

ABSTRACTS

The 3rd Asia-Oceanian Conference of Physical and Rehabilitation Medicine in Conjunction with The XI Annual Scientific Meeting of The Indonesian Physical Medicine and Rehabilitation Association

MAY 20–23, 2012, BALI, INDONESIA



WELCOME TO BALI

Dear Colleagues and Friends,

You are cordially invited to The 3rd Asia-Oceanian Conference of Physical and Rehabilitation Medicine in Conjunction with The XI Annual Scientific Meeting of The Indonesian Physical Medicine and Rehabilitation Association, 20th–23rd May 2012, Bali, Indonesia.

Come and enjoy a marvelous meeting at the world famous Island of gods. The perfect combination of gorgeous tropical and beach landscape, exotic, preserved and unique culture together with Balinese cuisine will certainly make the 3rd AOCPRM an unforgettable event.

Bali is easily reached from every corner of the world with direct flight from Jakarta, Singapore, Hong Kong, Bangkok, Kuala Lumpur, Taipei, Seoul, Osaka, Tokyo, and major cities in Australia.

The organizing committee is preparing a high standard scientific program as well as memorable social events with cultural performances and site seeing program.

Looking forward to meeting you soon in Bali and please contact us at aocprmbali@pharma-pro.com for further information.

Warmest regards,

Peni Kusumastuti, MD
AOCPRM President

Prof. Angela B.M. Tulaar, MD
Honorary President

PLATINUM SPONSOR:



MONDAY, 21ST MAY 2012**Plenary Lectures****08.00–09.00***PMR Practice in Musculoskeletal Rehabilitation*

Management of Pain in Musculoskeletal Disorders	Marta Imamura	PL01-01
Rehabilitation as a Health Strategy – How to Describe the Role of Physical and Rehabilitation Medicine at an International Level?	Christoph Gutenbrunner	PL01-02
Application of Ultrasound in Musculoskeletal Rehabilitation	Tyng-Guey Wang	PL01-03

Invited Lectures**09.00–10.15***Back Problem 1*

Change of Pain Characteristics Due to Back Problem and Influence Onto Related Activities and Social Participation	Masami Akai	SS01-01
Patient-oriented Treatment – Solution to Low Back Pain	Xin Gu	SS01-02
Massage, Music and Magnet in Low Back Pain	Reynaldo R. Rey Matias	SS01-03

Stroke Rehabilitation

Orofacial Dysfunctions Following Stroke	Ajit Kumar Varma	SS02-01
Early Rehabilitation for Stroke Patients	Peter Lim	SS02-02
Movement Facilitation of the Affected Side after Stroke: Focus on Mirror Therapy and Constraint-induced Aphasia Therapy	Bayu Santoso	SS02-03
Restoration of Hemiparetic Upper Limb after Stroke with Brain-machine Interface Technology	Meigen Liu	SS02-04

Spinal Cord Injury 1

Evaluation of Severity of Spinal Cord Injury by Blood Biomarkers	Toru Ogata	SS03-01
Rehabilitation of Spinal Cord Injury in Developing Countries: Do We Need A Specialized Unit?	Apichana Kovindha	SS03-02
Managing the Neurogenic Bladder Post Spinal Cord Injury – Can We Do Better?	Adela Tow	SS03-03
Sensomotoric Rehabilitation in Patients with Spine Injuries	Anton Wicker	SS03-04

Pediatric Rehabilitation

Neuropharmacological Intervention in TBI – From Acute to Chronic Rehabilitation	Heakyung Kim	SS04-01
Rehabilitation for Spinal Malalignment in Children from Torticollis to Idiopathic Scoliosis	Bong Ok Kim	SS04-02
Comprehensive PMR Protocol for Cerebral Palsy Referred from Remote Areas of Indonesia	Ratna D. Haryadi Soebadi	SS04-03

10.45–12.00*Back Problem 2*

Therapy in Low Back Pain: Documentation Based Care	Peni Kusumastuti	SS05-01
Management of Back Pain in the Medical Rehabilitation Clinic	Yap Eng Ching	SS05-02
Ultrasound-guided Injection for Back Pain	Carl Chen	SS05-03

Neuro Control of Spasticity

Brain Motor Control Assessment in Patients Suffering from Spasticity	Barry McKay	SS06-01
Volitional Modification of Neurocontrol of Spasm to Functional Movement	Milan R. Dimitrijevic	SS06-02
Locomotor Training and Modification of Spasticity	Keith Tansey	SS06-03

Spinal Cord Injury 2

National Survey on Health Statuses of Veterans with Spinal Cord Injury in Iran	S.Mansoor Rayegani	SS07-01
Model of Care for Patients with Spinal Cord Injuries in New Zealand	Shaun Xiong	SS07-02
Rehabilitation of Spinal Cord Injury – Lesson Learned from Sichuan Earthquake	Jianan Li	SS07-03
The Outcome of Spinal Cord Injury Due to Tuberculosis Spondylitis	Rosiana P. Wirawan	SS07-04

Geriatric Rehabilitation

Rehabilitation in Frail Older People	Ian Cameron	SS08-01
Rehabilitation in People with Dementia	Susan Kurrle	SS08-02
Rehabilitation Therapy and Prevention of Falls in Elderly	Hee-Sang Kim	SS08-03

Oral Presentations**13.00–14.00***Pediatric Rehabilitation 1*

Intra-rater Reliability of Prechtl's Method on the Qualitative Assessment of General Movements Based on the Video Recordings on Taiwanese Infants	Kuo-Kuang Yeh	0521FP01
Does Selective Dorsal Rhizotomy Procedure Help to Improve the Gait Pattern of Children with Cerebral Palsy?	Nerita Chan	0521FP02
The Application of Tracheotomy Ventilator Swallowing and Speaking Valve in Children with Swallowing Difficulty after Tracheotomy	Zulin Dou	0521FP03
Relationship of Sialorrhea and Motor Speech Function in Children with Cerebral Palsy of Different Motor Severities	Katie Pei	0521FP04
Normal Value of Manual Dexterity with Pegboard Test in 6-year-old Children	A.V. Fanny Aliwarga	0521FP05
Comparison of Reference Equations for the Predicted 6-Minutes Walking Distance in Healthy Indonesian Children ages 8–11-year-old	Nuryani Sidarta	0521FP06
Effect of Age on Home-Based Constraint-Induced Therapy in Children with Cerebral Palsy using by Kinematics and Clinical Analysis: a Preliminary Study	Chia-Ling Chen	0521FP07

14.00–15.00*Musculoskeletal Rehabilitation 1*

Effectiveness of Dual Molecular Weight Sodium Hyaluronate on Pain and Functional Ability in Patient with Knee Osteoarthritis: A Follow-up Study	Nyimas-Fatimah	0521FP09
Pulsed Electromagnetic Field Inhibits Chondrocyte Apoptosis in a Rabbit Model of Osteoarthritis	Jun Zhou	0521FP10
The Chondroprotective Effect of Botulinum Toxin type A on the Osteoarthritic Knee Joint in Rats	Pei-Chun Hsieh	0521FP11
The Effectiveness of Combination Exercise for Hamstring Flexibility and Pain on Knee Osteoarthritis Patients	Ferius Soewito	0521FP12
Level of Pain and Quality of Life Among Patients with Knee Osteoarthritis Based on VAS and WOMAC	Kamaria Kamaruddin	0521FP13
The Influence of Exercise in Obesity Clinic on Body Weight, Body Mass Index, Waist Circumference, Quadriceps Muscle Strength and Balance of Obese Patients with Knee Osteoarthritis	Dian Hadiati	0521FP14
H-Reflex of Soleus Muscle after the Reconstruction of Anterior Cruciate Ligament	Atsuko Ono	0521FP15
Effect of Knee Brace Combined with Pneumatic Artificial Muscles on Muscle Strength	Shuji Matsumoto	0521FP16

15.00–16.00*Neuromuscular Rehabilitation 1*

The Effect of Brain Computer Interface Training Combined with Anodal Transcranial Direct Current Stimulation Among Patients with Chronic Severe Hemiparetic Stroke	Yuko Kasashima	0521FP17
Anti-spastic Effects of Whole-body Vibration on Affected Muscles of Hemiplegic Legs in Post-stroke Patients	Miyara K.	0521FP18
Changes in the Hand Function According to the Cathodal Transcranial Direct Current Stimulation to the Undamaged Hemisphere in Stroke Patients	Jin Hee Nam	0521FP19
Repeated Prefrontal Theta Burst Stimulation Overcomes Visuo-spatial Hemineglect in Stroke Patients	Wei-qun Song	0521FP20
Molecular Mechanism of Cumulative Effects of Repetitive Transcranial Magnetic Stimulation on Neural Plasticity in Rats	Jung Yoon Kim	0521FP21
Sonoelastography and Acoustic Radiation Force Impulse Imaging in Common Soft Tissue Tumors: Preliminary Results	Tian Shin Yeh	0521FP22
Osteogenic Differentiation of Amniotic Epithelial Cells: Synergism of Pulsed Electromagnetic Field and Biochemical Stimuli	Qian Wang	0521FP24

16.00–17.00*Cardio-respiratory Rehabilitation*

Effectiveness of Physical Training in Limited Sessions of Cardiac Rehabilitation Program	Nor Zaliha A.B.	0521FP25
Operation of a Central Control system for Pulmonary Rehabilitation in Patients with Rare and Incurable Diseases	Jung-Hwa	0521FP26
Effects of Phase II Cardiac Rehabilitation Programme on Functional Capacity in Post Revascularization Patients	Verial Attamimy	0521FP27
Implementation of Clinical Decision Support System for Rehabilitation of Patients after Acute Myocardial Infarction Treated by Percutaneous Coronary Intervention	B.R. Wu	0521FP28
Impact of Exercise Training on Blood Lactate Concentration during Exercise Test for Severe Heart Failure Patients with Left Ventricular Assist Device	S. Makita	0521FP29

Effect of Outpatient Rehabilitation on Physical Capacity and Health-related Quality of Life in Bilateral Sequential Lung Transplantation Receipts	C.H. Wu	0521FP30
The Relationship of Respiratory Functional Capacity and Wheeling Performance in Chronic Paraplegia	Fitri Anetherita	0521FP31
The Efficacy and Safety of Cardiac Rehabilitation For patients With Chronic Kidney Disease	Mayumi K.	0521FP32

17.00–18.00*Myofascial Pain Rehabilitation*

The Effectiveness of Therapeutic Ultrasound on Myofascial Trigger Point Syndrome in Reducing Pain and Improving Range of Motion: A Systematic Review	Noor Hafifi Noorhisham	0521FP33
Synergistic Effects of Transcranial Direct Current Stimulation and Trigger Point Injection for Treatment of Myofascial Pain Syndrome	Yoon-Hee Choi	0521FP34
The Therapeutic Effect of Monochromatic Infrared Photo Energy on The Myofascial Trigger Points in The Upper Trapezius Muscle	Ta-Shen Kuan	0521FP35
Correlation of Brain-derived Neurotrophic Factor with Depression in Fibromyalgia Syndrome Patients	Boya Nugraha	0521FP36
Preliminary Study of Obtaining H-Reflex From Opponens Pollicis Muscle in Patients with Fibromyalgia in Comparison with Controls	Sayed Ahmad Raeissadat	0521FP37
Ultrasonographic Morphologic Assessment of Human Myofascial Pain Syndrome Using Digital Normalized Histogram: A Pilot Study	Cheng-Fang Tsai	0521FP38

08.00-17.00 Poster Presentation (see Poster list on p. 10)**TUESDAY, 22RD MAY 2012****Plenary Lecture****08.00–09.00***Neuro Rehabilitation*

The Effects of Mild Traumatic Brain Injury and Orthopaedic Injuries in Older Adults	John Olver	PL02-01
Factors Affecting Neural Recovery After Stroke	Nam Jong Paik	PL02-02
Advancement in Rehabilitation Intervention	Leonard S.W. Li	PL02-03

Invited Lectures**09.00–10.15***Myofascial Pain*

Evidence-based Rehabilitation in Chronic Pain Syndromes	Gülseren Akyüz	SS09-01
Myofascial Pain with Chinese Approach of Rehabilitation	Jun Hu	SS09-02
Acupuncture vs Myofascial Trigger Point Needling	John Hong	SS09-03
Tips and Tricks of Traditional Massage in Treating Myofascial Trigger Point	Pradit Prateepavanich	SS09-04
Botulinum Toxin Versus Fascial Manipulation Technique in the Treatment of Chronic Facial Pain	Marta Imamura	SS09-05

Rehabilitation after Brain Injury

Traumatic Brain Injury Rehabilitation in China	Yongshan Hu	SS10-01
Rehabilitation Brain Injury: Sensory Impairment in TBI	Henry Lew	SS10-02
Advanced Cognitive Rehabilitation in TBI	Parit Wongpheat	SS10-03

Pulmonary Rehabilitation

Management of Airway Secretions in Pulmonary Rehabilitation	Seong Woong Kang	SS11-01
Pulmonary Rehabilitation – Focus on Inspiratory Muscle Training	Mei Yun Liaw	SS11-02
Noninvasive Ventilation in Respiratory Failure, New Frontiers in Rehabilitation	Matthew N. Bartels	SS11-03
Rehabilitation for Patients with Advanced Heart and Lung Disease	Matthew N. Bartels	SS11-04

Sport Injury Rehabilitation

Role of Platelet Rich Plasma in Sports Medicine	Sukajan Pongprapai	SS12-01
Management of Sport Activity Induced ACL Injury	Damayanti Tinduh	SS12-02
Rehabilitation of Back Pain in Golfers	Yap Eng Ching	SS12-03

Special Lecture**09.00–10.15**

New Innovations in the Treatment of Osteoarthritis and Soft Tissue Injury	Robert J. Petrella	SL01-01
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Oral Presentation**07.00–08.00***Miscellaneous 1*

Rectal Balloon Training in Female Urinary Incontinence	N. Tantisirawat	0522FP01
Intermittent Pneumatic Compression Can Reduce Lymphedema in Postmastectomy Patients. Is it true?	H. Indiarsa	0522FP02
The Efficacy of Complex Decongestive Physiotherapy and Predictive Factors of Lymphedema Severity and Response to CDP in Breast Cancer-Related Lymphedema	Su-Fen Liao	0522FP03
The Visual Dependence on the Body Sway Emphasized by One Leg Standing in Healthy Subjects	Osamu Aoki	0522FP04
Physical Exercise Facilitates Neural Function Recovery Through Influencing Autophagosomes Accumulation and Neurogenesis in Rats	Xiquan Hu	0522FP05
The Effects of Exercise Training on Neural Function and Neurogenesis in Rats After Cerebral Infarction	Lili Li	0522FP06
Lactate Profile with Six Minutes Walking Test of Nury's Protocol	Nury Nudwiningtyas	0522FP07
The Effect of Oxygen Environment on Obese Youth's Body Shape Under Aerobic Exercises	Sun Biao	0522FP08

Geriatric Rehabilitation

Direct and Indirect Physical Therapy for Frail Older Citizens Who Cannot Walk Living in Private Nursing Homes	Daikuya S.	0522FP09
Comparing Proprioception and Strength Between Left and Right Ankle of The Elderly People	Xueqiang Wang	0522FP10
Maximal Oxygen Uptake of Indonesian Elderly People In Relation with Age, Gender and Body Mass Index	Sisca Susantio	0522FP11
Prevalence Rate and Risk Factor of Sarcopenic Obesity in Korean Elderly Population	Byungkwan Hwang	0522FP12
The Effects of Fatigue on Position Sense of Knee in the Elderly	Li'na Chen	0522FP13
The Effects of Ankle Strength and Range of Motion to Balance with Aging	Sang Sook Lee	0522FP14
Functional Status and Its Correlation with Exercise Self Efficacy in Elderly	Azliyana Azizan	0522FP16

Spinal Cord Injury Rehabilitation 1

The Effects of Electrical Tilt Table Integrated with Stepping on the Standing Training of Cervical Spinal-Cord Injured Patients	Xiang Mou	0522FP17
The Relationship of Independence in Daily Activities and Cardiopulmonary Endurance of Chronic Paraplegic: A Preliminary Study	Lulus Hardiyanti	0522FP18
Effects of Training on Upper Limb Function After Cervical Spinal Cord Injury: A Systematic Review	Xiao Lu	0522FP19
Developing an International Classification of Function (ICF) Core Set for Sub-acute Stage of Spinal Cord Injury in Taiwan: A Preliminary Study	Tze-Hsun Yen	0522FP20
The Ankle Brachial Index in Various Onset of Spinal Cord Injury	Adek	0522FP21
Quality of Life and Affecting Factors in Spinal Cord Injury Survivors of Sichuan Earthquake	Jianan Li	0522FP23
Effectiveness of a Hospital-based Community Reintegration Support Program for Patients with Spinal Cord Injury in Korea	Seung Hee Ho	0522FP24

Back Problem

The Effect of Acupuncture on Pain and Quality of Life in Patients with Lumbar Canal Stenosis	Mohammad J. Haianfard	0522FP25
Efficacy of A New Navigable Percutaneous Disc Decompression Device (L'Disq) in Patients with Herniated Nucleus Pulposus Related to Radicular Pain: Results from One-year Follow-up	Sang-Heon Lee	0522FP26
Effect of Core Stability Training on Patients with Chronic Low Back Pain	Xia Bi	0522FP28
Abnormal Streptococcal Serology Causing Sacroiliac Joint and Postural Dysfunction in Adults with Chronic Low Back Pain	Shin-Tsu Chang	0522FP29
Posture Control Following Neck Flexor Muscle Fatigue in Young Healthy Adults	Ling-Wei Yen	0522FP31
Efficacy of TOM Annulus Ablation Using New Navigable Percutaneous Disc Decompression Device (L'Disq) in Patients with Lumbar Discogenic Pain	Sang-Heon Lee	0522FP32

Miscellaneous 2

The Characteristics of Fluctuation Analysis of Heart Rate Complexity During Sleep in Patients with Chronic Neck Pain	Jiunn-Horng Kang	0522FP34
A Survey on the Current Status of Burn Rehabilitation Services in China	Jun Wu	0522FP35
The Intrarater Reliability of International Classification of Function (ICF) Based Activity Daily Living (ADL) Tool and Its Comparison to The Functional Independence Measure (FIM) on Rehabilitation Ward	Carol Connolly	0522FP36
Nutritional Status and Level of Activity of Daily Living in Patients with Disuse Syndrome	Hidetaka Wakabayashi	0522FP37
Protective Effect of Ultraviolet Blood Irradiation and Oxygenation on Peroxidation Damage in Type II Diabetes Mellitus Patients	Xiao Fu	0522FP38

Ultrasonographic Evaluation of Cross-sectional Ulnar Nerves in Healthy Adults	Yuka Kurihara	0522FP39
A Promoter Polymorphism (rs181781,-1107G/A) of IL3 is Associated with Complex Regional Pain Syndrom in the Korean Population	Jinmann Chon	0522FP40

Spasticity

Ultrasound and Electrical Stimulation-guided Obturator Nerve Block in Treating Severe Hip Adductor Spasticity	Cheuk-Kwan TAM	0522FP41
Ultrasound and Electrical Stimulation-guided Musculocutaneous Nerve Block in Treating Severe Elbow Flexion Spasticity	Cheuk-Kwan TAM	0522FP42
Nerve Block with Ropivacaine Relieve the Pain During BTX-A Injection of Post Stroke Spasticity	Yuanbin Yang	0522FP43
The Prevalence of Spasticity After First-time Stroke and Its Associated Factors: Preliminary Report	H. Nurhasyimah	0522FP44
The Dose-response Relationship of Ethanol-induced Tibial Nerve Block in Rabbit Model	Xiao Lu	0522FP45
The Effect of Botulinum Toxin Injection for Drooling of Saliva in Patients with Brain Lesion	Hyo Jae Kim	0522FP46
Management of Spasticity with Botulinum Toxin for Patient with Stroke – Based on ICF Framework	N.C. Chan	0522FP47
Botulinum Toxin Injections by Ultrasound Guidance in Spastic Toe Clawing	Ya-Ping Pong	0522FP48

Oral Presentation**13.00–14.00***Stroke Rehabilitation 1*

The Reliability and Validity of the Categorical Naming Test in Aphasic Patients After Stroke	Byungju Ryu	0522FP49
The Study of Rehabilitation Methods for Early Stroke	Li Yun	0522FP50
Cerebral Microbleeds and Cognitive Dysfunction After Primary Stroke	Osawa A.	0522FP51
The Relationship with Age and Japanese Independent Daily Life Scale, Modified Rankin Scale, NIHSS, ADL in Stroke Survivors: Analysis from JARM Data Base	Naohisa Kikuchi	0522FP52
Comparison of Gait Parameters During Single and Dual-Task Turning Between Stroke and Healthy Elderly	Haidzir Manaf	0522FP53
The Effect of Additional Mirror Therapy to Standard Rehabilitation of Hand Paresis on Motor Recovery and Hand Function After Stroke	Lydia Afrianti	0522FP54
Effectiveness of Hybrid Assistive Neuromuscular Dynamic Stimulation Therapy in Patients with Sub-acute Stroke: The Result of Stepwise Regression Analysis	Keiichiro Shindo	0522FP55
Effectiveness of Video-based Therapy for Stroke Patients	J. Patrick Engkasan	0522FP56

14.00–15.00*Dysphagia*

The Effect of Different Catheter Balloon Dilation Modes on Cricopharyngeal Dysfunction in Patients with Dysphagia	Zulin Dou	0522FP57
Effect of Balloon Dilation at the Vallecula Using Video-Fluoroscopic Swallowing Study on Patients with Dysphagia	Seong Kyun Kim	0522FP59
The Difference in Video-fluoroscopy Swallowing Study Findings of Various Involved Vascular Territory in Stroke	S.J Lee	0522FP60
The Effect of Early Balloon Dilation for Dysphagia Caused by Cranial Nerve Injuries Following Surgery	Bora Jung	0522FP61
Temporal Characteristics of Pharyngeal Structures in Normal Swallowing: A Kinematic Analysis of Video-fluoroscopic Swallowing Study	H.S. Nam	0522FP62
Altered Resting-state Functional and White Matter Tract Connectivity in Stroke Patients with Dysphagia	Shasha Li	0522FP63

15.00–16.00*Musculoskeletal Rehabilitation 2*

Prevalence of Obesity Among Intellectual Disability Students of Special School for Disabled in Jakarta	Tirza Z. Tamin	0522FP64
The Effects of Physiological Ischemic Training on the Function of Skeletal Muscle	Zhao Y	0522FP65
The Effect of Oral Curcumin Supplementation and Resistance Exercise to Disuse Atrophy on Skeletal Muscle Fiber Diameter of Rattus Norvegicus	I. Putu Alit	0522FP66
The Effect of Vibration and Static Stretching on Sport Performance of Volleyball Athletes	Yun-Tai Lin	0522FP68
The Clinical Application of Musculoskeletal Ultrasound for the Assessment of Cervical Luschka Joint: A Preliminary Study	Lehua Yu	0522FP70
The Growth of Knee on Frontal Plane	Ferial H. Idris	0522FP71

16.00-17.00*Pediatric Rehabilitation 2*

Dynamic Visuo-motor Control Deficits in Children with Developmental Coordination Disorder	Hsin-Yi Kathy Cheng	0522FP73
Effect of Music Therapy on Children with Attention Deficit Hyperactivity Disorder	Shih-Ching Chen	0522FP74
Functional Connectivity of Cerebral Cortex in Autism and Healthy Children Reflected in EEG Coherence	Jue Wang	0522FP75
The Validity and Reliability of Modified Peabody Picture Vocabulary Test IV (PPVT IV) in 48-59-month-old Children	Sumarni	0522FP76
Comparisons of The Modified Ober's Test and Modified Thomas Test to Measure Iliotibial Band Flexibility	P. Liao	0522FP78
The Safest Needle Insertion Approach to Tibialis Posterior: Ultrasonography Study	S.J. Kim	0522FP79

17.00-18.00*Musculoskeletal Rehabilitation 3*

Reliability of Six Minute Walk Test Performed on Rectangular Tract in Comparison with the Oval Track in Obese Students with Intellectual Disability in Jakarta	Tirza Z. Tamin	0522FP80
Sonoelastographic Evaluation of Plantar Fascia Stiffness After Shock Wave Therapy for Plantar Fasciitis: Preliminary Results of A One-Year Follow-up	Chueh-Hung Wu	0522FP81
Ankle Brachial Index of Diabetic Patients: Relationship with Duration of Diabetes and Compliance to Therapy	Masruroh	0522FP82
Quantitative Analysis of Sonoelastogram of the Plantar Fascia – Comparison Between Hue Histogram and Red-Green-Blue Color Histogram Analysis Methods	Yun-Yi Lin	0522FP84
The Relationship Between Ankle Brachial Index and Walking Function of Diabetic Patients, Measured with Walking Impairment Questionnaire: A Pilot Study	Melda Warliani	0522FP85
The Effectiveness of Focused Shock Wave Therapy of Different Intensity Levels and a New Alternative, Radial Shock Wave Therapy for the Treatment of Plantar Fasciitis: A Systematic Review and Network Meta-Analysis	Ke-Vin Chang	0522FP86

08.00-17.00 Poster Presentations (See Poster list on p. 10)**WEDNESDAY, 23RD MAY 2012****Plenary Lectures****08.00-09.00***Art and Culture in Synergy with PMR*

Through Arts to Increase the Quality of Human Life	I. Wayan Dibia	PL03-01
Art and Culture: An Asian Perspectives in Physical and Rehabilitation Medicine	Sukajan Pongrapai	PL03-02
Mental Processing of Music Expectation	Yu Cheng Pei	PL03-03

11.00-12.00*PMR Future and Direction*

ISPRM and AOCPRM – Mutual Benefits	Joel A. De Lisa	PL04-01
The World Report on Disability and its Recommendations: A Strong Support for PRM Role and Daily Tasks in Any Country	Alessandro Giustini	PL04-02
Interventional Procedures in Rehabilitation Medicine	Simon F.T. Tang	PL04-03
The Challenges of PMR in Developing Country	Angela B.M. Tulaar	PL04-04

Invited Lectures**09.00-10.15***Musculoskeletal Rehabilitation*

The Application of Ultrasound in Foot and Ankle	Chih-Chin Hsu	SS13-01
The Hip in Cerebral Palsy – What Does it Take to Keep it in Place?	Amara Naicker Naysaduray	SS13-02
Rehabilitation of Chronic Arthritis	Carmen Ho	SS13-03

Treatment of Spasticity

Effect of Intrathecal Baclofen Concentration and Mode of Administration on H-Reflex in Acquired Brain Injury	Dobrivoje Boba Stokic	SS14-01
The Immediate Effect of Electrical Nerve Stimulation Guided Botulinum Toxin Type A Injection for Focal Spasticity Management in Adults: A Retrospective Review	Xianghu Xiong	SS14-02
Botulinum Toxin Type A for Control Spasticity in Adult Patients	Yu Ching Lin	SS14-03
Clinical Experience of Botulinum Toxin and Neurolysis in Spasticity	Areerat Suputtitada	SS14-04

The Application of Botox Injection and Motor Control for Equinovarus Gait in Stroke Patients	Simon F.T. Tang	SS14-05
<i>Bladder Dysfunction</i>		
Overactive Bladder Problems in the Elderly	Siti Annisa Nuhonni	SS15-01
Urinary Incontinence After Stroke and in the Elderly: is there Differences in Management?	Helmut Madersbacher	SS15-02
Bladder Management for Spinal Cord Injured Patients in Developing Countries with Limited Resources	Apichana Kovindha	SS15-03
<i>Cardiac Rehabilitation</i>		
New Approach of Cardiac Rehabilitation from Hospital to Home by ICT	Yutaka Kimura	SS16-01
Exercise Training for Patients after Coronary Artery Bypass Grafting Surgery	Ssu-Yuan Chen	SS16-02
The Early Rehabilitation Program in Children with Congenital Heart Disease	Hening Laswati	SS16-03
Revisit the Evidence of Cardiac Rehabilitation	Leonard S.W. Li	SS16-04
Oral Presentation		
07.00–08.00		
<i>Neuromuscular Rehabilitation 2</i>		
Improvement of Quiet Standing Balance in Patients with Wallenberg Syndrome after Rehabilitation	Eun Hye Na	0523FP03
The Feasibility of Bal-Ex Training for Stroke in Improving Balance and Quality of Life: A Case Study	Zoolfaiz Salleh	0523FP04
The Effect of Intensive Repetition of Trunk Muscle Facilitation on Motor Functional Recovery after Stroke: A Randomized Controlled Trial	Takuya Hirokawa	0523FP05
Physiotherapy with Family Support is Effective for Stroke Patients in a Convalescence Rehabilitation Ward	Y. Hirano	0523FP06
The Effects of Robot-assisted Gait Training System on an Adult with Cerebral Palsy: A Case Report	Chi-Yao Hung	0523FP07
The Effect of Dynamic Supporting-induction Exercise for The Affected Lower Extremity Function of Severe Hemiplegic Patients Suffered Stroke	Keshu Cai	0523FP08
<i>Musculoskeletal Rehabilitation 4</i>		
Comparison Between Different Types of Scapular Taping on Scapular Kinematics and Muscle Activation during Shoulder Flexion	Q.X. Chang	0523FP09
Effectiveness of Supervised Physiotherapy on Patients with Adhesive Capsulitis of Shoulder	Taslim Uddin	0523FP11
Comparison of Therapeutic Effects of Ultrasound-guided Platelet-rich Plasma Injection and Dry Needling in Rotator Cuff Disease	Sang Chul Lee	0523FP12
Hand Grip Strength of Rheumatoid Arthritis Patients after Six Weeks of Conservative Hand Exercise	Wini Widiani	0523FP13
Range of Motion Exercise for Thumb Metacarpophalangeal Joint Contracture	T. Ebata	0523FP14
The Effect of Traction Therapy for Patient's Core Muscles with Neck Pain	Yi Zhu	0523FP15
Effect of Various Bowler's Throwing Styles Musculoskeletal Injuries of Upper Exterimity	Hsieh-Cing Chen	0523FP16
<i>Miscellaneous 3</i>		
Factors Associated with Fatty Atrophy of Supraspinatus and Infraspinatus in Brain-injured Patients	Hye Jin Jang	0523FP17
Wet-cupping: An Alternative Therapy for Pain Relief	Imam Subadi	0523FP18
Clinical Features in Children and Adolescents with Corpus Callosal Malformations	Young Uhk Kim	0523FP20
Relationship Between Basic Components of Physical Function and Functional Capacity of Patients in Sub Acute Geriatric Ward Cipto Mangunkusumo Hospital Jakarta	Yuli Suciati	0523FP21
Evaluation of Physiological Condition and Quality of Life by Supervised Hospital-based Exercise Therapy for Non-communicable Disease	Rumi Takigawa	0523FP22
Many-facet Rasch Model Analysis of the Reliability and Validity of the Brief International Classification of Functioning Disability and Health (ICF) Core Sets for Chinese Patients with Stroke	Xiquan Hu	0523FP23
A Promoter Polymorphism (rs3806798, -473T/A) of IL15 is Associated with Ischemic Stroke in the Korean Population	Jihe Bark	0523FP24
<i>Miscellaneous 4</i>		
Bowel Care in Individuals with Spinal Cord Lesion	J. Patrick Engkasan	0523FP25
Prognostic Factors of Activities of Daily Living on Stroke Patients in the Communities	D. Nishio	0523FP27
Lesional Infiltration of Receptor of Nuclear Factor-KB Ligand+ Cells in Experimental Autoimmune Neuritis Rats	Ying Yin	0523FP30

Stroke Rehabilitation 2

Effect of a Neuromuscular Electrical Stimulation for Shoulder Subluxation in Post-Stroke Patients	H. Sakae	0523FP32
Spasticity-related Complications in First Time Stroke: Preliminary Report	J. Elyana	0523FP33
Comparison of the Effect of Modified Constraint-induced Movement Therapy in Subacute and Chronic Stroke Patients	M.D. Dwiwulandari	0523FP34
Difference of Cortical Activation Pattern During Motor Execution and Motor Imagery Assessed with Simultaneous Near-infrared Spectroscopy and Encephalography in Stroke Patients	Mari Ito	0523FP35
The Correlation Between Rotator Cuff Injuries of Hemiplegic Shoulders and the Functional Outcomes in Stroke Patients	Yu-Chi Huang	0523FP36
Liaison Clinical Pathway for Stroke Patients in Regional Networks of West Saitama in Japan Reveal the Distinct Ventral Occipitotemporal Cortices Necessary for Visual Words, Faces, and Places Recognition in Chinese People by Using Neuropsychological Tests and Neuro-imaging Examinations	S. Maeshima	0523FP37
	Chunlei Shan	0523FP38
<i>Musculoskeletal Miscellaneous</i>		
The Agreement of Sacral Marker and Segmental Method on Center of Mass Displacement in Normal Adults during Standing	Yi Zhu	0523FP39
Intra-and Interrater Reliability in the Measurement of Isokinetic Wrist Flexor and Extensor Strength in Healthy Individuals	Jing Fei Xu	0523FP40
The Role of IL-6 and PTH on Bone Remodeling after Moderate Intensity Walking Exercise on Postmenopausal Women	Damayanti Tinduh	0523FP41
Electromyographic Amplitude Comparison Between Stable and Unstable Surfaces in the Lower Back	Bi Xia	0523FP43
Comparison of Whole-body Muscle Fatigue Between the Anaerobic and Aerobic Specific Tests in Badminton Players	Jen-Li Lin	0523FP44
Development and Validation of a New Wearable Inertial Sensing Instrument for Measuring Shoulder Range of Motions	Yu-Ching Lin	0523FP45

Prosthetic Satisfaction Perceived Problems and Reason for Non-use of Prostheses Among Unilateral Lower Extremity Amputees

Norhayati Hussein

0523FP46

POSTER PRESENTATION

MONDAY, 21ST MAY 2012

The Benefit of Pronated Feet Correction on Young Women Towards Muscle Injury Prevention	Maria R.Rachmawati	0521PP002
Relationship Between Korean Version of Falls Efficacy Scale-International (KFES-I) and Korean Instrumental Activities of Daily Living (K-IADL)	Mi Jung Kim	0521PP003
Effects of Concentric and Eccentric Abdominal Training on Lumbar Curvature and Flexibility	Maria Justine	0521PP004
Osteogenesis Imperfecta: A Case Report	Yudith Dian Prawitri	0521PP005
Juvenile Disc Disorder Causing Multiple Canal Stenosis In A Man on The Productive Age: The Role of PM&R for A Multidimensional Recovery	Husnul Mubarak	0521PP006
Cervical Myelopathy Superimposed by Fracture Dislocation C1–C2 AIS D: A Case Report	Rini Lestari Ansanay	0521PP007
The Predictors of Overweight for Children with Motor Delay Aged 0–6 Years	Ai-Wen Hwang	0521PP008
Infectious Situation in Elderly Stroke Patients Undergoing Rehabilitation	Chien-Min, Chen	0521PP009
Electrodiagnostic Evaluation of Statin Induced Neuropathy	Mohammad Reza Emad	0521PP010
The Effectiveness of Mouth-opening Exercise in Patients with Chronic Closed Lock of the Temporomandibular Joint	Shinya Yura	0521PP011
Inter-Rater Reliability and Validity of the Harris Infant Neuromotor Test in Taiwanese Infants	Sheng Chin Tsai	0521PP012
Charcot's Joint – Rehabilitation Medicine Approach	Agus Prasetyo	0521PP013
Treatment of Acute Spinal Cord Injury with Intravenous Infusion of a Ginseng Saponin, Ginsenoside Rb1	Kimihiko Nakata	0521PP014
Extracorporeal Shock Wave Therapy on Rehabilitation of Cervical Spondylosis with Nuchal Ligament Calcification	Mao-Hsiung Huang	0521PP015
Correlation of radiologic and Sonographic Findings with Score of WOMAC Questionnaire in Unilateral Knee Osteoarthritis	Alireza Ashraf	0521PP016
Effectiveness of Calcitonin Injection in the Treatment of Lumbar Spinal Stenosis	Alireza Ashraf	0521PP017
Effect of Treadmill Walking Training on Trunk Muscles Endurance in People with and without Low Back Pain	Yu-Ting Chen	0521PP018
Arteriovenous Malformation Incidentally Found in Hematoma After Contusion: A Case Report	Tae Sang Yoon	0521PP019
Subepidermal Edema in Diabetic Foot	Gladys LY Cheing	0521PP020
Pott's Disease with Cervical Dislocation: A Case Report	Nurhikmah	0521PP021
Intrathecal Baclofen Therapy for Severe Spasticity	Yasutaka Takagi	0521PP022
Papase as Treatment Option for Overgranulating Wound	Nadia M.M	0521PP023
The Effects of Dry Needling Therapy Induced Beta-Endorphin in the Myofascial Trigger Points	Li-Wei Chou	0521PP024
Comparison of the Analgesic Effects of Low- and High-intensity Laser Therapy Combined With Intraarticular Hyaluronan Injection on Adjuvant-induced Arthritis in Rats	Fang-Chuen Huang	0521PP025
Reliability of Posturography with Newly Developed Automatic Calibration Balance System	Myoung-Hwan Ko	0521PP026
Rehabilitation of Electrical Burn Hand Injury	Juli Hartati	0521PP027
Proprioception of Scapulothoracic Joints in Individuals with and without Shoulder Impingement Syndrome	Yi-Fen Shih	0521PP028
Dry Needling to Remote Myofascial Trigger Point May Augment β -endorphin Levels of Proximal Skeletal Muscles in Rabbits	Szu-Yu Liu	0521PP029
Klippel Trenaunay Syndrome in 3 Month Baby, A Case Report	Veranita Prabaningrum	0521PP030
Above Knee Amputation and Lung Metastatic Osteosarcoma: A Palliative Rehabilitation Case Report	Yanna Susanti	0521PP031
New Ultrasound Method in the Diagnosis of Frozen Shoulder	Sung Uk Lee	0521PP032
Effect of 45° Reclining Sitting Posture on Swallowing in the Patient with Dysphagia	Jeong-Hwan Seo	0521PP033
The Effect of Position of Immobilization Upon the Tensile Properties in Injured Achilles Tendon of Rat	Yong Min	0521PP034
Rehabilitation in Type V (Schatzker) Tibial Plateau Fracture Post Open Reduction and Internal Fixation: A Case Report	Dyah Gita RK	0521PP035
Effects of Electroacupuncture on Recent Stroke In Patients with Incomplete Bladder Emptying – A Preliminary Study	Kuo-Wei Yu	0521PP036
Linear Scleroderma in Childhood: A Case Report	Ida Yuanita	0521PP037
Evaluation of Change in Dynamic Property of Vessel Wall, Dynamic Deformability and Strength of Arteriosclerotic and Ruptured Blood Vessel by Ultrasound	Kenji Kagechika	0521PP038
Early Recovery Changes of Hip Abductor, Knee Extensor and Flexor Strength After Total Hip Arthroplasty	Toshiyuki Muratani	0521PP039
The Improvement of Spasticity and Kinetic Change After Botulinum Toxin Injection in Post-stroke Upper Limb Spasticity	Tsung-Ching Lin	0521PP040

