significant main effect for exercise and the region of the brain. The percent signal change showed a significant increase during RSCAE ($F(1, 238)=5.001, p=0.026$) in the left hemisphere. However, there was no region of brain effect in the left hemisphere ($F(6, 238)=0.831, p=0.547$). By contrast, the percent signal change in the right hemisphere showed a non-significant exercise effect ($F(1, 204)=0.186, p=0.667$). However, a region of brain effect was observed in the right hemisphere ($F(5, 204)=2.306, p=0.046$). *Conclusion:* Non-specific brain areas in the right hemisphere with RSCAE showed significant changes of signal intensity during RSCAE. Significant direction-dependent activation was observed between the antagonist resistive static contractions.

PC1128

Repetitive Sensory Stimulation in Neurorehabilitation

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The limited outcome of standard rehabilitation methods has fostered the development of additional and alternative approaches that could supplement, enhance, or even replace conventional training procedures. Recent research has demonstrated that human sensorimotor learning can be effectively acquired by an approach complementary to training, in which the learning is driven by mere exposure to repetitive sensory stimulation protocols - rSS (Beste, Dinse 2013). Numerous studies employing rSS in healthy young adults and elderly individuals demonstrated substantial improvements of tactile, haptic and sensorimotor performance parallel to cortical reorganization (Dinse et al., 2011). We here summarize findings from several studies in subacute or chronic patient groups suffering from brain injury or stroke affecting the upper extremities. rSS consisted of intermittent high-frequency electrical stimulation, applied 45 min/day, 5 days a week for 2 weeks (subacute patients) or several months (chronic patients), and was transmitted using custom-made stimulation-gloves with in-built electrodes (tip stim®). For the healthy and the affected limb we broadly assessed various aspects of sensory, sensorimotor, motor and proprioceptive functions including every day tasks (JTHF). In subacute stroke patients, rSS improved not only sensory performance (touch threshold and acuity), but similarly sensorimotor (e.g. dexterity), proprioceptive and motor performance (e.g. grip force). According to a recently completed randomised, sham-controlled trial, a combination of standard therapy with rSS over 2 weeks results in a greater recovery of sensory, motor and proprioceptive function as compared to standard therapy alone. In chronic patients suffering from brain injury, comparable broad-range positive effects emerged, but often after months of intervention, indicating the need for extensive treatment durations. Our data from subacute and long-term chronic patients showed that rSS induces substantial improvement of tactile and sensorimotor performance long lastingly. This effectiveness together with the advantage of usage under everyday conditions by laypeople at

their homes and the absence of significant side-effects, make repetitive sensory stimulation-based principles prime candidates for ambulant interventions in impaired populations. Beste C, Dinse HR (2013) Learning without Training. *Curr Biol* 23, R489-R499 Dinse HR, Kattenstroth JC, Gattica Tossi MA, Tegenthoff M, Kalisch T (2011) Sensory Stimulation for Augmenting Perception, Sensorimotor Behavior and Cognition. In *Augmenting Cognition*. EPFL Press, pp 11-39.

PC1129

The Ankle Plantar and Dorsal Flexion Torque While Walking with the Ankle Foot Orthosis in Healthy and Poststroke Hemiplegic Subjects

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Background: Hemiplegic patients often suffer from spastic equinus foot, and need to wear an ankle foot orthosis (AFO). If hemiplegic patients walk wearing the AFO, what force is loaded on it during a swing phase? The objectives of this study are: (1) to quantify ankle plantar flexion (PF) and dorsiflexion (DF) torque while walking with the AFO (Torque-walk); (2) to clarify the relationship between Torque-walk and PF torque against passive DF at rest (Torque-pf-rest); and (3) to find the factors which influence Torque-walk other than Torque-pf-rest. *Material and Methods:* 70 poststroke hemiplegic subjects, age of 30-70, who can walk without any assistance at least 15m, and 10 healthy subjects. We developed two devices, 'Atom-walk' and 'Atom-rest'. Atom-walk is to measure Torque-walk on a treadmill. It is attached to the AFO. While Atom-rest is to measure Torque-pf-rest. Before the tests by these devices, subjects were clinically assessed with manual muscle testing (MMT) of anterior tibial muscle (TA), modified Ashworth Scale of ankle plantar flexors and the frequencies of ankle clonus. Subjects walked on a treadmill at a self-selected speed wearing the Atom-walk attached AFO. 10 seconds were recorded after walks got stabilized. Of all the gait cycles recorded, the average minimum torque of the swing phase (Min-swing) was calculated for the main outcome measure of Torque walk. Then Torque-pf-rest was measured by Atom-rest. The ankle was passively dorsiflexed from 20° PF to 10° DF at 5°/s (slow stretch) and 90°/s (fast stretch). Angle and torque during passive DF were recorded. The torques at ankle 10° DF during slow stretch (T10-slow), fast stretch (T10-fast), and T10-gap (=T10 fast-T10 slow; velocity dependent component), were set for the parameters of Min-swing. The relationship between T10-slow and Min-swing, T10-fast and Min-swing were collated and tabulated. Furthermore, Min-swing was stratified by the MMT of TA and T10-gap. *Results:* Min-swing was more linearly related to T10-slow than T10-fast. Min-swing of the higher T10-gap group was smaller than that of the lower T10-gap group. The higher MMT score of TA, the smaller Min-swing. *Conclusion:* The AFO suppressed a velocity dependent increase of the ankle PF torque during a swing phase of a gait.

PC1130

Effect of Exercise on Quality of Sleep in Patients with Ankylosing Spondylitis

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Background: Ankylosing spondylitis (AS) is an inflammatory rheumatic disease, associated with limited mobility of the spine, sleep disturbance, and fatigue. The exercise aims are to preserve mobility and decrease sleep disorders. *Aim:* Compare the influence of an exercise program on two groups of patients with AS, home based and group based, and analyze the effect of it in sleep quality, cervical inability and Bath Index. *Methods:* One sample composed of individuals with AS, with more than 18 years, sedentary and without severe complications and comorbidities sample,

previously divided into group based, and home based, were subjected in an exercise program for 12 weeks. The Neck Disability Index (NDI) was used to assess cervical disability, Bath indices to characterize the EA and the Quality Index Pittsburgh Sleep, to evaluate the quality of sleep. **Results:** The significant improvement is observed only in the group based on the increased cervical capacity ($p=0.031$) and functional ($p=0.055$), while the quality of sleep does not show any significant result in both groups. On the other hand spine mobility was the only variable with a significant difference in intergroup evaluation. Meanwhile, the correlations were found, mainly, between the Index of Bath and the quality of sleep that showed a correlation coefficient of 0.668 and 0.896. **Conclusion:** The exercise program applied proved effective for this sample, showing improvements in almost all variables. However, it was found that the program had little impact on sleep quality in these individuals. **References:** 1) Aissaoui, N., Rostom, S., Hakkou, J., Berrada Ghziouel, K., Bahiri, R., Abouqal, R., & Hajjaj-Hassouni, N. (2012). Fatigue in patients with ankylosing spondylitis: prevalence and relationships with disease-specific variables, psychological status, and sleep disturbance. *Rheumatology International*, 32(7), 2117-2124. 2) Batmaz, I., Sariyildiz, M. A., Dilek, B., Bez, Y., Karakoc, M., & Cevik, R. (2013). Sleep quality and associated factors in ankylosing spondylitis: relationship with disease parameters, psychological status and quality of life. *Rheumatol Int*, 33(4), 1039-1045. 3) Jiang, Y., Yang, M., Wu, H., Song, H., Zhan, F., Liu, S., Gu, J. (2014). The relationship between disease activity measured by the BASDAI and psychological status, stressful life events, and sleep quality in ankylosing spondylitis. *Clin Rheumatol*.

PC1131

Influence of Exercise on Functional Capacity and in the Lumbar and Thoracic Disability in Ankylosing Spondylitis

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Background: Ankylosing Spondylitis (AS) is a chronic inflammatory disease, associated to spine mobility limitations. Until today it isn't known an efficient treatment; although, there are therapeutic strategies, like exercise, that can alleviate and delay the disease complications. **Aim(s):** Measure the influence of an exercise programme in the lumbar and thoracic incapacity and function, in AS patients. **Methods:** Quasi-experimental study, a sample with 16AS patients, divided into group-based ($n=9$) and home-based ($n=7$). After the initial evaluation, who contemplates Bath indexes, Oswestry index on disability, version 2.0, cytometry and the Six-minute Walking Test (6MWT), the participants were subjected to a 12 weeks programme of exercise, supervised or not, according to the group, and, posteriorly, the final evaluation was conducted. **Results:** Between groups its verified slight improvements, but without statistical significance ($p<0.005$). In intra-group comparison, the group-based presents significant results in all variables, with exception to Bath Ankylosing Spondylitis Metrology Index (BASMI) and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), the same doesn't happen with the home-based who only presents significant results in 6MWT. In intra-group comparison in the second evaluation moment, it's verified significant values in BASMI ($p=0.009$) and cytometry, in the level of the xiphoid line ($p=0.023$). **Conclusion:** The accomplished exercise programme seems to induce positively both groups, however it isn't possible to determinate which group is better. **References:** 1) Berdal, G., Halvorsen, S., Van Der Heijde, D., Mowe, M., & Dagfinrud, H. (2012). Restrictive pulmonary function is more prevalent in patients with ankylosing spondylitis than in matched population controls and is associated with impaired spinal mobility: a comparative study. *Arthritis Res Ther*, 14(1), R19. doi: 10.1186/ar3699. 2) Cho, H., Kim, T., Kim, T. H., Lee, S., & Lee, K. H. (2013). Spinal mobility, vertebral squaring, pulmonary function, pain, fatigue, and quality of life in patients

with ankylosing spondylitis. *Ann Rehabil Med*, 37(5), 675-682. doi: 10.5535/arm.2013.37.5.675. for spasticity. That risk is augmented in patients receiving anticoagulation therapy. In the absence of national or international guidelines, physician approaches to injecting patients on anticoagulant therapy may be variable. The purpose of this study was to compare physician preferences and attitudes for controlling bleeding risk during BoNTA injections in 3 countries in distinct geographic regions of the world: Canada, South Korea and Turkey. **Material and Methods:** A prospective cross-sectional questionnaire was sent to clinicians treating spasticity across Canada, South Korea and Turkey with variable range of experience with BoNTA injections. The questionnaires were translated into Korean and Turkish languages. **Results:** A total of 250 clinicians participated in the questionnaire (70 Canada, 100 South Korea, 80 Turkey). Physicians checked patients' INR before injecting 44% of the time in Canada, 69% in South Korea and 93% in Turkey. Physician preference for injections with an INR<2 was 10% in Canada, 40% in South Korea and 45% in Turkey. Physician preference for an INR range 2-3, was 60% in Canada, 41% in South Korea and 55% in Turkey. For an INR>3, physician preference was 20% in Canada, 15% in South Korea and 0% in Turkey. Physicians injected the deep compartment 83% of the time in Canada, 39% in South Korea and 81% in Turkey, and encountered compartment syndrome 1% of the time in Canada, 0% in South Korea and 1% in Turkey. **Conclusion:** Among the three countries, Turkish physicians were most conservative in checking INR values before injecting patients, and did not inject when INR values exceeded 3. South Korean physicians appear to be more reluctant to inject deep muscle structures compared to their Canadian and Turkish counterparts. In spite of aggressive INR checking, rates of compartment syndrome remained low. Studies are underway to image hematoma size following BoNTA injections in the deep compartment.

PC1132

Application of an Electronic Neurorehabilitation Census Board and Throughput Improvement: a Multi-Disciplinary Approach to Minimization of Length of Stay and Avoidable Hospitalization Days

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Introduction: Throughput and discharge efficiency is critical to the continued care curriculum. The expedition of post-stroke pathways amalgamates benefits of provision of efficient effective care, maximization of time-limited treatment windows, and limitation of post-stroke complications. This study presents a unique solution to throughput in stroke care. **Methods:** We developed a novel system of multidisciplinary communication and systems planning called the Neurorehabilitation Census Board (NRCB); a multimodal electronic communication system combined with protocolized multidisciplinary communication to identify various barriers to discharge. We highlighted discharge barriers categorized by medical, rehabilitation, case management, social work, and neuroimaging in a daily multidisciplinary review. This system was implemented over 2 neurology floors in a 953-bed teaching over 3 months, with the same 3 month block from the preceding year providing control data. **Results:** Implementation of the NRCB system quickly demonstrated an earlier discharge of patients. Within the first month, there was a marked drop in LOS by 1.61 (16.81%) and 2.15 (29.33%) days on the neurology floors respectively. LOS decreased from 9.58 until a nadir of 6.51 on the follow-up month. A comparison to the previous year demonstrated a decline of 8.332 (SD 0.52) to 7.234 (0.69), a difference of 1.098 days ($p\leq 0.01$). The second floor improved from a mean LOS of 6.71 (SD=0.2488) to 5.48 (SD 0.25), an improvement of 1.23 days ($p\leq 0.000027$). **Conclusions:** NRCB expedited higher and more efficient throughput throughout the study group and resulted in earlier discharges, while decreasing avoidable days and lengths of stay. These benefits are attributed to increased communication and tracking.

PC1133

Survey of Omega-3 Effects on Morning Stiffness in Osteoarthritis of the Knee*P. Yazdanpanah¹, H. Mohamadi², H. Sadeghi², H. Ghafarian Shirazi², A. Arjmand²¹Yasuj, ²Yasuj University of Medical Sciences, Yasuj, IR

Introduction: Osteoarthritis of the knee is a common disease that presents with knee pain, morning stiffness and limited knee joint motions. The aim of this study was to evaluate the compare single and combined effects of acetaminophen, naproxen and omega-3 on knee osteoarthritis in 45-65 years old persons. **Materials and Methods:** In this randomized clinical trial, 114 patients affected by mild to moderate knee osteoarthritis treated in 6 groups of 19 by acetaminophen, naproxen, naproxen + omega-3, acetaminophen + omega-3, acetaminophen + naproxen, and acetaminophen + naproxen + omega-3 for 6 weeks. The response to the treatment was measured and compared between groups after 6 weeks. **Results:** After treatment, the levels of WOMAC (physical functions, joint stiffness, pain severity) and visual analogue scale (pain severity) were reduced in all groups (p<0.5). The combination of acetaminophen + naproxen + omega-3 has decreased the pain severity more than other groups. Omega-3 combinational groups were meaningfully decreased morning stiffness. The addition of omega-3 in all treatment combinations obviously caused improvement of maximum total score of WOMAC, pain severity and drug complications in the patients, but there wasn't statistically meaningful. **Conclusions:** Usage of acetaminophen or naproxen as single or combined drug(s) has been effective on the treatment of osteoarthritis, whereas the addition of omega-3 to this medication(s) has been effective on improvement of healing and reduction of morning stiffness.

PC1134

An International Study of Spasticity Management with Botulinum Toxin Injections in Anticoagulated Patients*A. Kassam¹, *C. Phadke², J. Jang³, S. Im³, A. Y. On⁴, F. Ismail², C. Boulias²¹Western University, London, ²West Park Healthcare Centre, Toronto, CA, ³The Catholic University of Korea, Bucheon, KR, ⁴Ege University Medical Faculty, Izmir, TR

Introduction/Background: There is an inherent risk of minor bleeding with botulinum (BoNTA) toxin injections for spasticity. That risk is augmented in patients receiving anticoagulation therapy. In the absence of national or international guidelines, physician approaches to injecting patients on anticoagulant therapy may be variable. The purpose of this study was to compare physician preferences and attitudes for controlling bleeding risk during BoNTA injections in 3 countries in distinct geographic regions of the world: Canada, South Korea and Turkey. **Material and Methods:** A prospective cross-sectional questionnaire was sent to clinicians treating spasticity across Canada, South Korea and Turkey with variable range of experience with BoNTA injections. The questionnaires were translated into Korean and Turkish languages. **Results:** A total of 250 clinicians participated in the questionnaire (70 Canada, 100 South Korea, 80 Turkey). Physicians checked patients' INR before injecting 44% of the time in Canada, 69% in South Korea and 93% in Turkey. Physician preference for injections with an INR<2 was 10% in Canada, 40% in South Korea and 45% in Turkey. Physician preference for an INR range 2-3, was 60% in Canada, 41% in South Korea and 55% in Turkey. For an INR>3, physician preference was 20% in Canada, 15% in South Korea and 0% in Turkey. Physicians injected the deep compartment 83% of the time in Canada, 39% in South Korea and 81% in Turkey, and encountered compartment syndrome 1% of the time in Canada, 0% in South Korea and 1% in Turkey. **Conclusion:** Among the three countries, Turkish physicians were most conservative in checking INR values before injecting patients, and did not inject when INR

values exceeded 3. South Korean physicians appear to be more reluctant to inject deep muscle structures compared to their Canadian and Turkish counterparts. In spite of aggressive INR checking, rates of compartment syndrome remained low. Studies are underway to image hematoma size following BoNTA injections in the deep compartment.

PC1135

rTMS for Stroke Rehabilitation: Combination of Continuous and Intermittent Theta Burst Stimulation

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rTMS is currently used as a treatment for stroke mainly due to its ability to modulate the excitability of cerebral cortex over longer time periods. It can also enhance some cognitive processes, regulate activity in specific brain regions and provide causal information about the roles of different cortical regions in performance. The use of rTMS can also enhance neuroplasticity during motor training. High-frequency rTMS increases cortical excitability, whereas low-frequency rTMS suppresses cortical excitability. The first aim of applying cortical stimulation in stroke patients is correcting maladaptive brain plasticity caused by the cerebrovascular accident, and the second aim is trying to enhance adaptive brain plasticity during rehabilitation. The theta Burst Stimulation (TBS) protocol, as a patterned rTMS, has explored to transiently alter cortical excitability in the human brain. TBS involves applying short trains of stimuli at high frequency repeated at intervals of 200 ms. The different theta burst TBS protocols in which short bursts of 50 Hz rTMS are repeated at a rate in the theta range (5 Hz) as a continuous (cTBS), or intermittent (iTBS) train. Various mechanisms are worth considering, including facilitating long term depression (LTD) and long term potentiation (LTP) mechanisms, shifting network excitability, activating feedback loops, and synaptic changes. The major difference between traditional rTMS and TBS is the time of stimulation. TBS changes cortical activity in 40s (cTBS for inhibition) and 200s (iTBS for excitation), compared to 20-30mins stimulation in the conventional rTMS. The cTBS reduces motor evoked potential (MEP) amplitude (producing an LTD like phenomena), and the iTBS enhances MEPs (producing an LTP like phenomena), for about 30 min lasting effect after the end of stimulation. TBS with shorter stimulation time and long-lasting effects on facilitate cortical activity is suitable for therapeutic tool as a part of neurorehabilitation. Recent studies demonstrated that the value of excitability-increasing iTBS delivered to ipsilesional M1 might be enhanced by a prior excitability-decreasing protocol delivered to the contralesional hemisphere. However, there are no substantial and replicated results have been showed with recommendation regarding the combining use of cTBS of the contralesional motor cortex and iTBS of the ipsilesional motor cortex in motor stroke rehabilitation.

PC1136

Role of Mirror Therapy for Phantom Limb Pain in Below Knee Amputees

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Background: The pain caused by surgery is usually of a transient nature, however the perception of pain in an amputated limb often persists. This prolonged pain, which is often refractory to pain-killing medication, nerve block and surgical treatment may severely affect the patient's quality of life. The phenomenon of phantom limb pain has been investigated using neurological, neurophysiological and psychopathological approaches. In this study we analysed the role of mirror therapy for treatment of phantom limb pain in below knee amputation. **Material and Methods:** 96 patients who had phantom limb pain after below knee amputation were included in this study.

They had to visit the hospital four times a week for a 15-minute treatment period. In this technique they performed movement of unaffected limb while watching its mirror reflection and thus creating a visual illusion of movement of affected limb. The degree of pain relief was measured on visual analog scale (VAS). *Results:* 70 patients out of 96 reported an improvement of 4 or more degrees of VAS score after 6 months of the treatment. The result was statistically significant. *Conclusions:* Mirror therapy improves pain sensation of the amputated part when other treatment modalities fail. This therapy works on the principle of mirror neuron system. A mirror neuron fires both when a person acts or when a person observes same action performed by another. The mirror image of the normal body part helps reorganize and integrate the mismatch between proprioception and visual feedback of the removed body. This reorganization decreases the sense or emotion of phantom limb pain in the amputated part. *Reference:* Kim SY, Kim YY. Mirror therapy for phantom limb pain. *Korean J Pain.* 2012 Oct; 25(4): 272-4.

PC1137

Phenytoin Toxicity in Patient with Traumatic Brain Injury

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Case Diagnosis: Phenytoin toxicity. *Case Description:* A 39 year-old man, suffered a severe traumatic brain injury by blunt weapon. Initially, he was admitted in an inpatient neurology department, where he presented with cardiorespiratory arrest in a likely post-ictal context. He started treatment with antiepileptic drugs: levetiracetam 1,000 mg/day and phenytoin 300 mg/day, with no convulsions registered. He was referred to our center for intensive rehabilitation program. In the first outpatient evaluation, three months after injury, he presented: time-spatial disorientation, dysarthria, precarious dynamic standing equilibrium, hyperreflexia, mild dysmetria in finger-nose test. He was able to walk independently with a cane. He showed modified dependence for ADL. Two months later, he was admitted in our Center and showed marked changes in relation to the previous physical examination: appendicular ataxia, marked dysmetria in the finger-nose test and presented complete dependence of a 3rd person to walk and in ADL. Laboratory findings were normal and no medication changes were made during the previous months. Over two weeks, we started to gradually wean phenytoin dosage and increased levetiracetam, to a total of 2,000 mg/day, with concomitant decreased ataxia, improvement of gait pattern and he returned to just partial dependence on some ADL. The patient did not present any convulsion to date. *Discussion:* Treatment of epilepsy with phenytoin is effective and is still a treatment option, despite its drawbacks. A cluster of adverse effects and drug toxicity can develop immediately or later in the course of treatment. Neurological manifestations of phenytoin toxicity vary from nystagmus, drowsiness, dysarthria, ataxia, coma, and paradoxical seizures at very high levels. Iatrogenic phenytoin toxicity may be confirmed by drug levels. The symptoms usually disappeared after discontinuation of phenytoin therapy. In this case, facing a recent history of traumatic brain injury, it may be difficult to distinguish between drug toxicity and clinical worsening of the neurological condition. Although no drug levels were measured, the patient's improvement was evident after phenytoin suspension, which was very predictive of the diagnosis of phenytoin toxicity. *Conclusion:* Phenytoin toxicity is rarely fatal, but is important not to forget it. Clinical suspicion of phenytoin toxicity is a good predictor of biochemical toxicity.

PC1138

Smart Glasses – a Modern Strategy to Enhance Rehabilitation and Safety for Patients with Clinical Conditions

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Introduction/Background: Salient recordings of patient activity provides information on functional status; helps guide treatment plans; tailor rehabilitation programs; and can be used to monitor safety and progress. However, current methods are either qualitative and rely on accurate self-reporting and recall or are quantitative but limited when identifying stationary activities. This study investigates a novel recording device, the Smart Glasses system which integrates 3D accelerometry, video footage and machine learning techniques to identify a larger range of both stationary and dynamic activities in a heterogeneous group of patients undertaking rehabilitation. *Material and Methods:* Thirty-one patients (19 male, 12 female) aged 64.7±12.9 years (mean and standard deviation, range 34-89) were recruited from the Sacred Heart Rehabilitation service at St Vincent's Hospital, Sydney, Australia. The patients' clinical conditions were classified into three main groups: neurological (e.g. stroke), musculoskeletal (e.g. joint replacement) or general weakness (e.g. deconditioning from lung transplant). Patients wore the Smart Glasses during a 1-hour therapy session and were guided through up to 14 activities of daily living (e.g. walking, drinking and opening a door). The therapy session was filmed with an external camera and compared to the Smart Glasses activity classification output. *Results:* In this study a number of algorithms were tested to establish the most salient for recording activities in the three patient groups. The most salient algorithm across all groups identified an average accuracy of 77.08% for pooled subjects, 72.71% for musculoskeletal, 82.84% for neurological and 55.21% for general weakness. A different algorithms was more appropriate for subjects with musculoskeletal conditions and general weakness, with 84% and 69.79% accuracy respectively. The average kappa statistic for the 14 activities across all patients was 0.76 and ranged from 0.57 (walking downstairs) to 0.99 (lying down). *Conclusions:* The Smart Glasses present a promising quantitative assessment of both stationary and dynamic activities in a heterogeneous group of patients recovering from illness or injury and provide reasonable validity and test retest reliability. Different algorithms may be required for different patient populations to account for a range of presentations and varying movement patterns.

PC1139

Development of an Open Patellar Knee Immobilization Device: Improvements in Wound Complications in High-Risk Patient Populations; a Case Series

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Case Diagnosis: Below the Knee Amputations. *Case-Description:* This series highlights the cases of three male patients, ages 62, 49, and 74 years with the same comorbidities of HTN, DM2, CAD, CHF (HDCC) and bilateral lower extremity (BLE) pitting edema who required BKAs through different courses. Subject-A had bilateral aortic-iliac occlusions resulting in left BKA; Subject-B presented with an NSTEMI/PEA arrest and hypotensive shock, resulting in right BKA; while Subject-C was a scheduled left BKA case. Despite dissimilar courses, all three cases developed similar complications of rapidly progressive stage 2-3 pressure ulcers across the patella surface. Their obesity, high-risk medical comorbidities, low physical function, and BLE edema made them poorly prognostic for wound healing and functional improvement. Once decubitus ulcerations became apparent and recalcitrant to conservative management, we developed an open-patellar-knee-immobilizer pilot (OPKI) to replace the CPKI model typically used. After testing, we were able to offload the patellar while providing similar extension support as the CPKI equivalent. In the environment of eliminated patella support, the stage 3 ulcers finally began healing. The development and utilization of the OPKI device abrogated further complications during course and facilitated rehabilitative efforts. *Discussion:* Literature review was performed on OPKIs

showing the novelty of our device. CPKIs on the other hand were commonly used. Despite the lack of consensus, the literature demonstrated postoperative CPKI use provide improvements in pain control, knee extension, balance, healing-times, and reduction in hip dislocations and falls. However, in high risk patients, they may predicate wound breakdown. Our series is the first where a novel OPKI design provided all the benefits of the rigid design while preserving this skin by avoiding maladaptive patella pressure. The OPKI facilitates decubitus ulcers treatment while concomitantly providing postoperative rigid immobilization benefits in healing, pain, and knee extension. This series also highlights a population of high risk patients that may best benefit from the OPKI device. *Conclusion:* This case series suggests that in patients with high medical comorbidities and BLE edema, one should consider using an open-patella designed knee immobilizer to mitigate risk of decubitus ulcers.

PC1140

Global Trend Of Non-Invasive Brain Stimulation: Do Environmental, Socioeconomic, Geographic Factors Affect Interpretation?

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Introduction/Background: Non-invasive brain stimulation are powerful techniques that alter and measure brain activity and function. We aimed to analyze the global distribution of non-invasive brain stimulation in relation to geographic location and socioeconomic data in order to determine international barriers to the provision of brain stimulation research and care. *Methods:* We performed a systematic literature search for related articles from 1981 to 2013 on the PubMed database. The search terms: “transcranial magnetic stimulation OR TMS or transcranial direct current stimulation OR tDCS OR repetitive transcranial magnetic stimulation OR rTMS OR theta burst stimulation.” Brain stimulation articles were analyzed according to geographic location (country, region, city), year, type of stimulation, symptoms, against socioeconomic level of development assessed by the UNDP 2013 Human Development Index (HDI) *Results:* 9,515 articles out of 14,089 met the criteria and were included in the meta-analysis. The top five published countries represented 5,804 articles (61%) analyzed. The pooled analysis displayed an association between the number of articles and level of socioeconomic development. Regions with the most publications included Europe and North America. Analysis against the UNDP 2013 HDI’s global ordinal assessment showed the highest concordance of results within the 4th quartile percentage in development, whereas areas with lowest quartile failed to show re-demonstrable findings in neuromodulation. *Conclusion:* Non-invasive brain stimulation is a potential treatment of neuropsychiatric conditions. Geo-socio-metric data of population and center of origin should be included in the interpretation of results.

PC1141

Optimal Neuromodulatory Effects on Motor Function in Stroke Recovery: Safety of Dual Application of Paradigms of Repetitive Transcranial Magnetic Stimulation and Transcranial Direct Current Stimulation

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Introduction/Background: Stroke is a leading cause of disability in the United States with few able to re-integrate in the workforce by 6 months. Non-invasive brain stimulation techniques are a proposed solution to this problem. Both repetitive transcranial magnetic stimulation (rTMS) and transcranial magnetic stimulation techniques have been shown to change cortical excitability after stroke, however it is unclear which is paradigm is the most

effective. *Methods:* The aim is to develop a montage system that concurrently provides rTMS and tDCS on a parallel basis in order to be able to compare or combine them effectively. Six healthy subjects are provided 1 of 4 variants of these techniques (high-frequency rTMS, low-frequency rTMS, anodal transcranial direct current stimulation, cathodal direct current stimulation) while the other is on concurrently in sham mode. Patients received all 4 stimulation on a crossover basis with 1 week for wash-out and 1 visit for dual shams. Biophysiological safety profiles are recorded via Beck Depression Inventory (BDI), Mini Mental State Examination (MMSE), Visual analogue scale (VAS) for anxiety and pain/comfort, Side Effects Questionnaire, and Blinding Questionnaires. *Results:* All 6 tolerated the stimulations well without changes in cognitive, psychological, or comfort profile. There were no significant changes between groups. The largest symptom was itching related to tDCS which resolved during treatment. *Conclusion:* This comparative model of parallel treatment is a safe approach for comparing and combining treatment.

PC1142

Focused and Radial Extracorporeal Shock Wave Therapy: More Similarities than Differences

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Background: There is a growing interest in using less invasive, non-surgical alternatives for the treatment of musculoskeletal indications. Extracorporeal shock wave therapy (ESWT) has emerged as one such treatment. However, controversies regarding shock mechanisms and efficacy of the two principal modalities of shock wave therapy, focused and radial, (i.e. fESWT and rESWT), abound. *Material and Methods:* A systematic review of the literature was performed studying the mechanism of action of the two types of ESWT. The clinical results and functional outcomes were compared for various musculoskeletal indications. *Results:* Contrary to prevailing opinion, (i) most of the available fESWT devices generate pressure waves rather than true shock waves, (ii) both fESWT and rESWT devices can generate cavitation and, (iii) there is no evidence suggesting that fESWT is superior to rESWT except for deep indications such as pseudoarthrosis of the femur or avascular hip necrosis. *Conclusion:* Both fESWT and rESWT are safe and highly effective treatment modalities for musculoskeletal pathologies, with no proven superiority of one modality over the other. Both are effective for superficial indications such as plantar fasciopathy, Achilles tendinopathy, lateral epicondylitis and calcifying tendinitis of the shoulder while fESWT is preferential for deep bony indications such as pseudoarthrosis of the femur or avascular hip necrosis.

PC1143

A Resistance Exercise Intervention in a Chronic Neck Population Using a Novel Strengthening Tool

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Background: Chronic Neck Pain (CNP) is one of the most prevalent musculoskeletal conditions in Western society. It accounts for large losses in lost productivity figures and increased expenditure for sick leave and healthcare costs annually. Active exercise is advocated in the treatment of CNP, however which form of exercise is most effective is not yet fully known, resistance or strengthening exercise has been found to be beneficial for reducing symptoms of CNP including pain and disability. This investigation was undertaken to determine the effectiveness of a resistance training program using a novel cervical muscle strengthening tool, in conjunction with usual care physiotherapy in patients with CNP. *Methods:* 14 patients with CNP symptoms (duration >3 months) were recruited from outpatient primary care facilities in Cork & Limerick, Ireland. Patients had to be receiving physiotherapy for

mechanical non-specific neck pain. Participants were randomly assigned to either the control group (usual care physiotherapy) or the resistance training group (usual care physiotherapy plus resistance training). Outcome measures included isometric strength (N) and cross-sectional area of the Longus Colli (cm²) using real-time ultrasound (USI), pain (VAS) and disability (NDI) measures. Resistance training was undertaken for 8 weeks, using a purpose designed strengthening tool for the deep cervical flexor muscles. Outcome measures for both groups were taken at baseline and at follow up 8 weeks later. **Results:** Within-group statistically significant differences were seen for measures of isometric strength, pain and disability (UC Group; $p=0.02, 0.018, 0.026$ respectively, Resistance Group: $p=0.001, 0.034, 0.034$ respectively). Between-group differences for isometric strength were also evident with the resistance group performing better ($p=0.04$), with a trend towards significance in reduced disability figures ($p=0.46$) also. **Conclusion:** Using a targeted strengthening program for the deep cervical flexors in conjunction with usual care physiotherapy has more beneficial effects than physiotherapy alone. Larger scale studies with greater patient numbers is required to fully determine the effect of resistance exercise training using a novel strengthening tool in similar patient cohorts.

PC1144

Effect of 12-Week Backward Walking Exercise on Proprioception of Knee Joint in Patients with Knee Osteoarthritis

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Introduction: Inaccurate proprioception has been suggested to be a risk factor for the development of limitations in function in patients with knee osteoarthritis (KOA). Maintenance of knee proprioception may definitely have significance for delaying the development and progress of KOA. Low impact, moderate aerobic exercise is important interventions for individuals with KOA. Backward walking, areversal of forward walking shows a higher level of lower limb muscle activity and smaller ground reaction force compared with normal walking. Regular backward walking exercise can improve balance, gait abnormalities. All these characteristics suggest backward walking exercise may have benefits on KOA patients. However, no research to date has examined the effects of backward walking exercise on the knee proprioception of patients with KOA. The purpose of the study was to determine if 12-week backward walking exercise influenced proprioceptive function of knee joint among older adults with KOA. **Methods:** Thirty-six KOA patients (aged >55 years) were randomly assigned into either backward walking exercise group (BW group, $n=18$) or control group ($n=18$). The BW group underwent a supervised backward walking exercise program for 12 weeks, while the control group received general education for a comparable time period. Measurements of joint kinesthesia were used to evaluate proprioception in this study. Through detecting the threshold of passive movements, knee joint kinesthesia was measured in all subjects before and after the 12-week intervention. **Results:** The subjects in BW group detected the passive motion of the knee joint significantly faster at the post-test than at the pre-test. Knee motion sense in flexion and extension was improved by 37.2% and 34.2%, respectively, from the baseline in the BW exercisers. The BW group had significantly smaller mean movement thresholds in both directions than the control group at the post-test. **Conclusion:** For the older patients with KOA in the present study, 12-week backward walking exercise gave the practitioners better scores than controls on knee proprioception. Improvement in proprioceptive activity might be beneficial for improving knee joint function for the patient with KOA. This study was supported by the Chinese Ministry of Science and Technology, China National Science and Technology Infrastructure Program 2012 (Grant 2012BAK21B00).

PC1145

Effect of Polyunsaturated Fatty Acids on Neurorehabilitation in Traumatic Spinal Cord-Injured Individuals

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Introduction: Omega-3 polyunsaturated fatty acids (o-3 PUFAs) have positive effect on induction of neurorecovery, which is mediated through its antioxidant and anti-inflammatory effects. PUFAs are important components of phospholipids which contribute in constitution of cell membrane. Omega 3 PUFAs consist of a-linolenic acid, eicosapentaenoic acid and docosahexaenoic acid. We tried to understand whether administration of o-3 PUFAs may reveal any positive effect on Functional Independence Measure (FIM) and Functional Assessment Measure (FAM; FIM-FAM) scores in these patients. **Material:** This study is a double-blinded randomized clinical trial. Main inclusion criteria were: traumatic spinal cord injury (SCI) and post injury duration longer than 1 year. Disability and dependency was assessed using UK Functional Independence Measure and Functional Assessment Measure (Fim-FAM) scale. MorDHA capsules (435 mg of docosahexaenoic acid and 65 mg of eicosapentaenoic acid) were administered in treatment group, whereas control group received placebo capsules for 14 months. UK FIM-FAM scale were estimated before intervention and at the end of the trial. **Results:** Treatment group consisted of 54 patients and control group included 50 patients. There was no significant difference in mean age, weight, height, body mass index and injury level between treatment and control groups. Compliance with supplement averaged 80% in both groups over the 14 months of observation. No significant effect of omega-3 PUFA consumption could be detected on any components of FIM-FAM after 14 months of omega 3 fatty-acid consumption. **Conclusion:** Neuroprotective effect of omega 3 PUFAs was observed in acute phase of SCI. Most of these studies support this positive effect on experimental animal models, while literatures on human models are so limited. It seems that neuroprotective effect of o-3 PUFA in patients with chronic SCI, if exists, is very slight and cannot exert a significant influence of disability and dependency measures. Moreover, the effect of o-3 PUFA consumption on inflammatory cytokines after 4 months of intervention was investigated previously and the results demonstrated no significant alteration. Here, we propose that omega-3 PUFA administration in chronic traumatic SCI does not result in neuroprotection and its anti-inflammatory effect in this phase, if exists, cannot clinically change FIM-FAM scores.

PC1146

Upper Limb Orthosis after Stroke

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Introduction: Hemiplegia is a real public health problem. It is a source of limitations in daily living activities and restriction participation of patients, which causes a major impact on quality of life of patients. **Material and Methods:** we propose to conduct a review of literature on the benefit of orthosis of the upper limb in hemiplegic patient and to evaluate the experience of Tunis Military Department of Physical and Rehabilitation Medicine during four years between 2010 and 2014. **Results:** According to the International Classification of Functioning, Orthosis must be part of the rehabilitative and therapeutic management of hemiplegic patients and should be prescribed at the earliest stage in order to preserve the joints, to avoid distortion and muscle contractures. It should be reviewed and modified throughout the evolution to integrate the hemiplegic side to the body schema of the patient and make the patient as independent as possible and independent in activities of daily living. Different types of orthosis can be used at the upper limb, static or dynamic, flexible or rigid. Nowadays, functional orthosis are useful at initial stage to improve cerebral plasticity, to recover a missing

function or to improve the outcome of a therapeutic procedure such as injection of botulinum toxin. **Conclusion:** The use of orthosis in the upper limb of hemiplegic patients remains controversial.

PC1147

Efficacy of Radial Extracorporeal Shock Wave Therapy (rESWT) in Patients with a Symptomatic Heel Spur

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Introduction/Background: Heel spur is an osteophyte located on the calcaneus. Major symptoms consist of pain in the region surrounding the spur. Patients may report heel pain to be more severe in first step when waking up in the morning. Heel spurs can easily be detected by a radiological examination. In the patients who had poor response to well known conservative therapies, radial extracorporeal shock wave therapy (RESWT) can be a good alternative before considering surgical options. In this study we aimed to investigate the efficacy of rESWT for painful heel spur and compare the effects of different rESWT doses. **Material and Methods:** 90 patients were examined who had heel pain associated with calcaneal spur. A single blind randomised study was performed in which 30 patients underwent a placebo rESWT (0 mJ/mm²) [group 1], 30 patients received low dose (0.21 mJ/mm²) [group 2] and 30 patients received medium dose (0.29 mJ/mm²) treatment [group 3] once a week for 3 times. Variations in pain, walking time and function of the foot were evaluated by visual analogue scale (VAS), Roles and Maudsley Score, Foot Function Index (FFI) and AOFAS (American Orthopaedic Foot and Ankle Society) Ankle-Hindfoot Scale. Patients were evaluated before treatment, at 3rd week and 12th week after treatment. **Results:** For age, sex, weight, height and Body Mass Index (BMI) there was no statistically significant difference between groups. At week 12, we found statistically significant difference for pain, foot function and walking time in group 3 (p<0.05). There was no significant difference between group 1 and group 2 except for FFI pain subscale and FFI total index scores (p<0.05). **Conclusion:** Our results suggest that rESWT is a safe and effective treatment to reduce the symptoms of most patients with a painful heel. In our study we also detected the efficacy of rESWT for relieving symptoms in painful heel spur. Especially in the medium dose group, the results were found more satisfactory in pain, walking time and function of foot parameters.

PC1148

Static and Dynamic Parameters in Patients with Degenerative Flat Back and Its Change after Corrective Fusion Surgery

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Introduction/Background: Degenerative flat back shows sagittal imbalance from decreased lumbar lordosis and lead to gait disturbance with stooped posture. This study was to evaluate characteristics of static and dynamic parameters in patients with degenerative flat back (DFB), to assess their improvement after corrective surgery, to assess correlations between degree of improvement in static and dynamic parameters obtained by surgery, and to compare degree of their improvement between successful and unsuccessful outcome groups. **Material and Methods:** Forty-seven patients with DFB were included who conducted whole spine X-ray and three dimensional gait analysis before and 6 month after corrective surgery. Forty-four subjects were selected as control group. As static parameters, thoracic kyphosis (TK), thoracolumbar junction (TLJ), and lumbar lordosis (LL), pelvic incidence (PI), sacral slope (SS), and pelvic tilt (PT) were measured. As dynamic parameters, maximal and minimal angle of pelvic tilt, lower limb joints, and thoracic and lumbar vertebrae column (dynamic TK and LL) in sagittal plane were obtained. **Results:** The DFB group showed significantly larger LL, PT and smaller TK, SS. The DFB

group showed the smaller maximal and minimal TK, LL, pelvic posterior tilt, hip flexion, knee flexion, and ankle dorsiflexion than the control group. Most of these were corrected significantly by fusion surgery. Dynamic spinal parameters correlated with static spinal parameters. Successful group obtained significantly larger improvement in maximal and minimal dynamic LL than unsuccessful group. **Conclusions:** The patients with DFB showed decreased thoracic kyphosis and decreased sacral slope in static parameters and increased posterior pelvic tilt, hip flexion, and knee flexion angle in dynamic parameters, which could be reversed by lumbar corrective surgery. Significant correlation between static and dynamic parameters was mainly found in spinal parameters. Surgical outcomes in terms of patients' satisfaction were more related to improvement of dynamic parameters such as maximal and minimal dynamic lumbar lordosis rather than to that of static parameters. Three dimensional gait analysis was clinically useful in evaluation of patients with DFB in that it allowed for assessment of dynamic parameters of spinopelvic and lower limb segment, which might be related to daily function or treatment outcomes.

PC1149

The Influences of Specially Designed Backpack on Head, Trunk, and Pelvic Kinematics

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Introduction/Background: Many students of elementary school carry backpacks. While backpacks are an effective way to carry weight, they can also be a significant contributing risk factor for spinal discomfort and also cause problems for the developing skeletal system in childhood, which further lead to severe issues later in life. Position or presence of equipments such as shoulder strap or back support can influence balance, postures, comfortness, or postural instability during ambulation. The purpose of this study was to assess the influence of newly developed backpack on head, trunk, and pelvic alignment during ambulation by three dimensional motion analysis. **Material and Methods:** Thirty children were recruited who were 6-8 years old, 128~132 cm of height and 28~32 kg of weight, and had no history of disease or traumatic injury of spine, upper limbs, and lower limbs. The specially designed backpack (new backpack) was produced by adding special equipments to old type backpack. This new backpack was described as follows. 1) Strap was shortened by 3cm upward movement of attachment site of strap. 2) air mesh was attached into back support to help trunk to maintain straight position 3) anterior strap was added to connect bilateral shoulder straps for stabilization. We compared head, trunk and pelvic movements during ambulation with new backpack, old backpack and without backpack (control) by three dimensional motion analysis. Gait analysis was performed without any backpack, with new backpack, and with old backpack. **Results:** In trunk kinematics, sagittal range of motion in old backpack was significantly larger than that in control as well as new backpack. In head and pelvic kinematics, sagittal range of motion in old backpack was significantly larger than that in control as well as new backpack. No difference was found in sagittal range of motion in between control and new backpack. **Conclusion:** Shorter strap and back support and anterior strap added to old type backpack contributed to reduction of range of motions of head, trunk, and pelvis during ambulation with backpack, which was close to those during ambulation without backpack.

PC1150

A Principal Component Analysis Base on Three-Dimensional Motion of Tai Chi Chuan

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Introduction: Based on the human body movement Angle change to explore the internal mechanism of tai chi to improve balance

and coordination. *Material and Methods:* By three-dimensional motion capture system, we gather volunteers play Tai chi chuan (TCC) movement onset of joint angles, and use principal component analysis to investigate the correlation of each joint movement with data standardization. *Results:* In the whole process of movements, two nearby joint Angle change is not only there is a strong correlation ($P<0.01$), and there is also a strong correlation between multiple related joint ($P<0.01$), correlation with other joint movement of each joint Angle, and the head and spine just only do horizontal rotation, meanwhile form the integral action can guarantee the stability of the human body center of gravity. According to the correlation data can get the Tai chi chuan (TCC) movement mathematical model with principal component analysis. Base on principal component analysis, some near the joint exercise can constitute a special “principal component”, each “principal component” is both independent motor units, and relationships with other “principal component”, completes the Tai chi chuan movement together. Visual feedback and action of synchronicity can improve the stability of equilibrium. Meanwhile, one action can be divided into the head, spine (trunk), upper limbs, lower limbs, and other “principal component”, Different “principal component” have different relevance because the action of styles. *Conclusion:* TCC movement is designed based on the basic principle of human body balance coordination, According to the principle of motor learning, all kinds of people through the practice of these movements can form good balance reflex, which can effectively improve their balance and coordination, reduce the risk of falls.

PC1151

Botulinum Toxin in Neurogenic Sialorrhea: Two Ultrasound-Guided Injection Techniques Comparison

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Background: Neurogenic sialorrhea is defined as oral incontinence of saliva, secondary to several neurologic disorders, leading to functional, psychological or social impairments that could affect activities and patients participation, including their families as well. A variety of therapeutic options are available, including Botulinum Toxin injection at parotid and submandibular glands, which it has been shown safe and effective, increased with direct ultrasound-guided injection; but less has been said about identifying the puncture site with ultrasound prior to the procedure. *Objective:* To compare efficacy and safety between direct versus indirect ultrasound-guided Botulinum toxin injection on salivary glands, in children and adolescents with neurogenic Sialorrhea. *Material and Methods:* Single-blinded randomized experimental trial. Participants who met inclusion criteria and after informed consent obtained, were randomized in two groups: A) Direct ultrasound-guided injection and B) Indirect (i.e. identifying and marking injection site prior to the procedure) ultrasound injection. Onabotulinumtoxin A standard dose and technique at both parotids and submandibular glands were made (70 UI total). Blind evaluations with Drooling Impact Scale, Drooling Frequency and Severity and Fujishima Dysphagia Index were performed at baseline, 15 days and monthly till six months. Statistical tests (Wilcoxon, paired two-sample *t*-test and Mann-Whitney test) were applied. *Results:* 29 patients (19 male) were randomized. Main age in both groups was 12 (4-23) and 9 (4-16) year-old respectively. All subjects completed at least three months follow-up, and 21 patients completed six months follow-up (group A and B 10 and 11, respectively). Both groups showed statistical and clinical significance in all outcomes post injection, but there were no difference observed between group scores in all the measurements performed. *Conclusion:* There is a similar efficacy and safety whether using direct or indirect ultrasound-guided botulinum toxin injection technique in children and adolescents with neurogenic Sialorrhea. Note: This research has been made according to the Declaration of Helsinki.

PC1152

Radial Extracorporeal Shock Wave Treatment for Cellulite May Seriously Harm Embryos

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Introduction/Background: Radial extracorporeal shock wave treatment (rESWT), originally developed for the treatment of various musculoskeletal injuries, has become one of the best investigated treatment modalities for cellulite. Earlier studies reported potential damaging effects of focused extracorporeal shock wave treatment (fESWT) on embryos. Accordingly, pregnancy is considered a contraindication for rESWT. Concerns have been raised about possible harm to the embryo caused by treatment with rESWT for cellulite, especially in the critical period of time when a woman is not aware of her pregnancy. *Material and Methods:* Chicken embryos in ovo were exposed to various doses of radial shock waves at two different stages (two and three days old) of development (positive energy flux density=0.16 mJ/mm²). By these time points the chicken embryos possess a well developed circulatory system, well established primary optic vesicles, an identifiable telencephalon and the formation of appendages. *Results:* The mortality rate of the chicken embryos increased in a dose-dependent manner after exposure to rESWT at the age of two or three days. Among those embryos that survived the shock wave exposure, three embryos showed severe congenital defects (missing eyes, malformed pelvis, or missing coat). *Conclusion:* Our results show a potential serious physical harm to embryos treated with rESWT. The developmental stages (two or three days old) of the embryos exposed to rESWT is comparable to four- to six-week-old human embryos. Even if the results cannot be directly transferred to the embryo of a pregnant woman treated with rESWT for cellulite, we recommend to rule out pregnancy before the application of rESWT to avoid any risk to harm the embryo.

PC1153

Pharyngeal Electrical Stimulation for Restoration of Swallowing in Central Dysphagia: Does the Timing of Intervention Matter?

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Background: Pharyngeal electrical stimulation may improve the outcomes of swallowing rehabilitation. It is questioned whether this intervention is effective both in acute, subacute and chronic stroke and TBI. *Material and Methods:* 21 patients aged 52±20 years (15male) with stroke and TBI were included into the study. Bartel index averaged 10±15, NIHSS averaged 15±7. Rehabilitation included exercises with speech and language therapist and pharyngeal electrical stimulation. Assessment was performed at enrollment and after 2 weeks of treatment. *Results:* An improvement in swallowing scores was observed both in patients in acute (group 1, n=12) and subacute and chronic (group 2, n=9) stage of brain injury. In group 1 functional outcome swallowing scale (FOSS) decreased from 4.1±1.4 to 2.5±1.5 ($p=0.006$), swallow function scoring system (SFSS) score increased from 1.0±1.5 to 3.7±2.0 ($p=0.006$), 3-swallow score increased from 1.0±1.0 to 3.1±1.8 ($p=0.003$). In group 2 FOSS decreased from 4.3±1.4 to 2.5±1.7 ($p=0.01$), SFSS score increased from 1.1±1.7 to 4.0±2.5 ($p=0.02$), 3-swallow score increased from 0.9±1.1 to 2.7±2.0 ($p=0.03$). No difference in gains between was observed between these groups. *Conclusion:* Preliminary data suggests that pharyngeal electrical stimulation is of benefit both in acute and subacute and chronic stages of brain injury.

PC1154

The Effect of Instruction Focusing On Single versus Multi Movement Parameters on Upper Limb Exercise Training

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Introduction: Previous studies have shown the promoting effect of instruction and feedback on the motor learning of the upper limb movement. This study examined how different methods of instruction during upper limb exercise training affected learning efficiency. This was done by comparing two groups, one focused on single parameter and a second on multi-parameter, during robot-assisted upper limb exercise training. **Material and Methods:** The InMotion ARM™ Robot, a commercial version of the MIT-Manus, was used in this study. The training program consisted of 12 sessions; each session consisted of 80 repetitions of reaching movement. The healthy subjects were divided into two groups according to the instruction they had received. The multi focus group was instructed to concentrate on both speed and accuracy during all 12 sessions. The single focus group were told to concentrate on speed during the first four sessions, accuracy during the next four and both parameters in the last four sessions. A retention test was performed after the final session. The performance time and extent of path errors during every session was compared between the two groups. **Results:** Performance time and path errors were reduced during the training sessions in both groups. Performance time was significantly shorter within the single focus group during the retention test. There was no difference in the extent of path errors between the two groups. **Conclusion:** Focusing on a single parameter is more efficient than focusing on multiple parameters when learning movement in upper limb exercise training.

PC1155

Acupuncture Combined Joint Mobilization Treat a Case of Exercise-Induced Muscle

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Introduction: Modern rehabilitation techniques can combine with Traditional Chinese medicine. From this case we can see, acupuncture can treat muscle tension instead of inducing the muscle tension, the key point is acupoints selection and manipulation technique. Acupoints on Yang meridians dredging the channels and regulate of Yin and Yang. Joint mobilization technique grade I and II relieve pain and grade III improve ROM of joint. The reasonable combination of both, increase curative effect. **Material and Methods:** Ms Yang, Female, aged in 18 yr, a badminton player. She has received professional training for 7 years. Visit time: April 24, 2013. Chief Complaint: she suffered from pain in right elbow, was difficult to extend, and has not been able to participate in normal training for 3 months, and the symptoms grew worse in recent 2 weeks. Physical examination: tenderness in right elbow, pain spot, and a hard block was touched, but there was no swelling in right elbow. Active range of motion (AROM): right elbow extension -45°, flexion 120°. Positive range of motion (PROM) right elbow extension -40°, flexion 130°. X-ray: did not show abnormal in bone. Treatment Acupuncture therapy first: Acupoints selection, Chize (LU5), Quchi (LI11), Shousanli (LI10), and pain spot. Operating method, for Chize (LU5), the needle is inserted obliquely to form on angle of 45° with the skin along the meridian, insert depth was 25mm, reducing by lifting and thrusting the needle. For Quchi (LI11), Shousanli (LI10), and Pain spot, the needles inserted perpendicularly on angle of 90° with the skin, insert depths were 15, 20 and 25 mm respectively, and also reducing by lifting and thrusting the needle. Retaining the needle for 20 minutes. After 10 minutes removing the needle, joint mobilization technique was manipulated. The long axis of the humero-radial joint traction and humero-ulnar joint swinging in elbow extension (I-III grade), once every other one day. **Result:** After 5 times treatment, the AROM of right elbow was extension 10°, flexion 135°. No pain in right elbow. She went back to training. **Conclusion:** Acupuncture can combine with joint mobilization to treatment for exercise-induced muscle strain.

PC1156

Acupuncture Alleviates Post-Surgical Comorbidities of Fragility Fracture Patients

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Introduction/Background: As the population is ageing, the average age of fragility fracture, especially hip fracture patients is 83 in women and 84 in men with women have higher risk. The common protocol is surgical stabilization. However, some patients suffer from comorbidities include delirium and bowel disturbances after stabilization surgery. Delirium incidence rate has reached 61% in these patients. Acupuncture was included in the routine protocol to study if it could help relieving the current high risk of post-surgical comorbidities. **Material and Methods:** 25 fragility fracture patients were recruited after admission from an emergency hospital in Hong Kong. All patients will be in routine care while 11 patients were provided with acupuncture modality additionally. The acupuncture modality includes ear acupuncture and superficial body acupoints stimulation for 5 days consecutively starting from the day before surgery. All of the patients will be assessed by MMSE for their mental condition. The bowel movement will be evaluated by the first day of bowel opening after surgery. **Results:** The average MMSE score was increased by 6%, no delirium was seen in the intervention group. There was a drop in MMSE score by 10% and the rate of delirium is 45% in the control group. With acupuncture modality, 28.6% patients had voluntary bowel movement while 15.4% patients in the control group. **Conclusion:** Delirium and bowel disturbance has hindered the rehabilitation of the hip fracture patients, especially in older age patients. Acupuncture has been using as one of the therapies in Chinese population but it is not practiced in acute hospitals in Hong Kong. From the study result, it suggests that acupuncture might alleviate the condition of delirium and bowel disturbances. The study only evaluated up till the patients discharge, which is about 6 days. Delirium might occur after discharge. More study is needed to evaluate the effect in a longer time frame. More study should be on post-surgical problems other than fragility fracture.

PC1157

Clinical Decision Making for Using Electro-Physical Agents: What Do Physical Therapists Consider?