The Immediate Effect of Elastic Medical Taping in Athletes: Discussion Kinetic and Surface EMG Change	Tsung-Ching Lin	0521PP041
Voxel-based Statistical Analysis of Brain Metabolism in Patients with Growth Hormone Deficiency after Traumatic Brain Injury: A Pilot Study of F-18 FDG Positron Emission Tomography	Ha Lim Lee	0521PP042
High Plasma Leptin Levels are Associated with Functional Outcome and Depression in Post Stroke Patients	Charm Kim	0521PP043
The Difference of the Trunk Acceleration During Gait Between Functional Ambulation Categories in the Stroke Patients	Yoshitaka Otani	0521PP044
Rehabilitation of Patient with Osteoporosis and Compression Fracture of L1-5 Due to Prolonged Use of Glucocorticoid Drug Because of Wegener Disease	Irma Kurniawati	0521PP045
Will Non-ambulatory Children with Spastic Cerebral Palsy be Benefitted by Walking Experience with Robotic Assistance by Walkbot_K®?	Kyung Soon Park	0521PP046
Experience with Walkbot_K® in Children with Spastic Cerebral Palsy	Gwi-yeoun Sin	0521PP047
Effect of Lumbosacral Orthosis on the Trunk Muscle Strength in Patients with Low Back Pain	Seon Lyul Hwang	0521PP048
Rehabilitation Management for Traumatic Spinal Cord Injury with Pregnancy	Ronald E. Pakasi	0521PP049
Comprehensive Rehabilitation of Patients with Limb on Amputation after Crush Injuries Sustained During the Wenchuan Earthquake	Hongchen He	0521PP051
Correcting Bowlegs Child with Blount's Disease Using Customized KAFO	Istinganah Noviana	0521PP052
Intravenous Infusion of Dihydroergocristine Rb1 Ameliorates Ischemic Brain Damage Through Up-regulation of Bcl-xL and VEGF	Pengxiang Zhu	0521PP053
The Effect of Pressure on Rheumatoid Arthritic Knee in a Rheumatic Rat Model	Chang, H. Y	0521PP054
Graphical Modeling of Comprehensive International Comprehensive Classification of Functioning (ICF) Core Sets for Diabetes Mellitus	Feng Lin	0521PP055
Cardiac Rehabilitation of Patients with Tetralogy of Fallot with Total Correction By Beating Heart Technique: A Case Report	Yose Waluyo	0521PP056
Facioscapulohumeral Muscular Dystrophy: A Case Report	Ika Puspitasari	0521PP057
The effect of Video Feedback on Unilateral Spatial Neglect in Stroke Patients	Tae Hee Yoon	0521PP058
Profile of Low Back Pain in Medical Rehabilitation Department of Kariadi Hospital Semarang	Erna Setiawati	0521PP061
Three Point Pressure Principles of Knee Extension Device for Lack of Knee Extension after ACL Reconstruction	I Putu Alit Pawana	0521PP062
Seating Modification for Neglected Duchenne Muscular Dystrophy Patient	Fenny L Dewi	0521PP064
Kinematic Analysis of Spiking Movement in Volleyball Players with Shoulder Pain	Yuan - Ching Wang	0521PP065
Rehabilitation Management of Prolong Mechanical Ventilator in Chronic Inflammatory Demyelinating Polyneuropathy Patient	Ruby Valentine	0521PP069
The Synergistic Effects of Cold-water Swimming Exercise in Combination with Mesenchymal Stem Cell Therapy on Sciatic Nerve Crush Injury	Yueh-Ling Hsieh	0521PP070
Electrical Stimulation Combined with Amniotic Fluid Mesenchymal Stem Cells Enhance Functional Recovery after Peripheral Nerve Injury	Chen - Chia Yang	0521PP071
Clinical Observation of Acupuncture Treatment on Parkinson's Disease	Xiaoying Shang	0521PP072
Clinical Observation of The Early Rehabilitation Therapy with The Integrative Traditional and Western Medicine in Stroke Treatment	Xiaoying Shang	0521PP073
Rehabilitation for Disabled Indonesia Military	Dian Naka Eriawati	0521PP074
The Effect of Daily Life Habitus on Proprioception in College Students	Min-Keun Song	0521PP076
Factors Associated with Motor Function in Preschool Children with Cerebral Palsy – A 6-Month Follow-up	I-Shu, Liu	0521PP077
Ultrasound and Electrical Stimulation-guided Median Nerve Block in Treating Severe Wrist and Finger Flexion Spasticity	Cheuk-kwan TAM	0521PP078
The Use of Standardized Outcome Measures in Rehabilitation Centers in Korea	Kyung-Lim Joa	0521PP079
Predictors for Identifying Patients with Patellofemoral Pain Syndrome Responding to the Neurodynamic Approach	Bing-Yao Huang	0521PP080
Effect of Jin's Three-Needle Therapy Combined with Nerve Rehabilitation Reconstruction Therapy on Children with Cerebral Palsy	Jing Gao	0521PP081
Effectivity of Light Emitting Diodes as Adjuvant Therapy in Decreasing Blood Viscosity on Cerebrovascular Disease Stroke Ischaemic	Hendriko	0521PP082
The Relationships Among Abdominal Obesity, Social Determinants of Health and Physical Strength in Bali, Indonesia – Comparison Between Rural Area and Isolated Island	Daisuke Matsumoto	0521PP083
Chronic Exercise Augments Renoprotective Effect of Granulocyte Colony-Stimulating Factor (G-CSF) and Enhances Endurance in Chronic Renal Failure (CRF) Rats	Masahiro Kohzuki	0521PP084
Comparison of Pulsed Ultrasound and Continuous Ultrasound Therapy Effect in Carpal Tunnel Syndrome	Kartina Djuhadi	0521PP085
A Pilot Study of Kinesio Tape's Immediate Effect on Treating Patients with Knee Osteoarthritis	Chen, Wenhua	0521PP086
The Demographic Data of Patients Who Underwent Videofluoroscopic Swallowing Studies	Juyong Kim	0521PP087

TUESDAY, 22RD MAY 2012

Medical Rehabilitation Evaluation in an 11-year-old Girl with Cervical 3–5 Syringomyelia	Guritno A	0522PP02
A Study of Circadian Rhythm and Autonomic Nervous System Activity Using Power Spectral Analysis of Heart Rate Variability in Parkinson's Disease	Junichi Kato	0522PP05
Factors Associated with First Admission and Referral for Stroke in South Korea	Ja-Ho Leigh	0522PP06
The Rehabilitative Approaches for Respirator Dependent Severely Disabled Children at the First Discharge to Home from Neonatal or Pediatric Intensive Care Unit	Kaoruko Takada	0522PP07
High Concentration of Dextroglucose Facilitates Production of type 2 Collagen Synthesis and Inhibiting Degradation Enzyme Activity Via Reactive Oxygen Species in Rabbit Chondrocytes	Hung-Chih Hsu	0522PP08
Cardiac Rehabilitation in a Patient with Triple Vessels Disease: A Case Report	Rahmawaty Dian	0522PP09
"Siamese boys": The Habilitation Challenge	Imran Safei	0522PP010
Spina Bifida in Adolescent with Congenital Talipes Equino Varus Post Hamstring Release	Astri Wardani	0522PP011
The Comparison of Sequential Finger Movement between Sham Stimulation Versus Control Groups	Jae Hwan Jung	0522PP012
Comparison Between Functional Electrical Stimulation and Voluntary Contraction Induced Brain Activation by fMRI	Yong-II Shin	0522PP013
Proteus Syndrome: A Rare Case of Feet Gigantism	Martha Kurnia	0522PP014
Marfan Syndrome: A Case Report	Nurul K. Wardani	0522PP015
Mixed Connective Tissue Disease (MCTD) in an Adult: A Case Report	Suci Wulansari	0522PP017
Spina Bifida: A Case Report	Yani Christina	0522PP018
Dysphagia after Anterior C-spine Surgery: A Prospective Pre and Post-operative Videofluoroscopic Swallowing Studies	Si Hyun Kang	0522PP019
Zotepine Induced Hemichorea Subsided After Discontinuing the Medicine	Si Hyun Kang	0522PP020
The Association Between Orbital-Meatal Line Angle and Cervical Lordotic Curve	Tsung-Ju Wu	0522PP021
Wrist and Fingers Hand Flexion Extension Exercise with and without Mirror Therapy on Self Care Functional Recovery in Ischemic Stroke Patients	Anwar	0522PP022
Are the Current Diagnostic Criteria of Dysautonomia Suitable for Patients with Hypersympathetic Activity During Rehabilitation Stage?	Jun-fa Wu	0522PP023
Proprioception of Scapulothoracic Joints in Individuals with and without Shoulder Impingement Syndrome	Yi-Fen Shih	0522PP024
Lowe Syndrome with Recurrent Fractures	Jae-Young Han	0522PP025
Inter-arm Difference in Blood Pressure Measurement in Hemiplegic Patient	Joon-Sung Kim	0522PP026
Rehabilitation of Left Atrial Myxoma in Patient: A Case Report	Dodi Priyanto	0522PP027
Brachial Plexus Injury with Neglected Post Reposition Glenohumeral Joint Dislocation: A Case Report	Rahmi Isma Asmara Putri	0522PP028
Rehabilitation of Complicated Lupus Erythematosus	Lia Amalia	0522PP029
Mapping an Obesity Rehabilitation Protocol to International Classification of Functioning, Disability and Health (ICF) Core Set	Zhongli Jiang	0522PP030
Rehabilitation Program in Syringomyelia Patient with Balance Problem: A Case Report	Stefanie	0522PP031
Streeter's Disease and Congenital Talipes Equinovarus	Didik Fibriyanto	0522PP032
Rehabilitation in Neglected Case of Type II Spinal Muscular Atrophy (SMA): A Case Report	Hermilawaty	0522PP034
Neglected Case: A Woman with Disabling Leprosy	Jerish Paongan	0522PP035
Rehabilitation Program in Pott's Disease: A Case Report	Ninik Dwiastuti	0522PP036
The Comparison of Effects on Suprascapular Nerve Block, Intra-Articular Steroid Injection and a Combination of Two Injections in the Hemiplegic Shoulder	Mun JH	0522PP037
Scoliosis and Tip-Toeing Gait in Spinal Muscular Atrophy Patient with Type 3: A Case Report	Fatmawaty Abasmay	0522PP038
Biochemical Effects of Low-intensity 660-nm Laser on Myofascial Trigger Spots of Rabbit Skeletal Muscles	Shun-An Yang	0522PP039
Format of Certification in Postgraduate Medical Education in Physcial Medicine and Rehabilitation	Taslim Uddin	0522PP040
Can Anterior Knee Laxity be Used as a Risk Predictor for Anterior Cruciate Ligament Injury?	Hsiu-Chen Lin	0522PP041
Multiple Myeloma with Multiple Compression Fractures: A Case Report	Denafianti	0522PP042
A Rare Case of Bowed Leg Due to Pathologic Fracture in Poliostotic Fibrous Dysplasia Like Tumor Induced Rickets	Farida Agustina	0522PP043
The Effect of Weighted Kyphoorthosis (WKO) on Balance of Women with Osteoporosis	Seyed Ahmad,Raeissadat	0522PP044
Dynamic Sonoelastographic Findings of Medial Gastrocnemius in Children with Spastic Cerebral Palsy	Dong Rak Kwon	0522PP047
Diagnostic Value of Real-Time Sonoelastography in Congenital Muscular Torticollis	Dong Rak Kwon	0522PP048
Effects of Home Program Intervention for Preschool Children with Developmental Delay: A Preliminary Study	Hui-Yin Lee	0522PP049

Expression Changes of Transcription Factor EN1 in the Midbrain of Mice model of Parkinson Disease	Hongliang Liu	0522PP050
Distribution and Expression Pattern of Cannabinoid Receptors CB1 and CB2 in Brain of SD Rats	Zongyaou Wu	0522PP051
Modified CIMT in A Child with Upper-Extremity Dysfunction after Cerebral Infarction: A Case Report	Fifin Indraswari	0522PP052
Neurofibromatosis with Congenital Pseudarthrosis: A Case Report	Ade Irma	0522PP053
The Effect of Strength in Ankle Movement in Patients with Peroneus Longus Tendon as Autografts for Ligament Reconstruction: A Case Series Study	Allen C.L Hsu	0522PP056
The Effect of Early Rehabilitation of the Patient on Mechanical Ventilator due to Respiratory Failure	Irfan Thoha	0522PP057
Rehabilitation for Chronic Inflammatory Demyelinating Poliradiculoneuropathy Patient	Leonita K Sihotang	0522PP058
The Importance of KAFO with Orthopaedic Shoes to Stabilize Walking in Patient with Blount Disease	Helena Turnip	0522PP059
Rehabilitation Programs in C2 Tetraplegia AIS A: A Case Report	AASM Cahyandari	0522PP061
Stroke Hemiplegia Alternans: A Case Report	C. Eka Putri	0522PP062
Comprehensive Treatment of Type I Osteogenesis Imperfecta: A Case Report	D Intania Sari	0522PP063
Development and Validation of a New Spasticity Evaluation System for Spasticity in Upper Limb of Patient with Stroke	Yu-Ching Lin	0522PP064
Improved Bladder Emptying in Cystopathy by Pudendal Afferent Stimulation in Diabetic Rats	Chih-Wei Peng	0522PP065
Penile Plethysmography in Patients with Spinal Cord Injury	Soo Yeon Kim	0522PP066
Comparison of the Urodynamic Parameters at the Time of Vesicoureteral Reflux in Neurogenic Bladder	Soo Yeon Kim	0522PP067
The Effect of Transcranial Direct Current Stimulation on Writing in Dysgraphia	Jie Wang	0522PP068
Changes of Radiologic Indicators with Custom-made Rigid Foot Orthosis in Children With Pes Planus	Yeong-wook Kim	0522PP069
Rehabilitation of Patient with Left Below Knee Amputation and Right Hemiplegia: Case Report	Jinwan Seong	0522PP070
Clinical Effects of a Combined Protocol of Low-frequency Repetitive Transcranial Magnetic Stimulation (rTMS) and an Intensive Rehabilitation Program on Gait and Lower-limb Motor Function In Patients with Poststroke Hemiparesis.	Yutaka Yoshida	0522PP071
Correlation of Sit-To-Stand (STS) Motion Characteristic and Walking Ability in Stroke Patients with Falls	Masahito Murakami	0522PP072
Deep Vein Thrombosis in Intractable Complex Regional Pain Syndrome	Sam-Gyu Lee	0522PP073
Cost of Outpatient Stroke Rehabilitation in Malaysia	Julia Patrick Engkasan	0522PP074
Further Evaluation of Habilitation Programs of a Child with Cerebral Palsy after Second Stem Cell Transplantation	Azkiyatun	0522PP075
Measurement Reliability of Spiking Movement Kinematics in Volleyball Players	YJ Chen	0522PP076
Rehabilitation Program in Bilateral Hemimela Tibia: A Case Report	M. Barlian Nugroho	0522PP077
A Preliminary Study on Exploring Motor Development of Very Low Birth Weight Premature Baby in Preschool Age	Pei-Yu Yang	0522PP078
Anterior Cruciate Ligament Reconstruction with Hamstring Tendon or Patellar Tendon Autograft Exhibit Different Muscle Strength	Pei-Yu Yang	0522PP079
Rehabilitation for a Patient with Anti-N-Methyl-D-Aspartate Receptor Encephalitis: A Case Report and Literature Review	Pei-Chun Hsieh	0522PP080
Cervical SCIWORA in an 8-year-old Child: Case Report	Zetty NMR	0522PP081
Measurement Methods for Proprioception Performance of Scapulothoracic Joint	YF Lee	0522PP082
Rehabilitation for a Patient with Non Operative Post Stroke Arteriovenous Malformation	Rina Katharina	0522PP083
Effects of EEG Biofeedback in the Treatment of Attention Deficits in Children with Cerebral Palsy: A Preliminary Study	Yuh-Chuan Chen	0522PP084
Post-Operative Assessment of Activities of Daily Living After Surgical Repair of Arthroscopic Rotator Cuff	Satoshi Shimo	0522PP085
Left Hemiparalexia is not Derived from Left Hemineglect but from Disconnection of Neural Pathway for Visual Word Form Processing?	Chunlei Shan	0522PP086
Effects of the Balance Control Trainer in Hemiparetic Patients with Chronic Stroke	Yang Soo Lee	0521PP01

PLENARY LECTURES (MAY 21, 2012, 08.00–09.00)

PMR Practice in Musculoskeletal Rehabilitation**PL01-01****MANAGEMENT OF PAIN IN MUSCULOSKELETAL DISORDERS****Marta Imamura***Physical Medicine and Rehabilitation, University of Sao Paulo, Brazil, Physical Medicine and Rehabilitation, University of Padova, Italy*

Non-malignant musculoskeletal pain is the most common clinical symptom that causes patients to seek medical attention and is a major cause of disability in the world. There is further evidence from the literature that as well the intensity of ongoing pain as the duration of pain determine the degree of widespread muscle hyperalgesia and the area of the locations where the patient experience the pain. The myofascial pain syndrome is an example of a regional muscle pain condition characterized by localized tenderness and pains caused by active trigger points. Some authors suggest that the initial excitation and peripheral sensitization of nociceptors due to tissue damage will cause sufficient nociceptive input to the central pain systems to cause central sensitization of dorsal horn neurons and/or at higher brain centers. The peripheral theory suggests, in contrast, that myofascial pain is due to an alteration of innervations or of nerve stimulation of muscles or of fascia. This theory is based to the hypothesis that the fascia could be considered as a proprioceptive organ, and that it could be altered by trauma, overuse and surgery. It is well demonstrated that fascia is rich in innervations, including proprioceptors, as well as abundant vascular and lymphatic channels. Recent studies have showed a resolution of the trigger points thanks a deep pressure with friction for a mean value of 3 min and 14 s. After this time the patient reports an important decrease of the pain and the operator a decrease of the viscosity of the tissue. The better understanding of the mechanisms will pave the ways to provide novel mechanism-based therapies to treat these unique pain states to address a major unmet clinical need and have significant clinical, economic and societal benefits.

PL01-02**REHABILITATION AS A HEALTH STRATEGY – HOW TO DESCRIBE THE ROLE OF PHYSICAL AND REHABILITATION MEDICINE AT AN INTERNATIONAL LEVEL?****Christoph Gutenbrunner***Department of Rehabilitation Medicine and Coordination Centre for Rehabilitation Research, Hannover Medical School, Hannover, Germany*

Rehabilitation as well as Physical and Rehabilitation Medicine (PRM) often has been defined by its means and intervention, such as exercise and training, physical modalities, or multimodal in-patient measures. Since the WHO in 2001 published the International Classification of Functioning, Disability and Health (ICF) its comprehensive model of human functioning is used to describe the main targets of rehabilitation, and participation in society has been defined as a goal of all rehabilitation activities. At the same time the significance of social strategies to overcome disability

became mainstream opinion. However, in 2011 many documents have been published to clarify the definitions of rehabilitation, its role to overcome disability, and in particular the role of PRM in rehabilitation in general and clinical work.

- The World Report on Disability (WHO & World Bank 2011) defines disability as an interaction of a person with a health condition and the environment. It claims to remove barriers and defines Rehabilitation Medicine as an important tool to improve functioning or persons with disabilities and chronic health conditions.
- The new International Classification of Health Accounts (OECD 2011) defines rehabilitation as one of four main health strategies and describes the settings rehabilitation is performed in.
- The conceptual descriptions of rehabilitation and PRM systematically defines both within the framework of the ICF model of human functioning (Meyer et al. 2011; Gutenbrunner et al. 2011)
- Last but not least the UEMS-PRM Section started to publish a series describing the field of competence of PRM doctors with regard to clinical work (Gutenbrunner et al. 2010, 2011).

These definitions and description will be summarized and its significance for health care planning as well as for clinical practice will be discussed using chronic widespread pain syndromes as clinical example.

PL01-03**APPLICATION OF ULTRASOUND IN MUSCULOSKELETAL REHABILITATION****Tyng-Guey Wang***Department of Physical Medicine & Rehabilitation, National Taiwan University Hospital, Taiwan*

With the advancement of imaging quality, digital processing and software, high-resolution ultrasound has been widely used in the diagnosis and management of musculoskeletal disorders. The non-invasive nature of ultrasound makes it well accepted by the patients and physicians. Its dynamic application is unattainable in other modalities. Moreover, the internal structures of tendon and ligaments are better demonstrated by ultrasound rather than other image modalities. Synovial and cartilage thickness can be accurately quantified on sonogram, and providing a quantitative method of following up the effect of treatment. Joint effusion, loose body, tendonitis, as well as tendon and muscle rupture can all be well demonstrated sonographically. This lecture will cover the role of diagnostic ultrasound on musculoskeletal rehabilitation. The diagnostic ultrasound 1) can help to make the differential diagnosis or confirmation of the causes of musculoskeletal pain; such as the intra-articular lesion vs extra-articular lesion, the severity of peri-articular tendon, ligament injury, 2) can help to evaluate the effect of treatment; such as the reduction of joint effusion after a specific management, 3) can help to make the decision of treatment strategy; such as the proper duration of immobilization of ankle joint after an ankle sprain through the accurate assessment of the severity of ankle joint injury; the proper position of hand splint for carpal tunnel syndrome to keep the median nerve at the most relaxed position, and 4) can help the direct treatment of musculoskeletal disorder; such as sono-guided aspiration and injection. However, no matter how many benefits of diagnostic ultrasound on musculoskeletal disorders was told, the most sophisticated image study fail to reveal the exact status of soft tissue involvement. Nothing has yet replaced a delicate history and physical examination of the patients. Abnormal image study must confirm what the history and physical examination have suggested. The physician should treat the patient presenting with the symptom not the abnormal image findings.

INVITED LECTURES (MAY 21, 2012, 08.00–12.00)

Back Problem 1

SS01-01

CHANGE OF PAIN CHARACTERISTICS DUE TO BACK PROBLEM AND INFLUENCE ONTO RELATED ACTIVITIES AND SOCIAL PARTICIPATION**Masami Akai, K. Uehara, U. Ohkuma, Y. Tobimatsu, T. Doi, T. Iwaya***Rehabilitation Hospital, National Rehabilitation Center, Saitama, Fukuoka Clinic, Tokyo, Graduate School, International University of Health & Welfare, Tokyo, Japan*

Background: Increase of aging population has a great impact on public health. It is important to understand the progress of musculoskeletal disorders in those people. However, elderly people have always multiple problems and develop complicated conditions. Analysis as single disease is not sufficient for such pleural involvements. Recent patient-reported outcomes provide us much information about the conceptual architecture on targeted condition. For better understanding of back problems, we try to investigate the relationship among pain characteristics, various functional testing, and physical activities and social participation. **Methods:** We developed a comprehensive questionnaire on locomotive function in elderly persons (the Geriatric Locomotive Function Scale 25; GLFS-25). Using this as external criterion, we studied various biological data including past history, physical examination with motor functional tests (standing balance, grip power, etc.), X-rays of the spine and the knee, and some laboratory tests. We collected 314 cases whose age distributed from 65 to 93. Combining method with Akaike Information Criterion and graph visualization could provide domain structures to describe the degree of association among the items. **Results:** When using GLFS-25 as the objective variable, multiple variable analyses presented structural information and relationship among pain characteristics and related items. Even among the functional tests relating to standing or walking capabilities, their relationships to the aspects of daily activity are different and unique. **Conclusion:** With this approach, we could analyze the relationship of each items statistically and to confirm latent structures within the items.

SS01-02

PATIENT-ORIENTED TREATMENT – SOLUTION TO LOW BACK PAIN**Xin Gu**

Abstract is missing..

SS01-03

MUSIC AND MASSAGE FOR BACK PAIN**Reynaldo R. Rey-Matias***St. Luke's Medical Centre, Department of Physical Medicine and Rehabilitation in Quezon City and Bonifacio Global City, Philippine*

Back pain patients use Music and Therapeutic massage to reduce symptoms, improve coping, and enhance quality of life. Although several meta-analysis concludes that and Music and Therapeutic massage can confer short-term benefits in terms of psychological wellbeing and reduction of some symptoms, additional validated randomized controlled studies are necessary to determine specific indications for various types of therapeutic massage and music. In addition, mechanistic studies need to be conducted to discriminate

the relative contributions of body and mind in the subject. The relationship of activity in the subcortical central nervous system should also be considered. Understanding this relationship has important implications for symptom control in back pain patients, because it opens up new research avenues that link self-reported pain with the subjective quality of suffering. Evidences in Music shows increase in wellbeing, decrease in pain sensitivity, decrease in the amount of analgesic medications (54%), improvement in sleep quality, reduced intake of sedatives (63.6%) and reduction in hospital stay and costs. Massage lessened lower back pain, depression and anxiety, and improved sleep. The massage therapy group also showed improved range of motion and their serotonin and dopamine levels were higher. A systematic review to find the evidence for or against its efficacy included four random clinical trials in which massage was tested as a mono-therapy for low back pain. All were burdened with major methodological flaws. One of these studies suggests that massage is superior to no treatment. Two trials imply that it is equally effective as spinal manipulation or transcutaneous electrical stimulation. One study suggests that it is less effective than spinal manipulation. It is concluded that too few trials of massage therapy exist for a reliable evaluation of its efficacy. Massage seems to have some potential as a therapy for low back pain.

Stroke Rehabilitation

SS02-01

OROFACIAL DYSFUNCTIONS FOLLOWING STROKE**Ajit Kumar Varma***Rehabilitation Medicine Department, Patna Medical College, India*

Background: Oro-facial dysfunctions following stroke are common. Often situations are frustrating and embarrassing. From 30 to 40% of individuals who have suffered strokes, may have swallowing deficits ranging from mild to severe degree. Reduced elevation or closure of the larynx may result in materials being misdirected into the airways. Even delayed triggering of swallowing is common after stroke. Videofluoroscopic studies in past have also demonstrated delayed swallowing reflex. **Aims:** Effect of remedial measures are under consideration. A comparative study is undertaken under Indian situations to assess and evaluate its ultimate outcome. **Methods:** Thirty stroke patients with oro-facial dysfunctions (Group I) were evaluated within a period of one and half years. The missing components were identified. Accordingly Motor Control Program were planned and initiated to train swallowing, to train various tongue movements and further to train various oro-facial activities. The randomly selected control study Group II of another 30 stroke patients, of comparable age and sex, were instructed home exercise program only. Group I & Group II patients were evaluated prior to training program and at the end of one month again. **Results:** Group I patients did significantly well. Results were encouraging in males. It was better when Motor Control Program were initiated (in time) within first few weeks of its occurrence and constant attention/practices were given. **Discussion:** Existing joint family structure in India, a different psych-social background, illiteracy, poverty and strong God fearing background all have a major decisive overall effect in the total outcome. The Motor Control Program, when instituted early, at the hospital has shown improved breathing control, better lip and jaw closure and help regain confidence in stroke suffering patients. **Conclusion:** Retraining for restoring early oro-facial functions is vital. Techniques to improve tongue functions and swallowing needs constant attention and practice. Improved Oro-facial function and control has a significant contribution in rehabilitating a stroke patient.

SS02-02**EARLY REHABILITATION FOR STROKE PATIENTS****Peter Lim***Singapore General Hospital, Singapore*

Stroke accounts for 10,000 hospital admissions annually in Singapore, is the fourth leading cause of death after cancer, ischemic heart disease, and pneumonia, and is the most common cause of disability. Stroke patients who receive rehabilitation early have improved physical and functional outcome, with studies such as the ongoing multicenter AVERT (A Very Early Rehabilitation Trial) showing safety with initiation of mobilization within 24 h of stroke. The Singapore General Hospital (SGH) is a 1,600-bed tertiary teaching public hospital with academic affiliations to the Duke-NUS Graduate Medical School, and the Yong Loo Lin School of Medicine, National University of Singapore. SGH receives approximately 1,000 strokes with an additional 200 transient ischemic attacks annually. The SGH department of rehabilitation medicine runs 60 beds for acute/sub-acute patients, with strokes making up about 60% of admissions. The Department has put in place a collaborative program with the departments of neurology and neurosurgery to which almost all strokes are admitted. All patients admitted to these departments are routinely screened for rehabilitation needs by the neurology, neurosurgery, and rehabilitation medicine doctors, nurses and therapists. Reasons for the success of this program include persistence resulting in a long-established trusting relationship, recurrent in-service teaching on rehabilitation with new batches of trainee doctors as they rotate through these postings, and maintaining a continuous presence on the neurology and neurosurgery wards. This is either by way of a rehabilitation consultation team reviewing new admissions to the neurology stroke unit daily, or with twice weekly neurosurgery-rehabilitation and traumatic brain injury rounds. Rehabilitation needs of the patients are triaged either to the rehabilitation department beds, a slow-stream rehabilitation program in a community hospital, or to extended-care facilities. Appropriate stroke patients are commonly admitted to the department of rehabilitation medicine within a week, but the true value of such a comprehensive stroke rehabilitation program comes from the very early rehabilitation focus, and teamwork of the doctors, nurses, therapists, and medical social workers even before the patients are transferred for their definitive rehabilitation program.

SS02-03**MOVEMENT FACILITATION OF THE AFFECTED SIDE AFTER STROKE: FOCUS ON MIRROR THERAPY AND CONSTRAINT-INDUCED APHASIA THERAPY****Bayu Santoso, Fatchur Rochman, Lydia Arfianti***Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Airlangga University, Dr Soetomo Hospital, Surabaya, Indonesia*

Objective: Neuroplastic changes in adult brain can occur in association with rehabilitation retraining. Active participation in therapeutic programs provides direct influence on cortical reorganization and enhances neurologic recovery. This use-dependent neurologic reorganization following brain injury has become an important concept in motor and speech recovery after stroke. After recovery from a stroke, motor activity by the affected hand is associated with a greater degree of bilateral motor cortex activity. Indeed, an entire motor network is recruited in the nonstroke hemisphere. Current methods of therapy focus on facilitating movement in the affected extremity are employed to improve functional outcomes. Techniques that promote learned nonuse may inhibit recovery. In a developing country, socio-economic and educational status limit patients' compliance and effectiveness of the rehabilitation program. *Method:* Several studies on stroke in PMR outpatient centers were designed in the context of a developing country. Bilateral training of mirror therapy for hand creates a visual illusion of normal movement, and

facilitates movements of the impaired hand, thus preventing learned nonuse. This method is simple, cost-efficient, can be done independently, and beneficial for motor function recovery. Constraint-induced aphasia therapy (CIAT) focuses on short-term, intensive language training based on the learning principles of prevention of compensatory communication. *Results:* Mirror therapy showed significant improvement in motor recovery and hand function after stroke. Language recovery improved significantly in stroke patients after training with CIAT. *Implications/Impact on Rehabilitation:* These approaches demonstrate successful innovations in stroke rehabilitation applied in an outpatient setting of a developing country.

SS02-04**RESTORATION OF HEMIPARETIC UPPER LIMB AFTER STROKE WITH BRAIN-MACHINE INTERFACE (BMI) TECHNOLOGY****Meigen Liu, Keiichiro Shindo, Yuko Kasashima, Toshiyuki Fujiwara, Junichi Ushiba***Department of Rehabilitation Medicine, Keio University School of Medicine, Graduate School of Science and Technology, Keio University, Tokyo, Japan*

Because recovery of upper extremity (UE) functions to a practical level has been considered difficult in many patients with stroke, compensatory approaches have been emphasized. Recently, based on basic and clinical researches indicating greater potential for neural plasticity, approaches targeted to functional restoration are popularized. Recent meta-analysis indicates effectiveness of constraint-induced movement therapy, EMG biofeedback, electrostimulation, mental practice and robot exercise for arm functions, but not for hand functions. We therefore devised two new interventions to improve paretic hand. One is the Hybrid Assistive Neuromuscular Dynamic Stimulation therapy designed to facilitate daily use of the hemiparetic UE by combining EMG triggered electrical stimulation with a wrist splint. We demonstrated improvement of motor function, spasticity, functional scores and neurophysiological parameters in chronic stroke. We also demonstrated its effectiveness in subacute stroke with a randomized controlled trial. To be its candidates, however, EMG must be recorded from finger extensors. For patients with no detectable EMG, we devised a BMI neurofeedback training system that provides real time feedback based on analysis of volitionally decreased amplitudes of sensory motor rhythm (SMR) during motor imagery involving extension of the affected fingers. In a pilot study, we found appearance of voluntary EMG activity in the affected finger extensors, improvement of finger function, greater suppression of SMR over both hemispheres during motor imagery and increased cortical excitability as assessed with transcranial magnetic stimulation. These newer interventions may offer promising neurorehabilitative tools for hemiparetic UE.

Spinal Cord Injury 1**SS03-01****EVALUATION OF SEVERITY OF SPINAL CORD INJURY BY BLOOD BIOMARKERS****Toru Ogata, Kentaro Hayakawa, Keisuke Ishii, Yoshiko Tobimatsu, Masami Akai***Department of Rehabilitation for the Movement Functions, Research Institute, National Rehabilitation Center for Persons with Disabilities, Trauma and Critical Care Center, Tokyo Metropolitan Bokutoh Hospital, Japan*

Purpose: The precise evaluation of severity of spinal cord injury (SCI) is important for developing novel therapies. Although several biomarkers in cerebrospinal fluid have been tested, few analyses of blood samples have been reported. A novel biomarker for axonal injury, phosphorylated neurofilament subunit NF-H (pNF-H), has

been reported to be elevated in serum samples from a rodent SCI model. However, pNF-H values in blood samples from patients with SCI have not been tested. Here we performed a cross-sectional study of patients with acute cervical spinal cord injury to determine the utility of pNF-H in evaluating the severity of SCI. *Material and Methods:* This study enrolled 14 patients with acute cervical SCI. Sequential plasma samples were obtained from 6 h to 21 days after injury. Neurological impairment was assessed with the American Spinal Injury Association impairment scale (AIS). Patients were classified according to AIS at the end of the follow-up. Plasma pNF-H values were determined by ELISA system. *Results:* In patients with complete SCI (AIS A), pNF-H became detectable at 12 h after injury and continued to be detected in plasma. There were statistically significant differences in pNF-H value between patients with complete and incomplete SCI. *Conclusion:* Plasma pNF-H was elevated in accordance with the severity of SCI and reflected a greater magnitude of axonal damage. Therefore, this biomarker can be used to independently distinguish complete SCI from incomplete SCI. However, further studies are required to evaluate its utility in predicting prognosis of patients in the incomplete category.

SS03-02

REHABILITATION OF SPINAL CORD INJURY IN DEVELOPING COUNTRIES: DO WE NEED A SPECIALIZED UNIT?

Apichana Kovindha

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Objective: To find evidence to answer whether a specialized unit is necessary for SCI rehabilitation. *Materials and Method:* Reviewed literature. *Results:* In developed countries, dedicated or specialized centres have been established to provide a total comprehensive management for SCI patients from acute to rehabilitation phase and long-term care. Early admission to a SCI unit/center, where staffs are well-trained, aiming to prevent complication and early rehabilitation, has proved its efficiency and effectiveness. In developing countries, the question is how to cost-effectively manage with limited resources. At present, many SCI patients are treated at a general rehabilitation ward/unit based at university general hospitals where medical resources are available and shared; while some are rehabilitated at separated SCI centers. Are outcomes from these two setting different? And which is better? Whether it is a specialized SCI or a general rehab unit, dedicated and well-trained staffs and directive leaders are the key to successful outcome. Some published data from developing countries show less complications during admission and shorter length of stay when SCI patients were treated at a rehab center/unit with dedicated and well-trained staffs. Moreover a collaboration between rehabilitation units/centers and local communities is a must in developing countries to ensure that rehabilitated SCI persons will be socially re-integrated in a right-based, barrier-free and inclusiveness community. *Conclusion:* Rehabilitation unit/centers with dedicated and well-trained staffs for SCI patients do exist in developing world. Published and unpublished data show direct benefit to SCI persons and effectiveness, but whether they are cost-effective is inconclusive.

SS03-03

MANAGING THE NEUROGENIC BLADDER POST SPINAL CORD INJURY – CAN WE DO BETTER?

Adela Tow

Department of Rehabilitation Medicine, Tan Tock Seng Hospital, Singapore

The neurogenic bladder post spinal cord injury is a common problem in spinal cord injured (SCI) patients. Depending on the level, type and severity of the injury, various types of dysfunctions can occur including detrusor and sphincter over- and under-activity in various combinations, resulting in failure to store or empty, or storage and

voiding so at relatively high pressures. Optimizing bladder management including preventing and minimizing upper and lower urinary tract complications and infections in a socially acceptable and in accordance with the patient's lifestyle is a challenge. Early patient education and planning of bladder management is crucial to set the stage for improving bladder and renal outcomes long term. In tetraplegics and high paraplegics, careful consideration and preparation should be done prior to a trial of weaning off indwelling catheter, as problems of infection, autonomic dysreflexia and unwanted incontinence may occur. Urodynamic (UDS) testing should be done early to evaluate and characterize the neurogenic bladder as problems of low compliance, low cystometric capacity, neurogenic detrusor overactivity and high residual urine are common. In interpreting the significance of UDS findings, the classic cut off detrusor pressure of 40 cm H₂O for increased risk of upper tract damage has been challenged. What is the optimal cut-off point for bladder compliance and detrusor pressure or duration of contraction before we advise that it is unsafe to void, especially in a patient who does not want antimuscarinics? How low or high should the residual urine be in relation to voided volume before we allow it to be acceptable? In the long term, the choice of catheter or type of bladder drainage should be made on an individual basis, taking into account many factors such as patient preference, sex of the patient, level of injury, functional status, financial concerns, and availability of caregiver. For patients with low pressure storage bladder and unable to void, intermittent catheterization been shown to have better long term outcomes compared to indwelling catheter. For the patient with neurogenic detrusor overactivity (NDO), not optimized on one antimuscarinic drug, a trial of 2 or more medications may help improve compliance and reduce unwanted incontinent episodes. Botulinum toxin has been FDA approved and if cost is not prohibitive, is a viable option for the intractable NDO. Managing the long term patient with neurogenic bladder, especially those on indwelling or suprapubic catheter needs judicious care, as stones, recurrent infections, upper tract changes and autonomic dysreflexia can occur. Besides usual management and close follow up, are there other ways to help to reduce these risks? Judicious management of the neurogenic bladder is important including careful planning, weaning and close long term follow up. Clinicians must be cognizant of best practices and seek ways to optimize bladder management so as to minimize long term damages.

SS03-04

SENSOMOTORIC REHABILITATION IN PATIENTS WITH SPINE INJURIES

Anton Wicker

Austria

Spine injuries are naturally multiple and so they request individual therapy management. Some rehabilitation principles are generally valid and correctly used in all injury patterns common and necessary. Spine injuries are always causing a change in the movement pattern, which influences the patients behavior. Problems in the spine are marked by the following facts: pain, disturbances in the movement pattern, changes of the trophic state, atrophy of the muscles, disturbances in coordination. Exactly focused and adapted therapy-stimuli of motion are able to influence all 5 parts in a very positive order. The immobilization time should be as short as possible. The therapy medium "movement", dosed and adapted in right manner can be used immediately after the surgery. Spine stabilization, the stabilization of the trunk and posture control are the basics for all movement patterns. Sensomotoric training on instable devices like wobble boards, tubes and instable plates. Water is also an essential therapeutic medium in modern rehabilitation programs. Medical training therapy is based on the principles of motor and training science which are integrated in the rehabilitation process. Stamina, endurance, strength, balance, mobility and flexibility are trained in increasing intensities. The central coordinative capability in the sensomotoric learning process is the balance. The aim of every rehabilitation program in spine injuries is this spinal column which is: pain free, functioning in working, tough.

Pediatric Rehabilitation

SS04-01

NEUROPHARMACOLOGICAL INTERVENTION IN TRAUMATIC BRAIN INJURY: FROM ACUTE TO CHRONIC REHABILITATION**Heakyung Kim***Korea*

Traumatic brain injury (TBI) is a silent epidemic for children. Children with TBI suffer not only motor dysfunction but also significant cognitive/behavioral problems during acute and chronic rehabilitation. This course provides an overview of medications that have been used to the patients with TBI to enhance recovery of a number of brain functions. Participants will understand the rational of pharmacological interventions for post TBI such as arousal, agitation, central dysautonomia, cognitive function, behavior as well as spasticity.

SS04-02

REHABILITATION FOR SPINAL MALALIGNMENT IN CHILDREN: FROM TORTICOLLIS TO IDIOPATHIC SCOLIOSIS**Bong-Ok Kim***Department of Rehabilitation Medicine, Chungnam National University Hospital, Daejeon, Korea*

Rehabilitation Medicine has an important and unique role in management of spinal problems in children as we see patients with congenital muscular torticollis (CMT), congenital scoliosis, meningocele, cerebral palsy, progressive muscular dystrophy, idiopathic juvenile and adolescent scoliosis, etc. Most of the spinal mal-alignment in children including idiopathic adolescent scoliosis has been considered as idiopathic for a long time. However, there are cumulated evidences to show more underlying causes which will eventually bring the therapeutic measures into practice aiming possibilities in treatment and prevention from becoming serious musculoskeletal problems in the life ahead. Congenital muscular torticollis is a simple neonatal problem which can be resolved spontaneously with no treatment. But this will also cause cervico-thoracic scoliosis in later childhood if neglected to balance the paracervical muscles. Pelvic mal-alignment is caused by the various reasons in the lower extremities such as pes planus, leg length discrepancy, abnormal torsional problems in sagittal, transverse and coronal planes of the long bones and joints of the lower extremities. Pelvic mal-alignment syndrome (PMS) is one of the important causes of the thoraco-lumbar scoliosis in the second decade of life. Therefore, evaluation of biomechanical alignment of lower extremities and spine is critical in the everyday practice in pediatric rehabilitation for early diagnosis of the potential hazard in the growing musculoskeletal system. In this presentation the evaluation of alignment of foot, lower extremities, pelvis and spine from infancy to adolescence will be discussed as well as nonsurgical management of congenital muscular torticollis and PMS including simple stretching or strengthening exercises, foot orthotics, shoe modifications, spinal orthoses and appropriate seating systems.

SS04-03

COMPREHENSIVE PMR PROTOCOL FOR CEREBRAL PALSY REFERRED FROM REMOTE AREAS OF INDONESIA**Ratna D. Haryadi***Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Airlangga University, Dr Soetomo Hospital, Surabaya, Indonesia*

Objective: In children with cerebral palsy living in remote areas, spasticity of the lower extremity may result in lifelong inability to ambulate independently. In this study we evaluate a protocol that

can partially be executed by parents in their hometown combined with periodic visits to a PMR facility to improve ambulation in cerebral palsy children with severe ankle equinovarus spasticity. **Method:** Ten children, age 3 to 5 years, diagnosed as cerebral palsy with spastic diplegia or hemiplegia exhibiting equinovarus spasticity of the ankle were enrolled in this study. All subjects were able to maintain sitting balance and trunk control but unable to assume standing position due to severe equinovarus spasticity. They were treated with botulinum toxin injections, combined with lower extremity orthosis, night splinting, passive stretching, an exercise program that included weightbearing and electrical stimulation of the antagonist muscles. All subjects were given a home program to be continued by parents up to 6 months. **Results:** Before intervention, all patients were unable to place their feet with heels touching the floor due to ankle stiffness and muscle spasm. All subjects had decreased spasticity, improved ankle range of motion and improved feet position in standing. After 6 months of intervention all subjects were able to stand with flat feet or slight equinus, and none of them exhibited recurrence of the varus position. **Implications/Impact on Rehabilitation:** The comprehensive PMR protocol demonstrated significant positive effects on the standing and ambulation ability. It offers a solution in the rehabilitation of children with cerebral palsy living in remote areas.

Back Problems 2

SS05-01

THERAPY IN LOW BACK PAIN: DOCUMENTATION BASED CARE**Peni Kusumastuti**

Abstract is missing.

SS05-02

MANAGEMENT OF BACK PAIN IN MEDICAL REHABILITATION CLINIC**Yap Eng Ching***Singapore*

Low back pain is one of the most common presenting symptoms for patients to seek treatment. The one-year prevalence is about 30% and lifetime prevalence is over 70%. The prevalence rate increases with age, reaching a plateau about 55 years of age. This session will focus on management of back pain in medical rehabilitation outpatient clinic. Causes of back pain are often multi-factorial. Red flags for serious causes of back pain must be excluded during clinical evaluation. The managing physician often has to correlate significant clinical findings to diagnose the pain generator. Appropriate exercises help relieve pain and rebalance the muscles. Analgesics help control and dampen pain sensitization. Needling and injection mechanically disrupt and release taut bands in painful muscles, stimulate the release of endorphin into systemic circulation and relieve sensitization. Together with cognitive behavioral therapy and other complementary modalities, majority of back pain patients will improve with active rehabilitation, without invasive treatment or surgery.

SS05-03

ULTRASOUND-GUIDED INJECTION FOR BACK PAIN**Carl Pai-Chu Chen, Simon Fuk-Tan Tang***Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Tao-Yuan, Taiwan*

Introduction: Ultrasound is a radiation-free, easy-to-use imaging tool in diagnosing soft tissue lesions and in performing ultrasound guided injections. Our studies have indicated that ultrasound can

be applied in performing accurate caudal epidural, piriformis, and sacroiliac joint injections. Under ultrasound guidance, the advancing motion of the needle can be observed as continuous and real-time images. In our recent works, we have also shown that ultrasound may also be used as an effective screening tool for judging the success rate of caudal epidural injections. *Material and Method:* Sonographic images of the sacral hiatus were obtained from patients with low back pain and sciatica who were to receive caudal epidural injection treatments. Sonographic images of the sacroiliac joints were also obtained from patients suffering from spondylo-arthropathies. The LOGIQ 9 ultrasound machine (GE Healthcare, Milwaukee, WI, USA) was used in our study. The M12L real-time linear-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. *Results:* In sacral hiatus epidural injections, 100% accuracy in caudal needle placement into the caudal epidural space under ultrasound guidance was confirmed by contrast dye fluoroscopy. Sonographic images indicating a closed sacral canal and sacral diameters ranging from 1.2 to 1.6 mm may suggest a higher failure rate in caudal epidural injection. Ultrasound can also accurately guide the injection needles to the lower one-third of the sacroiliac joint, and the piriformis muscle for successful sacroiliac joint and piriformis muscle injections. *Conclusion:* When ultrasound-guided injection technique is used, higher volume of steroid–lidocaine suspension can be accurately infiltrated into the lesion site as compared with the conventional blind injection technique. Ultrasound guidance can ensure accurate needle placement into the sacral hiatus, piriformis muscle, and sacroiliac joint for successful injections to these areas. Sonographic images of the sacral hiatus can also provide us with crucial information on whether caudal epidural injections can be performed successfully.

Neuro Control of Spasticity

SS06-01

BRAIN MOTOR CONTROL ASSESSMENT IN PATIENTS SUFFERING FROM SPASTICITY

W. Barry McKay

Senior Research Scientist, the Shepherd Center, Atlanta, GA, USA

As clinically defined, the term “spasticity” does not adequately describe the variety and complexity of motor control that brings patient complaints. However, by simultaneously recording spinal motor output in the form of motor unit activity from multiple muscles the extent of unintended and unwanted muscle activation can be recorded and quantified. In addition, the tasking of the nervous system by presenting it with the need to process input from phasic and tonic stretch as is done in typical clinical evaluations, cutaneous stimulation or volitional activation of distant and local regions of the body provide information about the mechanisms that generate the excess motor activity that brings their complaints. This presentation will outline the protocol for such neurophysiological examination of spasticity and illustrate some of the results obtained.

SS06-02

VOLITIONAL MODIFICATION OF NEUROCONTROL OF SPASMS TO FUNCTIONAL MOVEMENT

Milan Dimitrijevic

Baylor College of Medicine, Houston, TX, USA

One of the disabling features of spasticity is the appearance of so-called “involuntary” movement. Apart from the appearance of such muscle contractions without warning, even more disabling is their appearance during efforts to initiate and control volitional movements. In people who are spastic after chronic spinal cord injury (SCI), we carried out multichannel surface electromyographic

recordings of spasms in their lower limbs. This study provided evidence of the presence of residual excitatory and inhibitory effects that are under residual brain control through a small population of axons conducting through the injury zone. Furthermore, we recorded evidence that this residual brain control could suppress these “spontaneous” spasms. Once such control was recognized, we have found that individuals with SCI can convert these involuntary movements into functional use to change body and limb position to aid in the performance of their activities of daily living. In this presentation, we shall demonstrate how to modify brain control from “spontaneous” spasms to provide functional movements.

SS06-03

LOCOMOTOR TRAINING AND MODIFICATION OF SPASTICITY

Keith Tansey

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Following neurological injury, there can be both the loss of normal sensorimotor control and the emergence of abnormal sensorimotor control such as spasticity, including hypertonia, hyperreflexia, dysynergias during movements, and recognized patterns of spasms including clonus. Functional recovery is the goal of neurorehabilitation but it takes addressing both the negative and positive sensorimotor phenomena expressed by the injured nervous system. That is to say, the goal is not just more movement, rather more normal movement. It has been known for some time that therapeutic interventions designed to enhance motor performance often reduce spasticity as well. In the case of spinal cord injury, locomotor training can improve locomotor function in patients with incomplete injuries. The magnitude and pattern of muscle activation during locomotor training can be influenced by gait associated sensory feedback, such as is provided by loading, gait speed and joint positioning. The function of the spinal and supraspinal neural circuitry processing those sensory cues can be augmented with the addition of other therapeutic approaches such as tonic spinal cord stimulation in an intensity and frequency dependant manner. Spinal cord stimulation at higher frequencies can globally diminish clinical measures of spasticity at rest but during stepping, we have found that clonus impacting the gait cycle can be modified at specific, lower frequencies that typically enhance the sensorimotor control for stepping. This suggests that the same frequency specific stimulation that enhances motor control for stepping can also simultaneously diminish abnormal sensorimotor control such as clonus.

Spinal Cord Injury 2

SS07-01

NATIONAL SURVEY ON HEALTH STATUS OF VETERANS WITH SPINAL CORD INJURY IN IRAN

S. Mansoor Rayegani, M. Reza Soroosh, Ehsan Modirian

Professor of physical medicine and rehabilitation, Shahid Beheshti University of Medical science, and Janbazan Medical and Engineering Research Center, Tehran, Iran

Introduction: Following Iran-Iraq war (1980–1988), throughout the country, more than 2050 civilians or veterans remained with different levels of spinal cord injuries. Spinal cord injury (SCI) deeply affects the patients and is accompanied by different types of physical and medical problems. *Materials and Methods:* During a two-year program, 1,429 spinal cord injury victims of imposed war from 26 states were thoroughly examined by trained physicians according to a unit protocol. A questionnaire addressing patients' demographic characteristics (age, sex, level of education, occupation, date of injury, type and level of injury) and information relevant to health

status was recorded. *Results:* Of a total of 1,429 individuals with SCI, 87.4% of the patients suffered from paraplegia (lumbar or lower thoracic) and the rest were three-plegic or tetra-plegic (upper thoracic or cervical). About 98.4% of the SCI patients were men; the mean age at follow up was 37.9 and 9–19 years had passed after injury. One thousand and sixty five patients (74.5%) suffered from at least one complication in their urinary tract system. Other problems reported in these patients include: infertility (13.2%), sexual dysfunction (63.8%), bed sore (20.7%), neurogenic pain (64.8%), spasticity (65.1%), restricted range of motion (51.4%), muscular atrophy (71.2%), gastrointestinal complications (21.4%), respiratory complications (91.2%), cardiovascular complications (21.4%) and endocrine problems (2.7%). *Conclusion:* Although this study comprises more than 80% of a total of 2,050 SCI veterans in Iran, as a cross-sectional study it cannot establish causal relations, but only generate hypothesis that could be evaluated by future prospective randomized trials.

SS07-02

MODEL OF CARE FOR PATIENTS WITH SPINAL CORD INJURIES IN NEW ZEALAND

Xianghu Xiong

Burwood Spinal Unit, Christchurch, New Zealand

New Zealand has a population of over 4 million, with yearly 80 to 100 people suffering from serious spinal cord injuries. The country has two spinal units (Burwood Spinal Unit (BSU) - Christchurch and Auckland Spinal Rehabilitation Unit). BSU is the larger of the two, and has comprehensive services, including acute, ICU, surgical spinal cares as well as comprehensive spinal rehabilitation, complimented by on site neuro-urology, hand reconstructions and tertiary complication management, such as spasticity and pressure sore, neurogenic bowel management and pain management. The unit has comprehensive reassessment services to the whole South Island and half of the North Island of New Zealand. This presentation will outline the services provided, with “total care concept” and present the data from Australasian Rehabilitation Outcome Centre and BSU’s Spin-Data. New Zealand has a comprehensive non-fault insurance cover for all patients with “Trauma” related spinal cord injuries. The unique insurance (Accident Compensation Cooperation) will also be described briefly.

SS07-03

REHABILITATION OF SPINAL CORD INJURY – LESSON LEARNED FROM SICHUAN EARTHQUAKE

Jianan Li, Yongqiang Li

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Aims: To characterize a spinal cord injury (SCI) population from the 2008 Sichuan earthquake in China; to evaluate functional outcomes of physical rehabilitation interventions; to assess potential determinants of rehabilitation effectiveness, and; to assess medical complications and management outcomes. *Methods:* Fifty-one earthquake victims with SCI were enrolled and underwent rehabilitation programming. Functional rehabilitation outcomes included ambulation ability, wheelchair mobility and activities of daily living (ADLs) assessed with the Modified Barthel Index (MBI) at the beginning and end of rehabilitation. Effectiveness of rehabilitation and the effect of other predictors were evaluated by mixed effects Poisson regression. Outcomes of medical complication management were determined by comparison of the incidence of respective complications at the beginning and end of rehabilitation. *Results:* Ambulation, wheelchair mobility and ADLs were significantly improved

with rehabilitation programming. Earlier onset of rehabilitation was a positive predictor of rehabilitation effectiveness whereas delayed onset of rehabilitation combined with prolonged time to rescue resulted in low effectiveness. Medical complications were managed effectively in 63% (pressure ulcers) to 85% (deep vein thrombosis) of patients during rehabilitation. KAFO in SCI is not suitable in the countryside. *Conclusion:* Earthquake victims with SCI may achieve significantly improved functional rehabilitation functional outcomes from a formal, institutional-based physical rehabilitation program.

SS07-04

THE OUTCOME OF SPINAL CORD INJURY DUE TO TUBERCULOUS SPONDYLITIS

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Medical Rehabilitation Unit Fatmawati Hospital, Jakarta, Indonesia

Background: Tuberculous spondylitis (TS) also known as Pott’s disease, is still a significant cause of disease in developing countries. Tuberculous involvement of the spine has the potential to cause serious morbidity, including severe deformities of the spine and severe neurologic deficits such as paraplegia or tetraplegia. Average 60–70 spinal cord injury (SCI) patients were admitted to Spinal Cord Injury Rehabilitation Unit of Fatmawati Hospital yearly. The causes were mostly traumatic (due to car or motorcycle accidents or fall from a height) and disease (such as TS, spinal tumors, or metastatic bone disease). In the last few years it had showed the tendency of increasing paraplegia or tetraplegia due to TS. This study was to show the outcome of SCI due to TS. *Materials and Methods:* Forty-two patients (36.2%) from 116 patients who were admitted in 2010–2011 were diagnosed with TS. Thirty-six patients among them had complete lesion (AIS A, B). Almost all patients with TS were treated with combined treatment including surgery for debridement and stabilization, regimen consisting of 4–5 anti-tuberculous drugs for 9–12 months, bracing and rehabilitation training. *Results:* The motor score were more or less increased. Thirteen patients (31%) achieved functional walking at discharge, while other traumatic cases never reached functional walking. The duration of rehabilitation training until patients could ambulate independently in- and out-door was 6–12 months. Surgical interventions and the compliance of the patients for taking anti-tuberculous drugs were the most critical in achieving the optimal recovery. *Conclusion:* Appropriate treatment combined with proper rehabilitation program could help SCI patient caused by TS return actively to their daily life.

Geriatric Rehabilitation

SS08-01

REHABILITATION OF FRAIL OLDER PEOPLE

Ian Cameron

Rehabilitation Studies Unit, University of Sydney, Australia

Older people make up the majority of participants in general rehabilitation programs and many are frail. Stroke and hip fracture are the major diagnostic groups. Most older people with significant disability of recent onset have the potential to benefit from rehabilitation. Assessing an older person’s pre-morbid functional and cognitive status, which are strong determinants of rehabilitation outcome, is an important component of management. The major goals of rehabilitation for older people are mobility and self-care without the assistance of another person. Evidence suggests that rehabilitation

for older people involving a coordinated multidisciplinary team of health professionals (including nurses and doctors) is effective. Contemporary rehabilitation practice is not confined to traditional inpatient rehabilitation units; it also occurs in the community and other non-hospital settings.

SS08-02

REHABILITATION IN PEOPLE WITH DEMENTIA

Susan Kurrle

Health Care of Older People, University of Sydney, Australia

Until recently cognitive impairment and dementia were exclusion criteria for admission to an inpatient rehabilitation program, and there is still often reluctance to accept people with dementia for rehabilitation. This presentation reviews the evidence and shows that rehabilitation is effective in patients with cognitive impairment or dementia in the context of stroke, hip fracture and other common rehabilitation groupings. It also briefly discusses the evidence for rehabilitation of cognitive impairment. It looks at factors that need to be taken into account when designing a rehabilitation program for people with cognitive impairment and dementia such as short attention span, limited ability to learn new tasks, and problems with vision, praxis and coordination. It finishes by using case studies to illustrate solutions for common clinical problems that may arise in the management of rehabilitation in people with cognitive impairment or dementia.

SS08-03

REHABILITATION THERAPY AND PREVENTION OF FALLS IN ELDERLY

Hee-Sang Kim

Kyung Hee University School of Medicine, Seoul, Korea

Falls are very common in the elderly and are associated with appreciable mortality, and cost. Risk factors for falls in the elderly include previous history of falls, muscle weakness and sensory disturbance of lower extremities, gait and balance problems, poor vision, cognitive impairment, use of psychoactive medications and environmental hazards. The aging of population in Korea is the fastest in the world. However, the elderly has not been systemically educated on the prevention of fall. The Korean Academy of Geriatric Rehabilitation Medicine reported 'The guidelines for falls prevention in Korean elderly (2011)', which was a brief and easy summary report. This guideline may be used by old people, their families, and caregivers. It also includes useful information for an assessment and a reduction of fall risks. Rehabilitation therapies and prevention of falls in the elderly are composed of 1) evaluating fall risks such as the cause of prior fall, balance test, gait analysis, and cognitive function test, 2) starting regular progressive exercise program for muscular strengthening, balance and coordination exercise, 3) modulating a number of psychoactive medications once or twice a year, 4) evaluating visual activity once a year, 5) eliminating fall risks in home and environmental hazards, 6) regularly evaluating the patient with cardiovascular disease and incontinence and 7) taking calcium rich foods and preventive medicine from osteoporosis.

ORAL PRESENTATIONS (MAY 21, 2012, 13.00–14.00)

Pediatric Rehabilitation

0521FP01

INTRA-RATER RELIABILITY OF PRECHTL'S METHOD ON THE QUALITATIVE ASSESSMENT OF GENERAL MOVEMENTS BASED ON THE VIDEO RECORDINGS ON TAIWANESE INFANTS**Kuo-Kuang Yeh^{1,2}, Alice May-Kuen Wong^{1,2,3}, Wen-Yu Liu², Reynin Lein¹**¹Chang Gung Medical Foundation, Lin Kao Medical Center, Taoyuan, ²Chang Gung University, Taoyuan and ³Chang Gung Medical Foundation, Taoyuan Branch, Taoyuan, Taiwan

Purpose: The Precht's method was developed as an instrument for earlier identification of potential motor disorders in young infants, which was based upon the observations of general movements (GMs). The aim of the present study was to examine the intra-rater reliability of Precht's method based on the video recordings of Taiwanese infants. **Materials and Methods:** Fifty-nine videos were recorded from 35 infants (16 girls and 19 boys, postmenstrual age (PMA) from 35 to 60 weeks). Their videos were observed and scored by one certificated physical therapist twice. Descriptive statistics, Cohen's Kappa and interclass correlation coefficient (ICC) were used for data analysis. **Results:** The intra-rater reliability of pairwise agreement ICC that was valued in the "quality", "sequence", "amplitude", "speed", "space", "rotatory components", "onset and offset", and "tremulous movement" for Preterm GMs/Writhing Movements in young infant with PMA up to the 46 weeks were 0.52 to 0.92. The ICC that was valued in the "fidgety movements", "repertoire of age-adequate of co-existent other movements", "quality of other movements", "posture", and "movement character" for infants aged with PMA from 49 to 60 weeks were 0.72 to 0.82. The total intra-rater reliability of the "GM optimality score" for the Preterm GMs/Writhing Movements from preterm up to PMA 46 weeks and the "Motor Optimality Score" with PMA from 49 to 60 weeks were moderate ($\kappa=0.43$ and 0.54). **Conclusion:** The results suggested that the intra-rater reliability of the Precht's method by one certificated physical therapist in Taiwanese infants was satisfactory.

0521FP02

DOES SELECTIVE DORSAL RHIZOTOMY PROCEDURE HELP TO IMPROVE THE GAIT PATTERN OF CHILDREN WITH CEREBRAL PALSY?**N.C. Chan, K.Y. Yam, M. Lao, D. Fong, P. Poon**

Department of Physiotherapy, Department of Neurosurgery, Tuen Mun Hospital, Hong Kong

Purpose: Children with cerebral palsy (CP) had different form of movement disorder. Selective dorsal rhizotomy (SDR) is an effective method in reducing the spasticity and help to improve the gait pattern. The aim of the present study is to analysis the change in gait after SDR for children with Gross Motor Function Classification System (GMFCS) level I and II. **Materials and Methods:** Twenty-two patients were recruited in the study. Children with CP selected for SDR with GMFCS level I and II would undergone 3-D gait analysis and energy consumption test before surgery, six-months and one year post-operation. The lower limbs kinematics data including the pelvic tilting (PT), the maximum hip extension(MHE), maximum knee extension(MKE) in stance, knee extension in initial contact (KEIC), ankle dorsiflexion in stance (ADF) were analyzed. Kinetics data on ankle moment quotient (AMQ) and ankle power quotients (APQ) were also selected for analysis. Oxygen consumption test (O_2 cost) for walking are studied in each test interval. **Results:** Seventeen of them had completed one year gait analysis. In kinematics, the PT angle were increase; the MHE ($p=0.003$, power=0.88)

and MKE ($p=0.001$, power=0.96) in stance were improved that mean the patients were able to walk in more straight posture. The KEIC ($p<0.001$, power=0.99) is improved, patients is able to swing leg into a bigger steps. ADF also showed significant improvement ($p<0.001$, power=0.99) which reflect the heel could be placed down with a more stable base. In kinetics, both AMQ ($p=0.008$, power=0.81) and APQ ($p=0.001$, power=0.93) and the O_2 cost ($p=0.008$, power=0.83) showed improvement after the surgery. **Conclusion:** The SDR procedure is able to improve the walking pattern and its efficiency for children with CP. The change is able to be documented clearly and objectively with the use of 3-D gait analysis.

0521FP03

THE APPLICATION OF TRACHEOTOMY VENTILATOR SWALLOWING AND SPEAKING VALVE IN CHILDREN WITH SWALLOWING DIFFICULTY AFTER TRACHEOTOMY**Zulin Dou, Guifang Wan, Xie Chunqing, Zhang Ding**

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Purpose: To discuss the application of dysphagia ventilation swallowing and speaking valve in children with swallowing difficulty after tracheotomy. **Materials and Methods:** Four children (3 with brainstem encephalitis caused by hand, foot and mouth disease and 1 after surgery of cerebellar astrocytoma) after tracheotomy have swallowing difficulties. All the videofluoroscopic swallowing study (VFSS) show the spasticity of cricopharyngenus and silent aspiration. After VFSS assessments, ventilation swallowing and speaking valves (Passy-Muir, produced in the USA, PMVs) are applied to the 4 children, and after that they are received several swallowing trainings including balloon dilatation, breathing exercises, sensory and electrical stimulation. **Results:** Four children can pronounce with the PMVs immediately. After (36.50±35.63) days of comprehensive therapies, all of them can live without the tracheostomy tube or nasal feeding tube and their swallowing functions are obviously improved. **Conclusion:** The application of PMVs combined with swallowing training is effective for children with swallowing difficulty after tracheotomy. It can decrease the risk of aspiration, help opening the cricopharyngeus muscle and help in pronunciation.

0521FP04

RELATIONSHIP OF SIALORRHEA AND MOTOR SPEECH FUNCTION IN CHILDREN WITH CEREBRAL PALSY OF DIFFERENT MOTOR SEVERITIES**Katie Pei-Hsuan Wu¹, Chia-Ling Chen^{1,2}, Yu-Cheng Pei^{1,3,4}, Chia-Ying Chung^{1,3}, Alice May-Kuen Wong^{1,3}, Simon F. Tang^{1,3}**¹Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, ²Graduate Institute of Early Intervention, Chang Gung University, ³School of Medicine, Chang Gung University, Taoyuan, ⁴Healthy Aging Research Center, Chang Gung University, Taoyuan, Taiwan

Purpose: Sialorrhoea and speech functions varied among children with cerebral palsy (CP). This study will identify the relation of drooling severities and motor speech function under eliminating the motor severity among children with CP at different levels of motor dysfunction. **Materials and Methods:** Thirty children with CP (age, 3–16 years) were divided into mild (levels II–III) and severe group (levels IV–V) based on the Gross Motor Function Classification System (GMFCS) levels. All participants received a modified drool-

ing impact scale (MDIS) and motor speech assessments, including speech intelligibility, speech pace, and voice loudness. *Results:* Children with levels II–III had lesser drooling severity and better speech intelligibility, speech pace, and voice loudness than those with levels III–IV ($p < 0.01$). Partial correlation analysis showed the MDIS scores were correlated with speech intelligibility ($r = 0.6, p < 0.01$) and speech pace ($r = 0.4, p < 0.05$) corrected by the GMFCS levels. However, the MDIS scores were not correlated with voice loudness. *Conclusion:* These findings suggest the motor speech functions were associated with the sialorrhea in children with CP even eliminating the impact of motor variables. The data will allow clinicians the treatment strategies planning for children with CP of various motor severities.

0521FP05

NORMAL VALUE OF MANUAL DEXTERITY WITH PEGBOARD TEST IN 6-YEAR-OLD CHILDREN

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Purpose: Dexterity is defined as adroitness and manual skill. Dexterity includes two concepts of speed and accuracy. Pegboard test is a screening for manual dexterity that is easy to be administered. There is no pegboard with standard normal value for assessing manual dexterity in Indonesia. Objective for this study is to get standard normal value for 6-year-old children and to know the difference of dexterity in girls and boys. The hypothesis is that manual dexterity in girls outperformed boys. *Materials and Methods:* Design of this study is cross sectional study. Target population is six-year-old children in public elementary school in South Jakarta. Sampling is done by 2-stage random sampling for location then random sampling on site with probability proportional to size. Dependent variables are age, sex and nutritional status. Independent variables are score on Pegboard Test. Statistical analysis was done by descriptive analysis and Mann Whitney test. *Results:* Subjects included are 191 girls and 191 boys, age 6 years old in nine public elementary schools in South Jakarta. This study uses dexterity manual three-jaw chuck 16 hole pegboard and subjects were requested to place as many pegs as possible in 15 s. Characteristic subjects in this study are age six years old, normal nutritional status, right handed with no neurological and orthopedic problem. Mean number of pegs placed for girls is 6.92 pegs (CI 95% 6.76–7.08). Mean number of pegs placed for boys is 6.49 pegs (CI 95% 6.33–6.65). *Conclusion:* Mean standard normal value for 6-year-old girls is 6.92 (SD 1.12) and mean standard normal value for 6-year-old boys is 6.49 (SD 1.12). Manual dexterity in girls is better than boys ($p < 0.000$).

0521FP06

COMPARISON OF REFERENCE EQUATIONS FOR THE PREDICTED 6-MINUTES WALKING DISTANCE IN HEALTHY INDONESIAN CHILDREN AGES 8–11-YEAR-OLD

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Purpose: This study was done to investigate whether 6 Minute Walking Test (6MWT) can be applied to children in Indonesia taking anthropometric and demographic factor into consideration, and to investigate the correlation of the following variables with distance walked in 6MWT for Indonesian students: body height, body weight, body mass index, and age. *Materials and Methods:* The sample included 349 healthy children, 196 male and 153 female. The mean age was 9.27 ± 1.00 years. Variables measured included body height, body weight, body mass index, age, and 6 min walking distance. To measure the predicted dis-

tance, equations obtained from Ben Saad et al., Li et al., Iwama et al. and Preisnitz et al. were utilized. *Results:* The actual mean walking distance obtained was 425 ± 48.80 m for female and 459.88 ± 59.51 m for male. Heart rate baseline was 98.18 ± 14.81 beat per min (bpm), increased to 106.80 ± 13.70 bpm after 6MWT. The different distance found ranged from 97.78 ± 57.27 to 209.85 ± 61.00 m; $p < 0.001$. Distance walked was found to be significantly correlated with age ($r = 0.20, p < 0.001$). The distance walked was found to increase significantly year to year from 8 to 11 years (8 years 436 ± 52 m; 9 years 442 ± 65 ; 10 years 455 ± 52 ; 11 years 478 ± 51 ; $p < 0.05$ between each). *Conclusion:* The findings suggest that reference equations of 6 MWT values for children living in other countries is not directly applicable to children living in Indonesia indicating the need of further research for another formula. The findings also indicate that out of all variables measured, distance walked is significantly correlated with age for Indonesian children.

0521FP07

EFFECTS OF AGE ON HOME-BASED CONSTRAINT-INDUCED THERAPY IN CHILDREN WITH CEREBRAL PALSY USING KINEMATICS AND CLINICAL ANALYSIS: A PRELIMINARY STUDY

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Purpose: This study aimed to investigate the effects of age on movement kinematics and functional outcomes after home-based constraint-induced therapy (hCIT) in children with cerebral palsy (CP). *Materials and Methods:* Sixteen children with spastic unilateral CP (age 6–12 years) were divided into a younger group and an older group, each containing 8 subjects. All participants received clinical and kinematic measurements at baseline and after (post-treatment) 4-week individualized hCIT. Clinical measures included Bruininks-Oseretsky Test of Motor Proficiency (BOTMP) and Pediatric Motor Activity Log (PMAL), and kinematic analysis of reaching movement. Kinematic variables included reaction time (RT), normalized movement time (nMT), normalized movement unit (nMU), and peak velocity (PV), and percentage of movement time where peak velocity occurred (PPV). *Results:* All clinical outcome measures and most kinematic variables at post-treatment and follow-up improved for both age groups. At post-treatment, ANCOVA showed larger gains in BOTMP and PMAL in the younger group compared to the older group. The younger group displayed lower RT, nMT, and nMU at post-treatment compared to the older group. However, PV and PPV did not differ significantly between the two groups. *Conclusion:* Younger children with CP respond better to hCIT than older children in terms of motor control (i.e. smoother movement, and more efficient movement preplanning and movement execution) and functional improvement. The findings suggest the early use of hCIT for children with CP may be more beneficial than late use.

Muskuloskeletal Rehabilitation 1

0521FP09

EFFECTIVENESS OF DUAL MOLECULAR WEIGHT SODIUM HYALURONATE ON PAIN AND FUNCTIONAL ABILITY IN PATIENT WITH KNEE OSTEOARTHRITIS: A FOLLOW-UP STUDY

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Purpose: To evaluate the effectiveness of Dual Molecular Weight (DMW) sodium hyaluronate on pain and functional ability in patients with knee osteoarthritis (OA). **Materials and Methods:** Pre and post test design with quasi experimental were used to evaluate twelve osteoarthritis patients given intra articular DMW (Dual Molecular Weight), a product that combined HA of different molecular weight and concentrations. The intra-articular injections were given twice and administered at weekly intervals. The primary outcome measure were global pain, that was measured with an 11-point numerical rating scale (between 0=no pain and 10=unbearable pain). Sary outcome measures were the subscale on pain, stiffness and disability of the WOMAC and also total scores of WOMAC. **Results:** There were significant improvements for both primary and sary outcomes. The *p*-value from Wilcoxon and Marginal homogeneity test respectively were: (*p*=0.004 and *p*=0.003) for 11-point numerical rating scale, (*p*=0.002 and *p*=0.001) for WOMAC pain subscale, (*p*=0.025 and *p*=0.025) for stiffness subscale, (*p*=0.002 and *p*=0.001) for functional subscale, and (*p*=0.002 and *p*=0.001) for overall WOMAC scores. **Conclusion:** This current study support the previous finding about DMW product, where it can significantly improve knee pain, stiffness, and functional capability of patients with knee osteoarthritis four weeks after two cycle treatment. Larger controlled study with further evaluation is required to provide more reliable and valid supporting data for this study.

0521FP10

PULSED ELECTROMAGNETIC FIELD INHIBITS CHONDROCYTE APOPTOSIS IN A RABBIT MODEL OF OSTEOARTHRITIS

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Purpose: The therapeutic effects of pulsed electromagnetic field (PEMF) on osteoarthritis have been documented. However, the mechanisms of the effects of PEMF on osteoarthritis remain unclear. The present study aimed to investigate the effects of pulsed electromagnetic field on osteoarthritis, and identify potential mechanisms by which pulse electromagnetic field protects articular cartilage in osteoarthritis. **Materials and Methods:** Twenty-four white New Zealand rabbits 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 pulsed electromagnetic field treatment (PEMF group). Six weeks after anterior cruciate ligament transection, the rabbits in the PEMF group were administered 10-sessions of pulsed electromagnetic field treatment. **Results:** ACLT- induced coarse articular cartilage surfaces, fibrous degeneration, and fissuring were suppressed by PEMF treatment. Mankin scores in the PEMF group were significantly lower compared to the ACLT group (*p*<0.01), although it was higher compared to the NC group (*p*<0.01). The apoptosis index of chondrocytes in the PEMF group was significantly lower than that of the ACLT group (*p*<0.05). The expression levels of caspase-3 in the PEMF group were significantly lower compared to the ACLT group (*p*<0.01). Caspase-8 expression had no statistical difference compared to the ACLT group (*p*>0.05). **Conclusion:** Pulsed electromagnetic field can prevent the degeneration of articular cartilage, at least partly, through the inhibition of apoptosis in chondrocytes in rabbits with anterior cruciate ligament transection.

0521FP11

THE CHONDROPROTECTIVE EFFECT OF BOTULINUM TOXIN TYPE A ON THE OSTEOARTHRITIC KNEE JOINT IN RATS

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Purpose: This study was designed to investigate the chondro-protective effect of intra-articular injection of botulinum toxin type A (BTX-A) on the articular cartilage in the knee osteoarthritis (OA) of rats. **Material and Methods:** Eight rats were collected. The anterior cruciate ligaments (ACL) of the rats in the bilateral knees were transected to establish an animal knee OA model. One month after the excision of ACL, BTX-A was randomly injected into one side of the knee joints, and normal saline (NS) was injected into the other knee joint. Gross and histopathologic study for these articular cartilages, including Mankin scale, at different time (before ACL excision, 2 weeks, 6 weeks, 8 weeks, and 12 weeks after ACL excision) were examined and analyzed. **Results:** Gross morphology indicated remarkable erosive changes of the articular cartilage after 8 weeks of ACL excision in the NS-injected knees. As for the histopathologic study of the articular cartilage, degenerative changes such as surface irregularity and reduced H & E staining were less prominent in the BTX-A-injected knees compared to that in the NS-injected knees. The Mankin scales were lower in the BTX-A-injected knees, especially 12 weeks after ACL excision (BTX-A: 3.66, NS: 9). The integrities of the tidemark were preserved in the BTX-A-injected knees, though remarkable disruptions were observed in the NS-injected knees. **Conclusion:** The result suggested that intraarticular injection of BTX-A provides chondro-protective effect for the articular cartilage and postpones the development of osteoarthritis.

0521FP12

THE EFFECTIVENESS OF COMBINATION EXERCISE FOR HAMSTRING FLEXIBILITY AND PAIN ON KNEE OSTEOARTHRITIS PATIENTS

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Purpose: Knee osteoarthritis cause disability in ambulation as a result of extension limitation due to hamstring shortening and pain. The purpose of this study is to investigate the effectiveness of combination exercise for hamstring flexibility and pain management in knee osteoarthritis patient compared with stretching exercise. **Materials and Methods:** Twenty-two subjects did the combination exercise designed by Nuhonni-Tulaar, three times a week. The combination exercise consists of endurance, strengthening and flexibility components. The other 20 subjects (control group), did the standard hamstring stretching exercise at home. Each group performed the exercise for 8 weeks. Hamstring flexibility was measured using chair sit and reach test before and after 8 weeks, pain was measured using Visual Analog Scale (VAS) each week and analyzed before and after the intervention. **Results:** Between baseline and the end of the study, the flexibility is increased in the combination exercise group (7.6 cm, 95% CI 3.8–11.5; *p*<0.05). The increase is also noted in the control group (5.2 cm, 95% CI 3.3–7.1; *p*<0.05). Between groups, the incremental difference is not significant (2.5 cm, 95% CI–6.7 to 1.7; *p*=0.238). For pain, VAS was significantly reduced in combination exercise group (*p*=0.002) but not in single stretching exercise group (*p*=0.059). Between group, VAS changes was significantly different (*p*=0.004). **Conclusion:** Combination exercise is effective for hamstring shortening and pain management in knee osteoarthritis patient, but hamstring flexibility it is not superior compared with single stretching exercise.

0521FP13

LEVEL OF PAIN AND QUALITY OF LIFE AMONG PATIENTS WITH KNEE OSTEOARTHRITIS BASED ON VAS AND WOMAC

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Purpose: Measurements of quality of life (QOL) is crucial for knee osteoarthritis (OA) patients as it reflects the impacts and the functional limitation. The main purpose of this study was to measure the relationship between gender, age and duration of disease with pain intensity and quality of life among knee OA patients. This study also aimed to ascertain the relationship between pain intensity and their quality of life. **Materials and Methods:** A clinical based, cross sectional study using visual analogue scale (VAS) for pain intensity and WOMAC questionnaire for QOL was conducted in physiotherapy department in one Malaysian government hospital over a period of three months. **Results:** A total of 50 patients ($n=25$ male and $n=25$ female) with knee OA that fulfilled the inclusion criteria were recruited. The mean age for subjects in the study was 55.18 ± 11.854 . Majority were Malay, followed by Indian and Chinese which counted for 66%, 22% and 12%, respectively. The female patients reported more frequent pain than the male patients with mean VAS score 5.80 ± 1.414 vs 5.24 ± 1.332 , respectively. Meanwhile, level of pain was positively correlated with age ($r=0.476$, $p \leq 0.001$) and disease duration ($r=0.450$, $p \leq 0.001$). There were significant differences between gender ($p \leq 0.005$) and age with negative fair correlation ($r=-0.440$, -0.358) in WOMAC score, although duration of disease was not significant with WOMAC score. The result shows pain was significant and negative correlation ($r=-0.647$, $p \leq 0.001$) with WOMAC score. **Conclusion:** This study has shown that female patients with knees OA reported more pain compare to men. Older age and longer duration of disease result in a higher pain intensity. As in women, older age group and pain intensity greatly influence QOL of patients with knee OA.

0521FP14

THE INFLUENCE OF EXERCISE IN OBESITY CLINIC ON BODY WEIGHT, BODY MASS INDEX, WAIST CIRCUMFERENCE, QUADRICEPS MUSCLE STRENGTH AND BALANCE OF OBESE PATIENTS WITH KNEE OSTEOARTHRITIS

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Purpose: Almost all of the patients with knee OA has obesity problem, that is why the rehabilitation management not only focus on the knee but also to reduce weight. Some of the exercise done in our clinic include strengthening, balance and aerobic exercise. The purpose of this study is to know the influence of these exercise on body weight, body mass index, waist circumference, besides quadriceps muscle strength and balance. **Materials and Methods:** Thirteen obese patients with knee osteoarthritis (2 men, 11 women) from obesity clinic of Department Physical Medicine and Rehabilitation Cipto Mangunkusumo Hospital were included in this retrospective study. Stress tests were done before starting the exercise. Exercises consisted of aerobic exercise with ergocycle, strengthening exercise using NK-table with De Lorme method and balance exercise using balance board. All patients did the exercise three times a week for 8 weeks. **Results:** After 8 weeks the strength of quadriceps muscle (1.65 ± 0.62) and balance (11.31 ± 1.93) significantly increased ($p < 0.005$). There was also significant reductions in body weight (2.15 ± 1.86 kg), body mass index (0.91 ± 0.83) and waist circumference (4.46 ± 5.81 cm) ($p < 0.005$). **Conclusion:** Exercise given for osteoarthritis could increase quadriceps muscle strength and balance

but also significantly reduce body weight, body mass index (BMI), waist circumference on obese patients with knee OA.

0521FP15

H-REFLEX OF SOLEUS MUSCLE AFTER THE RECONSTRUCTION OF ANTERIOR CRUCIATE LIGAMENT

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Purpose: To clarify the excitability of spinal neural function by investigating the longitudinal soleus H-reflex after reconstruction of anterior cruciate ligament (ACL). **Materials and Methods:** Two patients with ACL reconstruction were investigated in this study. They were 20-year-old male college soccer players and 19-year-old female college basketball players. Clinical findings in Case 1 were the dominant use and knee pain of non-operative leg. In Case 2, there was no clinical finding. Bilateral soleus H-reflex was recorded at Case 1: 2, 3, 4 and 5 months after operation, and at Case 2: 1, 2, 3 months after and 1 month before operation. H-reflex was calculated the peak-to-peak amplitude, and its amplitude was divided by amplitude of maximal M-wave (amplitude ratio of H/M_{max}). **Results:** The amplitude ratios of H/M_{max} in Case 1 (non-operative-side, operative-side) were (3.20, 0.08), (1.40, 0.05), (3.10, 0.05), and (1.13, 0.26), and (0.07, 0.05), (0.09, 0.09), (0.11, 0.09), and (0.11, 0.07) in Case 2. **Conclusion:** Amplitude ratio of H/M_{max} on non-operative-side in case 1 always showed high value compared with operative side and normal data, which was related to his non-operative-side domination in sport activity and knee pain. On the other hand, no characteristic finding in amplitude ratio of H/M_{max} was existed in Case 2. Since these results were matched to clinical findings during rehabilitation process, it was cleared that H-reflex can apply to evaluate neural function after ACL reconstruction.

0521FP16

EFFECT OF KNEE BRACE COMBINED WITH PNEUMATIC ARTIFICIAL MUSCLES ON MUSCLE STRENGTH

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Purpose: The pneumatic artificial muscles (PAMs) were first developed (under the name of McKibben Artificial Muscles) in the 1960s for use in artificial limbs. We aimed to determine the effect of knee brace combined with PAMs on muscle strength. **Materials and Methods:** A comparative follow-up study with control group was conducted. A total of 24 healthy volunteers (age 32.2 ± 12.0 years, height 172.5 ± 6.5 cm) were included in this study. The intervention group ($n=12$) received the muscle strength exercise with the knee brace combined with PAMs 100 times per day for 8 weeks, while the control group ($n=12$) received conventional exercise without the brace in similar ways. Isokinetic concentric knee extension and flexion strength was measured at $60^\circ/s$ using Cybex System. We also measured the cross-sectional area of the thigh muscle and crus muscle using computed tomography before and after the exercise. The protocol was approved by the Ethical Committee of Kagoshima University. **Results:** The muscle strength exercise with the knee brace combined with PAMs was well tolerated. It resulted in a greater improvement in strength of knee extensors and flexors leading to a larger cross-sectional area of the thigh muscle and

crus muscle, compared with the control group. No discontinuation included deterioration of patients' health was observed. *Conclusion:* The muscle strength exercise with the knee brace combined with PAMs is a safe, well-tolerated therapy. It improves knee extensor and flexor strength, which is one of the factors leading to greater functional independence after stroke or knee osteoarthritis.

Neuromuscular Rehabilitation 1

0521FP17

THE EFFECT OF BRAIN COMPUTER INTERFACE TRAINING COMBINED WITH ANODAL TRANSCRANIAL DIRECT CURRENT STIMULATION AMONG PATIENTS WITH CHRONIC SEVERE HEMIPARETIC STROKE

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Purpose: Electroencephalogram (EEG) based Brain Computer Interface (BCI) has been developed for stroke rehabilitation. Among patients with severe hemiparesis, however, it is sometimes difficult to detect a stable EEG signal change (event related desynchronization; ERD), which is used to control BCI. Anodal Transcranial Direct Current Stimulation (tDCS) could enhance the motor cortex excitability and ERD on the affected hemisphere. The objective was to study the long-term effects of tDCS added to BCI training on the upper extremity motor functions in patients with severe hemiparetic stroke. *Material and Methods:* Fourteen patients were assigned either to BCI group ($n=6$) or tDCS-BCI group ($n=8$). BCI produced paretic finger extension with a powered hand orthosis upon successful motor imagery. Both groups received BCI training 40 min a day for 10 days. In the tDCS-BCI group, they additionally received anodal tDCS over the affected hemisphere before each BCI training session. We assessed motor function with Fugl-Meyer Assessment (FMA) and spasticity with modified Ashworth scale (MAS) before, after and 3 months after the interventions. *Results:* We found significant improvements in FMA and MAS in both groups immediately after the intervention. At the 3-month follow up, improvement in FMA had been maintained only in the tDCS-BCI group. MAS of finger flexors in both groups significantly decreased immediately after and 3 months after the training. *Conclusion:* Anodal tDCS could be a conditioning tool for BCI training to maintain the improved motor functions.