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Introduction: Electro-physical agents (EPAs) are fundamental components in the management arsenal of physical therapy. The objective of this study was to provide a comprehensive understanding of the factors affecting the decisions made by Physical Therapists (PTs) when choosing to apply EPAs as a treatment modality. **Material and Methods:** A purpose-designed questionnaire was developed to investigate the contribution of 13 factors on the decision to use EPAs. Two hundred questionnaires were randomly distributed to PTs attending the annual conference of the Israeli Physical Therapy Society. The factors were grouped into six categories and Wilcoxon Sign Rank tests were applied to compare their impact on decision making. **Results:** In total, 144 (72%) questionnaires were completed. Good internal consistency was found for the 13 component of the decisions factors (Cronbach's coefficient alpha=0.77) with unequal distribution of answers in each question (p<0.01). Eighty-one percent of the participants reported past experience, and 55% mentioned research evidence as strong or very strong factors which influence their decision to use of EPAs. However, only 38% of the participants reported patients' preferences as a strong or very strong factor. Comparisons between the six categories of the decision factors determined three levels of impact (rank scores) which were significantly different from each other (p<0.01). Availability of equipment ranked the highest. The lowest level of impact included

two categories, technology related issues and patients' and physicians' preferences. **Conclusion:** The findings of the present study raise questions about the adequacy of decision making regarding EPAs usage. The participating PTs were likely to make decisions which were strongly impacted by availability of equipment and operational factors, while not involving their patients in the decision making process. Further training with EPAs is suggested in order to improve the clinical decision making for using EPAs.

PC1158

Clinical Application of the Magnetic Resonance Spectroscopy in Assessing the Cognition of Stroke Patients

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Objective: To explore the applicability of the Magnetic Resonance Spectroscopy (MRS) in evaluating cognitive function and observing the curative effect of stroke treatment. **Methods:** Using the Minimal status examination (MMSE) screening Thirty stroke patients with cognitive impairment (the cognitive impairment group) and thirty stroke patients without marked cognitive impairment (the stroke control group), and choose thirty healthy subjects as a normal control group. The gender distributions, ages and levels of education of the three groups were matched. All cases were examined with the MRS. After two months of treatment, the three groups were assessed again. **Results:** The bilateral hippocampus NAA/Cr of cognitive impairment group of is lower than the stroke control group and healthy control group ($P < 0.05$); The bilateral hippocampus Cho/Cr is higher than stroke control group and healthy control group ($P < 0.05$). After treatment, both of cognitive impairment group and stroke control group patients had higher NAA/Cr and lower Cho/Cr compared with before treatment ($P < 0.05$). **Conclusion:** MRS can be used to assess the degree of cognitive impairment in patients with stroke, and can effectively identify the presence of cognitive impairment, with better clinical value, and so have clinical value.

PC1159

Baropodometrics and Diabetic Foot - Contribution to Early Detection of Risk Factors of Foot Ulceration

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Introduction: Diabetic neuropathy (DN) is a main cause for foot ulceration in persons with Diabetes Mellitus (PwDM). Foot deformity (FD) and elevated plantar pressure have been associated with risk for foot ulceration, while there are controversial results regarding limited joint motion (LJM). **Objective:** To observe the association of FD, plantar hyperkeratosis (PH) and LJM with elevated PPP and the offloading effect of orthotic insoles, in a cohort of PwDN. **Material and Methods:** An observational, case series, transversal study was conducted. A 70-PwDN sample between 30 and 80 years old from a 50,000 inhabitants' area was selected. Inclusion criteria: Neuropathy Symptom Score ≥ 3 , Neuropathy Disability Score ≥ 5 , inability to detect a 5.07 Semmes-Weinstein 10 mg monofilament on the plantar foot over 4 areas. Exclusion criteria: previous plantar ulcers, lower limb amputation, signals of lower limbs ischemia, impairment that might lead to other neuropathy and/or to inability to walk without assistive device on level surfaces. Education and other preventive measures were delivered and recommended to every patient at the entrance of the study. Orthotic insoles were applied in PwDN with FD and PPP over 900 Kilopascals. Assessment of PPP without and with orthotic insoles was conducted by means of Biofoot/IBV baropodometrics system, during three-trial sessions, at free cadence of walking, without and with the orthotics and adequate footwear. **Main Outcome Measures:** FD (claw and hammer toes), PH, and range of movement in ankle extension and flexion, metatarsophalangeal of toes and interphalangeal joint of hallux, forefoot PPP. **Results:** Subjects with FD, mostly claw toes, and PH under metatarsal heads showed a

significant association with increased forefoot PPP. These patients showed an average reduction of 34.21% of forefoot PPP when using off-loading plantar orthoses. **Conclusions:** The study shows that FD and PH, but not LJM, are associated with increased PPP among PwDN, and thus PwDN assessment is recommendable to detect the association of these risk factors. It shows that off-loading forefoot orthotics is effective to decrease forefoot PPP.

PC1160

The Efficacy of 100 and 300 mg Gabapentin in the Treatment of Carpal Tunnel Syndrome

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Introduction: Carpal tunnel syndrome (CTS) is a neuropathy due to the compression of the median nerve. It is shown that gabapentin in high doses is effective in treatment of CTS patients. In this study we evaluated the efficacy of low doses of gabapentin in treatment of CTS patients. **Material and Methods:** In this study, 90 patients with CTS were randomly assigned to groups A, B and C. Gabapentin was administered to group A with dose of 100 mg/day and to group B with dose of 300 mg/day. Group C received no treatment. Before and after 2 months treatment, patients were evaluated using Visual analogue scale (VAS) for pain and parasthesia, Boston carpal tunnel questionnaire (BCTQ) including Symptom Severity Scale (SSS) and Functional Status Scale (FSS) to evaluate the efficacy of the treatment. The pinch and grip strength was also measured. **Results:** There was significant improvement in VAS, grip strength, pinch strength, SSS, FSS and BCTQ score in all three groups ($p < 0.05$), but the changes in CMAP and SNAP was not significant. Groups A and B in comparison to group C had significantly better improvement in VAS, pinch strength, SSS, FSS and BCTQ total score ($p < 0.05$). There was significantly more improvement in pinch strength and SSS score in group B compared to group A ($p < 0.05$). **Conclusion:** Gabapentin in low doses is a useful drug in treatment of CTS symptoms with no side effects and intolerance. Gabapentin with dose of 300 mg/day is more effective than the dose 100 mg/day.

PC1161

Dance Therapy as an Adjunct to Rehabilitation of Persons with a Physical Disability: What Do the Preliminary Analyses Say about Whether It Works?

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Introduction: A dance therapy program (DTP) is offered to clients receiving out-patient rehabilitation in Montreal, Canada. DTP is based on Laban movement theory principal components (body, space, effort and shape) and consists of 1.5 hr weekly sessions for 12 weeks (+ standard rehabilitation) aiming to facilitate social integration/participation in adults with motor deficits while improving balance, endurance, and mobility. The effectiveness of this program has not yet been formally investigated. **Objective:** to explore the effect of the DTP on social integration and community participation among participants compared to nonparticipants. **Methods:** Quasi-experimental study with repeated measures (comparison group being non participants on waiting list): 2 evaluations pre-intervention (T0=4 weeks prior, T1=1st 2 weeks of DTP) and 2 post intervention evaluations (T2=last 2 weeks of DTP, T3=3 m post). The 5 outcomes included: Timed up and go (TUG) score, Assessment of life habits (LIFE-H 3.0) relating to community mobility and active participation in community life,

and leisure involvement (Profile de Loisir, Dutil, 2013) including frequency of shopping mall/restaurant visits. *Results:* Subjects were 4 males and 4 females (average age =58.9 years, range=47 - 76 yrs) with varying neurological and musculoskeletal diagnoses. In general, scores for all subjects improved over time: TUG (mean time T0=13.5 vs mean time T3=10.6 sec), LIFE-H mobility mean scores (6.2/9 at T0 vs 7.2 at T3) and active participation mean scores (7.0 at T0 vs 8.7 at T3), and Profile leisure (mean shopping score increasingly different from 0). However, when comparing the DTP participants vs non participants, group mean scores did not differ significantly at T1 or at T2 ($p=0.733$) nor did the measures differ pre and post intervention ($p=0.964$) for either group. *Conclusion:* Although earlier research (pre-post design with only DTP participants) demonstrated significant improvements in these same measures, the preliminary analyses of the current study suggest DTP has limited added value beyond the provision of standard rehabilitation services. Non-significant results could be due to small sample size or the choice of measurement tools. The study is ongoing and results of more extensive analyses ($n>30$ each group) will be presented at the congress.

PC1162

Comparison of the Effect of Virtual Reality Training On the Balance Function in the Different Phase of Stroke: a Preliminary Study

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Objective: The purpose of this study is to compare the effect of VR training on the recovery of the balance in different phases of stroke. *Methods:* 13 subjects were included in the study. 8 patients with stroke were divided into two groups, 3 subjects included in the acute group. The other 5 subjects included in the chronic group received the VR training and conventional therapy. Both of the groups received the VR training. Balance of two group were compared with the balance of 5 healthy subjects. The Balance function were measured with three-dimensional kinetic parameters of COP and COM, combined with clinical assessment of BBA and FMA-LE at before and after the training protocol. *Results:* Follow the 3 weeks' VR training, the RMSE [COP-COM] in the ML direction decreased in both group, a significant decrease ($p=0.018$) was found in the chronic group, phases compared to baseline, and approached those of health subjects. Furthermore, a significant raise ($p=0.016$) of FMA-LE can be found in the chronic group before and after the training. But there was no significant difference in the BBA between the two groups. *Conclusion:* The VR training may be a kind of training which is suitable for the improvement of balance in the stroke patients especially in the ML direction. The VR training can also induce the improvement in the motor function of the lower extremity. And more studies should be done to find out the effect and the mechanism of VR training on the balance improvement of stroke.

PC1163

To Explore the Difference during Dominant and Nondominant Hand Drinking Water of Healthy Subjects Based on a Three-Dimensional Kinematic Analysis

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Objective: To analyze the kinematic feature of upper limb joint at dominant and nondominant hand drinking water of healthy subjects using the three-dimensional study, and exploring the difference. *Methods:* Fifteen healthy subjects with right dominant hand were recruited with the drinking water experiment. A three-dimen-

sional upper extremity kinematic model with Vicon Nexus was using to obtain joint angle and angular velocity of the shoulder, elbow and wrist with dominant and nondominant hand. The peak angle and velocity were computed for left and right hand drinking water. *Results:* Elbow range of Y and Z axes, peak wrist velocity of Z axis from dominant hand was statistical difference against the nondominant hand ($P<0.05$). There was no significant difference at other axis of upper limb joint between dominant hand and nondominant hand. *Conclusion:* Drinking water activity requires more angular velocity change of wrist joint in dominant and more angle of elbow joint in nondominant. The result of upper extremity should be taken into account with task related activity.

PC1164

Long-Term Effect of the Needs-Centered Seating Approach on the ADL

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Introduction/Background: The goal-oriented seating service based on the needs and physical assessment of the patient has been practiced in our hospital. We report the effects of this support using the FIM (Functional Independence Measure). *Material and Methods:* The subjects of investigation were 393 seating clinic users (SC group: mean age 76.4 ± 13.6 years, female 219, male 174) (from February 2006 to December 2012). Seating interventions were as follows; wheelchair adjustment, model selection support, offering of a trial cushion, Measurement of pressure, Advice of environmental conformity, coaching of drive or transfer technic, family and care worker support, instruction of rental procedure. From all SC users, convalescence and general ward hospitalized patients had been selected ($n=258$). Furthermore, it was analyzed that the data evaluated both within two weeks and within one month before and after the intervention ($n=88$). Controls were selected from the patient of the same period ($n=4329$) based on the same criteria ($n=296$). *Results:* FIM total score of the SC group ($n=88$) was increased from 38.6 points to 40.7 points after the intervention ($P<0.001$) FIM efficiency (gain/day) of the SC group showed a higher value than that of the non-SC group (at the time of admissions and discharges) ($P<0.01$). Long-term effects of both groups were examined by dividing into two groups based on the FIM total median score at the time of discharge. In severe group, SC group ($n=43$) showed a higher long term FIM efficiency than non-SC group ($n=154$) ($P<0.001$). In addition, the improvement item of the SC group was in the order of the locomotion 8 wheelchair >Eating >Comprehension >Social interaction. *Conclusion:* In the SC group, ADL has been significantly improved after the intervention. In particular, the intervention with the seating in the severe group showed that was long-term ADL improvement. In particular, the intervention with the seating in the severe group showed the long-term ADL improvement. In addition, by improving the sitting posture, it has been suggested that improved ADL in general, including cognitive domain. Chino, Naoichi, and John L. Melvin, eds. Functional evaluation of stroke patients. Springer, 1996.

PC1165

Clinical Trials of Newly Designed APPNA Orthopedic Rehabilitation Institute (A.O.R.I) Foot Abduction Brace and Comparison with DENNIS Brown Splint

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Background: Clubfoot (CTEV) is the commonest congenital deformity in babies. More than 100,000 babies are born worldwide each year with CTEV. Treatment goal is to achieve a functional, pain free, plantigrade foot with good mobility. The treatment of CTEV is serial gentle manipulations and splinting to maintain the correction. The main reason of relapse of deformity is non-compliance to bracing. *Aim:* To develop a standard & cost effective Foot

Abduction Brace to address the issues of non-compliance. Research Method: It was 3 years non randomized interventional study (April 2011 to March 2014) with convenient sampling. Total 110 patients were included. 30 patients using AORI FAB were in study group where as 80 patients using DB Splint, were in control group. Study was performed at Benazir Bhutto Hospital Rawalpindi. *Results:* Deformity relapsed in 15% of patients in control group but no relapsed in study group and P-value was 50% of patients from control group and it was about 0% in study group with P-value=50% less than the DB Splint. *Discussion & Conclusion:* AORI foot abduction brace is light in weight and having dynamic effects for Dorsi-flexion while D.B splint is relatively heavy and was poor to maintain Dorsi-flexion at ankle joint, which ultimately leads to the relapse of the adduction and then equinus. There is chance of skin damage (especially on heel part) in AORI FAB if not properly fitted. Superficial skin damage (bruise etc) were noticed in most of the patients using DB Splint. In AORI FAB too much tightening of Velcro straps may cause the edema of the distal part of the foot. Our clinical trials of the AORI FAB shows very good results in maintenance of the corrected CTEV as Marcunde described in Ponseti Management manual that relapse occurs in more than 80% of cases, where relapse occurs only 6% in compliant families and there is more family compliance of AORI FAB at low cost.

PC1166

Computerized Dynamic Posturography in Patients with Diabetic Peripheral Neuropathy and Visual Feedback-Based Balance Training Effects

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Background: Diabetic peripheral neuropathy (DPN) often has reduced stability during standing conditions. *Aim:* To compare balance control in diabetic patients and normal subjects using computerized dynamic posturography and to assess effect of visual feedback-based balance training in DPN. *Materials and Methods:* A total of 57 patients of type 2 diabetes mellitus and 30 age-matched normal control subjects were recruited. The sensory organization test was done before and after the training program. *Results:* There was a significant decrease of mean (\pm SD) of composite equilibrium score and somatosensory ratio score between subgroups of DPN and control healthy group ($p < 0.05$). There was a significant increase of mean (\pm SD) of composite equilibrium score and the somatosensory ratio score after treatment as compared to results before training ($p < 0.05$) in mild DPN. Moreover, there were a significant correlation between composite equilibrium score and disease duration before training in the severe DPN ($r = 0.368$, $p < 0.05$). *Conclusions:* Computerized dynamic posturography is an important quantitative tool in the assessment of posture instability and allows for early disclosure of the failure of the postural control system. Visual feedback-based balance training was shown to be a promising method for fall prevention among early diabetes mellitus with peripheral neuropathy.

PC1167

Electrical Activity of the Limbic System in Short-Term Sensory Stimulation

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Introduction: Increasing sensory effects on the body, what is happening at the moment, requires finding appropriate methods for preventing sensory stress. The limbic system is the area of the brain, including both activating stress and stress-limiting structure can probably participate in the modulation of the stress response during sensory stimulation. *Material and Methods:* In our experiments we evaluated changes in the electrical activity of the dorsal hippocampus and the lateral nucleus of the amygdala of white rats to the presentation of a sound stimulus of different frequency: 1

Hz, 2 Hz, 4 Hz. In the experiments, guided by international guidelines for biomedical research involving animals EEG processing was carried out using wavelet analysis in MATLAB. Statistical analysis was performed using the Mann-Whitney test ($p < 0.05$). *Results:* The studies revealed that, upon presentation of a sound stimulus is a decrease of the electrical activity of the dorsal hippocampus in the range of beta-1 rhythm, while the electrical activity of the lateral nucleus of the amygdala complex is increased in the range of the alpha rhythm and decreases in the range of beta-2 rhythm. *Conclusion:* in short-term sensory stimulation observed divergent changes in the electrical activity of the structures of the limbic system, which indicates their different functional significance.

PC1168

Motor Evoked Potential Changes in Facilitatory and Inhibitory Setting of Repetitive Transcranial Magnetic Stimulation in Ischemic Stroke Patient: a Pilot Study

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Objectives: The purpose of this randomized control study was to compare the motor evoked potential (MEP) changes using repetitive transcranial magnetic stimulation (rTMS) in inhibitory frequency setting on contralesional side and facilitatory frequency setting on lesion side in post-ischemic stroke patient. *Methods:* Eight post-stroke patients with upper limb hemiparesis were studied (age, 52.38 ± 7.29 years; time after stroke 21.50 ± 16.09 months). After randomization, either one of the 2 settings; 1) Inhibitory setting, which low frequency rTMS of 1 Hz was applied for 20 minutes to motor cortex of the nonlesional hemisphere, or 2) Facilitatory setting, which high frequency rTMS of 10 Hz were applied for 20 minutes to lesional hemisphere, will be randomly applied to the patient. The motor evoked potential (MEP) were recorded on first dorsal interossei (FDI) of the contralateral side of the stimulation directly before and after application of the rTMS setting. At least a week later, similar procedure will be repeated but this time, using different setting than the first intervention. Each patient will serve as their own control. *Results:* We found that the pre-facilitatory lesion side Motor Evoked Potentials (MEP) were lower ($56.05 \pm 2.85 \mu V$) compare to post-facilitatory ($59.80 \pm 5.79 \mu V$). Similar increasing pattern of MEP changes were seen in pre-inhibitory lesion side ($55.07 \pm 5.80 \mu V$) when comparing to post-inhibitory lesion side ($59.27 \pm 6.215 \mu V$). In contrast, we found that the pre-facilitatory non-lesion side Motor Evoked Potentials (MEP) were higher ($292.15 \pm 182.70 \mu V$) compare to post-facilitatory ($225.86 \pm 87.42 \mu V$). Similar decreasing pattern of MEP changes were seen in pre-inhibitory non-lesion side ($259.90 \pm 128.60 \mu V$) when 3 comparing to post-inhibitory non-lesion side ($156.44 \pm 21.61 \mu V$). Interestingly, we also manage to record post-facilitatory MEP reading in one patient without pre-stimulation MEP, but cannot obtain the same result using inhibitory setting in the same patient. *Conclusions:* Both low frequency rTMS and applied to the non-lesional hemisphere and high frequency rTMS applied to lesional hemisphere may improve the MEP of the upper extremity motorfunction in ischemic stroke patient. No significant improvement noted when comparing both setting. *Keywords:* stroke; motor evoked potential; repetitive transcranial magnetic stimulation.

PC1169

Effect of Daily Life of Full-Time Rehabilitation/ADL Nurses on Activities of Daily Living In Stroke Patients

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Objective: To investigate the effect of daily life of full-time rehabilitation/ADL nurses on activities of daily living in stroke pa-

tients. **Methods:** A total of 60 cases diagnosed stroke patients in our Hospital were randomly divided into control group (n=30) and experimental group (n=30). The control group was just received regular nurse care while the experimental group received ADL duty nurse care besides the regular nurse care. ADL duty nurses performed the personalized rehabilitation evaluation and rehabilitation nursing. Rehabilitation evaluation, including Barthel Index, Patient satisfaction score and the Brunnstrom stage (lower limbs), were performed for all patients on the time of admission and 6th week after admission. **Result:** Barthel Index scores on 6th week after admission were improved significantly than these on the time of admission both in control group and experimental group ($P < 0.05$, respectively). Barthel Index score in experimental group was higher than that in control group with a statistical difference on 6th week after admission ($P < 0.05$). Patient satisfaction score on the 6th week after admission were higher than these on the time of admission without statistical significance in both groups ($P > 0.05$, respectively). No significant difference of Patient satisfaction score was found between control and experimental groups on the 6th week after admission ($P > 0.05$). The Brunnstrom stage on the 6th week after admission were significantly improved than these on the time of admission in both groups ($P < 0.05$, respectively). Moreover, the Brunnstrom stage of experimental group was significantly higher than that of control group on the 6th week after admission ($P < 0.05$). **Conclusion:** It is useful to set ADL duty nurse in the Department of Rehabilitation, which will help the stroke patients to improve their activities of daily living and physical function in early stage. It is worthy of popularization and application.

PC1170

Effect of Motor Imagery on the F-Wave Parameters in Hemiparetic Stroke Survivors

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Introduction: To assess the effect of motor imagery, as a rehabilitation method in stroke, on F-wave parameters that undergo changes during upper motor neuron involvement. **Material and Methods:** Twenty-one fully conscious hemiparetic stroke survivors with a completely plegic hand (power: 0/5) and a minimum interval of 72 hours since stroke were recruited into this study. The mean F-wave latency, amplitude, and persistence in the median and ulnar nerves were measured in both the affected and non-affected sides at rest and in the paretic hand during a mental task. Comparison was made between data from the affected hand and the non-affected hand as well as between data from the affected hand at baseline and during motor imagery. **Results:** Patients had significantly different F-wave persistence between the affected and non-affected sides (paired *t*-test, $P < 0.001$). Motor imagery could improve F-wave persistence in both the investigated nerves (paired *t*-test, $P = 0.01$ for ulnar nerve and $P < 0.001$ for median nerve) and F-response amplitude in the median nerve (paired *t*-test, $P = 0.01$) of the affected limb. **Conclusion:** The amplitude and persistence of F-wave were improved during motor imagery, representing F-wave facilitation. This result suggests that motor imagery can restore motor neuron excitability, which is depressed after stroke.

PC1171

Trans Cranial Magnetic Stimulation and Neuroplasticity in Rehabilitation after Ischemic Stroke

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Background: Ischemic stroke it is known as a damage of cerebral substance after a thrombotic event. The repetitive Transcranial

magnetic stimulation could be used in two different ways. One of them is to apply the coil above the ischemic hemisphere, and the other one is to apply the coil above the healthy hemisphere in the same neurological area. The power of stimulation is depending by the type of the coil, the figure of eight coil used 2 T and the circular coil used 1 T. **Aim:** We tried to notice the differences obtained using the same coil in different neurological areas. **Material and Method:** We studied 90 patients divided in three homogenous groups from may 2011 to July 2014. Group A (30 patients) received repetitive Transcranial magnetic stimulation by figure of eight coil above the healthy hemisphere. The Group B (30 patients) received repetitive Transcranial magnetic stimulation in the ischemic hemisphere. The Group C (30 patients) did not receive repetitive Transcranial magnetic stimulation; it was a control group who had a classical rehabilitation program, consisting in peripheral neuromuscular stimulation using rectangular current. All groups followed an adequate kinetic and occupational therapeutic program. The patients were monitored by spasticity using Ashworth scale, palsy tests for upper and lower limb and grasp scale. The patients performed this program three times, each session by 14 days, repeated at two months. **Results:** All groups had a good evolution, but the group A developed a convenient and maintained evolution more rapidly than the others, and the palsy tests were more reduced, which permitted a good evolution of grasp. The control group unfortunately maintains the spasticity to a level at which is not able to develop a good prehension. **Conclusions:** The repetitive Transcranial magnetic stimulation applied on the healthy hemisphere is a way to develop neuroplasticity and the recruitment of new neurons to recover the loss function of the affected area. This result could be the start of research on the neuroplasticity in neuronal populations.

PC1173

Is Phonophoresis Treatment Effective? Determination of Ibuprofen Levels by Microextraction and HPLC Method in the Tissues of the Patients with Knee Osteoarthritis: a Preliminary Study

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Introduction: The use of ultrasound for the delivery of drugs to, or through, the skin is commonly known as sonophoresis or phonophoresis and was used for decades in the treatment of musculoskeletal disorders. There are a few animal studies regarding the efficiency of phonophoresis in the literature. They were mainly focused on the functional results of diseases. In this preliminary report, we evaluated the patients with knee osteoarthritis who were planned to undergo total knee arthroplasty and measured the drug concentration in articular tissues in order to test the efficiency of phonophoresis. **Material and Methods:** The patients who had diagnosed as grade 4 knee osteoarthritis and planned to undergo total knee arthroplasty were included in the study. Three sessions of ibuprofen phonophoresis were applied (5 gr ibuprofen, 5 minutes, frequency 1 MHz, power 0 W/cm², continuous mode for first patient and 5 gr ibuprofen, 5 minutes, frequency 1 MHz, power 1.5 W/cm², continuous mode for 2nd, 3rd and 4th patients) before surgery. Bone (B), synovial fluid (SF) and synovial tissue (ST) samples were obtained from patients during the surgery. The amount of ibuprofen in these tissues were measured using chromatographic method (high performance liquid chromatography- HPLC). **Results:** Ibuprofen was measured negligible concentrations at all tissues of the first patient. The quantity of ibuprofen were found higher in the SF of 2nd, 3rd and 4th patients. Ibuprofen concentrations at all measured tissues (B, SF, ST) were found significantly higher in the third patient. **Conclusion:** The penetration of ibuprofen to articular tissues by phonophoresis might be differed but study is going to have the clearer results.

PC1178

Effect of Schroth Therapy on Mobility of the Spine and Muscle Strength on Rhythmic Gymnasts

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Introduction: Rhythmic Gymnastics is an Olympic sport, mainly for women. It is a combination of ballet, gymnastics, theatrical dance, and play with the appliances. Rhythmic gymnastics is a sport that requires complex coordination, hypermobility of the joints, early onset of sports activity, train a lot and maintenance of a low-weight. These are the prerequisites for hypermobility of spine and specific injuries among gymnasts. Spinal hypermobility deformities and poor muscle strength can be the reason for spine deviations and its progression and this is the reason to apply timely treatment. In physical therapy practice there are various means and methods for treatment of spinal deformities. One of these methods is the Schroth method. *Material and Methods:* Prospective study, test-retest design. In August 2014 10 female gymnasts from 10 to 14 years old were observed. On these girls was applied physical therapy, aiming to improve static muscle endurance, reduce spine hypermobility and harmonize the physiological curves of the spine – 25 sessions. To objectify the results of therapy were used Active range of spine motion (AROM) and Krause-Weber test - test for static strength of the major muscle groups of the body, maintaining good posture. *Results:* The results were statistically analyzed by SPSS 19.0. There are statistical reliability improvements of muscle strength in three of tested muscles group. The results of Ott and Schober test were unchanged, but 20% of studied girls improve the results of the side slopes. *Conclusion:* The applied physical therapy improved static muscle strength and mobility of the spine in frontal plane and did not affect the mobility in the sagittal plane in the thoracic and lumbar part. Our results recommend applying of Schrot method in gymnasts in each workout and at home and children must be learn to monitor themselves and autocorrect in activities of daily living. The Schrot method should continue for longer in order to have more even results.

PC1179

Training Discrete and Rhythmic Movements and Balance with the MIT-Skywalker*H. I. Krebs¹, T. Susko²¹MIT, ²Massachusetts Institute of Technology, Cambridge, MA, US

Background/Objectives: Contrary to expectations, task-oriented therapies such as body-weighted treadmill training or robotic-assistive steppers did not lead to better outcomes as compared to usual care, suggesting a need for other strategies to improve outcomes. We hypothesize that in order to change this landscape, training should not be limited to rhythmic training but also discrete and balance training. Here we will summarize our initial findings in a series of case studies involving adults with stroke or cerebral palsy. *Design:* Pilot study; sample of convenience, repeated measures ANOVA, paired *t*-tests, Wilcoxon sign-rank test as required. Participants and Setting: Adults with gait impairment due to stroke or cerebral palsy. *Materials/Methods:* Assessments included the 6-minute walk test, Fugl-Meyer, Berg Balance scale, ranges of motion, and strength as well kinematic biomarkers including step length, symmetry of gait, single and double support phase. Subjects trained in discrete and rhythmic movements as well as balance during 12 1-hour sessions. *Results:* Improved motor control was seen as evaluated by clinical scales. Walking speed and balance increased, while subjects' kinematic variability decreased significantly. *Conclusions/Significance:* Training discrete and rhythmic movements and balance appears to form the basis of a successful training approach to improve walking abilities. Larger studies are being planned.

PC1180

Training Discrete and Rhythmic Movements with an Ankle Robot: a Preliminary Report*H. I. Krebs¹, A. Roy², L. Forrester², R. Macko²¹MIT, Cambridge, MA, ²University of Maryland School of Medicine, Baltimore, MD, US

Background/Objectives: Stroke is the leading cause of permanent disability. Contrary to expectations, task-oriented therapies such as body-weighted treadmill training or robotic-assistive steppers did not lead to better outcomes as compared to usual care, suggesting a need for other strategies to improve outcomes. Here we will summarize our findings in a series of trials with over 50 stroke patients on gains during subacute and chronic phases, employing an ankle robot (anklebot) to train discrete pointing movements as well as rhythmic movements during treadmill training. *Design:* Pilot studies; sample of convenience, repeated measures ANOVA, paired *t*-tests, Wilcoxon sign-rank test as required. Participants and Setting: Stroke survivors during sub-acute and chronic phase. *Materials/Methods:* Assessments included paretic ankle ranges of motion, strength, motor control, and overground gait function. Subjects training the discrete intervention played dorsi- and plantar-flexion video games with the robot five 1 hour training sessions weekly (sub-acute) or during three x1 hour training sessions weekly (chronic stroke). Subjects training in the rhythmic intervention walked on a treadmill three 1 hour per week for 6 weeks with the anklebot. *Results:* Improved paretic ankle motor control was seen as increased target success, faster movements and smoother movements. Walking velocity increased, while durations of paretic single support increased and double support decreased. *Conclusions/Significance:* Training discrete pointing movements with the ankle as well as rhythmic training appears to improve paretic ankle motor control and improved floor walking. Improvement in walking speed was comparable to those reported from other task-oriented approaches. We speculate that only a combination of discrete and rhythmic training will lead to better results than usual care.

PC1181

Neuromuscular Electrical Stimulation for Upper Limb Motor Recovery after Stroke: Effects on Motor Cortical Excitability and Implications*M. Gobbo¹, L. Bissolotti², C. Maioli¹, L. Falciati¹¹University of Brescia, ²Teresa Camplani Foundation, Brescia, IT

Introduction: Modern advanced stroke rehabilitation aims at recovering motor performance by limiting compensatory strategies. In this line it is essential to strengthen and regain function of the muscles specifically involved in daily activities and let patients relearn motor strategies similar to those of normality. Proprioceptive afference plays also a critical role in motor relearning and cortical reorganization after brain damage. Neuromuscular electrical stimulation (NMES) is widely applied to regain trophism and function of impaired muscles. NMES “artificially” activates skeletal muscles by bypassing volitional cortical drive and elicits concomitant afferent inputs from the target district. We hypothesized that NMES induces central effects able to promote adaptive plasticity and functional cortical reorganization after stroke through the distinctive afferent feedback arising during muscle stimulation. Aim of the study was therefore to investigate, by means of Transcranial Magnetic Stimulation (TMS), whether NMES applied to upper limb muscles functionally modulates cortical excitability. *Methods:* The study was first conducted on healthy subjects to explore normal brain responses to NMES and, after, on stroke patients. Single-pulse TMS was applied to the motor cortex and motor evoked potentials (MEPs) were recorded from contralateral extensor carpi radialis (ECR), extensor digitorum (ED) and first dorsal interosseus (FDI) muscles. MEPs were obtained by sequences of 12 TMS pulses (interpulse interval: 5 s) delivered before (baseline) and after (post-) NMES intervention. NMES was applied to

forearm extensor muscles for 15 minutes (stimulation cycle: 28 s at 2 Hz + 2 s of 50 Hz tetanic contraction), evoking wrist and finger extension. MEP amplitudes were analyzed through peak-to-peak calculation on the recorded EMG signals. **Results:** In healthy subjects, MEP amplitudes for ED and FDI muscles increased after NMES, while no change in MEP amplitude occurred for ECR muscle. NMES induced increased motor evoked responses from FDI also in patients. **Conclusion:** NMES of forearm muscles influences the excitability of the motor cortex, which, noteworthy, is affected in a specific manner, being the distal muscles controlling hand movements the main target of the observed modulations. These preliminary findings suggest NMES as a driver of targeted neural plasticity, with a potential role in shaping the functional reorganization of the remaining intact cortical tissue after stroke.

PC1182

Treatment of Newly Diagnosed Tendinopathies with Extracorporeal Shock Waves

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Background: Extracorporeal shock wave therapy (ESWT) has become one of the best investigated treatment modalities for tendinopathies. However, in many countries ESWT is still considered a third tier treatment after several weeks or months of first and second tier treatments (such as stretching, immobilization, local cortisone injections etc.) without success. It was therefore the purpose of this study to determine the value of ESWT as first tier treatment of newly diagnosed tendinopathies. **Material and Methods:** A systematic literature search was performed, and all studies in which ESWT as first tier treatment was applied were analyzed. **Results:** Three recent studies were found in which ESWT as first tier treatment was applied (plantar fasciopathy: Rompe et al., J Bone Joint Surg Am 2010;92(15):2514-2522; primary long bicipital tenosynovitis: Liu et al., Ultrasound Med Biol 2012;38(5):727-735; tennis and golfer elbow: Ann Rehabil Med;36(5):681-687). In all of these studies ESWT was found to be as good as conservative, first tier treatment. **Conclusion:** ESWT is an efficient and safe treatment modality for newly diagnosed tendinopathies. Compared to other treatment modalities, ESWT results in immediate pain relief, is not invasive, does not comprise injections or drugs, and prevents sick leave.

PC1183

Appreciating the Efficiency of Rehabilitation Treatment in Patients with External Popliteal Sciatic Nerve through EMG

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Introduction: Lesions of the external popliteal sciatic (EPS) nerve cause a paralysis of the antero-external leg and of the proximal phalanx, abduction and lifting of the lateral foot. Demonstrating the nature of the nervous lesion and appreciation of prognostic lesions on recuperation can be achieved by detection electromyography and stimulo-detection exam, measuring the conduction speed in sensitive and motor fibers. **Patients and methods:** Our study included 20 patients with nervous post-traumatic lesions of the EPS nerve or caused by compression factors (disc hernia, tumor formations etc.). Patients were initially treated in the surgery, orthopedics and neurosurgery clinics and then referred for physical rehabilitation within our Clinic. The aim of our study was to comparatively assess various physical rehabilitation techniques by studying evoked potentials obtained through EMG. **Results:** Our study lot was divided into two sublots of 10 patients (lot A –

with compressive lesions and lot B with post-traumatic lesions), each following electrotherapy and physiotherapy, both passive and active. We performed EMG in both lots within the Electrophysiological studies laboratory of the University of Medicine and Pharmacy of Craiova. EMG was recorded at the beginning of the rehabilitation, at one, three and six months. We noticed that the sensitivity at the periphery of the denervated area begins to recuperate as adjacent territory nerves take over. For this reason, EMG was similar in both lots at the one month control. **Ultterior,** any amelioration was obtained solely on the regeneration of the implicated nerve. For this reason, the results at three and six lesions showed significant improvement of neuromuscular transmission upon supra-maximal current stimulation (150 V), with a duration of 0.5-1 ms in patients of lot A, compared to lot B. **Conclusions:** Utilizing EMG allows the surveillance of the evolution of patients and the efficacy of the physical treatment in EPS lesions by analyzing transmission speeds and appreciating the evoked response at muscular level following electrophysical stimulation.

PC1184

Mechanotransduction and Pain Management Using Shock Waves

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Accompanying the rising up of Fascia tissue from the “Cinderella of Orthopaedic research to the highest rank of citation index and practical work of body workers as well as Orthopaedic doctors we are again crossing the border of classical indications for shock wave therapy. According to the model of myofascial trains (Myers 2001) we have used shock waves for treatment of myofascial pain syndroms not knowing exactly what we do for about 10 years. With the new model of fascial mobilisation and manipulation following the Centers of communication, perception and fusion (Stecco 2008) we have extended and precised the myofascial and trigger therapy using shock waves. Specific movement tests and precise anatomical information are necessary to determine the new areas and points which are responsible for any given dysfunction. We are using the combined shock wave therapy with radial and focussed handpieces. For effective fascial mobilisation and manipulation and based on the old chinese therapy method Gua Sha we have developed new handpieces and tips for radial shock wave. Leaving the common field of shock wave therapy we are still using shock wave impulses in a special manner. **References:** 1) Myers, T. Anatomy Trains, Churchill Livingstone, 2001 Stecco, L. Fascial Manipulation for Musculoskeletal Pain, Piccin, 2008, 2) Schleip, R. Passive muscle stiffness may be influenced by active contractility of intramuscular connective tissue. Med. Hypotheses, 2006; 66 (1); 66-71.

PC1186

Outcomes of a Community Neurorehabilitation Unit – a Four Year Review

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Background: Outcome analysis of rehabilitation units assesses appropriate resource use indicating possible improvement in management and care to provide better services and subsequently aiming for improved outcomes. **Methods:** A retrospective audit of four years of clinical activity within our 14-bed neurorehabilitation unit was conducted. We reviewed the outcomes of in-patient rehabilitation of 362 patients who used our services over 48 months (April 2007 to March 2011). The clients were divided into six groups based on diagnosis; Brain Injury & Trauma, Multiple Sclerosis, Neuropathies, Spinal Cord Compression, Stroke, and Other diagnoses. **Results:** The measures reviewed were; diagnosis type, age (mean: 56 years), length of stay (mean: 41 days), level

of disability as assessed through the Barthel Index, and complexity of management as measured through the Rehabilitation Complexity Score. Significant improvement in disability was demonstrated in all groups ($p < 0.05$). Improvement in the complexity of management needs was seen to be significant in four groups ($p < 0.05$). *Discussion:* The multidisciplinary in-patient rehabilitation provided at our department leads to functional improvement in the majority of our service users with overall improvement in complexity of rehabilitation needs. Despite the limitations of our retrospective data collection, adequate data was obtained to confirm the positive influence our department imparts on our service users. *Conclusion:* There is a need for a more robust and detailed data collection system. Introduction of the UK-ROC database, which was commenced at the end of our data assessment period, may well provide this need and is planned to be reviewed in the near future.

PC1187

The Changes of Surface Electromyographic Signals of Multifidus Muscle before and after Core Stability Exercise in Patients with Lumbar Disc Herniation

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Objective: This article focused on the features variation of electromyography, recorded from patients with LDH, after traction electrotherapy and CSE to discuss about the value of CSE. *Design:* A randomized, controlled trial design. 38 patients with LDH were divided into experimental group and control group, each group has 19 patients. The control group received only two weeks conventional treatment. While experimental group received two weeks conventional treatment and two weeks core stability of training therapy later. All patients had the sEMG test before treatment, after 2 weeks treatment and after 4 weeks treatment. *Results:* Before treatment, MF and AEMG value of affected side is smaller than that of unaffected side in both group; After two weeks, the difference in MF value in both groups become smaller, while that of AEMG value remains; After four weeks, the difference in AEMG value in experiment groups become smaller, while that of control group remains; In experiment group, MF value of unaffected side has increased after 4 weeks treatment, and that of affected side has increased after 2 weeks and 4 weeks. In control group, the two values of unaffected side has increased after 2 weeks and 4 weeks. Compared to control group, the MF value of both sides in experiment group has increased. *Conclusions:* Our findings suggests that core stability training can strengthen the muscle function of lumbar spine multifidus, which is important to maintain the stability of axis.

PC1188

Whole Body Vibration on the Intensive Care Unit

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Verticalisation is a major therapeutic goal in a neurological ICU. Advantages are e.g. prevention of contractures, thrombosis, pneumonia, and promotion of awareness. Whole body vibration could add to the effects. Accordingly a slim (5 cm high) platform was designed, which could be combined with any tilting device. It delivered a whole body vibration in the range of 20 – 50 Hz. 12 severely long term ICU patients (disorder of consciousness, spastic tetraparesis, being weaned) were verticalized for 15 min without and with vibration, each six times. The two conditions (vibration on and off) were compared with the patients being verticalized. The vibration increased the heart rate and the oxygen saturation.

Further the muscle tone released and in five out of 12 patients the arousal and awareness improved. No side effects occurred. In conclusion, whole body vibration adds to verticalization on an ICU, muscle tone reduction and promotion of awareness were clinical positive effects.

C.2.17. REHABILITATION TECHNOLOGY, INCLUDING IMPLANTS, PROSTHESIS, ORTHOSES

PC1189

Effects of Repetitive Peripheral Magnetic Stimulation (Rpms) to the Hemiplegic Shoulder and Arm Muscles on Upper Extremity Motor Function: a Pilot Study

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Objective: To study the immediate effects of rPMS to shoulder and arm muscles on motor impairment of affected arm of hemiparesis patients. *Study design:* a descriptive pilot study *Setting:* Physical Medicine and Rehabilitation, Faculty of Medicine, Ramathibodi hospital, Mahidol University. *Subjects:* Spastic hemiparesis patients with mild to severe paresis resulting from CNS lesion. *Methods:* We apply rPMS to the shoulder and arm muscles at 20Hz frequency in pulses of 4 minutes train alternate with 4 minutes rest for 12 minutes. Arm motor function were assessed with Fugl-Meyer scale immediately before and 5 minutes after the stimulation *Results:* There are 10 male and 3 female participants their average age is 54.23 years. There are 6 of 6 (100%) patient with severe paresis (Fugl-Meyer score <22) and 1 of 7 (14.29%) patients with mild to moderate paresis (Fugl-Meyer score ≥ 22) demonstrate improved motor function immediately after stimulation. The statistic association between severity of arm paresis and recovery were significant at $p=0.05$ *Conclusion:* rPMS could have immediate positive effects on arm and shoulder motor impairment of hemiparesis patient with severe paresis. *Keywords:* Repetitive Peripheral Magnetic Stimulation, spasticity, hemiparesis, Fugl-Meyer score. *Reference:* 1) Beaulieu LD, Schneider C. Effects of repetitive peripheral magnetic stimulation on normal or impaired motor control. A review. *Neurophysiol Clin.* 2013; 43: 251-60. 2) Struppler A, Havel P, Muller-Barna P. Facilitation of skilled finger movements by repetitive peripheral magnetic stimulation (rpms) - a new approach in central paresis. *NeuroRehabilitation* 2003; 18(1): 69-82. 3) Krewer C, Hartl S, Muller F, Koenig E. Effects of repetitive magnetic stimulation on upper-limb spasticity and impairment in patients with spastic hemiparesis: a randomized, double-blind, sham-controlled study. *Arch Phys Med Rehabil* 2014; 95: 1039-47.

C.2.18. ROBOTS, AIDS AND DEVICES

PC1190

Ankle Rehabilitation Using the High-Performance Robotic Device Iit-Arbot: Study Protocol and Preliminary Results

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Introduction: Little is known about the effects of robotic training in orthopedic conditions. A pilot study is now being conducted in INAIL Rehabilitation Center of Volterra using ARBOT, a proto-

typical robotic system for ankle rehabilitation has been developed by IIT and it consists of a 2-DOF electromechanical platform able to perform most of the exercises foreseen by the standard rehabilitation programs. **Materials and Methods:** The ongoing open randomized controlled trial foresees the enrolment of thirty patients with work related ankle and/or hindfoot fractures and subsequent to the immobilization phase. Each participant is randomly allocated to experimental or control group and receive a 4-week rehabilitation program and weekly robotic and clinical assessments. Subjects in the experimental group are treated using ARBOT with passive, active and active assisted range-of-motion exercises, resistive exercises in isometric, isotonic, isokinetic, elastic and fluid-dynamic conditions, and proprioceptive training. Control subjects are assisted by a physiotherapist during range of motion recovery exercises and perform resistive and proprioceptive training using Biodex System 3 dynamometer and ProKin PK254 mobile electronic platform. The assessment session includes measurements of dorsiflexion ROM, isometric and isokinetic plantar-flexion torque and proprioceptive performance with ARBOT and 2 minutes walking and timed stair climbing test, LEFS-Lower Extremity Functional Scale and AOFAS-Ankle-Hindfoot Scale. **Results:** Sixteen subjects (8 controls) completed the study by October 2014. The outcome measures collected at baseline and 4 weeks later were analysed using the Wilcoxon test for paired data. Both groups benefited the proposed training protocol and increased ROM ($p=0.017$ and $p=0.049$, for experimental and control group respectively). The experimental group showed significant improvements in both robotic (muscle strength in the plantar flexors: $p=0.012$; time to complete proprioceptive tests: $p=0.03$) and functional measures (walking and stair climbing tests: $p=0.042$ and 0.018 respectively; LEFS scale: $p=0.049$; AOFAS functional items: $p=0.018$). No adverse events were recorded. **Conclusions:** ARBOT demonstrated to be safe, reliable and easy to manage. The preliminary results of robotic training in terms of force and motor control recovery and functional improvements are encouraging. A larger number of treated patients will help to draw stronger conclusions on advantages related to robotic treatment.

PC1191

Changes in Skeletal Muscle Perfusion and Spasticity on Patients with Post-Stroke Hemiparesis Treated By Robotic Assistance (Gloreha) Of Hand: a Case Series

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Background: After a stroke event, only 5% to 20% of the patients demonstrate a complete functional recovery, while 80% reveal a variable degree of impairment and inability to attend daily life activities. Pain, spasticity, joint constraint and skin or vascular damages are typical consequences observed in stroke survivors with upper limb disability and represent a paramount rehabilitation challenge either in the sub-acute and chronic phase. **Materials and Methods:** Seven patients, 28.6% female (mean±SD age: 60.5±6.3 years), with hemiparesis (<6 months post-stroke, MMSE >23), received passive mobilization of the hand through the Gloreha (Idrogenet, Italy) device (30min per day; 3 sessions a week for 3 weeks). The outcome measures were hemoglobin (THb) profiles and tissue oxygenation index (TOI) in the muscle tissue evaluated through Near-infrared spectroscopy (NIRS, NIMO system, Niros Optoelectronics), The Motricity Index (MI) and modified Ashworth Scale for upper limb muscles (MAS) were used to assess mobility of the upper extremity. NIRS parameters were collected at baseline and during each robot-assisted mobilization sessions. MI and MAS outcomes were collected at baseline and after the intervention. **Results:** Robotic assistance reduced spasticity after intervention by 68.6% in the upper limb. MI was unchanged in these patients after treatment. Regarding changes in muscle perfusion, significant improvements were found in THb ($p=0.033$). There were significant differences between pre vs. post-treatment

MAS scores (all, $P=0.03$). **Conclusions:** The present work provides novel evidence that robotic assistance of hand induced significant changes in local muscle blood flow and oxygen supply and diminished spasticity, contributing to decrease the subject reported symptoms of heaviness and stiffness in subjects with post-stroke hemiparesis. Wash-out effect of metabolic toxic molecules could be a possible contributor to these results.

PC1192

Rewalk® Argo: a Robotic Orthosis for Independent Gait in Spinal Cord Injured People

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Background: In the aim to produce independent over ground gait in Spinal Cord Injury (SCI) patients belonging to AIS Class A and B, the ReWalk® by ARGO Medical Technologies Ltd. has been recently introduced in the field of rehabilitation as an innovative robotic orthosis. **Material and Methods:** We conducted a single center clinical trial on 15 SCI patients, 25% female (mean±SD age: 38.7±17.1 years, AIS A: 100%). Average sessions of treatment with ReWalk: 15.7±5.2. **Exclusion criteria were:** SCI above T3; Body weight not exceeding 90 Kg; presence of high level spasticity, more than 3/4 of Modified Ashworth Score and limited joint mobility of hip, knee or ankle; impaired cognition or history of uncontrolled seizures. Lower limbs bone stock was evaluated through Dual X-ray Densitometry. The ReWalk® orthosis is made up of a mechanical frame (exoskeleton) that is donned by the patients around their trunk, lower limbs and feet by means of Velcro, wraps and insoles. After the orthotic adaptation of the exoskeleton the precise selection of functional parameters of the gait cycle rely on the dedicated software that can be connected to the ReWalk® through a USB cable. **Results:** on average all the patients included in the program reached a full comprehension of functioning modalities (turning on, use of the controller); comprehension of the frame features; dressing of the trunk and lower limbs till the middle part of the thigh; reaching standing from sitting position and coming back; maintaining upright position with two crutches; walking with the help of one therapist for at least 50 meters. One of the patients climbed, with help, a few steps on the stairs. **Conclusions:** In the treatment of people with middle thoracic SCI AIS A and B ReWalk ARGO can be used in the clinical setting either for home training and use or rehabilitation purposes. The use of ReWalk gives the possibility to achieve a dynamic and repetitive mechanical overload on the lower limbs, to determine a relevant cardiovascular effort and to increase the self esteem perception.

PC1193

Exoskeleton Robotic Hand and Brain Training System for Stroke Rehabilitation

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Introduction: More than 70% stroke patients suffered upper limb motor impairment, and patients need to relearn the motor skill again in their brain to restore motor functions. While effective motor recovery after stroke depends on early rehabilitation program and intensive voluntary practice of the paretic limbs, current rehabilitation products have not use brainwave to guide the stroke survivors to identify voluntary intention and to relearn how to reconnect to their paralyzed limb again. **Material and Methods:** We developed the Brain Training Device with a new coherence algorithm for hand function training. The new algorithm is based on frequency coherence on surface electroencephalography (EEG, brainwave) and electromyography (EMG, muscle activities) to identify voluntary intention and their connection [1]. The exoskeleton robotic hand, through an interactive control, assists the user to undergo active physical training on the impaired upper limb by involving

his/her voluntary efforts identified by the EMG and EEG signals to facilitate motor relearning in the brain. The light and portable exoskeleton hand robot design allows user to practice functional daily living tasks with their own hands with their intention, such as open and close hands, pick up a water bottle or a sponge. **Results:** In our clinical study, 4 chronic stroke subjects who underwent 20 sessions (3-5times/week) were found to have improvement in upper-limb motor functions (Fugl-Meyer hand/wrist and shoulder/elbow scores, Action Research Arm Test and Wolf Motor Function Test). Significant reduction in spasticity of the fingers was measured by the Modified Ashworth Score. **Conclusion:** Brain training system with robotic hand have the potential to facilitate the motor recovery on the hand and upper limb functions. [1] Meng F, Tong KY*, Chan ST, Wong WW, Lui KH, Tang KW, Gao XR, Gao SK, (2009) Cerebral plasticity after subcortical stroke as revealed by corticomuscular coherence, IEEE Transactions on Neural Systems and Rehabilitation Engineering, 17(3): 234-43.

PC1194

Robotic Upper Limb Rehabilitation in Stroke Patients

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Introduction: Hemiplegia affecting mainly the upper limb (UL) is the most common motor and functional disability after stroke, with an important social and economic impact. Improvements in the upper limb function are often limited. Rehabilitation programs are based on neuroplasticity, which requires repeated intensive stimulation with a specific functional purpose. The more intensive and premature the rehabilitation process, the better the motor recovery. As robotics evolves, its use in Physical Medicine and Rehabilitation can become an important adjuvant to conventional therapies (CT). The work aimed to review recent publications on introduction of robotic therapy (RT) in UL rehabilitation after stroke. **Material and Methods:** Systematic search of Pubmed using the MeSH terms "Stroke rehabilitation", Robotics" and "Upper extremity", limited to studies in humans published during the last five years in English. **Results:** Twenty one articles were included. Robotic systems allow an intensive, repetitive, functional and individualized treatment with interactive interfaces which increase motivation. Greater diversity, higher autonomy, lower time and energy consumption and a continuous and objective evaluation count as advantages. The possibility of undermining the therapist-patient relationship, lack of active participation from the patient and speed training limitations are important disadvantages. Older models, focused on the UL proximal segments, achieved important benefits in muscular strength, but without significant improvements on global functionality. Younger models aiming the distal segments have enabled increases on distal motor and functional capacities with secondary benefits on the proximal structures. Clinical trials found robotic systems at least as effective as CT considering motor and functional criteria. Recently systems incorporating exoskeletons and distant controlled systems allowing home-based rehabilitation were presented with promising results. Robotics may contribute as diagnostic and monitoring tool, allowing quantitative and qualitative movement evaluation. **Conclusion:** This work discloses advantages of RT in post-stroke limb rehabilitation as an adjuvant of CT. The latest models based on exoskeletons may enable even better functional results. Economic and ergonomic factors are main limitations to its widespread use and, once overlapped, RT may become a usual tool in rehabilitation, including home-based programs. RT may become the solution to the present inexistence of objective tools to evaluate results from CT interventions.

PC1195

Robotic Exoskeleton; Is It for Mobility, Therapy, Exercise or All Three?

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Introduction/Background: Progressive technology has enabled the development of increasingly advanced robotic exoskeletons. The Indego® exoskeleton was designed for persons with Spinal Cord Injury (SCI), stroke and other neurological diagnoses. Indego weighs 12 kgs, is modular and incorporates Functional Electrical Stimulation (FES). The unique design, functionality and outcomes of Indego trials will be presented. Walking is an integral part of healthy living. Studies have correlated the inability to walk with increased risk for secondary health complications and decreased quality of life. Indego is not intended to replace a wheelchair as the primary means of mobility. Rather, it is intended as an assistive device to enable walking, exercise and accessibility. For poorly-ambulatory individuals, the intent is to utilize the device as a therapeutic intervention for early mobility and progressive gait training. **Materials and Methods:** Over 50 subjects have been enrolled in Indego clinical trials across the United States. Subject's diagnoses include SCI or stroke. Sessions per subject range from five to 26, depending on the center. Subjects trained on both inside and outside surfaces. Walking measures include 10 Meter Walk Test, 6 Minute Walk Test, Timed Up and Go and a 600 Meter walk. Additional measures include gait characteristics, Secondary Health Questionnaire, Satisfaction With Life Scale, Functional Electrical Stimulation (FES) outcomes and Metabolic outcomes. **Results:** At the time of this submission, average walking speed for C5-C6 Motor Complete Tetraplegics was 0.2 m/s and T4-L1 Paraplegics was 0.45 m/s. Average muscle torque contribution from FES was 18% for Hamstrings and up to 95% for quadriceps. Subjects with SCI were able to walk on inside and outside surfaces including sidewalks, grass and ramps within 5 sessions. Persons with CVA showed significant improvements in fast gait speed, stride length and step length symmetry. Metabolic data for persons with SCI indicate their oxygen consumption changes while walking for self-selected pace versus walking for exercise. **Conclusion:** Preliminary data on the Indego Exoskeleton suggest it can be used for mobility, therapy or exercise benefits. More studies are required to investigate both the short term and long term effects of all robotic exoskeletons.

PC1196

Feasibility and Practice of Robot-Assisted Gait Training in Daily Clinical Practice in Brain-Injured Patients: a Preliminary Study

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Introduction: Robot-assisted gait training (RAGT) is an emerging technique in neurorehabilitation that is especially applied in brain-injured patients. In this open-label study, we aimed at measuring, in a real world setting, tolerance of RAGT using a Lokomat, the evolution of robot settings during the training program and their main determining factors, and finally at evaluating the efficacy of RAGT on neuromotor deficiencies, posture and gait. Patients and **Methods:** 19 hemiparetic brain-injured patients (stroke n=16; traumatic brain injury n=3) were included. A majority of them was at the subacute phase and 6 were not able to walk at the beginning of the training program. RAGT treatment was administered 4 times a week for at least 30 minutes of effective gait, combined with regular physiotherapy for 4 weeks. Patients rated their tolerance about the RAGT by a visual analog scale (T-VAS) and adverse events were systematically registered. Concerning robot settings, body-weight support, gait speed, gait distance and walking time were averaged weekly. Clinical assessments were performed before rehabilitation (D0), at its end (W4) and ten weeks after its beginning (W10). They included assessments of neuromotor deficiencies of the paretic lower limb (range of motion, spasticity, motor strength), postural capacities (PASS, static posturography), spatiotemporal and videographic gait analysis (respectively with the Gaitrite electronic walkway and the GAIT scale), walking capacities (NFAC)

and activity limitations (Barthel index) *Results:* RAGT was well accepted by patients, with a mean tolerance of 83.1 ± 18.1 (/100) in walkers and 90.4 ± 13.7 in non-walkers. Bodyweight support, gait speed and walking distance in the Lokomat increased gradually throughout the sessions, more in walkers than non-walkers. Only few demographics, impairments and activity variables were correlated with the Lokomat settings. Although the specific part of RAGT could not be determined, the training program led to an improvement of motor strength, postural capacities, gait kinematics and capacities and activity level. *Conclusion:* RAGT is feasible in daily practice and well tolerated in brain-injured patients. Its use increases throughout the sessions, but factors explaining the setting of the robot remain to be more precisely studied.