0521FP18

ANTI-SPASTIC EFFECTS OF WHOLE-BODY VIBRATION ON AFFECTED MUSCLES OF HEMIPLEGIC LEGS IN POST-STROKE PATIENTS

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Purpose: Whole-body vibration (WBV) has anti-spastic effects in patients with cerebral palsy and spinal cord injury, but its efficacy in post-stroke patients has not been investigated. This study evaluated whether WBV inhibited spasticity in the hemiplegic legs of post-stroke patients. *Materials and Methods:* This before-and-after intervention trial examined 20 post-stroke patients (15 male and 5

female; 52.7 ± 17.3 years). All patients could walk using a T-cane and ankle-foot orthoses. The exclusion criteria were below 3 a Brunnstrom Recovery Stage of legs, higher cortical dysfunction, dementia, uncontrolled cardiopulmonary disease, joint disability or severe sensory disturbance. The protocol was approved by the Ethical Committee of Kagoshima University. The parameters measured before and after the intervention were the modified Ashworth scale (MAS) as a measure of spasticity, the active and passive range of motion (A-ROM, P-ROM) as a measure of motor function, and the 10-m walk test speed as a measure of walking ability. WBV was applied at 30 Hz (4–8 mm amplitude) for 5 min using a Power Plate to patients in a sitting position while slight pressure was applied to the legs by the apparatus. *Results:* MAS significantly decreased in terms of hip adductors, hamstrings, and gastrocnemius. A-ROM and P-ROM improved in terms of ankle dorsiflexion, and straight leg raising ($p < 0.01$). 10-m walk test speed also significantly improved ($p < 0.05$). No discontinuation included deterioration of patients, health was observed. *Conclusion:* WBV might therefore decrease spasticity, and improve motor function and walking ability in post-stroke patients.

0521FP19

CHANGES IN THE HAND FUNCTION ACCORDING TO THE CATHODAL TRANSCRANIAL DIRECT CURRENT STIMULATION TO THE UNDAMAGED HEMISPHERE IN STROKE PATIENTS

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Purpose: Transcranial Direct Current Stimulation (tDCS) is a non-invasive brain stimulating method and anodal stimulation known to increase brain excitability and cathodal stimulation to decrease it. It is known that cathodal stimulation of the healthy cerebral hemisphere of cerebral infarct patients increased the hand function of the affected side. This study aimed to investigate the motor evoked potential (MEP) and function changes of the healthy hand after stimulation of the healthy cerebral hemisphere. *Materials and Methods:* Ten acute stroke patients (4 males, 6 females), whose cognition were intact, were participated. Phoresor II Auto (Iomed, Salt Lake City, Utah, USA) was used with cathodal stimulation at 1mA at the healthy primary motor area for 15 min and sham stimulation was carried out only for the early 30 s, and their order was carried out at random. At least 48 h interval was kept between two stimulations and Jabsen-Taylor test (JTT) and MEP was carried out pre- and post-stimulation. Prior to the test, JTT was practiced 6 times to reduce the bias from repeated exercise. MEP of the normal adductor pollicis brevis was measured by stimulation at 120% of the resting motor threshold. During the investigation, rTMS, tDCS therapy were discontinued and no medication change was made. *Results:* In comparison with initial base evaluation, no significant change was showed after sham stimulation. Also, after cathodal stimulation, MEP latency, amplitude and JTT showed no significant change. *Conclusion:* While cathodal stimulation in the healthy cerebral hemisphere is known to improve hand function of the impaired side, this study showed no change in the hand function and brain excitability in the healthy side. Those mean different neurophysiologic mechanisms include interhemispheric inhibition exist in stroke patients.

0521FP20

REPEATED PREFRONTAL THETA BURST STIMULATION OVERCOMES VISUO-SPATIAL HEMINEGLECT IN STROKE PATIENTS

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Purpose: Visuo-spatial hemineglect is a frequent disability in stroke patients, characterized by abnormal biases in spatial attention, leading to severe impairments in the ability to perceive and/or explore stimuli on the contralesional side. It is reported that positive affect can decrease visual neglect by increasing attentional resources. Activation of left dorsolateral prefrontal cortex (DLPFC) by repetitive high-frequency magnetic stimulation can generate positive affect responses. Intermittent theta burst transcranial magnetic stimulation (TBS) is a new excitability brain stimulation protocol, which has the potential to induce behavioral effects outlasting stimulation. We aimed to explore whether prefrontal TBS over the left (unaffected) hemisphere can induce a long-lasting improvement of visual neglect. **Materials and Methods:** Two patients with left-sided visual neglect attributable to right hemispheric stroke received 2 weeks of intermittent theta burst transcranial magnetic stimulation (iTBS) of the left DLPFC. We used the iTBS protocol in which 10 bursts of high-frequency stimulation (3 pulses at 30 Hz) were applied at 5 Hz every 10 s for a train of 600 pulses, including 4 trains every 15 min. The coil was placed 5 cm anterior from the hand motor area on the left hemispheres. **Results:** Two-week iTBS over left DLPFC significantly decreased visuo-spatial hemineglect, and generated positive affect simultaneously. **Conclusion:** The new protocol of repeating iTBS over left DLPFC for two weeks may be promising for the long-lasting alleviation of neglect.

0521FP21

MOLECULAR MECHANISM OF CUMULATIVE EFFECTS OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ON NEURAL PLASTICITY IN RATS

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Purpose: We aimed to evaluate the cumulative effect of multi-session repetitive Transcranial Magnetic Stimulation (rTMS) on mRNA expression and protein synthesis which are correlated with the neural plasticity. **Materials and Methods:** Eight-week-old Sprague-Dawley rats ($n=45$) were subjected to unilateral rTMS with low- (1 Hz), high- (20 Hz) frequency, or sham stimulation groups. Each group were divided into 3 subgroups as the number of stimulation sessions; 1-, 5-, and 10-day ($n=5$ for each subgroup). Stimulation was applied to the left hemisphere for 20 min. Brain tissues were obtained 15 min after rTMS, and RT-PCR was conducted for c-fos, vegf, bdnf, mGluR1, and GABA_A receptor genes to investigate gene expression concerning immediate early gene, angiogenesis, neurotrophin, long term potentiation and depression. Western blot was done for Akt, phospho-Akt (pAkt), PKC, and phospho-PKC. **Results:** Expression in vegf significantly differed between each group with 5-day stimulation. High-frequency rTMS for 5 days increased vegf expression (median 0.63, range 0.18–0.87 in sham group; 0.91, range 0.43–1.32 in low-frequency rTMS; 1.59, range 1.56–1.69 in high-frequency rTMS group, $p=0.006$). The mGluR1 and GABA_A receptors were increased in low- and high-frequency groups respectively. Levels of c-fos and bdnf did not differ between subgroups. In Western blot, pAkt synthesis was higher with 5-day-stimulation than with 10-day, high-frequency rTMS (median 2.27, range 1.86–2.34 in 5-day stimulation; median 1.01, range 0.63–1.29 in 10-day stimulation, $p<0.001$). **Conclusion:** Gene expressions concerning angiogenesis increased following high-frequency rTMS for 5 days, not with 10 days. Cumulative effect of rTMS in rats may have different time-scale, which should be considered in further studies.

0521FP22

SONOELASTOGRAPHY AND ACOUSTIC RADIATION FORCE IMPULSE IMAGING IN COMMON SOFT TISSUE TUMORS: PRELIMINARY RESULTS

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Purpose: To evaluate sonoelastography and acoustic radiation force impulse (ARFI) imaging in conjunction conventional sonography for evaluation of common soft tissue tumors in clinical practice. **Materials and Methods:** A total of 55 soft tissue tumors in 55 patients underwent both sonoelastography and ARFI imaging, along with the conventional sonography for stiffness, size, vascularity, and compressibility. Sixteen tumors were diagnosed according to pathologic results. Averaged shear wave velocity in ARFI imaging for each tumor was acquired to quantify stiffness and was analyzed using Mann-Whitney *U* test. Sonoelastograms were graded according to a system adapted from previous studies. **Results:** Sixteen tumors with pathologic diagnosis included 8 lipomas, 4 epidermoid cysts, 2 ganglion cysts, 1 osteosarcoma, and 1 leiomyosarcoma. The shear wave velocity (m/s, mean \pm SD) were 1.42 \pm 0.43 for lipomas, 3.25 \pm 1.11 for epidermoid cysts, 0.69 \pm 0.03 for ganglion cysts, 1.91 for osteosarcoma, and 1.60 for leiomyosarcoma. The mean shear wave velocity of epidermoid cysts were significantly greater than lipomas ($p=0.004$). There was no significant difference in the mean shear wave velocity between other tumor groups. Technical limitations and artifacts of sonoelastography and ARFI were also identified. **Conclusion:** Stiffness of tumors varied with diagnosis. Epidermoid cysts were significantly harder than lipomas. Further large-scale studies with pathologic confirmation are required to evaluate the roles of sonoelastography and ARFI imaging in assisting the diagnosis of soft tissue tumors.

0521FP24

OSTEOGENIC DIFFERENTIATION OF AMNIOTIC EPITHELIAL CELLS: SYNERGISM OF PULSED ELECTROMAGNETIC FIELD AND BIOCHEMICAL STIMULI

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Purpose: Pulsed electromagnetic field (PEMF) is a non-invasive physical treatment used in the rehabilitation clinic, which facilitates the osteogenesis by direct actions on osteoblasts and bone marrow mesenchymal stem cells (BM-MSCs) in vitro. Amniotic epithelial cells (AECs) have been proposed as a potential source of stem cells for cell therapy. However, whether PEMF could modulate the osteogenic differentiation of AECs is unknown. **Materials and Methods:** AECs were isolated from amniotic membrane of human term placenta by trypsin digestion. The effects of PEMF on the osteogenic differentiation of AECs were investigated. **Results:** The PEMF or osteogenic-inducing medium alone could induce osteogenic differentiation of AECs, as shown by expression of osteoblast specific genes and proteins including ALP and OC. Furthermore, a combination of PEMF and osteogenic-inducing medium had synergy effects on osteogenic differentiation. The signal transduction of osteogenic was further investigated. BMP-2 and Wnt/ β -catenin pathways play important roles in the PEMF-induced osteogenic differentiation of AECs. Nrf2 and Keap1, two critical regulators of the generation of reactive oxygen species (ROS), might also be involved in the osteoblast differentiation of AECs induced by PEMF. Moreover, integrin β 1 may act as a PEMF-sensitive receptor in the process. **Conclusion:** Together, our results demonstrated that combined application of physical (PEMF) and biochemical stimuli (osteogenic-inducing medium) was synergistic for the osteogenic differentiation of AECs. It might be a novel approach in the bone regenerative medicine.

Cardio-respiratory Rehabilitation

0521FP25

EFFECTIVENESS OF PHYSICAL TRAINING IN LIMITED SESSIONS OF CARDIAC REHABILITATION PROGRAM*A.B. Nor Zaliha, M.Y. Saari**Physiotherapy Unit, Medical Rehabilitation Department, Serdang Hospital, Malaysia*

Purpose: Cardiac rehabilitation and secondary prevention programs (CRP) are recognized as integral to the comprehensive care of patients with coronary heart disease. The program has been shown a significant impact in patient's quality of life. However the CRP in Serdang Hospital has been modified to 6 weeks program to adapt with limited resources and patient's convenience to participate in the program. This study was done to evaluate the effectiveness of physical training in Cardiac Rehabilitation Program with limited exercises training schedule. **Materials and Methods:** This is prospective cohort study. Patients from Physiotherapy Unit, Rehabilitation Department Hospital Serdang who had attended and completed Phase I, Phase II and Phase III Cardiac Rehabilitation Program from January 2010 – December 2010 were enrolled in this study. We used standardized 6 min Walk test (6MWT) and Rating Perceived Exertion (RPE) as outcome measures. **Result:** A total of 62 patients were enrolled in this study with a mean age of 53.42±9.66 year old. Majority were male (83.9%) and more than half (58.1%) had received at least sary education. The mean of 6MWT at Phase I (383.45±61.4), Phase II (426.50±65.9) and Phase III (453.23±66.1) of CRP comparatively have shown significant improvement ($p<0.005$). However, there were no significant improvement of RPE comparing during Phase I with Phase II and Phase III. **Conclusion:** 6 weeks program of CRP has been shown a significant improvement in physical performance of the patients with coronary heart disease. Therefore, limited schedule of physical training complimented with home exercise program and adequate education session, can be implemented in any limited resources cardiac rehabilitation center.

0521FP26

OPERATION OF A CENTRAL CONTROL SYSTEM FOR PULMONARY REHABILITATION IN PATIENTS WITH RARE AND INCURABLE DISEASES*Jung-Hwa Choi, Won-Ah Choi, Seong-Woong Kang**Department of Rehabilitation Medicine and Rehabilitation Institute of Muscular Disease, Yonsei University College of Medicine, Seoul, Korea*

Purpose: For proper management of ventilatory insufficiency of patients with neuromuscular disease, pulmonary rehabilitation team has taken a professional approach to develop a guide manual for efficient management of central control system for pulmonary rehabilitation. Thus, the center can maximize the efficiency of national support project for ventilator. This study was supported by a grant from Korean Centers for Disease Control & Prevention. **Materials and Methods:** The pulmonary rehabilitation team developed the flow chart of patient management protocol, 'analysis of subjects – phone counseling – home visit – problem solving', to build up management system for home patients who need ventilator support. We had constructed effective flow chart for handling the patients list from Korea Centers for Disease Control & Prevention. **Results:** Phone counseling was done for 424 patients, and Home visits carried out for 163 patients. 106 patients (25% of 424 patients) had suffered symptoms of chronic ventilatory insufficiency. Regular follow-up in hospital were done in 336 patients (79%), but essential evaluation of pulmonary function had been tested in only 109 patients (26%). 54 patients (33%) among 163 home visiting patients showed

problems in ventilation, and 4 patients had been shown to be in need of reconsideration for using mechanical home ventilators. **Conclusion:** By establishing a central control system for pulmonary rehabilitation, we can maximize the efficiency of national support project for ventilator. Thus, social and medical expenses can be reduced by overall operation of the guide manual. Therefore, we consider a central control system for pulmonary rehabilitation, an imperative necessity.

0521FP27

EFFECTS OF PHASE II CARDIAC REHABILITATION PROGRAMME ON FUNCTIONAL CAPACITY IN POST REVASCULARIZATION PATIENTS*V. Attaminy, D. Tedjasukmana**Physical Medicine and Rehabilitation Department, Faculty of Medicine University of Indonesia/CiptoMangunkusumo Hospital Jakarta, Indonesia*

Purpose: The 6-minute walk test (6MWT) is widely used to evaluate exercise capacity in several diseases due to its simplicity and low cost. Reliable for measuring distance was found in the 6MWT. Patient post Percutaneous Transluminal Coronary Angioplasty (PTCA) and Coronary Artery Bypass Grafting (CABG) present progressive incapacity. The 6MWT allows an estimation of individual response to incremental maximal exercise and accurately reflects physical capacity of patients with cardiology disease. The purpose of this study was to evaluate the effect of phase II cardiac rehabilitation programme on functional capacity in post revascularization patients. **Materials and Methods:** Eighteen patients (72.2% males, mean age 59.83±6.41 years) admitted for intensive cardiac rehabilitation programme. The 6MWT were performed in post revascularization patients (55.6% PTCA and 44.4 % CABG) at CiptoMangunkusumo Hospital, Jakarta. After 1 weeks post surgery, patients get cardiac rehabilitation program (aerobic exercise) 3 days in a week for 8 weeks. Distance at the 6MWT and metabolik equivalents of exercise stress test (METs) was measured before and after rehabilitation programme. **Results:** After 8-weeks cardiac rehabilitation programme, 6MWT was well tolerated in all patients. The distance walked in 18 patients significantly increased (from 387.47±71.34 m to 629.28±85.192 m, $p<0.001$). The correlation between METs and 6MWT distance after cardiac rehabilitation programme was high ($r=0.988$). Furthermore, the distance walked in 6MWT was significantly increased in post PTCA and post CABG patients (from 415.89±38.02 m to 648.80±102.55 m, $p<0.001$ and from 351.94±89.02 m to 604.88±53.65 m, $p<0.001$). This significant increased are followed by METs in post PTCA and CABG (from 4.47±0.35 to 6.73±0.85, $p<0.001$ and from 4.14±0.76 to 6.32±0.46, $p<0.001$). **Conclusion:** Eight weeks cardiac rehabilitation programme improved functional capacity in post revascularization patients. Due to the limited sample in this study, further study is needed to have the definitive conclusion.

0521FP28

IMPLEMENTATION OF CLINICAL DECISION SUPPORT SYSTEM FOR REHABILITATION OF PATIENTS AFTER ACUTE MYOCARDIAL INFARCTION TREATED BY PERCUTANEOUS CORONARY INTERVENTION*B.R. Wu¹, Jin-Shin Lai², C. Lan² S.Y. Chen², Y.H. Tseng¹, C.I. Lin¹**¹Industrial Technology Research Institute, ²Department of Physical Medicine & Rehabilitation, National Taiwan University Hospital, Taiwan*

Purpose: Mobile devices have been recognized a new tool in clinical practice. The feature of high mobility and huge data capacity make

them an attractive means to apply on the use of clinical informatics. The potential of such widely used devices as iPad or EeePad for clinical decision support system (CDSS) on mobile devices for exercise and rehabilitation of patients after acute myocardial infarction treated by percutaneous coronary intervention (PCI) have not yet been fully developed. *Materials and Methods:* We developed a CDSS system which utilized iPad and EeePad to access the patient's record, receive the result of risk analysis and risk stratification, and provide the suggestion of home exercise based on well-known clinical guidelines. The system provides the cardiologist and registered nurse the suggestion of home exercise program based on the current status of the patient when they discharged. Physiatrist and physical therapist received the suggestion of risk stratification on this system when patient is transferred to rehabilitation program. The patients can receive their risk factor suggestion and home exercise suggestion on their iPads/EeePad. The system is designed to fulfill the gap when knowledge and patient's information were exchanged between two clinical specialties and decrease the level of risk when making decision. *Results:* The feasibility was tested by 7 clinical practitioners (included cardiologist, physiatrists, and registered nurses) who completed a structured questionnaire after using the system. *Conclusion:* All participants claimed that the system is useful for clinical work and patients will get benefit from this system.

0521FP29

IMPACT OF EXERCISE TRAINING ON BLOOD LACTATE CONCENTRATION DURING EXERCISE TEST FOR SEVERE HEART FAILURE PATIENTS WITH LEFT VENTRICULAR ASSIST DEVICE

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Purpose: The purpose of this study was to evaluate blood lactate concentration before and after exercise training for severe heart failure patients with left ventricular assist device (LVAD) to compare to patients after coronary artery bypass grafting (CABG). *Materials and Methods:* Subjects were 21 LVAD patients (LVAD-pat: mean age 38.9±11.9 years), who were implanted extracorporeal pulsatile LVAD (Nipro Ltd, Japan). The control subjects were 39 CABG patients (CABG-pat: 62.4±11.9 years). These two groups performed cardiopulmonary exercise test (CPX) before (B) and after (A) exercise training. During CPX, we took capillary blood every min from their earlobes to measure blood lactate concentration (BL). Supervised exercise training consisted 30 min cycle ergometer training or treadmill walking twice a day at the intensity of anaerobic threshold (AT) level. After discharge, CABG-pat was instructed home-based walking. *Results:* CPX showed statistically different BL at resting level (LVAD-patients 1.5±0.4 vs CABG-pat: 1.2±0.3 mg/l; $p<0.05$) and peak (LVAD-patients 2.9±0.8 vs CABG-patients 2.5±0.9 mg/l; $p=0.07$) between LVAD-pat and CABG-pat before training, but after training there were no significant differences between two groups. Peak $\dot{V}O_2$ improved significantly in LVAD-pat (B: 12.0±2.4 vs A: 14.2±2.9 ml/kg/min) and CABG-pat (B: 13.7±2.4 vs A: 17.0±2.9 ml/kg/min). *Conclusion:* Anaerobic metabolism is more accelerated in LVAD-pat than CABG-pat before training. But aerobic exercise training improves cardio-respiratory fitness and skeletal muscle metabolism in LVAD-pat.

0521FP30

EFFECT OF OUTPATIENT REHABILITATION ON PHYSICAL CAPACITY AND HEALTH-RELATED QUALITY OF LIFE IN BILATERAL SEQUENTIAL LUNG TRANSPLANTATION RECIPIENTS

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Purpose: To investigate the effect of an early postoperative exercise-based rehabilitation program to physical capacity and health-related quality of life among patients with bilateral sequential lung transplantation (BLTx). *Materials and Methods:* The study included 7 clinically stable BLTx patients (age: 37.6±7.9 years; 3 men, 4 women). The outpatient rehabilitation program started 3.2±2.4 months after BLTx. Patients participated in a 4.5±2.6 months supervised exercise training program three times per week. Each training session comprised 10 min of warm-up, 25 to 30 min of cycling or treadmill walking, and 10 min of cool down. The exercise intensity was set at 50% to 80% of peak oxygen uptake according to the patient's condition. The health-related quality of life of subjects was evaluated by the Medical Outcomes Trust 36-item health survey (SF-36) at baseline and upon the completion of rehabilitation. *Results:* After outpatient rehabilitation, the BLTx patients exhibited a significant increase of peak oxygen uptake (16.7±3.9 to 21.0±5.6 ml/kg/min, $p=0.0156$), peak min ventilation (35.4±8.5 to 47.5±11.1 l/min, $p=0.0156$), and oxygen uptake efficiency slope (1.017±257 to 1.354±292, $p=0.0156$) during cardiopulmonary exercise testing. A significant increase of SF-36 scores in standardized physical component scale was also observed (39.9±11.8 to 51.1±8.3, $p=0.0469$). *Conclusion:* Early postoperative outpatient rehabilitation significantly improved physical capacity and health-related quality of life among BLTx patients. For recipients of lung transplantation, early postoperative outpatient rehabilitation program should be recommended.

0521FP31

THE RELATIONSHIP OF RESPIRATORY FUNCTIONAL CAPACITY AND WHEELING PERFORMANCE IN CHRONIC PARAPLEGIA

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Purpose: Wheelchair performance, including long distance wheeling, is an important aspect of independent mobility and daily activities for paraplegic. The wheeling endurance influenced by cardiorespiratory endurance, but does it also have any relation to the respiratory functional capacity? This study was done to know the relationship of the respiratory functional capacity and the wheeling performance of chronic paraplegic patients. *Materials and Methods:* Eight chronic paraplegic patients were randomly selected from the Panti Pondok Bambu Jakarta. They were all spinal cord injured with low thoracic lesion. The functional respiratory capacity was measured using incentive spirometry for the maximal inspiration (MI) and peak-flow meter for maximal expiration (ME). The wheeling performance was evaluated by measuring the covered distance in six min wheeling test (6MWcT). *Results:* Wheeling performance showed have statistically significant and strong correlation with the maximal inspiration ($p=0.036$; $r=0.739$), but not with the maximal expiration ($p=0.753$). *Conclusion:* Long distance wheeling performance had strong correlation with respiratory functional capacity especially maximal inspiration. The higher maximal inspiration, the longer covered distance they could wheel. Further study should be done in order to have the definitive result.

0521FP32

THE EFFICACY AND SAFETY OF CARDIAC REHABILITATION FOR PATIENTS WITH CHRONIC KIDNEY DISEASE

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Purpose: Cardiovascular disease (CVD) combined with chronic kidney disease (CKD) is extra high risk situation for death from cardiovascular event. In Japanese guideline for CKD treatment, physical exercise is recommended for CVD patient with CKD. However, no optimal exercise intensity is examined. We evaluate the efficacy and safety of exercise training for CVD patients with CKD. **Materials and Methods:** Forty-eight patients of CVD patients were enrolled in this study. Patients were divided in two groups; non-CKD group (eGFR \geq 60) and CKD group (eGFR $<$ 60). Patients underwent cardiac rehabilitation program twice per month for six months at 80% of the anaerobic threshold (AT) for CKD group and at the anaerobic threshold (AT) for non-CKD group. CKD-group patients did additional program for management of water balance. Measures were taken at baseline and 6 months. **Results:** There were no significant difference between body weight, peak VO₂, ATVO₂, lipid profile and HbA1c in both groups. No worsening of CKD was found in both groups. **Conclusion:** Cardiac rehabilitation program twice per month for 6 months at 80% of AT with education of daily lifestyle was safe and had enough efficacy for CKD patients.

Myofascial Pain Rehabilitation

0521FP33

THE EFFECTIVENESS OF THERAPEUTIC ULTRASOUND ON MYOFASCIAL TRIGGER POINT SYNDROME IN REDUCING PAIN AND IMPROVING RANGE OF MOTION: A SYSTEMATIC REVIEW

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Purpose: Therapeutic Ultrasound is one of the methods in the management of myofascial trigger point syndrome (MTrPS). However, its effectiveness to reduce pain and improve range of motion in MTrPS patient is inconsistent. The aim of the study is to systematically and critically review relevant literature regarding therapeutic ultrasound effectiveness in reducing pain and improving range of motion plus the parameters associated with the effectiveness. **Materials and Methods:** Seven electronic databases (CENTRAL, EMBASE, CINAHL, MEDLINE, PubMed, Google Scholar and Pedro) were used to identify relevant RCT studies from year 2001 to 2011 and its methodological quality was assessed by 3 raters using PEDro scale. The review was analyzed based on pain (VAS, Pressure algometer), range of motion (Goniometric assessment) and treatment parameters. **Results:** Five identified RCT shows that application of therapeutic ultrasound on MTrPS patient is effective in reducing pain and improving range of motion within certain range of treatment parameter. **Conclusion:** Therapeutic ultrasound can reduce pain and improve range of motion. However, there is limited evidence to support the effectiveness. More studies should be conducted to support the effectiveness of therapeutic ultrasound on the improvement of pain, range of motion, functional status and quality of life.

0521FP34

SYNERGISTIC EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION AND TRIGGER POINT INJECTION FOR TREATMENT OF MYOFASCIAL PAIN SYNDROME

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Purpose: Trigger point injection (TPI) is the mainstay of myofascial pain syndrome (MPS) management to reduce acute and localized pain. However, other adjunctive intervention to modulate the central pain pathway might be helpful if they are combined with TPI. Transcranial direct current stimulation (tDCS) has been reported to be effective in treating chronic pain by changing cortical excitability. The aim of the present study is to determine whether there is the synergistic effect of tDCS and TPI to reduce pain in patients with MPS. **Materials and Methods:** Patients with newly diagnosed MPS were randomized into one of 3 groups (2 active and 1 sham stimulation groups). Immediately after TPI, tDCS (2mA, 20min for 5 consecutive days) was administered. For active groups, tDCS was applied over 2 different locations (primary motor cortex (M1) and dorsolateral prefrontal cortex (DLPFC)). For sham group, the stimulator was turned off after 30 s of stimulation. Visual analogue scale (VAS), pain threshold test and short form McGill pain questionnaire was measured prior to and immediately after stimulation for 5 consecutive days. **Results:** Twenty-one patients (8: M1, 7: DLPFC, 6: sham) were included. There was a statistically significant change between before and after stimulation in the DLPFC group. The significant change in the mean VAS value was shown from after the second stimulation session ($p=0.031$) and those remained significant until the last stimulation session ($p=0.027$). However, there were no significant differences among the 3 groups in between-groups comparisons. **Conclusion:** The present data suggest that tDCS over DLPFC may have synergistic effects with TPI to reduce pain in patient with MPS. tDCS over DLPFC can be used to reverse central pain pathway by modulating cortical plasticity.

0521FP35

THE THERAPEUTIC EFFECT OF MONOCHROMATIC INFRARED PHOTO ENERGY ON THE MYOFASCIAL TRIGGER POINT IN THE UPPER TRAPEZIUS MUSCLE

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Purpose: The purpose of this study is to determine the therapeutic effect of monochromatic infrared photo energy (MIRE) on the myofascial trigger point (MTrP) in the upper trapezius muscles. **Materials and Methods:** In this randomized-controlled, double-blinded experiment, we have recruited 41 patients. Pain measurements including visual analog scale (VAS), pressure pain threshold (PPT), pressure pain tolerance (PPTO), neck disability index (NDI) were evaluated before the intervention of MIRE (M0), immediately after the 2-week intervention (M1), and one week after completion of the intervention (M2). **Results:** The mean values of VAS of the experimental group were decreased from 5.80 (M0) to 2.38 (M1), and then progressed to 2.82 (M2). The mean values of PPT in the

experimental group were increased from 2.27 (M0) to 2.89 (M1), and then to 2.91 (M2). The mean values of PPTO in the experimental group were increased from 3.81 (M0) to 4.16 (M1), and then to 4.27 (M2). The mean values of NDI in the experimental group were decreased from 22.29% (M0) to 11.55% (M1), and then to 11.27% (M2). All the changes of data in the experimental group were more significant than that in the control group (VAS: 4.87 (M0); 3.84 (M1), and 4.14 (M2); PPT: 2.35 (M0), 2.31 (M1), 2.23 (M2); PPTO: 3.79 (M0), 3.84 (M1), 3.77 (M2); NDI: 24.63% (M0), 18.83% (M1), and 17.77% (M2)). *Conclusion:* The results of our study revealed that MIRE might be useful for the management of MTrP in the upper trapezius muscle.

0521FP36

CORRELATION OF BRAIN-DERIVED NEUROTROPHIC FACTOR WITH DEPRESSION IN FIBROMYALGIA SYNDROME PATIENTS

Boya Nugraha^{1,3}, Christoph Korallus¹, Nadine Schenke¹, Ralph Lichtinghagen², Christoph Gutenbrunner¹

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Purpose: Fibromyalgia syndrome (FMS) is a common chronic pain condition characterized by chronic widespread pain and decreased pain threshold, with hyperalgesia and allodynia. Depression is one of associated syndrome besides fatigue, morning stiffness, non-restorative sleep, mood disturbance, depression, irritable bowel syndrome. In addition to the administration of drugs, treatment of FMS mainly consists of psychological and physical therapies. Although the precise pathogenesis of FMS remains elucidated, modern understanding conceptualizes FMS as central sensitization as a consequence of altered endogenous pain- and stress-response system and continuous nociceptive input. Brain-derived neurotrophic factor (BDNF) is one of neurotrophins which may play a role in FMS, since it has been known to be modulated in pain and other symptoms which have correlation with FMS. Therefore, in this study, we investigated the correlation of this molecule with one of symptoms in women with FMS. *Material and Methods:* All procedures were carried out with written consent of the subjects as approved by local ethics committee. In this preliminary study, twenty nine women with FMS who matched definition of American College of Rheumatology (ACR) 1990 for FMS were asked to fill out the Hospital Anxiety and Depression Scale (HADS). BDNF was measured by ELISA method. Statistics evaluation was done with SPSS 19. *Results:* BDNF is found to have correlation with depression in women with fibromyalgia syndrome ($p < 0.05$). *Conclusion:* BDNF can be suggested as one of possible pathomechanism related to FMS symptom.

0521FP37

PRELIMINARY STUDY OF OBTAINING H-REFLEX FROM OPPONENS POLLICIS MUSCLE IN PATIENTS WITH FIBROMYALGIA IN COMPARISON WITH CONTROLS

Seyed Ahmad Raeissadat, Kamran Azma, Mohamad Hosein Sepehrian

Shahid Beheshti University of Medical Sciences, Physical Medicine and Rehabilitation Research center, Modares Hospital and Army

University of Medical Sciences, Dept of Physical Medicine and Rehabilitation, 501 Hospital, Tehran, Iran

Purpose: Fibromyalgia is at top of central hypersensitive syndromes as a group of disorders with no diagnostic paraclinic tests. Aim of this study was to assess frequency of opponens pollicis H-Reflex and the probability to use it as an auxiliary paraclinic test for detecting fibromyalgia. *Materials and Methods:* The subjects in this study were 30 patients with fibromyalgia referred to Physical Medicine and Rehabilitation of Emam Reza and Milad Hospital and 30 healthy subjects as control. H-Reflex of opponens pollicis muscles was obtained from these subjects. Other measure parameters include: minimal intensity of stimulation and amplitude of obtained H-Reflexes. *Results:* Frequency of obtained H-Reflex (of opponens pollicis) in patients with Fibromyalgia was significantly higher than control group ($p < 0.05$). In addition, minimal intensity of stimulation is significantly lower in patients with fibromyalgia but amplitude of obtained reflexes did not show significant difference. *Conclusion:* H-reflex recording from opponens pollicis is more frequent in patients with fibromyalgia. This preliminary study emphasized on hypercentralization as a possible origin of this disease. Further study is needed to confirm the value of these findings in early diagnosis of fibromyalgia.

0521FP38

ULTRASONOGRAPHIC MORPHOLOGIC ASSESSMENT OF HUMAN MYOFASCIAL PAIN SYNDROME USING DIGITAL NORMALIZED HISTOGRAM: A PILOT STUDY

Cheng-Fang Tsai, Hung-Chih Hsu, Chu-Hsu Lin, Kai-Hua Chen, Wei-Chi Hsieh, Chien-Min Chen, Wen-Ming Chang, Yi-Wen Chuang

Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Chiayi, Taiwan

Purpose: To assess the reproducibility and real-time characteristics of digital images of ultrasonography in examining myofascial taut band in human upper trapezius muscle under constant pressure by using normalized gray-scale histogram method. *Materials and Methods:* Twelve patients with myofascial pain syndrome involving the upper trapezius muscle clinically diagnosed by an experienced physician were evaluated by 2-D and 3-D ultrasonography. The digital images of the myofascial taut bands were recorded and analyzed by normalized segmental histograms. Gray-scale values of taut bands and areas of twitch responses were calculated and analyzed to differentiate with normal muscle tissue. *Results:* The taut bands were hyperechoic in 2D and 3D appearance. After normalized comparison, the density distribution curves of taut bands were distinctively from the normal muscle tissue in normalized histogram. There was also a tendency of left shift of higher density distribution curves after needling, indicating the decrease of hyperechogenic areas, and approaching the curve of normal muscle. More specifically, the localized twitch responses were observed near the epimysium of the upper trapezius muscle. *Conclusion:* Digital normalized histogramatic analysis (DNHA) method of ultrasonography images is a reproducible technique for morphologic assessment of myofascial taut band and localized twitch response, and is better visualized than the traditional 2-D ultrasound method in real-time analysis. Analysis with normalized gray-scale histograms is believed an effective method in identifying taut band, and localized twitch responses within surrounding muscular tissues.

PLENARY LECTURES (MAY 22, 2012, 08.00–09.00)

*Neuro Rehabilitation***PL02-01****THE EFFECTS OF MILD TRAUMATIC BRAIN INJURY AND ORTHOPAEDIC INJURIES IN OLDER ADULTS***John Olver**Director Rehabilitation Epworth Healthcare, Professor Rehabilitation Medicine Department of Medicine, Monash University, Australia*

In Australia, the rapid growth of the aging population is significantly affecting the Australian health care system, in terms of hospitalizations, higher incidences of injury and economic burden. In fact, hospitalisations which are commonly caused from falls within the older population are currently costing the Australian healthcare system 566 million per annum. Fall-related diagnoses within this population are predominately hip and lower limb injury and traumatic brain injury (TBI). Neurological injuries such as TBI can compromise the recovery of cognition. The added effect of increasing age can cause even more cognitive deficits, given older patients are more susceptible to cerebral deterioration and a lowered cognitive reserve. Thus, the current study has examined cognitive recovery as well as everyday ability and quality of life in patients over 65 at 3 and 6 months post TBI. Three samples were collected including 53 mild TBI (mTBI) patients, 62 mild orthopaedic injury (orthopaedic trauma) patients and 123 age and education matched community controls. Cognitive outcome measures covered overall cognitive status, memory domains (prospective, retrospective working) and speed of information processing. Cognitive deficits were compared between mTBI and orthopaedic trauma patients to determine whether there are any added effect of neurological injury (TBI) on cognitive recovery. Mild TBI patients were more susceptible to deficits in overall cognitive ability, retrospective memory and poorer social integration which did not improve over time. Subsequently, mTBI and trauma patients were combined and compared to community controls to determine cognitive deficits as a result of general traumatic injury. Generalised trauma patients performed worse on all memory domains and had poorer social integration and psychological well-being which were also all maintained over time. The added effect of neurological injury caused deficits in specific skills of cognition in addition to poorer social functioning. This supports the need for ongoing follow-up and community support even in mild cases of TBI. Therapy should be aimed at improving the cognitive recovery and outcome for both patients with TBI and multi-trauma patients, given cognitive deficits were maintained over time.

PL02-02**FACTORS AFFECTING NEURAL RECOVERY AFTER STROKE***Nam-Jong Paik**Department of Rehabilitation Medicine, Seoul National University, Seoul National University Bundang Hospital, South Korea*

The understanding of brain recovery after stroke is important for designing and implementing therapeutic strategies that aim

to improve functional recovery after stroke. Stroke patients are a heterogeneous group. Insights into this heterogeneity between patients could allow us to predict the response to treatments and therefore to target individual patients with appropriate strategies in the future. Therefore, this presentation will focus on the current knowledge of mechanism of brain recovery after stroke. Generally, neural recovery after stroke depends on many factors such as 1) stroke factors: infarct location, size, severity of initial stroke deficit, and intactness of cortico-spinal tract; 2) premorbid factors such as age, sex, BDNF genetic polymorphism; 3) rehabilitation intervention factors: early restorative therapies, amount and type of stroke therapy, medical complication after stroke, depression, applied medication, and caregiver factors etc. Recent researches on the neuroplasticity have demonstrated that plasticity occurs at molecular, synaptic, cellular and system levels during rehabilitative training, and the mechanism underlying this plasticity is similar to those of motor learning. Based on these findings, current therapeutic concept of task-oriented rehabilitative training has emerged.

PL02-03**ADVANCEMENT IN REHABILITATION INTERVENTION***Leonard S.W. Li**Division of Rehabilitation Medicine, University Department of Medicine, Tung Wah Hospital and University of Hong Kong, Hong Kong*

Rehabilitation of patients with brain impairment has been advanced with various modalities of intervention. Use of robotic training has been evaluated in various trials. The evidence was that robotic upper limb training was effective to enhance functional recovery. However, the effect seemed to be similar if additional intensive training could be provided by therapists. The results of robotic training for lower limb in stroke patients seemed to be varied with models of machines, from reasonable evidence published in Cochrane review to inclusive results. The other aspect for enhancing the neuroplasticity is through neurostimulation, which could be through peripheral stimulation or central stimulation. The peripheral stimulation is through somatosensory stimulation and the central approach is through either repetitive transcranial magnetic or transcranial direct current electrical stimulation. The central stimulation could be delivered as excitatory when applied on the lesion hemisphere or reduction of inhibition when applied on the contralateral hemisphere. So far, the evidences from many small trials showed that there was measurable clinical improvement with various type of neurostimulation. However, the effects seemed to last for weeks. This suggested further evaluation for the neurostimulation as a adjunct to other physical training would be needed. Other than intervention through advanced technology, less technologically dependent intervention has been evaluated. Mental imagery is a newly developed intervention by using a structured mental rehearsal to enhance the neuroplasticity. Nevertheless, the effectiveness shown in the literature may not be purely through simple mental imagery, but involved a more complicated mental pathway in rehearsing and executing a task. The enhancement of functional performance in a task through the mental imagery was demonstrated to have generalization effect.

INVITED LECTURES (MAY 22, 2012, 09.00–10.15)

Myofascial Pain**SS09-01****EVIDENCE BASED REHABILITATION IN CHRONIC PAIN SYNDROMES****Gulseren Akyuz***Marmara University School of Medicine, Department of Physical Medicine & Rehabilitation, Istanbul, Turkey*

Pain is one of the most popular titles of medicine that can be classified according to neurophysiological mechanisms, duration, etiology, region and a lot of other properties. There is no standardization in any of these classifications. Chronic pain is a useless and unpleasant condition, and also independent of tissue damage. Chronic pain is not a symptom, it is a syndrome. If a patient does not improve himself despite a proper medical treatment or if his pain behavior, exaggerate over the expected response, we should consider chronic pain syndrome (CPS). It is a complex condition that presents a major challenge to physicians because of its unknown etiology, and poor response to all kinds of therapies. It has been suggested that chronicity should be considered when pain persists longer than the acceptable healing time. The impact of chronic pain on patients' lives varies from minor limitations to complete loss of independence. The rehabilitation of chronic pain syndromes is multi-disciplinary and involves physical therapy, occupational therapy, manual therapy, aquatic therapy, cognitive/behavioral therapy, biofeedback, psychotherapy and some new therapies such as dry needling and pet therapy. In recent years, point of view in chronic pain management changed substantially chronic pain syndrome is managed best with a multidisciplinary approach, including rehabilitative process. Treatment protocol should be planned and modified individually. Combination of several methods has been tried, but, long term evidence-based studies are needed for new treatment modalities.

SS09-02**MYOFASCIAL PAIN WITH CHINESE APPROACH OF REHABILITATION****Jun Hu**

Abstract is missing.