PC1197

Electrodermal Activity: an Honest Signal to Measure Non-Motor Components of Gait Training with Wearable Robotic Devices in Upper Motor Neuron Syndrome Patients

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The diffusion of wearable robotic devices that allow an over-ground ambulation for upper motor neuron syndrome (UMNS) patients and the development of low-cost technologies could have the potential to change the way in which clinical evaluation is performed. Clinical attention could not only focus on description of interaction and strategies performed during task execution, but it should also focus on psychological issues that may affect a successful training and a future adoption of devices. The complexity of matching person and technology arises not only from the individual's unique combination of physical, sensory, and cognitive abilities, but also from people's expectations/reactions to technologies. The aim of this work was a psychophysiological and ecologic evaluation in UMNS patients during robotic over-ground ambulation. Skin conductance responses and temperature can be used as markers for psychological states evaluation in presence of physical effort induced by walking. EDA is a measure of skin conductance at the surface that reflects activity within the sympathetic axis of the Autonomic Nervous System (ANS) and provides sensitive and convenient measures of assessing alterations in sympathetic arousal associated with emotion, cognition, attention and effort. EDA evaluation, collected on 10 Spinal Cord Injury and 10 Stroke patients during an over-ground walking training assisted by exoskeletons, had been performed. EDA reveals different profiles according to patient's characteristics; in some subjects, EDA response is characterized by an achievement of plateau and by a decrease to the basal level after the end of the task. Learning how to walk with the robotic devices produces a change in EDA response and only little oscillations around basal level are measured. There are patients that, at the beginning of training period, are characterized by no changes in EDA response, while an EDA response, correlated to task execution, can be evoked at the end of training period. EDA could be used as a marker to monitor the level of confidence during a robotic training; in fact lower EDA activity could be correlated to a more automatic task execution. EDA could be also used to prove the efficacy of robotic training in evoking an ANS response in non-responsive patient at the beginning of the training period.

PC1198

Lower Limb EMG Activation Pattern during an Over-Ground Walking with Ekso in Hemiparetic Patients

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Introduction/Background: The recovery of rhythmic alternated/coordinated activation of the muscles of the lower limbs in patients with a hemiparesis as a results of a brain injury is a key target of

gait training during rehabilitation. To reach this goal and to try to simulate lower limbs coordinate movements, robotic treadmill training using exoskeleton or end-effector devices have been developed. The recent diffusion of wearable exoskeletons, allowing an over-ground mobility, has been proven only for complete spinal cord injured patients and no data have been presented regarding the use of these devices in hemiparetic patients due to brain damage. *Material and Methods:* 20 patients with hemiparesis secondary to cerebral vascular lesion were recruited. A surface electromyography (sEMG) of muscles rectus femoris, hamstrings, tibialis anterior and soleus of both limbs was collected in two different conditions: a) walking on ground at self-selected speed in patient's standard condition and b) walking with an over-ground wearable exoskeleton (Ekso). Ekso is a wearable exoskeleton equipped with 4 motors, which allows the patient to stand up, sit and walk on a flat hard surface. Each step is triggered by subject's transfer load from one leg to the other. A qualitative and quantitative analysis of the sEMG activity was performed. *Results:* In standard condition (a) the sEMG pattern of the affected side showed for 40% of patients analyzed a global hypo-activation, 40% a distal hyperactivity and 20% a timing alteration. In all patients the tibialis anterior of the non-affected side showed prolonged activation. During the robotized condition (b) 60% of patients showed a restored timing of activation of the muscles and 20% maintained a hypo-activation for the affected side, while for the unaffected side all patients restored the timing. *Conclusions:* The over-ground gait training with a wearable exoskeleton significantly changes the dynamic neuromuscular patterns of the lower limbs in patients with hemiparesis secondary to cerebral vascular injury, facilitating the correct timing of activation of both the affected and the unaffected side. These facilitation elements of neuromuscular control are considered relevant to the restoration of the control of gait in patients with hemiparesis. Further studies are needed to assess long-term efficacy of therapeutic procedure.

PC1199

Robot-Assisted Training of Arm and Hand Movement after Cervical Spinal Cord Injury

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Background: Incomplete tetraplegia is the most frequent presentation of spinal cord injury (SCI), and results in impairment of arm and hand function. The objective of this pilot study was to demonstrate the feasibility and effectiveness of robotic-assisted training of arm movements in persons with chronic, incomplete tetraplegia. *Methods:* Eight individuals (American Spinal Injury Association Injury Scale level C2-C6) with chronic SCI and impaired upper extremity movement completed robot-assisted training with MAHI Exo-II. Over four weeks, participants performed single degree-of-freedom exercise of bilateral elbow, forearm, and wrist movements at an intensity of 3 hours/session for 3x/week. Outcome measures included safety (i.e., adverse events), functional tests (Jebsen-Taylor Hand Function Test, Action Research Arm Test), strength (upper extremity motor score (UEMS), grip and pinch strength) and performance of activities of daily living (ADL; SCI Independence Measure II, Functional Independence Measure). Measurements were performed at baseline, after each session (only safety assessment), immediately after completing the protocol, and 6 months later. *Results:* After 12-treatment sessions, improvements were observed in arm and hand function. Averaged scores of both arms for JTHFT (593 ± 345 to 502 ± 375 sec; $p=0.031$) and ARAT (61 ± 21 to 68 ± 23 ; $p=0.03$) as well as strength of select muscle groups (total UEMS; 31 ± 6 to 34 ± 6 ; $p=0.007$), grip (19 ± 21 to 24 ± 24 lbs; $p=0.0$) and pinch (9 ± 6 to 11 ± 7 lbs; $p=0.004$) increased significantly. Some behavioral gains were maintained at 6 months. Independence in ADL did not show any significant difference immediately after treatment and at 6-month follow up. Despite an increase in level of fatigue and muscle soreness, individual training sessions were well-tolerated. No

significant adverse event occurred. Of the eight out of ten participants who completed the training, compliance rate was 100%. Two participants dropped out for personal reasons. **Conclusion:** The results of this pilot study suggest that repetitive training of arm movements with MAHI Exo-II exoskeleton is safe and has the potential as an adjunct treatment modality in rehabilitation of persons with SCI and mild to moderate impaired arm function.

PC1200

Muscle Activities during Balance Exercise Assist Robot (BEAR)

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Introduction: We have developed a “Balance Exercise Assist Robot (BEAR)” for postural strategy training by games. The BEAR is a system to do exercise against perturbation and the center of gravity movement by using the personal mobility “Winglet” made from Toyota Motor Corporation. So far, we have reported the improvement in balance and muscle strength in the lower limbs. **Purpose:** To examine the differences and features according to the game types and levels using the integrated electromyogram (iEMG) in BEAR training. **Methods:** Five healthy men (mean age, 26±5 years) participated three types of games (rodeo, tennis and skiing). Each type consists of 4 levels (1 level takes 90 seconds) and total of 12 games were performed. The surface electrodes were attached to both sides in the lower limb muscles (gluteus maximus, gluteus medius, rectus femoris, vastus medialis, long head of biceps femoris, tibialis anterior, medial head of gastrocnemius, and peroneus longus). The telemetry muscle-electrocardiograph MQ16 (Kissei Comtec Co., Ltd.) was used and the iEMG during games were measured. This study was approved by the Institutional Review Board and a written informed consent was obtained from all subjects. **Results:** The iEMG increased in accordance with a level in all 3 games. The iEMG in rodeo game was the most than other games. The gastrocnemius in tennis and the peroneus longus in skiing showed higher iEMGs. **Conclusions:** The required muscle activities in the lower limbs were different from game to game in the BEAR. Although rodeo game showed the highest iEMG, more effective training may be possible in patients with balance failure if we combine 3 kinds of games. In addition, iEMG increased in accordance with a level of games, so the iEMG may become an indicator of the difficulty of optimization.

PC1201

Motorized Walker Gait Training: Gait and Balance Improvement for Cerebellar Ataxia

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Introduction/Background: It is being developed a motorized walker with integrated sensors, which aims to improve balance and stability of gait in patients in need of auxiliary gait gear. It is adjustable in height, has forearm support and 4 wheels, two of which are connected to motors. Can be controlled by the patient or therapist (speed, steering, brake). Here we describe a clinical case of gait ataxia in which the device was used, integrated in her rehabilitation programme. **Material and Methods:** Female patient, 28 years old. She went through surgery for resection of a cerebellar astrocytoma in 2005, with a resulting ataxic gait. She trained assisted gait with the motorized walker, twice a week, for 4 weeks, in addition to her physiotherapy programme. She was assessed after every 4 sessions of treatment with physical examination, BERG scale and biometric parameters of the device, in order to evaluate the assisted gait, stability and interaction of the patient-walker. **Results:** She initially presented with an enlarged base on orthostatic position, unstable. She was able to walk with a walker with super-

vision. Started gait training with the motorized walker, 2 times a week, with increasing speed and time of training, respecting her tolerance (up to 35 minutes daily, up to a speed of 0.5 m/s). After four weeks of treatment, she showed an improvement in balance (static and dynamic), with improvement in BERG score (12 points at baseline to 35 at the end). **Discussion and Conclusion:** There was an obvious improvement of balance and gait pattern objectified by physical examination, BERG scale and the parameters collected through the sensors. Given this increased stability, the gait speed was gradually augmented. The patient had no clinical improvement for about 9 years, so apparently gait training with motorized walker contributed significantly to balance and gait improvement. The device also shown useful in acquisition of data regarding the balance and gait of the patient, allowing the evaluation of its progression during treatment. Experience with this system must be extended to other patients with ataxia in order to better assess its effectiveness.

PC1202

Motorized Walker for Gait Training in Patients with Ataxia

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Introduction/Background: It is being developed a motorized walker with integrated sensors, which aims to improve balance and stability of gait in patients in need of auxiliary gait gear. Here we describe a case of ataxic hemiparesis in which the device was used, integrated in his rehabilitation programme. **Material and Methods:** Male patient, 64 years-old. Right ataxic hemiparesis, aetiology is still under investigation. The diagnostic possibility of neurobrucellosis was placed and appropriate antibiotic therapy was initiated. For two weeks he trained in gait with the motorized walker which is made up of four wheels, two of which are connected to motors, adjustable in height and with forearm support. In this case it was controlled by the patient through a handlebar. He was evaluated weekly by physical examination, BERG scale and biometric parameters of the device, which allowed characterizing the assisted gait, stability and interaction of the patient-walker. **Results:** He initially presented with an enlarged base on orthostatic position, unstable, unbalanced to right and a Berg scale of 6. He trained gait with the walker for 10 minutes daily at a speed of 0.1 m/s. Two weeks later he exhibited good balance in orthostatic position and during gait (measured by the device) and a BERG scale of 30. He trained with the walker for 25 minutes at a speed of 0.3 m/s. He could walk and climb stairs with one crutch, with vigilance. **Discussion and Conclusion:** There was a marked improvement of balance and gait pattern objectified by physical examination, Berg scale and the parameters collected through the sensors. Given this increased stability, the gait speed was gradually augmented. The clinical improvement of the patient may be due to the use of the walker although one cannot exclude a favourable outcome by course of the natural history of the disease or by pharmacological intervention also instituted. It proved to be a promising device for the acquisition of objective data regarding the balance and gait of the patient in order to evaluate its progression during treatment. The experience with this system will have to be extended to other patients with ataxia to evaluate its effectiveness.

PC1203

Effects of the A3 Gait-Therapy Robot on the Walking Ability Training in Stroke Patients

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Objective to evaluate the clinical efficacy of rehabilitation robot for walking ability in people with sub-acute stroke. **Material and Methods:** Sixty stroke patients in 2–4 weeks were assigned to a treatment

group or a control group with 30 in each. Both groups received similar conventional rehabilitation training base on neurodevelopment treatment and motor relearning program for 8 weeks. The patients in the control group were treated with a body-weight-support stepping system for stepping training before walking training, while the patients in the treatment group were treated with a walking training robot for whole 8 weeks (30 min, twice daily, 5 d/week). The Fugl-Meyer Assessment of Lower Extremity Motor (FMA-L), The Fugl-Meyer Assessment of Balance (FMA-B), and the Holden Functional Ambulation Category (FAC) were used in assessment of the both groups before and after treatment. The 10-meter walk test was used in those who could walk independent after treatment. **Result:** There were no significant differences between the two groups' average FMA-L, FMA-B and FAC before treatment. After treatment, FMA-L, FMA-B and FAC had all increased significantly in the treatment group compared with in the control group, the patients those could walk independent in the treatment group is more than the patients in the control group and the average walk speed was significant higher than the average speed in the control group. **Conclusion** The robot assisted walk training can improve lower extremity motor function and walking ability significantly of sub-acute stroke patients.

PC1204

Effectiveness of Gait Exercise Assist Robot (GEAR)

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Introduction: Knee-Ankle-Foot Orthosis (KAFO) is frequently used when patients with hemiplegia have giving-way in the conventional gait exercise. However, it is very difficult to flex the knee during the swing phase of gait with KAFO. On the contrary, Ankle-Foot Orthosis (AFO) does not prevent knee flexion during swing phase, but it has a risk of giving-way. To solve this problem, we developed Gait Exercise Assist Robot (GEAR) which has a motor on the knee joint with KAFO-like framework. GEAR can extend and flex the knee joint in the appropriate timing using the data of load sensor on the sole. We conducted the preliminary study to see the effectiveness of GEAR. **Material and Methods:** Subjects are 8 stroke patients with hemiplegia within 3 months after the onset who needed KAFO for gait exercise. Their average age is 62±9 years old. To measure the efficacy of gait exercise, we defined Functional Independence Measure (FIM)-gait efficiency which was the gain of FIM score of gait divided by the number of weeks from the beginning of GEAR until the FIM score of gait reached 5 (Supervision). For each subject, we set control group who conducted gait exercise in a Kaifukuki Rehabilitation Ward of an affiliated hospital and had the same FIM score of gait and similar Stroke Impairment Assessment Set (SIAS) score in the lower extremity on admission. We compared FIM-gait efficiency between GEAR group and control group. This study was approved by the Institutional Review Board and a written informed consent was obtained from all patients. **Results:** The median FIM-gait efficiency in the GEAR group was 1.0. FIM score of gait in the GEAR group improved rapidly than that of control group. **Conclusion:** The results suggest that GEAR was effective for gait exercise and may contribute to shorten the recover.

PC1205

Robotic Rehabilitation of the Lower Extremity in Acute Stage Neurologic Patients: a First Evaluation of Muscle Activities in Healthy Subjects

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Introduction: To date, only limited attention has been focused on robotic devices for the very early lower limb mobilization and scant literature has been provided about their applicability and effectiveness in rehabilitation. Devices for the early stages of rehabilitation might give to the patient the possibility to repetitively exercise walking without moving the patient from bed to perform the treatment. The present work introduces a newly developed stationary gait trainer for the treatment of acute stage neurologic patients. **Methods:** 10 healthy subjects were evaluated during robot assisted lower limb training and unassisted movements, respectively. The robot-assisted training was performed using the First Mover system, a newly developed robotic lower limb trainer. The motor paradigm was executed during one-day experimental sessions under four conditions (robot-assisted training or unassisted movement in laying and sitting position). Surface EMG recordings were made on the tibialis anterior, gastrocnemius lateralis, vastus medialis, and biceps femoris muscles. The onset/offset points of muscle activation were calculated for every test condition. A statistical comparison by a two tailed Student *t*-test for paired samples between the robot-assisted and unassisted task in regard to onset and offset was the primary outcome measure. Secondary outcome measure was the comparison of the duration of the muscle activations. **Results:** In laying position the muscle activation patterns were comparable between the robot-assisted and unassisted condition. In sitting position the onset for the rectus femoris and gastrocnemius was delayed in the unassisted compared to the robot-assisted condition ($p < 0.05$). The duration of activation of the biceps femoris during the robot-assisted condition was longer than the unassisted ($p < 0.05$). **Conclusions:** The First Mover device is an innovative device that could induce physiological muscle activation patterns. It might indicate that this training exploits restorative mechanisms to promote lower limb recovery after CNS, orthopedics injuries as well as politraumatic injuries. This is particularly relevant in clinical practice allowing rehabilitation to be enriched even in patients in the acute stage of disease.

PC1206

Robotic Assisted Gait Therapy in Parkinson Disease

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Background: The use of robotic training into Parkinson's disease rehabilitation settings has a new reality. This randomized controlled observer trial is aimed at investigating the improvement of end-effector lower limb robot training in people with Parkinson's disease. **Material and Methods:** 50 cognitively intact participants with mild Parkinson's disease and gait disturbance were enrolled in the study and randomized into 2 groups EG (robot training) and CG (treadmill training). The EG underwent a rehabilitation training of robot assisted walking for 40 minutes, 5 times a week for 4 weeks. The CG received a treadmill-training for 40 minutes, 5 times a week for 4 weeks. The outcome measure of efficacy was recorded by gait analysis laboratory. The assessments were performed at the beginning (T0) and at the end of the treatment (T1). The main outcome was the change in velocity. **Results:** No differences were found between PRE sessions of group treated with robot and group treated with Treadmill, in terms of Gait Profile Score, Gait Variable Scores and spatio-temporal parameters ($p > 0.05$). Some spatio-temporal parameters improved significantly, according to our previous paper. Globally no difference was found in terms of GPS between PRE (10.6±2.8 degrees) and POST (11.4±3.0 degrees) session ($p > 0.05$) but there are significant differences in terms of the GVS hip add/abduction and pelvic up/down, which improved ($p < 0.05$). **Conclusions:** Robot training is a feasible and safe form of rehabilitative exercise for cognitively intact people with mild PD. This original approach can contribute to increase a short time lower limb motor recovery in idiopathic PD patients. Trial registration: ClinicalTrials.gov NCT01668407.

D.1. REHABILITATION SYSTEMS AND SERVICES RESEARCH

PC1207

Virtual Reality Guided Motor Imagery Can Increase Corticomotor Excitability

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Introduction: Motor imagery (MI) and virtual Reality (VR) applications are relatively novel and potentially useful techniques in neurorehabilitation. We investigated the beneficial effects of the application of MI combined with VR in healthy volunteer. **Methods:** In total, 15 healthy, right-handed volunteers participated. Four different conditions (Rest: observation of block screen; MI alone: paced MI of wrist extension with observation of own wrist; VR guided MI; MI of wrist extension according to regular VR-avatar representation; VR guided MI with task variability: irregular representation of VR-avatar) were provided in random order in same day. We used the transcranial magnetic stimulation (TMS) single and paired-pulse paradigm. TMS was applied at the Lt motor cortex and motor evoked potentials (MEP) were recorded in the Rt. extensor carpi radialis. We compared pre, during, post corticomotor excitability under different conditions by measuring the changes of MEP parameters (resting motor threshold, amplitude, area, intracortical inhibition; ICI, intracortical facilitation; ICF, cortical silent period; CSP). In addition, we investigated the change of peripheral excitability using Mmax of median nerve and the movement imagery questionnaire. For statistical analyses, repeated measure ANOVA was used. **Results:** The comparison of the percentage of MEP amplitudes at rest across the four testing conditions revealed a pattern of significant differences during each condition ($p=0.005$). The percentage of MEP amplitudes were higher during VR guided MI condition compared than MI alone ($p=0.013$). The increase of MEP amplitudes was greater during VR guided MI with task variability compared than MI alone ($p=0.048$). The change of ICI (% ICI) after each condition was lowest in VR guided MI with task variability. The decrease of %ICI was higher in VR guided MI with task variability condition than VR guided MI ($p=0.029$). The CSP, MEParea and Mmax didn't reveal any significant change according to conditions. **Conclusion:** In this study, we demonstrated the corticomotor excitability elicited by MI using VR-avatar representation was greater than MI with real body observation. Furthermore, task variability within VR condition decreased intra-cortical inhibition compared with regular representation of VR task. This finding supports the use of various VR program and the concept of combining MI with VR program for neurorehabilitation.

PD1208

The Role of Cadres on Community Based Rehabilitation Program in West Sumatra, Indonesia

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Introduction: The study has been conducted for 6 months since January through June 2014 in Batipuh II Public Health Center (PHC), West Sumatra Province – Indonesia using descriptive method. **Objectives:** The major objectives of Community Based Rehabilitation (CBR) were to ensure that people with disabilities are able to maximize their physical and mental abilities, to access regular services and opportunities in order they could become active contributors for the community, and to activate community within which the human rights of people with disabilities are promoted and protected through changes, for example, by removing barriers to their participation. **Methods:** Cadres were community members who work as volunteers by giving their time each week to carry out such activities that could assist people with disabili-

ties and their family members. People with disabilities and their family members could take position as cadres themselves. Data gathered by cadres will further analyzed by professionals. Data were collected as reported by 30 cadres in the form of the completion of form 1 and form 2 along with the matrix of training package selection. **Results:** The description that found in the study were 68.87 percent of form 1 completion was done correctly; on the other hand, it was 74.93 percent of form 2 completed correctly. Whereas in the application of training matrix it was found that 64.67 percent of the data can be applied correctly. In West Sumatra, the role of cadres have apparently been significant in bringing CBR programs into success since it was established in 2012 in the concern that cadres has been bridging professional to people with disabilities and their family. **Conclusion:** Cadres have obviously played an important role in CBR programs. **References:** 1) CBR, a strategy for Rehabilitation, Equalization of Opportunities, Poverty Reduction and Social Inclusion of People with disabilities; Joint Position Paper 2004; ILO, UNESCO and WHO. 2) Nurdin, A; Community Based Rehabilitation in West Sumatra, Indonesia; 4th World Congress of International Society of Physical Medicine and Rehabilitation; Seoul – Korea 2007. 3) WHO; Training in the Community for People with Disabilities; Geneva 1989.

PD1209

The Impact of Introducing DRG in Switzerland on Functional Abilities of Patients in a Rehabilitation Centre

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Introduction: To assess the impacts of DRG (diagnosis related groups) introduced in 2012 in Switzerland on functional abilities and co-morbidity of patients entering a Rehabilitationcentre for neurological and/or musculoskeletal rehabilitation. **Methods:** The functional status of patients on admission to the Rehabilitationcentre between January 2011 to December 2013, were assessed using the FIM, the Chedoke Activity score and the POMA-Tinetti score. **Results:** Data of patients admitted in the year 2011 ($n=312$) before introduction of DRG and patients admitted in the years 2012 ($n=300$) and 2013 ($n=319$) after the introduction of DRG were analysed. The mean age was 73 years and the mean length of hospital stay was 30 days. No significant differences were found on the mean Charlson co-morbidity score. The FIM-Score, the Chedoke McMaster Index and the POMA Tinetti-Score showed no significant changes for neurological and musculoskeletal patients over the years 2011, 2012 and 2013 despite the introduction of DRG in 1.1.2012. **Conclusion:** In the first two years after the introduction of DRG, there were no significant change in functional abilities of patients entering a Swiss rehabilitation centre when assessed by FIM, Chedoke McMaster Activity Index and the POMA Tinetti Score at entry, which argues against an earlier referral, for example because of financial interests. These results could be the consequences of the special situation of our rehabilitation centre, being integrated in an acute hospital. This circumstance facilitates early referrals because of the easy access to an emergency room, an intensive care unit and acute medical treatment, and early referral was already established before the introduction of DRG. Another possible explanation would be, that the evaluation of the financial impacts of DRG on the balance sheet of a hospital, is still in progress and the pressure for earlier referrals to rehabilitation facilities has not yet been developed. After all, some special issues of the Swiss DRG, e.g. the reduction of the contribution to the treatment costs in patients with a hospital stay of short duration, could also be responsible for these findings.

PD1210

Is There a Correlation Between the Functional Status of Stroke Patients and the Informal Caregiver Strain?

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Introduction: After inpatient treatment of stroke patients we conduct a two week later special consultation to survey the possible daily strains of the informal caregivers, defined as relatives or friends, who give support to the stroke patients. We examined if there is a correlation between the functional status of the patient and possible daily strains of the informal caregiver. **Methods:** From 2005 till 2013 we collected and evaluated data from 150 stroke patients. We compared the “Caregiver Strain Index” (CSI) and the “Self Related Burden Scale” (SRB) concerning the informal caregivers, with the values of the “Functional Independence Measure” (FIM) addressing the patient. In 2012 we switched from the “Modified Barthel Index Shah Version” to the “Extended Barthel Index”. For this reason we used only the FIM in the present study, which showed a highly significant correlation with both the Modified Barthel Index Shah Version and the Extended Barthel Index (Pearson correlation coefficient 0.880 and 0.876 respectively, p-value 0.01) **Results:** Significant correlation could be demonstrated between the CSI and the SRB (Pearson correlation coefficient 0.658, p-value 0.01). Otherwise there was no significant correlation found between the CSI and the FIM (Pearson correlation coefficient 0.124, p-value 0.14) and also not between the SRB and the FIM (Pearson correlation coefficient 0.143, p-value 0.09). This is also true for the sub-group analyses of the FIM-Domains, i.e. self-care, sphincter control, transfers, locomotion, communication and social cognition, in regards to the SRB and CSI (all Pearson correlation coefficients <0.16, all p-values >0.05) **Conclusion:** Our study shows no significant correlation between the functional status of stroke patients as assessed by the FIM and the strains of informal caregivers according to the SRB and CSI. Obviously more important are personal conditions of the caregiver, which are exceptionally diverse, e.g. the biography, the physical capacity, the mental health or the social network of the caregiver. To assess the complex individual context of any caregiver on the other side, there would be the necessity to perform additional evaluations at a great cost of time, effort and financial resources.

PD1211

Factors Related To Strain Experienced By Caregivers of Patients with ALS

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Introduction: Informal caregivers play a key role in the care for patients with ALS, but are vulnerable as caregiving exerts substantial physical and psychological strain. To optimize support for family caregivers, insight is needed in potentially modifiable factors associated with caregiver strain. This study examined the associations between caregiver strain and psychosocial characteristics of caregivers and disease- and psychosocial characteristics of patients. **Material and Methods:** Data were captured as part of a randomized controlled trial that evaluated the effectiveness of case management in patients with ALS and their most important informal caregiver on quality of life and caregiver strain (Creemers *et al.*, 2014). Baseline data on caregiver strain and variables (patient and caregivers) potentially associated with caregiver strain were available from 126 couples. Caregiver strain was assessed with the Caregiver Strain Index (CSI; score range 0-13). Patient variables included sociodemographic and clinical characteristics, functional status (ALS Functional Rating Scale-Revised; ALS-FRS-R), mental status (Hospital Anxiety and Depression Scale; HADS), health-related QOL (40-item ALS Assessment Questionnaire; ALSAQ-40), coping style (Utrecht Coping List; UCL) and perceived quality of care (numeric rating scale 0-10; NRS). Caregiver factors included sociodemographic characteristics, mental status (HADS), coping style (UCL) and perceived quality of care (NRS). Multivariate linear regression analysis was used to investigate the independent factors associated with caregiver strain. **Results:** Caregiver strain (mean 5.4, SD 3.2) was significantly associated with patient factors ALSFRS-R (standardized beta (SB)

-0.322), independence in daily activities (SB -0.163) and coping style (seeking social support SB .168 and reassuring thoughts SB 0.171) and with caregiver factors emotional coping style (SB 0.151), perceived quality of care for themselves (SB -0.267) and symptoms of anxiety (SB 0.301). These factors accounted for 46% of the variance in caregiver strain. **Conclusion:** Our study has identified that apart from factors relating to the patient’s physical disability, psychological factors as passive coping and emotional wellbeing, and perceived quality of care for the caregiver have impact on the burden for ALS caregivers. Professionals involved with the care of patients with ALS should be aware of these factors that are potentially amenable to intervention. **Reference:** Creemers H *et al.* *Neurology* 2014; 82(1): 23-31.

PD1212

Example of Biases and Assumptions in Rehabilitation Medicine

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Introduction: This paper will cite some examples from a tertiary hospital to underscore the issue of reviewing the diagnosis in rehabilitation. There is an implicit assumption that the diagnosis has already been made in the acute setting. The main focus of rehabilitation is therapy and functional restoration, through multidisciplinary programs. This puts little emphasis on reviewing the diagnosis and looking for new pathology. Research shows that medical diagnosis receives too little emphasis and attention. A discussion will follow on clinical reasoning, common diagnostic biases and assumptions in rehabilitation and how one might prevent them. **Materials and Methods:** Five illustrative case reports will be discussed- A lady with post polio weakness and pain, an young woman with cerebral palsy and recent functional decline, an ankylosing spondylitis patient with fall, an elderly lady with compression fracture of L1 and the last patient with right MCA ischaemic stroke. **Results:** All of these patients found to have new pathologies in addition to their existing problem. The lady with post polio paralysis had Arnold Chiari malformation, the young lady with cerebral palsy had cervical myelomalacia, the patient with ankylosing spondylitis suffered a thoracic Chance fracture, the lady with L1 compression fracture had conus medullaris syndrome and the stroke patient was diagnosed to have gliomatosis cerebri. **Conclusion:** These narratives emphasize the application of clinical reasoning and diagnostic decision making in rehabilitation medicine. The physicians should not be anchored in to the mistaken assumption that all problems are related to the existing disability. Besides applying clinical reasoning in treating patients with impairments, it is important to be aware of the common diagnostic biases and how to prevent them. For the persons with disability, best care can be ensured if the medical model of care supplements the multidisciplinary and the social model of care.

PD1213

Health Policy and Strategy Development for Barrier Eradication and Improvement in Health Service Accessibility for People with Amputated Disabilities in Thailand

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Background: According to the World Health Organization report (2011), there are over 15% of the world population are disabled. In Thailand, people with disabilities accounts for 1.5 million which is approximately 2.2% of Thai population. Forty-eight percent of them are registered with physical disability. It has also been reported that 5% of this population are amputees and an approximate of 4,000 new cases occur annually. The amputees primarily need prostheses and assistive devices for normal living. However, they have been facing difficulties in accessing several public services

including transportation, healthcare, education and employment. *Methods:* In 2013, Ministry of Public Health (MOPH) implemented a policy and set up particular strategies for accessibility improvement to healthcare services in Thai people with amputation disabilities. According to this policy, Sirindhorn National Medical Rehabilitation Centre (SNMRC) in cooperation with National Health Security Office (NHSO) and local administration has developed a 3-year project with an aim to eliminate barriers in accessibility in medical services for amputees. This has involved medical management, rehabilitation design arrangement and assistive technology development. In addition, the database of Thai amputees has been updated. The main operations consisted of four stages: 1) survey of the amputees (both old and new cases) 2) registration of the amputees. 3) medical service management for amputees and 4) clinical follow up/evaluation. *Results:* We have currently found that 89% of all amputees are able to access medical services including prosthetics and assistive technologies/devices. However, analyses from a field service survey showed major obstacles in providing services to the amputees are well-trained staff shortage and multi-dimensional lack of coordination. The key success factors are the good coordination/management and available local services. *Conclusions:* A recent policy for amputees in healthcare improvement has been implemented by MOPH. Data from this project demonstrated important points in medical service accessibility which could be beneficial for further strategic planning in eradication of barriers for disable.

PD1214

Feasibility of Post-Intensive Care Unit Clinics: an Observational Cohort Study of Two Different Approaches

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Background: Post-Intensive Care Units (ICU) clinics have been advocated to reduce long-term physical and psychological impairments among ICU survivors. A format for optimal structure, timing, and care content has not yet been established. We developed and implemented two post-ICU clinics in different hospital settings and evaluated the feasibility. *Methods:* In this prospective cohort study ICU-survivors of a university hospital (AMC) and a general hospital (TG), who were mechanically ventilated ≥ 2 days and discharged to their homes, were included. Survivors of the AMC were invited to the post-ICU clinic, which was run by the department of Rehabilitation Medicine, one month after hospital discharge. In TG, the post-ICU clinic was performed under the responsibility of Intensive Care Medicine, and patients were invited three months after ICU discharge. Feasibility was evaluated as 1) the number of eligible ICU-survivors and the proportion that attended, 2) the prevalence of ICU-related abnormalities, that required referral for further treatment, and 3) patient satisfaction. *Results:* 45 of 629 AMC-patients and 70 of 142 TG-patients were eligible for the post-ICU clinic. Of these, 49% and 67% respectively, visited the outpatient clinic ($p=0.026$). The majority of all screened patients had functional restrictions, and 68% required referral for further diagnosis and treatment. Patient satisfaction was high. *Conclusion:* This study provides valuable information to support the implementation of post-ICU clinics. The use of validated screening instruments facilitates the identification of patients with need for further treatment. Early in-hospital screening and recruiting patients at highest risk for adverse outcome could be a more targeted approach to initiate rehabilitation treatment as soon as possible and to improve recovery. With respect to the limited physical and psychological resilience of ICU survivors, these patients are a potential target population for Rehabilitation Medicine in the post-ICU care.

PD1215

Comparative Analysis on Romanian And European Disability Holistic Case Management

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Introduction: The key elements of a successful holistic approach and disability case management (DCM) are grounded on the biopsychosocial model (ICF), the key-role of physicians and clinics, on the preventive and curative role of rehabilitation. We are investigating the current status of disabled people on Romanian national territory, while presenting the practices of the Welfare System, Department for Disabled People Protection (DDPP), compared with German and European approaches. *Material and Methods:* The methods included research at the policy, organizational and practice level. The framework of the UNCRPD 2006, European Disability Strategy 2010-2020, and the ISSA Guidelines on Return to Work and Reintegration (2013) were used to analyse the national policies and the support that professional services offer with regard to participation and inclusion. *Results:* According to DDPP in Romania, the latest statistics (31.03.2014) indicate a number of 715,201 disabled persons; however due to disability criteria change (May 2014), we are expecting to exceed 1 mil. by the end of 2014. Acting in the field of social and medical services, DDPP achieved major realisations in the last 10 years, but only in some restricted geographical areas (as Dolj County) is implemented the DCM; in many rehabilitation settings the multidisciplinary evaluation and rehabilitation teams (where they exist) are not coordinated by PRM specialists, there are still legislative definition and terminology dilemmas, and major gaps exist regarding coordinated actions between Welfare and Health Systems. In terms of employment, only 4.62% of disabled adults were working, not finding Return-To-Work initiatives or strategies to attract vocational rehabilitation to enterprises or employers. Although there is a motion for the National Strategy on inclusion of disabled persons 2014–2020, the document is still officially unpublished. When comparing with EU disability approaches, we found that the emphases is on preventive role of rehabilitation (medical, vocational, social) by pro-active social services focused on early interventions, individual participation, stakeholders collaboration. *Conclusion:* Even if Romania has ratified the UNCRPD, different policies apply in case of disabled persons. Access to high quality care for these patients needs improving, therefore we consider that European and Romanian good practices should be disseminated and implemented by other stakeholders serving this field.

PD1216

Young Adults In Nursing Homes: Does Rehabilitation Medicine Services Have a Role to Play?

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Introduction: The National Clinical guidelines for Stroke recommends any patient with residual impairment after the end of initial rehabilitation period should be offered a formal review at least every six months and with regards to nursing homes the guidelines highlights these patients rarely receive any attention from rehabilitation services. The National Service Framework (NSF) for Long-term Conditions states “people with long-term neurological conditions are to have their specific neurological needs met while receiving treatment or care for other reasons in any health or social care setting”. *Material and Methods:* The aim of this study was to assess the disability level, and the service received by young adults (16-65) with neurological disabilities in one nursing homes. This is a pilot cross sectional study. Patients were visited and assessed in July 2009 by structured medical interview, Barthel Index, Office of Population Census Survey (OPCS) Disability Form, review of drug charts. *Results:* 12 adults with neurological disabilities (mean age 50); originally residents in one nursing home, now living in 1 of 8 nursing homes in Glasgow. There were 7 patients

with acquired brain injury, 2 multiple sclerosis, 2 peripheral neuropathies, and one dementia. Prior to admission to nursing homes two patients received inpatient rehabilitation; no others had rehabilitation medicine assessment. 5 patients received community rehabilitation input. Planned medical reviews were rare. 6 patients had significant spasticity and 4 had significant pain. OPCS scores ranged from 1 to 10 with 4 patients scoring ≤ 6 ; Barthel index, 0 to 100, with 4 patients ≥ 90 . **Conclusion:** A wide range of disabilities was observed. Specialist rehabilitation input was lacking both before and during admission. Proactive medical review was deficient. Larger studies, cognitive assessment and nursing needs measurement are justified. Assessment by rehabilitation services (which in our view should include Rehabilitation Medicine) should be the norm rather than the exception before admission to a nursing home.

PD1217

Reducing the Incidence and Progression of Pressure Ulcers Using a Uniform Interdisciplinary Approach with Visual Aides

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Introduction: Whether patients' are being admitted to an inpatient rehabilitation unit with pressure ulcers or developing skin breakdown during the hospital stay, pressure ulcers are both a large financial and physical burden on a facility. The National Center for Health Statistics Data Brief reported about 11% of inpatient residents develop pressure ulcers, with the yearly average at RUSK Rehabilitation's inpatient neurological unit being approximately 6.8%. In an effort to reduce the incidences and progression of pressure ulcers in the inpatient neurological population at NYU Langone Medical Center, a protocol using visual aids has been developed. The purpose of the protocol is to establish an interdisciplinary dialogue between Physical Therapy, Occupational Therapy, Nursing and the wound care team to develop the best positioning plan for each at risk patient. **Methods:** The target patient population for this positioning protocol is the inpatient neurological population with a Braden score of 18 or below that require maximal assistance for bed mobility or the neurological population admitted with a pressure ulcer. Patients classified in the "high risk group" (maximal assist for bed mobility and Braden score of 18 or below) are assessed by Physical Therapy and patients in the "existing group" (admitted with a pressure ulcer) are assessed by Occupational Therapy and pressure mapping is completed in bed and wheelchair. A positioning plan is formulated with photos in pressure relieving positions and written descriptions on how to position the patient. Plans are discussed and posted over the head of bed for the interdisciplinary team to refer to when positioning patient. **Results:** At time of abstract submission, 20 patients have been active on the positioning protocol for a period of 5 months. All patients considered "high risk", discharged home or to another facility without incidence of pressure ulcer during their hospital stay. All patients in the "existing" group demonstrated either full healing or a significant reduction in pressure ulcer size upon discharge. **Conclusion:** Although this project is still in its early stages, it has shown an improvement in incidences of pressure ulcers on the inpatient rehabilitation unit. A larger sample population is needed to full assess the effects of this protocol.

PD1218

Disability at Discharge amongst Hospitalized Older Adults Experiencing Adverse Events in Postacute Rehabilitation Care: a Prospective Observational Study

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Introduction: Most hospitalized older adults suffering any acute injury or disease are vulnerable to transient or permanent disability after acute hospital care. In this respect there is a clear trend to provide rehabilitation care in dedicated units of an acute care hospital or in specialized rehabilitation facilities in order to optimize functioning after acute care. Adverse events (AEs) are health care-associated incidents which cause harm. The relationship between AEs and functional status has not been explored in older individuals receiving post-acute rehabilitation care in acute hospitals. **Methods:** In this prospective cohort study, the relationship between AEs and disability at discharge in inpatient rehabilitation programs was assessed in a cohort of 216 older adults who were admitted to a rehabilitation unit of a French acute hospital. The occurrences of any adverse event or persisting associated injury were reported. The level of disability for mobility activities was initially measured with the Mobam-in instrument, and afterwards patients' scores were used to estimate the disability qualifier from the International Classification of Functioning, Disability and Health. A total of 6 variables were selected from literature research as covariates. **Results:** Moderate or severe disability at discharge was reported by 131 (60.7%) of the 216 participants. Concerning reported levels of disability, significant differences were found when comparing individuals who experienced any AE with those who did not. Experiencing either fall-related events or any other kind of adverse event was independently associated with moderate-severe disability (odds-ratios: 6.40 and 8.42, respectively) after adjusting for baseline confounders. **Conclusion:** Both AEs occurring during a hospital stay at rehabilitation units and injuries associated to AEs that occurred before admission were important independent predictors of subsequent disability at discharge in a cohort of older adults followed during their hospital stay. These data suggest that efforts to prevent the occurrence of these events, as well as early interventions, may have a positive influence on the consequences from adverse events. Further studies should evaluate disability over time, before and after discharge, to obtain a better sense of how transient or permanent the associated disability may be.

PD1219

Characteristics of Patients in Regional Outpatient Rehabilitation Service

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Introduction/Background: Regional Rehabilitation unit is in charge of all cases of rehabilitation treatment in Clalit Health Services on Tel Aviv - Jaffa (CHSTAJ) territory. The professional staff of the unit decides about the primary rehabilitation setting after the discharge from a general ward, supervises patient's program in the rehabilitation department and organizes his outpatient rehabilitation plan at home. **Material and Methods:** 736 patients were referred to rehabilitation in CHSTAJ for 4 months. 106 patients were below 65 years old and 630-above this age. Age, waiting time to start the treatment (WT) in days, length of stay in rehabilitation ward, treatment continuation after discharge from rehabilitation department (unit, other place or none) and general outcome (discharge home, transfer to nursing facility or death) were analyzed statistically for geriatric population with stroke (64), hip fracture (HF-122) and deconditioning (117). **Results:** Patients with HF were significantly ($F=3.630$, $p=0.028$) older than others- 83.16 ± 7.27 (65-113 years). WT was found to be statistically longer ($F=3.102$, $p=0.046$) for CVA- 3.97 ± 4.30 (0-15 days). Stroke patients stayed significantly ($F=17.858$, $p<0.001$) longer in rehabilitation ward- 38.75 ± 20.99 than other groups (23.85 ± 14.05 for deconditioning and 32.82 ± 15.60 for HF). Much more ($\chi^2=33.342$, d.f.=4, $p<0.001$) HF patients (72.1%) were transferred for outpatient rehabilitation to the unit, contrary to other patients, which mostly were not sent to continuation of treatment (56.4%-deconditioning and 56.3%-

CVA). Mortality was found to be significantly higher ($\chi^2=15.355$, d.f.=4, $p=0.004$) in deconditioning group-23.1%. Home destination was highest in HF group-81.1% and more stroke patients (20.3%) were transferred to nursing facility. *Conclusion:* The rehabilitation patient's parameters can help a lot in managing the regional professional structure.

PD1220

Predictors of Community Integration Trajectories across the First Five Years after Brain Injury in Norway

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Introduction/Background: Community integration is the ultimate goal for individuals with traumatic brain injury (TBI). Yet, research that examines community integration over longer periods of time is extremely sparse, especially that outside of the United States. The purpose of this study was to assess the trajectories of community integration in individuals with TBI through 1, 2, and 5 years post-injury in Norway and to examine whether those trajectories could be predicted by demographic and injury characteristics. *Material and Methods:* A longitudinal cohort study was conducted with 105 individuals with moderate-to-severe TBI who had been admitted to a Trauma Referral Centre in from May 2005 to May 2007. Pre-injury, injury-related, and acute phase factors were extracted from medical records. At the 1-, 2- and 5-year follow-ups, a physiatrist performed assessments and interviews of patients at the outpatient department. Community integration was measured by the Community Integration Questionnaire. *Results:* A hierarchical linear model (HLM) examined whether linear trajectories of community integration over 1, 2, and 5 could be predicted by: time, sex, age, relationship status at admission, education, employment status prior to admission, occupation prior to admission, acute GCS score, cause of injury, days in posttraumatic amnesia (PTA), CT head injury score, and injury severity score. Community integration improved across the three time points ($p<0.001$). Additionally, higher trajectories of community integration were predicted by being single at the time of injury ($p<0.001$), higher level of education ($p=0.006$), employment at the time of injury ($p<0.001$), and a shorter length of PTA ($p<0.001$). In a follow-up HLM with interaction terms, time*PTA was statistically significant ($p<0.001$), suggesting that participants with longer PTA increased in community integration more rapidly than those with shorter PTA, likely because of the high level of community integration among the latter group. *Conclusion:* This study has implications for rehabilitation professionals to provide more precise information on long-term community integration trajectories to patients and their families. In addition, the longitudinal courses of community integration described in this study may help rehabilitation professionals when planning targeted post-acute rehabilitation programs.

PD1221

Physiotherapist and Dentist – a Comprehensive Treatment in an Interdisciplinary Team

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Introduction: Dental Rehabilitation should become one of the essential element of a comprehensive treatment. Restricting the use of dental rehabilitation can lead to adverse functional relationships within the oral cavity. *Objective:* The aim of this study is to determine the needs of a physiotherapist working to formulate guidelines

comprehensive medical treatment in dentistry. *Material and Methods:* The work of an analysis of the available material was developed based on the selective evaluation of the material published in the years 2000-2013. The choice of material used on the basis of an analysis of the work of journals indexed in both Polish and abroad. The study does not address the determination of the extent and power of each recommendation and also no reference to the work of a description of the event. The study was based mainly published and available work multicenter. *Results:* Currently, there is still very little known in the field of physiotherapy in the field of dentistry. A very important fact is also very small number of papers presenting research results and the lack of guidelines and detailed descriptions of the procedures used in dental rehabilitation. *Conclusions:* It is possible to present specific problems and specific needs rehabilitation in dentistry. Establishing clear rules of procedure allow for precise execution of comprehensive rehabilitation. Currently, rehabilitation is an important component of modern dental proceedings.

PD1222

Predictors of Quality Of Life Trajectories across the First Year Post Stroke in Colombia

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Introduction/Background: Stroke results in several cognitive, emotional, and physical deficits that may cause disability and influence the quality of life (QoL) of patients. In Latin-America there is a lack of research with this population. The majority of studies have been cross-sectional, and little is known about the long-term consequences and predictors of QoL after stroke. The purpose of this study was to investigate trajectories of QoL over the first year post-stroke and the influence of different predictors on these trajectories. *Material and Methods:* Fifty individuals diagnosed with stroke from Ibagué, Colombia participated on the study. QoL was measured with the Short Form of Health Survey (SF-36) at three, six, and twelve months post-injury. A hierarchical linear model (HLM) was performed to examine whether linear trajectories of QoL over the three time points could be predicted by: time, gender (male vs female), age (50 years old or less, vs. over 50), education (12 years or less, vs. over 12) and NIH score at 3 month (no neurological impairment=0 vs. neurological impairment >0). *Results:* The HLMs showed that time yielded a statistically significant effect on all subscales of SF-36 trajectories in stroke patients ($p's<0.05$), except on Role-Physical, suggesting that QoL improved across time. Additionally, male participants achieved higher scores on Physical Functioning, Mental Health and General Health subscales than female participants across time ($p's<0.05$). Younger participants also reported higher scores on Vitality and General Health subscales than those who were older over time ($p's=0.05$). Finally, patients with no neurological impairment showed higher score on Pain subscale ($p<0.05$) in comparison with patients with neurological impairment across the three time points. No predicted variables were found for Role-Physical subscale. In addition, statistically significant fixed effects in the first HLM did not interact with time. *Conclusions:* Time, age, gender, and severity of the neurological impairments were significant predictors of QoL trajectories over the first year post stroke. Even though QoL outcomes improved in all individuals with stroke over time, those who were females, older, and individuals with more severe neurological impairments had worse QoL. Rehabilitation professionals should develop interventions to improve QoL of these individuals.

PD1223

Application of Generic ICF in Assessment of Rehabilitation Needs and Efficacy of Early Rehabilitation in

Persons Following 2014 Earthquake in Ludian

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Objective: Application of generic ICF to assess the rehabilitation needs in persons following Ludian earthquake, and the efficacy of the injury recovery after early rehabilitation intervention. **Methods:** A total of 113 earthquake victims were treated in the first people's hospital of Zhaotong city, we assessed generic ICF scores 1 week after injury or 2-5 days after surgery to identify the rehabilitation needs in wounded persons; and compared the changes of generic ICF scores after one-month rehabilitation intervention. **Results:** 80 persons met the inclusion criteria (male 41, female 39, mean age 43 years). Before early rehabilitation intervention, rehabilitation needs were identified almost in all wounded persons according to the ICF scores; After one-month rehabilitation intervention, the generic ICF scores have decreased significantly ($p < 0.05$). **Conclusion:** The results indicated that this generic ICF-based needs assessment both quick and effective in acute hospital in the context of natural disaster, and early rehabilitation intervention have a significant effect on the injury recovery of earthquake victims.

PD1224

Graduates' Perceptions of Education at the Tanzania Training Centre for Orthopaedic Technologists and Their Profession

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Introduction: The Tanzania Training Centre for Orthopaedic Technologists is one of very few schools in Africa providing training for prosthetic and orthotic staff, and it is therefore important that the education offered is of high quality. It is necessary to determine if the education currently provided meets the needs of people with disabilities requiring prosthetic and orthotic services. **Aim:** To describe how Tanzanian and Malawian graduates of the Diploma in Orthopaedic Technology offered at the Tanzania Training Centre for Orthopaedic Technologists perceived their education in relation to their profession. **Methods:** Nineteen graduates from the diploma course in orthopaedic technology working in Tanzania or Malawi were interviewed. Phenomenographic analysis was applied on statements of the participants' perceptions and conceptualized into conceptions. Similarities and differences in conceptions were analysed and grouped into descriptive categories. **Results:** Seven descriptive categories emerged namely; Varied awareness of the profession before starting education, Well-equipped teaching facilities, Aspects lacking in the learning context, Need for changes in the curriculum, Enable people to walk is motivating, Obstacles in working conditions and the Need for professional development. All participants perceived possible improvements to the content and learning environment. **Conclusion:** Prosthetic and orthotic services can be better provided by modifying the education program content by dedicating more time to the clinical management of different patient groups and applied biomechanics and reducing the program contents focus on technical aspects of prosthetic and orthotic practice. Working in rural conditions has demands that graduates were not prepared for and the graduates desired continued training. The study can contribute to the evidence base for review of the international guidelines for training personnel in developing countries for prosthetics and orthotics services. **Reference:** Magnusson L, Shangali H, Ahlström G, Graduates' perceptions of education at the Tanzania Training Centre for Orthopaedic Technologists and their profession.

PD1225

Monitoring Facial Changes in the Course of Inter-Professional, Individually Targeted Rehabilitation at the Department of Rehabilitation Medicine

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Assessment of the effects of therapy and rehabilitation for facial palsy is not always clear. In our pilot study, we used the modern approach of photogrammetry for the assessment of facial motor function during mimicking of facial expression before and after rehabilitation. The study includes day care patients - day care being for patients who have suffered a traumatic brain injury, cerebrovascular accidents, brain tumor surgery or brain inflammation. There is an ongoing comprehensive rehabilitation program, compiled for the individual patient. The rehabilitation program includes doctors, physiotherapists, occupational therapists, a clinical psychologist, a speech therapist and an education specialist. Part of the therapy is also made up of non-verbal psychotherapeutic methods: music therapy, dance and movement therapy, art therapy. We also use music therapy as speech therapy. Rehabilitation takes place over 4-6 weeks. Our study includes patients who have suffered a traumatic brain injury and patients who have suffered a stroke, with precise indication and contraindication criteria. The research is based on 3D surface scanning of the patient's face (during the second and last week of treatment) and a control group of individuals performing five facial expressions (neutral expression, raised eyebrows and forehead, eyes closed, lips pursed, inflated cheeks, smile). The process and the interpretation of the patients' results after scanning is time consuming, but we believe that the beginning of any scientific research project and searching for standard objective interpretational methodology is always so. Further, we believe that in the case of future patients, where we will already have a tested methodology and more experience in the interpretation of the results, the time factor will be reduced. In this communication, we present two case reports of patients. The study was based on co-operation between the Department of Rehabilitation Medicine, General University Hospital in Prague and the 1st Medical Faculty of Charles University in Prague and the Department of Anthropology and Human Genetics, Faculty of Science, Charles University in Prague.

PD1226

Experiences of Physicians with Migration Background in Inpatient Medical Rehabilitation Facilities

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Background: Medical facilities have increasing problems to cover medical jobs in Germany. One possible reason for this development could be a limited number of physicians or an uneven distribution and allocation of physicians. Rehabilitation clinics have even more problems to cover jobs because of e.g. reduced attractiveness due to remote locations of some facilities. A possibility for changing this situation is to hire migrant physicians. At present there are no systematic studies about the situation of migrant physicians in German inpatient medical rehabilitation facilities. Therefore, in our study (EMMI-R) physicians with migration background have the chance to describe their experiences at work. Aim of the study is to identify difficulties and support opportunities but also potentials that physicians with migration background contribute to rehabilitation practice. **Material and Methods:** In this qualitative pilot study open interviews with three male and seven female physicians with migration background working in different medical fields from east and west parts of Germany were conducted. They were asked about their experiences in and wishes for their work in inpatient medical rehabilitation facilities. Statements of physicians were analyzed by means of qualitative content analysis. **Results:** In total, five different categories of experiences of physicians emerged: interdisciplinary cooperation, intradisciplinary cooperation, physician-patient-interaction, experienced support and wishes. Migration background of physicians may affect interaction with colleagues and patients in very different manners, both positively, negatively or without relevance. The results show that positive interaction depends on persons' at-

titudes concerning migration and how well these positions match together. For example in personal physicians-patients-interaction migration can be a connecting factor or causes confrontation with prejudices. Speech diversity can be experienced as a resource but also as a special challenge and difficulty for daily work in rehabilitation facility. *Conclusion:* The experiences show an area of conflict. On the one hand physicians would like to experience “normality” at work but on the other hand physicians are in need of support. With regard to difficulties and medical self-conception it is hard to identify to which extend difficulties or differences depend on different experienced (medical) socialization or further aspects which are related to individual background.

PD1227

A Project to Establish a Disaster Relief System for Community-Dwelling Persons Requiring Medical Cares in Tokyo: a Pilot Survey of Their Actual Conditions

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Introduction: To formulate disaster relief plans for community-dwelling persons requiring medical cares (CDPRMC), it is necessary to understand their actual conditions. As a first step to prepare for a powerful inland earthquake supposed to occur in Tokyo, the purpose was to grasp the approximate number of CDPRMC in Shinjyuku-ku, one of the 23 wards in Tokyo with a population of 32,4000. *Methods:* We performed a pilot survey of CDPRMC by analyzing pre-existing data collected by the local government regarding people requiring assistance during a disaster (PRADD) with regard age, sex, functional level and types of medical cares required. *Results:* 2,886 persons were listed as PRADD, 882 males (30.6%) and 2,004 females (69.4%). Their mean age was 75.7 yo: 50 and below (13.8%), 60 s (6.1%), 70 s (23.3%), 80 s (44.1%) and 90 and above (12.6%). Reasons for enlisting as PRADD were 75 yo and above (48.5%), demented (2.1%), with disabilities (26.2%) and others (21.3%). Their functional levels were: For stepping the stairs, impossible (18.1%), handrails needed (49.0%), a cane need (15.9%) and independent (24.2%); For outdoor mobility, a cane needed (29.9%), a wheelchair needed (18.3%), a stretcher needed (1.4%), requiring more than usual time (8.1%) and independent (39.5%); For communication, visually impaired (16.4%), auditory impaired (19.3%), expression difficult (16.4%), understanding difficult (14.3%) and independent (42.8%). 1478 persons (51.2%) required some kinds of medical cares: ventilator (0.8%); IVH (0.1%); oxygen therapy (1.8%); tube feeding (1.9%); colostomy (0.2%); indwelling catheter (0.7%); dialysis (4.9%); insulin injection (2.1%); others (pacemaker, artificial valve, medications, etc) (38.4%). *Conclusion:* Although we could get some idea of the actual conditions of PRADD and CDPRMC in Shinjyuku-ku, their numbers are likely to be underestimated because the listing was done on a voluntary basis. Further in-depth and focused survey is needed, and a steering committee was established consisting of members from the local government, a regional rehabilitation support center, regional medical, dental and pharmaceutical associations, disaster medical hospitals, NPOs and medical equipment companies. The committee will conduct a detailed survey of CDPRMC, draw up a support manual and a support plan during a disaster, and perform manpower training to enhance disaster preparedness.

PD1228

Impact of Caregiving the Patients with Neurological Diseases on the Primary Caregivers

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Introduction/Background: Neurological disorders such as stroke, multiple sclerosis, idiopathic parkinson disease, and spinal cord

injury currently affect as many as a million people worldwide. They lead to physical, psychological, cognitive impairment and the loss of behavioral and social skills. In that case a suitable care is needed. Caregivers are usually family members (ie. spouse, partner or child). Caregiving of a patient is an extremely demanding task resulting in caregiver burden or stress. The aims were; (1) to study reliability and validity of Turkish version of Bakas Caregiving Outcomes Scale (TvBCOS); (2) to evaluate impact of caregiving on primary caregivers in a Turkish sample. *Materials and Method:* In the first step of this cross sectional and comparative study, reliability and validity of TvBCOS has been studied. Ninety two caregivers (mean age; 46.36±12.60 yr.) and 80 non-caregivers (mean age; 44.25±12.81 yr.) participated. Caregivers were examined with the TvBCOS, Beck Depression Inventory (BDI) and Short Form-36 (SF-36). The BDI and SF-36 were also used to assess non-caregivers. *Results:* The internal consistency of the TvBCOS was 0.90. The item total correlation coefficients were between medium and strong levels (0.40-0.76). ICC score for the test-retest reliability coefficient was 0.96 (95%, CI: 0.5584/2.6250). The total score of the TvBCOS for the caregivers was found to be 55.1/105. In addition to this, the caregivers had lower scores in terms of BDI and SF-36 scales compared to the non-caregivers (p<0.05). *Conclusion:* The findings indicate that TvBCOS is a reliable tool to assess the impact of caregiving on caregivers. Caregiving the patients with neurological disease affect negatively emotional status and, the quality of life of the caregivers. Therefore; caregiver burden should be considered.

PD1229

A Prospective Study of Rehabilitation Patients in Western Norway with Focus on Activity, Participation and Quality of Life

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Introduction/Background: Each year, approximately 55,000 patients participate in rehabilitation by the specialized health care services in Norway; however, there are large regional differences. Western Norway is the region with the fewest rehabilitation patients per 1,000 inhabitants. The reason for these differences is poorly investigated. There is limited knowledge of the patients referred for somatic rehabilitation; only age, sex, domicile and referral diagnosis are recorded systematically. These data are marginally useful when predicting the outcomes of rehabilitation interventions. Furthermore, the effect of rehabilitation in the specialized health care services is uncertain, especially the impact on social participation, including return to work. The present project aims to identify and survey the patients accepted for somatic rehabilitation in the specialized health care services in western Norway in terms of functional level, aspects of activity and participation, and quality of life. Patients will be followed up after one and three years. Use of other health care services, coordination between these services and cooperation within multidisciplinary teams will be further investigated. *Materials and Methods:* This is a cohort study in which patient-reported data is collected through questionnaires, with linkage to official registry data on socio-demographics and use of health care services. Generic questionnaires will be utilized since the study includes various diagnostic groups. All patients who are accepted for somatic rehabilitation at a rehabilitation institution in western Norway will be invited to participate in this study. The data collection is scheduled to start in January 2015 and will last for 6 months. Approximately 2,400 patients will be invited to the study. Validation of several measurement tools is also a part of the study. *Results:* Preliminary data will be presented at the congress. *Conclusion:* Increased knowledge of patients referred for somatic rehabilitation in the specialized health care services may help improve designing and planning rehabilitation services. To investigate changes in functional level, aspects

of activity and participation, and quality of life may contribute to clarify whether rehabilitation has the intended effect.

PD1230

Systemic Introduction of Hospitalization-Associated Disability Prevention System (HPS) for Improving “Quality of Medical Care” in Hospitalized Patients

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Background: Functional disabilities such as gait disturbance and lower extremity muscle weakness, can develop in hospitalized patients owing to inactivity after their admission. These disabilities can be referred to as “hospitalization-associated disability” (HAD). The risk factors for HAD have been already clarified and HAD is currently considered to be preventable. However, no institution in Japan has applied a systematic approach for preventing the development of HAD. Therefore, we developed and applied a system, which we called the HAD Prevention System (HPS), at some departments of our hospital. The purpose of this study was to perform an initial evaluation of the safety, feasibility and efficacy of the HPS. **Materials and Methods:** All patients admitted to 7 selected departments in Jikei Third Hospital (Tokyo, Japan) during the period between February 1, 2014 and September 30, 2014, were enrolled in this clinical attempt. First, the physicians of each department fill out an HPS evaluation sheet for the screening of “HAD high-risk patients” and submit the completed sheets to the physiatrists at Department of Rehabilitation Medicine, when a new patient is admitted. Second, the physiatrists examine the patients identified with the screening and order a rehabilitative program to prevent HAD if needed. Third, the rehabilitative program is administered by physical therapists. The HPS evaluation sheet was originally developed based on the results of previous studies investigating risk factors for HAD. The system including the submission of the sheet was conducted on a computerized medical records system. **Results:** During the study period, 312 patients underwent rehabilitative program in the early phase of their admission. In 68% of patients undergoing rehabilitation, the program was started within 3 days of admission and produced no adverse events. Of the patients undergoing rehabilitation, 85% did not have HAD during their hospitalization. With the introduction of this system, the mean hospitalization period was significantly decreased at some departments. **Conclusion:** Our proposed HPS was safely introduced in our hospital and appears to facilitate early introduction of preventive rehabilitative program in hospitalized patients. The introduction of this system can prevent the development of HAD during the hospitalization and improve the quality of a hospital’s medical care.

PD1231

CBR Using Rehabilitation Specialists

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Abbreviations: PWD=Person With Disability, LMIC=Low Middle Income Country. **Introduction:** CBR stands for Community Based Rehabilitation. It is a way of implementing rehabilitation services outside of the institution, mostly in developing countries. CBR programs usually have an integrative and social backbone. The aim of this project is to deliver (para)medical rehabilitation care to PWD’s in the rural setting of West Kenya 1. **Materials and Methods:** The local CBR program was extended towards 3 pillars: medication, home based therapy, and mobility aids. The first pillar consists of the delivery of chronic medication prescribed by a PRM specialist (spasticity, bladder instability, pain.). Secondly, home based treatments, consisting of basic physiotherapy and occupational therapy are performed 2. All included clients get a continuous follow up, according to their ‘rehabilitation prescription’

that is done at the moment of assessment, with a given frequency and content of therapy. A system of regular home visits by local CBR staff is established to deliver these therapy sessions. For the training of CBR staff, we developed a syllabus 3 with basic physiotherapy and occupational therapy techniques in rehabilitation of neurolocomotore disabilities. The CBR trainees also receive guidance with hands on teachings at the clients homes. The transfer of knowledge towards family members is incorporated in the competency building process. Finally, mobility aids are prescribed in an adequate manner, and procured. **Results:** Rehabilitation services are delivered for over 200 clients, with an overall cost of 100 USD/PWD/year. The CBR workers are trained by rehabilitation professionals from Belgium, resulting in adequate and consecutive home based therapy sessions. A reliable local partner is a key factor to success. **Conclusion:** It is possible to extend specialised rehabilitation services, outside of the centralised health care system of a LMIC, and it is cost effective. Literature: 1. Thomas MJ, Thomas M (1997). Need for technical support in rehabilitation in developing countries. Asia Pacific Disability Rehabilitation Journal 1997; 8: 37-39. 2. WCPT Keynotes (2007). Community based rehabilitation - changing concepts. http://www.wcpt.org/sites/wcpt.org/files/files/KN-Changing_Concepts_of_CBR2.pdf. 3. www.cbrteaminternational.com: Syllabus https://docs.google.com/file/d/0B36bman71_7xa3dKVHhsNmZkSHM/edit.

PD1232

Outcome Evaluation of a “Disability Acute Rehabilitation Team” on 512-Earthquake Victim with Amputation

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Background: StandTALL has been providing long-term rehabilitation treatment and prosthesis installation services to the victims of 2008 Wenchuan earthquake. However, information regarding to mobility outcome and quality of life of lower limb amputees in this earthquake remains limited. We aimed to document the mobility outcome and quality of life of lower limb amputees taken care by StandTALL, to evaluate the effectiveness of this rehabilitation program, and to investigate the prognostic determinants of these outcomes to serve as a basis for better planning of disability acute rehabilitation team. **Methods:** This is a cross-sectional study of 58 lower limb amputees followed up in Sichuan-Hong Kong Rehabilitation Centre, Sichuan in November 2013. Amputee Mobility Predictor (AMP) was used to determine the mobility capacity. Houghton Scale of Prosthetic Use (Houghton score) was used to measure mobility capability and to determine rehabilitation success, which was defined as scoring more than or equal to 9. Trinity Amputation and Prosthesis Experience Scales (TAPES) was used to measure quality of life. **Results:** 49 (84.5%) were unilateral amputees and 9 (15.5%) were bilateral amputees. 43 (74.1%) attained rehabilitation success. 37 (63.8%) were classified as K4 level according to the Medicare functional classification system (MFCL). Adult amputee experienced less adjustment to limitation ($p=0.008$), more athletic activity restriction ($p=0.013$), more social restriction ($p=0.006$) and more functional restriction ($p=0.046$) than young amputee, with Mann-Whitney U test. There was no significant difference in AMP total score between trans-femoral and trans-tibial unilateral amputees ($p=0.083$). Unilateral amputee scored higher in AMP than bilateral amputee ($p=0.001$). Significantly higher proportion of bilateral amputee used wheelchair ($p=0.0016$, standardized residuals=2.2). AMP was inversely correlated with athletic activity restriction ($rs=-0.471$, $p<0.001$), functional restriction ($rs=-0.480$, $p<0.001$), social restriction ($rs=-0.323$, $p=0.013$) and aesthetic satisfaction ($rs=-0.357$, $p=0.006$) TAPES subscales using Spearman rank correlation coefficient. **Conclusion:** 74.1% of the subjects attained rehabilitation success. We conclude that StandTALL Program promotes functional independence and quality of life of lower limb amputees of 512 Wenchuan earthquake. Emphasis should be put on long-term social reintegration of lower limb amputee especially adult and bilateral amputees.

PD1233

Hospital Readmission after Discharge from an Acute Rehabilitation Facility**R. Bell, *D. Burke***Emory University, Atlant, GA, US*

The American Patient protection and Affordable Care Act has identified hospital readmission rates as an indicator of hospital quality of care that must be monitored. Previous studies concerning rehabilitation facility discharges have focused on patients treated under government payers systems including Medicare. This retrospective study was designed to further understand the rate and reasons for hospital readmission after discharge from an acute inpatient rehabilitation facility. This retrospective study included all patients admitted to a freestanding academic rehabilitation facility over a five-year period. All discharges were followed for 30 days to determine emergency room visits or hospital admissions within 30 days after discharge from the rehabilitation facility. Of those readmitted, the diagnosis treated at the rehabilitation facility as well as the readmission diagnoses were recorded. Of the 3,338 patients admitted to the rehabilitation hospital, the 30 day readmission rate was 28% for the entire group. Of these, 51% were readmitted directly from the rehabilitation hospital. The most common causes for acute care readmission were pneumonia, 25%, complications of a device, 26%, acute cerebrovascular disease, 25%, infection, 17%, and septicemia, 7%. Combining septicemia common among an infection, the readmission for infectious diseases accounted for over 50% of the readmissions. *Conclusion:* this study of patients discharged from an acute academic rehabilitation center found that 28% of the patients were readmitted to an acute care facility within 30 days. Of those readmissions, approximately half were admitted directly from the rehabilitation facility. The majority were readmitted for infectious disease complications.

PD1234

Persons with Haemophilia in Sweden – Experiences and Strategies in Everyday Life***E. Brodin, F. Baghaei, K. Sunnerhagen, M. Törnblom***The Sahlgrenska Academy, University of Gothenburg, Göteborg, SE*

Haemophilia is a X linked congenital disorder which is caused by deficiency in coagulation factor VIII (haemophilia A) or coagulation factor IX (haemophilia B). Haemophilia can be treated by replacing missing coagulation factors that has been available in most developed countries during the last decades. The aim of the study was to explore the experiences and coping with the disorder of adults living with severe or moderate haemophilia at a single centre in Sweden. The interview study had a qualitative empirical approach and was analysed on the basis of the method empirical phenomenological psychology (EPP). The sample included 14 informants due to the inclusion criteria and to saturation of information. The mean age of the participants was 42 years (19-80 y). General characteristics were; All PWH were satisfied with and grateful for access to medication. An acceptance of the disorder and willingness of living a normal life was identified among all participants. They were all content with care provided by Haemophilia Treatment Centre (HTC) and felt supported by its multidisciplinary team. Four typologies were identified; Protective adults and assertive children, adaptation in social activities, experiences of symptoms and treatment, and fear of limited resources in the future. Experiences that were prominent were; limitations versus no limitation due to activities; worried but supportive adults during up-bringing; practical support from family; discrimination versus consideration in education and working life; worries about cuts of the subsidized medication; symptoms and treatments and a mostly supportive HTC. Task-, emotional- and avoidance coping strategies were seen among the participants. The most prominent coping category was task oriented. It seems important to continue com-

prehensive medical care at HTC in order to follow-up the PWH regularly.

PD1235

Guiding the Approach to Patients in a Public Rehabilitation Services Network in Brazil – Development of a First-Contact Protocol for Collecting Functional Information***M. Souza, R. Sampaio, F. Ferreira, S. Furtado, C. César, M. Mancini***Universidade Federal de Minas Gerais, Belo Horizonte, BR*

Introduction: Over the past decade, Brazil has faced an increase in chronic diseases and in life expectancy. These changes, associated with increasing work-related illness morbidity added by external events, such as traffic accidents and urban violence, have been challenging its health system by increasing the demand for rehabilitation services. The beginning of the rehabilitation process should focus on identifying the concerns and needs of the individual. This study describes the development of the Protocol for Identification of Problems for Rehabilitation (Protocolo de Levantamento de Problemas para a Reabilitação–PLPR), a tool for collecting functional information based on the International Classification of Functioning, Disability and Health (ICF). *Methods:* The PLPR was developed after a series of meetings that included 61 rehabilitation professionals and rehabilitation managers from the public rehabilitation services of Belo Horizonte, along with rehabilitation researchers from the Universidade Federal de Minas Gerais, Brazil. The protocol was developed to be used at first contact with adult patients within a network of rehabilitation services. Steps to develop the protocol included: survey of the ICF codes most used by rehabilitation professionals; compilation of data from functional instruments available in the literature; development and implementation of a preliminary version in the service settings; discussion with rehabilitation professionals regarding the protocol's strengths and weaknesses; and development of the final version. *Results:* The final version includes four parts: user identification; social and health information; user's Brief Functional Description (BFD); summary of the BFD; and PLPR results, with definitions of the place where treatment will take place and the professionals involved in the patient's intervention. The BFD, was created based on sets of ICF codes considered relevant for people with a medical condition that causes disability or at risk for developing disability. In order to facilitate and standardize the use of BFD codes, a guiding or reference question was created for each code. *Conclusions:* The PLPR protocol standardizes the first contact between the user and the rehabilitation service. Systematic use of this protocol by rehabilitation professionals could also help create a functional database and allow comparisons between rehabilitation services and countries over time.

PD1236

Specialized Stroke Rehabilitation - Descriptive of Content from a Multicultural-Multicenter Study***B. Langhammer¹, S. Sällström², F. Becker³, T. Zhang⁴, X. Du⁴, T. Bushnik⁵, M. Panchenko⁶, O. Keren⁷, S. Banura⁸, K. Elessi⁹, F. Luzon⁹, A. Lundgren Nilsson¹⁰, K. S. Sunnerhagen¹⁰, L. Xie¹¹, J. K. Stanghelle³**

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Background: Persons with moderate to severe stroke may be in need of specialized rehabilitation. Services provided in specialized

rehabilitation centers, on the other hand, are not standardized or described. In-patient stroke rehabilitation services may differ widely from clinic to clinic, and from country to country. The aim with this study is to provide a description of the content of specialized stroke rehabilitation services in nine different institutions in seven countries, and to study the outcomes for stroke patients treated in these institutions. *Materials and Methods*: Descriptive data of the collaborating centers regarding content and services and patient outcomes at baseline were recorded and compared to the British Society of Rehabilitation Medicine (BSRM)(1-2) Specialized Services National Definitions Sets. Patients outcomes was registered with National Institutes of Health Stroke Scale (NIHSS), Modified Rankin Scale (MRS), Barthel Index (BI) alternatively Functional Independence Measure (FIM) at baseline. *Results*: Financing, size, university affiliation, quality accreditation, admission procedures, time and type of therapies, estimated length of stay (LOS) and follow-up procedures differed between the centers. Comparisons to BSRM's definitions revealed varied staffing levels, specialist training, cognitive, and vocational services and differences in coordination of the professional teams. All centers admitted severely disabled persons with stroke, in need of complex rehabilitation, and provided high levels of physical services, with specialized equipment and facilities. *Conclusion*: This study of the content of specialized stroke rehabilitation in seven different countries, nine clinics in total, shows the variation of what is defined as content in the respective specialized rehabilitation clinics between clinics and compared to a standardized definition. However, all the clinics admit severely disabled persons with stroke and provide high levels of service. Whether the differences in procedures influence the outcomes of the rehabilitation has yet to be established. *References*: 1) BSRM Standards for Rehabilitation Services Mapped on to the National Service Framework for Long-Term Conditions. Accessed 03112014. Retrieved at URL: <http://www.bsm.co.uk/publications/StandardsMapping-Final.pdf>. 2) Turner-Stoke L. Specialist neuro-rehabilitation services: providing for patients with complex rehabilitation needs. Accessed 03112014. Retrieved at URL: http://www.bsm.co.uk/publications/Levels_of_specialisation_in_rehabilitation_services5.pdf.

PD1237

Standardized Protocol for the Management of the Post-Void Residue in Patients after Stroke and Spinal Cord Injuries

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Introduction: In literature it is shown that increased post-void residual volume in patients after stroke or spinal cord injuries is described as a risk factor for both urinary tract infections and urinary incontinence. Also, in certain situations, the presence of the Foley catheter can lead to urinary tract infections. Given these facts, in order to accomplish a satisfying rehabilitation, and reduce hospitalization costs, there is a need to implement a standardized protocol and to apply constant efforts in reducing these variables. *Material and Methods*: We have developed and applied a standardized protocol for monitoring the patients admitted in the Rehabilitation Department of the Clinic CF Hospital in Iasi, Romania, both by the resident doctors and by the nurses. We have also evaluated the documentation of the nurses and residents. *Results*: After applying the protocol, the feed-back received from the nurses, residents and doctors show a better collaboration between them, and also an increased documentation in this area. Also, the evaluation of the protocol showed that hospitalization costs can decrease significantly by applying it. *Conclusions*: Future objectives are related to an even better compliance in nurses and also a constant and collective effort in order to achieve the best individualized rehabilitation program for each patient. *Keyword*: post-void residue, Foley catheter, urinary tract infections, standardized protocol.

PD1238

Rehabilitation Outcome for the Home-Based Stroke Survivors in the Public Independent-Living Training Centers: Multi-Center Study

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Introduction: It is important for the home-based stroke survivors to train in the public independent-living training center after recovery phase inpatient rehabilitation. The aim of independent-living training is to reappointment the past job, to participate the community based activity, and to use independently public transportation. The purpose of this study is to clarify rehabilitation outcome of training in the public independent-living training center with Japanese Rehabilitation Medicine Database (JARM DB). *Material and Methods*: This study was performed by Prospective Cohort study. The data was collected from 2012 September to 2014 May. Participate facilities were 21 facilities in all local areas in Japan. They were all-day living type public independent living training center. Participants were home-based stroke survivors over 6 month's onset and under 65 years old. Total number of the participants was 128. Mean age was 49.6 years old. We evaluated the period of beginning and end of training. Rehabilitation outcome were evaluated by modified-Rankin Scale, Brunnstrom Stage, Hasegawa Dementia Scale-Revised, Independent Scale for Dementia, Barthel Index and its items, FIM total, subscales and its items. *Results*: Modified Rankin Scale change was 0; 1 to 1, 1; 9 to 10, 2; 29 to 37, 3; 38 to 38, 4; 51 to 42 (P<0.05, n.s.). Hasegawa Dementia Scale-Revised change was 27.5±13.4 to 27.6±10.6 (P<0.05, n.s.). Independent Scale for Dementia did not change significantly (P<0.05). Upper extremities, finger, lower extremities of Brunnstrom Stage did not change significantly (P<0.05). Barthel Index changed significantly as follows, total score, transfer, toileting, bathing, walking, stair climbing, dressing (P<0.05). FIM changed significantly as follows, total score, motor FIM, body wiping, upper extremities dressing, lower extremities dressing, toilet transfer, bathroom transfer, stair climbing, understanding, memory (P<0.05). *Conclusion*: Although Modified-Rankin Scale, Brunnstrom Stage, Hasegawa Dementia Scale-Revised, and Independent Scale for Dementia did not change, Barthel Index total, its items, FIM total, subscales and its items change especially relatively difficult items. These results suggest that the public independent-living training centers have ability of ADL improvement and social life independent for the home-based stroke survivors.

PD1239

Community-Based Rehabilitation Needs in Wuhan, China

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Introduction: Due to the ongoing increase in the aging population, along with the co-existing chronic, disabling conditions, there is a need to develop community-based rehabilitation services in China. As an exploratory study, we decided to determine and analyze the rehabilitation needs among five community health centers by surveying health care providers and community residents in the city of Wuhan, which is the most populous city in Central China with a population of 10,220,000 as of 2013. *Methods*: A group of national and international rehabilitation experts designed the questionnaire based on the major rehabilitation topics outlined by the American Board of Physical Medicine and Rehabilitation. Respondents included leaders in 5 community health centers in Wuhan, 29 representative health care providers, and 42 community residents. *Results*: The major findings are summarized as follows: (1) There are no licensed therapists in any of the five community health centers. (2) Among 29 community health providers, 24 of them rou-

tinely provide traditional Chinese rehabilitation services. (3) The 29 community health providers expressed inadequacy in rehabilitation knowledge and skills. Their average self-rated score of basic rehabilitation knowledge is 3.63 out of 10. (4) Most services offered by community health providers are related to chronic conditions such as pain and complications of stroke. Most health providers refer to traditional Chinese medicine as part of the rehabilitation services. (5) Pediatric rehabilitation and cardiovascular rehabilitation are not provided in the community. **Conclusion:** The results in this study provide a glimpse of the rehabilitation needs in Chinese community health centers. With the blooming economy, purchase of modern rehabilitation equipment is becoming less of an issue. The pressing topics that need to be addressed are: (1) how to provide a proper pathway for training and credentialing of rehabilitation professionals, including physicians, physical therapists, occupational therapists, speech therapists, and rehabilitation nurses. (2) how to incorporate traditional Chinese Medicine into the rehabilitation services, especially in pain and post-stroke management.

PD1240

A Service Evaluation to Establish the Prevalence of Neutropenia in Patients Admitted to the Neurorehabilitation Ward

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Introduction: Neutropenia is an indicator of susceptibility to infection. Neutropenia can be graded from 1-4. Grade 1: ≥ 1.5 - $< 2.0 \times 10^9/l$, Grade 2: ≥ 1.0 - $< 1.5 \times 10^9/l$, Grade 3: ≥ 0.5 - $< 1 \times 10^9/l$, Grade 4: $< 0.5 \times 10^9/l$. The aim of this study was to identify the prevalence of neutropenic patients in a neurorehabilitation ward. **Methods:** A retrospective case series analysis of inpatients in a neurorehabilitation ward from October 2013 to May 2014. Patients with a blood test result showing neutropenia were identified. Electronic case record documentation of neutropenia, causative factors and management of the neutropenia was analysed. **Results:** 63 patients were analysed. 12 patients had a blood test result showing neutropenia. 2 patients had grade 1, 5 patients had grade 2, 5 patients had grade 3 and none had grade 4. Causative factors were documented in 6 cases: 4 were drug related, 1 related to sepsis and 1 had no particular cause. The management in these 6 documented cases were: 1 was started on antibiotics to treat sepsis, 1 had gabapentin reduced, 1 had sodium valproate reduced, 1 had anti-retrovirals changed and 2 were monitored. The majority of patients with neutropenia (11/12) were on medications likely to cause neutropenia with 75% on anti-epileptics. 33% of patients were on more than one anti-epileptic. 4 cases of neutropenia resolved spontaneously, 5 patients were discharged with neutropenia and 3 patients improved after medication changes. **Conclusion:** Neutropenia is a common finding in a neurorehabilitation setting with a 19% prevalence in this sample. Rehabilitation Physicians should be mindful of this amongst their patients and the specific causative factors in particular medication including antibiotics, anti-epileptics and antiretrovirals. In this study population there were no significant adverse outcomes recorded however we did not have any patients with a grade 4 neutropenia. It could be argued that appropriate management steps prevented further deterioration of neutrophil levels however in 4 cases neutrophil levels resolved spontaneously. To improve practice a structured ward round has been implemented. This routine review of investigations and medications will allow neutropenia to be detected early and managed.

PD1241

Quality of Compound Health Rehabilitation Service; Client Satisfaction Study

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Background: Quality of care is of a major concern of healthcare providers. However, satisfaction, as a multidimensional concept, of consumer of provided service is an important outcome measure that reflects the level of quality of the service. It helps determine the gap between practice and expectations of provided service. Although compound health rehabilitation service is running in Saudi Arabia over 30 years no previous study has been conducted to investigate the quality of the service provided. **Materials and Methods:** 179 male and female subjects aged 18 - 80 years (mean \pm SD, 42.6 \pm 16.8 years) who received compound health rehabilitation program in any of its four forms; physiotherapy, occupational therapy, speech and hearing therapy or prosthetic and orthotics services, at least for three consecutive sessions, completed and returned the Client Satisfaction Questionnaire (CSQ-8) at Rehabilitation Center, Taif, Saudi Arabia. The CSQ-8 consists of 8 items that is rated on Likert Scale from 1 to 4 with total scores of 32. For each item, the response was expressed as "Strongly agree", "Agree", "Agree somewhat", "Disagree somewhat", "Disagree", and "Strongly disagree" matched to their equivalent score 1-4. **Results:** High satisfaction levels were scored by respondents, 86.1% (Mean \pm SD, 27.5 \pm 4.3). The highest was scored for Q8 (returning to the center in future) with 93.9% (Mean \pm SD, 3.8 \pm 0.6) while the lowest was scored for Q3 (meeting client needs) with 77% (Mean \pm SD, 3.1 \pm 0.7). The orthotics has the highest score and physiotherapy has the lowest score with no statistical significance $r=0.097$, $p>0.05$. The satisfaction level was increased with age but it was not statistically significant $r=0.73$, $p>0.05$. Females scored higher satisfaction levels (86.3%, mean \pm SD, 27.6 \pm 4.2) than males (85.9% mean \pm SD, 27.5 \pm 4.2) but not statistically different $r=0.83$, $p>0.05$. **Conclusion:** This study showed that compound health rehabilitation service possesses high satisfaction level in all of its categories. The orthotics service scored the highest level of satisfaction. Females and older clients were more satisfied than males and younger populations.

PD1242

Patients with Medically Unexplained Physical Symptoms; the Response to Inpatient Rehabilitation

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Introduction: Prospective observational study. The aim is to assess the effects of inpatient rehabilitation on patients with medically unexplained physical symptoms. **Materials and Methods:** Between November 2007 and October 2009, 10 patients with physical symptoms, primarily gait impairment but without any neurological or musculoskeletal diagnoses, were admitted to a regional rehabilitation department. The main therapy module was multidisciplinary team input focusing on consistent behavioral reinforcement and function-focused therapy. Psychological therapy was offered to all patients. Functional Independence Measure (FIM) was used to assess response to inpatient therapy. **Results:** Mean age was 40 (23-57). Nine female. All patients had abnormal gait. Additional unexplained symptoms in some patients included high tone, tremor, pain, weakness, and numbness. Mean length of stay was 22 days (2-50). Median FIM improvement was 7 points (0-23). FIM improved in 7 patients by ≥ 5 points. FIM did not change in 3 patients: one refused any therapy and self discharged at two days; another self discharged after one week for social reasons; and the last patient's FIM did not change because of a ceiling effect. None of the patients fully accepted medically unexplained physical symptoms as a diagnosis and only 3 patients agreed that psychosocial factors had an influence on their ongoing symptoms. One patient agreed to have psychological therapy. **Conclusion:** Most patients improved during inpatient admission despite not accepting the diagnosis of medically unexplained physical symptoms. Further research on how these patients behave in the community after discharge may be recommended.

PD1243

US Health Care Changes: Opportunity and Challenge for PRM Specialists

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Introduction/Background: The population demographics show that 20% of the US population will be 65 or older by 2030 from 14.1% in 2013. Within this age group, 37.9% group reports some type of disability requiring adaptive equipment or limiting activities. This segment accounts for greater health care costs than the rest of the population. The Affordable Care Act (ACA) of 2010 was intended to reduce health costs, in part with the introduction of accountable care organizations (ACOs). Psychiatrists are uniquely positioned to have a major role in this new structure; however fewer new United States (US) psychiatrists engage in the care of persons with long term disability. **Materials and Methods:** The senior author provided information for this abstract based upon his involvement in adapting to the evolving changes in US health care. In addition, the junior author supplemented the observations of both authors through a literature search. **Results:** There is an ongoing shift in reimbursement from fee-for-service/volume based to a value/outcome based model. This is partially evident by the sharp increase in the number of ACOs from 114 in 2012 to 366 in 2014. Health care costs grew by only 1.3% per year since the ACA was passed. There has been an increasing US trend towards graduating psychiatrists who pursue musculoskeletal and pain fellowships and away from management of complex disability. However, compensation for interventional spine procedures has fallen by 23 to 58% during this same period, partially driven by the lack of evidence demonstrating their efficacy. Reimbursement for ultrasound guided injections has also been significantly reduced. **Conclusion:** Since the ACA was implemented, rate of growth of health care costs in the US have fallen to historic lows. The psychiatrist, being broadly trained to manage both neuromuscular dysfunction and restorative function will play an instrumental role in the care of patients and their cost management. Increased sub-specialization could lead to a deficit of psychiatrists to manage patients with complex, life-long disabilities. As the landscape of reimbursement changes, incentives may sway the current tide of specialization. Psychiatrists will need to partner with primary care physicians within ACOs to maximize their utility in this new health care environment.

PD1244

The Formulation of Novo-Design Electronic Neurorehabilitation Census Board and its Impact on Efficiency Quality Metrics of the Acute Stroke Care Pathway

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Introduction: The efficacy of acute stroke management is largely predicated by the minimization of the time to treatment of the stroke pathway. This study presents a unique solution to avoidable barriers to effective stroke care. **Methods:** We created the Neurorehabilitation Census Board (NRCB), a bipartite electronic communication system combined with protocolized multidisciplinary communication and systems planning to address various barriers to discharge. The overall aim was the identification of accessible limitations to the stroke pathway. Given the stroke management pathway implemented multiple diagnostic tests, we configured the NRCB system implementation to target decreasing imaging attainment delays by at least 10%. We implemented this system over 2 neurology floors in a 953-bed teaching hospital March-June 2014. **Results:** NRCB system quickly resulted in the earlier performance of diagnostic imaging over the 3 months of observation. There were a total of 333 tests. There was a rapid increase in early performed TTE scans from 40.91% to 57.58% in first month, and a decrease in 1-day delays from 34.09% to 30.30% and 2-day delays from 25% to 12.12%. By the last month, 91% of TTEs were performed within 24 hours. Compared to 2013, early TTE performance improved by 28.27%

and 2-day delays decreased 28.27%. Delays in TTEs performed ≥ 72 hours decreased by 30%. **Conclusions:** NRCB resulted in faster attainment of imaging tests in our hospital system, a necessary step towards our stroke pathway improvement.

PD1245

Changes in Health-Related Quality of Life (HRQoL) During Inpatient Orthopedic Rehabilitation

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Introduction: Physical rehabilitation after orthopedic surgery is vital to regain full or partial abilities such as health-related quality of life (HRQoL) or mobility as patients were used to before. Especially amputees when arriving to rehabilitation report many deficits in activities of daily living. Not only physical health is impaired and needs to be recovered but also mental health. The current study aim is to analyze whether the rehabilitation stay of minimum 3 weeks and maximum 6 weeks would influence the HRQoL of orthopedic patients, especially amputees. Amputees are being compared with non-amputated orthopedic patients (same rehabilitation stay conditions as amputees). Differences between the two groups regarding HRQoL, mobility and depression are being analyzed in a pre-post measurement. It is presumed that the overall HRQoL and mobility increase during rehabilitation stay, whereas depressive symptoms decrease. **Material and Methods:** 102 patients of Orthopedic Rehabilitation Center Zicksee (Austria) are being tested throughout their consecutive stay between May until December of 2014. The experimental group is consisting of 50 amputees, the control group is consisting of 52 non-amputated orthopedic patients. Patients of both groups are being selected randomly. As testing and questionnaire tools, following tests were chosen: SF-36, EQ-5D, FKKS, BDI-II, VAS-Scales, such as different mobility tests (i.e. timed-up-and-go test, 6 minutes walking test, 10 meters distance test). All subjects are over 18 years age, the mean age being 63.1 years (SD=13.1). For statistical analyses, *t*-tests such as repeated measures ANOVA and multiple regression analysis are being used. **Results:** Preliminary outcomes show significant changes in pre-post HRQoL, mobility and depression in both groups. As expected, non-amputated patients show in general higher results at the beginning compared to amputees. More detailed and further results are being analyzed after completion of the study. **Conclusion:** The study aim is to assess the different outcomes of orthopedic patients regarding HRQoL and mobility during physical rehabilitation. The study shows major improvement in all categories, the final results are still being analyzed. Only short-term outcomes can be evaluated, yet, a wide range of measures enables a detailed picture of the importance of a holistic rehabilitation process.

PD1246

Prevalence of Acute PRM Needs in a General Hospital

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Introduction/Aim: To study the prevalence of acute Physical and Rehabilitation Medicine (PRM) needs in a general hospital. **Material/Methods:** Assessment of patients' files in every department of a general hospital with 607 active beds by a team of PRM doctors in a period of a few days and a follow-up assessment at 3 and 6 months. The following parameters were assessed: Communication, respiratory and cardiovascular system, mobility, bowel and bladder dysfunction, and pressure ulcers. Patients with potential rehabilitation needs were clinically assessed and classified in groups according to their rehabilitation needs. The different levels of acute and post-acute PRM settings were defined according to the special report of UEMS-PRM section. **Results:** We studied 458 files of patients hospitalized at the time, 84 patients (18.34%) were considered in need of rehabilitation management and were clinically

assessed. Forty-four males and 40 females, with mean age 66.9y. Reason of admission: Stroke 9.52%, Neurological Disorders 5.95%, Trauma 22.62%, Infections 7.1%, Tumors 26.19%, Elective surgery 13.09%, Gastrointestinal bleeding 4.76%, Cardiac/Respiratory/Renal failure 3.57%, Electrolyte Disorders 2.38%, Ruptured Aneurysm 4.76%. Eight patients had no need for PRM intervention. The rest 76/458 patients (16.59%) were grouped according to their PRM needs in Group A: inpatient PRM setting in the acute hospital: 7/76 patients (8.3%), Group B: mobile visiting PRM team: 68/76 patients (89.47%). Group A and B patients were classified according to their post-acute rehabilitation needs. Three patients (3.94%) had no need. The rest 73 patients should have access in post acute rehab department and day clinic by 19.17%, in home and community based rehabilitation by 64.38% and in institutions for chronically ill by 16.43% of patients. *Conclusion:* Patients should have access to appropriate rehabilitation services as soon as possible. The early PRM assessment has an impact on secondary and tertiary prevention (i.e. complications and rehabilitation outcomes). In our hospital 16.59% of patients needed PRM consultation in acute phase. The inpatient PRM setting in the acute hospital and the establishment of a mobile visiting PRM team is necessary in order to accelerate the rate of recovery and result in earlier discharge from hospital.

PD1247

Implementing Rehabilitation Processes through the Rehabilitation Information System IASIS (HIS)

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Introduction/Background: IASISNet is a powerful Hospital Information System (HIS) which is established on the rehabilitation center of EUROMEDICA AROGI, in Greece, during the last 4 years with remarkable results. The central idea of IASISNet for the rehabilitation is to supplement the effort of the medical personnel by continuously monitoring the patient progress together with the accurate tuning of the rehabilitation procedures. *Material and Methods:* IASISNet with the experience of over 6,000 hospitalizations during the last 4 years in EUROMEDICA AROGI, has developed certain special “tools” which control the therapeutic procedures. *Results:* “Notes” are the place where the medical and therapeutic staff records every medical treatment or session. Apart from these memos, IASISNet additionally combines “evidences”, such as photos. All these memos with “evidences” could be emailed to the involving medical staff inside or outside of the rehabilitation center. After the first “note” of the initial evaluation, physiatrist plans a detailed “Therapeutic Schedule” for the patient according to the severity of his case. IASISNet monitors the accuracy of schedule execution. “Team meeting” is the concurring moment when the involved medical and therapeutic staff is gathered to discuss about patient’s therapy progress. IASISNet helps all team members to organize and group the collected data, mainly the medical memos of each patient. During the “team meeting” the physiatrist plans the therapeutic program of next week. “Messages & Instructions” are direct orders (or reminders) referring each time to a certain patient. They consist an early warning system, functioning as a safety net and a security shield for the information distributed among the medical staff. Finally, IASISNet has developed several “methods” to log easily different functionality and medical progress scales, such as FIM, ASIA etc. *Conclusion:* It is understandable that the system provides managers and physiatrists with an advanced tool to organize and supervise their medical and therapeutic staff and to get the information needed regarding a patient’s treatment progress, fast and with accuracy, improving the overall rehabilitation performance. The example of the rehabilitation center EUROMEDICA AROGI, can be describe as a successful case of the functionality of IASISNet within the complicated and demanding environment of a rehabilitation clinic.

PD1248

Improving Rehabilitation Medical Leadership and Teamwork

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Introduction/Background: Team based is recognized and accepted as a pillar in physical and rehabilitation medicine service delivery, and an extensive literature supports its superiority over non-team care. Still, the fragmentation of existing knowledge and limited use of relevant models inhibit efforts to study rehabilitation systems and services. This study offers insights from the fields of organizational behavior and leadership development to improve service delivery. *Materials and Methods:* Two experts in leadership development and teamwork reviewed the conceptualization, development, application, refinement, and validation work done by Strasser, Falconer, and colleagues over a 25 year period with a particular emphasis on a leadership development intervention of a successful randomized clinical trial. Drawing on recent work on leadership development in health systems and services research, we offer themes to guide efforts towards understanding and improving team based service delivery. *Results:* Four practical observations emerged. 1) Models depicting the patient-care/teamwork nexus provide a mental map, a common language, a structure to facilitate the collection and interpretation of data, and a decision framework for the continuous improvement of services. 2) Interdisciplinary team functioning leverages the shared experience and multiple perspectives of a rehab team. 3) Leadership integrates and focuses team expertise. And 4) Performance feedback is essential for learning and iterative improvements. In terms of leadership development and team functioning improvement interventions, we concluded with three observations. 1) Expectations and preparations matter. 2) A leadership and teamwork intervention should model the model. 3) Reinforcements of information gained and actions taken promote successful interventions. *Conclusions:* Leadership effectiveness and improved teamwork in rehabilitation is an iterative process of continuous improvements culminating overtime in improved patient care and outcomes. *References:* 1. Smits S.J., Bowden D.E., Falconer, J.A., and Strasser D.C. Improving Medical Leadership and Teamwork: An Iterative Process. Leadership in Health Services. In Press 2014 (Early release available online), Leadership in Health Services; vol 27, Issue 4 (Manuscript ID: LHS-02-2014-0000). 2. Strasser DC, Falconer JA, Stevens AB, Uomoto JM, Herrin J, Bowen SE, and Burrigge AB. (2008) Team Training and Stroke Rehabilitation Outcomes: a cluster randomized trial. Arch Phys Med Rehabil 2008; 89:10-5.

PD1249

Sustained Rehabilitation: Maintaining Continuity of Care after Official Rehabilitation Services

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Introduction: Once official/institutional rehabilitation training is completed, adhering to recommended healthy physical activity guidelines can be difficult for individuals with spinal cord injury, stroke or other paralytic conditions. In the United States “The Americans with Disabilities Act (ADA) of 1990” mandates that public facilities including community fitness centers be accessible to everyone equally. However, questions remain about the level of accessibility and accommodation of individuals that are wheelchair reliant. Because access to appropriate exercise facilities is essential for sustaining long term rehabilitation and wellness we studied the level of accessibility and accommodation of fitness facilities in a southeastern U.S. metropolitan area. *Methods:* An 82-item checklist was used to survey community fitness facilities in a southeastern U.S. metropolitan area to determine the level of accessibility and

accommodation of individuals that are wheelchair reliant. **Results:** All participating facilities were found to be partially compliant, with none of the facilities being 100% compliant. The areas of least compliance were access to exercise equipment, a shortage of adaptive exercise equipment suitable for individuals in wheelchairs, and a lack of staff members trained in the special needs of individuals with paralytic conditions. **Conclusion:** A better understanding of how to decrease barriers to access and improve education concerning the special needs of those with paralytic conditions is required to improve long term continuity of care. Additionally, increased awareness of available adaptive equipment designed to accommodate individuals with paralysis and wheelchair reliance is needed to allow community fitness centers to provide appropriate exercise equipment for individuals with paralytic conditions.

PD1250

Clinical Rehabilitation of West China Hospital for Functional Recovery of Lushan-Earthquake Fracture Victims

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Background: On 20 April 2013, an earthquake of magnitude 7.0 on Richter scale struck Sichuan Province of China and destroyed Lushan County. West China Hospital, the currently largest hospital in China, with 4,300 inpatient beds and the major referral center for complex health problems for Southwestern China, played a prominent role in rescuing casualties. However, specific data referring to its effectiveness of clinical rehabilitation for functional recovery of fracture victims has not been systematically summarized. Thus we retrospectively evaluated the functional recovery of inpatients with fractures who survived the Lushan-earthquake. **Material and Methods:** Fracture victims transferred to West China Hospital from the stricken area were all included. Those received comprehensive early postoperative rehabilitation were regarded as the intervention group while those did not were treated as the control group. Functional recovery was defined as improvement in functional status on discharge, compared with admission. The focused measurements included muscle strength (Manual Muscle Testing method), range of motion, pain intensity (visual analogue scale), activities of daily living (Modified Barthel Index) and health-related quality of life (Medical Outcomes Study Short-Form 36). **Results:** Three hundred and fifty-one fracture victims were identified. Two hundred and forty-six received comprehensive early postoperative rehabilitation intervention while the remaining one hundred and five did not. Baseline characteristics were comparable between the two groups ($P>0.05$), referring to patients' ages, sex distribution, marital status, level of education, annual income, type of injury, transit time, muscle strength, range of motion, pain intensity, activities of daily living, health-related quality of life, etc. As for functional recovery, group differences in muscle strength, range of motion, pain intensity, activities of daily living, health-related quality of life were all significant ($P<0.05$) in favor of the rehabilitation group, which were adjusted for immobilization duration, the numbers of days in hospital, as well as baseline characteristics. **Conclusion:** Clinical rehabilitation made a difference for functional recovery of Lushan-earthquake fracture victims. Early aggressive rehabilitation after surgery should be paid much attention to in responding to this sort of disasters to optimize functional recovery of survivors. **Keyword:** Earthquake; Disasters; China; Rehabilitation; Function.

PD1251

The Development in Rehabilitation Strategies for Earthquake Fracture Victims in West China Hospital: a Comparative Study of Yushu Versus Lushan Earthquakes

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Background: Earthquake is one of the most devastating natural disasters. It not only threat human lives, but also could lead to significant disabling impairments. The latter should be paid much attention to since disability could substantially affect quality of life, contributing heavy burden on the society and individuals. However, traditionally health-related rehabilitation strategies were often neglected in response to natural disasters. So we designed this research, comparing rehabilitation treatments in West China Hospital (the currently largest hospital in China, with 4,300 inpatient beds and the major referral center for complex health problems for Southwestern China, played a prominent role in rescuing casualties) for fracture victims in Yushu (2010) and Lushan (2013) earthquakes, to explore the development in post-earthquake rehabilitation strategies. **Material and Methods:** We included all fracture victims transferred to West China Hospital from the two stricken area. Medical records were retrospectively reviewed and compared, focusing on the applied rehabilitation treatments. **Results:** The difference between the percentages of fracture victims from the two earthquake-stricken areas receiving relevant rehabilitation treatments was significant ($P<0.05$). Furthermore, for fracture victims from Lushan, early postoperative rehabilitation was implemented much better ($P<0.05$), especially for those transferred to the department of rehabilitation medicine, receiving comprehensive rehabilitation intervention, which included physical therapy, occupational therapy, psychological rehabilitation and rehabilitation engineering, etc. These treatments were chose by exhaustive evaluation regarding the clinical features, dysfunction, activities and participation status. **Conclusion:** After three years, in response to devastating earthquakes, there is a significant development in employing rehabilitation strategies for fracture victims in West China Hospital, indicating a transform and improvement in medical response to natural disasters. **Keyword:** Earthquake; Disasters; China; Rehabilitation strategies.

PD1252

Rehabilitation Outcomes in the Phoenix Rehabilitation Centre

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Background: Rehabilitation is a goal-directed process which reduces impact of long-term conditions on daily life. The Phoenix Rehabilitation Centre (PRC) is a 'spoke unit' providing active rehabilitation with 15 inpatient beds in a rehabilitation pathway across Cheshire and Merseyside, Liverpool, England. This review aims to identify patient groups and their rehabilitation outcomes comparing levels of functioning on admission and discharge using Functional Independence Measure/Functional Assessment Measure (FIM/FAM). FIM/FAM is an internationally recognised clinical outcome measure of both cognitive and motor functional state comprising 30 items across a range of disciplines including mobility, cognitive and social abilities. **Methods:** Retrospective study of 97 patients admitted and discharged over a 17 month period. Patients were classified as; Neurology, Trauma or other, based on the aetiology of their underlying condition. Information was collected on diagnosis, FIM/FAM, age, length of stay and discharge destination. **Results:** The neurology group was composed of 48 of patients, ranging from age 20 to 82 (mean 53). Length of stay was mean 62 days, with one patient staying 202 days. Mean FIM/FAM score on admission was 146, which improved an average 53 points. 2 patients improved by 148 points. 92% of patients in this group were discharged home, 3 patients were transferred to another Hospital, 1 patient went to a nursing home. 42 trauma patients, age 16 to 95 (mean 59) stayed for mean 62 days (longest 180). FIM/FAM improved an average of 63 points, from baseline of 138. 93% were discharged home, 2 patients required transfer to another Hospital and 1 discharged to a nursing home. The 'other'

category included 6 patients with conditions including general deconditioning, amputations and conversion disorder. Age between 19 and 76 (mean 46), staying for 45 days on average, (longest 71) these patients improved 57 points on the FIM/FAM scale, from a mean score of 123 on admission. 100% of patients went home. *Conclusion:* Rehabilitation at the Phoenix centre is associated with favourable outcomes in all patient groups. This is reflected by the vast improvements in FIM/FAM scores during admission, and the high percentage of patients discharged home.

PD1253

Demand-Adequate Rehabilitative Care of Migrants

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Introduction/Background: Despite an increased demand migrants in Germany participate medical rehabilitation of the German Pension Insurance less than persons without migration background [1]. Within the project “MiMi (With Migrants for Migrants)-Rehabilitation: Implementation and evaluation of an offer of information for migrants about medical rehabilitation on the basis of ‘MiMi-campaign technology’” we are aiming for strategies to decrease access barriers for migrants to the medical rehabilitation of the German Pension Insurance we identified before. *Material and Methods:* To identify access barriers six focus groups were conducted (according to a manual, sound recorded and subsequently transliterated): Two groups of German-speaking migrants with rehabilitation-experience, added three groups with migrants without rehabilitation-experience (respectively one German-, Russian- and Turkish-speaking group). Focus groups took on average 90 minutes, 7-14 persons participated. The Data were examined by qualitative content analysis using software MAXQDA. The results were used to generate a guide for migrants in the medical rehabilitation of the German Pension Insurance to support demand-adequate rehabilitative care of migrants. *Results:* We identified system- and person-related barriers, which were partially migrant-, class- or gender-specific. Further analysis revealed that single barriers can interact and form complexes of barriers. We identified four complexes: 1) Language, 2) Knowledge, 3) Religion, Culture, Social Environment, 4) Discrimination. We considered them generating the guide, which will be translated in Russian and Turkish. *Conclusion:* The Outcome of the focus groups shows a demand on culture-sensitive and multilingual informative literature for migrants to reduce access barriers for migrants in medical rehabilitation of the German Pension Insurance. The generated guide can contribute to demand-adequate rehabilitative care of migrants. *References:* 1. Razum, O., Voigtländer, et al. (2009): Medizinische Rehabilitation für Personen mit Migrationshintergrund – Zwischenergebnisse eines Forschungsprojektes im Auftrag des Bundesministeriums für Arbeit und Soziales. In: Bundesministerium für Arbeit und Soziales (Hrsg.): Gesundheitliche Versorgung von Personen mit Migrationshintergrund. Berlin: Bundesministerium für Arbeit und Soziales. 36-52.

PD1254

New Approach to the Therapy of Lobular Panniculitis

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Lipodermatosclerosis (LDS) is mostly lobular panniculitis (LP), happens mostly within women of middle age, who are overweight and suffer from chronic venous insufficiency. *Objective:* to evaluate the efficiency of mesotherapy (MT) and ultrasonic shock-wave therapy (UST) when LDS. *Methods:* within 467 patients diagnosed “erythema nodosum” or “panniculitis” there was found LDS within 9.9% (46) patients (female-44, male-2) at the age of 18-82 years

old with excessive body weight (32) with average duration of the disease 11.8±6.4 months. Patients were randomized on 2 groups, each consisted of 23 patients. The 1st group was given treatment of MT with homeopathic preparations, which were antioxidants, anti-inflammatory medicines, had lymph drainage and lipolytic action (manufacturer is HEEL, Germany) 8.0 ml No.10 and UST of 3 MHz frequency twice a week No.5 applied for induration area. The 2d group, placebo-controlled, was given treatment of MT with 0.9%-8ml normal-saline and non-operating UST. Monitoring methods consisted of general examination: assessment of bodily pain under VAS, characteristics of induration on anticnemions, clinical blood and urine analysis, ultrasonic investigation with elastography (USIE) of the induration. Main stages of monitoring: initial (T0), within 14 days (T1), 1 month (T2) and 3 months (T3). *Results:* all the patients of the 1st group showed improvement after physiotherapy: bodily pain under VAS (T0 50±18 mm; T1 35±11 mm), decrease of diameter (T0 6±2.2 sm; T1 4.5±1.7 mm) and intensity of induration color (p<0.002), decrease of blood sedimentation rate, C-reactive protein and thickening of subcutaneous fat in the way of «stones» with micro-vascularization when USIE. In 43% of cases treatment effect increased by T2 (p<0.05). Within 3 months of investigation 15 patients needed the repetitive course of physiotherapy. In the 2 d group improvement was noticed by T2 within 11 patients and by T3 within 16 patients (p<0.05). MT and UST were well accepted by patients and adverse reactions were not noted. *Conclusion:* MT and UST allowed to reach an improvement within LDS patients.

PD1255

Transition from Hospital to Community: Experiences of Adults with Traumatic Brain Injury, a Qualitative Research

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Introduction: It is estimated that half a million people in the UK are currently living with long term disability stemming from a traumatic brain injury (TBI). Due to improvement in acute management, more TBI patients are surviving and needing in-patient neuro-rehabilitation. A care pathway is being planned to streamline services across the County of 2 million populations. Literature suggests that the initial period of transition to community is a time when individuals with TBI and their carers feel particularly unsupported. There appears to be a gap in the literature as to what is most beneficial to individuals during this transition. This pilot project aimed to explore with service users and carers their experiences of the transition from inpatient rehabilitation into their community to identify perceived gaps in services, what interventions they valued and their perceptions of how this transition could be better supported. *Methods:* Semi-structured interviews were carried out one month post-discharge with adults admitted to the East Kent Neurorehabilitation Unit with severe TBI. Ten consecutive patients and their carers were interviewed in their own home. Thematic analysis (Braun & Clarke, 2006) carried out by two independent researchers. *Ethical Approval:* NRES Committee London City & East, 13/LO/0117. Funding: KE Project Local Award, CCCU. (Canterbury Christ Church University and East Kent University NHS Hospitals) *Results:* Participants are struggling with emotional and practical adjustment and community support appears to be limited or even absent. Problems include insufficient guidance; lack of meaningful activities and a sense of isolation and fear for the future. These findings are consistent whether patients move via Independent Sector based institutions or moves to home direct from hospital. Lack of enabling service users to participate in meaningful goal-directed activities despite investments into Independent sectors to facilitate discharge from hospital based specialist Rehab Unit. *Conclusions:* Inadequate community services and poor communication within and between statutory and voluntary services results in lack of continuity of care and needs to be addressed in the commissioning strategy. Improving quality of service

should be underpinned by improving carer/patients' experience. *References:* Braun, V. & Clarke, V. (2006) Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2): 77-101.

PD1256

Outcome Comparison between Early and Late Rehabilitation in Stroke – a Prospective Cohort Study in Bangladesh

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Introduction: Stroke is a leading cause of disability in Bangladesh (BD). Many investigators have argued that early rehabilitation could maximize recovery from stroke. No such data is available for BD. Aim is to examine the improvement with early and delayed initiation of rehabilitative intervention among the ischemic patients after ischemic stroke. 3 groups of patients depending on commencement of Rehabilitation: *Methods:* Data was collected prospectively for 12 months in 2012 in this multi-centre study in Bangladesh after obtaining IRB approval and consent from patients. 4 groups of patients depending on commencement of Rehabilitation: a) *Very Early:* 0-24 hrs post stroke b) *Early:* 24-72 hrs post stroke. c) *Intermediate:* 3-7 days post stroke d) *Late:* 8-60 days post stroke. *Dependent variables:* NIH Stroke Scale, Spasticity, Inattention, Urinary incontinence. *Independent variables:* Age, Sex, occupation, Height, Weight, Body Mass Index, Site of lesion, Duration of stroke, co-morbidity, rehabilitative interventions, NIH score. (1st, 3rd & 12 wks) *Results:*

	Incidence, N=235 (%)	Mean, SD
Age, <60Y/>60Y	100 (42.6%)/135(57.4%)	63.09, 15.430
Sex, Male/Female	120 (51.1%)/115 (48.9%)	
Dominant hand, Left/Right	0(0.0%)/235(100.0%)	
Type of Stroke	n=235	
Ischemic Stroke	165 (70.2%)	
Hemorrhagic Stroke	70 (29.8%)	
Co-morbidity		
Diabetes Mellitus	90 (38.3%)	
Hypertension	225 (95.7%)	
Ischemic Heart Disease	10 (4.3%)	
Chronic Kidney Disease	0 (0%)	
Duration between stroke and rehabilitation initiation		
Very early	40 (17.0%)	
Early	100 (42.6%)	
Intermediate	55 (23.4%)	
Late	40 (17.0%)	
NIHSS Score (n=235)		
Mild (1-7)	50 (21.3%)	
Moderate (8-16)	140 (59.6%)	
Severe (>16)	45 (19.1%)	
Modified Barthel index (n=235)		
Total Dependence	130 (55.3%)	
Severe Dependence	95 (40.4%)	
Moderate Dependence	10 (4.3%)	

Duration between Stroke and Rehab Initiation cross tabulation with Berg Balance Scale after 12th week. SD: Standard deviation.