SS09-03**ACUPUNCTURE VS MYOFASCIAL TRIGGER POINT NEEDLING****Chang-Zern Hong***Department of Physical Therapy, Hungkuang University, Tai-Chung, Taiwan, and Department of Physical Medicine and Rehabilitation, University of California Irvine, Irvine, CA, USA*

Needling therapy includes any treatment with one or more needles. Dry needling is defined as a needling therapy with penetration of a needle through the skin without introduction of any drug. On the other hand, "injection" is the procedure of needling therapy with introduction of drugs via a central hollow of the penetrated needle. The therapeutic needle used for medical treatment can be purely a solid metal rod with a sharp tip such as traditional acupuncture needle, or can be specifically made with a central hollow as a pathway of drug for injection such as a regular injection needle used in general medical practice. If no medication was introduced into the body during needling with this "injection needle" (containing a central hollow), this procedure is still called "dry needling". In the other words, "dry needling" can be performed by using a solid

needle without central hollow or using an injection needle with a central hollow. Chinese traditional acupuncture is probably the first reported technique in treating patients with dry needling. For pain control, there are some similarities between acupuncture and needling of myofascial trigger point (MTrP): 1) All MTrPs can be considered as acupuncture points, either "traditional acupuncture points" or "Ah-Shi points", but only some acupuncture points are MTrPs. 2) Needle stimulation to an MTrP can elicit referred pain, and needle stimulation to an acupuncture point can elicit referred pain in some cases. 3) Needle stimulation to an MTrP can elicit a local twitch response (LTR), and needle stimulation to an acupuncture point can elicit LTR in some cases. When an LTR is elicited, the patient can have sensation similar to "De-Qui" effect. 4) Similar to the remote effect of acupuncture, therapeutic effect (pain relief) can be obtained in a painful region during needling of a remote MTrP. 5) There are multiple nociceptors in an MTrP region, and it is very likely that there are also multiple nociceptors (and probably other types of sensory receptors) in an acupuncture point region since Melzack consider hyperstimulation analgesia is the major mechanism of acupuncture therapy. Chou and Hong have recently developed a new technique of dry needling with multiple rapid insertions using acupuncture needles. This technique is similar to MTrP dry needling by insertion of the acupuncture needle to multiple sites of the MTrP region with simultaneous rotation of the needle to facilitate needle movement.

SS09-04**TIPS AND TRICKS OF TRADITIONAL MASSAGE IN TREATING MYOFASCIAL TRIGGER POINT****Pradit Prateepavanich***Thailand*

Myofascial trigger point is a common musculoskeletal pain with no single standard of the treatment. To our knowledge the efficacy of all strategies is not significant difference including acupuncture, trigger point injection, stretch and spray, massage. Regarding to all strategies mentioned are manual treatments. So technique and skill is essential for the outcome. Furthermore the advantage and disadvantage of each strategy may be difference mostly based on precaution or contraindication, patient's preference, anatomical location of the trigger point, expense, possible for self management or not, and by product. Traditional massage is one of the most popular strategies utilized by Asian population. It is targeted and tailored treatment to individual trigger point. It has both direct effect to the trigger point and remote effect beneficial to certain perpetuating factors. In this session we will mix and match the technique of traditional massage with the advantage of our anatomical knowledge to some specific trigger points that considered simple to perform and favorable outcome.

SS09-05**BOTULINUM TOXIN VERSUS FASCIAL MANIPULATION TECHNIQUE IN THE TREATMENT OF CHRONIC FACIAL PAIN****Marta Imamura, Antonio Stecco***Physical Medicine and Rehabilitation, University of Sao Paulo, Brazil, Physical Medicine and Rehabilitation, University of Padova, Italy*

Purpose: The present investigation is a preliminary randomized clinical trial with the aim to assess the efficacy of type A botulinum toxin (BT) and Fascial Manipulation technique (FM) to treat myofascial pain symptoms and to reduce muscle hyperactivity in bruxism. *Material and Method:* Thirty patients (age range 23–69 years)

with a diagnosis of chronic facial pain associated with myofascial syndrome were randomly divided in 2 groups: 15 subjects (mean age 44) were treated with BT injections (group A) and 15 subjects (mean age 45) were treated with 4 sessions of FM (group B). All the patients were assessed with the Research Diagnostic Criteria for Temporomandibular Disorders axis II. *Result:* The group A showed a decrease in pain (from 7.0 to 4.8 of the VAS scale) and in the masticator pain (from 3.4 to 1.6). Moreover, BT injections permit to quit habits of tooth grinding and clenching. There are no side effects further a “fixed” smile for about 6 to 8 weeks. In group B a reduction of pain intensity was evident (from 6.0 to 2.1). Significant differences were found in rest pain between pre-intervention and both post-intervention and one month follow-up periods. Besides, all the participants reported reductions in headache frequency and intensity over time, although only in the group B this improvement was statistically significant (73.3%). Surface electromyography measured a decrease of frequency (microvolt) and amplitude of muscle activity in both groups, but higher in group A. *Conclusion:* Results from the present study support the efficacy of BT and FM to reduce myofascial pain symptoms in bruxism, and it is probably that using both the methods could further improved the outcomes.

Rehabilitation After Brain Injury

SS10-01

TRAUMATIC BRAIN INJURY REHABILITATION IN CHINA

Yong-shan Hu

Abstract is missing.

SS10-02

REHABILITATION AFTER BRAIN INJURY: SENSORY IMPAIRMENT AND TBI

Henry L. Lew

USA

Numerous injuries such as burns and traumatic amputations can result from blast or non-blast events associated with traumatic brain injury (TBI). Sensory impairments have been shown to exert an adverse impact on TBI patients' functional improvement, activities of daily living, and their ability to interact with their immediate environment and with others. However, due to the lack of externally visible wounds, the co-occurrence of hearing and vision impairments (also known as dual sensory impairment, DSI) may not be noticed until patients were discharged to home. The goals of this study were to document the prevalence of self-reported DSI and to identify contributing factors related to self-reported auditory and visual impairment in OEF/OIF service members who underwent a comprehensive TBI evaluation. A total of 36,919 veterans who received a TBI evaluation between October 2007 and June 2009 were entered into the database for analysis. Our final sample included 12,521 subjects judged to have deployment-related TBI and a comparison group of 9,106 subjects with no evidence of TBI. A main finding was that the co-existence of sensory impairment was common. Depending on exposure to blast and TBI status, rates of visual impairment ranged from 8.5% to 15.7%; auditory impairment from 21.0% to 33.0%; and DSI from 22.7% to 35.4%. The regression models showed that sensory impairment in one modality (i.e. auditory or visual) was the largest predictor for sensory impairment in the other modality. This finding suggests that either these impairments have a single source (e.g., brain trauma with associated dysfunction) or that damage to the two systems stems from a common source (e.g., blast wave, shrapnel). We suggest that patients with blast-related TBI should also be systematically and comprehensively evaluated to determine the extent of sensory impairment. Identifying DSI could allow clinicians to collaborate and maximize rehabilitation.

SS10-03

ADVANCED COGNITIVE REHABILITATION IN TBI

Parit Wongpheat

Abstract is missing.

Pulmonary Rehabilitation

SS11-01

MANAGEMENT OF AIRWAY SECRETIONS IN PULMONARY REHABILITATION

Seong-Woong Kang

Department of Rehabilitation Medicine, Pulmonary Rehabilitation Center Gangnam Severance Hospital, Yonsei University, Korea

Respiratory complications are the leading cause of mortality in neuromuscular disease. Patients with NMD are known to develop restrictive pulmonary disease pattern due to the progressive weakening of respiratory muscles. The management correlates directly to support for respiratory muscle weakness. The point of pulmonary rehabilitation is the application of non-invasive respiratory aid. Respiratory muscle aids can improve patients' quality of life and maximize the function just as other rehabilitation aids do. Like respiratory muscles, respiratory muscle aids are divided into expiratory and inspiratory muscle aids. Expiratory muscle aids are either a maneuver or a mechanical device used for removal of tracheal secretions. There are diverse methods and devices for the management of respiratory secretions. They can be used alone or in combination. The traditional method is postural drainage combined with vibration and percussion. Other methods include positive expiratory pressure device, flutter valve, high frequency chest wall oscillation, intrapulmonary percussion ventilation and et al. Coughing is an essential method for airway clearance among various techniques. The weakened respiratory muscles should be assisted to cough up secretions. The mechanical in-exsufflator is an especially useful device in NMDs. It generates strong expiratory flow through an instant application of negative pressure right after maximum insufflations of the lung with positive pressure. It is an essential device for non-invasive mechanical ventilator users who have decreased cough capacity because clearing airway secretions is possible only by application of in-exsufflator via an oronasal mask. Finally, we had developed a special tool for airway clearance. It is a new device which can be used in patients with glottis dysfunction caused by bulbar paralysis or tracheotomy. The new cough-assist device gave support to clearance of bronchial secretions and made it possible to perform chest expansion exercise by substituting functions of glottis opening and closing in patients with bulbar paralysis and tracheotomy, who could not produce an effective cough even with the help of existing cough assist methods.

SS11-02

PULMONARY REHABILITATION – FOCUS ON INSPIRATORY MUSCLE TRAINING

Mei-Yun Liaw

Division of Rehabilitation Medicine, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan, Chang Gung University, Taoyuan, Taiwan; Xiamen Chang Gung Hospital, Xiamen, Fujian, China

The principal goal of PR is to reduce symptoms, decrease disability, increase participation in physical and social activities, and improve the overall quality of life (QOL) for patients with chronic respiratory disease. The most prevalent complaints of chronic respiratory disease are dyspnea and exercise intolerance, which can limit most activities, thus lead to the dyspnea and de-conditioning cycle, limit the functional independence and QOL, especially for moderate and severe patients. Inspiratory muscle training (IMT), in combination

with PR or applied alone, can reduce exertional dyspnea at rest and during exercise, and improve QOL in individuals with chronic obstructive pulmonary disease. Other clinical indications of IMT include spinal cord injury, ventilatory weaning, pre-surgical use and other respiratory disease. IMT was also reported to attenuate inspiratory muscle metaboreflex in healthy individuals. In addition to the variety of training methodology, outcome measures and patient characteristics, such as degree of hyperinflation, severity of airway obstruction and respiratory muscle weakness, might influence the efficacy of IMT. Whether the improvement of exercise performance is mediated through improved inspiratory muscle strength and endurance by IMT or through improved the adaptation of subjective self-sensation to clinical symptoms was not well clarified. Future studies should include larger samples and control for degree of hyperinflation in patients with chronic respiratory dysfunction. How to keep the adherence of training or maintain long-term outcome will need further investigation. We recommend that physicians who take care of patients with inspiratory muscle weakness might consider the necessity and initiation of IMT application.

SS11-03

NONINVASIVE VENTILATION IN RESPIRATORY FAILURE, NEW FRONTIERS IN REHABILITATION

Matthew N. Bartles

USA

This presentation will allow the attendees to have a basic understanding of the application of noninvasive ventilation for patients who experience ventilatory failure either as a result of primary pulmonary disease, or from neuromuscular, neurological or other causes. The focus will be on application of non-invasive ventilation in rehabilitation settings and adaptation of rehabilitation programs to allow for exercise and functional restoration in the setting of ventilatory compromise. New devices will be discussed, as well as mobilization of patients with respiratory failure in acute settings. Goals of the presentation include: 1) Participants will be able to express the basic settings and applications of noninvasive ventilation in respiratory failure; 2) Participants will know how to perform rehabilitation in the setting of non-invasive ventilation, and 3) Participants will understand how to mobilize patients with acute respiratory failure who may only require transient noninvasive ventilation in order to allow for earlier mobilization and prevention of deleterious effects of immobility.

SS11-04

REHABILITATION FOR PATIENTS WITH ADVANCED HEART AND LUNG DISEASE

Matthew N. Bartles

Abstract is missing.

Sport Injury Rehabilitation

SS12-01

ROLE OF PLATELET-RICH PLASMA IN SPORTS MEDICINE

Sukajan Pongprapai

Vichaiyut Hospital

Platelet-rich plasma (PRP) is a kind of autologous blood with concentrations of platelets above normal level (PRP) was defined as having at least 4 times the normal platelet concentration). Platelets play a role in normal healing response via local secretion of growth factors and recruitment of reparative cells. PRP was first utilization on maxillofacial and plastic surgery to improve bone

healing in 1990. Later, there are growing evidence support the use of PRP injections for the treatment of muscle, tendon injuries and degeneration. Recent development of PRP preparation devices in outpatient and surgical settings has led to an increased use in sports medicine, orthopedic, rheumatology, and rehabilitation medicine. PRP is prepared by taking autologous, anticoagulated blood and using a centrifuge or filter to separate red blood cells from leukocytes and platelets. With further concentration, plasma is divided into platelet-poor and platelet-rich plasma. After isolation, PRP can be administered with or without an activating agent. Its combination with calcium chloride and/or thrombin immediately before injection initiates platelet activation, clot formation, and growth factor release at the injection site. Cell culture studies have provided evidence that PRP can stimulate processes of tendon healing. Several investigators have found increased collagen gene expression and increased production of vascular endothelial growth factor and hepatocyte growth factor in human tenocytes treated with PRP. In addition, recently reported that PRP stimulate the mobilization of circulation-derived cells to the area of injection and stimulates type I collagen production. In skeletal muscle, growth factors in PRP have been shown in laboratory studies to regulate the inflammatory phase and improve healing. In a mouse model, insulin-like growth factor-1 (IGF-1) and basic fibroblast growth factor were found to improve muscle healing and increase fast-twitch strength. There are increasing numbers of clinical use of PRP. Mishra and Pavelko prospectively evaluated 20 patients who failed nonsurgical treatment of lateral or medial epicondylitis. The study was non-blinded, and 10 of the 20 patients were randomized to their treatment. At 8 weeks follow-up, those with PRP injection noted a statistically significant improvement in both visual analog scale (VAS) (60% vs 16%) and Mayo Elbow Performance (52% vs 14%) scores compared with control subjects. Preliminary results have been released of an ongoing double-blind, randomized, controlled trial evaluating PRP and cortisone injections for chronic lateral epicondylitis. Of 100 patients, those receiving PRP have demonstrated greater improvements in VAS and Disabilities questionnaire scores at a minimum 6-month follow-up. Recently, there is emerging literature on the beneficial effects of PRP for chronic non-healing tendon injuries including Achilles tendinitis, plantar fasciitis, and patella tendinitis. In summary, PRP has been used safely in a variety of conditions such as acute and chronic muscle and tendon injuries. Most studies to date are involved in small sample sizes. Anyway, we are seeing increased clinical use of PRP especially in sports medicine, rheumatology, orthopedic, and rehabilitation medicine. However more clinical trials are certainly needed.

SS12-02

MANAGEMENT OF SPORT ACTIVITY INDUCED ACL INJURY

Damayanti Tinduh, I. Putu Alit Pawana, D.N. Utomo, P. Rahardjo, S.A. Utomo

Sport Injury Rehabilitation division of Department of Physical Medicine and Rehabilitation, Sport and Lower Extremity division of Department of Orthopedic and Traumatology, Musculoskeletal division of Department Radiology School of Medicine, Airlangga University, Dr. Soetomo Hospital Surabaya, Indonesia

Background: Incidence of ACL injury increased by increased participations in sport activities. ACL injury leads to reduced sport performance and functional activities. Sport Clinic was a transsectoral-multifacet team consisted of Trainers, Physiologist, Orthopedic Traumatologist, Radiologist and Physiatrist with Rehabilitation team, which had specific roles and approaches on this injury. Every patient was managed individually comprehensively. This presentation explained the overall management process on ACL-injured patients and the outcomes. *Conclusion:* Transsectoral-multifacet management of ACL injury facilitated the patients to achieve their performance in term of sport and other functional activities.

SS12-03

REHABILITATION OF BACK PAIN IN GOLFERS

Yap Eng Ching

Singapore

There are over 60 million golfers in the world today. More than 15 million are from the Asia Oceania region. With our rapidly developing and advancing economies, it is one of the fastest growing sports. The number of golfers in the region will increase significantly over the next few years. Golf is a sport that involves storing of potential energy during the back swing and releasing it as high speed kinetic energy during the down swing. Although a relatively 'sedentary' sport, the player is often subjected to high torsion, compression and shear forces, as well as rotational stress and tissue tension during the game. Many golfers sustain musculoskeletal injuries. Back pain is one of the most common injuries. Factors that predispose to back injury include ill fitting equipment and asymmetrical nature of the golf swing; poor physical conditioning and poor warm up routine; age-related degeneration and the attendant ripple effects from restricted motion. Amateur golfers tend to sustain injuries from poor technique. On the other hand, professional golfers tend to sustain injuries from repetitive overuse. This session will focus on rehabilitation of back pain in recreational golfers. Effective treatment includes analysis and modification of the golf swing, rebalance of muscles and back conditioning exercises. It is also important to look into prehabilitation and prevention strategies.

SPECIAL LECTURES (MAY 22, 2012, 9.00–10.15)

SL01-01

NEW INNOVATIONS IN THE TREATMENT OF OSTEOARTHRITIS AND SOFT TISSUE INJURY

Robert J. Petrella

Intra-articular hyaluronic acid (HA) has shown efficacy equivalent to NSAID in the treatment of osteoarthritis of the knee, hip, shoulder and small joints of the hand. Typically, HA products have been used interchangeably by clinicians, however, different products may have differing efficacy, safety and adverse events. Further, newer application of HA therapy has been described in soft tissue injury including ankle sprain. In this presentation, a review of current HA practice will be contrasted with new emerging applications of HA in osteoarthritis and soft tissue conditions. Applications will include clinical evidence as well as practical issues related to techniques and considerations for practitioners. Questions will be welcome to stimulate discussion.

ORAL PRESENTATIONS (MAY 22, 2012, 13.00–14.00)

Miscellaneous 1

0522FP01

RECTAL BALLOON TRAINING IN FEMALE URINARY INCONTINENCE**N. Tantisirawat, S. Roongsirisangrat, S. Rangkla, T. Manchana***Department of Rehabilitation Medicine, King Chulalongkorn Memorial Hospital, Thai Red Cross Society and Faculty of Medicine, Chulalongkorn University, Thailand*

Purpose: To compare the effects of Rectal balloon training (RBT) and Pelvic floor muscle training (PFMT) on pelvic floor muscle strength and severity of urinary incontinence. **Materials and Methods:** This study was conducted in Department of Rehabilitation Medicine, King Chulalongkorn Memorial Hospital. Subjects were female aged 25–70 years having urinary incontinence. Baseline data and risk factors of urinary incontinence were collected. Subjects were divided randomized into 2 groups and was trained either with PFMT or RBT for 6 weeks. Primary outcome was the change of pelvic floor muscle strength. Sary outcomes were 1 h pad test, self-rating severity score of urinary incontinence and satisfaction. Outcomes were compared between each group based on the strength of pelvic floor muscle before and after training. **Results:** After 6-week training, pelvic floor muscle strength increased whereas 1 h pad test and severity of urinary incontinence decreased significantly in both groups ($p < 0.05$). The change was not significantly different between the two groups ($p = 0.84$). Both PFMT and RBT increased pelvic floor muscle strength 9.88 ± 6.43 mmHg and 9.22 ± 9.54 mmHg respectively. Both groups are satisfied with their training and would recommend it to other people having urinary incontinence. **Conclusion:** Improvement of pelvic floor muscle strength after training with RBT was not significantly different comparing with PFMT. Symptoms of urinary incontinence could be relieved by both methods. Hence, RBT might be an alternative method of pelvic floor muscle training for female who feel uncomfortable with insertion of a device into the vagina.

0522FP02

INTERMITTENT PNEUMATIC COMPRESSION CAN REDUCE LYMPHEDEMA IN POSTMASTECTOMY PATIENTS. IS IT TRUE?**H. Indiarso, Novitri***Physical Medicine and Rehabilitation Department, Faculty of medicine Padjadjaran University, Bandung, West Java, Indonesia*

Purpose: Breast cancer is the most commonly diagnosed cancer in women and approximately 15% to 20% of breast cancer patients develop lymphedema following breast cancer treatment. Lymphedema, a sequelae of breast cancer and breast cancer therapy, changes functional abilities and may affect patient's psychosocial adjustment and overall quality of life. Edema represents an increase in interstitial fluid volume sufficient to be manifested as swelling. In this way, lymphedema can begin insidiously at variable periods after axillary treatment and progress from a barely noticeable condition to one involving a severely impaired limb. Conservative treatment of postmastectomy lymphedema can be divided into two broad categories: pharmacological and physical. Pneumatic compression is one of the most commonly used physical modalities. The goals of treatment for patients with postmastectomy lymphedema are to reduce edema, prevent recurrent swelling and minimize the formation of new lymph. **Materials and Methods:** Four patients with monolateral post-mastectomy lymphedema are included and assessed by measuring circumference between affected and normal

arm. Each of these subjects received intermittent pneumatic compression, using a pressure between 40–60 mmHg, with a pressure phase of 45 s and a relaxation phase of 15 s. Treatments were given 2 h a day, 3 times per week for 4 weeks. Education and exercise were also given to patients. **Results:** After four weeks of treatment with intermittent pneumatic compression, swelling decreases more than 30%. **Conclusion:** We demonstrated that intermittent pneumatic compression can reduce lymphedema in post mastectomy patients, but has a certain limitation.

0522FP03

THE EFFICACY OF COMPLEX DECONGESTIVE PHYSIOTHERAPY AND PREDICTIVE FACTORS OF LYMPHEDEMA SEVERITY AND RESPONSE TO CDP IN BREAST CANCER-RELATED LYMPHEDEMA**Su-Fen Liao¹, Shu-Hua Li¹, Hsin-Ya Huang¹, Shou-Tung Chen¹, Shou-Jen Kuo¹, Dar-Ren Chen^{1,2}, Ta-Sen Wei***¹Department of Physical Medicine and Rehabilitation, Division of General Surgery, ²Department of Surgery, Comprehensive Breast Cancer Center, Changhua Christian Hospital, Taiwan*

Purpose: The aim of this study was to identify the efficacy of Complex Decongestive Physiotherapy (CDP) and the predictors of lymphedema severity and response to CDP in Breast Cancer-Related Lymphedema (BCRL) patients. **Materials and Methods:** We performed a retrospective analysis of 107 BCRL patients who were treated with a CDP program between January 2004 and March 2011. **Results:** The patients' mean age was 52.8 years; 64 (65.5%) patients received radiotherapy and 12±2.4 sessions of CDP, and the duration of lymphedema was 22.4 months. The latency period of lymphedema was 36 months, and 56% of BCRL occurred within 2 years after surgery. Lymphedema severity, baseline and post-CDP PEV (percentage of excess volume), was 27.7% and 14.9%, respectively. The baseline PEV was correlated with the duration of lymphedema ($p = 0.002$) and the number of CDP sessions ($p = 0.049$), but not with age and radiotherapy. The duration of lymphedema was a predictive factor for PEV, and PEV was a predictive factor for CDP sessions. The CDP efficacy, PREV (percentage reduction of excess volume), was -50.5%, and was correlated with PEV, duration of lymphedema and age, but is not correlated with the number of CDP sessions. PEV ($p = 0.005$) and age ($p = 0.038$) were the predictive factors for CDP efficacy. Baseline lymphedema severity was the most important predictive factor for CDP efficacy. **Conclusion:** This study showed the effectiveness of 12 sessions of CDP interventions. The key to predicting successful lymphedema treatment is the baseline PEV, and age will affect CDP efficacy. The longer duration of lymphedema will induce higher PEV and a worse CDP effect.

0522FP04

THE VISUAL DEPENDENCE ON THE BODY SWAY EMPHASIZED BY ONE LEG STANDING IN HEALTHY SUBJECTS**Osamu Aoki¹, Yoshitaka Otani²***¹Faculty of Rehabilitation, Shijonawate Gakuen University, Osaka, ²Faculty of Rehabilitation, Kobe International University, Kobe, Japan*

Background: It is well known that to short the eye-object distance improved the body sway in the upright standing. This visual effect seemed to be more likely for unbalanced patients. The purpose of this study was to examine the visual effects on the body sway in two

balance conditions. *Materials and Methods:* Fifteen healthy subjects participated in this study (7 males and 8 females) mean age 26.3 ± 3.9 years, visual acuity 1.12 ± 0.39 . Subjects were asked to stand upright on the forceplate with arms hanging on both sides and alternately standing on two legs closed to each other and on one leg standing for 30 s. The sampling rate of the force plate was 50Hz. Subjects were instructed to gaze at 1.5 m or 6.0 m forward marker and to stay upright as possible as they could. The body sway indexes were the total length (LNG) and root mean square area (RMS area). And we calculated the percentages of the index improvement from 6.0 m to 1.5 m condition. To compare between closed two legs standing and one leg standing, Wilcoxon signed rank test was used. *Result:* The percentage of improvement in LNG during one leg standing was significantly greater than that during two legs standing (11.3% ($0.4, 25.7$): 4.7% ($-3.5, 12.7$), respectively, $p < 0.05$). That in RMS area had an almost the same result as in LNG (-3.5% ($-61.9, 20.0$); 44.4% ($-0.6, 56.1$), respectively, $p < 0.05$). *Conclusion:* The results of this study indicated that the visual dependency on the body sway seemed to be more important when the balance deteriorated.

0522FP05

PHYSICAL EXERCISE FACILITATES NEURAL FUNCTION RECOVERY THROUGH INFLUENCING AUTOPHAGOSOMES ACCUMULATION AND NEUROGENESIS IN RATS

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Purpose: To examine the role of physical exercise in improving damaged neural function and influencing autophagosomes accumulation and neurogenesis. *Materials and Methods:* Transient focal cerebral ischemia was established by using a middle cerebral artery occlusion (MCAO) model in rats which were randomly divided into 3 groups: the physical exercise group, the control group and sham-operated group. The neurological severity scores were examined for evaluating the neural function of the rats which were killed on the third, seventh, fourteenth and twenty-first days. Autophagosomes accumulation and neurogenesis in the peri-infarction region were checked with the marker LC3 and Ki67 by immunofluorescence. *Results:* Autophagosomes accumulation and neurogenesis in the peri-infarction region were observed in both control and physical exercise group. The number of LC3 positive cells significantly decreased in physical exercise group in comparison with those in control group on the fourteen and twenty-one days after ischemia ($p < 0.05$), the number of Ki67 positive cells were more in physical exercise group than those in control group on the seventh, fourteen and twenty-one days ($p < 0.05$). LC3 immunoreactivity was barely co-localized with Ki67-positive puncta. Moreover, the neurological severity scores in the physical exercise group declined more quickly as compared to those in control group from the seventh day after ischemia. *Conclusion:* Our results suggested that physical exercise plays an important role in the recovery of damaged neural function, reduction of autophagosomes accumulation and induction of neurogenesis in the peri-infarction region after transient cerebral infarction in rats. Autophagosomes accumulation was barely involved in proliferating cells.

0522FP06

THE EFFECTS OF EXERCISE TRAINING ON NEURAL FUNCTION AND NEUROGENESIS IN RATS AFTER CEREBRAL INFARCTION

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Purpose: To explore the effects of exercise training on neural function and neurogenesis in the peri-infarction region in rats after cerebral

infarction. *Materials and Methods:* Permanent focal cerebral ischemia was induced by left middle cerebral artery occlusion (MCAO) in 65 male adult Sprague-Dawley rats using a modification of Longa's method. The rats were randomly divided into 4 groups: exercise training groups (D2 group, D4 group, D6 group) in which the rats received wheel running training every day beginning at day 2, day 4 and day 6 after ischemia respectively, and the control group in which the rats could move freely in standard cages. Their neurological functions were measured at 24 h after cerebral infarction and 1 week and 2 weeks after exercise. The co-location of Ki67 and Nestin was used to observe the neurogenesis in the peri-infarction region. *Results:* The neurological severity scores in the exercise groups showed a faster decline as compared to those in control group at 1 week and 2 weeks. Moreover, the neurogenesis was significantly increased in exercise groups as compared to those in control group. *Conclusion:* Exercise training facilitates the recovery of neural function after cerebral infarction in rats. The neurogenesis may play an important role.

0522FP07

LACTATE PROFILE WITH SIX MIN WALKING TEST OF NURY'S PROTOCOL

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Purpose: To show that six min walking test in healthy adult using Nury's protocol is a submaximal test. *Materials and Method:* Post hoc-cross sectional study. Forty Indonesian (20 man), sedentary, 18–50-year-old, normal cardiovascular, chest, and neuromusculoskeletal. Capillary blood is withdrawn from tip of participant's fingers post six min walking test. Lactate is measured using Accutrend® Plus. Descriptive analysis and correlation. *Results:* Six min walking test with Nury's protocol shows submaximal zone with heart rate within 120–170. Average heart, man 134.05 ± 14.98 beat/min; woman 139.20 ± 16.89 beat/min. Lactate shows the protocol is an aerobic zone which mean level of 4 mMol. Average lactate, man 4.22 ± 1.31 mmol; woman 4.06 ± 0.99 mmol. There is correlation between lactate level and maximal heart rate $r = 0.342$; $p < 0.05$. *Conclusion:* Proven that Nury's protocol of six min walking test is an aerobic-submaximal test.

0522FP08

THE EFFECT OF OXYGEN ENVIRONMENT ON OBESE YOUTH'S BODY SHAPE UNDER AEROBIC EXERCISES

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Purpose: In recent years, overweight and obesity in Chinese university students have increased in number. This study tries to compare the aerobic exercises in the normal environment and in the simulated hypoxic environment to observe the effect and efficiency on the obese youth's body change. *Materials and Methods:* Twenty persons from one summer losing weight camp were divided into two groups: normal environment and combination of normal with simulated hypoxic environment. The subjects from two groups had to finish the same training exercises every week. The aerobic exercises included jogging, aerobic gymnastics, badminton, table tennis, games, dumb-bell exercises, step aerobics and other exercises using aerobic equipment (treadmill, pushbike and stair-master) and strength equipment. *Results:* Compared with the normal environment group, the combination of normal with simulated hypoxic environment group has significant difference in body weight (kg), body fat (kg), BMI, chest fat thickness (cm) and abdomen fat thickness (cm) ($p < 0.05$). *Conclusion:* Exercises in both environments have effect on loss of body weight, decreased body fat and improved body shape. However, the added simulated hypoxic environment has a better effect on body shaping.

Geriatric Rehabilitation

0522FP09

DIRECT AND INDIRECT PHYSICAL THERAPY FOR FRAIL OLDER CITIZENS WHO CANNOT WALK LIVING IN PRIVATE NURSING HOMES

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Purpose: Direct and indirect physical therapy was provided to the elderly to improve the various life functions. In this study, we aimed to enable the subjects to remove the wheelchair. **Materials and Methods:** Subjects were a total of 5,303 elderly required nursing care including full time wheel chair user living in 76 private nursing homes in the period of Jan. 2008 to Nov. 2011. Factors related to full time wheelchair use, "internal" and "external" factors were considered. Internal factor include physical function, and external factor were staffs' skills, facilities and equipment. To improvement of internal factor, we provided a direct physical therapy, and for external factor, an indirect physical therapy such as staff education was agreed. After intervention, staffs were expected to continue the program. The average number of intervention for each individual was 3 times (range 1–5). **Results:** 106 elderly discontinued using wheelchair for their locomotion and 548 elderly turned out to be able to walk independently. **Conclusion:** Fulltime wheelchair use results from individual impairments, unawareness of walking ability, and/or over-assistance by staff. To assure the health support of frail older citizens living in private nursing homes, it is important to consider both improvement of physical function and nursing care. In this study, we gained satisfactory results to become independence on wheelchair by a direct physical therapy and an on-the-job training to change the attitude of staff with an improvement in nursing technique as an indirect physical therapy.

0522FP10

COMPARING PROPRIOCEPTION AND STRENGTH BETWEEN LEFT AND RIGHT ANKLE OF THE ELDERLY PEOPLE

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Purpose: This study aimed to compare proprioception peak torque between the left and right ankle of the elderly and evaluate the relationship between ankle joint proprioception and strength. **Materials and Methods:** Ankle joint proprioception of twenty-eight healthy elderly subjects (12 male and 16 female average age 66.1±5.1 year) was measured with Biodex System 3 Dynamometer. The absolute error angle of passive replication test was used to assess ankle proprioceptive function. And the ankle flexor muscle, extensor muscle isokinetic concentric peak torque was measured by the Biodex System 3 Dynamometer at the speed of 30°/s. Main outcome measurements are ankle flexor muscle, extensor muscle concentric peak torque and relative peak torque. **Results:** The absolute error angle of passive replication test in the left is better than the right ($p=0.011$); Flexor muscle, extensor muscle concentric peak torque of the right ankle are stronger than the left ($p<0.001$), and extensor muscle concentric relative peak torque of the right ankle are stronger than the left ($p<0.001$); There was no significant correlation between the proprioception errors and strength ($p>0.05$). Proprioceptive function of the left ankle is better than the right, but flexor muscle, extensor muscle concentric peak torque and relative peak torque is smaller than the right. **Conclusion:** There was no significant correlation between the proprioception errors and both ankles strength in the elderly.

0522FP11

MAXIMAL OXYGEN UPTAKE OF INDONESIAN ELDERLY PEOPLE IN RELATION WITH AGE, GENDER AND BODY MASS INDEX

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Purpose: Maximal oxygen uptake ($VO_2\max$) was known to decline with age in a constant manner but recent studies indicate that the decline in $VO_2\max$ might be more variable. This study describes $VO_2\max$ of 41 Indonesian elderly people and its relationship with age, gender and body mass index (BMI). **Materials and Methods:** Incremental cycle ergometer test was performed in 28 females with mean age 66.2 (SD 4.0) years and 13 males with mean age 67.5 (SD 4.5) years till exhaustion. Criteria for maximal performance were VO_2 plateau or attainment of maximal heart rate (220-age). **Results:** None of the subjects reached these criteria. Mean $VO_2\max$ was 18.4 (SD 3.7) $ml \times kg^{-1} \times min^{-1}$ for males and 14.13 (SD 2.5) $ml \times kg^{-1} \times min^{-1}$. $VO_2\max$ showed decline with age in females ($r=-0.439$, $p=0.019$) but not in males. $VO_2\max$ was statistically lower females than in males ($p=0.001$). $VO_2\max$ did not show decline in relation with BMI ($r=-0.188$, $p=0.239$). **Conclusion:** $VO_2\max$ of Indonesian elderly showed relationship with age in females but not in males. There was statistically difference between $VO_2\max$ in males and females. There was no obvious relationship between $VO_2\max$ and BMI in elderly.

0522FP12

PREVALENCE RATE AND RISK FACTOR OF SARCOPENIC OBESITY IN KOREAN ELDERLY POPULATION

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Purpose: This study was conducted to estimate the prevalence rates and to explore risk factors of sarcopenic obesity (SO) in 2,221 Koreans over 60 years of age from the fourth Korea National Health and Nutrition Examination Survey. **Materials and Methods:** Participants were assessed by dual energy X-ray absorptiometry. Appendicular skeletal muscle mass divided by body weight was used to define sarcopenia and waist circumference was used to define obesity. We estimated the prevalence rates of SO according to age-groups, sex and region. In addition, each group was compared by demographic characteristics, metabolic status, nutrition, and physical activity. **Results:** The prevalence rate of SO in men and women were 6.1% (95% confidence interval (CI)=6.1–6.2) and 9.3% (95% CI=9.3–9.3), respectively. SO was positively associated with not current working and the number of combined medical conditions. Income, frequency of resistance exercise and walking time per day decreased the likelihood of SO in men, whereas the absence of spouse increased the likelihood of SO in women. High serum insulin level was positively associated with SO in both men and women, whereas vitamin D was negatively associated with SO in women. In addition, the amount of carbohydrate, protein, potassium, and phosphate intake decreased the likelihood of SO. **Conclusion:** The prevalence rates of sarcopenic obesity were 6.2% in men and 9.3% in women. SO in Korean elderly population was associated with insulin resistance, inappropriate nutrition, and low physical activity.

0522FP13

THE EFFECTS OF FATIGUE ON POSITION SENSE OF KNEE IN THE ELDERLY*Li'na Chen, Yuanbiao Liu**Hangzhou First People's Hospital, Zhejiang, China*

Purpose: To determine the effect of local muscle fatigue on knee joint position sense (JPS) in older subjects. **Materials and Methods:** Thirty-six male volunteers (mean age±SD: 71.35±4.13 years) were recruited for this study. JPS measures were obtained prior to and immediately after the fatigue protocol in one visit to the institute. JPS was evaluated by passive reproduction of pre-determined angles on a dynamometer (Biodex 3 system) and was reported with absolute, relative and variable angular errors. The fatigue protocol admitted to the lower limb was consisted of 30 maximum voluntary concentric contraction of the knee extensors and flexors on the isokinetic dynamometer at an angular velocity of 120/s. Muscle strength of the knee extensors and flexors was also measured prior to and immediately after the fatigue protocol was applied. **Results:** The peak torque of knee extensors and flexors was significantly decreased from baseline to post-fatigue. At the same time, a significant increase of absolute angular error was observed, with a mean value increased from 6.4° to 8.34°, respectively. Similarly, the relative angular error was significantly increased from 5.38° to 8.41°, respectively. Whilst, there was no significant difference of the variable angular error between the pre- and post-fatigue evaluation. **Conclusion:** The joint position sense of the knee joint of elderly could be attenuated by local muscle fatigue.

0522FP14

THE EFFECTS OF ANKLE STRENGTH AND RANGE OF MOTION TO BALANCE WITH AGING*Sang Sook Lee, Soo-Kyung Bok**Department of Rehabilitation Medicine, School of Medicine, Chungnam National University, Daejeon, Korea*

Purpose: Maintenance of balance depends on the interaction of multiple motor, sensory, and integrative systems. It had been reported that balance is associated with foot and ankle strength. Therefore, this study is conducted to find out effects of ankle strength and range of motion contribution to balance with aging. **Materials and Methods:** Sixty healthy people (24 men and 36 women) were undergone tests for ankle strength and range of motion using System 4 Pro (Biodex), one leg balance including postural sway and stability index using Balance system (Biodex), and self-reported Desmond fall risk questionnaire were collected. **Results:** Participants are classified in to 3 groups by age (I: 20–40 years, II: 40–65 years, III. over 65 years). Stability index and postural sway were significantly increased with aging. Ankle plantarflexor strength and ankle eversion range of motion were significantly decreased with aging. Pearson correlation revealed that ankle plantarflexion strength was significantly correlated with anteroposterior sway and ankle eversion range of motion was significantly correlated with mediolateral sway in the order group. **Conclusion:** Stability, ankle plantarflexor strength and eversion range of motion decline with aging, and ankle plantarflexion and eversion range of motion is correlated with balance stability. Therefore programs to improve ankle strength and range of motion in elderly may be beneficial in improving balance stability.

0522FP16

FUNCTIONAL STATUS AND ITS CORRELATION WITH EXERCISE SELF EFFICACY IN ELDERLY*Azliyana Azizan, Maria Justine**Physiotherapy Department of Health Sciences Faculty, Puncak Alam Campus, Universiti Teknologi MARA Selangor, Malaysia*

Purpose: Exercise self efficacy (ESE) is a level of confidence of an individual to perform physical or exercise tasks. ESE has been shown to predict exercise behaviour thus may also be associated with level of functional status. However, little is known about the relationship especially in the elderly population. This study was conducted to determine the relationship between ESE and functional status in elderly residing in an institution. **Materials and Methods:** This cross-sectional survey recruited 45 institutionalized elderly participants (mean age=65.91±5.87 years, BMI=25.24±3.30 kg/m²) who performed performance-based measures of functional status (upper limb strength (30-s arm curl test), lower limb strength (30-s chair rise test), upper limb flexibility (back scratch test), lower limb flexibility (chair sit and reach test), balance (timed-up and go test), and gait speed (10-m walk test)). The participants also completed the ESE scales via face-to-face interview. All tests were conducted by trained physiotherapists. **Results:** There were significant positive correlations between ESE and upper limb strength ($r=0.53, p<0.01$) as well as lower limb strength ($r=0.58, p<0.01$), but inversely correlated with balance ($r=-0.86, p<0.01$) and gait speed ($r=-0.77, p<0.01$). The level of ESE was poorly correlated with upper limb flexibility ($r=-0.06, p>0.05$) and lower limb flexibility ($r=0.17, p>0.05$). **Conclusion:** The level of ESE is significantly associated with muscle strength, balance and gait performance but not with flexibility. Thus, older persons who present with high level of confidence in performing physical activity may have good functional status. Hence, elderly with poor functional status may benefit from behavioral change intervention that may improve up their confidence and motivation to be engaged in regular physical activity and exercise for as long as possible.

Spinal Cord Injury Rehabilitation 1

0522FP17

THE EFFECTS OF ELECTRICAL TILT TABLE INTEGRATED WITH STEPPING ON THE STANDING TRAINING OF CERVICAL SPINAL CORD INJURED PATIENTS*Xiang Mou, Xu Hu**Department of Rehabilitation, Xijing Hospital, the Fourth Military Medical University, Shaanxi, China*

Purpose: To determine the effects of the electrical tilt table integrated with stepping device standing training, the time of standing training, mobility function, sensory function and activities of daily living function of for cervical spinal cord injured patients. **Materials and Methods:** Twenty-three cervical spinal cord injured patients were randomized into treatment group ($n=10$) and control group ($n=13$). Patients in the treatment group were subjected to an electrical tilt table with an integrated stepping devices. Patients in control group were subjected to an electrical tilt table without stepping devices. The side effect rate, the time for patients being able to stand at 90° for at least 10 min, the motor scores, the sensory index scores and Barthel index scores before treatment and after 4 weeks treatment were compared between the two groups. **Results:** After treatment the side effect rate showed a decreasing trend along with the increasing of standing times, and the rate was lower in treatment group than that in control group ($p<0.05$). The average is 9.8±4.16 days for the treatment group and 16.46±5.42 days for the control group to stand up straight for at least 10 min. After 4 weeks of treatment, the motor scores and Barthel index scores were significantly higher than that before treatment ($p<0.05$), but no significant difference was found between treatment group and control group ($p>0.05$). No difference was found between the sensory score of the two groups ($p>0.05$). **Conclusion:** Compared to the traditional electrical tilt table, standing training with integrated stepping device can reduce the side effect rate. It will also shorten the training days for patients to stand up straight. Patients may get more benefit from electrical tilt table with simultaneous leg movement.