Berg Balance Scale (n=220)				
Duration between Stroke and Rehab Initiation	High Fall Risk (0-20)	Medium Fall Risk (21-40)	Low Fall Risk (41-56)	Total
Very Early	0	10	15	25
Early	15	25	60	100
Intermediate	10	30	15	55
Late	0	25	15	40

Conclusion: limited evidence exists about early initiation of rehabilitation in Bangladeshi cohort

PD1258

Strengthening the International Perspective of Rehabilitative Care and Rehabilitation Research in Germany through the Development of an International Research Network

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Introduction/Background: Rehabilitation research in Germany is highly active and on an advanced stage of theoretical and methodological development. Compared to other disciplines, however, its international perspective is limited. This has theoretical, methodical and practical implications. For example, an international discourse in terms of health care theory and practice and comparative benchmarking analyses are important for quality assurance and health policy formulation. We propose an international research network which aims to strengthening the international perspective of rehabilitative care and rehabilitation research in Germany by bringing together senior and junior research from the field and giving them a platform for joint work and discussion. *Material and Methods:* The network will consist of interested researchers from Germany and other European countries. Its core activities will comprise two- to three-day workshops, which will take place twice a year focusing on different substantive or methodical topics over a funding period of three years. The workshops will comprise keynote presentations, discussion panels, and work in small groups covering the structural, procedural, functional and organizational characteristics of rehabilitative care as well as the scope, stakeholders, contexts and methods of rehabilitation research from an international perspective. For each of the workshops selected international experts in the field from European and other countries will be invited to join the network members for discussion and exchange. The workshop activities will be complemented by synchronous and asynchronous online activities facilitated by an online collaboration platform and e-conferencing software. *Results:* The results of the workshops will be disseminated by means of substantive and methodical contributions to international journals and conferences as well as by means of a joint handbook. In addition, activities will be documented on the online collaboration platform. *Conclusion:* A broader international perspective can benefit rehabilitative care and rehabilitation research in Germany in terms of theory, methods and practice. The activities of the research network will serve this purpose by contributing to the internationalization of rehabilitation research in Germany and to strengthening its international visibility. Both will promote exchange and collaboration between researchers in Germany and other countries and has the potential to develop a sustainable cooperation network that can continue to exist beyond the funding period.

PD1259

Socio-Economic Impact on Oral Health-Related Quality of Life of Parkinson's Disease Patients: Evidence from India

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Background: The severity of physical and mental impairments and oral problems, as well as socioeconomic factors, may have an impact on quality of life of Parkinson's disease (PD) patients. The aim of this research was to assess the impact of impairments and oral health conditions, adjusted by socioeconomic factors, on the Oral Health-Related Quality of Life (OHRQoL) of Parkinson's disease (PD) patients. *Objectives:* 1) To examine the characteristics of Oral Health-Related Quality of Life (OHRQoL) in Parkinson's disease patients using the OHRQoL instrument. 2) To assess the impact of impairments and oral health conditions, adjusted by socioeconomic factors, on the Oral Health-Related Quality of Life (OHRQoL) of Parkinson's disease patients. *Methods:* Sixty Parkinson's disease (PD) patients, between 55-74 years of age were selected attending Yenepoya medical college and Hospital, Mangalore. Their caregivers answered a OHRQoL instrument which combines the Parental-Caregivers Perception Questionnaire (P-CPQ) and Family Impact Scale (FIS) after obtaining Written informed consent from all the participants. The severity of dental caries, communication ability, gross motor function, seizures and socioeconomic conditions were assessed. *Results:* Considering the total score of the OHRQoL in-

strument, only the reduction of communication ability and dental caries severity had a negative impact on the OHRQoL ($p < 0.05$). Considering each domain of the instrument, the severity of the Parkinson's disease (PD) and its reduction of communication ability showed a negative impact on oral symptoms and functional limitations domains ($p < 0.05$). The multivariate fitted model showed that the severity of dental caries, communication ability and low family income were negatively associated with the impact on OHRQoL ($p = 0.001$). **Conclusions:** The severity of dental caries, communication ability, and family income are conditions strongly associated with a negative impact on OHRQoL of Parkinson's disease (PD) patients. All these conditions should be assessed before medical and/or dental treatment of the patients to prepare an appropriate treatment protocol and optimize oral health. Clinicians should routinely check patients' oral health in order to maintain high quality of life of Parkinson's disease patients. We suggest short and frequent dental visits for having high range attention of the Parkinson's disease patients.

PD1260

Knowledge, Attitude and Practice of Patients towards Orthodontic Treatment in Mangalore City

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Introduction: Patient's perspective and cooperation on treatment procedure and service is very important to evaluate the management system and success of the orthodontic treatment. **Objective:** To assess knowledge, attitude and practice of patients towards orthodontic treatment attending Yenepoya Dental College and Hospital, Mangalore. **Materials and Method:** A structured questionnaire comprising of fifteen questions in three sections was used among 147 orthodontic patients attending the Department of Orthodontics and Dentofacial Orthopedics, Yenepoya Dental College and Hospital, Mangalore. The knowledge, attitude and practice were assessed on Likert scale. **Result:** 85% of orthodontic patients possess good knowledge about ongoing orthodontic treatment; however about half of the patients are unaware about retainers. About 35% patients think that people wearing braces do not look good, 59% experience long waiting time, 25% feel time spent for procedure is inadequate and 68% believe orthodontic treatment is expensive; still 82% are happy about treatment outcome. Most of the patients brush and rinse more carefully, however 28.9% patients are careless about braces and 12.7% forget appointment dates. **Conclusion:** Knowledge regarding the duration of the retainers was observed to be inadequate. Improving the awareness amongst the patients in this area can help the patients to avoid complications later in the future. The practitioners should inform patients about retainers and be concerned about waiting time, procedure duration and cost of the treatment. The study highlights on the need for more active participation of the dentists and orthodontists to update them.

PD1261

Patient Call Bell System at a Level 1 Neurological Rehabilitation Unit: Staff Perception

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Objective: Patients admitted to Neurological Rehabilitation units in the United Kingdom are provided with a call bell system so that they can summon help when required. There are no national standards on the reasonable length of time for a call bell to be answered. The objective of this study is to understand staff perception on why patients use their call bell system and to ascertain the reasonable length of time for a patient to wait for a call bell to be answered? **Design:** An exploratory, qualitative study over 2 weeks involving feedback from neurological rehabilitation staff. **Setting:** Level 1 Neurological Rehabilitation Unit. **Participants:** Voluntarily participation staff. Main outcome measures: subject-

tive data about perception and opinions. **Results:** Staff members believe that patients use their call bell system for physical reasons like to use the toilet, for help with mobility, to get an item that is out of reach and due to pain or feeling unwell. Some patients can use their call bell for a life threatening condition like blocked tracheostomy tube. Patient's also use their call bell to seek psychosocial support for reasons like feeling scared, wanting to speak to someone and for reassurance. The reasonable length of time for a patient to wait for a call bell to be answered depends on the reason to use their call bell. **Conclusion:** Patients use their call bell system for physical and psychosocial reasons. There is no way to determine the urgency to answer a patient's call bell. In a Neurological Rehabilitation Unit a call bell should be answered immediately by any member of the multidisciplinary team, regardless of the reason.

PD1262

An Audit to Assess the Compliance of the Use of a Structured Ward Round Checklist within the Rehabilitation Medicine Department

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Background: The Royal College of Physicians and Royal College of Nursing published "Ward rounds in medicine: Principles for best practise" (WRIM), suggesting that the implementation of a structured ward round checklist, locally adapted, can reduce omissions in clinical care, improve patient safety and strengthen multidisciplinary (MDT) communication. (1) The structured ward round checklist version 1 (SWRCv1) was introduced in 2014 following its creation in 2013 by the MDT team. The aim was to produce a comprehensive SWRC specifically for the complex needs of rehabilitation patients and aiming for 100% compliance of its use. This audit was to evaluate the compliance of the use of the SWRCv1 within the rehabilitation medicine department (Ward 1, Ward 2 and Ward 3) at Salford Royal Foundation Trust. **Methods:** A retrospective review of ward round documentation via the electronic system during September 2014. All rehabilitation inpatients from Ward 1, Ward 2 and Ward 3 were included. Data was recorded for the use of the SWRCv1 and for the presence of information recorded under each heading. **Results:** The compliance rate of SWRCv1 on each consultant ward round were as follows: Ward 1 100%, Ward 2 98.8% and Ward 3 0%. The average percentage for the presence of information recorded under each heading was 88.9% on Ward 1 and 76.3% on Ward 2. **Conclusion:** The compliance rate for SWRCv1 use varied from 100% to 0%. SWRCv1 use led to a high percentage of completion of information under each heading. The quality of this information was not audited; a limitation of this review. The implementation of SWRCv1 increased compliance with the national guidelines WRIM and improved standardisation of consultant led ward round content. There is need for improvement; with the wards achieving a combined compliance of 66%. The recommendations to improve compliance include: SWRCv2 to be developed and its use to be mandatory across all 3 wards. Guidance for its completion to be disseminated to all members of the multidisciplinary team. Re-audit after the implementation of SWRCv2. **Reference:** Royal College of Physicians and Royal College of Nursing: Ward rounds in medicine. Principles for best practise. October 2012.

PD1263

Telerehabilitation Services in Pakistan: a Rehabilitation Professional's Perspective

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Introduction/Background: Physical Rehabilitation Services allows disables to restore their normal life and to play role in development of country. Use of Tele-Medicine for provision of rehabil-

itation services at community level is very in. This use of ICT brought a revolution in delivery of an efficient & cost effective rehabilitation services for the patients at Door Steps. Currently in Pakistan Physically Disabled community is much more than the WHO described ratio due to war against terror and high rate of rauma but there are very limited Rehabilitation Centers & Professionals available in the country. This study is aimed to assess the need and scope of Tele-Rehabilitation Services in Pakistan according to the Different Rehabilitation Professionals working in field. *Material & Methods:* Mixed Methodology (both Qualitative & Qunatitative) questionnaire filled out by different Rehabilitation Professionals working boht in Public & Private Sectors in Pakistan. *Results:* About 7% graded existing Rehabilitation Services System in Pakistan as v.poor while more than 30% graded as good. More than 20% graded existing number of Rehabilitation Centers as "Somewhat Satisfactory". Most of the participants were having good Computer Knowledge with significant knowledge about Telemedicine and Telerehabilitation. Almost 50% participant said that Telerehabilitation programs will be very useful in provision of Rehabilitation Services in Pakistan with maximum social acceptance and will reduce the disables visits to big cities. High cost of Technology & Lack of ICT knowledge may be limiting factors in Telerhabilitation Services. Data miss use, privacy and other risk factors are associated with Telerehabilitation Services and patient may have some limitation in developing good doctor, patient relationship. 40% participant suggest that only Consultation can be provided through Telerehabilitation Services while about 50% said that multiple type of services may be provided. *Conclusion:* In this study it is concluded that Telerehabilitation Services will be very useful and socially acceptable in Pakistan and will help to reduce per patient cost. Rehabilitation Professionals in Pakistan have good understanding of Telerehabilitation Services and according to them Telerehabilitation programs are need of time and will help them to reduce the burden on Teaching Hospitals for Rehabilitation Services.

PD1264

Design and Implementation of a Type of Comprehensive Rehabilitation Information Management System Based on ICF Framework and B/S Structure

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Objective: To design and develop a type of comprehensive rehabilitation information management system based on ICF framework and B/S structure, to promote the application of ICF concept in clinical practice of physical and rehabilitation medicine, to implement electronic data entry, retrieval, statistics, analysis, browsing and exhibition of rehabilitation medicine, to explore the rehabilitation team work model based on computer network and information technology, to improve the informational level of rehabilitative treatment. *Methods:* A distributed database system was designed and established after a systematic analysis of the rehabilitation work flow and the data need to be disposed, then we developed some appropriate application modules based on the database, such as treatment planning module, efficacy evaluation module, outcome prediction module and performance appraisal module. The ICF codes were used to classify and connect the core data, which makes the whole database to be a comprehensive and systematic cross-linked rehabilitation knowledge base. Ruby on Ralis framework and PostgreSQL database software were adopted as the development technologies. *Results:* The comprehensive rehabilitation information management system was successfully developed and tested in the local area network (LAN) of China Rehabilitation Research Center (CRRC). *Conclusion:* The comprehensive rehabilitation information management system based on ICF framework and B/S structure is feasible in theory and technology, the rehabilitation team work model based on computer network is help to improve work efficiency, the information technology tools can

be used to promote the application of ICF concept in clinical practice of physical and rehabilitation medicine.

PD1265

Effects of Home Rehabilitation Training Based on Body Sensor Networks on Activity of Daily Living in Hemiplegic Patients after Stroke

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Introduction/Background: To home rehabilitation training based on body sensor networks on activity of daily living in hemiplegic patients after stroke. *Material and Methods:* Forty-eight hemiplegic patients were divided randomly into treatment (n=24) and control (n=24) group. Both groups were treated with medicine and rehabilitation guide, the treatment group also was added with the home rehabilitation training, training lasted for 10~20 min/d, 6 d/week for 12 weeks. All patients were assessed with the Fugl-Meyer upper limb (FMA), modified Ashworth scale (MAS) classification and the modified Barthel index (MBI) at the time of beginning and 12 weeks later. *Results:* Before intervention, there were no significant differences between the two groups in any of the assessment, 12 weeks later, all the assessment scores obtained with the FMA and MBI in the treatment group were significantly better than those in the control group. *Conclusion:* The application of home rehabilitation training based on body sensor networks can distinctly improve the motor function of upper limb and activity of daily living.

PD1266

The Relationship between Physical Health-Related Quality of Life, Demands for Urban Development, and Usage of Public Transports among Dwelling Not-Homebound Elderly

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Objectives: Participating in social activities is good effect for elderly's health. The number of going out among homebound elderly is less than once a week, and he or she is the potential to need care and/or support in their daily life in the future. From these, participating in community activities is important for elderly's health as well as preventing becoming homebound elderly. The purpose of this study was to examine the relationships between physical health-related quality of life, demand for urban development, and usage of public transports among dwelling not-homebound elderly. *Methods:* All the study participants were 65 years and over of age (N=5,135) and lived in the city of Arakawa (population=212,000, rate of aging=23.8%, Tokyo, Japan). Questionnaires were inclusive of the Short Form-8 for HRQOL (SF-8), seven questions regarding the demands for urban development, and eight questions regarding the usage of public transports, and were sent to participants by mail. The response rate was 1,991. Only those classified as "not-homebound elderly" were included in the study, the subjects were 1,201. Subjects were divided into two groups by the results of PCS score of SF-8 using non-clustered analysis, namely high health group (n=731) and low health group (n=470). This study analyzed the demands for urban development and usage of public transports using analysis of chi-square test. Logistic regression was used to identify the relationships between physical HRQOL and the demands, and usage of public transports. *Results:* The results of logistic regression showed that the user of the JR East and Tokyo Metro that connect the center of Tokyo and suburb was significant relation to high health group. Also, the demand of increasing number of benches was significant relation to low health group. *Discussion:* This study indicated that usage of public transports and demands for urban development were relate to the characteristic of physical health-related quality of life among

the not homebound elderly. In other words, it was revealed that some of use situation and demands of the public transport was not related to physical HRQOL. This study indicated how the government should spend a budget preferentially.

PD1267

Prevalence and Factors Associated with Healthcare Service Use among Chinese Elderly with Disabilities

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Background: It is forecasted that persons aged 60 years and older will exceed 2 billion by 2050, approximating 21% of the world's population. Among them, persons living with disabilities were overrepresented. Ageing and disability would reduce the opportunities for social participations including healthcare service utilization among persons. However, demand for healthcare services among older population is expected to rise, especially among those who are living with disabilities. This study aims to estimate the prevalence rate and identify social demographic factors associated with healthcare service use among Chinese elderly with disabilities. **Material and Methods:** This study employed a nationally representative survey and defined healthcare service utilization as use of curative care, auxiliary aids, or rehabilitation services for elderly with disabilities (aged ≥ 60 years) in China. Population weighted numbers, proportions, and prevalence rates were calculated. Multivariate logistic regression was used to calculate the adjusted Odds Ratios (OR) and 95% confidence interval (CI). **Results:** A weighted total of 45,005,026 Chinese elderly with disabilities were reported. The weighted prevalence rate of healthcare service use was 36.6% (95% CI: 35.6-37.5). Significantly less use of healthcare services was observed among older age groups, males, less educated, singles, rural dwellers, non-eastern residents, with the lower annual family income, without medical insurance coverage, without a disability certificate, with a single disability, and with less severe disabilities. **Conclusion:** Low use of healthcare services indicates an unmet need among Chinese elderly with disabilities especially for the old-old. More effort should be warranted to enhance healthcare service use among the elderly with disabilities. **Reference:** Rusalem H, Dill S. Vocational rehabilitation of the older disabled person[J]. Journal of rehabilitation, 1961, 27: 19.

PD1268

Compliance and Motivation in Rehabilitation Medicine (Pilot Study)

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Background: A prospective questionnaire based pilot study in a clinical and ambulatory setting of a PMR unit in an acute hospital setting for patients receiving physiotherapy and/or music- and/or occupational therapy standard regimes for their diseases. We evaluated the influence of patient related therapeutical expectations and illness perception (health belief, health behaviour- and illness perception) on their satisfaction with the received therapies. **Material and Methods:** All patients (n: 558) receiving more than 3 therapies either in an ambulatory or clinical setting filled out 2 questionnaires. At the starting point of therapy a questionnaire based on PAREMO-20, the self efficacy scale of the IPQ-R questionnaire, the FREM-8 scales of illness coping, a VAS scale for pain and the BRQ pain scale had to be filled out. At the end of the therapy regime patients filled out the second questionnaire on organizational commodities, therapist communication skills and a score for global satisfaction with the therapies. Patient who terminated preliminary their therapy (drop outs) were documented and counted as non-compliant patients. Exclusion criteria were: dementia, person under age of 18 years, non German speaking patients, patients with diseases which enabled them to participate in full orientation (intensive care). **Results:** Preliminary results (Analysis of variance, Regression Analysis) show,

that the patient related factors (motivation, illness perception, pain level.) have a significant influence on compliance and therapy satisfaction. Additionally the organizational settings and the individual perception of being well informed by their therapists influenced the overall satisfaction with the therapy regardless of the underlying disease. **Conclusion:** The results show that a personalized medicine based on the illness perception and health believe model of the patients may ensure a better compliance behavior with the recommended therapies. To incorporate the patients beliefs in the selection of therapeutical regimes may also ensure a efficient as well as an effective therapy preventing economical strain on the care holder by applying costly therapist centered physiotherapy on patients who are not able to change behavior at that point of life. Furthermore organizational factors as well as communicational skills are major markers for compliance with the prescribed therapies.

PD1269

Analysis of Scores Obtained in Games of Balance of Videogame in Patients with Stroke during 24 Weeks – Preliminary Datas

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Introduction/Background: Strokes causes significant changes in postural control (PC). The treatment of these patients is based on intensive and repetitive training tasks, aiming motor learning. Thus, the virtual therapy (VT) can be used as intervention. Consoles using force platforms introduce the proposal of improving the balance from their games, that are quantified by a score. However, it is not known if the users get a better score with this training and how would be the progression of the score obtained in the interventions. The study proposes to investigate the behavior of this score in individuals with stroke during 24 weeks of experimental protocol. **Material and Methods:** Seven patients with stroke underwent experimental protocol (2 x/week, 60 minutes) in which were elected the games Penguin Slide and Snowboard Slalom. Scores were collected during 24 weeks for observational analysis. Attending a normal distribution, the values of the initial and final points were compared by Student's *t*-test ($p < 0.05$). **Results:** It was found that there was a gradual improvement in the score during the course of weeks to both games. Comparing the two scores – first and last - a significant gain was verified in both of the games: Penguin Slide ($p = 0.00003$) and Snowboard Slalom ($p = 0.04$). **Conclusions:** The subjects showed improvement in the scores of games during the experimental protocol, indicating that learning was achieved in the realization of such tasks. However, studies using validated tests or biomechanical variables that identify whether this improvement translates into improved PC are still needed. A greater number of individuals studied would check if there is a stabilization of this score and at what time it would be, thus defining the ideal timing of the VT.

PD1270

Comparison of Scores Obtained by Videogame with Biomechanical Variables in Stroke – Preliminary Data

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Introduction/Background: Virtual reality (VR) promotes an intensive and repetitive training that enables motor learning and may influence the reacquisition of postural control (PC) in stroke. Among the VR equipment, literature indicates videogames with balance platform (VG) as a form of therapeutic intervention. At the end of each game is given a score, but there are no evidences that it can be used as a parameter for quantifying the PC. The purpose of this

study is to compare the score for a game of VG with stabilometric variables. Through the results will be possible to associate or not the score in the VG with the reacquisition of the PC in stroke. **Material and Methods:** Four patients with stroke participated in experimental protocol using the Penguin Slide game of Nintendo Wii (repeated 18 times, 2 times/week for 24 weeks). The score of the game in the first and last session was collected. For assessment (pre and post) used the force platform AMTI 2.0 with frequency of 100 Hz. The volunteers were positioned with one foot on each platform, with the open (OE) and closed (CE) eyes in the standing posture for 60 seconds. The variables quantified by Matlab were: total COP area (ACOPt), COP x area (ACOPx), COP y area (ACOPy), speed DOT (DOTs), distance COPxCOG (COPXCOGd). Due to sample size, was conducted the Wilcoxon test ($p < 0.05$) to compare the initial and final score of the game Penguin Slide and pre and post intervention data obtained by the force platform in OE/CE conditions. **Results:** Initial and final score comparison ($p = 0.125$). Provided OE, initial and final comparison: ACOPt ($p = 0.625$), ACOPx ($p = 0.875$), ACOPy ($p = 0.625$), DOTv ($p = 0.875$) and COPXCOGd ($p = 1.0$). Provided CE, initial and final comparison: ACOPt ($p = 1.0$), ACOPx ($p = 0.625$), ACOPy ($p = 0.625$), DOTv ($p = 0.125$) and COPXCOGd ($p = 1.0$). **Conclusion:** The scores awarded in VG couldn't be used as a method of quantifying improvement of balance. Studies with more subjects should be conducted to confirm the results.

PD1271

Mainland China Needs Substantial and Sustainable Support From Hong Kong to Launch and Upgrade Occupational Therapy Interventions for Its Elders with Dementia

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The world prevalence of dementia was estimated at 35.6 million people in 2010. No exception is in mainland China. Besides pharmacological treatment, psychosocial interventions have become another core modality for elders with dementia. Reminiscence therapy, reality-orientation therapy and cognitive training have been well proven to be effective in improving cognitive, emotional and behavioral functioning (Bernhardt et al, 2002; O'Connell et al, 2007; Wang et al, 2009). Occupational therapy (OT) is the well recognized profession in providing these psychosocial interventions. In Hong Kong, occupational therapists (OTs) are adequately equipped to take up these leading roles in terms of professional development and financial support. In addition to the intensive training embedded in the undergraduate OT program (classroom learning and clinical practicum), there are plenty of training opportunities under continuing professional development scheme for practicing OTs. Unfortunately, the situations are far less favorable in mainland China. Roles of OT have not been duly recognized and hence this profession is usually not included in the healthcare workforce (Yip, 2007). Not until recently is there some seed funding in Wuxi (a city of China) which supports the launch of pilot OT interventions for elders with dementia implemented by a few newly trained OTs in a major mental health centre. It is the first of its kind in the city and probably among almost all other regions in the mainland. This initiative could finally be actualized mainly because the senior management group had been deeply impressed by the work and experiences in dementia rehabilitation of the Hong Kong experts. given the intensive experiences and the high socio-cultural relevancy, the Hong Kong experts are in the best position to guide the continuous development and improvement of OT interventions for the elders with dementia in mainland China.

PD1272

The Influence of Acupuncture for Depression in Victims with Traumatic Brain Injury after Lu Shan Earthquake

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Objectives: To observe the effects of acupuncture therapy for depressive disorder in victims with Traumatic Brain Injury (TBI) after Lu Shan Earthquake and to provide informations for the further clinical researches in this field. **Methods:** Two weeks after Lu Shan earthquake, Patient Health Questionnaire-PHQ-9 was used for screening depression among 51 TBI victims from Lu Shan earthquake, who had been admitted to West China Hospital from 20th April to 3rd May, 2013. 25 patients with low to moderate depression were included in treatment group and got acupuncture treatment. These acupoints were chosen: DU20, DU24, EX-HN3, PC6 and HT7. Another 15 TBI patients with low to moderate depression disorder who were not from Lu Shan earthquake were in control group. **Results:** there is no significant difference in PHQ-9 score between the treatment group and the control group before acupuncture treatment. (treatment group 11.6 ± 4.7 ; control group 11.5 ± 4.7 , $P > 0.05$). However, PHQ-9 score in the treatment group was lower than those in the control group after the treatment even if there is no significant difference according to statistical analysis. (treatment group 6.9 ± 5.4 ; control group 8.3 ± 4.7 , $P > 0.05$). The cure rate in the treatment group was higher than that in the controls group, but there is no significant difference (24%; 0%, $P > 0.05$). The total effective rate of the two groups haven't significant difference too (72%; 73%, $P > 0.05$). The both groups have significant differences between before and after treatment ($P < 0.05$). **Conclusion:** It is uncertain that the effects of acupuncture for depression in the TBI victims after Lu Shan earthquake. However, it showed positive tendency that acupuncture might improve the depressive symptoms. The effects are influenced by other factors such as funding for earthquake and social support. It was inadequate to allow any confident conclusion about the efficacy of acupuncture for depression in the TBI victims after Lu Shan earthquake. More high quality research is needed. The further studies will investigate the victims from non-earthquake and follow up 3 months, 6 months, 1 year or even 3 years.

PD1273

Fit for Function: a Community Wellness Program for Persons with Stroke

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Introduction/Background: Currently 300,000 people are living with stroke in Canada. While the majority of stroke survivors return to their homes after stroke, this period is consistently reported to be a stressful and challenging time. LiveWell is an innovative partnership between the YMCA of Hamilton/Burlington/Brantford, Hamilton Health Sciences and McMaster University, Canada. This partnership is founded on principles of a population health conceptual framework, to promote wellness through access to innovative programs. **Methods/Objectives:** 1) To assess the feasibility of a community partnership between 3 institutions (health (HHS), community (YMCA) and academic (McMaster University)) to deliver a community based wellness program for persons with stroke. 2) To evaluate the community based wellness program for persons with stroke to improve their physical functioning, community reintegration, patient activation and quality of life. 3) To increase the capacity of a community institution (YMCA) to deliver a community stroke wellness program. A single blinded randomized controlled trial was used to evaluate the 12 week intervention comprised of group and individual exercise programs and the Living with Stroke self-management education program. Participants were assessed by a blind assessor at baseline, 12 weeks and 24 weeks. **Results:** 61 participants were recruited. 33 were randomized to the intervention arm. Analysis at the 12 week follow-up shows significant improvement in: Community Re-integration (RNLI: $p = 0.008$); Rapid Assessment of Physical Activity (RAPA) $p = 0.02$; Walking (2MWT: $p = 0.01$; 6MWT $p = 0.002$; Short Physical Performance Battery Subscale: $p = 0.001$).

There were no differences in strength measures or 10M walk test. **Conclusions:** Results indicate favorable outcomes, demonstrating that this program can be a resource for people at different stages of stroke recovery.

PD1274

An Evidence Based Intervention for Rehabilitation in the Home Environment Post-Stroke: a Knowledge Translation Study

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Introduction/Background: There is no explicit framework for delivering post-acute stroke rehabilitation in the home environment. **Purpose:** To describe the application of a knowledge-to-action (KTA) process (Graham, 2006) to adapt an evidence-based framework for home-based rehabilitation post stroke. **Methods:** A KTA Cycle (Graham 2006) was used to translate evidence into a home-based stroke rehabilitation approach based on motor learning principles and self-management strategies. Physiotherapists and Occupational therapists accessed an online Learning Management System, training workshops, and a mentoring process. Stakeholders engaged an iterative process to capture and adapt knowledge. Perceived barriers and supports to implementation were assessed through stakeholder telephone interviews, and therapist focus groups and therapists' reflective journals. The OTs and PTs piloted the home-based intervention. **Analysis:** Themes from qualitative data were identified and patient profiles and paired *t*-tests statistics assembled. **Results:** Implementation challenges included philosophy and commitment to practice change, funding constraints, using learning resources, uncertainty about the KT process, client engagement and identifying the most appropriate clients for the intervention. Fifteen persons with stroke received the intervention (n=15, 60% male, x=65.5 yrs) and a pre-post-test was undertaken. Three out of four of the outcomes showed positive change at the end of the intervention. Barthel Index mean difference (MD)=10 (sd=11.55), p=0.001; Timed up and Go, MD=-13.26 (13.28), p=0.01; Stroke Impact Scale, MD=7.62 (6.45), p=0.001, Patient Activation Scale, MD=7.01 (14.96), p=0.12. Therapists reported that it was easier to motivate the patient in the home environment as it had increased ecological validity and older persons were harder to engage in the problem solving approach with the Task Oriented Approach compared to younger patients. Patient profiles and outcomes will be discussed in more detail. **Conclusions:** The KTA process resulted in an explicit framework and online training and manualized tools for rehabilitation service delivery that delivered promising results and needs to be tested in a randomized controlled trial. This intervention is very translatable for other conditions that require rehabilitation in the home.

PD1275

Rehabilitation in Jordan (Action Plan 2009-2015)

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Amman, JO

Jordan's population is around 6.5 million; disability forms 5% of the population. The main causes of disability are: trauma, diseases, congenital & heredity causes, and elderly problems. Accordingly the Jordan government and the local society paid more attention to improve rehabilitation services and facilities on the country for disabled persons. National strategies were set to help the disabled subjects by annulment of the welfare law for these people, development of the law on the rights with persons with disabilities, and the creation of the higher council for affairs of disabled people. Therefore, the rehabilitation services in Jordan have been developed in the last twenty years; specially by different members of a disciplinary team. This team involves well trained physicians as specialists in the physical medicine and rehabilitation field

under the umbrella of Jordan medical council. In addition to the paramedical staff in field of rehabilitation (PT, OT, OP, and speech therapists) embraced under the school of health and rehabilitation. Moreover, medical rehabilitation centres in the big hospitals played a crucial role in the development of the rehabilitation services in Jordan in different regions of the country; middle, north, and south parts of Jordan. Furthermore, Jordan has developed and provided CBR at the rural areas of the country.

PD1276

FRAX – Why May It Fail?

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The acronym FRAX (Fracture Risk Assessment Tool) is, as is well known, an electronic “on-line” tool, developed by a group of experts sponsored by the World Health Organization (WHO), for the occurrence risk assessment of osteoporotic fractures in 10 years. This calculation is based on an algorithm constructed from epidemiological studies focused on the main known risk factors for fragility fractures. From the values found for the probability of fractures reference values were established (“cut-off”) from which to start treatment with different drugs recommended for osteoporosis. However, in our clinical experience, certain problems in the decision to initiate therapy based on just this tool are found. The “cut-off” established, the absence of other potential risk factors and relativity of the importance of each factor may cause biases in the final result of the desired calculation. About three clinical cases, the authors of this work present some possible causes for this tool's biases, suggesting some avenues for improving its efficiency. **Keywords:** FRAX osteoporosis, fracture risk factors.

PD1277

(Re-)Integration Strategy to Working Life from the Perspective of a Regional Pension Insurance Fund

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Introduction: The (Re-)Integration Strategy described was conceived as a sustainable process- and context-oriented approach against the backdrop of demographic change. It encompasses different intervention measures and involves all sectors of the health care system to enable workers to return and stay at work. A regional statutory pension insurance scheme in Germany, is pursuing this strategy to fulfill its primary statutory mission – to maintain and restore its insurees' ability to work according to the basic principle of putting rehabilitation before retirement. At the same time, has an integrating, coordinating and advisory function in the overall health care system. **Material and Methods:** From September 2013 to June 2014, a group of experts from the academia, rehabilitation medicine and rehabilitation strategy as well as the management of the regional pension insurance elaborated the new strategy in five joint meetings and various consensus discussions. **3. Results:** The current version represents a fundamental step in the development of the (Re-)Integration Strategy, with approaches that extend across different sectors and insurance providers and interventions within the health care system. This strategy extends beyond the field of medical rehabilitation to include the areas of occupational health, prevention and cure, medical and vocational rehabilitation, and return-to-work from disability pension. Cross-sectoral approaches for specific target groups will be described. **Conclusions:** These extensive initiatives are designed to do more than just secure the social security system and protect employer interests. Current efforts are focused on the insuree who, through

targeted support and better networking of all stakeholders, will have a greater chance of returning to work and remaining in the workforce. The (Re-)Integration Strategy is aimed at health care workers in the affiliated rehabilitation facilities as well as their administrative officers and management and decision makers in the fields of research, clinical practice and health policy. 5. *References*: Schwarze M, Ehlebracht-König I, Kobelt A, Rodewald J, Gutenbrunner, C, Miede, J. (2014): Strategisches Konzept für ein berufliches (Re-)Integrationsmanagement der Deutschen Rentenversicherung Braunschweig-Hanover [The Strategic Concept for a (Re-)Integration Management]. Gemeinsames Papier der Medizinischen Hochschule Hanover und der Deutschen Rentenversicherung Braunschweig-Hanover, Hanover, Nord Ost West Informationstechnik, KC Produktion tragereigener Druck.

PD1278

The Experience of Helping Victims Regain Life Roles in Rural Areas after Ya'an Earthquake, a Case Report

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Case Diagnosis: In April 2013, the 63-year-old lady underwent closed reduction of right hip dislocation due to fall during the earthquake 5 years after the total hip replacement. She was diagnosed with rheumatoid arthritis more than 30 years while had not received regular treatments. *Case Description*: The deformity was observed in bilateral hands, knees, feet and spine, with decrease in power grip and dexterity and lower limbs strength, and high risk of fall during ambulation with crutches. She either depended on her son or discarded steps in performing Activities of Daily Living (ADL). The lady lived with her son and grandson. With difficulty in getting access to makeshift kitchen, bathroom and household tools due to environmental obstacles and inadequate ability, she expressed despair and reported suicide intent in losing the role of care-giver and aggravated the burden of the family. To decelerate the progress of the disease, improve physical function and facilitate community integration, occupational therapy with 4 months follow-up were delivered. The methods of protection of the joints, controlling exercise, and techniques of performing ADL and household chores were practiced; the environment and tools were modified using materials available at home. The intervention finally enabled the lady to be independent in ADL and participate in household chores, and social gathering under the help of assistive devices and modified access, which empowered her the satisfaction of the life role. *Discussion*: The altering of roles under strike of life event would change the life tasks according to the "Ecological of human performance model", which emphasized the client-centered intervention aimed not only at promoting the healing of physical structure but also restoration of function to facilitate recovery of psychosocial function and community integration, especially for those who had limited potential to regain full physical function. Besides, under the circumference of limited access to medical and public resources, innovation in modification of environment, tools, and treatment methods are needed to meet the requirement of the specific client. *Conclusions*: Holistic intervention addressing "PEO" areas are essential in helping geriatric clients with chronic disease to regain life roles. Voluntary services and innovative ideas are needed when providing Occupational Therapy in resource-limited areas.

PD1279

Disaster Preparedness for Persons with Disabilities

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Introduction/Background: Persons with disabilities have a lot of difficulties in emergencies such as fires and natural disasters. To increase the ability to cope with emergencies, disaster preparedness manuals and drills for persons with disabilities were developed and showed the effects. *Material and Methods*: Two accessible manu-

als, one brochure, three leaflets and an iPad application of disaster preparedness for persons with disabilities were developed. One of the accessible manuals was evaluated by 84 support centers for persons with autistic disorders through the Internet. Nine persons with disabilities including persons with visual, hearing mobility and cognitive impairment participated in annual disaster drills by the local government for two years with the help of guides, personal care assistants, and sign language interpreters. In addition to researchers' observations, questionnaires and interviews were conducted to participants with disabilities, assistants, and chairpersons at local neighborhood agencies. *Results*: Although 46% of service providers failed to download or to run over the accessible manuals, 56% of service providers answered that they wanted to show the manuals to their clients. Although, in the first year, misunderstandings about assistance methods for persons with disabilities and isolation from community residents were observed in disaster drills, considerations to persons with disabilities by community residents and opportunities for persons with disabilities to participate in drills and community activities are essential. *Conclusion*: Further studies are required to evaluate the effects of the developed materials and to improve the participation of persons with disabilities to community activities including evacuation drills.

PD1280

Effect of Panax Notoginseng in Patients with Multiple Fractured Ribs and Pulmonary Contusions Caused by the 2008 Wenchuan Earthquake

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Objective: To investigate whether the combination of conventional treatment and Panax notoginseng (PN group) is superior to conventional treatment alone (CG group) in reducing the clinical symptoms of patients with multiple fractured ribs and pulmonary contusions. *Patients and Methods*: We retrospectively analysed the medical records of patients treated for multiple fractured ribs and pulmonary contusions by CG (17) and by PN (18). Visual Analog Scale (VAS) pain scores and arterial oxygen saturation were measured at baseline and at, one, and two weeks following treatment. The durations of mechanical ventilation, the duration of administration of systemic analgesics, and hospital stay were also recorded. *Results*: VAS scores in the PN group were lower than in the CG group at one week ($P < 0.01$) and at two weeks ($P < 0.05$). The arterial oxygen saturations of both groups were higher after treatment than at baseline ($P < 0.05$), but there was no statistically significant difference between the two groups ($P > 0.05$). The durations of the mechanical ventilation, the duration of systemic analgesics, and hospital stay in the PN group were remarkably decreased as compared to the CG group ($P < 0.05$). *Conclusion*: Combining conventional treatment and Panax notoginseng seems to be an efficient method that can improve the clinical symptoms of multiple fractured ribs and pulmonary contusions.

D.1.4. REHABILITATION ECONOMICS

PD1281

Determinants of Costs of Care and Rehabilitation of People Injured in Traffic Accidents in Medellin (Colombia)

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Background: Although traffic accidents (TA) in Medellin are recognized as a serious economic and public health problem, we are not aware of researches that explore the variables that determine the magnitude of the costs of TA in Colombia. The aim of this study is to estimate the determinants of the cost of TA, within the

first year of the accident, from a health care system's and patient's point of view. *Methods:* We analyzed data from 483 patients with moderate and severe injuries caused by TA in four hospitals in Medellin, Colombia, between 2009 and 2010. Information on demographic, socio-economic and epidemiological variables was captured by interviewing patients at three different times. Medical costs were extracted from hospital invoices. Productivity losses were estimated using the human capital approach and information reported by the patients. A generalized linear model (GLM) was built to estimate the determinants of total costs. *Results:* Patients with severe injuries are on average \$2.152USD more costly than patients with moderate injuries. Those admitted to intensive or special care units are on average \$29.362USD and \$5.746USD more costly than patients that were not admitted to these units. The total amount of productivity losses was \$112.800USD (an average of \$233USD per patient). *Conclusions:* variables such as the severity of the injury and the type of care are the main determinants of cost of care for patients injured in traffic accidents. In this study, variables such as the site of care, age, educational level and income level did not generate differences in costs.

D.2. COMPREHENSIVE REHABILITATION INTERVENTION RESEARCH

PD1282

Prolonged Effects of Home Orthopedic Rehabilitation

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Introduction/Background: Home-based rehabilitation program can be successful after orthopedic surgery and joint replacement operations. However, it is still unclear if the effect of home rehabilitation can be prolonged and the level of patient's motor independence can be maintained through the time. *Material and Methods:* 38 patients aged 73±12 years were included after orthopedic operations on lower extremities (19-Total Knee Replacement, 10-Total Hip Replacement and 9-Hip Fracture). Shortly after the surgery individual rehabilitation program was built by home rehabilitation unit staff. Length of stay in the orthopedic ward was 6.3±3.7 days and the program was started at home in 2.0±1.4 days. The patients were managed at home by rehabilitation staff for 34.0±9.4 days by physiotherapist (12.4±5.2 sessions), nurse (1.9±0.7 visits), occupational therapist (0.9±0.4) and social worker under the supervision of rehabilitation doctor. According to the needs some help in basic living (22.4±21.2 hours) was provided. The patient's satisfaction and motor abilities were measured by phone questionnaire 114.5±51.4 days after discharge from the program. 35 patients were reached by the phone and were asked to answer the following questions: "what is the level of your satisfaction from the program?" (from 1 -not satisfied at all to 10 - completely satisfied); "how are walking today?" (1-not walking, 2-with walker and assistance, 3-with walker without assistance, 4-with cane without assistance, 5-independently at home only, 6-independently at home and outside); "how can you walk up and downstairs?" (1-not walking, 2-need massive help, 3-need some help, 4-walking independently); "do you feel that you can do things today as before the operation?" (1-yes, 2-partially, 3-no). *Results:* The patients' satisfaction level was very high – 8.8±2.0. The walking ability was preserved at quite high level – 4.7±1.2 and the stairs climbing was 3.0±0.9. Most of patients reported of partial preservation of previous motor abilities (1.9±0.8) few months after the discharge from the rehabilitation program. *Conclusion:* Home-based rehabilitation program can lead to prolonged positive effect on motor abilities of patients after orthopedic surgery and joint replacement operations.

PD1283

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The Third Generation of Functional Electrical Stimulation on Post-Stroke Spasticity of the Upper Limb Wrist Flexion Improvement and Opponents Function Recovery

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Introduction: The aim of this study was to test the third generation of functional electrical stimulation on post-stroke spasticity of the upper limb wrist flexion improvement and opponents function recovery. *Material and Methods:* 42 patients after stroke participated in this study. The patients were randomly divided into rehabilitation group (n=21) and control group (n=21). The rehabilitation group received functional electrical stimulation therapy (FES) coupled with conventional therapy, while control group conventional therapy. The functional electrical stimulation therapy included: 1) passive electrical stimulation; 2) trigger feedback electrical stimulation; 3) booster electrical stimulation combined with task-oriented feedback training - training in occupational therapy cups. Treatment day 1, every 30min, a total of 12 weeks. The performances in the modified Ashworth scale (AS), Brunnstrom's classification (BS) Scale, Fugl-Meyer Scale (FMS) in the upper extremity motor function motor function scale scores and active movement wrist dorsiflexion range of motion evaluation (WE-AROM) were evaluated before and 12 weeks after treatment. *Results:* In AS score, the score after treatment than before treatment were decreased compared score, the difference was statistically significant (P<0.01), but two groups comparison between post-treatment score was no significant difference (P>0.01). in BS scale score, the score after treatment than before treatment were compared to the higher score, and the difference was statistically significant (P<0.01). But the score between the two groups after treatment showed no significant difference (P>0.01). In FMS scale in the upper limb motor function motor function score, score after treatment than before treatment score were compared was significantly higher, the difference was statistically significant (P<0.05). In addition, scores between the two groups after treatment was significantly (P<0.05); between the two groups after - former difference scores were significantly (P<0.05). In the WE-AROM score, score after treatment than before treatment were compared to the higher score, the difference was statistically significant (P<0.05). In addition, between the two groups after - before the score difference was statistically significant difference (P<0.05). *Conclusion:* A combination of FES therapy may improve the upper limbs motor function, wrist dorsiflexion range of motion for stroke patients, However, it may be ineffective for spasticity.

PD1284

Human Rights for Persons with Disability Using Prosthetic and Orthotic Devices in Sierra Leone

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Introduction: Sierra Leone is a low income countries in west Africa that has a history of conflict. Sierra Leone have signed and ratified the Convention of Rights of Persons with Disabilities. *Aim:* To evaluate persons with disability that use prosthetic and orthotic assistive devices access to human rights. The addressed areas were; right to health, right to a standard of living adequate for health, right to vote, right to marry and found a family, right to education, right to work and. A further aim was to compare groups of participants regarding gender, area of residence, income and type and level of device. *Methods:* Questionnaires were used to collect self-reported data from 139 prosthetic and orthotic users in Sierra Leone. *Results:* About half of the patient considered their overall physical health as good or very good. Thirty-seven percent of the participants said their mental health is bad or very bad. The majority said they did not have access to medical care and the most common reason given was that they could not afford doctors fee. The orthotic users reported they required medical care outside home more often than the prosthetic users. About half of the participants

could not access afford medication when they needed it. About half of the participants had regularly access to safe drinking water and only 10% had the possibility to eat three times a day. The majority had a reasonably or adequate house to live. Half of the participants were married and 70% had children. Almost all reported that they could vote if they wanted. About half were working but often self-employed with small business. Sixty percent could read and write. *Conclusion:* There was still a need for significant progress in increased access to medical care and medication when needed for persons with lower limb physical disability in Sierra Leone. Increase3d access to food and clean water to facilitate an acceptable standard of living adequate for health were also necessary in order to strive towards implementing the rights to health for persons with disability.

PD1285

Development of a New Inconsistency-Score for the Sapphire System

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The neuro orthopaedic achievement diagnostic using the Sapphire System is based on computerized recording of static and dynamic forces as well as time-dependent movements. The test results are compared with an internal database according to NIOSH and MTM. In order to recognize self limitation of the Subject, a new specific test protocol was developed together with the research-team from Göttingen Medicine University Sports Medicine Department. In this protocol we use vegetative parameters as indications of pain and effort. The conclusive tests given by the manufacturers' guideline (SIM Work Systems, USA) were completed by some parameters taken over from EFL. To estimate the motivation of test persons we evaluated the duration of hand functioning tests. All test results were medically estimated. Our Inconsistency-Score consists of 10 parameters. In a retrospective analysis of 129 Sapphire tests the Orthopaedic Rehabilitation Center Bad Pyrmont (Deutsche Rentenversicherung Braunschweig-Hanover) we observed in 40% of all cases inconsistencies. Duration of the inability to work, female gender and psychological co-morbidity were accompanied with an increased negative finding distortion. Also even a computer-assisted test of workloads requires a standardised and critical result analysis, in order to improve reliability and to seize negative finding distortions.

PD1286

Research the Behavioral and Event-Related Potential of Visual Spatial Attention by TBS

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Background: To investigate the mechanism of visual spatial attention disorder with continuous theta burst stimulation (cTBS). *Material and Methods:* Thirty normal subjects were randomly divided into experimental group (cTBS, n=15) and control group (sham cTBS, n=15). Event-related potentials (ERP) was used and the test paradigm was "cue-target" including the range cue and the character cue. The range cue includes big circle and small circle and the character cue includes big character and small character. The frequency of TBS was 30 Hz and the intensity was 50% of output of the stimulator. The stimulation site was the right posterior parietal cortex (P4). There were 801 pulses and the stimulus interval was 100 ms. *Results:* For range cue and character cue, there was obvious cue range level effect in both two groups (P<0.05). Compared with the control group, P1 and P2 amplitude was sig-

nificantly lower in the experimental group for the character cue and P1, N1, and N2 amplitude at PO4 position was significantly lower in the experimental group for the range cue (P<0.05). In the experimental group, P1, P2 and N2 amplitude was higher for the range cue (P<0.05). In the control group, P1, N1 and P2 amplitude was higher for the range cue (P<0.05). *Conclusion:* Cortical neuronal excitability could be inhibited with cTBS stimulation over the right PPC, that could influenced target recognition and processing of the left side.

PD1287

Predictive Factors Regaining Complete Oral Intake in Dysphagic Stroke Patients with Internal Tube Feedings in a Convalescent Rehabilitation Ward

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Introduction: Dysphagia is one of major symptoms in post-stroke patients and percutaneous endoscopic gastrostomy (PEG) is widely used as a nutritional support. Some patients regain complete oral intake after PEG, and those cases might be appropriate to indicate nasogastric tube feeding (NGT). The aim of this study is to investigate predictive factors for complete oral intake before admitting to convalescent rehabilitation ward, thereby avoiding unnecessary PEG. *Methods:* Stroke patients admitted to our convalescent rehabilitation ward during January 2009 to December 2013 were screened from the medical record to check for their eligibility to participate in the study. All the patients hospitalized into the ward during two weeks and two months after the diagnosis of the stroke. Inclusion criteria were dysphagic stroke with PEG or NGT. We conducted case control study by dividing patients into two groups depending on the status of complete or incomplete oral intake at discharge. Unilateral or bilateral brain injury, single or recurrence stroke, and supra or infratentorial lesion were compared. Functional Independence measure (FIM) scores, Fujishima dysphagia rating scale, National Institutes of Health Stroke Scale (NIHSS), Glasgow Coma Scale (GCS) were evaluated at admission. We aimed to identify predictive factors for complete oral intake using logistic regression analysis. A p-value <0.05 was considered statistically significant. Present study was approved by the Ethics Committee in our Institution. *Results:* Sixty-two patients were included for this study. Twenty-eight patients could regain complete oral intake at discharge. Demographic data showed no significance between the two groups. Complete oral intake group had significantly higher GCS (13.2 vs. 11.8, p<0.01), cognitive FIM scores (14.8 vs. 9.8, p<0.01), Fujishima dysphasia rating scale (2.4 vs. 1.9, p<0.05) at admission. Logistic regression analysis showed cognitive FIM scores at admission were contributed to complete oral intake independently (Odds ratio 1.13, 95% CI 1.03-1.24). Receiver-operating characteristics curve provided cut off points at 14 in cognitive FIM scores predicts for complete oral intake with sensitivity 60.7% and specificity 85.3%. *Conclusion:* Dysphagic stroke patients with cognitive FIM scores higher than 14 had a tendency to regain complete oral intake, therefore those patients could avoid PEG placements before admitting to convalescent rehabilitation ward.

PD1288

Effect of Transcranial Cerebellar Direct Current Stimulation on Patients with Cerebellar Ataxia After Stroke: a Randomized Sham

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Introduction: The aim of this study was to test the hypothesis that transcranial cerebellar direct current stimulation (tcDCS)

could improve performances in cerebellar ataxia, balance and activities of daily living of patients after stroke, compared with sham tDCS. *Material and Methods:* Thirty patients with cerebellar ataxia after stroke participated in this double-blind, sham-controlled design study. The patients were randomly divided into tDCS group (n=15) and control group (n=15). The tDCS group received anodal tDCS over bilateral cerebellum coupled with conventional therapy, while control group received sham tDCS coupled with conventional therapy. The performances in the International Cooperative Ataxia Rating Scale (ICARS), Berg balance scale (BBS) and Barthel Index (BI) were evaluated before and 4 weeks after treatment. *Results:* Before treatment, there were no significant difference in ICARS, BBS and BI between the two groups ($P>0.05$). Compared with the pre-treatment, ICARS, BBS and BI were significantly improved for the tDCS group and control group after treatment ($P<0.05$), and the scores of ICARS, BBS and BI in the tDCS group were better than those in the control group. *Conclusion:* Combined with conventional therapy, anodal tDCS over bilateral cerebellum may improve cerebellar ataxia and balance, furthermore enhance the activities of daily living (ADL). tDCS may be a potential new tool for cerebellar ataxia treatment after stroke.

PD1289

The Challenges of Neurological Lyme Disease: a Case Study of Individualized Physical Therapy and an Inter-disciplinary Team Approach

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Case Diagnosis: A 42-year-old female was referred to PT with diagnosis of late onset Neurological Lyme disease. Lyme disease is the fastest growing vector-borne disease in the USA; 14% of cases affect the central and/or peripheral nervous system. Presentation in its Neurological form varies with a wide spectrum of symptoms. It is a complex, multi-factorial diagnosis with limited research for PT intervention. *Case Description:* The patient's PMH included antibiotic treatment for 11 months. Brain MRI and EEG tests were normal. The patient had no history of falls and presented with gait abnormality, joint pain, fatigue and dyskinesia's, intensified by external stimulation. These impairments resulted in difficulty with ADLs, including caring for her baby. Treatment goals included increasing pain-free exercise tolerance, improving gait speed, quality and endurance. The patient was treated twice per week, including over-ground and treadmill gait training. Abnormalities observed consisted of trunk and head thrashing, stomping, hip swiveling and changes in cadence and step length; all captured in video analysis. A team meeting with psychiatry, OT, and psychology discussed the possibility of psychogenic factors contributing to the patient's symptoms. Due to the complexity and variety of patient symptoms, opinion differed regarding diagnosis. Psychogenic movement disorder (PMD) was suggested as a possibly etiology. As a result PT worked with psychology to implement cognitive behavioral strategies, such as positive feedback, into treatment. *Discussion:* The patient responded positively to PT and a multidisciplinary approach. 6-MWT score increased from 175 ft to 400 ft and gait speed improved from 0.7 ft/s to 1.7 ft/s. Gait analysis, including video footage, showed significant decreases in dyskinesia's, as well as a more normalized and consistent gait pattern. The patient now ambulates indoors without assistive device and in the community with a rollator, reporting reduced fatigue and joint pain improved from 8/10 to 4/10. *Conclusion:* The patient has completed her PT treatment and will begin psychotherapy to address the psychological component of her diagnosis. This case study demonstrates the importance of an early interdisciplinary approach and differential diagnosis with consideration of a PMD, for improved management and outcomes when treating neurological Lyme disease in an outpatient setting.

PD1290

The Biomechanical Effect of Ankle Foot Orthoses on Gait in Adults with Hemiplegia

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Introduction: Hemiplegia secondary to stroke contributes to altered gait pattern and decreased mobility. Ankle Foot Orthoses (AFOs) are routinely prescribed for hemiplegic patients to compensate these deficits. Among various kinds of AFOs, Hinged (H) AFO and Solid (S) AFO are two of the most prevalent ones. Although many studies have been conducted regarding the effect of AFOs on hemiplegic gait, no study has declared which kind of AFO should be preferred to be utilized by stroke patients. Thus, this study aimed to compare the effect of HAFO and SAFO on hemiplegic gait. *Material and Methods:* 26 hemiplegic patients (aged between 40 to 70) who were at least 6-months post-stroke (17 men and 9 women) voluntarily participated in this study. They were able to walk independently for at least 10 meters, and their maximum Modified Ashworth Scale was 3. Force Platform and Motion analysis system with six infrared cameras were used to evaluate kinetic and kinematic outcome measures including step-length, stride-length, cadence and hip and knee flexion angles. Participants were randomly assigned to two groups (13 patients in each group). The first group used HAFO and the second utilized SAFO. Patients were examined with and without orthosis (shoe only) in random sequences. Pair *t*-test and *t*-test were used to analyze data. *Results:* Both orthoses significantly increased step-length, stride-length, cadence, hip and knee flexion angles ($p<0.05$). No significant differences were seen between two orthoses regarding step-length, stride-length and cadence ($p>0.05$). However, hip and knee flexion angles were significantly more using HAFO compared with SAFO ($p<0.05$). *Conclusion:* The findings of this study showed that HAFO and SAFO improved hemiplegic gait. Also, it was shown that they similarly improved kinetic parameters of hemiplegic gait. However, hip and knee flexion angles were increased more while patients utilized HAFO which was most likely due to its hinge that allowed ankle motion toward dorsi-flexion at the stance phase of gait while preventing plantar-flexion. Finally, the present study suggests that both HAFO and SAFO are suitable for post-stroke hemiplegic patients although evaluating their long-term effects seems to be necessary.

PD1291

The Efficacy of Occupational Therapy Combined with Eye Acupuncture on Activities of Daily Living and Upper Limb Movement Function in Patients with Stroke

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To observe the clinical efficacy of occupational therapy combined with eye acupuncture on activity of daily living and upper limb movement function in patients with ischemic stroke. *Method:* 60 cases with ischemic stroke were randomly assigned to occupational therapy combined with eye acupuncture group (treatment group) and occupational therapy group (control group), each group with 30 cases. Patients in treatment group received occupational therapy and eye acupuncture, patients in control group received occupational therapy only. Respectively before and after 6 weeks' of treatment apply modified Barthel index assessed the ability of daily life and the Fugl Meyer assessment of upper limb to assess the upper limb movement function. *Results:* In terms of modified Barthel index and Fugl Meyer assessment of upper limb, there were significant differences in both two groups before and

after treatment ($P < 0.01$), and there were significant differences between treatment group and control group after treatment ($P < 0.01$). Conclusions: Occupational therapy combined with eye acupuncture can better promote the recovery of limb movement function in the affected side, especially in the upper limb movement function. At the same time, it could effectively improve the activities of daily living of stroke patients.

PD1292

The Efficacy of Robotic-Assisted Training Combined with Functional Task Training on Motor Impairment, Functional Independence, and Quality of Life in Subacute Patients with Stroke

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Background: Robot-assisted training (RT) with advantages of high intensity and repetitive training has been proved to be effective in reducing motor impairments after stroke. However, previous studies indicated that RT has limited effects on ADLs, probably due to the limited generalization of motor gains to daily functions. Robot-assisted training (RT) combined with functional task practice may augment benefits toward functional independence and maximal recovery during subacute stroke. **Object:** To demonstrate the comparative effects of RT combined with functional task practice v.s. dose-matched control therapy on the outcomes of motor impairment, functional independence, and quality of life. The dose-matched control therapy is task-related training (TT). TT was delivered by therapists without robot involvement and included task-specific training followed by functional task practice. **Methods:** Thirty-one subacute stroke patients with severe to moderate upper extremity impairments were randomly assigned to receive RT and TT, for 1.5 hours/day, 5 days/week for 4 weeks, including 30 – 40 min functional task practice respectively in each session. Primary outcomes were the modified Rankin Scale (mRS) and the Fugl-Meyer Assessment (FMA). Secondary outcome was the physical domain of the Stoke Impact Scale version 3.0 (SIS). **Results:** Both RT group combined with functional task practice group and TT group improved significantly in motor impairments and quality of life in the physical domain over 4-week intervention, but there were no between group differences. However, the RT group showed superiority to TT in the level of mRS ($p=0.049$) and strength subscale in the physical domain of SIS ($p=0.004$). **Conclusions:** RT combined with functional task practice exhibited comparable improvements to TT on motor impairment and quality of life. RT led to significant improvements in functional independence and muscle strength. With the additive advantage of labor-saving and additional benefits of RT, RT combined with functional task practice may be a promising approach for subacute patients with stroke.

PD1294

Mindfulness-Based Interventions for People with Multiple Sclerosis – an Integrative Stress Management Strategy

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Introduction: Multiple sclerosis (MS) is an inherently stressful condition. Stress can impact on both functional and pathological markers of disease activity/progression. Mindfulness-based interventions (MBIs) are widely utilised in various long-term conditions, with evidence for effectiveness in many. Very little is known regarding the use of MBIs in people with MS. **Methods:** This

mixed-methods study follows guidance outlined by the UK Medical Research Council on evaluating complex interventions (2008). A systematic review was undertaken on the empirical literature examining for effectiveness of MBIs in MS. This coincided with a cross-sectional analysis of a nationally representative primary care database, examining for prevalence of mental and physical health comorbidities in people with MS (results reported as adjusted odds ratios, 95% confidence intervals, and 'p' values. Findings were used to inform a pilot randomised controlled trial (RCT) examining a standardised MBI for people with MS ($n=50$), including quantitative measures evaluating likely effectiveness, and qualitative measures, assessing feasibility, accessibility, and acceptability, as well as implementability (via normalisation process theory for complex interventions) in an NHS tertiary care, integrative rehabilitation setting in Scotland. **Results:** A small international literature ($n=4$) suggests effectiveness for MBIs in people with MS, especially for anxiety and depression, quality of life, standing balance and pain. Mental health comorbidity is markedly over-represented in people with MS, rising in cohort with increasing number of physical health comorbidities. Cardiovascular comorbidities are unexpectedly low. Early RCT findings suggest feasibility, accessibility, and acceptability of MBIs for people with MS, although population-specific modifications may hold particular advantages in this group. **Conclusion:** MBIs can play an important role in managing the integrative rehabilitation needs of people with MS.

PD1295

“Inclusive Education and Art Therapeutic Support in the Field of Rehabilitation”

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The support in the field of inclusive education has different aspects in relation to rehabilitation. It concerns the physical, psychic as well as social factor in enabling the persons to be part in the social life. In that regard it works with basic stimulation and recognition of personal competences in its development. In the field of art therapeutic support it works in a playful way with inner images, stress release, resources by using the artistic expression as a means for getting in contact with the own abilities as well as with others. It can be integrated in the different fields of rehabilitation as group activity or single intervention in relation to the complexity of disability. Referring to three different cases some different aspects of intervention will be introduced: -selective mutism of an 21-year old girl in a rehabilitation centre regaining strength to handle own affairs; -a fifty-year old woman with breast cancer finding a new life perspective; =digital story-telling as a resource-suitcase in a psychiatric hospital for patients with traumatic experiences. The art therapeutic intervention is related to support the feeling of coherence and self-esteem. It refers to multimodal forms of expressions in combining them to enhance emotional enrichment by overcoming habits in behaviour. On the other hand it enables in a playful way to activate physical competences by overcoming blockages in movements. In relation to neurosciences it supports new ways of stimulating the inner learning abilities and is part of a new approach to inclusion. **References:** 1) Hampe, R. (2012). Gesundheitsförderung und Prävention durch Künstlerische Therapien. In: W. Rössler & B. Matter (Hrsg.). Kunst- und Ausdrucks Therapien. Stuttgart: Kohlhammer. S. 418-430. 2) Hampe, R. (2013). Die Förderung therapeutischer Prozesse bei Brustkrebspatienten durch Kunsttherapie. In: Seltrecht, N. (Hrsg.). Krankheit: Lernen im Ausnahmezustand?. Berlin: Springer. S. 533-544.

PD1296

The Effect of Circuit Training on Functional Outcome in Subacute Stroke Patients

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Introduction: The purpose of this study was to investigate whether task oriented circuit training improve functional outcome during inpatient stroke rehabilitation and to compare effectiveness of circuit training and individual physiotherapy on recovery of balance, walking ability and activities of daily living. **Materials & Methods:** Twenty patients receiving inpatient rehabilitation after a stroke were enrolled and were randomly assigned to the intervention group (n=10) and the control group (n=10). Intervention was a structured, progressive, physiologically based, therapist-supervised, in-patient program of 90-minute treatment sessions a day, five days a week for 4 weeks designed to enhance flexibility, strength, balance and gait endurance. Progressions included increasing the intensity and complexity of the exercise. 10 subjects in control group participated in individual physiotherapy, on a 1 therapist to 1 subject ratio, for the same amount of time as intervention group. Outcome measures were lower-extremity motor control (the lower limb score in the Fugl-Meyer assessment (FMA-LL)), balance (Berg Balance Scale (BBS)), gait endurance (six-minute walk test (6MWT)), gait speed (ten-meter walk test (10MWT)) and activities of daily living (Korean-Modified Barthel Index (K-MBI)). Measure was taken on admission and 4 weeks later. **Results:** Both intervention and control groups showed significant improvement between admission and follow-up assessment in all outcome measures, respectively. There were no significant between group differences in the outcome measure before and after intervention. **Conclusions:** These findings suggested that task oriented circuit training was as effective as conventional individual physiotherapy for inpatient rehabilitation on the recovery of motor control, balance, walking ability and activities of daily living in subacute stroke patients with severe walking deficit.

PD1297

Caregivers Stress According to Cognition and Activities of Daily Living Change in Stroke Patients

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Introduction: This study is to investigate the change of cognitive function and activities of daily living (ADL) in stroke patients has any influence on the stress of caregivers. **Methods:** A total of 48 patients (29 males and 19 females, mean age 60.42±14.91 years) and 48 caregivers (14 males and 34 females, mean age 49.71 ±11.88 years) were evaluated. Evaluation tests were performed initially, after 4 weeks and 8 weeks. ADL and Functional Activity (FA) were evaluated by Korean Modified Barthel Index (K-MBI), Functional Independence Measure (FIM), Functional Ambulation Categories (FAC), Berg Balance Scale (BBS). Neurologic test was done by Korean version of NIH Stroke Scale (K-NIHSS), Motricity index, Modified Rankin Scale (MRS). Language function was tested by Screening Test for Aphasia & Neurologic-Communication Disorder (STAND), Korean Version of Western Aphasia Battery (K-WAB), Korean Version of Boston Naming Test (K-BNT). Cognitive function was evaluated by Korean Dementia Screening Questionnaire (KDSQ), Mini Mental Status Examination (MMSE), Neuropsychiatric Inventory-Questionnaire (NPI-Q), Wechsler Test, Clinical Dementia Rating (CDR). The caregivers' stress index were evaluated by Burden Interview (BI), Revised Memory and Behavior Problem Checklist (R-MBPC). We analyzed the correlation between the change of patients' cognitive function, ADL and Stress of caregivers. **Results:** After 8 weeks of rehabilitation, Neurologic exam, cognitive function, language function and ADL in patients were improved compared to initial test. Among that Motricity index of trunk, K-BNT, KDSQ-C, Wechsler, CDR, K-MBI showed significant improvement (P<0.05). BI has correlation with R-MBPC. BI and R-MBPC was decreased by improvement of K-MBI, Wechsler, K-BNT. There was no significant difference of improvement according to brain lesion subgroup (cortex and subcortex). **Conclusion:** This

study showed that the stress of caregivers was decreased according to improvement of cognitive function and ADL in patients of stroke.

PD1298

Application Status of Assistive Devices in Children Rehabilitation

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Introduction/Background: Children from the Third Affiliated Hospital of Jiamusi University, the Prevention and Treatment Centre of Cerebral Palsy of Heilongjiang Province were admitted for the application status research of assistive devices in children rehabilitation. **Material and Methods:** 2,469 children treated in Third Affiliated Hospital of Jiamusi University during 2008 ~2012 were admitted, including 1,722 children with physical impairment as cerebral palsy, 498 children with intelligence disability as mental retardation, 123 children with mental disability as autism, 51 children with developmental delay and 75 children with other disability. **Results:** the utilization ratio of rehabilitation training aids is 100%, daily life aids is 100%, orthosis is 36%, walkers is 0.8%, and wheelchair is 0.2%. Rehabilitation training aids and daily life aids include 41% educational aids and 5.5% communicational aids. **Conclusion:** The utilization ratio of some assistive devices as walker, wheelchair should be improved, and the consciousness of assistive devices using should be improved.

D.3. EDUCATION AND TRAINING IN REHABILITATION

PD1299

Reciprocity Relationships in Rehabilitation Process Explained By the “Mutual Caring-From Knowledge to Action” Project

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Background: The M-CARE project focal point is to underline the reciprocity and complexity of multidisciplinary care process, considering that dominant cultural narratives of disability and rehabilitation tend to emphasize a unilateral perspective on need, dependency and giving. We set to understand and transfer the know-how from the mutual caring process that can provide the basis for an innovative learning approach, in which “mutual care”, “mutual learning” and “interdependency” should underlie educational topics on disability issues. **Material and Methods:** The project research work, which started on 1st of August 2013, involved medical universities, social assistance stakeholders, NGOs from different cultures and countries (Romania, Italy, Latvia and Poland). A Consensual Qualitative Research (CQR) was conducted and explored reciprocity relationships within the multidisciplinary rehabilitation teams, linking the aspects of making a contribution to the role of patient (or family carer) empowerment in disability case management. **Results:** The comprehensive examination revealed specific organizational practices, culture and structural elements that encourage the development of innovative, effective care delivery practices based on “interdependence paradigm”. Conversely, we found that challenges and barriers still exist in care process of the disabled persons, with significant impediments to effective knowledge, education and real inclusion. We systematized the knowledge that concerns and refers to the chronically ill and disabled persons, their paid rehabilitation specialists or unpaid caregivers, the paradigms of care process, since neither “care” nor “dependency” have simple uncontested meanings. Therefore the

“mutual care approach” emphasizes on the carer-patient dynamics where is a reciprocal give-and-take process between all the involved ones (be they rehabilitation team members or care recipients); this highlights the centrality of an informed, activated patient to productive mutual patient-provider interactions in terms of motivation, information and skills exchanges (mutual learning), and confidence. *Conclusion:* Professional training for health and PRM specialists should include a substantial component which relates to patients and unpaid carers as proactive partners in multi-disciplinary case management; making a contribution and participating in a two-way mutual process of care are common features of strong, healthy relationships and community belonging, thereby being regarded as a cornerstone in facilitating education, health and social care programs.

PD1300

Immediate and Long-Term Effects of Reach-To-Grasp Training with Trunk Restraint on Functional Abilities in Individuals with Hemiparesis Poststroke: a Systematic Review

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Introduction: Suppression of excessive trunk movements during reach-to-grasp training has been suggested for individuals post-stroke to improve functional abilities. It has been proposed that clinical detectable and meaningful change has to exceed minimal detectable change (MDC) and minimal clinically important difference (MCID) values. This review evaluated the evidence and clinical relevance for immediate and long-term effects of trunk restraint (TR) during reach-to-grasp training on functional abilities in adults poststroke. *Methods:* A literature search was performed in PubMed, Web of Science, CINAHL, Embase, PEDro, and the Cochrane Library. We included randomized controlled trials, comparing training with TR with any other training (publication dates 1985-2014). Methodological quality was assessed with the Physiotherapy Evidence Database (PEDro) Scale. *Results:* Six studies met the inclusion criteria. Training with TR was compared either to the same training without TR or usual care/neurodevelopmental treatment. The PEDro scores ranged from 4 to 7. Three studies identified more improvements in functional abilities in TR-groups compared to the control-groups at posttest (effect size [ES] range 0.35-0.72). Seven different clinical measures have been used to measure changes in functional abilities. However, the observed change of the TR-groups exceeded the MDC in 2 outcome measures and the MCID in one. Long-term effects on functional abilities were found in one study after 4 weeks (ES 0.26). To our knowledge MDC/MCID values of the used outcome measure are not yet known. *Conclusion:* TR has immediate and long-term effects on functional abilities. However, these changes are not consistently clinically detectable and meaningful. *References:* 1) Michaelsen S.M., Dannenbaum R., Levin M.F. (2006). Task-specific training with trunk restraint on arm recovery in stroke: randomized control trial. *Stroke*, 37, 186–192. 2) Wu C.Y., Chen Y.A., Chen H.C., Lin K.C., Yeh I.L. (2012). 3) Pilot trial of distributed constraint-induced therapy with trunk restraint to improve poststroke reach to grasp and trunk kinematics. *Neurorehabilitation and neural repair*, 26, 247–255. 4) Wu C.Y., Chen Y.A., Lin K.C., Chao C.P., Chen Y.T. (2012). Constraint-induced therapy with trunk restraint for improving functional outcomes and trunk-arm control after stroke: a randomized controlled trial. *Physical therapy*, 92, 483–492.

PD1301

Effect of the Level of Self-Esteem on Self-Reported Adjustability Related To Clinical Practica in Occupational Therapy Trainees: Pre- and Post-Practicum Comparison

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Introduction: Clinical practica are opportunities for occupational therapy trainees to recognize their roles and responsibilities of occupational therapists. The trainee's self-esteem may have effects on self-evaluation after the clinical practicum experience. We investigated the changes in trainees' self-evaluations and their relationship with self-esteem by using the Self-Assessment Scale of Adjustability Related to Practical Placement for Occupational Therapy Students (SSA). *Material and Methods:* Forty-three senior occupational therapy students at A University participated in this study. The Self-Esteem Scale (SES) and the SSA were administered before and after two eight-week practica in two topics. The SSA consists of 19 items that fall under Factor 1 “Learning from Supervisor,” Factor 2 “Dealing with Concerns,” Factor 3 “Understanding the Occupational Role,” and Factor 4 “Collaboration with Clients.” We analyzed the first three factors due to their high reliability. *Results:* The scores from 27 participants were included in the final analyses. The mean SES score was 22.37 (SD 5.89, range 12-36). We divided the participants into high (n=13) and low (n=14) SES groups based on the SES scores. On repeated measures analysis of variance, there were no significant differences between the high and low SES groups in SSA factor scores (Factor 1, $F=2.026$, $p=0.167$; Factor 2, $F=1.391$, $p=0.249$; Factor 3, $F=1.472$, $p=0.236$). Multiple comparisons within each group using Bonferroni inequality showed that all SSA factor scores were significantly higher post- relative to pre-practicum in the high SES group (Factor 1, $p=0.001$; Factor 2, $p=0.006$; Factor 3, $p=0.005$). On the other hand, in the low SES group, there was a significant increase in Factor 1 scores in the post- compared to pre-practicum ($p=0.003$), but not in Factors 2 and 3 ($p=0.291$ and 0.165 , respectively). *Conclusion:* High SES students demonstrated increased SSA scores in all factors investigated. In contrast, in the low SES group, clinical practicum experiences did not lead to increased self-evaluation related to “Dealing with Concerns” and “Understanding the Occupational Role.” Our data also suggest that regardless of the level of self-esteem, clinical practicum experience led to improved self-evaluation on “Learning from Supervisor.”

PD1302

Does the Involvement of Board-Certificated Physiatrists in Rehabilitative Management Influence Clinical Outcomes after Stroke at a Convalescent Rehabilitation Ward?: Analysis Based on Japan Rehabilitation Database

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Background: Many countries have board certification processes for physiatrists. However, the influence of board-certificated physiatrist's involvement in rehabilitative management on stroke rehabilitation outcomes remains unclear. The purpose of the present study was to determine the impact of involvement of board-certificated physiatrist on functional recovery in stroke patients at a convalescent rehabilitation ward. *Materials and Methods:* This study is a retrospective cohort study. Data of in-hospital stroke patient at a rehabilitation ward who were registered in the Japan Rehabilitation Database between 2005 and 2013 was analyzed. A total of 2,873 patients were eligible after applying exclusion criteria. Outcomes were compared with the use of propensity scores and inverse probability weighting adjustment to reduce selection bias. A generalized estimation equation was used to account for clustering of patients within hospitals. Additional subset analyses focused on age and modified Rankin Scale on admission were added. *Results:* Responsible physicians of 42% stroke patients were board-certificated physiatrist. Using inverse probability weighting, patients with board-certificated physiatrist had significantly higher scores than those without board-certificated physiatrist for

FIM efficiency (mean: 0.311 vs 0.284; $p=0.04$). After adjusted with amount of exercise, we found similar result. In the subset analysis, patients with board-certificated physiatrist had significantly higher FIM efficiency compared with those without board-certificated physiatrist in younger and low admission modified Rankin Scale subgroup. In addition, patients with board-certificated physiatrist performed independent exercise more than those without them ($p<0.01$). *Conclusions:* The data suggests that board-certificated physiatrist is associated with good functional recovery in stroke patients at a convalescent rehabilitation ward.

PD1303

Evaluation of the Acute Effects of Gait Disorders in Parkinson's Disease Following Home Physical Therapy Using Wireless Motion Sensors

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Introduction: Gait disorders are one of most disabling symptoms of Parkinson's disease (PD) in daily life. To sustain gait ability, it is important to not only use drug treatment and therapeutic exercise but also improve flexed and asymmetrical posture. The purpose of this study was to indicate the possibility of maintaining gait ability through physical therapy for improving flexed and asymmetric posture in a single patient. *Methods:* The subject was an 80-year-old man suffering from PD for the past 4 years (Hoehn and Yahr stage IV). He could walk independently indoors; however, he had installed handrails as an emergency measure. He had forward flexion of the trunk and scoliosis. In this study, we used wireless motion sensors consisting of a triaxial accelerometer, triaxial gyroscope, and triaxial magnetometer to evaluate gait ability. The wireless motion sensors were attached to five body parts: head (torus occipitalis), neck (7th cervical vertebra), pelvic (2nd sacral vertebra), and both thighs. The patient walked 3m straight and turned back at self-selected speed before and after physical therapy. The physical therapist intervened in trunk and hip joint mobility to improve flexed and asymmetric posture as a treatment for gait disorders. Informed consent was obtained from the patient and the study was approved by the Ethics Committee of our affiliated institution. *Result:* After physical therapy, the patient's posture became extended and symmetrical compared with that before physical therapy. As a result of having analyzed wireless motion sensors, swing phase was longer and turning movement was smooth. Regarding to turning movement, the vertical acceleration was smaller and the horizontal angular velocity was faster than before physical therapy. *Conclusion:* This study suggests that maintaining extended and symmetrical posture by physical therapy intervention can stabilize or delay gait disorders as long as possible. However, this study involved a single patient; therefore, for detailed examination of acute effects of gait disorders in PD, it is necessary to conduct long-term clinical trials to demonstrate the efficacy of interventions using wireless motor sensors.

PD1304

Application of Assistive Devices for Upper Limbs in Patient with High Level Quadriplegia (C5, ASIA-A)

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Introduction: The purpose of the current case study is to demonstrate the usefulness of the application of assistive devices and the patient's education in their use, in order to maximize his participation in activities of daily living. *Material and Methods:* This case study refers to a 33 years old male patient, with quadriplegia C5 (ASIA-A), as a result of a car accident. The assistive devices were totally constructed from thermoplastic material in our Occupational Therapy Department, with emphasis on activities such as feed-

ing, computer use, writing and facial hygiene (shaving-brushing teeth). *Results:* The application of assistive devices enables the quadriplegic patient to participate in simple everyday activities, which is an additional motivation for participation, acquisition of interests, maintaining and retrieving new roles, in order to be satisfied and improve his quality of life. The involvement of the quadriplegic patient to perform daily activities also contribute to maintaining fitness, strengthening the musculature, improving balance in sitting position and coordination of movement. *Conclusions:* The application of assistive devices is an important tool for the reintegration of the quadriplegic patient in operational areas of everyday life. It provides an additional motivation for further improvement of socialization, decreasing the possibilities of depression.

PD1305

Sensory and Motor Re-Training in Patients with Cerebral Damage Using Board Games

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Introduction: The purpose of the current study is to describe the methods in which patients with cerebral damage can be involved in board games, as an effective means of exercise and retraining of motor control of the upper limb. *Material and Methods:* 12 patients (10 males and 2 females, range of age 25-42 y.o.) with cerebral damage and concomitant hemiplegia, participated in the study. To improve the use of the hemiplegic upper limb we used board games, which contained small cubes (dimensions: 4 cm * 2 cm) and cylinders. The frequency of treatment session was 5 times per week, 45 minutes per session, under the supervision of the responsible occupational therapist. *Results:* Participation of hemiplegic patients in board games contributed to the improvement of sensory and motor skills (initial modified Barthel index 65, post program modified Barthel index 85) which retrieved their involvement in simple daily activities. Additionally, the use of board games promoted the safe use of the upper limb during various daily activities or spontaneous tasks. *Conclusions:* Board games are important tools in re-training sensory and motor function of the upper limb in patients with cerebral damage and improve participation in daily and recreational activities. They also promote productivity, participation in self-care activities and entertainment.

PD1306

How Resident Doctors Perceive the Rehabilitation Medicine Training in Romania-EU

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Introduction: Rehabilitation is a complex activity, both medical and social, that involves professional education for the patient, family and medical personnel, that seeks to restore full functionality for patients. Our goal was to measure the interest and assessment of resident doctors in Rehabilitation Medicine on their specialty and also on their social and educational life. *Material and Methods:* We have applied and validated three tests. First, the original "Dundee Ready Education Environment Measure (DREEM)" test in English, for the first time for residents. Second, the "10 questions" test for research in medical rehabilitation. Third, a professional orientation questionnaire containing 52 questions divided into 5 categories. A total of 28 resident doctors have participated at the tests anonymously, the results being distributed by year of practice. *Results:* For the DREEM test, all Cronbach alpha correlation coefficients are significant (>0.7) except the 5th category; the test also has its own interpretation guide, in our case, the total average score was 150.4 points. For the "10 question" test, the average score was 7.03 points. The questionnaire emphasized the strength and weaknesses in the teaching program. *Discussion:* The tests showed that the residents

have approved the courses and the clinical part comprising practical works. They showed interest in treatment methodologies, as well as in the idea of associating theoretical and practical training, considering it necessary for their future profession. *Conclusions:* Periodic testing of resident's perception proves particularly useful for identifying the deficiencies, which may arise during the teaching process. This can be a significant instrument to continuously respond to the raised common issues, solving them efficiently. As a student-teacher partnership, modern training cannot ignore the practical needs of resident doctors. *Keywords:* Medical Rehabilitation, resident doctors, professional training, DREEM test.

PD1307

Master Course Occupational Therapy & Physiotherapy at Medical School of Hanover

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Relevance: Development of education in health care professions in Germany is tending to an academic level over the last 15 years (Küther, 2013). Those study courses settled on universities of applied sciences are now reaching universities. One of the first is Medical School Hanover (MHH) with a master program for occupational therapy and physiotherapy. The Health Research Council has called for strengthening research in the health care professions by more university places to Masters courses in order to provide the scientific youth development to ensure research together with reference disciplines at the university level and to make a continuous research in the allied health professions (Health Research, 2011). *Concept and Educational Goals:* The master's degree occupational therapy and physiotherapy is integrated in the Department of Rehabilitation Medicine at MHH. Students research in occupational therapy and physiotherapy benefits from synergies with successfully established rehabilitation research and highly specialized and innovative spectrum of patient care, which is an ideal research field. Unique features of the program are in addition to the integration into a medical school clinical and rehabilitative orientation and direct scientific relevance with a methods-critical approach. Educational goals are to enable advanced therapists to carry out research in the field of therapy with practice derived research questions. Hereby they may develop evidence-based treatment regimens and a professional self-image with a therapy-specific body of knowledge. *Establishment:* In February 2013, the program was accredited by the AHPGS. The academic training of occupational therapists and physiotherapists in Germany are added to the master's degree program in Occupational therapy and Physiotherapy in October 2013. The students complete 14 modules in four semesters. In summary, the modules are divided into categories of science methodology, clinical practice, Social Sciences, Management and Scientific works. To offer teaching that is led by research: nearly all lecturers are researchers.

PD1308

Transdisciplinary Training in Rehabilitation Professionals: Roadmap to a Unique Professional Language

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Dealing in rehabilitation with overlapping skills is a major challenge. Different occupational groups with differing qualifications working together, but with overlapping competencies it must come to be clarified together necessarily. One solution to this dilemma represents the joint transdisciplinary training of professionals in the rehabilitative skilled occupations. Idea is to find a common language and level of communication for clinical diagnosis and consideration. We present a roadmap that can serve all professions involved to the orientation of education and training models in the context of academic and non academic processes and in combination. Hard- as well as softskills are implemented in this process oriented view.

PD1309

Influence of Rehabilitation Residency Training in Performing Chemodenervation in Cerebral Palsy Children

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Introduction/Background: Chemodenervation practice in Thailand began in around 1991, using phenol as the principle injecting agent. It had been included in Thai rehabilitation training program five years later at around 1996. The Thai rehabilitation residency training policy requires a minimum of 5 chemodenervation cases, however, its influence on post-training practice is not known. This study aimed to 1) discover number of cases performed during residency training to enable confident practice and 2) identify the present practice obstacles. *Materials & Methods:* The questionnaire structure and content was designed by the authors and then developed into electronic and plain paper format. The electronic format was developed using REDCap (Research Electronic Data Capture) application. A 3-month data collection period consisted of three e-mail invitation to 394 Thai physiatrists, in total. The plain paper questionnaires were sent via surface mail to 64 physiatrists. The questionnaire consisted of two parts. The first part focused on present demographics, working status, chemodenervation practice and workplace facilities related to chemodenervation procedure. The second part focused on past residency training experience, particularly the number of CP children cases, confidence to perform the procedure and need for additional training. The data were analyzed using SAS statistical software. Demographics, current practice and residency training data were described as percentage and mean (SD). The impact of present training policy on post-graduate practice was analyzed by Cochran-Mantel-Haenszel chi-square and binary logistic regression. *Results:* Eighty-five physiatrists had been trained to perform chemodenervation in cerebral palsy (CP) children, only 54% actually practiced, 49.4% reported training experience of less than 10 CP cases and 63.5% would like to have further training. Training experience was associated with post-training practice ($p=0.014$), but, age had stronger association ($p=0.0055$). Cochran-Mantel-Haenszel Chi-square showed significant association between number of cases and physiatrists' confidence in performing chemodenervation in children ($p<0.001$) Binary logistic regression analysis showed a minimum of 10 cases during training was required to perform chemodenervation in CP children with 50% confidence. The younger physiatrists tended to have training experience than the older. *Conclusion:* Increase in number of case requirement during rehabilitation residency training should be considered.

PD1310

Creation of Rehabilitation System in Latvia, 20 Years of Experience

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Introduction/Background: After regain of independence in 1990 there was no rehabilitation system that would be based on functioning and multiprofessional rehabilitation team. One of the reasons for this was that professional resources had lack of education and there was no therapist profession at all. *Material and Methods:* Retrospective analysis of the achievements in educating rehabilitation professionals in Riga Stradins University for last 20 years was carried out. *Results:* In the last 20 years Riga Stradins University Faculty of Rehabilitation has initiated and continued to implement the following occupational therapist study programs: physiotherapists, occupational therapists, audio/speech therapists, prosthetic/orthotic, nutritionists, art therapists. Faculty of Rehabilitation also is responsible for the PRM specialists training program content. Taking into account the low level of financial strength in region in the nineties, creation of study programs was done with the help of

different supporters: universities and professional schools (physiotherapy, audio/speech therapy, art therapy), Professional associations (occupational therapy), Rotary international (prosthetic/orthotic). After the year 2000 programs were created using Latvian own experience and resources (nutritionists). There was a lot of support from UEMS PRM Board & Section in educating the PRM doctors. It was decided not to make any specific Latvian model when the system of rehabilitation was first made, but to use experience of more developed countries. It should be noticed that there is some inconsistencies in making of the system with the physical medicine. In last 20 years Faculty of Rehabilitation has prepared around 1,300 therapists and more than 30 PRM doctors. For Latvia with its less than 2,000,000 populations this is a relatively sufficient number for the development of multiprofessional rehabilitation. *Conclusion:* Development system for education of rehabilitation professionals in countries can be based on: 1) In case of limited fundings international support and assistance should be used. 2) Possibilities of using the experience of developed countries has to be assessed.

PD1311

Revision of the Postgraduate PRM Curriculum in the Republic of Srpska (B&H Entity)

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Introduction: In year 2014, the Ministry of Health and Social Welfare in Republic of Srpska (B&H entity) passed new By-law, approving the proposed extension of the PRM curriculum. For years, PRM association was lobbying for 4 years curriculum in order to meet minimal standards. Association was also involved in the Curriculum revision process, through wide consultations. However, the last word was given by Dept. for PRM at Medical School of Banjaluka University while fields for PRM subspecialist training were decided by Ministry, based on regional experiences. Aim of the paper is to analyze the new PRM postgraduate curriculum in terms of formal novelties, including fields of subspecialist training which PRM specialists are eligible for. *Material and Methods:* PRM curricula contents of new and previous by-laws were compared with focus on formal novelties in rehabilitation fields and non-rehabilitation fields. Current subspecialist training fields for PRM doctors were listed and commented in terms of experience up-to date. *Results:* In new PRM curriculum formally novel fields are cardiac and pulmonary rehabilitation, rehabilitation of oncological patients and community based rehabilitation. More time is given to rehabilitation of vascular patients and patients with post-operative/posttraumatic conditions. Other novelties are protected periods (4 months) for development of practical skills and for optional field (3 months) as chosen by PRM trainee and mentor. Novelties in non-rehabilitation fields include pomology, endocrinology, vascular surgery and radiology. PRM doctors are eligible for seven (7) subspecialist trainings, as follows: assessment of occupational/working ability, angiology, epidemiology of non-communicable diseases, baromedicine, balneoclimatology, children rehabilitation and addiction diseases. *Conclusion:* Changes in new curriculum certainly reflect changes in PRM practice – more patients with consequences of chronic non-communicable diseases, more patients after oncology treatment and burning need for adequate community based treatment and follow up. Introduction of radiology and protected time for practical skills may be result of EBPMR and necessity for PRM doctors to get more involved in diagnostics, traditionally performed by other specialists. Presently, there are PRM doctors subspecialized in children rehabilitation, angiology and balneoclimatology. Whether new generations of PRM specialist will have interest in new subspecialties proposed by policy makers it yet to be seen.

PD1312

Inclusive Education and Art Therapeutic Support in the Field of Rehabilitation

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The support in the field of inclusive education has different aspects in relation to rehabilitation. It concerns the physical, psychic as well as social factor in enabling the persons to be part in the social life. In that regard it works with basic stimulation and recognition of personal competences in its development. In the field of art therapeutic support it works in a playful way with inner images, stress release, resources by using the artistic expression as a means for getting in contact with the own abilities as well as with others. It can be integrated in the different fields of rehabilitation as group activity or single intervention in relation to the complexity of disability. Referring to three different cases some different aspects of intervention will be introduced: - selective mutism of an 21-year old girl in a rehabilitation centre regaining strength to handle own affairs; - a fifty-year old woman with breast cancer finding a new life perspective; - digital story-telling as a resource-suitcase in a psychiatric hospital for patients with traumatic experiences. The art therapeutic intervention is related to support the feeling of coherence and self-esteem. It refers to multimodal forms of expressions in combining them to enhance emotional enrichment by overcoming habits in behaviour. On the other hand it enables in a playful way to activate physical competences by overcoming blockages in movements. In relation to neurosciences it supports new ways of stimulating the inner learning abilities and is part of a new approach to inclusion. *Keyword:* inclusive education, art therapeutic support, coherence, neurosciences, case studies.

D.4. REHABILITATION MANAGEMENT AND ADMINISTRATION

PD1313

Societal Cost of Traumatic Brain Injury: a Comparison of Cost-of-Injuries Related to Biking with and without Helmet Use

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Objective: The goal of this study is to determine if a difference in societal costs exists from traumatic brain injuries (TBI) in patients who wear helmets compared to non-wearers. *Methods:* This is a retrospective cost-of-injury study of 128 patients admitted to the Montreal General Hospital (MGH) following a TBI that occurred while cycling between 2007 and 2011. Information was collected from Quebec Trauma Registry. The independent variables collected were socio-demographic, helmet status, clinical and neurological patient information. The dependent variables evaluated societal costs. *Results:* The median costs of hospitalization were significantly higher ($p=0.037$) in the no helmet group (\$7,246.67, vs. \$4,328.17). No differences in costs were found for inpatient rehabilitation ($p=0.525$), outpatient rehabilitation ($p=0.192$), loss of productivity ($p=0.108$) or death ($p=1.000$). Overall, the differences in total societal costs between the helmet and no helmet group were not significantly different ($p=0.065$). However, the median total costs for patients with isolated TBI in the non-helmet group (\$22,232.82) was significantly higher ($p=0.045$) compared to the helmet group (\$13,920.15). *Conclusion:* Cyclists sustaining TBIs who did not wear helmets in our study were found to cost society nearly double that of helmeted cyclists.

PD1314

Mouth and Pharynx Rehabilitation with the Oral Health Care Team

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Introduction/Background: Evaluation of intra-oral conditions and the practice of oral health care contribute to the prevention and improvement of aspiration pneumonia. Recently, the necessity of such care for inpatients has been recognized, but the care activity has not been standardized. Documentation of teamwork may be useful for strengthening the team approach to oral health care at other hospitals. Therefore, we describe mouth and pharynx rehabilitation with the oral health care. **Material and Methods:** With respect to intra-oral conditions, we examined the values of oral cleaning, salivary wetness, furred tongue, and oral malodor. The overall oral condition was evaluated with a total grade (4-16) of these four items. The patients with a poor oral condition (more than 8 in total) were performed oral cleaning by ward nurses and oral hygienists. With respect to the number of patients who underwent oral screening and cleaning, 800 inpatients in July 2006 and 1951 inpatients between April 2007 and March 2008 were investigated with the assessment sheets. The differences in the incidence of patients between these two periods were compared using the chi-square test. **Results:** The incidence of patients who underwent screening increased significantly ($p < 0.01$) from 45% (360/800) to 80.6% (1573/1951). The incidence of patients who underwent oral cleaning increased significantly ($p < 0.01$) from 6.3% (50/800) to 13.4% (261/1951). Before the oral care, the total grade of four items ranged from 4 to 10, with a median of 6.0. After the care, the oral conditions improved significantly (the total grade ranged from 4 to 8, with a median of 5.0). In all patients, the aspiration pneumonitis did not occur. **Conclusion:** Taking these results into consideration may be useful for the development of mouth and pharynx rehabilitation with oral health care work in other institutions.

PD1315

The Risk Assessment of DVT/PE before Rehabilitation Therapy

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Introduction/Background: Deep vein thrombosis (DVT) and pulmonary embolism (PE) are one of the most important complications in Rehabilitation therapy. When we diagnose them, we use some examinations (enhance CT, MRA, ultrasound examination). But, we couldn't have much manpower and testing equipment. So, sometimes we have to have the first walking exercises with no exams. In our hospital, we use PTP score (by Wells) and D-dimer cutoff value for risk assessment of DVT/PE. **Material and Methods:** From April 2014 to September 2014. Patients in our hospital. They take rehabilitation therapy. We make a rule for patients that their PTP score is 2 or more and D-dimer is 4.0 $\mu\text{g/ml}$ or more (cutoff value) have to take exam to rule out DVT. **Results:** In that period, there are 800 patients they take rehabilitation therapy. In those of them, the 29 patients had met both conditions (PTP score and D-dimer). In the 29 patients, there were 15 DVT patients. **Conclusion:** The combination of PTP score and D-dimer cutoff value is effective, to find DVT patients. To use them, we can find DVT patients in high rate, before the first walking exercise if we can not have the chance to have examination of them.

PD1316

Using uSPEQ to Improve Service Quality in Inpatient Rehabilitation Program

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Introduction/Background: Our hospital was the first facility in China who had been accredited by CARF international for a period of one year. uSPEQ Consumer Experience Survey is an anonymous and confidential survey for consumers to voice their: Experiences, Service satisfaction. **Material and Methods:** uSPEQ is used in Inpatient Rehabilitation Program during the process of CARF accreditation. Every patient is asked to fill out the uSPEQ Questionnaire Items when they are discharged. A report is given every three months. It is intended to support the continuation of the quality improvement of our program. For example, there are five questions about patients' participation: "I am able to deal effectively with everyday life activities." "I am able to make choices that are important to me." "I know where and how to get help I need in the community." "I am generally able to do things I need to do without major barriers." "I have opportunities to make friends." The percentage of positive answer of the first report was 71.4%, 90.2%, 73.8%, 83.7%, 95.5%. Then we sought improvement in these areas. We provided services that address the individual impairments, activity limitations, participation restrictions, environmental needs. Patients, family members, caregivers, and other relevant stakeholders were included as integral parts of the team. The interaction and communication was doing well and consensus was reached on predicted outcomes and treatment plan. We individualized the discharge planning for the individual based on goals and outcomes to achieve the most appropriate setting for the patients. We ensured the continuum of care by building relationships with community systems. Much information had been shared with community health centers to promote knowledge of rehabilitation services and continuity of care after patients were discharged. **Results:** Three months later, the percentage of positive answer of these five questions was 75%, 89.3%, 82.1%, 85.7%, 96.3%. The percentage of the patients who thought they had met the needs they came our hospital for increased from 86.4% to 92.9%. **Conclusion:** Hearing the voice of experience offered by patients is essential to establish and improve the quality of services. uSPEQ is an effective tool.

PD1317

Neuromuscular Magnetic Stimulation on Quadriceps in Hemiplegic Cerebral Infarction

*I. A. Han

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Introduction: NMMS generating an electric field below the body surface relatively, can stimulate the neuromuscular system deep with less pain. This study was performed to compare isometric muscle power and ambulatory function after application of neuromuscular magnetic stimulation (NMMS) and neuromuscular electrical stimulation (NMES) in subacute hemiplegic patients. **Material & Methods:** Ten subacute hemiplegic subjects with Poor-Fair quadriceps muscle strength were allocated into NMMS (n=5) and NMES (n=5) group randomly. Quadriceps stimulation was performed 20 minutes/session, twice a day, five days a week for 4 weeks in each group. NMMS were applied using Medtronic Magpro R30, with 12 cm diameter circular coil, at 10 Hz for 5 seconds, 25 seconds resting time, and total 1,500 pulse. NMES were applied at maximally tolerable level intensity. Isometric quadriceps muscle strength using Biodex (Biodex Medical System, New York, USA) and EMG activities during maximal isometric contraction were measured before and after stimulation. Secondary outcome measured using Fugl-Meyer motor score (FMS), Functional Ambulation Category (FAC), 10 meter walking time (10MWT), and Korean Berg Balance Scale (BBS). **Results:** After 4 weeks treatment, quadriceps muscle power and EMG activities were significantly improved in both groups ($p < 0.05$) with no significant difference between groups. FMS, FAC, 10MWT and BBS score were also improved in both groups ($p < 0.05$) with no difference between groups. **Conclusions:** NMMS is a potential alternative treatment to NMES in improvement walking ability and strengthening of muscle power. We need further study of large sample size and follow-up period to determine if the improvement in lower extremity is sustainable.

PD1318

Effects of Kinesio Taping Application to Quadriceps Muscles on Isokinetic Muscle Strength, Gait, and Functional Parameters in Patients with Stroke

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Introduction: Until now, effects of Kinesio Taping (KT) on muscle strength have been studied in healthy subjects or knee osteoarthritis. Furthermore, previous studies focused on sudden effects of KT application. On the other hand, effects of KT on muscle strength in patients with stroke have not been studied as well. Accordingly, the objective of this study was to evaluate the effects of long-term KT application to quadriceps muscles on isokinetic muscle strength, gait, and functional parameters in patients with stroke. **Methods:** Twenty-four patients with subacute-chronic stroke were allocated into KT and control groups. All patients were applied the same conventional rehabilitation program 5 times a week for 4 weeks. In addition, KT was applied to quadriceps muscles bilaterally to the participants in the KT group. **Results:** Compared with baseline, peak torque (PT) levels increased significantly in both groups (all $p < 0.05$) after the treatment. However change levels were significantly higher in the KT group than the control group at 60°/sec AV in extension ($p = 0.04$), 60°/sec and 180°/sec AVs in flexion (both $p = 0.02$). Although PT values increased significantly in both groups (all $p < 0.05$), the change levels were more prominent in the KT group at 60°/sec and 180°/sec AVs in extension ($p = 0.028$ and $p = 0.44$, respectively). Compared with baseline, all values increased significantly in both groups (all $p < 0.05$), however the change levels between the groups did not reach significance ($p > 0.05$). **Conclusion:** KT application to quadriceps muscles in addition to conventional exercises for 4 weeks is effective on isokinetic parameters, but not effective on functional parameters.

D.4.2. CASE MANAGEMENT

PD1319

Physical-Kinetic Therapy in Complex Regional Pain Syndrome Type I-Case Report

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We present the case of a 58 year-old male, diagnosed with complex regional pain syndrome right leg, type I, dystrophic stage. His other comorbidities were: Paresis of the right internal popliteal sciatic, residual after traumatic nerve section. Bilateral primary knee osteoarthritis, moderate stage. High-risk, stage II hypertension. Effort angina. Hypercholesterolaemia. Hypocalcaemia. At admission in our clinic his complains were pain, stiffness, paresthesia and functional impotence of the right ankle and leg, with gait deficit. The patient suffered a posttraumatic section of tibial artery, posterior tibial nerve and peroneal artery, anterior tibial artery thrombosis, distal 1/3 fracture of the right fibula, multiple metatarsal fractures (3, 4, 5) in the right foot (03. 2013). The surgical intervention - peroneal artery, posterior tibial and peroneal veins ligation, internal saphenous vein graft interposition - right posterior tibial artery ligation, followed by skin graft in the distal 1/3 posterolateral right thigh, right popliteal space and right posterolateral calf (05. 2013); latissimus dorsi muscle flap right foot (10. 2013). **Goals of Therapy:** fighting pain, segmental muscle strengthening, improving stability and mobility deficit of the right leg, gait reeducation, sensitivity reeducation, reducing vasomotor and trophic disturbances. **Therapeutic tools:** lifestyle changes, drug therapy, physical kinetic therapy. **Objectives of Physical Therapy:**

correct vicious postures and prevent further deviations, fighting muscle retractions, ameliorate right knee and ankle mobility and stability, restoration of right leg muscle tone, gait reeducation, reeducation of everyday gestures, reducing edema and vasomotor disturbances. Hydrokinetotherapy in the pool with thermal water, 360C, was used for the relaxing and analgesic effect, for joint unloading, musculoligamentous stretching, combating joint stiffness and gait reeducation. Alternating baths of the legs were used for edema resorption and to promote blood return. Ultrasonophoresis with hydrocortisone 0.5 W/cm² was used for simpaticolitic effect on Scarpa's triangle right leg and fibrinolytic effect 1-1.5 W/cm², right foot. Sedative lumbar massage and venolymphatic drainage, 10 minutes, on the right leg were also performed. Evolution was favorable, we managed to reduce knee flexion with 50. The patient also gained muscle strength, improved gait, right leg support was about 80% and edema was significantly reduced.

PD1320

Medical Rehabilitation in a Case with Severe Clinical Onset of Syringomyelia*M. Cevei¹, D. Stoicanescu², F. Cioara³

¹University of Oradea, Faculty of Medicine and Pharmacie, Baile Felix, ²University of Medicine and Pharmacy "Victor Babeş", Timisoara, ³University of Oradea, Faculty of Medicine & Pharmacy, Oradea, RO

We present the case of a male aged 35 years, with sudden onset of sensorimotor deficit, without loss of consciousness. Clinical examination findings were tetraplegia, urinary and fecal incontinence and loss of thermal and pain sensitivity, sparing tactile and deep sensitivity in the limbs and trunk. MRI excluded multiple sclerosis, revealing intramedullary cystic cavities at C3-C7. Emergency surgery with *drainage* of the *syrinx* was practiced. 3 weeks after surgery rehabilitation treatment was initiated in Medical Rehabilitation Clinical Hospital Baile Felix, Romania, the patient gradually regaining sphincter control at about 2 months after surgery, and performed transfers with minimal help. The most significant data from the patient's medical history were diabetes mellitus and hypertriglyceridemia. Diagnosis: Operated C3-C7 syringomyelia. Incomplete spinal cord neurological lesion ASIA D, motor level C7. Left scapulohumeral peri-arthritis, mixed shoulder. Insulin-requiring type 2 diabetes mellitus complicated with peripheral sensory polyneuropathy. Hypertriglyceridemia. General objectives of the treatment: fighting pain and joint stiffness, decrease spasticity, walking reeducation, increase voluntary motor control of limbs, ADL training and improving quality of life, treatment of associated metabolic diseases and prevention of complications. Means: lifestyle changes, drug therapy, kinetic physical therapy. **Objectives of physical therapy:** increase joint mobility, decrease spasticity, correct vicious postures (flexion of elbow and fingers, dorsolumbar scoliosis), improving the coordination of upper and lower limbs, gait reeducation, prevention of cardio-respiratory deficit. Occupational therapy goals: increase functional independence and improve quality of life, prehension improvement, training self-care activities, training orthosis use in daily gestural activity. Therapy also included relaxing massage for dorsal and lumbosacral spine to decrease contractures and spasticity, venous lymphatic drainage of lower limbs to relieve edema and neuropathy, underwater shower 36.50, 15 minutes for pain relief and muscle relaxation. Evolution was favorable, spasticity decreased, stability, functional independence, ADL increased, leading to improved quality of life. The peculiarity of the case: young patient in apparently good health condition who suddenly developed motor deficit and impaired thermal sensitivity, rapidly worsening to severe quadriplegia, inexplicable as etiology, potential trauma during childhood or idiopathic, requiring emergency surgery. The condition is aggravated by concomitant neuropathy of central cause and diabetic polyneuropathy.

D.5. MISCELLANEOUS

PD1321

Awareness of PMR among Health Care Professionals: a Cross Sectional Study

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Background: Physical medicine and rehabilitation is an established medical specialty that aims to enhance functional ability and restore quality of life to those with physical impairments and disabilities. Unfortunately, there is a huge shortage of PMR departments in our country. This paper presents finding from a survey of health care professionals regarding their awareness of PMR. **Methods:** Validated questionnaire was mailed to the concerned authority (Administrators and Medical superintendents) of 924 hospitals across India. A total of 67 responses were obtained and only 60 were included for analysis. **Results:** The physiatric skills correctly identified by a majority of respondents were limb prosthesis evaluation (68.3%), trigger point injections (58.3%), and Nerve conduction and Electromyography studies (51.7%). Skills correctly attributed to PMR by significantly fewer respondents included Motor point block (48.3%), Urodynamics (33.3%), Surgery-amputation, tendon lengthening, skin grafting (30.70%) and Epidural injection (26.7%). Correctly identifying the skills possessed by a subspecialist is integral to making a decision to refer. 55% of the respondents agreed physiatry is a synonym for PMR and 83.3% recognized it as specialty recognized by Medical Council of India. 91.7% believed that they understood the Difference between Physiatrist and Physiotherapist. Only 43.3% of the respondents reported that they referred patient to PMR with an average of >3 patients per month. **Conclusion:** Hospital Administrators and Medical superintendents should be educated about the benefits of referring patients to physiatrists. Even though their knowledge about the specialty is good, the actual referral status is inadequate. This point to the fact that the respondents are unable to refer people with disability because of the lack of PMR Departments for rehabilitation. This emphasize the need of more PMR departments and more Physiatrists in India for the people with disabilities

PD1322

The Impact of Housing Adaptations on Person's Occupational Life: View Point of Occupational Therapists*K. Bormašovs¹, K. Haberkorne², A. Nelsone², M. Kuželenko², A. Metelica², G. Bergholde²¹Riga, ²Social Service of Riga, Riga, LV

Introduction: One of the obligations of occupational therapists working at social department in Municipality of Riga is to do assessment of accessibility of home environment on request of client and the supervision of projects of housing adaptation. The rights to get grants (EUR 2134,31) for housing adaptation has person – wheelchair user, lived in administrative territory of Riga. **Aim:** to assess impact of housing adaptation on occupational life of person – wheelchair user. **Methods:** to assess and analyze impact of housing adaptation on occupational life of person – wheelchair user we used documents of housing adaptation in Municipality of Riga for the time period from 2010- 2013, including two assessment tools: The Housing Enabler (Iwarsson, Slaug, 2010) to assess accessibility in physical environment and Activities of Daily living (Fricke J.) to assess ability or inability to perform activities of daily living. **Results and Conclusions:** There were realized 137 projects of housing adaptation in Municipality of Riga in 2010 - 2013. Most frequently based on occupational therapist assessment and clients point of view there have been made adaptations in bathroom and in entrance to apartment. Housing adaptation increased persons independence in daily activities. The major improvement was detected by occupational therapists in persons' self care and mobility.

PD1323

The Impact of Housing Adaptations on Person's Occupational Life: View Point of Occupational Therapists

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Riga Social Service, Riga, LV

Introduction: One of the obligations of occupational therapists working at social department in Municipality of Riga is to do assessment of accessibility of home environment on request of client and the supervision of projects of housing adaptation. The rights to get grants (EUR 2134,31) for housing adaptation has person – wheelchair user, lived in administrative territory of Riga. **Aim:** to assess impact of housing adaptation on occupational life of person – wheelchair user. **Methods:** to assess and analyze impact of housing adaptation on occupational life of person – wheelchair user we used documents of housing adaptation in Municipality of Riga for the time period from 2010- 2013, including two assessment tools: The Housing Enabler (Iwarsson, Slaug, 2010) to assess accessibility in physical environment and Activities of Daily living (Fricke J.) to assess ability or inability to perform activities of daily living. **Results and Conclusions:** There were realized 137 projects of housing adaptation in Municipality of Riga in 2010 - 2013. Most frequently based on occupational therapist assessment and clients point of view there have been made adaptations in bathroom and in entrance to apartment. Housing adaptation increased persons independence in daily activities. The major improvement was detected by occupational therapists in persons' self care and mobility.

E.1. THEORY AND MODELS OF FUNCTIONING

PE1324

Effects of A Motor Learning Method Using Auditory Beat Sound Stimulation on Motor Imagery and Physical Performance*K. Kawakata¹, Y. Ikeda²¹Tokyo University of Technology, ²Tokyo Metropolitan University, Tokyo, JP

Introduction/Background: Motor memory, which is part of motor learning, is believed to be related to motor imagery. Motor learning, which can be increased with appropriate auditory stimulation, is related to attention and concentration ability. In this study, motor learning was evaluated from the perspective of memory with a focus on “chunking”, and the effects of auditory beat sound stimulation on the chunk were determined for improvement of motor imagery and physical performance. **Material and Methods:** Thirty healthy subjects (10 females, 20 males; mean age: 27.0 years; range: 20–37 years) were randomly classified into three equal groups. In the learning group, subjects observed six system motion tasks, which they had to reproduce on a PC without actual body movement for 8 sets. Subsequently, they had to physically reproduce these tasks for 10 sets. The learning group was divided according to auditory beat sound stimulation at the time of learning: a sound group (group A) and no- sound group (group B). For physical task reproduction, physical reproduction time, remembrance time, and the accuracy of performance were analyzed from video recordings. The non-learning control group (group C) was assigned calculation tasks. In all groups, CMI-T was used to evaluate motor imagery before and after the task. **Result:** There was no significant difference in motor imagery between groups at the end-point or within groups before and after stimulation. A negative correlation between the accuracy of performance and the remembrance time was observed in group A only (R=-0.775, p=0.009). **Conclusion:** Under the learning conditions used in this study, no improvement in motor imagery was observed following auditory beat sound stimulation. However, an effect on remembrance was observed in group A, in which the performance accuracy and remembrance time represented memory reproduction

and retrieval, respectively. This suggested that exposure to the beat sound might have improved concentration but did not improve the ability to maintain a stable memory of the motor image.

PE1325

Stakeholder Perspectives' on Social Participation in Pre-School Children with Autism Spectrum Disorder

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Background: Social participation for children with disabilities is considered the ultimate aim of rehabilitation. To date, the perspectives of stakeholders' have been absent in the refinement of this construct. Thus, the primary aim of this study was to refine the construct of social participation for pre-school children with Autism Spectrum Disorder (ASD) using stakeholders' perspectives. The secondary aim was to understand the facilitators and barriers experienced during the promotion of social participation. **Methods:** A mixed methods web-based survey, utilizing the taxonomy of the International Classification of Functioning, Disability and Health – Child and Youth (ICF-CY) version, was developed to support the construct refinement of social participation. The survey was pilot tested with two groups of stakeholders from Alberta and Ontario to ensure clarity of questions and intended response time of 30 minutes. Stakeholders were identified as professionals (i.e. educators, clinicians) with a minimum of 2 years experience working with pre-school children with ASD. In addition, families were identified as stakeholders if they had a least one child with ASD less than 8 years old. Stakeholders were recruited through purposeful sampling of local community service providers, social media and professional organizations in each province, and then snowball sampling was employed. Quantitative analysis included frequency counting and qualitative analysis included latent content analysis. **Results:** Analysis of 73 stakeholders (professionals [n=50] and parents [n=24]) revealed that the most highly ranked construct was regulation of behaviours to moderate interactions during cooperative and complex play. Further, content analysis revealed that parents and professionals used intrinsic motivation strategies and contingency management to promote social participation. Disruptive and repetitive behaviours were seen to most negatively impact social participation while familiarity of persons or environments facilitated social participation. Barriers to social participation often included sensory elements, as well as disruptive and repetitive behaviours; while facilitators often included the child's familiarity with environment or individuals. **Conclusions:** Findings suggest that stakeholders' view the constructs of social participation as the cooperative and complex engagement of activities with peers requiring the internal regulation of behaviours. This is the first step of a research program aimed at developing a classification system on social participation for pre-school children with ASD.