0522FP18

THE RELATIONSHIP OF INDEPENDENCE IN DAILY ACTIVITIES AND CARDIOPULMONARY ENDURANCE OF CHRONIC PARAPLEGIC: A PRELIMINARY STUDY

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Purpose: Cardiopulmonary endurance is diminished in most individuals with SCI, due to reduce of the muscle mass, altered of the autonomic nervous system and result of the sedentary lifestyle. This study were done to find the relationship between independence in daily activities and cardiopulmonary endurance in paraplegic. **Material and Methods:** Twelve persons with chronic SCI from SCI shelter in Jakarta were included in this study. Independence in daily activities was assessed using spinal cord independence measure (SCIM). Cardiopulmonary endurance was evaluated by measuring the covered distance in twelve min wheeling test (12MWhT). **Results:** All of the subject were males, with low thoracic and lumbar lesion. Mean age was 40.2±7.9 years, duration of injury was 13.6±7.9 years, SCIM score was 64.8±5.6, covered distance in 12MWhT was 1,448±186 m. The results were revealed significant correlation between SCIM score with 12MWhT ($p=0.049$; $r=0.557$). But no significant correlation between SCIM score with duration of injury and completeness of the lesion ($p>0.05$). **Conclusion:** This study found that cardiopulmonary endurance is the important factor that influences independence in daily activities or in other way active in daily activity could maintain cardiorespiratory endurance as well. Due to limited sample, further study is needed.

0522FP19

EFFECTS OF TRAINING ON UPPER LIMB FUNCTION AFTER CERVICAL SPINAL CORD INJURY: A SYSTEMATIC REVIEW

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Purpose: Limited hand and upper limb function after cervical spinal cord injury is often more profoundly disabling and of greater importance than an inability to walk. The aim of this review was to summarize the evidence for the effectiveness of exercise training in promoting recovery of upper extremity function after cervical spinal cord injury (SCI). **Materials and Methods:** A search of the databases: Medline, Cochrane, CINAHL, EMBASE, PEDro was performed using the following MeSH terms: participants (tetraplegia, quadriplegia, spinal cord injury, spinal cord lesion), interventions (exercise, strength, robotic, electrical stimulation, task specific training) and outcomes (hand function, arm function, upper limb function, upper extremity function). The methodological quality of the selected articles was scored using a checklist. A descriptive analysis was performed. **Results:** Nineteen papers were included. Overall, the internal validity and reporting of the human studies was fair to good while power and external validity were poor. Only one of the five animal studies randomized the animals to different interventions. Interventions included exercise therapy (ET), electrical stimulation (ES) and functional electrical stimulation (FES). Most studies in humans reported improvements in muscle strength, arm and hand function, activity of daily living (ADL) or quality of life (QoL) after intervention. **Conclusion:** Training including ET, ES, FES of upper limb following cervical SCI leads to improvements in muscle strength, upper limb function and ADL or QoL. Further studies should be care-

fully designed to increase trial power and external validity.

0522FP20

DEVELOPING AN INTERNATIONAL CLASSIFICATION OF FUNCTION (ICF) CORE SET FOR SUB-ACUTE STAGE OF SPINAL CORD INJURY IN TAIWAN: A PRELIMINARY STUDY

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Purpose: The purpose of this study was to develop an ICF core set for sub-acute stage of Spinal Cord Injury. **Materials and Methods:** Using the Delphi method, a consensus process was conducted. In total, 20 multidisciplinary experts from different institutions completed the consensus process. The questionnaire for the study comprised 118 ICF s-level categories relevant to sub-acute stage of spinal cord injury. A 5-point Likert scale was used by participants to weight the impact of each category on activities of daily living after a stroke. Consensus of ratings was assessed using Spearman's rho and semi-interquartile range indices. The core set for sub-acute stage of spinal cord injury was developed from those categories with a mean score ≥ 4.0 found in the third round of the Delphi exercise. **Results:** The core set for sub-acute stage of spinal cord injury contained 46 categories. Of these, 21 categories were from the component body functions (b), three from body structures (s), 21 from activities and participation (d), and one from environmental factors (e). **Conclusion:** The preliminary core set for sub-acute stage of spinal cord injury can offer comprehensive information for disability assessment and verification. Further validation is required.

0522FP21

THE ANKLE BRACHIAL INDEX IN VARIOUS ONSET OF SPINAL CORD INJURY

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Purpose: Reduce or loss of muscle activity of the legs in paraplegics indicated that the burden of Peripheral Arterial Disease (PAD) may be higher in these individuals compared with able-bodied subject. Ankle Brachial Index (ABI) is known as a screening tool to detect the PAD of lower extremity. The aim of this study was to find the ABI in various onset of spinal cord injury (SCI). **Material and Methods:** Thirty Paraplegics were participated in this study. Demographic and onset of the injury data were collected and the physical examination to determine the level and severity of the injury were conducted. All subjects were then divided into 4 groups: <1 year, 1–5 year, 6–10 years and >10 years after onset the injury. ABI was measured using the manual sphygmomanometer. **Results:** All subjects had low level thoracic and lumbar injury, the mean age was 38.10±10.83 years. The abnormal ABI were found in all groups, but the difference between groups was not statistically significant ($p>0.05$). The proportion of abnormal ABI tends to increase parallel with the duration of having injury. **Conclusion:** The occurrence of abnormal ABI tends to increase with the duration of having injury. Routine examination is therefore important for early detection of PAD in SCI patients.

0522FP23

QUALITY OF LIFE AND AFFECTING FACTORS IN SPINAL CORD INJURY SURVIVORS OF SICHUAN EARTHQUAKE

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Purpose: To analysis the quality of life and contributing factors in spinal cord injury survivors of 2008 Sichuan earthquake and to provide a clinical reference for the future disaster. **Material and Methods:** A total of 26 subjects with SCI completed the World Health Organization Quality of Life Assessment Instrument-Bref (WHOQOL-Bref) at discharge from a hospital rehabilitation department and after one year in the community. Other functional evaluation included the Modified Barthel Index (MBI), Walking Index for Spinal Cord Injury II (WISCI II) and Patient Health Questionnaire-9 (PHQ-9). **Results:** The mean age of the research subjects was 52.6±15.8 years. The Linear Mixed Models (LMM) showed the score of MBI and WISCI II significantly increased ($p<0.05$), while PHQ-9 reduced with no statistical significance. Self-reported QoL, overall health, and satisfaction with social relationships increased significantly ($p<0.05$), physical and psychological health domains remained at baseline and the environment domain was reduced ($p<0.05$), and the environment domain was reduced with no significance ($p>0.05$). Age, education, MBI, and pain were used to predict the QoL. **Conclusion:** The QoL of SCI survivors was significantly improved after one year community life. Special attention should thus be paid to depression, pain, functional status and social integration during rehabilitation measures after earthquakes.

0522FP24

EFFECTIVENESS OF A HOSPITAL-BASED COMMUNITY REINTEGRATION SUPPORT PROGRAM FOR PATIENTS WITH SPINAL CORD INJURY IN KOREA

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Purpose: To assess the effectiveness of a Hospital-based Community Reintegration support Program (H-CRsP) with a comprehensive team approach for treating inpatients with Spinal Cord Injury (SCI), offered by the Korea National Rehabilitation Hospital. **Materials and Methods:** Participants with SCI were recruited from the Korean National Rehabilitation Hospital. Twenty-five participants who met inclusion criteria were provided with a H-CRsP. Participants were composed of 68.0% male and 32.0% female, with a mean age of 34.6±12.2. A H-CRsP with modules related to the training of daily living skills, driving, vocations and school support activities, leisure or recreational activities, peer counseling, sexual rehabilitation, and others support activities. The 25 enrolled patients had been treated with average of 6.1 programs 2 times a week for over 2 or 3 months. Spinal Cord Independence Measure (SCIM), Canadian Occupational Performance Measure (COPM), World Health Organization Quality of Life-BREF (WHOQOL-BREF), Hospital Anxiety and Depression Scale (HADS), Acceptance of Disability Scales Revised (AD-R), Community Integration Questionnaire (CIQ) were administered

before the treatment (pre-test) and also at the time of discharge (post-test) to compare the treatment outcomes in the 25 program participants. The data were analyzed by such statistical methods as frequency and paired *t*-test analysis. **Results:** Significant improvements were found on the independent living skill (54.2 to 68.3), Occupational Performance (2.2 to 3.9) and Satisfaction (2.0 to 3.8) Quality of Life (44.2 to 48.7), Acceptance of Disability score (78.0 to 81.6) in the SCIM, COPM, WHOQOL-BREF, AD-R ($p<0.05$). In addition, 10 of the 25 patients returned to home, work or school. **Conclusion:** These results demonstrated the effectiveness of the H-CRsP in helping patients with SCI return their communities to which they belong.

Back Problems

0522FP25

THE EFFECT OF ACUPUNCTURE ON PAIN AND QUALITY OF LIFE IN PATIENTS WITH LUMBAR CANAL STENOSIS

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Purpose: Lumbar canal stenosis is one of the major causes of pain and debilitation. There is not any effective and curable treatment for this disorder. Acupuncture is a documented analgesic treatment. Our clinical experience shows that it is also effective in functional improvement of patients. In this study, we assess the effect of acupuncture on pain and quality of life in patients with lumbar canal stenosis. **Materials and Methods:** We randomly selected 24 patients who had symptoms of neurogenic claudication as confirmed by MRI, electrodiagnosis or both. The patients underwent 10 episodes of acupuncture. Pain and quality of life were evaluated before and after intervention and six weeks later. We used Visual Analogue Scale (VAS) and SF-36. **Results:** The average pain score in patients before intervention was 7.91 and after the intervention it was 4.33, showing a significant decrease ($p=0.000$). The mean pain score was 3.08 six weeks after the intervention which was also considered significant ($p=0.009$). Four aspects of quality of life consisting of “general health”, “bodily pain”, “role emotional” and “vitality” showed significant improvements ($p<0.05$). **Conclusion:** Acupuncture had a significant effect on pain reduction in patients with lumbar canal stenosis and that effect persisted in evaluation after six weeks of intervention. Acupuncture also improved the quality of life of patients in the aspects of bodily pain, general health, role emotional and vitality. Acupuncture did not have any adverse effect on the patients.

0522FP26

EFFICACY OF A NEW NAVIGABLE PERCUTANEOUS DISC DECOMPRESSION DEVICE (L'DISQ) IN PATIENTS WITH HERNIATED NUCLEUS PULPOSUS RELATED TO RADICULAR PAIN: RESULTS FROM ONE-YEAR FOLLOW-UP

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Purpose: To evaluate the 1-year follow-up of efficacy of a new navigable percutaneous disc decompression device (L'DISQ) in patients with lumbar disc herniation with radicular pain. **Materials and Methods:** We performed disc decompressions using L'DISQ on 10 patients with persistent disabling back and leg pain for one month or longer (average 5.9 months) due to a herniated lumbar intervertebral disc. Baseline data was prospectively gathered before the index procedure and at 1, 4, 12, 24 and 48 weeks post procedure. Data included Visual analogue scale, Oswestry disability index, Rolando-Morris Questionnaire, SF-36 BP and passive straight leg raising test. Written informed consent was obtained from each subject, and our study protocol was submitted to and approved by the Korean University Medical Center Ethics Committee. **Results:** The VAS fell from 7.40±0.97 to 1.35±1.16 scores at 48 weeks post procedure. At 48 weeks the ODI had fallen from 42.08±8.93 to 12.60±10.50%, and the RM from 12.00±4.74 to 1.80±1.75 points. The SF-36 BP dropped from 33.32±6.24 to 51.82±4.70 scales. In SLR test, the angular change of 48 weeks showed improvement from 58.50±19.44 to 89.00±3.16 degrees. No major complication occurred except one case with reherniation. **Conclusion:** Following disc decompression with L'DISQ we measured clinically significant pain improvement and decreased disability for patients with both radicular and axial pain caused by protruded and extruded discs.

0522FP28

EFFECT OF CORE STABILITY TRAINING ON PATIENTS WITH CHRONIC LOW BACK PAIN

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Purpose: The aim of this study was to demonstrate that core stability training could produce more beneficial effects than conventional exercise in patients with chronic low back pain. **Materials and Methods:** Sixty patients with low back pain were randomly allocated into core stability training group and control group. Control group received conventional exercise and the training group received core stability training. Subjects were asked to exercise 3 times a week (40 min/time) for 8 weeks. In the pre- and post-training sessions, all participants performed tests of pain scale, Oswestry Low Back Pain Disability Questionnaire and core muscle strength test. **Results:** Five of 60 participants (training group, $n=29$; control group, $n=26$) completed the 8 weeks program. Pain index, Oswestry Low Back Pain Disability Questionnaire and core muscle strength in the training group were significantly better than those in the control group after 8 weeks ($p<0.05$). **Conclusion:** Our results demonstrate that core stability exercise, can be more effective in decreasing pain, improving spinal function and reducing daily life dysfunction.

0522FP29

ABNORMAL STREPTOCOCCAL SEROLOGY CAUSING SACROILIAC JOINT AND POSTURAL DYSFUNCTION IN ADULTS WITH CHRONIC LOW BACK PAIN

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Purpose: To examine the pelvic sacroiliac (SI) joint and postural tests in individuals with high streptococcal serology. **Material and Methods:** All individuals were examined for anti-streptolysin O (ASO) titer and SI joint imaging (as determined by SI-to-sacrum (SI/S) ratio from SI scintigraphy), and were divided into two groups to judge postural sway during vertical standing (ten sway tests). **Results:** In the group of ASO titer <116 IU/ml (32 men and 6 women), 27 had back pain; whereas, the group of titer >116 IU/ml (36 men and 10 women), high

proportion of subjects (45/46) reported as low back pain. Pearson correlation coefficients demonstrated a good correlation between the ASO titer and the SI/S ratio. Generalized estimating equations linked the relationships between titer and ratio at various locations (lateralization: left, right; part: upper, middle, lower). After amendment for potential confounders, a highly significant correlation was verified between titer and ratio ($p<0.0001$), with an increase of 1 IU/ml of titer resulting in a significant increase in ratio by 0.0008 units. In comparison of the postural parameters (sway area, velocity, and intensity) between the two groups, there were significant differences between them in all measures under all the position conditions tested. **Conclusion:** The study suggests an abnormality of postural sway in subjects with high streptococcal serology, i.e. having increased sway on all postural controls. A significant proportion of those subjects with SI disorder reported suffering from postural abnormality and low back pain.

0522FP31

POSTURE CONTROL FOLLOWING NECK FLEXOR MUSCLE FATIGUE IN YOUNG HEALTHY ADULTS

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Purpose: Neck extensor fatigue has been reported to interfere with the postural control in healthy adults. This study was to investigate whether the neck flexor fatigue also lead to a poor postural control and its test-retest reliability. **Materials and Methods:** Eight healthy adults participated in this study. Subjects were asked to stand barefoot quietly on force plate under four standing conditions including: tandem standing with closed eyes (TC) and open eyes (TO) as well as wide standing with closed eyes (WC) and open eyes (WO) before and after the neck flexor fatigue. Posture control was analyzed by the antero-posterior (AP) displacement, medio-lateral (ML) displacement and sway area of the center of pressure (CoP). Subjects were retested after five to six days. Paired-t test was used to analyze the difference before and after fatigue. Intra-class correlation coefficient (ICC) was used to assess the test-retest reliability. **Results:** Subjects showed significant of AP increase during TC ($p<0.01$), and ML increase and sway area during WC ($p<0.05$). The reliability of all CoP parameters were moderate to high (ICC=0.44–0.92), except for ML increase during TC (ICC=0.44). **Conclusion:** This study showed that the ability to maintain posture during the challenged standing conditions was deteriorated after the neck flexor fatigue. The present method is feasible to assess the postural control of fatigue-induced destabilization. Further studies are suggested to verify the relation of great fatigability of neck flexor in patients with neck disorder and sensorimotor disturbance.

0522FP32

EFFICACY OF TOM ANNULUS ABLATION USING NEW NAVIGABLE PERCUTANEOUS DISC DECOMPRESSION DEVICE (L'DISQ) IN PATIENTS WITH LUMBAR DISCOGENIC PAIN

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Purpose: This is the pilot study to assess the clinical outcomes of percutaneous disc decompression using the L'DISQ in patients with

lumbar discogenic back pain. *Materials and Methods:* Torn annulus was ablated using L'DISQ on 20 patients with axial low back pain unresponsive to conservative management {for at least three months (average 7.2 months)}. All the patients had been diagnosed with lumbar discogenic pain through provocation discography. The target ablation site, torn annulus was identified through lumbosacral magnetic resonance image and computed tomographic discogram. Baseline data was prospectively gathered before the procedure and at 1, 4 and 12 weeks post procedure. Data included VAS, Oswestry disability index, Rolando-Morris Questionnaire and SF36. *Results:* The VAS fell from 7.40 ± 0.97 to 1.35 ± 1.16 scores at 48 weeks post procedure. At 48 weeks the ODI had fallen from 42.08 ± 8.93 to $12.60 \pm 10.50\%$, and the RM from 12.00 ± 4.74 to 1.80 ± 1.75 points. The SF36 showed significant improvement from 33.32 ± 6.24 to 51.82 ± 4.70 scales. No major complication occurred, although one case developed a disc reherniation ten months post procedure. *Conclusion:* The L'DISQ device is specifically designed to ablate adjacent disc tissue, probably including nociceptive nerve free endings, using a probe that can be navigated into a torn annulus. Following ablation, clinically significant pain improvement was measured and disability in patients with axial low back pain was decreased.

Miscellaneous 2

0522FP34

THE CHARACTERISTICS OF FLUCTUATION ANALYSIS OF HEAR RATE COMPLEXITY DURING SLEEP IN PATIENTS WITH CHRONIC NECK PAIN

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Purpose: Autonomic dysfunction and sleep disturbance have been reported to be associated with chronic pain. New non-linear analysis model has been proposed to analyze the complexity of heart rate, a powerful indicator of autonomic status. However, there are limited data regarding the characteristics of autonomic changes during sleep in patients with chronic neck pain. The study aims to explore the characteristic of heart rate complexity during sleep in patients with chronic neck pain. *Materials and Methods:* Twenty-one healthy subjects and 19 patients with chronic neck pain were included in the present study. Standard over-night polysomnographic examination was performed for each subject. The normal-to-normal RR interval was extracted from original ECG signal. Hilbert-Huang transform was applied to decompose the EEG (C3A2) signal into two main components including delta and alpha band. Alpha (1) of detrended fluctuation analysis (DFA) was applied to obtain the heart rate complexity. *Results:* Patients with chronic neck pain had a significantly higher alpha (1) during REM sleep (1.21 vs 1.07 , $p=0.01$) and wide range of variation of alpha one from awake to sleep (0.24 vs 0.16 ; $p=0.029$). In addition, the correlation between REM index and alpha (1) was significantly higher in patients with chronic neck pain (0.58 vs 0.43 , $p=0.009$). *Conclusion:* Our findings indicate that the autonomic balance in patients with chronic neck pain may be altered during sleep; these changes may be different according to the different stages of sleep.

0522FP35

A SURVEY ON THE CURRENT STATUS OF BURN REHABILITATION SERVICES IN CHINA

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Purpose: In China, there was a very long history of burn wound treatment, but the specialized burn care units were built up only from 1958, and after more than 50 years' improvements, great achievements have been made in burn care system all over the country. In order to determine the status of current burn rehabilitation services in China, a survey was conducted, and some specific suggestions on improvement were proposed. *Materials and Methods:* A comprehensive survey was conducted to obtain information in the following areas: 1) the admissions and staffing of the burn centers; 2) availability of rehabilitation services, number and educational background of specialized personnel dedicated in burn rehabilitation therapy; 3) the difficulties leading to the lag of the burn rehabilitation services. The survey was sent to the Chief of 87 burn centers via E-mail. *Results:* There were a total of 39 (44.8%) burn centers responding our survey. These centers geographically distributed in nearly 70% of the administrative provinces in China, so the results could well represent the current burn care system. Most centers have recognized the importance of rehabilitation therapy and remarkable improvements of outcome in burn patients had been achieved. There is a very huge number of burn patients who need rehabilitation therapy, but most centers face the problems of shortage of nurses, burn surgeons and especially rehabilitation therapists which apparently could lead to the neglected rehabilitation therapies. Although the initiation time of rehabilitation therapy was far more earlier than before, it is still not widely accepted in acute burn care stage. Specialized personnel began to join some burn centers since the late 1990s, but the numbers and the professional educational background still need some improvements. Problems impede the progress of rehabilitation therapy are: lacking of rehabilitation knowledge in medical staff as well as the community, the shortage of specialized personnel and the relatively low educational background of this team, lacking of standard guidelines for rehabilitation treatment instructions, and lacking of funding from the government. *Conclusion:* After 20 years' clinical practices, rehabilitation concepts are well accepted and many kinds of rehabilitation therapies were carried out in most centers. But the relatively short history explains that the overall condition of burn rehabilitation therapy in China still faces great challenges. More steps should be taken to improve the current status of burn rehabilitation services: 1) a development of standard guidelines for clinical instruction of rehabilitation therapy; 2) an arrangement interdisciplinary team of burn care system; 3) rehabilitation education program to burn surgeons, therapists, nurses, as well as patients, families and the community; 4) administrative measures implementation of in terms of staffing, funding, burn injury insurance for patients and many others.

0522FP36

THE INTRARATER RELIABILITY OF INTERNATIONAL CLASSIFICATION OF FUNCTION (ICF) BASED ACTIVITY DAILY LIVING (ADL) TOOL AND ITS COMPARISON TO THE FUNCTIONAL INDEPENDENCE MEASURE (FIM) ON REHABILITATION WARD

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Purpose: This study aims to determine the intrarater reliability of an ICF based ADL tool and to compare it to the intrarater reliability of the FIM. *Materials and Method:* This is a prospective clinical trial. Two investigators independently reviewed the notes and used an ICF based ADL tool to score the function of each new admission to the rehabilitation ward from one march two thousand eleven. Two other investigators independently reviewed the same patient files to score function using the FIM. An ICF and a FIM rater repeated the scoring process after a period of three months to allow calculation of intrarater reliability. The scores were based on the observations recorded by the rehabilitation multidisciplinary team in the 3 days after admission and 3 days prior to discharge. Comparison was also made between the scores

obtained from the files and those allocated by the treating clinicians during routine care. Variation in the scores was numerically rated using the Kappa Statistic. **Results:** The unweighted Kappa statistic for motor, cognitive and total FIM scores were 0.691; 0.718 and 0.604, respectively. The equivalent values for the ICF based ADL tool were 0.344, 0.324 and 0.247, respectively. Intraclass correlation coefficients for the FIM were, 0.9930 (motor); 0.9203 (cognitive) and 0.9925 (total) and for the ICF based ADL tool; 0.9478 (motor); 0.7702 (cognitive) and 0.9317 (total). **Conclusion:** The results for the ICF total were not as good as those for the FIM. However, the results suggest that the ICF-based ADL tool may be suitable for use in a similar manner to the FIM and further development and study is warranted.

0522FP37

NUTRITIONAL STATUS AND LEVEL OF ACTIVITY OF DAILY LIVING IN PATIENTS WITH DISUSE SYNDROME

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Purpose: To investigate the association between nutritional status and level activity of daily living (ADL) in patients with disuse syndrome. **Materials and Methods:** A cross-sectional study was performed in 176 patients aged 65 years or older were admitted to university medical center and diagnosed as disuse syndrome by physiatrists during a period of April 2010 and March 2011. All patients were prescribed physical therapy at bedside or gymnasium. Nutritional status at referral was assessed by Mini Nutritional Assessment Short Form (MNA-SF). Association between MNA-SF, body mass index (BMI), hemoglobin, serum albumin (Alb), total lymphocyte count (TLC), C-reactive protein (CRP) and Barthel Index score were examined. **Results:** There were 107 men, 74 women. Mean age was 78.6 years. Median duration between admission and referral was 13 days. Fifty-three patients given prescribed physical therapy at gymnasium, 123 were at bedside. Median Barthel Index score was 37.5 (5.57). Based on MNA-SF, no patient was evaluated for normal nutritional status, 23 were at risk of malnutrition, and 153 were malnourished. Mean BMI was 20.7. Mean hemoglobin (9.69 g/dl), Alb (2.64 g/dl), mean TLC (964) were below normal. Median CRP was 2.58 mg/dl. In Spearman rank correlation coefficient there were significant correlations between MNA-SF, Alb, TLC, CRP, and Barthel Index score. In multiple regression analysis, only MNA-SF and Alb was significantly associated with Barthel Index score (Barthel Index score = $3.76 \times \text{MNA-SF} + 20.38 \times \text{Alb} - 36.76$, $R^2=0.302$, $p<0.001$). **Conclusion:** Most of patients with disuse syndrome are malnourished. There is some association between nutritional status and ADL in patients with disuse syndrome.

0522FP38

PROTECTIVE EFFECT OF ULTRAVIOLET BLOOD IRRADIATION AND OXYGENATION ON PEROXIDATION DAMAGE IN TYPE II DIABETES MELLITUS PATIENTS

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Purpose: To study the protective effect of ultraviolet blood irradiation and oxygenation (UBIO) on peroxidation damage in type II diabetes mellitus (DM). **Materials and Methods:** Sixty patients were recruited in this study and divided into two groups, 30 patients in the UBIO group and 30 in the conventional group. The control group includes 20 normal subjects. The UBIO group was treated with UBIO combined with routine therapy (2-Mercaptobenzothiazole and gliclazide) and the conventional group was treated with routine therapy only. UBIO therapy was given 3 times per week, 10 times in total. Before and after 10 UBIO therapy, the levels

of superoxide dismutase (SOD) and malondialdehyde (MDA) in serum were measured. **Results:** Before treatment, SOD in patients (72.71 ± 11.53 nU/ml) was significantly lower than the control group (108.54 ± 10.15 nU/ml) $p<0.01$. After treatment, the SOD in routine group increased from 73.21 ± 9.71 nU/ml to 83.43 ± 8.65 nU/ml, $p<0.01$. SOD in UBIO group increased even higher, from 71.68 ± 10.23 nU/ml to 98.81 ± 9.84 nU/ml, $p<0.01$. Before and after treatment, MDA in routine group were decreasing from 6.57 ± 0.85 nmol/ml to 5.21 ± 0.86 nmol/ml. In UBIO group, MDA decreased, from 6.46 ± 0.86 nmol/ml to 4.48 ± 0.88 nmol/ml, $p<0.01$. **Conclusion:** One of the pathogenesis of type II DM is oxidation damage. This investigation suggests that UBIO therapy has a more protective effect on peroxidation damage on type II DM than the treatment with 2-mercaptobenzothiazole and gliclazide only.

0522FP39

ULTRASONOGRAPHIC EVALUATION OF CROSS-SECTIONAL ULNAR NERVES IN HEALTHY ADULTS

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Purpose: 1) To obtain reference normal values for the cross-sectional area (CSA) and the frequencies of the echotexture of the cross-sections (ECS) by ultrasound (US) investigation of the ulnar nerve along with the entire length. 2) To correlate the CSAs, the profile and the finding of the nerve conduction studies and so on. **Materials and Methods:** We recruited 31 healthy adults (62 arms) without symptoms and/or history of ulnar neuropathy. Age, sex, height, weight, body mass index, skin temperature and dominant hand were recorded. US examinations and the nerve conduction studies (NCS) of the ulnar nerve were performed. We measured CSA and examined ECS at 7 sites: 1) distal wrist crease, 2) arterial split, 3) 2cm distal the tip of the medial epicondyle, 4) tip of the medial epicondyle, 5) 2cm proximal to the tip of medial epicondyle, 6) mid-humerus, and 7) axilla. We classified ECS into 3 patterns: a) the internal fascicles depicted with normal inner nerve echogenicity, b) the internal fascicles depicted with decreasing inner nerve echogenicity, c) the internal fascicles not detected. **Results:** The CSAs of the ulnar nerve were: 1) 5.7 mm², 2) 5.2 mm², 3) 6.3 mm², 4) 6.3 mm², 5) 6.8 mm², 6) 6.1 mm², and 7) 5.8 mm² on average. There was no statistical difference in CSAs between dominant and non-dominant arms. No correlation was found between the CSAs and the items of NCS. The CSAs were larger in men than in women ($p<0.05$) at the measuring site other than 3). ECS pattern a) was frequently at found site 1) and 2). The pattern b) and c) were dominant at site 4). **Conclusion:** These results can be used to diagnose and follow-up the entrapment and trauma of the ulnar nerve.

0522FP40

A PROMOTER POLYMORPHISM (RS181781, -1107G/A) OF IL3 IS ASSOCIATED WITH COMPLEX REGIONAL PAIN SYNDROM IN THE KOREAN POPULATION

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Purpose: Interleukin-3 (IL3) is a hematopoietic colony-stimulating factor that is capable of supporting the proliferation of broad range of

hematopoietic cell types. IL3 also has neurotrophic activity. The aim of this study was to investigate whether promoter single nucleotide polymorphisms (SNP) (rs181781, -1107G/A) of the IL3 gene are associated with the development of ischemic stroke (IS). *Materials and Methods:* We enrolled 121 IS patients and 291 control subjects. Genotype of SNP was determined by direct sequencing. SNPStats and SPSS 18.0 programs were used to evaluate odds ratios (ORs), 95% confidence intervals (CIs), and *p*-values. Multiple logistic regression models were performed to analyze genetic data. *Results:* The rs181781 SNP was associated with complex regional pain syndrome (CRPS) of IS (co-dominant 1model, OR=0.21, 95% CI=0.07–0.69, *p*=0.006; dominant model, OR=0.29, 95% CI=0.10–0.81, *p*=0.013, over-dominant model, OR=0.21, 95% CI=0.07–0.66, *p*=0.0033). However, the promoter SNP did not find any difference between IS group and control group (*p*>0.05). *Conclusion:* The result suggests that the promoter SNP rs181781 of IL3 may be associated with the CRPS of IS in the Korean population.

Spasticity

0522FP41

ULTRASOUND AND ELECTRICAL STIMULATION-GUIDED OBTURATOR NERVE BLOCK IN TREATING SEVERE HIP ADDUCTOR SPASTICITY

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Purpose: Patients with severely adducted hips have interference with daily perineal care, change of diapers or trousers, proper sitting or walking. Forceful abduction of the legs by caregivers may cause pain, adductor muscle tear or even “unexplained” femoral fractures. The obturator nerve can easily be located under ultrasound scanning and confirmed by electrical stimulation at the inguinal region. The anterior branch of the nerve is blocked with 5% aqueous Phenol to reduce the spasticity of hip adductor muscles. *Materials and Methods:* This is a retrospective case series studies where records of all patients who received 1st obturator nerve blocks during October 2009 to September 2011 with at least 3 months’ follow-up were retrieved for analysis. The effectiveness was measured using Modified Ashworth Score (MAS 0–5) and the duration of action was counted as the period when the MAS returned to baseline level. *Results:* Twenty-four perineural obturator nerve blocks were performed on 14 patients under ultrasound guidance and confirmed by electrical stimulation of minimal current of <0.3 mA at 2Hz, 0.1 ms. Seven nerves had no response to treatment as they were likely to have soft tissue contractures already and were excluded from subsequent analysis. MAS significantly reduced from baseline of 4.24±0.56 to 1.59±1.06 (*p*<0.001) and 1.59±1.00 (*p*<0.001) at 1 month and 3 months, respectively. Nine nerves had follow-up for 24 months. One nerve returned to baseline MAS at 12 months follow up and another returned to baseline at 18 months. The MAS of the remaining 7 nerves were still significantly reduced at 24 months (MAS=1.57±1.27 compared with baseline 4.14±0.69, *p*=0.017). No complication was reported. *Conclusion:* Blocking the anterior branch of obturator nerve using 5% aqueous Phenol under ultrasound and electrical stimulation guidance is safe and effective in reducing severe hip adductor spasticity and the effect can last for more than 2 years in most patients.

0522FP42

ULTRASOUND AND ELECTRICAL STIMULATION-GUIDED MUSCULOCUTANEOUS NERVE BLOCK IN TREATING SEVERE ELBOW FLEXION SPASTICITY

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Purpose: Patients with severe elbow flexion spasticity interfere with daily skin care, change of clothes and affect walking gait. Forceful extension of the elbow by caregivers may cause pain, muscle spasm or even “unexplained” humeral fractures. The musculocutaneous nerve can easily be identified under ultrasound scanning and can be confirmed with electrical stimulation at the medial upper arm region. The nerve is blocked with 5% aqueous Phenol to reduce the spasticity of elbow flexor muscles. *Materials and Methods:* This is a retrospective case series studies where records of all patients who received 1st musculocutaneous nerve block during April 2010 to September 2011 with at least 3 months’ follow-up were retrieved for analysis. The effectiveness was measured using Modified Ashworth Score (MAS 0–5) and the duration of action was counted as the period when the MAS returned to baseline level. *Results:* Eighteen perineural musculocutaneous nerve blocks were performed on 13 patients under ultrasound guidance and were confirmed with electrical stimulation of minimal current of <0.3 mA at 2Hz, 0.1 ms. MAS of elbow flexors significantly reduced from baseline of 4.00±0.59 to 2.11±1.37 (*p*<0.001) and 2.61±1.61 (*p*=0.002) at 1 month and 3 month follow-up respectively. Nine nerves had followed-up for 12 months. 3 nerve returned to baseline MAS before 12 months (6, 9 and 12 months). The MAS of the remaining 6 nerves were still significantly reduced at 12 months (MAS 2.00±1.90 compared with baseline 4.17±0.75, *p*=0.026). No complication was reported. *Conclusion:* Blocking the musculocutaneous nerve using 5% aqueous Phenol under ultrasound and electrical stimulation guidance is safe and effective in reducing severe elbow flexor spasticity and the effect can last for more than 12 months in most patients.

0522FP43

NERVE BLOCK WITH ROPIVACAINE RELIEVE THE PAIN DURING BTX-A INJECTION OF POSTSTROKE SPASTICITY

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Purpose: To explore whether nerve block with ropivacaine can relieve the pain, but not reduce the BTX-A effect for spasticity treatment after stroke. *Materials and Methods:* Thirty patients with hemiplegic spasticity and foot varus were recruited, (course 2–5 months, mean age 45 years, Ashworth scale 2–3). All patients were allocated randomly to Group A (nerve tibialis block with ropivacaine before BTX-A injection for pain relief) and group B (BTX-A injection only). Before, during, after BTX-A injection, pain was evaluated on VAS for two groups, and spasticity degree on Ashworth scale, gait analysis were also assessed before and after BTX-A injection. *Results:* There was significant difference for VAS pain score before and during, after BTX-A injection in group A (*p*<0.01). Significant difference for VAS pain score between group A and group B also exist (*p*<0.01). comparison between pre- and post-injection of BTX-A, Ashworth score and gait analysis reach statistical significance in each group (*p*<0.01), but there was no significant difference between both groups (*p*>0.05). *Conclusion:* Tibialis nerve block with ropivacaine could relieve the pain better and prevent from the sary spasticity worsening induced by the pain during BTX-A injection, especially in the severe spasticity treatment, and the BTX-A effect was not decreased.

0522FP44

THE PREVALENCE OF SPASTICITY AFTER FIRST-TIME STROKE AND ITS ASSOCIATED FACTORS: PRELIMINARY REPORT

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Purpose: To document the prevalence of spasticity at 3, 6 and 12 months after first-time stroke and to establish factors that associated

with the development of spasticity. *Materials and Methods:* A prospective cohort study was conducted on 63 patients with first-time stroke admitted to University Malaya Medical Centre, recruited from July to September 2011. Presence of spasticity was recorded, together with its severity and patterns of limb involvements. Clinical factors associated with the development of spasticity were determined. *Results:* This preliminary result reported the prevalence of spasticity and its associated factors at 3 months post stroke. Only 37 patients assessed at 3 months (11 died and 14 defaulted follow-up). Spasticity was reported at the affected hemiplegic side in 21 of 37 patients (56.8%). Forty-three percent of the spasticity reported were of MAS 1+ followed by 39.2% of MAS 1, 10.1% of MAS 2, 5.1% of MAS 3 and 2.5% of MAS 4. The upper limb was more involved (71.1%) than the lower limb (28.9%). Thirteen of 21 patients (57.1%) developed spasticity in both upper and lower limbs while the remaining had spasticity in upper limb only. Moderate to severe stroke (NIHSS >7) and initial hemiplegia (0/5 motor power on MRC grading) were significantly associated with the development of spasticity at 3 months post stroke, $p < 0.01$ and $p = 0.03$, respectively. *Conclusion:* High prevalence of spasticity at 3 months post stroke should raise clinicians' awareness in detecting the problem early, especially in patients with initial hemiplegia and moderate to severe stroke (NIHSS >7) at onset.

0522FP45

THE DOSE-RESPONSE RELATIONSHIP OF ETHANOL INDUCED TIBIAL NERVE BLOCK IN RABBIT MODEL

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Purpose: Chemical neurolysis by phenol or ethanol is among the most frequently used methods to reduce spasticity. There are few reports about dose-effect relationship of phenol while there is almost no report about ethanol dose-effect relationship. So this study is to observe the dose-response relationship in ethanol induced tibial nerve block in rabbit model. *Materials and Methods:* Twenty-four New Zealand white rabbits were assigned to different ethanol volume groups (0.1 ml, 0.3 ml, 0.5 ml, 1.0 ml) with 100% concentration. All tibial nerves were successfully located with a nerve stimulator. Compound muscle action potential (CMAP) by electric stimulation of the sciatic nerve were measured at pre injection and at day 1, 2, 4, 7 and week 2–8 post injection. Histological studies were performed to evaluate the destruction of the nerves and surrounding muscles. *Results:* The CMAP amplitude decreased ($p < 0.01$) significantly on the first day after ethanol injection in all groups. The amplitude of CMAP in group 0.1 ml recovered at week 2, while group 0.3 ml recovered at week 8. Group 0.5 ml and group 1.0 ml maintained at low level at week 4 ($p < 0.01$), but with high complication. The degree of axonal degeneration and muscle desmoplasia were related to the injection volume. *Conclusion:* There was a positive-linear relationship between the ethanol injection volume and the tibial nerve block effect. The safe effective volume is 0.3 ml for tibial nerve block in rabbit model.

0522FP46

THE EFFECT OF BOTULINUM TOXIN INJECTION FOR DROOLING OF SALIVA IN PATIENTS WITH BRAIN LESION

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Purpose: To investigate the intraglandular injection of botulinum toxin in drooling patient with brain lesion and to know the efficiency, duration of the effect and possible adverse effect of botulinum toxin type B (BNT-B) injection to patients with brain lesion. *Materials and Methods:* Fourteen patients with brain lesion and severe drooling

were included and divided into two groups. Group A patients ($n=7$) received injection of 1,500 units and group B patients ($n=7$) received injection of 2,500 units of BNT-B in submandibular gland using ultrasound guidance. Saliva secretion was assessed quantitatively at baseline and at weeks 1, 2, 4, 8, and 12. Patients and/or caregivers also assessed the severity and frequency of drooling using Drooling Quotient (DQ). *Results:* Both group reported a distinct improvement of their symptoms within 2 weeks after BNT-B injection. Compared with baseline, the mean amount of saliva show significant decrease throughout the study. But, comparison of amount of saliva in the two groups does not show any difference at each follow-up visit. Greatest reductions were achieved at 2 weeks and lasted to 12 weeks after BNT-B injection. *Conclusion:* Local injection of BNT-B into salivary glands proved to be a safe and effective therapy for drooling in patient with brain lesion as shown in 10 patients. The effect of injection of BNT-B lasted for about 3 months and there was no side effect of BNT-B. We recommend ultrasound guidance if injection of botulinum toxin into the salivary gland are considered.

0522FP47

MANAGEMENT OF SPASTICITY WITH BOTULINUM TOXIN FOR PATIENT WITH STROKE – BASED ON ICF FRAMEWORK

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Purpose: Patients with stroke with increased spasticity often encountered different degrees of dysfunctions. Rehabilitation plan based on ICF framework (International Classification of Functioning) is essential in identifying the goal and facilitate the activities and participation of patients. The aim of the study is to evaluate the outcomes of the program based on ICF framework. *Materials and Methods:* Patients with locomotive problem caused by increase tone, Modified Ashworth Score (MAS) ≥ 2 were selected. Joint assessment was done by doctors and physiotherapist to identify the treatment goals of spasticity management. Outcome evaluation was performed at pre, one month and three months post-injection, with MAS and passive range of motion (PROM) for the body structure and function. Observational gait analysis with Edinburgh visual gait score (EVGS) was measured for activity level. Goal attainment scale (GAS) was used to measure the change in participation level. *Results:* Nineteen patients, mean age 47.4 ± 15.3 years, were recruited. The muscle tone of quadriceps ($p = 0.024$), hip adductors ($p = 0.034$), gastrocnemius ($p < 0.001$) and tibialis posterior ($p = 0.001$), all got significant improvement with Wilcoxon Signed Ranks Test at one month post-injection. The ankle dorsiflexion range showed significant improvement at one and three months post-injection ($p < 0.001$, $p = 0.001$, respectively). For EVGS, 33.4% of patients revealed significant improvement in one month and three months post-injection. For the participation, most of the patients were claimed by carer to be more active in walking and participate in daily life, however, the data of GAS results were too small for analysis. *Conclusion:* Spasticity management with botulinum toxin is effective in improving body functions and activities of patients with stroke. Specialized team is crucial for the success of the program.