PE1326

Acceptable Agreement between Inertia-Based Measurement Unit and Optical Motion Capture System Applied in Quantitative Measurement of Physical Function in Patients

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Background: There is need for valid objective measures of physical function when outcome after orthopaedic or rehabilitation interventions are evaluated. The aim of this study was to validate an Inertia-based Measurement Units (IMU) against an Optical Motion Capture System (OMCS). **Material and Methods:** Ten patients (eight females), mean age 28 (16-43) years with hip dys-

plasia were tested. The test battery included four lower extremity performance measures: sit-stand-sit (STS), stair climbing (SC), block stepping test (BST) and counter movement jump (CMJ). We applied an IMU (Micro Strain Inertia-Link) and recorded data at 100 Hz. Kinematic data were recorded at 240 Hz with an 8-camera ProReflex MCU 1000 OMCS. Rotations were measured as range between highest and lowest value. Agreement between the two systems was analyzed and presented with Limits of Agreement (LOA) (mean difference \pm 1.96 x SD). **Results:** Overall, the agreement between the rotations by the IMU and the OMCS was acceptable. LOA for rotations in the frontal plane in degrees for STS were 3.7 \pm 15.4 in ascending and 3.3 \pm 11.1 in descending. For SC, LOA for rotations in the sagittal plane were 2.2 \pm 6.9 deg in ascending and -3 \pm 5.8 deg in descending. LOA for rotations in the sagittal plane at the BST were -0.7 \pm 5.3 deg in ascending and -1.2 \pm 5.9 deg in descending. LOA for vertical translation for CMJ were -0.6 \pm 5.5 cm. There were systematic differences between the IMU and OMCS in SC (mean diff 2.2 deg p=0.03 and mean diff -3 deg p<0.01 respectively). **Conclusion:** The IMU showed acceptable agreement with OMCS when applied in test of physical function in patients. There is a clear perspective for clinicians to apply the IMU in the evaluation of orthopaedic or rehabilitation interventions.

PE1327

Approach and the Effect of Ward Charge System Rehabilitation in Acute Phase Hospital

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In the beginning: The place of rehabilitation was shifted to the ward in the this hospital for neurosurgery and the neurology ward in-patient to offer a better team medical treatment for patient QOL improvement in July, 2010, and succession with the nurse and participation in the conference, etc. began. The convalescence rehabilitation ward was a center in the report of rehabilitation team medical treatment up to now, and the report in the university hospital where a lot of diagnosis and treatment departments and number of beds existed was few. Then, because the method of the rehabilitation team medical treatment to the brain and the nerve disease patient in the university hospital was examined this time, it reports. **Object and Method:** It made comparative study by the crowd after ward rehabilitation had begun with the crowd before ward rehabilitation of the patient hospitalized in neurosurgery and the neurology ward began. The examination item are an effect of FIM, FIM efficiency from hospitalization to hospital days and the rehabilitation beginning, and the number of average execution unit of a day. **Results:** After ward rehabilitation had begun intentionally hospital days and hospitalization to the rehabilitation beginning was shorter. The difference did not admit other items. **Considerations:** As for the factor of shortening days of hospitalization, it was thought that the intelligence sharing between multi occupational categories was enhanced by doing rehabilitation in the ward, targets were united, and the flow until the changing hospital (convalescence rehabilitation ward) and leaving hospital had become smooth. It was suggested that it be useful to have enhanced the rehabilitation team and medical treatment for improving the intelligence sharing between multi occupational categories and promoted of the family education. The necessity of the rethinking of rehabilitation in an improvement of FIM and shortening further hospital days was suggested as future tasks.

E.2. CLASSIFICATION OF FUNCTIONING (E.G. ICF CORE SETS; ICF UP-DATE AND REVISION)

PE1328

Validation of "Brief Core Set of Depression" of ICF

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Introduction: ICF Core Sets have been developed for the twelve most chronic health conditions with depression as the only psychiatric condition. This study is first of any such which has attempted testing the psychometric properties of the Brief ICF core set for Depression. Inter-rater reliability, convergent validity and divergent validity have all been tested in this study. **Material and Methods:** For this study, a cross sectional design was employed in which patients with two distinct severities of depression (first, dysthymic disorder; second, severe depressive episode without psychotic symptoms) were rated on Brief ICF Core Set for Depression as well as on the other selected comparison scales. A subsample of these patients was used for pilot testing to measure inter-rater reliability. The discriminant validity of Brief ICF Core Set for Depression was tested by comparing two groups. The convergent validity of Brief ICF Core Set for Depression was tested by comparing (i) Mental function domain of Brief ICF Core Set for Depression with score of (Hamilton Depression Rating Scale) HDRS (ii) Activity participation domain of Brief ICF Core Set for Depression with Indian Disability Evaluation and Assessment Scale (IDEAS) and Dysfunction Assessment Questionnaire (DAQ). (iii) Environmental factors domain of Brief ICF Core Set for Depression with Social Support Questionnaire (SSQ). **Results:** Discriminant validity: subjects in the severe depression group had significantly higher level of dysfunction compared to subjects with dysthymia on all the domains of IDEAS and DAQ. **Convergent validity:** (a) The HDRS scores in the severe depression without psychotic symptoms had significant correlation with mental function domain of ICF core set of (b) There were significant correlations between total IDEAS and total DAQ score and scores on the activity participation domain of the Brief ICF core set of depression for both the groups of depression (C) There was no correlation between environmental factors of Brief ICF Core Set for Depression and SSQ in either group. **Conclusion:** Brief ICF core set for Depression has overall good discriminant and convergent validity, as regards to mental function and activity participation domains, but poor validity regarding environmental function domains.

PE1329

Incorporating Environmental Factors in Gait Assessments of Persons Following Amputation

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Background: For persons following amputations of the lower extremities, the main limitation is difficulty walking, which limits function necessary for independent living. Reduced motor abilities can have additional negative effects on the mental health of these individuals. The environmental factors are external to individuals and can positively (facilitator) or negatively (barrier) influence several aspects of a person's life, including gait. These environmental factors have also been recognized by the International Classification of Functioning, Disability, and Health (ICF) to be a component of a multidimensional assessment of people living with disabilities. The purpose of this study was to investigate whether the environmental factors outlined by the International Classification of Functioning, Disability, and Health (ICF) are considered when evaluating gait following lower limb amputations. **Materials and Methods:** A literature search of the PubMed, EMBASE, CINAHL, and SPORTDiscus databases was performed. The keywords "amputations" and "gait" were combined with the keywords "barriers", "facilitators", and "environmental factors". Searches were performed without language restrictions. All articles containing data about environmental influences on gait functionality after lower limb amputations published during or after 2002, were included. Manuscripts that did not study adults and literature reviews were excluded. Two researchers identified potentially eligi-

ble articles and the methods used to assess gait. To make comparisons between scales, the 2 researchers selected the categories from the ICF chapter on environmental factors. **Results:** Fourteen studies were obtained from the search. Seven studies were duplicates and 4 were excluded. The remaining 3 articles were evaluated. We identified a total of 74 possibilities for categorization according to the ICF environmental factors, but only 7 ICF categories (9.45%) were considered in the studies analyzed. **Conclusions:** The influence of environmental factors is frequently not considered in the evaluation of gait following a lower limb amputation. Thorough evaluation of gait after lower limb amputation should reflect the complex nature of gait changes, including environmental factors.

PE1330

Proposed Use of the ICF to Evaluate Quality of Life after an Amputation

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Background: The International Classification of Functioning, Disability, and Health (ICF) has become a suitable tool to identify the conditions of functionality, environment, and personal characteristics that affect quality of life. Amputations resulting from traumatic injuries stand out among conditions that negatively influence the quality of life. The purpose of this study was to quantify the quality of life of people with a lower limb amputation, and to propose a relationship between the quality of life and the ICF. **Materials and Methods:** After a retrospective study of medical records, 15 amputees met the inclusion criteria. The characteristics of the amputation and quality of life were evaluated, and both were correlated with the ICF. The 36-Item Short-Form Survey (SF-36) was used to assess quality of life. **Results:** It was possible to establish ICF codes for levels of amputation and the quality of life. A high and significant correlation was found between quantitative descriptors of the ICF and SF-36 scores ($r=-0.9376$, $p<0.0001$). **Conclusion:** People with a lower limb amputation showed a reduced quality of life, which was reflected in scores from a generic questionnaire and their correlation with the ICF.

PE1331

Functional Profiles of Active Elderly Individuals with Low Back Pain According to the International Classification of Functioning, Disability and Health

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Background: Low back pain (LBP) is a common health problem across all age groups, but the risk of frequent LBP is greater among elderly than among young adults. To develop adequate health care strategies targeting the needs of elderly individuals, information on the patterns of functional health conditions is required. The current reference for the assessment of human functioning is the International Classification of Functioning, Disability and Health (ICF). The purpose of this study was to describe the functioning of active elderly adults with chronic nonspecific mechanical LBP. **Material and Methods:** This cross-sectional, population-based study was conducted among active community-dwelling older adults in a southern Brazilian city. Participants were enrolled by convenience sampling from a group conducting supervised aquatic and land-based exercises. We included elderly individuals with nonspecific LBP and excluded those with histories of lumbar fracture or surgery, or rheumatic or neurological disease. Forty elderly adults (5 men and 35 women, mean age 67.2 ± 6.0 years) participated in the evaluation. The brief ICF core set for LBP, which includes categories from component body functions ($n=10$), body structures ($n=3$), activities and participation ($n=12$), and environ-

mental factors ($n=10$), was used to establish functional profiles. A health professional with training and experience in ICF use performed evaluations, which were considered valid when $\geq 20\%$ of participants showed some disability (according to ICF qualifiers). Frequency distributions and medians of qualifiers were calculated. The study adhered to Brazilian laws and guidelines for human research. *Results:* Thirty-two of the 35 (91.4%) categories of the brief ICF core set for LBP could be considered representative of the sample. Three categories (b735, e110, and e135) were not considered valid because they showed no impairment in $>80\%$ of the sample. No category showed a high level of disability, as $>50\%$ of elderly participants rated by qualifiers .3 or .4. Only the category e580 was considered by all elderly to be a facilitator. *Conclusion:* Functional impairment differed within this sample of elderly individuals with LBP conducting supervised aquatic and land-based exercises. These results do not favor a sedentary lifestyle because these limitations do not affect the practice of regular physical activity.

PE1332

Functional Profile of A Brazilian Wheelchair Basketball Team with Spinal Cord Injury According to the International Classification of Functioning, Disability and Health

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Background: The International Classification of Functioning, Disability and Health (ICF) considers multiples aspects of functionality and may be useful for the evaluation of athletes with disabilities. The purpose of this study was to determine the functional profiles of Brazilian wheelchair basketball team members using the brief ICF core set for individuals with spinal cord injury in a long-term context. *Materials and Methods:* This cross-sectional study was conducted with 12 male Brazilian wheelchair basketball athletes with spinal cord injury (mean age 35.5 ± 7.2 years). All participants were paraplegic; injuries were caused by firearms, falls, and vehicular accidents ($n=4$ each). Functional profiles were established using the brief ICF core set for individuals with spinal cord injury in the long-term context, which contains 33 categories (body functions, $n=9$; body structure, $n=4$; activity and participation, $n=11$; environmental factors, $n=9$). They were considered valid when $\geq 20\%$ of athletes showed some disability (according to ICF qualifiers). A health professional trained in ICF use conducted physical evaluations. Frequency distributions and medians of qualifiers were calculated. The study adhered to Brazilian laws and guidelines for human research. *Results:* Thirty-one of the 33 (93.9%) categories were representative of the sample. Two categories (b710 and e340) were not considered valid because they showed no impairment in $>80\%$ of the sample. All athletes showed some impairment in seven categories (s120, d455, d465, d530, e115, e150, and e580). Impairment was most severe in categories s120, d455, d465, e115, and e120. Qualifier 8 (not specified) was not used, reflecting the good quality of data. *Conclusion:* Functional impairment differed within this sample of wheelchair basketball players, but these limitations do not prevent them from practicing the sport.

PE1333

Same Impairment, Different Restriction? Modelling Disability and Environmental Factors

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Background: According to the International Classification of Functioning, Disability and Health (ICF) as well as the UN Convention on the Rights of Persons with Disabilities, restriction in participation result from an interaction of persons with impairments and environmental factors. People with the same impairment may thus experience more or less restrictions depending on the presence

or absence of environmental barriers and facilitators. The ICF, however, is supposed to be etiological neutral and thus theoretically underdetermined in that it does not specify what is actually meant by interaction. Understanding mechanisms and conditions of disablement in more detail is, however, of pivotal importance to intervention planning on the clinical as well as policy level. *Objective:* Participation is a function of body and environment. To further understand this fundamental notion, the lecture focuses on how this function and interactions of environmental factors and impairments can be described with mathematical models and empirically studied. *Materials and Methods:* Conditional process modelling based on analysis of mediation and moderation as well as a combination of the two is introduced to empirically study by which environmental mechanisms and under which conditions impairments may translate into participation restrictions. Appropriate statistical techniques and examples of empirical studies are provided. *Results:* The interplay of impairment and environment in the production of restrictions in participation can be theoretically modelled and empirically studied with moderation and mediation analysis. A combination of both is particularly promising in intervention modelling. Innovative study designs and comprehensive data collection across all components of the ICF are a necessary pre-requisite for the application of these models. *Conclusion:* More precise modelling of interactions of environmental factors and impairments is key to understanding participation restrictions, breaking disablement mechanisms, and creating conditions under which the impact of impairment on restrictions will be minimized.

PE1334

International Classification of Functioning, Disability and Health Core Set for Physical Health of Older Adults

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Background: To facilitate a systematic, comprehensive description of functioning and to enable the use of the International Classification of Functioning, Disability and Health (ICF) in clinical practice and research, core sets have been developed. The aim of this study was to propose a version of the ICF core set to classify the physical health of older adults. *Material and Methods:* The proposition of the ICF core set was based on the Delphi technique. The panel of experts included 8 Brazilian researchers (physical therapists, medical doctors, nurses and physical educators). The communication was wholly electronic. In total, there were 5 rounds of interactivity between the participants to arrive at the final version of the construct. *Results:* The ICF core set presented 30 categories and had a Cronbach's alpha of 0.964. There are 14 categories on body functions (b1300, b1343, b2352, b260, b280, b4100, b420, b4400, b4550, b4551, b7102, b7306, b7356 and b7402), 4 on body structures (s4100, s7700, s7701 and s7702), 9 on activities or participation (d160, d4101, d4104, d450, d470, d5700, d5701, d7504 and d9201) and 3 on environmental factors (e1101, e1400 and e5800). *Conclusion:* The presented core set is a secure, fast and accurate instrument for assessing the physical health and engagement of older adults. It defines points related to functioning and health that are relevant when evaluating this population, as well as when re-evaluating it and monitoring changes.

PE1335

How to Assess and Punctuate an ICF Core Set: a Factorial Validation Study

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Background: The use of ICF core sets is rapidly increasing and is necessary to propose forms of utilization and punctuation rules.

The aims of this study were to apply a core set in a sample to assess the physical health of older adults and to explain how this can be punctuated using an exploratory factor analysis (principal component analysis). *Material and Methods:* 340 older adults (226 females) were evaluated by the ICF core set for physical health. The factor analysis reduced the instrument from 30 to 19 variables, which were divided into six domains: Physical conditions (b1300, b2352, b280, b4550, b7102, b7306, b7356, b7402 and d9201), Osteoarticular conditions (s7700 and s7701), Cardiorespiratory function (b4100 and b4400), Sleep and attention (b1343 and d160), Exercise aspects (b260 and b420), and Drugs and health services (e1101 and e5800). These were responsible for 61.03% of the total variance of the instrument. *Results:* The factor analysis present the Kaiser-Meyer-Olkin (KMO) of 0.86 and the Bartlett's test of sphericity was statistically significant ($\chi^2=1847.1$, $df=171$, $p<0.0001$). There was no anti-image correlations under 0.5 and no communalities below 0.5 in the variables. Older individuals received a punctuation (Core Set Score, CSS), that ranged from -4.75 to 7.85 (mean: -0.0002; mode: 0.02; percentile 25: -1.63; percentile 50: -0.32; percentile 75: 1.40). Lower scores indicated that a person's physical health was better. *Conclusion:* This factor analysis proved to be a reliable way to score an ICF core set. The authors strongly suggest that researchers propose new sets to punctuate ICF core sets, in order that the scientific community can discuss this subject more appropriately and establish a gold standard tool for how to score them.

PE1336

Use of an ICF Core Set in Acute Rehabilitation for Stroke Patients with Higher Order Brain Dysfunction

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Introduction: Because the International Classification of Functioning, Disability and Health (ICF) is exhaustive in its coverage of wide areas, ICF Core Sets have been developed to implement the ICF in clinical practice. An ICF Core Set is a selection of categories for a specific health condition or condition groups. We applied an ICF Core Set to acute stroke patients with higher order brain dysfunction in Japanese acute stroke care settings. *Material and Methods:* Subjects were 19 acute stroke patients (14 male and 5 female, mean age 59.6 years) admitted to our stroke center. All the patients had no definite paresis but suffered from higher order brain dysfunction such as inattention, memory disturbance, and execution disorder. Medical social worker (MSW) supported them to transfer to rehabilitation hospital for continuing further comprehensive rehabilitation program. Patients were matched with rehabilitation hospitals based on their impairments, limitations and personal and environmental factors. To review the process of support provided by MSW, the ICF Core Set for Neurological Conditions in Acute Care was applied to assess functioning of the patients retrospectively. The Generic Core Set was also used for comparability of information. Additionally, final functional status of the patients after home discharge was inquired from MSWs belonged to the rehabilitation hospitals. *Results:* The number of the rehabilitation hospitals where the patients transferred was 9, and mean duration of their hospital stay was 42.0 days. The Brief version of the ICF Core Set for Neurological Conditions in Acute Care was selected and the Documentation Forms were filled out. Information was taken from the case history, previous medical and rehabilitation reports, and Functional Profile was created for each patient. *Conclusion:* It is not so easy to integrate patients with higher order brain dysfunction in the community, however, applying the ICF Core Set make summarizing problems, providing systematic support, and evaluating outcome much easier and more reliable. The ICF has great potential for enhancing clinical practice by providing a standardized description of functioning, and the ICF Core Sets support the interdisciplinary, comprehensive assessment of functioning.

PE1337

Patient Perspective: Functioning, Disability and Participation Restriction Following Lower Limb Amputation

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Background and Aim: The International Classification of Functioning, Disability and Health (ICF) was endorsed by WHO in 2001. ICF is complex and difficult to use as whole on daily practice. A Core Set of ICF categories specific to lower limb amputation is being developed to facilitate its use. As parts of the process a qualitative study is conducted to explore the perspective of the individual with a lower limb amputation from different backgrounds and countries. The aims of focus groups are (1) to explore and understand the perspective of individuals following an amputation on functioning and health and (2) to identify concepts of functioning and health important to these individuals and mapping these concepts to relevant categories of ICF. *Methods:* A semi-structured interview was conducted using 5 open-end questions. It covers body structure and function, activities and participation and environmental factors. The study was conducted in two sites, Beijing, China and Sydney, Australia from 2012 to 2013. The responses were analysed and linked to ICF categories according to published standardised linkage protocol. ICF categories frequency analysis performed. *Result:* There are 83 participants. Participants (39) from China are younger (mean 40 years) and predominantly male (70%). Causative factors are injuries from motor vehicle accident, trauma and cancer. The 44 participants from Australia with a mean age of 56 years had amputations mainly secondary to diabetes and peripheral vascular disease. In Chinese focus group, the most common ICF categories are those related to mental functioning, mobility and basic self-care. The common environmental factors are related to physical barriers, accessing the community and prosthetic funding policy. In the Australian group predominant findings are those categories related to pain and depression and disabilities with basic mobility and activities of daily living at home. *Conclusion:* This focus group study has identified a wide variety of functional problems with different disability profiles in individuals following lower limb amputation from different cultures.

PE1338

Validation of the International Classification of Functioning, Disability and Health Core Set for Chronic Ischemic Heart Disease in Turkish Patients

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Introduction: ICF is a current standard, for the assessment of the health conditions, developed by the WHO. CIHD is a worldwide major cause of death and disability. Interventions of cardiac rehabilitation is effective in the prevention and treatment of CIHD. The ICF core sets can be used at planning, monitoring and measurement of results in rehabilitation interventions. This study investigates the reliability and construct validity of the ICF core sets for CIHD in Turkish patients. *Material and Methods:* Research was conducted with 101 patients who were diagnosed CIHD. Demographic and disease data were collected. ICF core sets for CIHD, SF-36 and MIDAS scores of the patients were recorded. Descriptive analysis of the data were evaluated. Reliability was evaluated by using the Cronbach's alpha coefficient. Spearman correlations were calculated to evaluate the construct validity. *Results:* Both Comprehensive and brief core set scales and their main components found reliable. "Body Functions", "Body Structure" and "Activities and Participation" components included in the categories were correlated with both SF-36 and MIDAS subgroups. Some "Environmental Factors" included in the categories were not correlated neither SF-36 nor MIDAS subgroups, with no statistically significant. *Conclusion:* "Body functions, Body Structure and Activities

and Participation” set from the ICF comprehensive and brief core sets for the CIHD were found to be valid to assess in patient with CIHD. When using “Environmental Factors” set could be affected by culture specific should be considered.

PE1339

Development of an “ICF Set For Spasticity”: Capturing What Matters

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Introduction: Assessment of spasticity and its impact on functioning is essential for decision making regarding treatment and outcomes. The ICF, developed by the WHO, provides a comprehensive framework for describing functioning and disability. WHO “ICF Core Sets” exist for various health conditions and contexts. However, selection of categories specifically relevant to spasticity and its impact on functioning may be more useful than the full ICF. There are tests described in the literature for assessing spasticity on an impairment level, but there is little attention given to activity and participation levels. The objective here is to develop an *ICF Spasticity Set* in order to 1) have a framework for determining relevant outcome measures and gaps, and 2) serve as a basis for the development of improved assessment tools for spasticity. **Materials and Methods:** A physician-led consensus driven approach (under the ABILITY network) has been used to define the *ICF Spasticity Set*. Firstly, two rehabilitation specialists developed a *Crude ICF Set* covering all potentially relevant spasticity aspects. Secondly, in two rounds of review, a wider group of clinicians consolidated the crude set to an *ICF Spasticity Set* with final consensus from all ABILITY network members. Next steps involve including a broader rehabilitation professional community to further refine the *ICF Spasticity Set*. **Results:** The current *ICF Spasticity Set* covers categories in *Body Function* chapters b1 to b7, and all (d1-d9) chapters of *Activity and Participation*. Of the *Activity and Participation* chapters, *Mobility, Self-Care* and *Major Life Areas* are the chapters with the most categories selected. **Conclusions:** The *ICF Spasticity Set* being developed by the ABILITY Network can provide a framework for patient assessment and outcome measures development. The project to date has underlined the importance of including *Activity and Participation* considerations when assessing patient impact of spasticity, from SCI and other conditions.

E.3. MEASUREMENT OF FUNCTIONING

PE1340

Measuring Perceived Pain among People with Musculoskeletal Disorders: Correlation between Numeric Rating Scale and Whodas 2.0. Turku ICF Study

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Background: WHO Disability Assessment Schedule WHODAS 2.0 is a tool used to assess functioning and disability based on Classification of Functioning, Disability and Health (ICF). Perceived pain and disability has been thought to be closely associated. **Materials and Methods:** Consecutive patients from a university outpatient clinic with a main diagnosis of some musculoskeletal disorder filled up a questionnaire including both WHODAS 2.0 (12 items on scale 0 to 4) and numeric rating scale (NRS, 0=no pain, 10=maximal pain). Pain intensity was assessed as the average and the worst pain in the last month. For calculations NRS was adopted to a visual analogue scale. Spearman’s correlation were calculated for total scores and for each domain of WHODAS 2.0 and NRS. **Results:** The age of 103 patients (73% women) was on average 47 (17 to 84) years. The

monthly average pain intensity was 6.5 (2.0 to 10.0) points, while maximal pain was 8.2 (4.0 to 10.0). Both the monthly average and monthly maximal pain were strongly and positively correlated with the total score of WHODAS. When the intensity of pain was separately compared with each of the 12 items of WHODAS, pain level was strongly correlated with difficulties in household responsibilities, walking. Pain was not correlated with limitations on learning, social participation or emotional functions. **Conclusion:** The correlation between the intensity of pain and limitations of functioning measured by WHODAS 2.0 was found to be significant only for limitations in household responsibilities and walking.

PE1341

Toward The System-Wide Implementation of the ICF in Routine Practice: Results of the Consensus Conference to Develop Simple, Intuitive Descriptions of ICF Categories in the ICF Disability Set

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Introduction: The World Health Organization’s (WHO) International Classification of Functioning, Disability, and Health (ICF) serves as international standard for describing functioning. A parsimonious set of ICF categories, the ICF Generic Set and a more extended set, the ICF Disability Set, have been developed to serve as the standard for routine documentation across individuals with varying health conditions and settings. A pilot study on the system-wide implementation of the ICF for documentation in routine practice in China has shown that the descriptions of ICF categories are not necessarily commonly understood, and thus make application in routine clinical practice difficult. Hence, finding consensus on simple and intuitive descriptions of each of the ICF categories contained in the ICF Disability Set is important to improve reliability and comparability of functioning information collected in routine clinical practice. **Materials and Methods:** Twenty-one clinicians from across Mainland China participated in a two-day, three-stage consensus process that examined the ICF Disability Set. Consensus was defined as agreement upon proposed intuitive descriptions by more than 75% of participants. Categories that were not agreed upon during a first stage were further refined by small working groups in the second stage. In the third and final stage, each working group developed a proposal of descriptions which have not yet reached consensus; the description with the highest votes was considered as the final description. **Results:** Four ICF categories achieved consensus in the first stage; 16 ICF categories were agreed upon by more than 75% of participants in the second stage; the remaining 10 ICF categories were voted on in the third stage. Prior to each vote, extensive discussions about varying aspects contained in the description of an ICF category took place to enhance clarity of the descriptions. **Conclusion:** A task force has been established to develop a user manual for the use of the ICF Disability Set for the standardized collection of functioning information in routine clinical rehabilitation practice that will integrate the simple, intuitive descriptions and the points raised in the expert discussions throughout the consensus process. This project outlines a promising model toward the system-wide implementation of the ICF in rehabilitation practice.

PE1342

Relative Sensitivity of Change of Generic Health Status and ICF-Based Measures in Lower Extremity Musculoskeletal Conditions

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Introduction: Over the two past decades, generic measures of physical function were widely used to describe changes in outcomes of outpatient rehabilitation programs. However, as many of these measures focus only on some ICF mobility activities, may have limited capacity to measure the extent to which patients have successfully achieved the broad range of mobility activities required for community function. Recently, new generic and ICF-based measures have been developed (eg. MOBAM) and they may be alternative to previous measures (eg. PF-10). The aim of this study was to examine the ability of the MOBAM short forms to detect change in a population of rehabilitation patients with musculoskeletal conditions in the lower extremity across the 8 weeks following admission in post-acute outpatient rehabilitation settings and compared its performance to that of the PF-10. **Methods:** Prospective descriptive study. Patients were recruited and measures at beginning of their treatment from three outpatient rehabilitation facilities. Measures were repeated 4 and 8 week thereafter. A convenience sample of 239 patients with lower extremity problems was recruited at baseline and classified into two location-based groups (foot-ankle-leg; knee-thigh-hip). Outcome measures were done by two self-report questionnaires: Mobam scales (changing and maintaining body position involving only sitting and/or lying; changing and maintaining body position involving standing up; walking and moving) and PF-10. **Results:** All 3 MOBAM scales were sensitive to both positive and negative change for all patients and conditions groups across the two follow-up periods (0-4th; 4-8th week). Standardized response means (SRM) in positive change were around 1.7 at both periods and somewhat lower in negative change. In the 0-4th period, SRMs in positive change for the MOBAM were consistently larger than for the PF-10 across all patients and the two conditions groups. However, they were similar for negative change. In the 4-8th period, SRMs for both MOBAM and PF-10 were also similar. **Conclusion:** The MOBAM offers sensitive measures of positive and/or negative change in functional activity performance for persons with lower extremity conditions who receive post-acute outpatient rehabilitation services. They are more sensitive over the first 4 weeks of treatment compared to the PF-10.

PE1343

Test-Retest Reliability of Mobility Activities Measurement Using a Patient Self-Report Questionnaire

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Introduction: Determining the relative reliability of outcomes of physical performance tests for people with musculoskeletal conditions is necessary to discriminate between the true effects of rehabilitation interventions and the inherent variability of them. The aim of this study was to investigate the test-retest of mobility activities scores for use in a new postacute care outcome using a self-report questionnaire, called MOBAM, across different care settings. **Methods:** Prospective descriptive methodological investigation. Fifty-four patients were selected from a larger study. Patients were interviewed within 1 to 4 days to fill out the MOBAM self-report questionnaire. In order to measure test-retest reliability of Mobam scales, intraclass correlation coefficients (ICCs) were calculated using a two-way mixed effects model for each of mobility activities scales. In addition, a paired, two tailed *t*-test was used to test for differences between test-retest. **Results:** Intraclass correlation coefficients between test and retest scores ranged from 0.90 to 0.96 (median=0.95) across the Mobam scales. Analyses of differences

between the reliability pairs as measured by paired *t*-test, reveals no significant differences between test-retest. Differences between test and retest scores ranged from 0.70 to 2.62 (median=1.24) across the Mobam scales. **Conclusion:** Test-retest reliability was acceptable for the domains of the mobility activity construct: changing and maintaining body position involving only sitting and/or lying; changing and maintaining body position involving standing up; carrying and moving objects using the hand and shoulder; handling objects using only the hand and/or forearm; and walking and moving.

PE1344

On the Treatment of Ordinal Scale Data in Rehabilitation Medicine Research

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Background: There have been a number of publications during near 30 years pointing out that descriptive statistical measures such as mean and standard deviations are invalid whenever data are on ordinal scales as may also be summed raw scores. Changes in an observed raw score may reflect a different change in the underlying metric range depending upon the starting point. In a recent Editorial in J Rehabil Med (2012), it was argued to end the malpractice of using raw scores from ordinal scales. Authors who report IRT (item response theory)-based estimates should justify that their estimates are on an interval scale and the use of Rasch analyses and Rasch-derived instruments was encouraged. User-friendly conversion tables for transforming raw scores to linear measure should be available. **Methods:** All original articles, including Brief reports and Short communications, published during 2013 and 2014 in Am J Phys Med Rehabil (AJPMR), Arch Phys Med Rehabil (APMR), Clin Rehabil (CR), Eur J Phys Rehabil Med (EJPRM), J Rehabil Med (JRM) and Neurorehabil Neural Repair (NNR) were analyzed for the use of ordinal scales and the treatment of their data. **Results:** Of totally 1375 original articles, 728 (53%, range 33-73%) used multi-item ordinal scales. In 49 (7%, range 1-11%) of these, Rasch-analysis had been performed. Eight (in APMR and JRM) of these articles also reported conversion tables from raw scores to linear measures. Other means of treating ordinal scales, instead of summed raw scores, as item for item analysis, dichotomization or other IRT type of analysis were used in 42 articles (6%, range 2-9%). There was no major change between the two years. **Conclusion:** The use of Rasch analysis or other acceptable modalities for treating ordinal scales is still rare in rehabilitation research. It is to note that Rasch analysis may not be the solution for all ordinal scales used, as many of them may not be unidimensional and may not in their original form fulfill criteria for measures based on Rasch analysis. The use of conversion tables should be encouraged. **Reference:** Grimby G, Tennant A, Tesio L. The use of raw scores from ordinal scales: Time to end malpractice? J Rehabil Med 2012; 44: 97-98.

PE1345

Two Functioning Assessment Instruments in Neck Pain – Turku ICF Study

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Background: WHO Disability Assessment Schedule WHODAS 2.0 was developed with the aim of creating a comprehensive but easy-to-use tool for assessing functioning and disability in different health conditions across different populations. WHODAS 2.0 is based on the ICF concepts of 'activity' and 'participation'. Neck Disability Index NDI is a condition-specific assessment tool used to assess the functional status of neck pain patients. Currently, the correlation between WHODAS and NDI is unclear. **Material and Methods:** From March to June 2014, 55 consecutive patients with neck pain from a university outpatient clinic filled up a questionnaire including both

12-item WHODAS 2.0 and NDI. Spearman's correlation coefficient was calculated for each domain and the total scores of these two tools. *Results:* There was a strong correlation between the total score of WHODAS and every item of NDI except headache. On the other hand, when the total score of NDI was compared with each of the twelve items of WHODAS 2.0, there was a strong correlation only with household responsibilities, social participation and maintaining a friendship. The total scores of WHODAS and NDI were significantly correlated. *Conclusion:* In neck pain patients from a PRM outpatient clinic, NDI and WHODAS seem to assess only partly same domains of functioning.

PE1346

Validity and Reliability of the Indonesian Lower Extremity Functional Scale (LEFS)

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Introduction: Main objective of Medical Rehabilitation services is to maintain independence, prevent the decline of functional abilities and improve the health related quality of life (HRQOL). Functional status is an individual's ability to perform activities of daily living and participation in the community. Measurement of functional status is done with a variety of instruments that produces an objective value. For research purposes, instruments should be valid, reliable, efficient and practical. *Methods:* For research on knee osteoarthritis in the Department of Physical Medicine and Rehabilitation, Hasan Sadikin Hospital, we selected The Lower Extremity Functional Scale (LEFS), an instrument to measure dysfunction due to abnormalities in the lower leg, containing 20 questions, focused on function, easily adapted to the task, job and functions of the target population. The LEFS was translated into Indonesian, with adaptations of a few questions. The translation method endorsed by the WHO uses a forward translation, back translation, pre-testing and cognitive interviewing. We tried to follow the instruction, but not the entire process was accomplished as prescribed. The Indonesian version of LEFS was tried out in an observational study with sixteen patients with knee OA *Result:* Assessment of reliability and validity of the Indonesian LEFS instrument showed reliability (Cronbach-Alpha value 0.936 and Half Split value 0.824) and validity (positive correlation between the strength of the flexor-extensor muscles of the knee to the total score of the questionnaire, $P < 0.05$ and a significant positive correlation between questions 1-20 to the total score of the questionnaire, $P < 0.05$, except for questions 5, 8, 9, 11, $P \text{ value} > 0.05$) *Conclusion:* The Indonesian version of LEFS is valid and reliable.

PE1347

What Types of Assessment Tools Can Be Used to Ensure Individual's Problems and Rehabilitation Needs Are Adequately Identified? A Systematic Review

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Introduction: The WHO Disability and Rehabilitation Action Plan 2006-2011 highlights a need for guidelines on developing and strengthening rehabilitation services. The World report on disability highlighted a lack of outcome tools for vulnerable people. Accordingly, it is not possible to define policies for rehabilitation services with a higher degree of certainty, in order to improve the functionality these populations. This proposal is an answer to a call for research proposals for the WHO to provide the best available evidence to the guideline development group (GDG) about the Tools that are useful for identifying rehabilitation needs, so the results will support national, regional and global efforts to promote rehabilitation services for persons with disabilities and their

families. *Materials and Methods:* Population: People experiencing physical disability, Study design for included studies: Systematic reviews, randomized controlled trials non-randomized trials with a before-and-after measure observational epidemiologic studies with a control group (cohorts, case-controls or cross-sectional studies). Studies without a control group: administrative databases or analytic studies with subgroup analyses *Intervention:* Validated rehab tool. Tool used for needs assessment. Tool used during admission, during or discharge from rehab. *Co-Intervention:* Disease specific vs generic tool. *Outcomes:* Access to/Utilization of rehabilitation services Rehabilitation/Health outcomes Continuity of care. *Search Strategies:* P.I.C.O. Key terms were applied to MEDLINE (past 20 years), EMBASE (past 20 years), CINAHL (past 20 years), CENTRAL (The Cochrane Collaboration Trials Registry – latest issue) and LILACS (added during June 6, 2014 meeting to ensure we are capturing content from South America). The references were uploaded to DistillerSR(R) software where the independent reviewers completed screening and data extraction phases of a systematic review. For quality appraisal a GRADE approach will be completed. *Reliminary Results:* A total of 16,393 titles and abstracts were screened. For relevancy screening, 2,678 articles were uploaded to Distiller SR. The inclusion of articles for data analysis is been completed. Data Analysis and conclusions will be presented at the 9th World Congress of the ISPRM.

PE1348

Kinematic Characteristic of Translation of Thorax that Occurs with Rotation of Trunk

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Introduction/Background: In clinical, it is often observed that movement such as translate of laterally with respect to pelvis at rotation of trunk. The additional translation of thorax cannot be ignored because it is a factor that reduces performance in action that requires axial rotation movement of trunk. Therefore, this study was aimed to clarify the kinematic characteristic of translation of thorax that occurs with rotation of trunk. *Material and Methods:* Subjects were 13 healthy young adults (8 men and 4 women, age 26.1±4.1). We measured trunk rotation movement of repeat left and right four times alternately at standing position. Using 3D motion analysis system (VICON-NEXUS, Vicon motion systems Ltd, UK), rotation angle of the thorax to pelvis and translation length of thorax center for pelvis center were measured. We defined the linear regression coefficient between the angle and the length as the thorax translational rate (TTR, mm/°) in the trunk rotation movement. The relationship between anterior TTR and lateral TTR were analyzed using the product-moment correlation coefficient of Pearson (significant at $p < 0.05$). *Results:* With the rotation of the trunk, translational of the thorax to the front and the other side of rotation was caused. The anterior TTR was $0.40 \pm 0.30 \text{ mm/}^\circ$ and lateral TTR was $-0.62 \pm 0.44 \text{ mm/}^\circ$. Correlation coefficient between anterior TTR and lateral TTR was $r = 0.50$ ($p = 0.01$). *Conclusion:* This study revealed that rotation of the trunk is not movement of pure axial rotation but movement with the translation of thorax of forward and opposite side of rotation. For example, the 10 degrees of right rotation of trunk involve translation of about 4 mm anterior and 6mm left in average case. The analysis showed that translation of forward and opposite side of rotation occur in complementary. From this, we are reasoning that the approach to promote forward translation of thorax can be suppressed translation of opposite side during trunk rotation.

PE1349

Non-Uniform Coupling of Body Trunk Muscles Affects Thoracic Shape through Estimation on Sagittal Plane

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Introduction/Background: Control of thorax shape provides the stability of the human trunk. This study is aimed to verify activities of upper back and abdominal muscles or thoracic and lower back (pelvic) muscles and movements of thorax to understand the relation of back and abdominal muscle activities to thoracic shape change on the sagittal plane. **Material and Methods:** Subjects were 16 healthy men (age 20.1±0.7). Tasks were generation of forced contractions of upper back and abdominal muscles (dorsal activity) or thoracic and lower back (pelvic) muscles (thoracolumbar activity). Muscle activities were monitored by electromyogram (TeleMyoG2, Noraxon, USA). Using ultrasonography (MyLab25, Hitachi Medical, Japan), intercostal distance between 6-7th ribs was estimated. Using 3D motion analysis system (VI-CON-NEXUS, UK), backward and forward rotation angles of the sternum against the trunk major axis (sternal angle) were measured. **Statistics:** paired *t*-test with the correspondence for a comparison at relaxation and shrinkage (significance level, $p < 0.05$). **Results:** When dorsal activity was increased, intercostal space expanded ($p = 0.03$). While, it narrowed as increased thoracolumbar activity ($p < 0.001$). Sternal angle changed to elicit anteversion by the increased dorsal activity ($p < 0.001$) and retroversion by the increased thoracolumbar activities ($p = 0.1$). **Conclusion:** In the increased dorsal activity, contraction of back muscles may rotate upper ribs downward, and contraction of abdominal muscle rotate lower ribs upward, resulting in the expansion of intercostal space. Concomitantly, upper costal anterior extremity moves to anterosuperior direction and lower costal anterior extremity moves to posteroinferior direction thereby bringing about anteversion of the sternum. In contrast, in the increased thoracolumbar activity, chest muscle contraction rotates the upper ribs upwardly, resulting in the reduction in the intercostal space, and the low back muscle contraction induces the downward rotation of lower ribs leading to the retroversion of sternum. Thus, non-uniform but coupled activities between back and abdominal muscles may produce the lateral deviation in thoracic shape. Intervention to minimize the lateral deviation in thoracic shape may.

PE1350

Construct Validity of the Item Bank of the Computerized Adaptive Testing System for Measuring Self-Care Performance (CAT-SC) in Children with Developmental Disabilities

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Introduction: Currently available pediatric self-care assessments have several limitations, such as poor efficiency and feasibility, because they are lengthy and time-consuming. Computerized adaptive testing (CAT), which combines adaptive testing and item response theory by using computer technology, can eliminate these limitations. Therefore, we have been developing a CAT system for measuring self-care performance (CAT-SC) to precisely and efficiently measure self-care performance in children with DD aged 6 months to 12 years. The CAT-SC is being developed in 6 steps: 1) construction of the item bank; 2) field testing; 3) examination of model fitting and item calibration; 4) determination of the stopping rules; 5) construction of a web-based assessment platform; and 6) validation of the efficiency and psychometric properties. At this point, the item bank of the CAT-SC has been constructed, and the purpose of this present study was to examine the construct validity of the item bank of the CAT-SC. **Materials and Methods:** A total

of 215 caregivers of children with DD were interviewed with the 73-item CAT-SC item bank. The children were aged 6 months to 12 years and exhibited the entire range of self-care performance. The construct validity of the CAT-SC item bank was assessed by confirmatory factor analysis (CFA) techniques. **Results:** Due to the gender difference, 5 items were removed from the item bank for the first CFA. However, the first CFA showed an inadequate fit. After removing one low factor loading item, the CFA showed that the data had an adequate fit, as judged by various goodness-of-fit (GOF) indices, including the comparative fit index (CFI=0.987), the Tucker-Lewis index (TLI=0.986), and the root mean square error of approximation (RMSEA=0.061). **Conclusion:** The results of the CFA showed a good fit of the unidimensional model of the CAT-SC item bank and thus confirmed that the CAT-SC item bank has good construct validity for measuring self-care performance in children with DD. Therefore, this item bank will be used in the subsequent steps of developing the CAT-SC in the future and the CAT-SC is expected to ease the assessment burden of measuring children's self-care performance. **Keywords:** confirmatory factor analysis, unidimension, computer adaptive testing.

PE1351

A New Consideration of the Modified Barthel Index: the Correlation and Grouping of Each Activities in the Modified Barthel Index (MBI) in Stroke Patients Using Rasch Model

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Introduction/Background: The Modified Barthel Index (MBI) is used for measuring performance in activities of daily living (ADL). However the order of items of MBI was not arranged hierarchically (such as, difficulty) and there was no study about the correlation between each activities. Therefore, we investigated to evaluate the degree of association between each activities and difficulty of each activities, and realigned the order of MBI scale according to the level of difficulty. **Material and Methods:** We retrospectively reviewed 30 records of stroke patients which were evaluated by physicians and occupational therapists. These patients were referred to department of physical medicine and rehabilitation, Korea university medical center Anam hospital from April 2013 to June 2014. Biographical factors, neurological factors and functional scores were collected. The relations among these activities were evaluated using the spearman rank correlation. To analyze difficulty of each activities, Rasch analysis was used by winstep® software program. **Results:** The average age of the patients was 63.97 (SD 11.75, range 43-81) years. Of 30 patients, sixteen were women and nineteen had hemorrhagic stroke. The Spearman rank correlation analysis showed strong positive correlation between personal hygiene and feeding ($r = 0.77$, $P < 0.01$); toilet and dressing ($r = 0.78$, $P < 0.01$); stair climbing and ambulation ($r = 0.76$, $P < 0.01$); bladder and bowel control ($r = 0.95$, $P < 0.01$); ambulation and transfer ($r = 0.84$, $P < 0.01$). Personal hygiene, feeding, bowel control, and bladder control were not correlated with ambulation. According to Rasch analysis, stair climbing was the most difficult activity and bowel control was the easiest activity in stroke patients. **Conclusion:** There was strong correlation between feeding and personal hygiene. This finding indicated that those two activities has similar component of movements like finger and hand motions. This assumption can be also applied to other highly correlated activities. Correlation between stair climbing and ambulation was very strong. Also, ambulation and transfer were highly correlated. However, these activities showed different difficulties in the Rasch model. As a result of analysis through Rasch model, level of difficulty among MBI activities was different and can be grouped by difficulties. And we could reorganize the order of MBI scale by difficulty of activities.

PE1352

Profile of the Patients of a Public Rehabilitation Services Network in Brazil – Using a Systematized Protocol to Collect Functional Information and Guide the Rehabilitation Care

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Introduction: Changes in morbidity patterns, with increasing in chronic conditions and in life expectancy, have been challenging the Brazilian health system. One of the strategies to deal with the increased demand for rehabilitation was to create multidisciplinary teams and to structure public rehabilitation services in an integrated network organized across different levels of care. Given the importance to focus the rehabilitation process on the needs of the individual, effective communication among all persons involved in the process is essential. This study aims, using a systematized protocol to approach the patients in the first contact with a rehabilitation service, to describe the profile of individuals who seek rehabilitation treatment in Belo Horizonte – Brazil. **Methods:** The Protocol for Identification of Problems for Rehabilitation (PLPR), was applied during the first contact of 516 patients with public rehabilitation services of Belo Horizonte. The protocol is based on the ICF and its items were developed to describe the health, functioning, and social context of patients. For a Brief Functional Description (BFD) there are 25 items distributed in 10 domains: Mobility, Communication, Eutrophy, Self-care, Pain, Interpersonal Activity, Energy/Sleep, Affect, General Tasks/Demands, Paid Work. **Results:** The mean patients' age was 57 years old, 65% studied up to the Elementary School, 75% were women, 47% married, 41% employed, and 35% retired. Most of them were living with someone else (47% with spouse; 58% with children). Physical inactivity (65%) and overweight (31%) were the main risk factors reported. About 34% self-rated positively their physical health and 43% their emotional health. Regarding the functional description, 87% reported severe/complete disability in at least one domain of the BFD. Most patients (77%) started their rehabilitation treatment at the Primary Care (mean of 5 items of the BFD with severe/complete disability). Those who started at the Specialized Care, reported a mean of 8 items with severe/complete disability. **Conclusion:** We expect that the PLPR will be useful to guide the patient's pathway throughout the rehabilitation network. By better identifying the patients' functional demands, the use of the PLPR can contribute to reduce the waiting list for rehabilitation treatment, as well as the inadequate referral among the services.

PE1353

Development of the Criteria for Motor Imagery for Children – Validity and Reliability

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Introduction/Background: It has been indicated that children with developmental disabilities show immature motor imagery. However, there have been no methods of evaluating motor imagery in children. Faced with this situation, we developed the criteria for motor imagery (CMI) for children. The validity of this study was assessed in children with typical development, who were used as external criteria. Approval for this study was granted from the Ethics Committee of Tokyo Metropolitan University. **Methods:** On evaluating motor imagery in children as subjects, the evaluators faced them each other, presented orally to take a standard posture, and indicated orally to change the posture by 2 stages. The postural changes included positional changes in the extremities, body trunk, and neck. Finally, the subjects were made to choose postures after the changes from 5 photos shown on the desk. According to choice of the postures, which were shown by the degree of difficulty due to the postural

complexity, the evaluators evaluated the postures on a maximum of 36 points. The subjects were typically developing children aged 4-7 years, whose consent and whose parents' consent were obtained. Internal consistency is considered adequate when Cronbach's alpha is between 0.7 and 0.95. Test-retest reliability was determined from participants during the baseline and at the One month follow-up. To quantify test-retest reliability, the intraclass correlation coefficient (ICC) (1,1) with a 95% confidence interval (CI) was used. To evaluate the convergent validity, we examined the relationship between the CMI for children and age using Pearson correlation coefficients. **Results:** Cronbach's alpha for the CMI for children was 0.829. The test-retest reliability score concerned the subgroup of 13 patients that stated at One month follow-up. The ICC was 0.85 (95% CI=0.61–0.95). Significant correlations between age and the score acquired were confirmed. The convergent validity was analyzed by 46 participants. Mean age is 4.7(sd1.0). The correlation coefficient was 0.78. **Discussion:** The study suggested the possibility of the degree of maturity of motor imagery in children with developmental disabilities being evaluated by the criteria.

PE1354

Development of the Motor Coordination Evaluation Scale for Children – Validity and Reliability

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Introduction/Background: It has been indicated that children with developmental disabilities show motor coordination disorders. However, since there have been no methods of evaluating motor coordination in children, it is impossible to accurately comprehend features of the disorders. Faced with this situation, we developed the motor coordination evaluation scale for children. The validity of this study was assessed in children with typical development, who were used as external criteria. Approval for this study was granted from the Ethics Committee of Tokyo Metropolitan University. **Methods:** The motor coordination evaluation scale was composed of 16 items concerning throwing a ball, catching, and football. The feature of coordination of the extremities and body trunk was evaluated at each motion, scored, and evaluated on a maximum of 89 points. The subjects were typically developing children aged 4-7 years, whose consent and whose parents' consent were obtained. Pearson's correlation coefficient was calculated from the correlations between the results of evaluation and age in the analysis. Internal consistency is considered adequate when Cronbach's alpha is between 0.7 and 0.95. Test-retest reliability was determined from participants during the baseline and at the One month follow-up. To quantify test-retest reliability, the intraclass correlation coefficient (ICC) (1,1) with a 95% confidence interval (CI) was used. To evaluate the convergent validity, we examined the relationship between the motor coordination evaluation scale for children and age using Pearson correlation coefficients. **Results:** Cronbach's alpha for the motor coordination evaluation scale for children was 0.958. The test-retest reliability score concerned the subgroup of 13 patients that stated at One month follow-up. The ICC was 0.95 (95% CI=0.84–0.98). Significant correlations between age and the score acquired were confirmed. The convergent validity was analyzed by 46 participants. Mean age is 4.7 (sd1.0). The correlation coefficient was 0.85. **Discussion:** The evaluation scale developed was revealed to reflect the degree of the coordinate motor function according to age. In the future the scale will be indicated to the evaluation of children with developmental disabilities. This study suggested the possibility of the degree of maturity of coordinate motor function in children with developmental disabilities being evaluated by the evaluation scale.

PE1355

Outcome Evaluation of Family Service in Early Intervention

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Introduction: Early intervention in Taiwan advocated the implementation of Family-Centered model recently. The focus of early intervention shifts from child-centered to family-centered services. The purpose of the study was to investigate how to evaluate the outcome of family services in early intervention in Taiwan. The paper reported first part of the study that translated "Family Outcome Survey- Revised" to Taiwanese version and examined the validity and reliability of FOS-Taiwan version. **Material and Methods:** FOS-R was first translated into traditional Chinese by the researchers. After the draft of FOS-R Taiwan version was translated, it was mailed to co-principal investigator and 9 other experts with working and research experiences in early intervention. All the experts and the investigators attended an expert meeting to validate the content of FOS-R Taiwan version. One item was added in Part A to evaluate how parents feel about the accessibility of education services. A native English speaking professional translator back-translated the FOS-R Taiwan version to English. The English translation of FOS-R Taiwan version was mailed to Dr. Bailey for the evaluation of clarity, appropriateness and inclusiveness. Two hundred and eighty six parents participated in this study after they signed the informed consent. All participants filled out FOS-R Taiwan version twice with one week in-between. **Results:** Cronbach's α of FOS-R Taiwan version is 0.949 for Part A and 0.972 for Part B. No item was eliminated because the values decreased if any item was deleted. Confirmatory factor analysis showed comparative fit index (CFI) was 0.905 for Part A and 0.978 for Part B. The RMSEA was 0.074 for Part A and 0.200 for Part B. The χ^2/df was 2.6 for Part A and 4.08 for Part B. The test-retest reliability was 0.764 for Part A and 0.710 for Part B. **Conclusion:** FOS-R Taiwan version is a valid and reliable assessment to evaluate the outcome of family services in early intervention in Taiwan.

PE1356

A Study on Factors of Standing Postural Control by Moving Center of Gravity

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Introduction/Background: Keeping standing under moving and controlling center of gravity is important with respect to preventing accidental falls in the elderly. Purpose of this study was to extract and investigate factors of standing postural control by moving center of gravity. **Material and Methods:** Participants were 25 males and 15 females, aged 19 to 80, who had no apparent neurological disease and consented to participate in this study. They were selected because of reducing the other effects. We measured postural sway, and limits of stability as follows: they stood still on the force plate with medial border of their feet 10 cm apart, and postural sway was measured each for duration of 10 seconds in the central position, and then anterior, posterior, right, and left position in which they moved center of gravity voluntarily and maintained on the base of support. Limits of stability were calculated as each center of postural sway. Area of limit of stability was defined as the limit of stability in anteroposterior direction multiplied by one in side-to-side direction. Toe flexion strength was measured using the push-type toe flexion strength meter with measurement of grip strength and functional reach. Toe flexion strength with each value, as exemplified by limits of stability was examined using the Pearson's correlation coefficient. Each value of postural sway in five positions was analyzed among five values using analysis of variance and multiple comparison. **Results:** The results showed that age was negatively correlated with limits of stability and functional reach but positively correlated with postural sway, especially in posterior position. Toe flexion strength had significant correlation coefficients with limits of stability in posterior, anteroposterior, and side-to-side direction, area of

limit of stability and functional reach but had no correlation with postural sway. Value of postural sway in central position showed significant low compared with values of ones in others. **Conclusion:** These results suggested that stability of standing became diminished because limits of stability exhibited a declining trend with age. And it showed that toe flexion strength was correlated with moving center of gravity more actively.

PE1357

Psychometric Properties of the Ghent Participation Scale: Measuring Participation Based on the Subjective Experiences of Individuals

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Introduction: The ICF reflects a bio-psycho-social paradigm and is increasingly used in many areas of medicine. The component of participation is in the ICF the embodiment of the paradigm-shift from a biomedical towards a bio-psycho-social reasoning. By means of qualitative research a new self-administered measure for participation, covering all domains of the ICF and based on the insiders' perspectives has been developed; the GPS (Ghent Participation Scale). The GPS scores are based on the ICF qualifier scale ranging from no participation-problem to complete participation-problem. It is the goal of this study to explore whether the GPS has a good internal validity (homogeneity and factorial validity) and a sound criterion-validity and intrarator-reliability. **Materials and Methods:** This study involves former rehabilitation outpatients from five rehabilitation facilities (n=160). The statistical coherence between items was expressed in Cronbach's α coefficient. A factor analysis following the principal components analysis was performed to underlying dimensions. The Impact on participation and autonomy (IPA) was included as a reference measure to define the criterion-validity and was calculated by means of a Pearson correlation-coefficient. Intrarator-reliability was assessed by means of an ICC (IntraClass-Correlation coefficient). **Results:** Dimensions within the GPS are 1) performing activities according to preferred choices and wishes, 2) social appreciation and acceptance by performing activities and 3) the need to delegate activities. Consistency between the items of the GPS was strong ($\alpha=0.76 - 0.92$). Intrarator reliability was shown by a strong ICC (0.894). The criterion validity was shown by good correlations between the GPS and the IPA ($r=-0.78$). **Conclusion:** The GPS appears to be a valid and reliable measure to rate participation irrespective of their health condition. It covers all domains within the ICF and the qualifier scale can be used as an anchor. Since it is argued that participation is a critical component in the rehabilitation process and since the subjective aspects are of paramount importance for the health care practitioner this measure could help professionals in their clinical decision making.

PE1358

A Characterization of Change Scores on the Stroke Upper Limb Capacity Scale (SULCS) during Inpatient Stroke Rehabilitation

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Introduction/Background: The Stroke Upper Limb Capacity Scale (SULCS) is a 10-point standardized assessment of upper extremity activity applicable over the range of stroke severity. We examined the characteristics of SULCS change scores (chSULCS) between admission and discharge from inpatient stroke rehabilitation (ISR). **Materials and Methods:** As part of routine care under an IRB-approved protocol, the SULCS, functional independ-

ence measure motor subscore (FIM-M) and motricity index (MI, including pinch, elbow and shoulder sub-scores) were collected within 3 days of admission and discharge from ISR. Demographics and stroke characteristics were also collected. Mann-Whitney U Test examined differences in chSULCS between patients who did/did not achieve the 17 point minimally clinically important difference (MCID) on the FIM-M by discharge. We characterized changes in MI scores/sub-scores within groups defined by chSULCS. *Results:* Of 108 patients, we excluded 15 with admission SULCS=10 leaving 93 with a mean age of 68.6+16.2y, acute NIHSS of 8.9+6.9 and length of stay 17.2+8.7 days. Fifty-seven percent were male and 31% had right hemiparesis. Median (mean+SD) admission and discharge SULCS, FIM-M and MI scores were 5.0 (4.5+3.4) and 7.0 (6.2+3.3), 25 (29.2+13.5) and 55 (51.6+17.1), and 70 (57.2+37.1) and 81 (71.0+32.9), respectively. chSULCS were statistically different when patients were grouped by FIM-M MCID (1.95 (N=62) v. 1.19 (N=31); $p=.043$). 26, 24, 18 and 22 patients logged a chSULCS of 0, +1, +2 +>3; respectively. Patients achieving any degree of motor recovery (MI level >0) on the 3 subscores increased with greater chSULCS (20-30%; chSULCS=0 to 77-86%; chSULCS=>3) as did the mean MI (6.7+8.7 to 30.8+19.4). *Conclusion:* The SULCS is a fast, easy upper extremity activity assessment. chSULCS are statistically different among patients who did/did not achieve clinically significant gain. Greater chSULCS also demonstrated greater motor recovery. Further research should explore other clinical anchors for change among patient with greater and lesser impairment.