0522FP48

BOTULINUM TOXIN INJECTIONS BY ULTRASOUND GUIDANCE IN SPASTIC TOE CLAWING

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Purpose: To investigate the efficiency of BTX-A injection on the flexor digitorum muscles by sonographic guidance in stroke pa-

tients with spastic claw toes. *Materials and Methods:* We enrolled 14 chronic stroke patients with claw toes. Under ultrasonographic guidance, BTX-A will be injected into the flexor digitorum muscles. Foot spasticity, sensation, range of motion (ROM), visual analog scale (VAS) for pain, Berg Balance test, Fugl-Meyer assessment, and ABILOCO questionnaire will be assessed before injections and at 2nd, 4th, 8th, 12th, and 24th week after injections. *Results:* Comparing with the baseline data, the spasticity of the claw toes, ankle and metatarsophalangeal joint (MTPJ) improved at 4th and 8th week ($p<0.05$). Pinprick improved at 12th and 24th week ($p<0.05$), light touch sensation improved at 4th, 8th, 12th, and 24th week ($p<0.05$). Ankle muscle strength/ ROM increased at 4th, 8th, 12th and 24th week ($p<0.05$). MTPJ and proximal interphalangeal joint ROMs improved at 8th and 24th week ($p<0.05$). VAS scores while walking and standing, Berg balance test, and Fugl-Meyer assessments improved at 2nd, 4th, 8th, 12th, and 24th week ($p<0.01$). ABILOCO questionnaire improved at 4th, 8th, 12th, and 24th week ($p<0.05$). *Conclusion:* BTX-A injection by sonographic guidance in stroke patients with claw toes could be significantly improved foot spasticity from 4th to 8th week. The benefit of BTX-A on claw toes is to improve lower extremity motor function which maintained at least 24 weeks after injection.

Stroke Rehabilitation 1

0522FP49

THE RELIABILITY AND VALIDITY OF THE CATEGORICAL NAMING TEST IN APHASIC PATIENTS AFTER STROKE

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Purpose: Although it is important to know what category of word is affected by various brain lesions in order to for of anomia therapy, there is not yet any categorical naming test in South Korea. Therefore, we developed a categorical naming test (Korea University Categorical Naming Test, KCNT) and was standardized in 221 normal adult populations. This study was designed to investigate the reliability and validity of the KCNT in aphasic patients following stroke and to know what category of word is affected by various brain lesions. *Materials and Methods:* Forty-eight stroke patients (mean age 58 years) with aphasia were recruited for analysis of reliability and validity of KCNT. We obtained biographical data and characteristics of stroke, and assessed aphasia severity by using Korean version of the Western Aphasia Battery (K-WAB) and KCNT. Internal consistency reliability was evaluated by Chronbach's alpha. Concurrent validity of KCNT was investigated by correlation analysis between K-WAB and KCNT scores. Cut off value of KCNT in aphasia was determined by drawing a receiver operating characteristic (ROC) curve using KCNT scores from 221 normal and 48 aphasic groups. Sensitivity and specificity of KCNT was also calculated from the data. *Results:* Stroke types were cerebral infarct (27 cases) and intracerebral hemorrhage (21 cases) and mean duration post-onset was 0.8 years. The types of aphasia in order of frequency were Broca's aphasia (16 cases), anomia (14 cases), global aphasia (10 cases) and Wernicke's and transcortical aphasia (6 cases). The mean aphasia quotient and KCNT score was 44.0 and 26.5, respectively. Internal consistency reliability of KCNT (Cronbach's alpha=0.987) and concurrent validity were very high ($r=0.942$, $p<0.001$). In ROC curve, optimal level of cutoff score was 59 point with good sensitivity and specificity, 0.90 and 0.88, respectively. There is no difference in the kind of category of word affected by various brain lesions. *Conclusion:* Newly developed categorical naming test, KCNT, is a reliable and valid tool to diagnose and assess naming difficulty in aphasia.

0522FP50

THE STUDY OF REHABILITATION METHODS FOR EARLY STROKE

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Purpose: To explore the effective rehabilitation methods for early stroke patients. *Materials and Methods:* Sixty-three cases of stroke were divided into treatment group (33 cases) and control group (30 cases). The control group was treated by medication and general nursing, and treatment group was treated by early rehabilitative care besides medication and general nursing. The early rehabilitative care included the correct posture for patients' limbs, helping the patients with passive and active exercises, as well as promoting the patients to do active exercises. The result was evaluated using Fugl-Meyer scale evaluating sports abilities and Barthel index scale evaluating daily life activities. *Results:* The patients sports abilities and daily life activities were improved more significantly in the treatment group after one to two months treatment ($p<0.05$). *Conclusion:* The early effective rehabilitation methods for stroke can improve the movement function and life activity in patients with paralysis.

0522FP51

CEREBRAL MICROBLEEDS AND COGNITIVE DYSFUNCTION AFTER PRIMARY STROKE

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Purpose: Cerebral microbleeds (MBs) are strongly associated with intracerebral hemorrhage, hypertension, lacunar stroke and ischemic small vessel disease. However ischemic small vessel disease is well known to be associated with white matter changes on MRI and neurological impairments, there were few reports about the cognitive change due to MBs. We therefore examined the relationship between cognitive dysfunction and MBs after stroke. *Materials and Methods:* Subjects were 176 patients with primary stroke included 111 men and 74 women. Their mean age was 65.0±14.2 years. MBs were counted and classified by using T2*-weighted MRI with a 1.5-T system. Additionally, cognitive function was evaluated in all patients using Mini-mental state, Raven's coloured progressive matrices, Frontal assessment battery, Auditory verbal learning test, Trail Making Test and so on. After then we considered the relationship between the MBs and cognition, the MBs and the ability of daily living. *Results:* MBs were found in 104 patients (59.0%) and 75 patients had MBs bilaterally. Fifty-six patients had MBs in both of supra and sub tentorial area. The average number of MBs was 7.0±18.9. The score of most neuropsychological tests in patients with MBs were lower than that of the patients without MBs, and there were some correlation between grade on MBs and deterioration of neuropsychological tests. This deterioration influenced the low activity of daily living. *Conclusion:* The MBs were not so rare in stroke patients, and associated with cognitive dysfunction. These results made it very interesting to investigate vascular dementia.

0522FP52

THE RELATIONSHIP WITH AGE AND JAPANESE INDEPENDENT DAILY LIFE SCALE, MODIFIED RANKIN SCALE, NIHSS, ADL IN STROKE SURVIVORS: ANALYSIS FROM JARM DATA BASE

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Purpose: In stroke patients, if physical function and ADL recover well at discharge from rehabilitation hospitals, they still required

social skill rehabilitation such as public transportation commuting to return to work. Therefore we investigated the relationship of age and Japanese Independent Daily Life Scale (JIDLS), modified Rankin Scale (m-RS), NIHSS and ADL. **Materials and Methods:** The data was collected from the Japanese Association of Rehabilitation Medicine Rehabilitation Database (JARM DB). The basic data was stroke patients in the recovery phase ($n=2,700$), then we extracted those aged less than 65 years old ($n=986$), and extracted only those who were discharged to home ($n=664$). The average age was 54.8 ± 9.1 years. Average total length of stay was 131.0 ± 65.3 days. Based on age they were divided into 4 groups (less than 40, 40–49, 50–59, and 60–65). The items were JIDLS, m-RS at discharge and NIHSS at discharge, Barthel Index (BI) at discharge. **Results:** There were significant correlation between age groups and JIDLS. In m-RS, the older the age group, the higher the frequency of 3, 4 and 5 groups. There was no significant difference between age groups and NIHSS and between age groups and BI in ANOVA table. On the other hand, there was significant difference between JIDLS and NIHSS, between JIDLS and BI, and between m-RS and NIHSS in ANOVA table. **Conclusion:** JIDLS was getting worse in higher age. JIDLS had correlation with NIHSS and BI. If BI score was 70–80 points in the stroke patients, they need social skill rehabilitation including public transportation commuting.

0522FP53

COMPARISON OF GAIT PARAMETERS DURING SINGLE AND DUAL-TASK TURNING BETWEEN STROKE AND HEALTHY ELDERLY

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Purpose: Stroke survivors have difficulty performing dual motor task simultaneously. The purpose of this study are 1) to compare gait parameters during single and dual-task turning between stroke survivors and healthy elderly, 2) to compare gait parameters during single and dual-task when stroke survivors turn towards the non-paretic and paretic sides. **Materials and Methods:** This cross-sectional study recruited 12 participants with stroke (mean age 61.58 ± 9.2 years) and 12 healthy age-matched controls (mean age 64.17 ± 4.6 years). Both groups performed four trials of turning based on the Timed Up and Go (TUG) test: 1) single task turning towards non-paretic/matched side, 2) dual-task turning towards non-paretic/matched side, 3) single task turning towards paretic/matched side and 4) dual-task turning towards paretic/matched side. Gait parameters were measured by the number of steps and time required to complete the turning. **Results:** There were significant differences in the number of steps and time during trial 1, 2, trial 3 and 4 between stroke survivors and the controls ($p<0.05$). However, there is no significant difference between turning towards paretic and non-paretic side during single and dual-task turning in stroke survivors ($p>0.05$). **Conclusion:** Stroke survivors presented with higher number of steps and time to complete turning compared to healthy subjects. Further study is required to explore characteristics of muscle activation that can be related to the performance of gait during multi-tasking in stroke survivors.

0522FP54

THE EFFECT OF ADDITIONAL MIRROR THERAPY TO STANDARD REHABILITATION OF HAND PARESIS ON MOTOR RECOVERY AND HAND FUNCTION AFTER STROKE

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Purpose: The paretic upper limb is a common and disabling sequel of stroke that results in activity limitation. Optimising motor recovery after stroke is important to improve function in daily activities. Mirror therapy is a new therapeutic intervention, focuses on moving the unimpaired limb thus creating a visual illusion of enhanced movement of the impaired limb. Studies on stroke have shown that mirror therapy is simple, inexpensive, and may be beneficial for motor function recovery. The objective was to evaluate the effect of additional mirror therapy to standard rehabilitation of hand paresis on motor recovery and hand function after stroke. **Materials and Methods:** Eighteen patients from outpatient clinic with 3 weeks–6 months post first-attack stroke, were randomly allocated into 2 groups. The treatment group (9 patients) received 20 min of mirror therapy in addition to standard rehabilitation of hand paresis, the control group (9 patients) received standard rehabilitation only, for 10 sessions twice a week. Brunnstrom stages of hand motor recovery and FIM self-care items were measured at baseline, after 5 sessions, and after 10 sessions. **Results:** The Brunnstrom's stages for hand and the FIM self-care score improved more in the mirror group than in the control group, after 5 and 10 sessions of treatment compared to baseline ($p<0.05$). No significant differences were found in the period of after 10 sessions compared to after 5 sessions of treatment ($p>0.05$). One patient dropped out from the treatment group after 5 sessions. **Conclusion:** Addition of 5 and 10 sessions of mirror therapy to standard rehabilitation of hand paresis improves motor recovery and hand function after stroke compared to standard rehabilitation only. Further study is needed to determine optimal frequency, intensity and duration of mirror therapy.

0522FP55

EFFECTIVENESS OF HYBRID ASSISTIVE NEUROMUSCULAR DYNAMIC STIMULATION THERAPY IN PATIENTS WITH SUBACUTE STROKE: THE RESULT OF STEPWISE REGRESSION ANALYSIS

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Purpose: We reported that the Hybrid Assistive Neuromuscular Dynamic Stimulation (HAN<DS) therapy improved motor function of the paretic upper extremity in patients with sub-acute stroke. Using the same sample, we performed a stepwise regression analysis to investigate factors related to the effectiveness of the HANDS therapy. **Materials and Methods:** The HANDS group ($n=10$) used integrated volitional electrical stimulator (IVES) combined with a wrist splint for 8 h a day for 3 weeks, and the control group ($n=10$) used a wrist splint alone in addition to standard post-stroke multidisciplinary rehabilitation. To evaluate the relationship between the explanatory variables and gains in the Fugl-Meyer Assessment (FMA) of upper extremity function with each intervention, we generated a stepwise linear regression model. The explanatory variables included the type of the intervention, age, sex, time since stroke, stroke type, side of hemiparesis, dominant hand affected, the Mini-Mental State Examination score, the baseline of FMA score and its change during an observation period of 3 weeks before the intervention. The stepwise regression algorithm was set beginning with no terms in the model and using entrance/exit tolerances of 0.05/0.10 of the p -values. **Results:** The result of the stepwise regression analysis showed that the type of the intervention alone was associated with gains in FMA, explaining 26% of the variance ($p<0.05$). **Conclusion:** This result also supported previous study that

the HANDS therapy was effective for the improvement of hand function among patients with sub-acute stroke.

0522FP56

EFFECTIVENESS OF VIDEO-BASED THERAPY FOR STROKE PATIENTS

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Purpose: More than half of stroke survivors need assistance in daily activities and therefore, stroke rehabilitation has an important part in recovery where it aims to maximize functional independence as well as to help the patients regain back their psychosocial role. Because inpatient rehabilitation program in this country is not widely available, an alternative rehabilitation program such as home-based therapy is a choice and should be look into. This study utilizes the use of multimedia to reduce patient visits while providing guidance for self-therapy at home to address this problem. **Materials and Methods:** This was a randomized controlled trial involving stroke patients who were admitted to the neurology ward of a tertiary hospital. The intervention group had the combination of rehabilitation at home guided by DVD containing therapy techniques and 2 weekly outpatients follow-up. The conventional therapy group (control) attended weekly outpatient therapy. We measured independence level (Modified Barthel Index), frequency of stroke related complications, and caregiver stress level (Carer Stress Index). **Results:** There were 44 patients in intervention group and 46 patients in the control group. At 3 months, 26 (59.1%) patients from video group had significant improvement in function as measured by MBI score compared to 21 (45.7%) patients in the control group ($p=0.202$). None of the patients deteriorated in either group. The frequency of complications was similar in both groups. The caregivers in control suffered higher level of stress compared to the intervention group (34.8% vs 20.5%, $p=0.129$). Regression analysis showed that stroke severity is the only significant predictor for independent level, frequency of complication and caregivers' stress. **Conclusion:** Video-based therapy at home was as effective as the conventional hospital-based rehabilitation.

Dysphagia

0522FP57

THE EFFECT OF DIFFERENT CATHETER BALLOON DILATION MODES ON CRICOPHARYNGEAL DYSFUNCTION IN PATIENTS WITH DYSPHAGIA

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Purpose: The primary aim of this study was to investigate the outcomes of two different modes (active and passive) of balloon dilation therapy on cricopharyngeal dysfunction (CPD). **Materials and Methods:** Thirty-eight CPD patients with neurological disorders and 11 CPD patients with nasopharyngeal carcinoma after radiotherapy (NPC post RTx) were recruited between 2006 and 2010. Twenty-seven of them (21 with neurological disorders, 6 with NPC post RTx) were randomized to receive active balloon dilation therapy, and the remaining 22 (17 with neurological disorders, 5 with NPC post RTx) were randomized to receive passive dilation therapy. Outcome measures included Functional Oral Intake Scale (FOIS), pharyngeal transit time (PTT) and observations of upper esophageal sphincter (UES) opening with videofluoroscopic swallow study (VFSS). **Results:** It showed that both modes of balloon dilation therapy yielded improvements in FOIS, UES opening and

PTT, and that active dilation showed a significantly better result for CPD caused by neurological disease. **Conclusion:** The present study suggests that active balloon dilation benefits patients with neurological disorders, while passive balloon dilation and active balloon dilation work equally on NPC post RTx patients. Although the possible mechanism of active balloon dilation has been presented in this study, further investigation, such as fMRI, is needed to substantiate this hypothesis.

0522FP59

EFFECT OF BALLON DILATION AT THE VALLECULA USING VIDEO-FLUOROSCOPIC SWALLOWING STUDY ON PATIENTS WITH DYSPHAGIA

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Purpose: To evaluate the effect of balloon catheter dilation on post-swallowing vallecular remnant, laryngeal elevation, and pharyngeal transit time, in patients with dysphagia. **Materials and Methods:** Twelve patients with vallecular remnant in video fluoroscopic swallowing study (VFSS) were recruited for the study. Using 16 Fr Foley Catheter, balloon was positioned across the vallecular space under video-fluoroscopy. Balloon catheter dilation was done for 3 min and each ballooning was repeated 6 times for a min. We compared pre- and post-balloon dilation values. 3 factors were evaluated: laryngeal elevation, pharyngeal transit time, and post-swallowing vallecular remnant. **Results:** There was no significant difference in total pharyngeal transit time after balloon dilation. However, laryngeal elevation ($p<0.01$) was significantly increased and vallecular remnant ($p<0.001$) was significantly reduced after balloon dilation. **Conclusion:** There was a significant increase in laryngeal elevation and a decrement of post-swallowing vallecular remnant after balloon dilation procedure. Balloon dilation of vallecular space can improve dysphagia of patients with vallecular remnant.

0522FP60

THE DIFFERENCE IN VIDEOFLUOROSCOPY SWALLOWING STUDY FINDINGS OF VARIOUS INVOLVED VASCULAR TERRITORY IN STROKE

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Purpose: To investigate the pattern of post-stroke swallowing difficulty according to the involved vascular territory in stroke. **Materials and Methods:** One hundred dysphagia patients with first time acute stroke were studied. By reviewing MRI and MRA taken at the onset of stroke, topographic pattern of stroke was classified according to the vascular territory: anterior circulation stroke ($n=47$), posterior circulation stroke ($n=32$), and centrum ovale stroke ($n=21$). Swallowing difficulty was evaluated by video fluoroscopic swallowing study (VFSS). Parameters including lip closure, bolus formation, oral transient time, pharyngeal delay time, pharyngeal transit time, laryngeal elevation, pharyngeal retention, existence of residue in valleculae or pyriformis sinus, and existence of penetration or aspiration were assessed. **Results:** Pharyngeal delay and pharyngeal transit time were significantly more delayed in the posterior circulation stroke ($p<0.05$). Presence of residue in valleculae or pyriformis sinus was significantly more frequent, and the incidence of penetration or aspiration

was significantly higher in the posterior circulation stroke ($p < 0.05$). However, other parameters did not show significant difference among groups. **Conclusion:** The results demonstrated that patients with posterior circulation stroke are more likely to have pharyngeal motility dysfunction and higher risk of penetration or aspiration. We suggest that the appropriate prevention and treatment strategies should be established according to the involved vascular territory in stroke, in order to prevent the complication of dysphagia.

0522FP61

THE EFFECT OF EARLY BALLOON DILATION FOR DYSPHAGIA CAUSED BY CRANIAL NERVE INJURIES FOLLOWING SURGERY

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Purpose: Dysphagia caused by cranial nerve injury after surgery occur via two possible mechanisms such as direct nerve injury during surgery and pressure neuropathy by intubation. Purpose of our study was to evaluate the effect of balloon dilatation for cricopharyngeal opening in dysphagia after surgery. **Materials and Methods:** Two patients with dysphagia occurred right after their operation were included in our study. We performed cranial nerve function test and used laryngoscope to confirm cranial nerve injuries. Vocal cord palsy was observed in both patients and one patient had tongue deviation. Both patient showed decreased pharyngeal contraction and impaired cricopharyngeal opening in videofluoroscopy. They received videofluoroscopy-guided balloon dilatation at about 3–7-day intervals for 6 times and 13 times, respectively. After positioning the ballooning portion of deflated 16 Fr foley catheter around upper esophageal sphincter, we dilated the balloon for 30 s and each ballooning was repeated 6 times. We compared pre-balloon dilatation and post-balloon dilatation values, the amount of piriform sinus residue after swallowing, clinical symptom score and disability rating scale for swallowing impairment. **Results:** All 3 values of 2 patients improved after balloon dilatation. The amount of piriform sinus residue decreased (grade 3→1, grade 3→0, respectively). Clinical symptom score and disability rating scale also improved (clinical symptom score : 9→0, 10→4 ; disability rating scale : 4→0, 4→1). **Conclusion:** Balloon dilatation of upper esophageal sphincter is effective for early recovery of dysphagia caused by cranial nerve injuries following surgery.

0522FP62

TEMPORAL CHARACTERISTICS OF PHARYNGEAL STRUCTURES IN NORMAL SWALLOWING: A KINEMATIC ANALYSIS OF VIDEO FLUOROSCOPIC SWALLOWING STUDY

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Purpose: The purpose of this study was to assess the temporal characteristics of pharyngeal structural movements during normal swallowing using kinematic analysis of video fluoroscopic swallowing study (VFSS). **Materials and Methods:** The swallowing of 2-ml diluted barium by 75 healthy volunteers was examined using VFSS. Kinematic analysis was done by digitization of video files for movements of pharyngeal structures such as the hyoid bone, vocal cord, epiglottis and transition of fluid bolus during normal swallowing. The timing and sequence of structural movements were measured. **Results:** The results revealed that the preparatory phase, an insidious movement of hyoid bone in vertical direction, begins 0.252 s before initiation of vocal cord elevation. Just after the fluid bolus passes the mandible angle, vocal cord elevation (0.000 s; reference time), hyoid bone anterior excursion (0.065 s), and epiglottic rotation (0.127 s) are

initiated in order. Then the bolus reaches the vallecula (0.131 s) and transits through the upper esophageal sphincter (UES; 0.357 s). When the fluid bolus head is passing the vallecula, hyoid anterior excursion is 13.50% in process, and vocal cord elevation is 25.68% complete, while epiglottic rotation is just being started. On the moment that the fluid bolus head is passing the UES, hyoid anterior excursion (62.38%), vocal cord elevation (69.82%), epiglottic downward rotation (42.02%) is still ahead of maximal point. The vocal cord elevation reaches its maximal point at 0.512 s, and hyoid maximal excursion (0.545 s), epiglottic maximal rotation (0.662 s) follows. **Conclusion:** This is the first study to report the temporal characteristics of pharyngeal structural movements using the kinematic analysis system. These results can be a basis to investigate major temporal factors contributing to aspiration.

0522FP63

ALTERED RESTING-STATE FUNCTIONAL AND WHITE MATTER TRACT CONNECTIVITY IN STROKE PATIENTS WITH DYSPHAGIA

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Purpose: Swallowing dysfunction is common and disabling after acute stroke; however, the altered neural network of neurogenic dysphagia remains uncertain. The objective of this study was to explore cerebral functional connectivity of swallowing in unilateral hemispheric stroke with dysphagia using resting functional magnetic resonance imaging (fMRI) to compare the healthy adults, as well as the changes of the white fiber connections of swallowing. **Materials and Methods:** In total, 12 hemispheric stroke patients with dysphagia and 12 healthy controls were examined with resting stage fMRI and diffusion tensor imaging (DTI). Seed regions were mainly placed on the primary motor cortex and subcortical areas relevant to swallowing function. The functional connectivity gained from the seed to the rest voxel in the brain, and the structural connectivity described the mean FA on fiber bound through the seed regions. **Results:** The health subjects showing positivity altered functional connectivity mainly in the sensorimotor-insula-putamen circuits on the seed-based analysis of the left primary motor (M1) and right M1, respectively, while the dysphagic stroke showed negative connectivity in the bilateral hemisphere, which are strongly associated with swallowing function. DTI analysis revealed that FA was significantly reduced typically in the white matter, bilateral insula, thalamus and internal capsule compared with controls. **Conclusion:** These results strongly suggest that dysphagia sary to stroke is associated with disruptive functional and structural integrity in the large-scale brain control system, thus providing new insights into the understanding of the neural remodelling of this disorder.

Musculoskeletal Rehabilitation 2

0522FP64

PREVALENCE OF OBESITY AMONG INTELLECTUAL DISABILITY STUDENTS OF SPECIAL SCHOOL FOR DISABLED IN JAKARTA

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Purpose: Intellectual disability (ID) individuals with obesity have multiple problems, which limit their daily life and some complications resulting from obesity. Therefore prevalence data are needed to create management plan in coping with obese ID individuals. The prevalence

of ID with obesity in foreign countries range between 16–29%. In Indonesia, the prevalence of ID with obesity was 5.2% in Bali and 3.4% in young adults of the Indonesian Special Olympics athletes in Bandung. Since the prevalence data in Jakarta is not available, we were encouraged to do a research to find out the prevalence of obesity in Special School for disabled C/C1 in Jakarta. **Materials and Methods:** This is a cross-sectional study. Subjects were students from Special School for disabled C/C1 in Jakarta between 10–30 years old. The criteria of obesity for the age of 10–20 years was using BMI $\geq 95^{\text{th}}$ percentile for the respective age and sex. The criteria of obesity for the age of 21–30 years was using the BMI > 25.0 according to WHO for Asia Pacific. **Results:** Based on the classification, prevalence of obesity at Special School for disabled C1 was 50.30%, and at the Special School for disabled C was 49.70%. **Conclusion:** The prevalence of ID with obesity among students from Special School for disabled C and C1 in Jakarta is 282 (16%) from 1,760 subjects.

0522FP65

THE EFFECTS OF PHYSIOLOGICAL ISCHEMIC TRAINING ON THE FUNCTION OF SKELETAL MUSCLE

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Purpose: This study is aimed to examine the effects of physiological ischemic training on the function of skeletal muscle. **Materials and Methods:** Adult male New-Zealand white rabbits ($n=27$) were divided into three groups: (i) ischemia with cuff inflation training (CT) group, which received left limb cuff inflation for 3 min, followed by 5 min of deflation, repeated three times. (ii) ischemia with isometric exercise training (ET) group, which received isometric contraction exercise ischemic training on left limb for 4 min, followed by 10 min of rest, repeated twice and (iii) the control group (NI), which received no ischemic training. After 4 weeks, muscle strength, endurance and the formation of collateral circulation and the types and cross-sectional areas of muscle fiber were evaluated. **Results:** The maximal tension of tetanic contraction in the CT and ET groups were both different from that of the NI group ($p<0.05$). During the first 3-min exercise period, the endurance of CT and ET groups were significantly different from that of the NI group ($p<0.05$). For collateral circulation, there was no significant difference between the groups ($p>0.05$). The cross-sectional areas of muscle fiber in the CT and ET groups showed significant difference. **Conclusion:** Physiological ischemic training could strengthen muscles and affects the endurance of these muscles during the initial 3 min of exercise.

0522FP66

THE EFFECT OF ORAL CURCUMIN SUPPLEMENTATION AND RESISTANCE EXERCISE TO DISUSE ATROPHY ON SKELETAL MUSCLE FIBER DIAMETER OF RATTUS NORVEGICUS

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Purpose: Curcumin inhibit degradation and decreasing protein synthesis through NF- κ B pathway. It stimulates activities of myogenesis and muscle skeletal regeneration. Resistance exercise decrease Atrogin-1 and MuRF-1 gene expression. To evaluate the effect of oral curcumin supplementation and resistance exercise to disuse atrophy on skeletal muscle fiber diameter of rattus norvegicus. **Materials and Methods:** Randomized post test only experimental study was conducted on thirty adult male rattus norvegicus, age between 10 and 12 weeks, weight between 150 and 300 g. Soleus muscle diameter assessed by histopathology examination. The staining use Hematoxylin Eosin

(HE) and viewed by light microscope in 400X enlargement. Muscle fiber diameter was measured by histopathology examination with HE staining after 6 weeks follow-up. Subjects divided in three groups after 2 weeks immobilized to produce atrophy. In the first group i.e. the control, subjects without oral curcumin and resistance exercise. The second group, subjects with resistance exercise without oral curcumin; the third group, subjects with resistance exercise and oral curcumin supplementation. The resistance exercise performed 3 times a week for 4 weeks with load 25% to 35% body weight. The curcumin dose was 500 mg/rat 3 times a week. The differences between means evaluated by ANOVA. **Results:** Mean muscle fiber diameter in the second group was increased 41.37% and the third group was increased 40.11% compared to the control group. There was significant difference ($p<0.05$) in muscle fiber diameter between the first group to second group and third group. There was no significant difference between second and third group. **Conclusion:** Resistance exercise with or without curcumin supplementation significantly increased soleus muscle diameter for 4 weeks of disuse atrophy.

0522FP68

THE EFFECT OF VIBRATION AND STATIC STRETCHING ON SPORT PERFORMANCE OF VOLLEYBALL ATHLETES

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Purpose: The aim of this study was to compare the effect of vibration and static stretching on explosive force and flexibility of volleyball athletes. **Materials and Methods:** Fifteen female volleyball athletes were randomly divided into two groups: 8 athletes with vibration training and static stretching group, 7 athletes without vibration training. After 6 weeks training, pre and post-test were conducted with Biodex to evaluate the maximal isokinetic torque of biceps and anterior deltoid muscle, and shoulder flexibility. **Results:** After 4 weeks training, the maximal isokinetic torque of biceps muscle significantly increased with vibration. The static stretching group had better improvement in the maximal isokinetic torque of anterior deltoid muscle. Flexibility performance was significantly increased in both vibration and static group. The vibration group could increase the flexibility more quickly and the effect accumulated with time, though there was no significant difference between these two groups. **Conclusion:** Vibration stretching training could increase explosive force and flexibility simultaneously, which improved more quickly than the static stretching group. The effects could be seen within 4 weeks.

0522FP70

THE CLINICAL APPLICATION OF MUSCULOSKELETAL ULTRASOUND FOR THE ASSESSMENT OF CERVICAL LUSCHKA JOINT: A PRELIMINARY STUDY

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Purpose: To explore the application of Musculoskeletal Ultrasound (MSUS) in identifying Luschka joint (UJ). **Materials and Methods:** Twenty-three patients who clinically diagnosed with CSA were included. MSUS were performed on these patients to observe the operation steps and detailed the MSUS image of UJ. The presence of Luschka joint hyperplasia in different sites and sections were compared by Chi-square test. **Results:** UJ and its adjacent structures were clearly shown on MSUS image. UJ were located between two transverse processes and behind VA, between the lateral margins of two vertebral bodies and outside the intervertebral disc. The base of UP was followed by the upper margin of the vertebrae and the lateral border of the UP was on a straight line with the lateral margin of

vertebral body, with VA in front of the line. Some images of the UP passed the line and became closer to the VA, making the VA tortuous or stenosed. In this condition, we assessed the UJ exists lateral osteophyte formation, and measure the distance from cutting-line of lateral cortical margins of the cervical vertebrae to outer cortical margins of the lateral of the UP. The statistical analysis showed that there were no significant difference between left and right side ($p>0.05$). C5/C6, C4/C5 had been found to have more Luschka joint hyperplasia compared with the others and C2/C3, C3/C4 had fewer Luschka joints hyperplasia ($p<0.05$). The mean value for 55 Luschka joints with lateral osteophyte formation was 2.58 ± 1.2 mm. **Conclusion:** MSUS could be used to observe UJ and also to assess and measure the UJ with lateral osteophyte formation.

0522FP71

THE GROWTH OF KNEE ON FRONTAL PLANE

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Purpose: Human requires knee that are able to support crawling, kneeling, standing, walking, and running. To be able to fulfil the function, the form of knee on frontal plane changes since birth till adult. Sometimes parent worried about the form of the knee, whether it still belongs to normal valgus or varus? So far there has been no standard of the growth of knee on frontal plane from 0–18 years. This study was conducted to determine the value of inter medial malleoli (IMM) distance and inter medial condilli (IMC) distance as indicator of knee growth on frontal plane from 0–18-year-old by yearly age and sex. **Materials and Methods:** Design was a cross-sectional study by age (yearly) and sex on children aged 0–18 years, recruited from maternity clinics, posyandu (integrated health community post), playgroups, kindergartens, elementary schools, intermediate schools, and high schools in South Jakarta, as representatives of urban characteristic. Sampling was done by 2-stage random sampling, location and subjects random on site, with probability proportional to size. The inclusion criteria were babies and children aged 0–18 years old without evidence of physical abnormality. The distance of IMM and IMC were measured using modified callipers on straight leg lying (0–1 years old)/standing (2–18 years old) position with the feet in straight forward position. Statistical analysis was done by descriptive analysis. **Results:** Subjects included were 8,083, of which 4,125 were boys. In boys, the biggest IMM distance was 4.1 cm at the age 3 years, means knee looks more valgus and the biggest IMC distance was 3.9 cm at the age 15 years means knee looks more varus. In girls, the biggest IMM distance was 4.1 cm at the age 17 years, means knee looks more valgus and the biggest IMC distance was 2.7 cm at birth, means look more varus. **Conclusion:** Knees growth in boys from more valgus to more varus, where as girls from more varus to more valgus.

Pediatric Rehabilitation 2

0522FP73

DYNAMIC VISUO-MOTOR CONTROL DEFICITS IN CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER

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Purpose: Research shows that children with Developmental Coordination Disorder (DCD) have specific deficits in coordination between the eye and hand. As task complexity increases, this population is challenged more by the impairments. Few studies have used dynamic assessment instrument to examine specific deficits of eye–hand coordination in children with DCD. The purpose of this study was to investigate the differences in dynamic visuo-motor control with increasing task complexity via a computerized assessment in both

typically developed (TD) children and children with DCD. **Materials and Methods:** Based on reviewed literature, a visual perceptual computerized program was developed for testing the coupling of eye and hand. A quasi-experimental design (group x direction x level) was used to compare visuo-motor issues in the two target groups. Thirty-four children, age 5–10 years, participated in this study. Sequential targets were presented on a computer screen while three levels were measured: single (one target), double (two targets), and double-off (two targets appeared then disappeared). Reaction time and error scores were measured. **Results:** A repeated-measure ANOVA was used. Significant difference was found in direction (right/left side), but not in level. There was a significant between-group difference. **Conclusion:** Children with DCD demonstrated visuo-motor deficits, compared to the TD children. In this study, the task complexity did not affect task performance. Future studies are needed concerning the differentiating effect of task complexity, and the use of this visuo-motor assessment as a training instrument.

0522FP74

EFFECT OF MUSIC THERAPY ON CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

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Purpose: To investigate the effects of music therapy on children with attention deficit hyperactivity disorder (ADHD), to improve behavioral control. **Materials and Methods:** Twenty-four children aged between 5 to 10 years were recruited in this study. All of them diagnosed as ADHD were also enrolled in regular rehabilitation programs. Subjects were divided into 2 groups randomly: experimental group and control group. Members in both groups continued their original rehabilitation program, while those in experimental group received additional 12 courses of 40-min music therapy within 6 weeks. The ADHD checklist announced in DSM-IV was adopted for measurement of dimension in attention deficit and dimension in hyperactivity before and after intervention. The differences in scores of the ADHD checklist before and after intervention were analyzed by using *t*-test. **Results:** Before intervention, there was no significant difference between experimental group and control group in total scores of ADHD check list. In experimental group, significant improvements were noted in dimension of hyperactivity ($p<0.01$) and total scores ($p<0.01$) after 6 weeks of intervention. While in control group, the improvements in each dimension and total score were not significant. Improvement of total scores in experimental group was significantly better than in control group ($p<0.05$). **Conclusion:** Music therapy demonstrated significant positive effects on children with ADHD. It offers a promising alternative solution for improving the traditional ADHD therapy.

0522FP75

FUNCTIONAL CONNECTIVITY OF CEREBRAL CORTEX IN AUTISM AND HEALTHY CHILDREN REFLECTED IN EEG COHERENCE

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Purpose: Autism Spectrum Disorders (ASD) is a severe neurodevelopment disorder which is characterized by deficits in social and communicative skills. Precious studies have shown that dysfunc-

tional integration of frontal and posterior brain region is a major factor leading to ASD. The current study investigated quantitative EEG findings in ten children diagnosed with ASD as compared to ten controls matched for gender, age and IQ. *Materials and Methods:* The EEG was recorded during four tasks conditions, which are watching a video of a movement of human body, implement of that movement, watching a video of a movement of nonhuman body and watching a baseline video. Analyzing EEG signal using the spectrum of coherence. *Results:* We found that there are 4 EEG coherence patterns in particular region and frequency range of children with ASD. They are between the left the temporal lobe and the central zone; left temporal lobe and the prefrontal lobe; the right temporal lobe and the occipital lobe; and among bilateral frontal lobes. *Conclusion:* These results suggest in different tasks the functional connectivity patterns of cerebral cortex have many significant differences between the ASD and control. By the results we will establish a series of assessment-based individual neurofeedback treatment protocols for children with autism in future study.

0522FP76

THE VALIDITY AND RELIABILITY OF MODIFIED PEABODY PICTURE VOCABULARY TEST IV (PPVT IV) IN 48–59-MONTH-OLD CHILDREN

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Purpose: This study was done to investigate the validity and reliability of Peabody Picture Vocabulary Test IV (PPVT IV) in modified Indonesian Version. *Materials and Methods:* One hundred and five children between 48–59 months were enrolled to this cross sectional study. Two hundred and twenty-eight items in 19 sets of PPVT IV were translated in Indonesian language and revised according to Indonesian culture. The results were analyzed for its validity and reliability. The validity was measured by the correlation coefficient between the set score and the total score and the correlation coefficient between the item score and the set score. The reliability was measured by intra-class correlation coefficient, standard error of measurement (SEM) and Cronbach alpha. Modified PPVT IV had a good validity and high reliability. *Results:* Validity of Modified PPVT IV was good ($r > 0.256$; $\alpha = 0.01$ $n = 100$) and the reliability was high (internal consistency with Cronbach alpha 0.938, inter-rater reliability 0.957–0.985 and standard error of measurement (SEM) 6.4). *Conclusion:* Modified PPVT IV was a valid instrument with satisfactory reliability. There were 36 items that should be substituted for validation.

0522FP78

COMPARISONS OF THE MODIFIED OBER'S TEST AND MODIFIED THOMAS TEST TO MEASURE ILIOTIBIAL BAND FLEXIBILITY

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Purpose: Tightness of the iliotibial band (ITB) could cause an excessive lateral force exerted on the patella and lead to the patellafemoral pain. Various methods to measure ITB flexibility were documented and resulted in different outcomes. Besides, all published methods were performed by at least 2 examiners. Therefore, the purpose of this study was to describe the one-man performed modified Ober's and Thomas test, and to compare the ITB flexibility measured by two methods, between genders, and between dominant and non-dominant legs. *Materials and Methods:* Thirty healthy subjects (15 males and 15 females) were recruited. All subjects received the modified Ober's test in side-lying and the modified Thomas test in

supine position. Both tests were performed 2 times per session on two different days, and the flexibility was measured using an inclinometer and a universal goniometer. The between-day intra-rater reliability was calculated using an intra-class correlation coefficient model, and the comparisons were examined using repeated measures analysis of variance. *Results:* Both tests resulted in moderate to good between day repeatability (ICC 0.68–0.87), with higher ICC values for the modified Thomas test. A significant gender effect was detected for both the modified Ober's test ($p = 0.035$) and modified Thomas test ($p = 0.007$). *Conclusion:* Findings of this study suggested that ITB flexibility measurement could be accomplished by one examiner using the modified Thomas test. In addition, ITB flexibility was different between males and females, which should be taken into consideration in clinical assessment.

0522FP79

THE SAFEST NEEDLE INSERTION APPROACH TO TIBIALIS POSTERIOR: ULTRASONOGRAPHY STUDY

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Purpose: During needle insertion to tibialis posterior, electromyographers commonly compress the needle insertion site to reduce the depth to the muscle. This compression may move the neurovascular bundle and affect the safety window for needle insertion to the tibialis posterior. To estimate the safety window of needle insertion in the anterior and posterior approach to tibialis posterior using ultrasonography study with compression. *Materials and Methods:* We recruited 75 healthy volunteers (150 legs, 26 males and 49 females). During ultrasonography, the estimated area was pressed with transducer until parameters on ultrasonography did not change any more. The safety window and depth to tibialis posterior were measured at the upper third and midpoint of tibia with an axial ultrasonography scan in both approaches. And their correlations with clinical finding were estimated. *Results:* The safety window at the midpoint in the posterior approach was significantly larger than any other points (0.31–2.78 cm, mean 1.45 ± 0.39 cm). The depth at the midpoint in the posterior approach was significantly shallower than any other points (1.57–3.52 cm, mean 2.43 ± 0.40 cm). Body weight, height, tibia length, and leg circumference showed positive correlation with the safety window at all points. *Conclusion:* During the needle insertion to tibialis posterior with compression, the midpoint with posterior approach may be more favorable than any other points.

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0522FP80

RELIABILITY OF SIX MINUTE WALK TEST PERFORMED ON RECTANGULAR TRACT IN COMPARISON WITH THE OVAL TRACK IN OBESE STUDENTS WITH INTELLECTUAL DISABILITY IN JAKARTA

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Purpose: The purpose of this research was to measure the reliability of 6 min walking test (6MWT) on 20×2 m rectangular tract as compared to the usual oval track, in which the rectangular tract was considered easier to perform by Intellectual disability (ID) with obesity. *Materials and Methods:* Subjects in the study are ID

individuals aged 10–30 years from the SLB C and C1 in Jakarta in 2008–2009 with obesity and who have willingness to participate in this research with signed informed consent by parents/guardians. Twelve subjects were involved in this study. The subjects were asked to perform the 6MWT on the oval track followed by rectangular track. Reliability of the 6MWT on a rectangular track was measured using the Cronbach alpha reliability test and correlation of the 6MWT distance between the oval and rectangular track was measured using the Pearson correlation test. *Results:* Statistical analysis of 6MWT performed on the oval and rectangular track showed that Cronbach Alpha of rectangular tract was 0.93 with the correlation value of 0.88. *Conclusion:* It is concluded that the six min walk test performed on rectangular tract has good reliability.