PE1359

Disability in Low Back Pain: Correlation between Oswestry Back Pain Disability Index and WHODAS 2.0. Turku ICF Study

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Background: WHO Disability Assessment Schedule WHODAS 2.0 has been developed to be an easy way to assess functioning and disability based on ICF. Oswestry Back Pain Disability Index is a common questionnaire used for assessing restrictions of functioning among patients with low back pain. It is not known, how well the results of WHODAS and Oswestry are correlated. *Material and Methods:* As part of Turku ICF Study, sixty eight consecutive patients with low back pain from the PRM Outpatient Clinic in Turku University Hospital, South-Western Finland filled up the questionnaire including both WHODAS 2.0 (12 items) and Oswestry Disability Index. Spearman's correlation coefficients were calculated for total scores and for each domain of these two function assessments. *Results:* Total scores of WHODAS and Oswestry were strongly correlated with each other ($p<0.01$). Also the total score of WHODAS was strongly correlated with all ten separate items of Oswestry. When the total score of Oswestry was separately compared with the 12 items of WHODAS, there was a strong correlation only with standing and walking, but not with learning, self-care or interpersonal relations. *Conclusion:* It seems that WHODAS 2.0 and Oswestry Back Pain Disability Index assess similarly the overall level of functioning among people with low back pain.

PE1360

Measuring Perceived Work Ability Among Patients of an Outpatient PRM Clinic Using WHODAS 2.0. Turku ICF Study

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Background: 12-item WHO Disability Assessment Schedule WHODAS 2.0 is purposed as a standardized tool for the evalua-

tion of functioning in diverse situations. The 10-point work ability scale (WAS), derived from a Work Ability Index has been commonly used to assess the perceived work ability. The correlation between the results obtained by using these two scales is unknown. *Methods:* From March to June 2014, consecutive patients of a university outpatient clinic filled up a questionnaire including both 12-item WHODAS 2.0 and WAS. WAS is a single-item question asking patient to assess his current work ability compared with the lifetime best (0-10, 0=completely unable to work, 10=work ability at its best). Spearman's coefficient was calculated to assess the correlation between WAS and WHODAS 2.0 scores. *Results:* The age of 96 patients (73% women) was on average 49 (17 to 84) years. Of them, 19% were retired. The majority had musculoskeletal symptoms as a main reason for visiting a PRM clinic. On average, WAS was 4.13 (0-9) points. There was strong positive correlation between the total scores of WHODAS 2.0 and WAS. When WAS was compared with each of the 12 items of WHODAS 2.0, there was positive correlation with every WHODAS 2.0 item. This correlation was strong for restrictions in moving, social participation, household responsibilities, learning, and washing oneself. *Conclusions:* It seems that restrictions of functioning assessed using WHODAS 2.0 are well correlated with perceived work ability and, therefore, WHODAS 2.0 may provide additional value to assessment of work ability.

PE1365

IBMAT: Pilot Validation Study of an ICF Based Mobility Assessment Tool

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Background: The International Classification of Functioning, disability and health (ICF) provides a universal language for rehabilitation professionals across the globe. An International steering committee has been working on developing a mobility assessment tool based on ICF. A 21 item tool was designed after systematic review of the literature, expert surveys, patient focus groups and an International consensus conference. *Aim:* The aim of the study was to establish the reliability and the sensitivity to change of the ICF based Mobility assessment tool (IBMAT) and companion scoring instructions in lower extremity amputee rehabilitation and to understand the issues that arise when using the tool. *Methods:* In 2 study centres, 47 lower limb amputees were assessed using the IBMAT. The inter-rater reliability was assessed by two examiners scoring at the same time but independent of each other and the intra-rater reliability was assessed by the examiners repeating the assessment in stable outpatients after a period of at least 2 weeks. The kappa score was used to measure the reliability and the spread of scores were analysed to understand the sensitivity of the items and determine floor and ceiling effects of the tool. *Results:* The Kappa score for inter-rater reliability ranged from 0.43 to 0.71. The kappa scores for intra-rater ranged from 0.36 to 0.64. There was good spread of scores across the categories indicating that the items were of variable difficulty. Some of the categories had similar scores suggesting that there may be some redundant items in the tool. Some minor misunderstanding of some of the scoring instructions was evident. *Conclusion:* Based on the pilot study the IBMAT has reasonable inter-rater and intra-rater reliability with wide distribution of item difficulty and no evidence of a ceiling or floor effect were identified. Further validation is warranted and it is possible that after further extensive validation some redundant items could be removed from the scale.

PE1366

The Prognostic Value of Functional Capacity Evaluation (FCE) in Occupational Rehabilitation

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Introduction/Background: Functional Capacity Evaluation (FCE) has become increasingly firmly established as a tool at the interface of medical and vocational rehabilitation. The system developed in the USA in the 1980s by Susan Isernhagen is a comprehensive kinesio-physical test of a person's ability to perform work-related tasks. **Material and Methods:** 145 patients with work-related injuries (1/3 upper extremity, 1/3 lower extremity, 10% spinal and pelvic, 10% neurological, 15% combination injuries) had undergone FCE at the Trauma Hospital Hamburg (BUKH) in 2008/2009. The main indication for FCE was prolonged rehabilitation with failure to return to work. In 90 (62%) cases follow-up data about the results of vocational rehabilitation could be obtained in co-operation with the appropriate regional workmen's compensation insurers using a standardized questionnaire. **Results:** Based on the results of the FCE in 58 of the 90 cases with follow-up data a return to the work originally carried out at the time of the accident was recommended, in 20 of these 58 cases workplace adjustments were recommended, in 44 of these 58 cases (76%) actually returned to their original work, 5 to another work, 9 did not return to work. All 9 who did not return to work had been unemployed at the time of the FCE, and in 4 of these the effort during the FCE had been assessed as unreliable. In 16 cases it was deemed that the functional deficits permanently precluded a competitive return to the original work necessitating an occupational re-orientation. 3 of these returned to their original work nevertheless, 9 to another work, 6 did not return to work. In 16 cases a definitive statement could not be made at the time of FCE, mainly because treatment options had not been fully utilized yet. **Conclusion:** FCE is a useful tool to guide occupational rehabilitation and predict its outcome. Apart from the assessment itself FCE also helped to ameliorate avoidance behaviour on the part of some patients thereby promoting return to work. A subgroup of patients benefited from previously not utilized treatment options that were identified in the course of FCE.

E.4. FUNCTIONING EPIDEMIOLOGY (POPULATION-BASED COMPARATIVE STUDIES OF FUNCTIONING ACROSS CONDITIONS, CULTURES, AND TIME, E.G. ON EMPLOYMENT OF PEOPLE WITH DISABILITY)

PE1367

Playing-Related Musculoskeletal Disorders in Musicians

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Introduction: We introduce an epidemiological analysis and risk factors within the musical population of Valencia. The musicians, as a work group, enjoy only a limited physician approach to playing related problems. Musicians begin their career at an early age, suffer intense hours of practice, the physical demands, stress and are subjected to continued competitiveness. This group reported a higher frequency of musculoskeletal and neuromuscular problems, the most affected musculoskeletal system. However, health problems linked to the musical practice are still insufficiently recognized. **Hypothesis:** There is a relationship between the practice of an instrument and the development of musculoskeletal disorders. The most prominent symptom of these disorders is pain. The existence of Playing Related Musculoskeletal Disorders (PRM) as a specific occupational pain problem can be established. **Materials and Methods:** In this study 268 questionnaires were distributed of which 222 met inclusion criteria were collected from medium and higher level Conservatory from Valencia Region, including all the musical specialities. **Results:** In the results, 68% of respondents claimed to have developed at some time or discomfort linked to musical performance pain. The most frequently affected was the musculoskeletal system with special reference to the oral cavity. Symptoms related to touch most often mentioned were pain, muscle tension, spasm, and fatigue. The women's group has higher

incidence of complaints, greater perceived pain intensity and pain sequelae as a result. **Conclusions:** PRM is a frequent yet little known problem, with only limited efforts dedicated to prevention and treatment. Communication between artists, teachers and health professionals should be developed. Proper education can help the musician prevent the development of injuries related to the playing of instruments.

PE1368

Perceived Environmental Barriers in People with Spinal Cord Injury Living in Switzerland

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Background: Environmental barriers importantly contribute to the experience of disability in populations with health conditions such as SCI. **Objectives:** The present study aims to describe environmental barriers perceived by people with SCI living in the Swiss community and determine their prevalence across meaningful subpopulations. **Methods:** Data from 1,549 participants with spinal cord injury (SCI) of the cross-sectional community survey of the Swiss Spinal Cord Injury Cohort study was analyzed. The perceived impact of environmental barriers on participation was measured with the Nottwil Environmental Factors Inventory Short Form (NEFI-SF). Independence in activities of daily living was measured with the Spinal Cord Injury Independence Measure Self Report (SCIM-SR). Frequencies of perceived individual barriers are provided as well as bi-variate comparisons according to demographics and SCI-characteristics. Multivariate fractional polynomials regression of the NEFI-SF Rasch transformed total score on demographics, SCI-characteristics, and SCIM-SR Rasch transformed abilities was used to identify determinants of the overall amount of perceived barriers. **Results:** Most barriers were perceived in climatic conditions and due to inaccessibility of public infrastructure and participants' own homes. Older participants, those with longer time since injury and participants with complete lesions indicated more problems with accessibility. Females reported more attitudinal barriers, Most barriers due to communication devices and personal care assistance were reported by participants with tetraplegia. Higher SCIM-SR abilities scores showed a non-linear, cubic, association with lower NEFI-SF scores. **Discussion/conclusions:** Despite living in a rich country with a well-developed social system, many people with SCI experience participation restrictions due to environmental barriers.

PE1369

Incidence and Prevalence of Disease Related Lower Limb Amputations in Johannesburg, South Africa

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Background: The incidence and prevalence of disease (dysvascular) related lower limb amputations (LLA) at the Johannesburg Metropolitan Hospitals South Africa. Literature shows an incidence of LLA ranging from 1.6-197 per 100,000. To establish the cumulative incidence and prevalence of disease related LLA at Johannesburg Metropolitan Hospitals. **Materials and Methods:** A population sample of all five hospital operating theatre register records was reviewed. All records of general surgery and vascular operations were reviewed to count the number of LLA operations performed over a two year period from June 2011-June 2013. Institutional ethical approval was obtained (Ethical clearance no: M110124). Data were analysed using IBM SPSS version 22. Descriptive and ratio analysis was used to estimate the incidence and prevalence. All continuous data are presented as means, standard deviations. **Results:** A total population of N=23,617 people were registered during the study period. Total of 743 patients underwent a LLA and the total amputations performed were 879. The mean

age was 60.72 (SD±13.31). The majority of the patients amputated were males (446, 60%) and the majority were underwent a below knee amputation. The cumulative prevalence of LLA operations is 0.037 (95% CI) (or 3,722.0 per 100,000 persons seen at the Johannesburg metropolitan hospitals). The cumulative incidence of LLA is 0.031 (95% CI) (or 3,146 per 100,000 persons -2-years of study). The cumulative incidence of LLA in males is 0.038 (95% CI) (or 3,849.14 per 100,000 persons -2-years of study). The cumulative incidence of LLA in females is 0.023 (95% CI) (or 2,300 per 100,000 persons -2-years of study). *Conclusion:* The incidence and prevalence of LLA is very high in this metropolitan area.

PE1370

Etiology and Demographics of Traumatic Spinal Cord Injuries in Japan

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Aim: The aim of this study is to report annual changes of the patients with spinal cord injuries through retrospective study of 1997–2012 Spinal cord injury data base faced to an extraordinary explosion of the elder population in Japan. *Methods:* Data on admission and discharge were collected in the Kibikogen medical rehabilitation statistics center: including age, gender, cause of injury, type of vertebral lesion, operative treatment, complications, ASIA/ISCOS impairment score, neurological examination, FIM on admission and discharge, Length of Stay and Aftermath. *Results:* The total number of patients was 4,220. Standard age was average 52.7 years±SD 18.3 the age distribution was two peaks 21–25, 61–65, the ratio of male was four times more than female. Cause of injury was the first fall from height 31%, the second traffic accident 27%, the third slippery fall 20%, the fourth sports injury 7%. The neurological distribution was the most occurred at cervical C4 and C5 70.2%. Complications were the first pain and numbness 70%, the second UTI 31%, the third autonomic Dysreflexia 15% and the fourth DVT 8.0%. Comorbidities were the first Diabetes 15%, the second Hypertension 14%, the third cardiovascular disease 11%. Decubitus is 25% (new occurred in hospital 8%), mainly sacral and occipital region. Urination was natural 43%, CIC 22%, dwelling catheter 20%. Evacuation was natural 43%, finger stimulation 37%, using appliances 20%. LOS was average 131±SD 96.5. FIM scores on admission was average 63.5±SD 23.3 and FIM scores on discharge was average 89±29.5. Aftermath was return to home 54%, transfer to other chronic hospitals or nursing home 28% and return to occupation 6% and return to school 1%. *Discussion:* The rapid explosion of elderly population in Japan compelled to change the etiology what the older, the more incomplete tetraplegia. Japanese care giver insurance excludes the patients below 65 years old with spinal cord injury. Also we can not shorten length of stay because being still poor social welfare, depending upon to the care by the family and also Japanese style home circumstances. *Conclusion:* 1) ageing factor causes increasing of cervical incomplete tetraplegia 2) We need to prepare social approach to prevention of the elderly fall.

PE1371

Does the Traffic Accident War End? From the Point of View of Spinal Cord Injury Due to Traffic Accident

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Aim: The aim of this study is to report annual changes of the patients with spinal cord injuries regarding to mainly traffic accident in Japan through retrospective study of 1997–2012 Spinal cord injury data base. *Methods:* Data on admission and discharge were

collected in the Kibikogen medical rehabilitation statistics center. *Results:* 1) The total number of patients was 4,220. Standard age was average 52.7 years±SD 18.3 The age distribution was two peaks 21–25, 61–65, the ratio of male was four times more than female. The average of Length of Stay was 156 days±45.0 SD. Aftermath was return to home 51%, return to work 30% and return to school 1%. 2) Causes of accidents were 1st traffic accident 34.3%, 2nd falling 33.4%, 3rd slippery fall 3.5%, 4th Sports. 3) Most frequent decade of age was Sports below 15 years old, Traffic accident among 16–30, Falling among 61–75 and slippery fall above 76. 4) Recently SCI cause of traffic accident has been gradually decreasing so long as the number of traffic accidents decreasing. 5) The kind of traffic accidents was 1st vehicle 52%, 2nd motor bicycle 32%, 3rd bicycle 12% and walkers 3%. 6) 12 years trend was vehicle cause decreasing but others causes increasing 7) The distribution of neurological level was very similar among other causes. 8) The ratio of each neurological level differed T2–T8 level more often occurring. *Discussion:* The type of SCI epidemiology showed quite different pattern compared with other countries especially western country. Our speculation is due to more rapid aging population and motorization with delay of infrastructure and governmental policy so called traffic accident War. But after establishment of vehicle safety in itself and also traffic education of drivers and professional drivers working circumstances, since 2,000 the rate of traffic accidents has shown a drastic decrease. Those social and legal efforts followed better results. *Conclusion:* we have not better results to enough improvement to prevent the disaster of the traffic accident.

PE1372

Measurement of Functioning in Subjects with Chronic Stroke Using WHODAS II

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Introduction: The purpose of this study is to identify the accessibility of World Health Organization Disability Assessment Schedule 2.0 (WHODAS II) for subjects with chronic stroke as a long-term follow up tool and to identify the relationship of functional status at discharge with long-term abilities after discharge, also regarding the effects of personal factors. *Methods:* We enrolled 79 subjects with stroke from years from 2012 to 2013. All subjects had been assessed with MBI and MMSE at their admission and discharge. They were interviewed with the WHODAS II questionnaire either at the outpatient clinic or on the phone. All subjects were divided into five groups according to the time from their discharge to follow up interview to figure out the functional progression. *Results:* The mean age of 79 subjects was 61.6 years, and 48 of them were with ischemic attack. Subjects were divided into five groups according to how long it had passed from their discharge to the interview; Seven for shorter than 6 months, 19 for 7–12 months, 28 for 13–24 months, 16 for 25–36 months, 9 for 37–48 months. The scores of MBI and MMSE at discharge were correlated with the total score of WHODAS II. Among the personal factors, the higher educational level and the presence of occupation were correlated with better total scores of WHODAS II, especially in terms of participation in the society. The marital status might result in better getting along with others. Each functional domain of WHODAS II showed that cognition, self care and getting along with others were relatively well-maintained, while mobility, life activity and participation in society were relatively poor. Overall it was found that functioning tended to be maintained or improved within 13–24 months after discharge but declined thereafter. *Conclusions:* The long-term functioning of subjects with chronic stroke is influenced by functional status at discharge and environmental factors such as marriage, presence of occupation and educational level. In spite of functional maintenance up to 2 years after discharge, functional decline emphasizes the importance of long-term regular monitoring. Accordingly, the community-based aftercare would

may reduce in-hospital expenditures and improve the quality of prevention

PE1373

The Blog, a Modern Approach to the Evaluation of the Quality Of Life? Application in Our Medical Practice in the Management of Idiopathic Adolescent Scoliosis

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Introduction: The treatment of adolescent idiopathic scoliosis (AIS) has an impact on the patient's quality of life. Body image and self-esteem are also affected during the sensitive period of adolescence. Many scales are used in our daily practice, but they do not accurately reflect the patient's feeling. Internet blogs are a place of free expressions, can they help us to better understand the scoliotic teenagers?
Methods: We spotted several internet blogs created after 2005 and dealing with the treatment of AIS. This qualitative and observational study did not include websites dedicated to children with "secondary" scoliosis. Discontinued cases and accounts were not kept. An observation grid was created specifically for this study and was used to collect data.
Results: 14 blogs were selected. The targeted population was aged 14.7 and was a 100% females. All received orthopaedic treatment and half of them required surgery. No psychological follow-up was mentioned. We found that the treatment process was assimilated to the 7 stages of bereavement with sometimes children never getting to the point of acceptance or reconstruction. The most significant stages of the monitoring appeared to be the diagnosis, the spinal brace introduction and its moulding, paradoxically its removal and surgery. Body image was altered at each of these key stages. Self-esteem never reached a satisfying level. In most cases, the physiotherapist was chosen as the resource person. The internet blog appeared also to be an undeniable support throughout the treatment.
Conclusion: Our awakening to body image and self-esteem alteration in AIS encouraged us to adapt our therapeutic behaviour in particular when prescribing a spinal brace or during a post-arthrodesis follow-up. It seems that a psychological follow-up should be systematically offer to help the adolescent to progress along the path to body reconstruction and self-image acceptance.

PE1374

Ten Month Review of FIM+FAM and RCS Outcome Measures on the Phoenix Centre for Rehabilitation

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Introduction: Rehabilitation is a goal-directed process which aims to help reduce the impact of long-term conditions in daily life. Rehabilitation is applicable both in acute injury and in progressive/static disability. Phoenix Centre for Rehabilitation is a newly inaugurated rehabilitation unit which cares for patients from diverse backgrounds. Over the first months of its existence 53 patients have been admitted and discharged. This review aims to identify the patient groups and their rehabilitation outcomes comparing the change on admission and discharge using two scales. These are the Functional Independence Measure (FIM)/Functional Assessment Measure (FAM) and the Rehabilitation Complexity Score (RCS).
Methods: A retrospective study of 53 patients of whom 35 were male, admitted and discharged between 3/6/2013 to 17/04/2014. All their discharge forms were reviewed, information regarding diagnosis, discharge destination, (FIM), (FAM) and (RCS) were collected and analysed.
Results: Of the 53 patients 64% were classed as trauma and 25% were classed as having a neurological diagnosis. The average length of stay (LOS) was 60 days. The FIM+FAM scores improved, on average by 46% and the RCS scores improved, on average by 49%.

Trauma patient's average age was 56 years ranging from 17 years – 99 years. For the trauma group the FIM+FAM improved on average by 56.1% and the RCS improved on average by 48.7%. Neurological patient's average age was 57.6 years ranging from 25 years – 70 years. For the neurological group the FIM+FAM improved on average by 31.3% and the RCS improved on average by 52.8%. The average LOS was 68 days. Other medical diagnoses included Pulmonary Fibrosis and Acute Myeloid Leukaemia these were classed as 'Other'. The average age was 49.5 years ranging from 21 years – 7 years. For the Other group the FIM+FAM improved on average by 27.5% and the RCS improved on average by 33.3% (ranging from 8-63%). The average LOS was 55.8 days (ranging from 14 – 157 days).
Conclusion: A multi-disciplinary team dedicated to trauma and neurological-rehabilitation produce measurable rapid functional gains and is of benefit to the rehabilitation model.

PE1375

Falls Efficacy Scale International (Fes-I) in Greek Community-Dwelling Adults

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Introduction: Fear of falling assesses both easy and difficult physical and social activities. The purpose of the study was to use the Greek version of the Falls Efficacy Scale among various populations in Greece and assess the differences.
Material/Methods: Two hundred community-dwelling adults aged between 40 and 90 years living in rural (Amynteo: n=35, Karpenisi: n=23), urban areas (Arta: n=49, Athens: n=16) and Greek islands (Dodecanese, n=77) completed the Greek version of the Falls Efficacy Scale-International (FES-I) either in postal self-completion format or by structured interview. To obtain a total score for the FES-I simply one adds the scores on all the items together, to give a total that will range from 16 (no fear about falling) to 64 (severe fear about falling).
Results: Subjects were concerning less about activities at home, and concerned about more demanding physical activities mainly outside the home. In the islands (Dodecanese, mean age 54.5 years {23-79}), the FES score (24.75, {16-61}) was statistically lower compared to the mainland (Athens, Arta, Karpenisi, Amynteo; mean age 63.4, {40-90}, FES score (33.3, {27-40}). In the mainland higher FES score was found in rural areas (Amynteo and Karpenisi, 40 and 36.5, respectively) and statistically lower in urban areas (Arta and Athens, 27 and 28.4, respectively).
Conclusions: These differences may be due to the age and sex differences between populations. Our study's population was homogeneous; however, the majority of the material consisted of women (80%). Physical activity was increased in rural areas (was not measured by an evaluation tool only from the history). Moreover, geographical differences i.e. islands and mountainous regions vs. cities (many of the participants lived in remote and inaccessible areas, but this was not the case for increased FES score). More puzzled according to fear of falling are the urban dwellers, who have reduced physical activity, or are aware of the increased risks of falling due to their educational level, etc.). The Falls Efficacy Scale-International (FES-I) is a short, easy to administer tool that measures the level of concern about falling.

PE1376

Disability Statistics in Japan

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Introduction: Since 1990, the importance of disability statistics has been pointed out in planning services for persons with disabilities. However, there was no international agreement on measurement of disability. Domestically, although the new legislation deals with different types of disabilities all together in Japan, disability statistics and disability services have been carried out according to each type of disabilities, such as physical disabilities, intellectual disabilities

and psychiatric disabilities. In 2011, the former Survey on persons with physical disabilities, which has been investigated every 5 years since 1951, was reconstructed as “Survey on persons with difficulties in daily lives” and covered not only 3 major disabilities but also incurable and rare diseases. *Material and Methods:* The background, process, questionnaires of “Survey on persons with difficulties in daily lives” and the outline of the results were investigated through minutes of the committees of the survey. *Results:* The expected results of the detailed statistics were estimated on four points. Firstly, the background and the need of non-registered persons with difficulties are expected to be revealed, such as persons with autistic spectrum disorders, traumatic brain injuries, and incurable diseases. Secondly, the new questionnaires will show the characteristics of income and consumption activities of persons with disabilities. Thirdly, the difficulties of multiple disabilities will be compared to those of single disabilities. Fourthly, detailed statistics on different types of disabilities among physical disabilities, age, onset of age, severity, and the comparison with the former survey are expected to show the spectrum of persons with disabilities. *Conclusion:* According to the above mentioned design, detailed statistics will be made with 31 question items and 14,243 collected data from “Survey on persons with difficulties in daily lives”.

E.5. FUNCTIONING IMPACT ASSESSMENT

PE1377

Content Analysis of the World Health Organization’s Global Action Plan on Disability and Prevention and Control of Non-Communicable Diseases: Actions, Measures and Indicators

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Introduction: Addressing the right to health of persons with disabilities is a significant challenge for health systems because health services for this population group are interdependent on other sectors such as education, employment, social affairs/protection and accessible transportation. By considering access to healthcare and rehabilitation services in relation to persons with disabilities, it is possible to evaluate the overall effectiveness of the health system in terms of equity. *Material and Methods:* Content analysis of World Health Organization’s Global Disability Action Plan 2014–2021 and the Global Action Plan for the Prevention and Control of Non-Communicable Diseases 2013–2020. The analysis will focus on actions, measures and indicators proposed to monitor progress. *Results:* Disability action plan lacks clarity on what existence of health policy in line with the Convention on the Rights of Persons with Disability means in practice thus posing challenges for benchmarking. The NCD Action Plan having placed due importance on reducing disability calls for disaggregated disability data but falls short by not including any indicators and targets that would allow monitoring of reduced disability if any. *Conclusion:* The World Report on Disability highlighted that 14 out of the 20 top health conditions resulting in disability were NCDs. Given the impact of NCDs on disability the missed opportunity for both action plans to monitor and benchmark policy and health systems implications in preventative, health promotion and curative interventions addressing NCD related disabilities needs to be immediately addressed.

E.6. ETHICAL ISSUES AND HUMAN RIGHTS

PE1378

Ethical Issues in Bio-Medical Research – a Developing Country Perspective

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Introduction: Everybody should be aware of human rights during biomedical research. Research Ethics is the discipline of evaluation of merits, demerits, risk, benefit, and social concern of activities. Maximum benefit should be derived from a research and no harm should be employed to the participants. In a developing country there are many vulnerable subjects like people of slum areas, patients of low socioeconomic condition, females, low income group etc. Protection of person with diminished autonomy i.e. vulnerable subjects should be ensured. Informed consent (IC) is an essential prerequisite for starting a biomedical research involving human subjects. For all biomedical research involving human, the investigator must obtain voluntary IC of the prospective subject. Some important ethical issues like voluntary IC, inducement, confidentiality, autonomy and assessment of risk-benefit should be kept in mind during research and all ethical norms should be maintained with justification. *Materials and Methods:* An observational study was done to assess the knowledge about ethical issues involving human. A total of 214 doctors of a postgraduate medical institute were included who was involved in a study to assess their knowledge of research ethics. A structured questionnaire was supplied to them to answer the questions regarding research ethics. The collected data was analysed statistically and chi-square test was done to see the level of significance. *Results:* It was found that maximum participants have poor knowledge about research ethics guidelines like the Nuremberg Code, Helsinki declaration etc ($p=0$). Regarding knowledge of informed consent (IC), maximum participants were more or less knowledgeable about it. The attitude of the respondents was also in favour of taking IC. In practice, most of them had taken IC that was verbal (39.3%, $P=0.001$) and written (47.6%, $p=0.001$). But some of the researcher had not taken any IC (13.1%, $p=0.001$). *Conclusions:* By this study, it can be concluded that the knowledge of most of the researchers of the concerned institute are poor about ethical issues during research but they were aware of informed consent.

PE1379

Ethical Decisions in Medical Rehabilitation

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Introduction: Common decisions taken by patients with disabilities and their Rehabilitation doctor can deeply affect their quality of life. On the model developed by the Hastings Center and adapted by A.Cristian in 2014 to apply in Medical Rehabilitation, we have analyzed the second phase – „Systematic review of cases with disability” as a responsibility of the current physician to know the complete clinical, biographical, cultural or medical history data for each patient. *Material and Methods:* We have analyzed data collected from 121 patients with disabilities (total of 2,793 patients) admitted in the Medical Rehabilitation Department in the Clinical CF Hospital in Iasi, Romania, for the periods 01.01.2013–31.12.2014, both retrospectively and at the follow-up admissions for each patient. We have analyzed 4 important aspects concerning the compliance with medical ethics: A. Medical indications; B. Patient preferences; C. Quality of life; D. Cultural contextual features. *Results:* From the total 121 patients, 65 presented with hemiplegia, 9 with paraplegia, 35 with hip arthroplasty, 6 with fractures in other sites and 3 with other debilitating neurological conditions. Analyzing the four boxes, we discovered: A: the clinical data were correctly reported, but the evolution in patient condition was not evaluated correctly so the analysis for the potential benefits and complications were not rightfully interpreted in some cases; B: a crucial part in rehabilitation is played by the patient’s description of his/her quality of life and how is he involved in the medical decision; C: data about the family, social status and motivations were correctly interpreted; D: an important role is played by the family and it’s functionality and by the social status of the patient. From the total number of patients there were

approximately 7 cases with different problems that have required a second medical decision. *Conclusions:* The analysis model with four boxes has evaluated correctly most situations and dilemmas occurred in the Medical Rehabilitation practice; clinical and diagnostic data correctly interpreted, associated with anamnestic and biographical data, were directed towards the medical outcome and patient's desires. Misinterpretation of these 2 directions in few cases led to the necessity of a new step-reevaluation and new clinical and therapeutic approach.

E.7. MISCELLANEOUS

PE1380

Kinematic Relationship between the Trunk and Ankle during Different Speeds of Sit-to-Stand Task in Healthy Young Subjects

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Introduction: The sit-to-stand (STS) task requires inter-segmental coordination between the upper body and lower limbs to control the body's center of mass. However, the interaction between the trunk and ankle has not been clarified during STS tasks conducted at different speeds. The present study determined the kinematic relationship between the trunk and ankle during the STS task performed at a natural speed (NSTS) and at a slow speed (SSTS). *Material and Methods:* Twelve healthy young subjects participated in this study. We used a motion analysis system involving 4 cameras, synchronized to a force plate, to assess the STS tasks. Three trials were recorded for each subject at both the natural and slow speeds. The mean and standard deviation values of the NSTS and SSTS durations were obtained. Thereafter, the percentage of total task time for initiation of ankle motions (dorsiflexion, plantar flexion), maximum angular velocities of trunk motions (flexion, extension), and lift off (LO) were calculated for NSTS and SSTS. A Pearson's correlation coefficient was used to assess the correlation between the maximum angular velocities of trunk motions and initiation of ankle motions. *Results:* The total durations of the NSTS and SSTS were 1.82 ± 0.22 s and 3.63 ± 0.61 s, respectively. The LO occurred at $41.0 \pm 5.0\%$ of the total NSTS time and at $37.2 \pm 7.3\%$ of the total SSTS time. A significant positive correlation was found between the maximum angular velocity of trunk flexion and initiation of ankle dorsiflexion during NSTS ($r=0.78$, $p<0.01$) and SSTS ($r=0.80$, $p<0.01$). In addition, there was a significant positive correlation between the maximum angular velocity of trunk extension and initiation of ankle plantar flexion during NSTS ($r=0.51$, $p<0.01$) and SSTS ($r=0.50$, $p<0.01$). *Conclusion:* These findings indicated that the same kinematic strategies of trunk and ankle interactions during different task speeds might help healthy young subjects to efficiently perform STS tasks.

PE1381

Relationships of Inspiratory Muscle Strength and Standing Balance Ability

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Introduction/Background: It is important that we preserve the right position of balance in daily life. The neurologic system is important to posture control, same as lower limb muscle is important, because the purpose of lower limbs is effective in standing posture. And, because a link exists in diaphragm and lower limb muscles, it is considered that the breathing muscular strength is linked up to standing position maintenance. The aim of this survey was to elucidate the relations of inspiratory muscle force and standing balance ability. *Material and Methods:* Subjects were 12 volunteers (6 males, 6 females) with informed consent. The average of age,

height, and body mass were 20.9 years, 168.7 cm, and 61.1 kg, respectively. At first we measured inspiratory muscle strength (IMS) [cmH₂O] and peak inspiratory flow (PIF) [L/Sec] using an inspiratory resistance device (POWERbreathe, Southam, UK). And, we performed stabilometry using the stabilometer (Gravicorder GP -7, Anima, Tokyo, Japan). Indexes were total locus length (TLL) [cm], locus length per unit area (total locus length/area of sway, L/A) [1/cm²], circumference area (CA) [cm²], root mean square of area (RMSA) [cm²]. We did a correlation analysis of Pearson about correlation these values. The analysis was done using IBM SPSS statistics (version 22). *Results:* Average (SD) of IMS, PIF, TLL, L/A, CA, RMSA was 45.5 (11.2) cmH₂O, 2.6 (0.6) L/Sec, 31.3 (6.4) cm, 23.5 (9.3) 1/cm², 1.5 (0.7) cm², 1.4 (0.8) cm², respectively. As a result of correlation analysis, significant correlation was seen between IMS and UATL, IMS and RMSA. The coefficient of correlation was -0.66, 0.59 each ($p<0.05$). *Conclusion:* In these results, there was a negative correlation between IMS and L/A, and there was a positive correlation between IMS and RMSA. In other words, because the TLL and IMS do not have correlation, and L/A decreases, a real centre of gravity enlarges the moving range, so that breathing muscular strength is strong, but shows that delicate adjustment is enabled. Because nervous system did not have the abnormality for subjects, it was suggested that they could maintain a stable posture if inspiratory muscle strength became strong. *Acknowledgement:* Authors thank all subjects.

PE1382

Spondylodiscitis – an Underestimated Disease

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Introduction: Early detection and treatment of spondylodiscitis increases with the improvement of medical care and is getting more important with the aging population. The pathogenesis is diverse, treatment inconsistent. The disease can be life threatening. *Objective:* Is there a standard procedure for the detection and treatment of spondylodiscitis? *Materials and Methods:* From January 2012 to December 2013, 54 patients were treated primarily surgically due to spondylodiscitis at the University Hospital Ulm. Affected were 20 women and 34 men with an average age of 56 years. The laboratory parameters of inflammation were increased in 49 cases. The detection of the disease was clinically as well as radiologically. *Results:* All 54 patients presented with back pain, 15 with radicular pain and all were treated with antibiotics. Fever was rare. The onset of symptoms was on average 8 weeks prior to the diagnosis and predominantly affected the lumbar spine. The indication for surgery is mainly dependent on age. The detection of pathogens, mainly *S. aureus*, was achieved in 38 cases by samples taken during the operation and in three cases by a CT-guided fine-needle biopsy. Declining or in the normal range located inflammation parameters did not correlate with radiological findings (MRI). The duration of treatment lasted in the surgically as well as conservatively treated group at least 3 months. On average the patient received inpatient care for 23 days. One patient died due to a septic shock. Healing was achieved in the remaining patients. *Conclusion:* The infection is mainly hematogenous. Affected were mainly patients over 50 years old. The main location was the lower lumbar spine. The diagnosis is always delayed. An early symptom of the disease was, in addition to general symptoms, back pain. The therapy is tedious, inconsistent and not standardized. Surgery is the most common form of therapy. The pathogen did not influence the duration of treatment.

PE1383

The Influence of a Psychosocial Training on the Quality of Consultations in Primary Care in Austria

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Background: Psychosocial factors represent an important component of consultations in General Practice. A structured psychosocial training is commonly considered advantageous in improving the quality of the doctor-patient-interaction. **Objectives:** The aim of the present study was to evaluate the influence of the existing postgraduate psychosocial training in Austria, represented by three diploma programmes of the Austrian Medical Association. We compared the quality of consultation at General Practitioners with advanced psychosocial training and those without. Additionally we analysed the influence of work-related satisfaction. **Methods:** We took patient satisfaction and patient empowerment after the consultation as our indicators. As measuring instrument we designed a patient questionnaire on the basis of Richard Baker's 'Consultation satisfaction questionnaire' and John Howie's 'patient enablement instrument'. General Practitioners received a doctor-questionnaire assessing their professional satisfaction (based on Bovier P et al.). **Results:** 25 General Practitioners (12 with advanced psychosocial training and 13 without) and 1215 patients participated. We could not find significant correlations ($p < 0.05$) between psychosocial training or professional satisfaction of General Practitioners and mean values of patient rating. But there was a tendency that General Practitioners with advanced psychosocial training received better ratings than those without. Rural General Practitioners got better patient rating scores too. General Practitioners with advanced psychosocial training, rural and female General Practitioners were on average more satisfied than others. Most critical patients were those with chronic or psychosocial health problems. 39.3% of the patients affirmed that a psychological component contributed to their illness. Chronically ill patients and patients with multimorbidity had a higher percentage of self-rated psychological components than other patients. **Conclusion:** The percentage of patients with a self rated psychological component contributing to their illness was relatively high (39.3%), wherefore a good psychosocial competence seems necessary for General Practitioners. We were able to detect a trend that General Practitioners with advanced psychosocial training receive better patient ratings after the consultation. For following surveys we suggest to either increase the number of participants or at least look for a smaller variation of doctor- and practice – characteristics.

CASE STUDIES

PX1384

A Clinical Case: Stroke in Patient with Overlap Syndrome

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Case Diagnosis: A 56 year-old woman suffers from a moderately-severe left middle cerebral artery stroke as a consequence of cardiac emboli and presents with left hemiparesis. She has a known history of Overlap Syndrome with mitral stenosis and pulmonary fibrosis. **Case Description:** Initially diagnosed with Cutaneous Lupus Erythematosus in the early 90 s, in 2000 she presented sclerodactyly, pulmonary hypertension, pulmonary fibrosis, low TLCO and antiperistaltic waves in the esophagus. The cutaneous biopsy suggested Scleroderma which was confirmed by the positive anti-centromer antibodies and an ACR score of 11. In 2010 she was admitted with multiple joints symptoms that suggested Rheumatoid Arthritis which was confirmed by an ACR score of 8. She no longer had any signs of Lupus, and the Overlap Syndrome was now suggested by Scleroderma and Rheumatoid Arthritis. She also suffered from severe mitral valve disease and EF=55-65%. After the stroke in 2014 the echocardiography also showed severe left atrium enlargement with high probability of atrial fibrillation and severe pulmonary hypertension, making her a candidate for valve replacement. **Discussion:** Due to severe heart and pulmonary conditions, the patient was experiencing fatigability, shortness of

breath, reduced effort capacity and severe deconditioning which was preventing the stroke recovery. Cardiac recovery was debatable due to the severe mitral valve stenosis. We tried swallowing re-education and early mobilization for prevention of thrombosis, embolism, respiratory complications and for increasing the effort capacity. We then continued with stroke recovery and physiotherapy. There was only a limited recovery in her upper extremity, but she improved in her lower extremity, now being able to ambulate, albeit with a spastic gait, a cane and supervision. Her effort capacity has increased and the pulmonary hypertension has decreased, improving her heart and pulmonary conditions. **Conclusions:** Concerning the recovery, it is very important to see the patient as a whole and try to evaluate the disability caused by each condition. We need to prioritize the disabilities we find and decide the best approach and the order in which help is given. As it was shown, we couldn't start the proper recovery of the paretic limbs before improving the heart, pulmonary and swallowing conditions.

PX1385

Nutritional Management in Multiple Trauma Patients: A Case Report and Review of Literature

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Introduction: The hypercatabolic state induced following major trauma and in critical illness lead to rapid malnutrition. Over the last few decades advances in enteral and parenteral nutrition have improved the management of these patients. However nutritional support can still be very challenging due to many factors. We present a complex case where relatively aggressive nutritional support failed to minimise weight loss. **Case Report:** A 31-year-old gentleman was admitted to Neurosciences Critical Care Unit (NCCU) following a road traffic accident. He sustained extravasation of the left subclavian artery (failed endovascular repair and axillary femoral bypass graft), lumbar 3/4 transverse process fracture, cervical 6/7 facet joint fracture. X and XII cranial nerve injury. Despite all efforts to save his left upper limb he underwent above elbow amputation, which was complicated by a wound infection. This resulted in multiple washouts, debridement and vacuum dressings. On admission his body mass index (BMI) was 21.4 kg/m². Enteral nutrition (EN) via a nasogastric tube (NGT) was commenced within 32 hours of admission. Over the whole length of stay a total of 19% of feeding time was interrupted, resulting in delivery of 81% and 83% of total prescribed energy and protein respectively. On discharge (day 55), his BMI was 14.6 kg/m². **Discussion:** Resting energy expenditure rises as a result of metabolic response to injury increasing the likelihood of unintentional weight loss and profound muscle wasting. Predictive equations are often used to calculate nutritional requirements rather than recommended calorimetry as gold standard for energy. EN is the route of choice and should be initiated within 24-48 hours of admission. Methods to optimise nutritional delivery were implemented including prokinetic usage, intermittent feeding and supplemental parenteral nutrition. Target rate of EN was not reached until day 5. Perioperative fasting and delayed gastric emptying resulted in underfeeding. **Conclusion:** Nutritional support plays an integral role in the care of critically ill major trauma patients. However, many barriers exist resulting in ; failure to deliver optimal nutritional intake and delayed functional and psychological recovery. During the rehabilitation phase, more aggressive energy and protein delivery is required to replenish losses.

PX1386

The Effects of Low-Frequency Repetitive Peripheral Magnetic Stimulation on Lower Limbs Muscle Stiffness – a Case Study

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Background: Muscle stiffness is frequent in patients after an upper motor neuron (UMN) lesion and is an important cause of disability. Repetitive peripheral magnetic stimulation (rPMS) of affected muscles while stretching can be an attractive option to reduce pathological muscle tone and to stimulate cortical reorganization. **Methods:** This study tested whether non invasive and painless rPMS, while stretching supra-maximal the target joints, could improve active range of motion and lead to a reduction of muscle stiffness. A 70-year old male with multiple sclerosis (MS) with severe motor deficits and muscle stiffness on the lower limbs received low-frequency rPMS daily, for 10 sessions. The coil was placed over the muscles corresponding to the target joint, the hamstrings and the triceps surae muscle (in case of knee flexor stiffness) and the plantar flexor group (in case of ankle flexor stiffness). The stimulation parameters were: 60% intensity, 5 Hz, 3 s trains of stimulation and 3s pause, a total of 750 stimuli per targeted muscle group. Dependent variable were the relative active extension deficit and Modified Ashworth Scale assessed at baseline (when the patient received only physiotherapy), daily at a fixed time before and after stimulation, and 10 days later (T10). **Results:** The mean relative extensor deficit at baseline was not significantly modified (5.76%) After only one session of rPMS was 21.11%. A significantly larger decrease from baseline to T10 75.65% was observed. Muscle tone was reduced within 10 days of stimulation with 1.25 points on the Ashworth score. No side effects occurred. **Conclusion:** Repetitive peripheral magnetic stimulation is a safe and feasible approach. For patients with muscle stiffness it appears to provide positive effects, with no clear long term benefits. Further studies with rPMS in larger and randomized population are required. **Acknowledgement:** This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number POSDRU/159/1.5/S/137390.

PX1387

Rehabilitation Program of a Patient with Vacuolar Myelopathy in the Course of Acquired Immune Deficiency Virus – Case Report

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Introduction: Vacuolar myelopathy is a disease affecting the central nervous system, caused by damage to myelin. There is evidence that up to 30% of adults with AIDS experience some level of damage to the myelin, although clinical signs of this condition are less common. In this case a 47-year-old man with acquired immune deficiency virus has developed bilateral lower-extremity weakness diagnosed as vacuolar myelopathy. The patient presented with dysfunction from bilateral lower extremity weakness that began three weeks prior to admission to Neurological Rehabilitation Ward. **Material and Methods:** Physical exam was remarkable for symmetrical weakness of both lower extremities (2/5 in the Lovett scale) and paresthesia of the lower limbs. 6-week long rehabilitation program was applied in the hospital conditions. Both the kinesiotherapy and physical therapy were adjusted to the neurological deficits that the patient presented. Moreover psychological therapy was applied during the whole hospitalization period. **Results:** As a result of the applied rehabilitation functional status of the patient had improved. We observed a slight reduction in motor weakness of the lower limbs which allowed for further rehabilitation in ambulatory conditions. **Conclusion:** Properly chosen rehabilitation seems to give satisfactory results in the myelopathy in HIV-infected patients. Current knowledge and models of rehabilitation care can be applied to HIV-related physical disability. However there is a need for more rehabilitation strategies to be published to collate the achieved results in an effort to improve overall quality of life.

PX1388

Vertebral Manipulation Effect in Lumbar Discopathy – Case Report

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Introduction: Manipulation is a technique used for the first time, in 1874 by AT Still, in the US for various therapeutic purposes musculo-articular pains of the machine. The generalization of this technique belongs to Robert Maign . Currently this technique is more commonly used. The purpose of this presentation is to present case intake manipulation technique discopathy with lumbar radiculitis L2, L3, L4. **Material and Methods:** Patients aged 42 years is presented in specialist outpatient spinal pain lower back mecano-inflammatory nature, onset after day. Physical examination: paravertebral muscle contraction revealed right lower back, pain in the lumbar spinous percussion, IDS 30 cm of soil, extension 0 degrees, IFL limited negative Lasseque bilateral index. It establishes treatment with injectable NSAIDs relieve complaints to the rachis. At 5 days for pain control returns to the IRAD right thigh burning character. Pain intensity was assessed note 7 on the VAS. Physical examination shows three quadriceps strength as the force three iliopsoas right inlactare deficient knee straight. Treatment with corticosteroids is set injectable form, 5 days, then injectable NSAID, with analgesic, decontracturant and vitamin therapy. Diminish the value painful accusations 3 but deficit persists inlactare knee and quadriceps cramps feeling, which is why we recommend handling the rachis. **Results:** After the first session handling in the quadriceps cramp goes away, and the pain tends to 0. After the second session performed 3 days, patients present without pain, strength iliopsoas 5 May quadriceps without gait disturbance. **Conclusion:** the result demonstrates tratamentului beficile complex medication, with particular techniques to recover in discopathies.

PX1389

Functional Rehabilitation of an Osmotic Demyelination Patient: a Case Study

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Case Dignosis: Osmotic demyelination syndrome (ODS) include a central pontine myelinolysis and an extrapontine myelinolysis mainly, as a consequence of a rapid fluctuation in serum tonicity, wich insults to white matter tracts to myelin injury. **Case Description:** A 30-year-old female diagnosed with Osmotic Demyelination Syndrome (ODS) was transferred to the rehabilitation center from neurologic department administering medication to relieve tremor. She had symptoms of quadriplegia, dysarthria, dysphagia and cognitive disorders. During the first month the rehabilitation procedures included motor functional training techniques for patient to regain movement and relieve muscle spasm, and balance training (from sitting to standing) to increase stance capability. We also applied key points of control and reflex-inhibiting patterns in combination with occupational therapy for patient to improve hand function and cognitive function. The following two months we increased the intensity of balance training and introduced gait training. Dysarthria training and cognitive impairment training were also applied to strengthen and improve verbal communication skills of the patient. Closed kinetic chain exercises were used as a major strategy and muscles were trained from the distal limbs for improving the motor control of the affected limbs and trunk. Abilities of daily living training, task-specific practice and auditory cueing were also applied to improve gait function and coordination. Outcomes were measured at the baseline and 3 months after intervention in our rehabilitation center using Fugl-Meyer Motor and Balance Assessments, Modified Barthel Index, MMSE, Gugging Swallowing Screen, and Frenchay test. The scores were

64, 7, 30, 12, 3 and 2/28 respectively before treatment, and 85, 14, 90, 20, 18 and 9/28 respectively after treatment. *Discussion:* With the application of MRI, early diagnostic efficiency of ODS is increased, while most surviving patients remain with neurological deficits. The findings of this study may illustrate rehabilitation program is effective to the patient with ODS. *Conclusion:* Lacking of study in terms of functional rehabilitation procedure on ODS, we hope the presentation of this case study will provide some suggestions for further treatment.

PX1390

Applying the Ethical Model in Medical Rehabilitation – Case Study

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Case Diagnostic: Tetraplegia; Type 2 Diabetes; Urinary Tract Infection; Acute Toxic Hepatic And Renal Failure. *Case Description:* 41 years-old female patient presented with tetraplegia that occurred after encephalitis with S. pneumoniae. Biographical and social data collected revealed an extremely committed women, with 5 children of different ages and a strong religious faith, that struggled with an alcoholic husband and almost no support from family and friends. Her expectations for quality-of-life were high since she was the only support for her family. *Discussion:* We have applied the four-box model for medical ethics for this case. In the first box we noted clinical and diagnostic data. In the second box, we noted biographical data: patient’s family, preferences her capacity to take decisions regarding her condition; in the third box we noted the quality of life of the patient: her expectation, the type of treatment that might lead to accomplish those desires. In the fourth box we noted the social and cultural context: who is the patient, how is her family, neighbours and friends, how can they support her, what are her religious and spiritual believes, what are the financial possibilities for this patient and how w the medical decision will affect the patient and her family on a long-term period. *Conclusions:* The four-box model evaluates correctly the ethical dilemmas occurred in Medical Rehabilitation. All data collected are correctly ranked to support the patient’s best interest. After applying this model, we were able to sustain an appropriate medical decision and to offer an outcome the nearest to the patient’s expectation.

DISASTER RELIEF

PX1391

Medical Issues and the Need for Medical Rehabilitation in Floods

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Introduction: Floods are one of the major natural disasters. It requires attention in terms of awareness of medical professionals about common illnesses and injuries, evacuation of disable population and incidence of new onset disabilities. The aim of this study was to assess the spectrum of medical issues during floods and the needs for medical rehabilitation. *Materials and Methods:* A questionnaire based cross sectional survey was designed. Doctors who provided services in the flood affected areas in the acute phase were interviewed. Data recorded included the area, time since flood, number and types of patients seen per day, medical issues encountered and opinion about the need of rehabilitation medicine physicians. *Results:* Fifty questionnaire were distributed among doctors whom have worked in flood hit areas in 2010. The response rate was 68% (34). All the doctors were general duty doctors or residents in their respective specialties. The Doctors

reached the flood area between 1-4 weeks and spent an average of 30 days in the flood affected areas. Average number of patients attended was 147 patients/physician/day (Range 50-450). Gastrointestinal, respiratory and skin infections were the commonest ailments followed by conjunctivitis and trauma. Trauma included minor bruises and lacerations. There was only one case each of head injury and fracture reported while no spinal cord injury was reported. None of the respondents considered early rehabilitation intervention mandatory in acute flood situation however weekly visits of medical, surgical, skin, eye, gynecologist and psychiatrist were recommended by half of the respondents. Ninety percent of the doctors considered general duty doctors and paramedics trained in flood related medical conditions sufficient to handle the situation. *Conclusion:* The major medical problems in flood hit areas of Pakistan are gastrointestinal disorders, skin diseases, respiratory infections and conjunctivitis. No specialized medical services are required in initial days, general duty doctors trained in common flood related ailments can handle situation. Head injury and major trauma including fractures, amputations and spinal cord injuries are rare. Rehabilitation services are not required in initial phase of flood however evacuation of previously disabled person residing in the area should be catered for.

DYSPHAGIA

PX1392

tDCS with Task Modulate Local and Remote Plasticity of Two Asymmetric Swallowing Hemispheres

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Introduction: Transcranial direct current stimulation (tDCS) has been a promising treatment to dysphagia. However, as swallowing cortex is under bilateral but asymmetric control, the optimal selection of target hemisphere is controversial. In order to reveal the underlying neurophysiological relationship between two intact swallowing motor system, we examined bilateral effects of tDCS on both stronger (dominant) and weaker (non-dominant) suprahyoid/submental projection concurrent with swallowing tasks. *Material and Methods:* Healthy participants were divided into two groups: dominant tDCS and non-dominant tDCS. Online tDCS (anodal, cathodal and sham) was randomly given while subjects performed effortful swallowing on separate days. Neurophysiology in bilateral hemispheres was measured by recordings of submental motor-evoked potentials (MEPs) to single-pulse transcranial magnetic stimulation (TMS). The assessment was made prior to, following 5, 30, 60 and 90 minutes post intervention. *Results:* Anodal tDCS (a-tDCS) augmented the excitation under stimulated (dominant or non-dominant) hemisphere with spreading it to contralateral projection following non-dominant stimulation. Cathodal tDCS (c-tDCS) decreased the ipsilateral excitability on dominant motor cortex, but enhanced contralateral projection. A slightly increased effect was observed on ipsilateral non-dominant c-tDCS. *Conclusion:* Bilateral plasticity changes of swallowing motor cortex to tDCS combined with task is site and polarity dependent. Task-concurrent a-tDCS not only increase the excitation of ipsilateral swallowing projection but also spread these facilitated effects to the contralateral hemisphere under non-dominant intervention, which has therapeutic potential for swallowing rehabilitation. Moreover, c-tDCS on dominant cortex with online tasks could boost excitability of contralateral hemisphere, which may merit a future research on a model to understand the interaction of asymmetric swallowing cortex both in health and dysphagia patients. *Reference:* 1) Suntrup, S., Teismann, I., Wollbrink, A., Winkels, M., Warnecke, T., Floel, A., Pantev, C., and Dzielaw, R. (2013). Magnetoencephalographic evidence for the modulation of cortical swallowing processing by transcranial direct current stimulation. *Neuroimage.* 2) Vasant, D.H., Mistry, S., Michou, E., Jefferson, S.,

Rothwell, J.C., and Hamdy, S. (2014). Transcranial direct current stimulation reverses neurophysiological and behavioural effects of focal inhibition of human pharyngeal motor cortex on swallowing. *J Physiol*.

PX1393

The Effect of Balloon Catheter Swallowing on the Penetration-Aspiration Scale in Stroke Patients

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Background: Stroke patients commonly present with the dysfunction of upper esophageal sphincter which is composed of inferior pharyngeal constrictor muscle, cricopharyngeus muscle, and parts of upper esophageal muscle. In these patients, the relaxation of the upper esophageal sphincter is incomplete. Repeated swallowing training will improve swallowing difficulty of stroke patients as part of rehabilitation program. This study intended to find the effect of balloon catheter swallowing on the Penetration-Aspiration Scale (PAS). *Methods:* We recruited hospitalized stroke patients and performed balloon swallowing on the videofluoroscopy

swallowing study. Our test starts with semisolid swallowing and moves to the ballooning stage if aspiration (PAS 6, 7 or 8) occurs; otherwise, the test moves to liquid swallowing and further to the ballooning state if liquid aspiration occurs. After repeated balloon swallowing for 5 minutes, we performed semisolid or liquid swallowing respectively to see change in PAS between before and after treatment. *Results:* Ninety patients were recruited for the study from March, 2013 to June, 2013; among them, 18 patients suffered aspiration at the semisolid swallowing step and 72 patients without aspiration moved to the liquid swallowing step, leaving 24 of them who showed liquid aspiration. Average PAS score of 18 patients who experienced semisolid aspiration improved from 7.56 to 4.00 after balloon swallowing, while average PAS score of 24 patients who showed liquid aspiration decreased from 7.21 to 3.09. Ten of 18 (56%) showed improvement in PAS to the level less than 6 (mostly 1) in the semisolid aspiration group and 16 of 24 (67%) in the liquid aspiration group. *Conclusion:* Aspiration in stroke patients is a major cause of pneumonia. Dysphagia therapy that includes balloon swallowing is known to enhance swallowing function; however, no study was performed to investigate the effect of balloon swallowing in terms of PAS. This study is the first report on dramatic improvement in aspiration risk during swallowing test in terms of PAS after balloon swallowing therapy.

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