0522FP81

SONOELASTOGRAPHIC EVALUATION OF PLANTAR FASCIA STIFFNESS AFTER SHOCK WAVE THERAPY FOR PLANTAR FASCIITIS: PRELIMINARY RESULTS OF A ONE-YEAR FOLLOW-UP

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Purpose: To follow-up changes of plantar fascia stiffness in plantar fasciitis patients undergoing extracorporeal shock wave therapy (ESWT). *Materials and Methods:* Seven plantar fasciae of 7 plantar fasciitis patients (3 men and 4 women) completed the one-year follow-up. Severity of heel pain was evaluated with visual analogue scale (VAS) of 0–100. Thickness and stiffness of the plantar fasciae were measured with B-mode sonography and sonoelastography. For objective evaluation of sonoelastogram, hue histogram analysis was used (value: 0–255, from stiffer to softer). All evaluations were recorded before ESWT, 1 week, 1 month, 6 months and 12 months after ESWT. Paired *t*-tests were used for comparison of VAS for heel pain, the plantar fascia thickness and hue value in sonoelastogram between pre-ESWT and different timings post-ESWT. *Results:* At different timing of measurements (pre-ESWT, and 1 week, 1 month, 6 months and 12 months post-ESWT), pain VAS was 57±21, 49±31, 30±25, 7±7, and 4±4. The plantar fascia thickness was 6.0±1.2 mm, 6.1±0.9 mm, 5.9±1.3 mm, 5.3±0.9 mm, and 4.4±0.7 mm. The hue value for sonoelastogram was 19±7, 39±16, 32±12, 27±8, and 14±7. *Conclusion:* After ESWT for plantar fasciitis, heel pain intensity and the plantar fascia thickness decreased gradually. Plantar fascia became softer initially but became stiffer than pre-ESWT at long-term follow-up.

0522FP82

ANKLE BRACHIAL INDEX OF DIABETIC PATIENTS: RELATIONSHIP WITH THE DURATION OF HAVING DIABETES AND COMPLIANCE DOING DIABETIC THERAPY

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Purpose: Peripheral arterial disease (PAD) is a common complication in diabetic patients. Several factors influence the development of PAD, including duration of having diabetes mellitus (DM) and compliance to the therapy programs. Ankle Brachial Index (ABI) is

usually used as a screening tool to detect PAD of lower extremity. This study was conducted to study the relationship between ABI and the duration of having DM, as well as the compliance to the therapy, which include medication, exercise, and diet. *Materials and Methods:* A cross-sectional study was conducted in one diabetic club in Jakarta. Twenty-two diabetic patients were participated in this study. ABI was measured using manual sphygmomanometer. The patients filled the questionnaire of demographic data, and assessment of the compliance was taken by interview. *Results:* Age of the patients was 68.77±7.43 years, duration of having DM was 10.86±8.05 years. Abnormal ABI was found in 40% of patients. The mean ABI of the patients who were diagnosed with DM ≤5 years and >5 years was 1.14±0.14 and 1.08±0.22, respectively. The mean ABI in patient who were taking medication properly was 1.10±0.22 and those who were taking improperly was 1.05±0.17. In patients who were on diet, the mean ABI score was 1.08±0.20, and in those who were not on diet the score did not perform exercise the score was 1.16±0.22. The mean ABI score in patients who performed exercise regularly was 1.14±0.00, and those who was 1.08±0.21. However the difference between all of the parameters was not significant. *Conclusion:* The occurrence of PAD in this study was higher than that in other literature. Age of the patients and duration of having DM seem to have an important role but other factors should also be taken into consideration. Further study is therefore needed.

0522FP84

QUANTITATIVE ANALYSIS OF SONOELASTOGRAM OF THE PLANTAR FASCIA – COMPARISON BETWEEN HUE HISTOGRAM AND RED-GREEN-BLUE COLOR HISTOGRAM ANALYSIS METHODS

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Purpose: To compare red-green-blue (RGB) color histogram and hue histogram analysis methods in quantitative analysis of sonoelastogram of the plantar fascia (PF) in chronic plantar fasciitis patients and healthy subjects. *Material and Methods:* The standard stiffness scale for corresponding relative stiffness on sonoelastogram was extracted for analysis. Twenty-four feet of chronic plantar fasciitis patients, nineteen asymptomatic feet of younger (age <40) healthy subjects, and fifteen asymptomatic feet of older (age ≥40) subjects were included. Both sonoelastography and conventional sonography (for PF thickness) of the proximal PF were performed. The sonoelastogram of each PF and the extracted standard stiffness scale were analyzed by RGB color histogram and hue histogram analysis methods using Image software. J. Mann-Whitney *U* test was used to compare the results of RGB and hue analysis between groups. *Results:* Hue analysis of the standard stiffness scale showed a linear pattern from the hardest to the softest parts, while red, green, and blue analyses showed non-linear patterns with different distributions. In hue analysis, the hue intensity (0–255, from hardest to softest) was significantly higher in the fasciitis group (24.1±11.4) than in younger (8.9±3.3) and older healthy (9.5±4.6) groups, indicating softer PF in chronic plantar fasciitis patients than the healthy subjects. In RGB analysis, although the red intensity for relative hardness (0–255) demonstrated softer PF in the fasciitis group (131.7±13.0) than younger (147.4±8.5) and older healthy (141.5±12.8) groups, the blue intensity for relative softness (0–255) revealed a conflicting result that the PF was softer in younger healthy group (88.3±6.1) than the fasciitis group (77.7±10.2) and older healthy (79.0±11.6) groups. *Conclusion:* Hue analysis method was superior to RGB analysis method in differentiating the PF stiffness between chronic plantar fasciitis versus healthy subjects.

0522FP85

THE RELATIONSHIP BETWEEN ANKLE BRACHIAL INDEX AND WALKING FUNCTION OF DIABETIC PATIENTS, MEASURED WITH WALKING IMPAIRMENT QUESTIONNAIRE: A PILOT STUDY

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Purpose: Ankle Brachial Index (ABI) is sensitive and specific for early screening of peripheral arterial disease (PAD). In people with diabetes, the risk of PAD is increased by age, duration of diabetes, and presence of peripheral neuropathy. In the literature, prevalence of PAD in people with diabetes >40 years of age are 20%. They usually have a slower walking speed and a limited walking distance. This study was done to find whether there were any relationship between ABI and walking function in diabetic subjects. **Materials and Methods:** Twenty-two diabetic subjects at one diabetic club in Jakarta were recruited in this study. They performed exercise regularly twice a week. ABI value was measured using the manual sphygmomanometer, and walking function was assessed using the Walking Impairment Questionnaire (WIQ), which was divided in to three parts: walking distance, walking speed, and stair climbing. **Results:** The mean age of the subjects were 68.77±7.43 years. Nine subjects (40%) had abnormal ABI. Those subjects also had lower score at walking speed and stair climbing of WIQ, but was not significant ($p>0.05$) Four of nine subjects who had abnormal ABI still had a maximum score of 100 for walking distance of WIQ. **Conclusion:** Subjects with abnormal ABI in this study still had average walking function. It could be the result of regular exercise, which help in maintaining their walking performance.

0522FP86

THE EFFECTIVENESS OF FOCUSED SHOCK WAVE THERAPY OF DIFFERENT INTENSITY LEVELS AND A NEW ALTERNATIVE, RADIAL SHOCK WAVE THERAPY FOR THE TREATMENT OF PLANTAR FASCIITIS: A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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Purpose: Controversial results exist regarding shock wave therapy for plantar fasciitis. The purpose of this study was to conduct a network meta-analysis to determine the effectiveness of focused shock wave (FSW) therapy of different intensity levels and to compare with a new alternative, radial shock wave (RSW) therapy for managing plantar heel pain. **Materials and Methods:** We performed a systemic review of all randomized control trials through Medline and Pubmed from 1996 to September 2011. FSW of different intensity ranges were treated as three subgroups, whereas studies using RSW were regarded as a separated one. The pair-wise and network meta-analysis were undertaken to compare their successful rates of treatments and magnitudes of pain reduction. Relation between the intensity levels of FSW and its effectiveness was investigated by meta-regression. **Results:** The pair-wise meta-analysis showed that medium and high intensity FSW had reliably higher successful rates of treatments and magnitudes of pain reduction against plantar fasciitis, while the effectiveness of low intensity FSW and RSW appeared less convincing due to the huge confidence interval. After employing the network meta-analytic methods, the probability of being the best treatment was the highest in RSW, followed by low, medium or high intensity FSW. The meta-regression for FSW therapy indicated that the successful rates of treatments were not related to its intensity, whereas elevated energy efflux densities has a tendency tended to relieve pain even effective more. **Conclusion:** Applying the highest and mostly tolerable energy output within the medium intensity range is the prior option when applying FSW on plantar fasciitis. RSW may be considered an appropriate alternative due to its cost effectiveness and better efficacy in clinical practice.

PLENTERY LECTURES (MAY 23, 2012, 08.00–09.00)

Art and Culture in Surgery with PMR

PL03-01

THROUGH ARTS TO INCREASE THE QUALITY OF HUMAN LIFE***I. Wayan Dibia****University of Indonesian Institute of Arts, Bali, Indonesia*

Arts, and important aspect of human creation, are richly laden with potential benefits for both the individual and community as a whole. When they are utilized correctly and properly, arts can offer much more than just pleasure and enjoyment. Arts can increase the quality of human life. The increasing global competition has motivated nations around the globe to put their best effort and energy and strategy forward, using all possible means, to increase the quality of their citizen. Aiming to achieve this goal, most nations rely on science and technology, and many tend to overlook the potential of arts. This paper demonstrates the great potential of arts to increase the quality of human life. Using Balinese performing arts (music, dance, and drama) as a means of illustration, this paper aims at showing the potential of arts in increasing the quality of human life.

PL03-02

ART AND CULTURE: AN ASIAN PERSPECTIVES IN PHYSICAL AND REHABILITATION MEDICINE***Sukajan Pongprapai***

Abstract is missing.

PL03-03

MENTAL PROCESSING OF MUSIC EXPECTATION***Yu-Cheng Pei****Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital at Linkou, Taoyuan, Healthy Aging Research Center, Chang Gung University, Taoyuan, Taiwan*

Auditory event-related potentials (ERPs) were investigated in an oddball paradigm to verify electrophysiological evidence of music expectation, which is a key component of artistic presentation. The non-target condition consisted of four-chord harmonic chord sequences, while the target condition was manifested by a partially violating third chord and a resolving fourth chord. The results showed that the specific MMN (mismatch negativity) elicited in the resolving chord is as robust as that elicited in the partially violating chord. Moreover, the P3b (P300) elicited in the resolving chord was smaller than the one in the violating chord. Taken together these data indicates that the human brain pre-attentively may be able to anticipate a subsequent resolving chord when music expectation is generated by a partially violating chord.

PLENARY LECTURES (MAY 23, 2012, 11.00–12.00)

PMR Future and Direction**PL04-01****ISPRM AND AOCPRM – MUTUAL BENEFITS****Joel A. De Lisa***ISPRM Immediate Past President*

ISPRM was founded November 13, 1992. It has undergone a formative stage (1992–1999), an operational stage (1999–2008), a programmatic stage (2008–2011); and a re-organizational change (2012–). It has divided the World into three ISPRM areas: Asia–Oceanic (2013); Europe–Eastern Mediterranean, African; and the Americas. It has planned for annual ISPRM Congress with standardized structure and format. The ISPRM serves as the International umbrella organization for PRM physicians. It has an official relationship with the World Health Organization. It is in the process of restructuring its governance. Much of the conceptual thinking was accomplished at the 2nd AOCPRM meeting in Taiwan. One of the key issues that need to be refined is ISPRM's relationship with Regional Societies. AOCPRM may serve as the model for this process.

PL04-02**THE WORLD REPORT ON DISABILITY AND ITS RECOMMENDATIONS : A STRONG SUPPORT FOR PRM ROLE AND DAILY TASKS IN ANY COUNTRY****Alessandro Giustini***University of Florence, Scientific Director of Rehabilitation Hospital San Pancrazio-SantoStefano Group-Italy, Chair of ISPRM WRD Sub-Committee*

CRPD- 2006 focused attention on ways to combat discrimination, promote accessibility and inclusion, and promote respect for people with disabilities. It was accepted in many countries, so these contents are basis for their national rules regarding any problems regarding Disabled People rights, and any interventions and programmes towards Rehabilitation. WRD synthesizes the best available scientific evidence to overcome the barriers for people with disabilities in rehabilitation, assistance, education, environment and employment. Provides evidence to support policies and programmes to improve the disabled people lives; final recommendations are valuable resources for policy-makers, service-providers, professionals and people themselves to address these problems in any Country . An innovative approach, based on the ICF, determinant for clinical and scientific system of rehabilitation interventions management. Surely a strong support for PRM. Only our Discipline combines different anatomic-biological, functional and relational elements with aspects of context, personality and individuality of the subject, of his/her personal and medical history, defining the global prognosis of a person's health condition. WRD makes Communities (Governments, Stakeholders) understand how disability problems, needs and services for citizens, are strictly connected with Rehabilitation and development of PRM: "Rehabilitation Medicine is concerned with improving functioning, reducing impairment and preventing or treating complications. Doctors with specific expertise in medical rehabilitation are referred as Physiatrists or Physical and Rehabilitation specialists." PRM specialists can offer their existing professional knowledge and experience in daily activity and in research helping people preventing and reducing disabilities by specialized interventions, empowering them back into participating in the Society.

PL04-03**INTERVENTIONAL PROCEDURES IN REHABILITATION MEDICINE****Simon F.T. Tang***Professor and Program Director, Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital and Chang Gung University, Taoyuan County, Taiwan*

Physiatrist, physical therapist, occupational therapist, and speech therapist work as a team to offer multi-disciplinary rehabilitation treatment strategies for the needed patients. Physiatrist acts as a team coordinator or team leader. In recent years, new imaging tools such as the musculoskeletal ultrasound has evolved and can be used not only to assist physiatrists to diagnose musculoskeletal disorders but also to perform ultrasound-guided injection techniques for musculoskeletal pain disorders. Furthermore, the outcome of neurological disorders can be improved by the application of guided Botulinum toxin type A (BTX-A) injection. Therefore, physiatrist can play a key role in modifying the rehabilitation outcome through these interventional procedures. However, more studies should be conducted to prove the efficacy and cost-effectiveness of these new procedures. *Part1:* Intra-articular injection of Hyaluonic Acid for knee OA Gait pattern and lower extremity muscle activities are often altered in patients with knee osteoarthritis which may further aggravate existing symptoms. Intra-articular knee joint injection of hyaluronic acid was documented to reduce nerve impulses and nerve sensitivity associated with the pain from knee OA. Hyaluronic acid also provides protective effects on cartilage, enhances proteoglycan synthesis and helps to maintain a more robust cartilage. In this study, intra-articular knee injection of hyaluronic acid was effective in reversing the altered gait pattern, ground reaction force, lower extremity joint kinetics, and muscle force in patients with less severe knee OA (Ahlback grading scale ≤ 2). It was also effective in alleviating clinical pain symptoms and improving activities of daily living. The treatment effectiveness lasted up to six months. *Part2:* Application of echo-guided injection for musculoskeletal pain. Ultrasound is a radiation-free, easy-to-use imaging tool in diagnosing soft tissue lesion and in performing ultrasound guided injection. Ultrasound can also be applied in performing accurate shoulder, caudal epidural, and knee joint injection. Under ultrasound guidance the advancing motion of the needed can be observed as continuous and real-time images. In sacral hiatus epidural injection, 100% accuracy in caudal needle placement into the caudal epidural space under ultrasound guidance was confirmed by contrast dye fluoroscopy. Ultrasound can also accurately guide the injection needle to the lower one-third of the sacroiliac joint for successful sacroiliac joint injection. The significant improvements in shoulder pain and range motion after ultrasound-guided injection in treating shoulder impingement syndrome suggest that a higher volume of steroid-lidocaine suspension can be accurately infiltrated into the lesion site as compared with the conventional blind injection technique. Ultrasound is a reliable imaging tool that modern physiatrists can use to accurately perform guided injection procedures for the treatment of musculoskeletal disorders. *Part 3:* Application of electrical stimulation technique or echo-guided or guided injection of Botulinum toxin type A for spasticity. During the past decade, intramuscular (IM) BTX-A injection has been increasing used due to its effectiveness, convenience and relative safety. Several studies have focused on the therapeutic effects of IM BTX-A injection on lower limb spasticity and showed benefits in posture control, base of support, spasticity reduction, PROM, distal positioning in the upright situation, upright balance, subjective rating of problem severity , walking distance, stepping rate, limb pain, reduction in the use of walking aids and decreased ankle muscle activity by kinematic PEMG study. Our studies also revealed the positive effects on kinematic parameters and motor control of lower limbs following BTX-A therapy.

PL04-04**THE CHALLENGES OF PMR IN DEVELOPING COUNTRY****Angela B.M. Tulaar***Faculty of Medicine, University of Indonesia, Indonesian Board of Physical Medicine and Rehabilitation, Jakarta, Indonesia*

Physical Medicine and Rehabilitation (PMR) as a new specialty faces many challenges during its implementation and development, including in Indonesia as a developing country. The implementation of PMR started only during 1970's although rehabilitation services has been introduced since 1947 after World War II by the Late Professor Doktor R. Soeharso in Surakarta. First challenge met was the production of PMR Specialists prompting several Physicians having to attain PMR Education and Training abroad and coming home faced the second challenge of being rejected as a new medical specialty among the already existing medical specialties. Another rejection came from the earlier existing allied health professionals. Struggles to overcome the challenges were initially forming the IDARI (Indonesian Association

of Rehabilitation Medicine Specialists) in 1982, followed by the provision of PMR Residency Training Program in 1984 at three main universities, namely University of Indonesia, Airlangga University and Diponegoro University. Recognition by the Ministry of Education for PMR Specialty Training Program was only given in May 1987, and recognition of PMR as a Medical Specialty by the Indonesian Medical Association was only given in 1990. Existency of Indonesian PMR had to be maintained and preserved continuously even up to the present time when more than 350 PMR Specialists were already produced from five training centers. Challenges are still met, on top of the persisting initial challenges, such as the evenly distribution of PMR Specialists in the county to meet the demands of serving a population of more than 250 million people spread among 14,000 islands of Indonesia; combining the simple traditional method with the modern sophisticated method of PMR management. Continuing education and pursuing higher level of education have provided additional credits to the existency, and proven qualified standard professional performances, including roles in the community even during disasters, have made PMR Specialty one among the Medical Specialties to be taken into consideration seriously.

INVITED LECTURES (MAY 23, 2012, 09.00–10.15)

Musculoskeletal Rehabilitation**SS13-01****THE APPLICATION OF ULTRASOUND IN FOOT AND ANKLE****Chih-Chin Hsu, Carl Pai-Chu Chen, Wen-Chung Tsai, Simon Fuk-Tan Tang***Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Keelung, Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Linkou, Taiwan*

The musculoskeletal ultrasound (MSUS), possessing the advantages of the absence of radiation exposure, wide availability, and low cost, is a valuable tool for simultaneously surveying a variety of foot and ankle pathologies, including ligament and osseous injuries. When judged by the MRI diagnosis, an injured anterior talofibular ligament can be correctly diagnosed by high-resolution ultrasonography with the sensitivity of 92%, specificity of 83%, positive predictive value of 93%, negative predictive value 82%. This tool can accurately diagnose a damaged calcaneofibular ligament with 100% in sensitivity, specificity, positive predictive and negative predictive values. This examination for an injured anterior inferior tibiofibular ligament had a sensitivity of 66%, specificity of 91%, positive predictive value of 86%, and negative predictive value of 77%. The normal ankle ligaments have a fibrillar echogenic pattern, a well-defined sharp border, and a thickness of less than 2 mm on sonograms. Torn ankle ligaments appear hypoechoic and swollen. Edema of the subcutaneous tissue and avulsion of the bony insertion are typical ultrasonographic features associated with injured ligaments. Foot and ankle tendons, including the anterior tibial, extensor hallucis longus, extensor digitorum longus, peroneus longus & brevis, Achilles, flexor hallucis longus, flexor digitorum longus, and posterior tibial tendons, have to be checked in routine examination. The normal tendon appears as an echogenic fibril band in longitudinal sonograms and an echogenic oval shape in transverse sonograms. Typical ultrasonographic features for tendon pathologies, including decreased echogenicity, thickening, longitudinal split, and rupture, can be observed in daily practice. Peritendinitis presents as a hypoechoic rim surrounding the tendon substance. The plantar fasciitis is the most common cause of inferior heel pain and can be easily diagnosed by the MSUS. Findings of increased thickness greater than 4 mm and hypoechoic fascia are consistent with plantar fasciitis. Ultrasound guided needle placement is useful in dealing with intractable ankle joint problems and heel pain syndrome. MSUS has become increasingly important in the assessment of abnormalities of tendon, joints, ligaments, and other soft-tissue structures. Because there are so many structures to be examined in the foot and ankle areas, the examination should be focused and guided by the clinical findings.

SS13-02**THE HIP IN CEREBRAL PALSY – WHAT DOES IT TAKE TO KEEP IT IN PLACE?****Amara Naicker Naysaduray***Rehabilitation Medicine Department of Orthopedics & Traumatology, Faculty of Medicine, HUKM, Cheras, Kuala Lumpur, Malaysia*

Hip disorders are common in patients with cerebral palsy and cover a wide clinical spectrum, from the hip at risk to subluxation, dislocation. Although the hip is normal at birth, a combination of muscle imbalance and bony deformity leads to progressive dysplasia. The displaced/dislocated hip in cerebral palsy results in significant morbidity in terms of pain, contractures, problems with sitting, standing or walking, difficulty with perineal care, pelvic obliquity, scoliosis and fractures and decubitus ulcers. The natural history of any spastic hip

disorder is progressive lateral displacement of the hip sary to spasticity and muscle imbalance around the hip. Displacement may progress to subluxation with sary acetabular dysplasia, deformity of the femoral head, dislocation and painful degenerative arthritic changes in the hip. Several risk factors such as age of child, GMFCS and CP subtype have been identified as contributors to the progression of spastic hip disease. Widely accepted management combinations such as therapy, orthotics, botulinum toxin and even surgery have been used to address the problems of spastic hip disease with varying degrees of success. Management of the CP hip should begin early on in the follow-up. Methods of preventing the onset of the spastic disease process and its subsequent morbidities need further attention. Identifying and incorporating sensitive assessment methods both clinical and radiological for early detection of hips at risk and subsequent management should be included as part of preventive intervention to educate parents, careers and healthcare personnel. The roles, benefits and options, of early institution of management techniques that might contribute to the prevention or avoidance of onset of spastic hip disease needs to be further evaluated in the presence of overwhelming data on how to manage it once the disease process is underway.

SS13-03**REHABILITATION OF CHRONIC ARTHRITIS****Carmen Ho***Department of Medicine, Tung Wah Hospital and MacLehose Medical Rehabilitation Centre, Associate Consultant Honorary Clinical Assistant Professor, University of Hong Kong, Hong Kong*

The rehabilitation management of individuals with chronic arthritis is imperative to decrease the potential long-term disabilities. Specifically, individuals with chronic arthritis are at risk for decreased joint range of motion and flexibility, decreased muscle strength and muscle atrophy, and reduced cardiopulmonary endurance. Deficit in such areas lead to functional compromise and increased risks for other health problems. Therefore, 2 dimensional approach utilizing pharmacological and rehabilitative techniques is necessary. Fortunately, under proper supervision, individuals with chronic arthritis can exercise safely, improving overall physical fitness, greater ease for activities of daily living and an improved sense of well-being. Rehabilitative techniques commonly used include appropriate periods of rest and activity modification; physical therapeutic modalities such as heat/cold, ultrasound, pulsatile electromagnetic field or simple electrical stimulation; aerobic and resistive exercise; bracing/splinting and use of adaptive equipments.

Treatment of Spasticity**SS14-01****EFFECT OF INTRATHECAL BACLOFEN CONCENTRATION AND MODE OF ADMINISTRATION ON H-REFLEX IN ACQUIRED BRAIN INJURY****D.S. Stokic, S.A. Yablon***Methodist Rehabilitation Center, Jackson, Mississippi, USA*

Background: Intrathecal baclofen (ITB) administration by programmable pump allows manipulation of several parameters but adjustments are often limited to dose with concentration increase made to lower the frequency of refills. A few anecdotal reports suggest that lowering concentration may result in better clinical response, but these observations remain without neurophysiologic support. This study aimed to assess changes in spinal reflex excitability after manipulation of ITB concentration and mode of administration in patients with hypertonia due to acquired brain injury. *Materials and Methods:* The effect of ITB concentration on soleus H-reflex (H/M ratio) was assessed 1–6 h after administering a 50 µg bolus at 50 µg/

ml concentration via lumbar puncture (LP, duration 1–2 min) during screening trial ($n=25$) in comparison to a 50 µg bolus at 500 µg/ml concentration programmed through the pump and delivered via intrathecal catheter (IC, duration 10 min) over simple continuous dose (25–100 µg/day, $n=16$). The effect of mode of administration was assessed by comparing peak changes in H/M ratio after the same 50 µg IC bolus given over simple continuous dose (complex mode) to the equivalent daily dose delivered in simple continuous mode only (75–150 µg/day, $n=22$). *Results:* The decrease in H/M ratio was significantly faster and greater after LP than IC bolus (1–6 h mean 90% vs 82%, 1-h 76% vs 63%, respectively). H/M decrease was also significantly greater with complex than simple continuous mode of administration (91% vs 78%), which was not related to the total daily dose received. *Conclusion:* Within the dose ranges evaluated, lowering ITB concentration and programming complex continuous mode of administration led to greater decrease in spinal reflex excitability. Manipulation of drug and pump parameters to increase ITB flow may lead to better clinical response, which warrants further studies.

SS14-02

THE IMMEDIATE EFFECT OF ELECTRICAL NERVE STIMULATION GUIDED BOTULINUM TOXIN TYPE A INJECTION FOR FOCAL SPASTICITY MANAGEMENT IN ADULTS: A RETROSPECTIVE REVIEW

Xianghu Xiong, A. Zamli

Burwood Spinal Unit, Christchurch, New Zealand

Background and Aims: Spasticity is a common complication associated with an upper motor neuron lesion and can have a detrimental impact on quality of life. Even though Botulinum Toxin Type A (BoNT A) offers a relatively new treatment modality for focal spasticity management, it has gained wide acceptance amongst clinician worldwide. Typically, the administration of BoNT A intramuscular injection can be performed using clinical palpation, electromyography (EMG), electrical nerve stimulation or ultrasound guidance. The main objective of this retrospective review was to specifically evaluate the efficacy of electrical nerve stimulation guided BoNT A injection for the treatment of focal spasticity resulting from different neurological insults. *Materials and Methods:* We retrospectively reviewed all available treatment records of patients undergoing treatment with BoNT A from January 2004 to April 2011. From this sampling frame, we were able to identify a total of 86 consecutive injection series. We had however, excluded 12 cases due to the extent of incomplete documentation. This makes a total of 74 BoNT A injection series with acceptable required amount of information for analyses in this study. *Results:* The majority of the injections 51 (68.9%) involved spasticity of cortical origin while 23 (31.1%) involved spasticity of spinal origin. From this sample, 30 (40.5%) has problematic spasticity of the upper limb while 40 (54.1%) had significant involvement of the lower limb spasticity requiring BoNT A treatment. A total of 49 (66.2%) injections involved single treatment while 25 (33.8%) involved multiple treatment sessions. Amongst those requiring multiple injections, the average time frame between injections was 5.96 months with range of repeat treatment from 2 to 4 times. All of the injections were performed with electrical nerve stimulation guidance. Overall, the clinical decision for BoNT A treatment involved severe focal spasticity with a mean Modified Ashworth Scale (MAS) of 3.50+ 0.50. We had interestingly found that there is a significant reduction of spasticity by 1 MAS score immediately post injection which we would suggest to be due to possible combination effect of BoNT A and needling mechanism associated with the electrical nerve stimulation. The reduction of spasticity effect continues to sustain up to a period of 12 weeks when there was significant resurgence of spasticity. *Conclusion:* This study adds to the existing evidence of significant reduction of spasticity with BoNT A treatment. The findings on immediate reduction of spasticity post electrical nerve stimulation guided BoNT A treatment is anticipated to create interest amongst clinicians to explore further evidence associated with this phenomenon as well as identifying potential clinical advantages associated with this effect.

SS14-03

BOTULINUM TOXIN TYPE A FOR THE CONTROL OF SPASTICITY IN ADULT PATIENTS

Yu-Ching Lin

Medical Device Innovation Center, Department of Physical Medicine and Rehabilitation, National Cheng Kung University, Tainan, Taiwan

Patients with stroke are disabled by weakness and spasticity. Spasticity has great impact on patients with stroke and their caregivers, in the aspects of abnormal body structure and function, limited activities and participation. Botulinum toxin type A (BoNT-A) has been used safely in patients with stroke. Spasticity of elbow, wrist, and finger flexors in upper limb is established to be reduced effectively with BoNT-A. The benefits include relief of pain, correction of deformity, improvement in activity of daily living like dressing the upper limb, and a reduction in caregiver burden. Some patients show improvement in function with active movement of the spastic upper limb after BoNT-A injection. BoNT-A injection to lower limb is established as effective to reduce lower limb spasticity, increase passive range of motion of lower limb, relieve associated pain and requirements for bracing. It is probably effective to improve motor function and manage associated reactions in the arm to enhance gait speed. Treatment of overactivity in the leg and foot by BoNT-A is possibly effective to improve gait speed. Regarding the quality of life and participation in patients with stroke after BoNT-A injection, the effect remains unproven. More research is needed to answer the unknown questions for control of spasticity in adult patients with botulinum toxin.

SS14-04

CLINICAL EXPERIENCE OF BOTULINUM TOXIN AND NEUROLYSIS IN SPASTICITY

Areerat Suputtitada

Thailand

Spasticity is a major challenge to the neurorehabilitation team. It manifests as an increase in stretch reflexes, producing tendon jerks and resistance appearing as muscle tone. It is caused by damage to the central motor pathways that control voluntary movement. Effects of spasticity range from mild muscle stiffness to severe, painful muscle contractures and repetitive spasms that reduce mobility and substantially impede normal activities of daily living. Spasticity can prevent or hamper function, cause pain, disturb sleep, and present major difficulties for hygiene care. However, it must not be forgotten that spasticity can also be useful, perhaps allowing a person to stand or walk when weakness would not otherwise permit it. With these issues in mind it is imperative that management is always patient and function focused rather than aimed at the reduction of spasticity only. Optimizing the methods of evaluation of spasticity is also important. Focal treatment of spastic muscles is to block the final common pathway. Nowadays chemodenervation with botulinum toxin (BTX) injections have been used to block the final common pathway at the neuromuscular junction. BTX is better tolerated than neurolysis with phenol or alcohol. It is a relatively safe medication and has few serious side effects. Although BTX has recently been approved for use in focal spasticity, its high cost limits this use. Both BTX and phenol or alcohol have dose ceiling limitation. Neurolysis should be preserved for pure motor innervations muscles to avoid paresthesia. BTX is recommended in the distal muscles which are mixed nerves innervations. Thus, managing these patients appropriately or referring them to those with expertise in this area is important. Chemodenervation with BTX and chemical neurolysis with phenol or alcohol can be used alone or in combination to effectively manage focal spasticity as with other treatments, these interventions must be done the right way, at the right time, in the right patient, and for the right reason. The proper use of these treatments requires careful patient assessment and realistic goals, knowledge of the peripheral functional anatomy, and an understanding of how these treatments work and how to best to administer them. Clinical experience is importance in successful of the treatment of botulinum toxin and neurolysis in spasticity.

SS14-05

THE APPLICATION OF BOTOX INJECTION AND MOTOR CONTROL FOR EQUINOVARUS GAIT IN STROKE PATIENTS*Simon Fuk-Tan Tang**Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital and Chang Gung University, Tao Yuan country, Taiwan*

Study design: Blinded, placebo-controlled, prospective clinical trial. *Purpose:* To examine the effects of botulinum toxin type A (BTX-A) injections into plantar flexor muscles in stroke patients with equinovarus gait. *Subjects:* 15 post-stroke and 10 matched neurologically intact subjects. *Methods:* Modified Ashworth Scale (MAS) and Fugl-Meyer Assessment of Physical Function scale scores along with surface EMG collected before and up to 12 weeks after BTX-A injections to plantar flexor muscle motor points in stroke subjects. Saline placebo injections were performed in a subset of stroke subject group. *Results:* MAS scores were decreased at 4, 8 and 12 weeks but F-M scores did not improve until 12 weeks post injection. Multi-muscle EMG patterns showed the return of volitional dorsiflexor activity in 11 and a decrease of antagonistic and distant co-activation in all but one of the 15 subjects. *Conclusion:* BTX-A is effective in reducing antagonistic and distant muscle activation that impedes volitional dorsiflexion.

Bladder Dysfunction

SS15-01

OVERACTIVE BLADDER PROBLEMS IN THE ELDERLY*Siti Annisa Nuhonni**Faculty of Medicine, University of Indonesia, Departemenet of Physical Medicine and Rehabilitation, Cipto Mangunkusumo Hospital, Jakarta, Indonesia*

As defined by the International Continence Society (ICS), overactive bladder (OAB) is a group of symptoms characterized by urinary urgency with or without urge incontinence, which is usually associated with frequency and nocturia. The prevalence of OAB increases with age and it is more prevalent in women than in men. Indonesian Continence Assosiation (PERKINA) conducted a multi-centered study and had found that the prevalence of urinary incontinence in geriatric patient (aged ≥ 60 years) was 22.2% which was significantly higher when compared to the other age group (12.0% in adult population aged 18–59 years and 6.8% in children population aged < 18 years). In a study conducted at Geriatric Outpatient Clinic, Cipto Mangunkusumo Hospital during 2006, it was found that the prevalence of nocturia was very high, 87.7%, 22.4% was found to have OAB and 18.4% with urinary incontinence. OAB is a serious condition as it can affect not only the medical condition of patient, but also their financial condition. Specifically, urinary incontinence is associated with an increased risk of urinary tract infection, pressure ulcers, falls and fractures, which may severely compromise patients function and overall health. Furthermore, the cost of care of Urinary incontinence is relatively high and had become a financial burden both for patient and hospital. OAB is a chronic condition, therefore, the goal of therapy is to reduce long-term health care costs, and increase quality of life (QOL) and patient satisfaction. Up until now, there have been many modalities found to help reduce the symptoms of OAB, antimuscarinic treatment; behavioral modification such as bladder training, fluid manipulation, scheduled toileting, and pelvic muscle exercises; and surgical intervention. Behavioral therapy is often combined with pharmacological treatment. Behavioral therapy are currently recommended as the first line therapy in the treatment of urinary incontinence. It is relatively inexpensive and easy to implement. However, the effectiveness depends mainly on patient motivation and compliance, thus, in order for this therapy to be effectively conducted it requires a high level of motivation and encouragement. Without motivation, behavioral

therapy in elderly will not be effectively accomplished. Therefore, the role of caregiver is very important in helping the elderly to build up confidence and motivation, as well as in reminding patient for therapy compliance and patient supervision during the practice of training. In this case, the success of therapy does not solely depends on patient motivation, but also on the caregiver's understanding and willingness in motivating patient.

SS15-02

URINARY INCONTINENCE AFTER STROKE AND IN THE ELDERLY: IS THERE DIFFERENCES IN MANAGEMENT?*H. Madersbacher**Department of Neurology University Hospital, Innsbruck, Austria*

In time of maximal impairment after "stroke" (CVA) 46% of females and 37% of males are incontinent, however 31 % have pre-stroke urinary incontinence - (UI). Double (urinary and fecal) incontinence is more prevalent than isolated incontinence (Kovindha et al., 2010). Incontinence in the elderly has the highest known prevalence in any group. The etiology is complex, multifactorial and conditions outside the urinary tract play an important role. In both groups the diagnostic work-up comprises a targeted history, clinical examination, urine analysis, bladder diary and a post-void residual urine (PVR) and urodynamics are only indicated, if PVR is more than 50% of bladder capacity. Management of UI in both groups depends on the degree of bother to the patient and/or to the carer, on motivation, level of cooperation, compliance and on the overall prognosis including life-expectancy. Successful treatment of UI has an important impact on the quality of life in both groups; however, this is often not recognized in rehab institutions. The management of incontinence after stroke and in the elderly has in common lifestyle interventions, an individualized behavioral therapy, anticholinergic medication and the treatment of relevant co-morbidities.

SS15-03

BLADDER MANAGEMENT FOR SPINAL CORD INJURED PATIENTS IN DEVELOPING COUNTRIES WITH LIMITED RESOURCES*Apichana Kovindha**Department of Rehabilitation Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand*

Objective: To find appropriate bladder management for spinal cord injured patients in developing countries with limited resources *Materials and Methods:* Reviewed evidence from literature. *Results:* At present, aims of neurogenic bladder dysfunction (NBD) are to prevent complications including upper urinary tract damage, and to be socially continence. With limited resources, a simple one-channel cystometry, instead of two-channel urodynamics, is adequate for detecting neurogenic detrusor overactivity (NDO). Early antimuscarinic prescription can keep detrusor pressure low; and clean intermittent self catheterization (CISC) with frequency of 4–6 times/day, depending on urine output, help control urinary incontinence between catheterizations. Reused silicone and red rubber catheters are acceptable for CIC Transurethral indwelling catheterization (IDC) is rather common especially among chronic SCI women and tetraplegics in developing countries. To prevent infection, slow down the reduction in bladder capacity and compliance, and maintain upper tract function, patients and caregivers are educated about the needs of antimuscarinics, appropriate catheter sizes, catheter fixation and care as well as adequate fluid intake, frequent emptying urine bag and regular change of catheter. In addition, a regular follow-up is mandatory for early detection of complications and appropriate treatments. *Conclusion:* Although materials for bladder management are limited in developing countries, we can improve bladder outcomes and minimize complications by correct diagnosis of neurogenic detrusor dysfunction, proper treatment, patient education and regular follow-ups so that chronic SCI persons can look after their bladder properly.

Cardiac Rehabilitation

SS16-01

NEW APPROACH OF CARDIAC REHABILITATION FROM HOSPITAL TO HOME BY ICT

Yutaka Kimura

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Cardiac rehabilitation basically consists of behavior medicine and based on modification of life style such as exercise, food and smoking cessation. There are some problems to achieve behavior medicine, since recording of the patient's physical/vital data in daily life is not easy for long period and simultaneously subsequent feed-back of those data are also more difficult. However, ITC (Information Technology Communication) will make some solutions of these problems. We developed ICT home monitoring system, which obtain home vital data such as blood pressure, steps of walk and body weight automatically through wireless gateway system and feed back some messages to patients by e-mail for keeping of patient's positive daily activity. Our study in metabolic syndrome subjects showed that the ICT home monitoring group (body weight, steps, blood pressure) showed more reduction of body weight compared with the subjects without home monitoring. And the subjects with feed-back message showed highest reduction of body weight. The subjects with myocardial infarction also showed good control of body weight and blood pressure when followed by ICT home monitoring system. These data showed ICT home monitoring and feed-back would quite cost-benefit and effective system of cardiovascular disease management. Now we are using real time ECG monitoring system through just simple LAN and smart phone. These ECG data will be more convenient and useful for not only emergency situation but also daily cardiac monitoring. We will show the latest system for these cardiac monitoring systems.

SS16-02

EXERCISE TRAINING FOR PATIENTS AFTER CORONARY ARTERY BYPASS GRAFTING SURGERY

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Patients with coronary artery disease (CAD) who suffer persistent symptoms and reduced quality of life while receiving medical therapy are considered for revascularization. Coronary Artery Bypass Grafting Surgery (CABG) and percutaneous coronary intervention (PCI) are the most common methods of revascularization for symptomatic CAD. These two interventions can reduce ischemic symptoms such as angina or dyspnea, thus improving the ability to undertake physical training. In general, CABG remains the method of choice in patients with left main disease, multivessel disease, especially in diabetic patients, or patients with left ventricular dysfunction, in the event of failure of PCI, and in-stent restenosis. Although the procedure risk is higher for patients receiving CABG, the extent of revascularization is more complete, and hence the potential of training is higher than patients with PCI. Cardiac rehabilitation (CR) exercise training improves exercise capacity, without significant complications or other adverse effects. For patients with CABG, previous studies reported 10.5%–48.2% increase of peak oxygen uptake in outpatient CR, and the increase of absolute value was 1.9–6.6 ml/kg/min, depended on different exercise protocol and the initial level of fitness. Short-term exercise training for patients with CABG showed benefits to cardiorespiratory function, muscular strength, metabolic profile, cardiac function, ventilatory threshold, hemodynamic function and quality of life. Additionally, exercise training may improve graft patency, reduce cardiac events and readmission rate. Thus, CR exercise training is an important intervention and should be recommended to

most of the patients after CABG. Tai Chi Chuan (TCC) is a popular Chinese conditioning exercise. The exercise intensity of TCC was low to moderate, depends on its training style, posture and duration. We have applied a 12-month TCC program to patients with CABG as a phase III cardiac rehabilitation program. After training, the TCC group showed an increase of 10.3% in peak oxygen uptake and 11.9% in peak work rate. Therefore, TCC may be prescribed as an alternative exercise program for selected patients with CABG.

SS16-03

THE EARLY REHABILITATION PROGRAM IN CHILDREN WITH CONGENITAL HEART DISEASE

Hening Laswati

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Progress in the treatment of congenital heart disease has lead to a dramatic reduction of mortality. Between 70–80% of all congenital heart diseases can be corrected, and carried out in early infancy, to avoid long-term complications resulting from hemodynamic burden, or from chronic cyanosis. With improved survival, the focus of follow-up care has shift from assessment of procedure-related mortality toward assessment of long-term quality of life. Cardiac disease means a restriction of the affected child's perceptual and motor experience. Children with complex congenital heart disease had higher risk of having some degree of impaired motor competence. Anxiety and worries about the ill child often cause parents to adopt an overprotective behavior. Motor development and physical activity is one of the fields on which diagnosis and treatment must focus. The problem is how to give proper comprehensive rehabilitation management in children with congenital heart disease, because there are wide variations defect of the heart and vessels, and there are many factors that impede the motor development and physical capacity. However the implementation of early rehabilitation program can prevent complications after correction and increase the physical capacity. The present paper provides a review regarding early rehabilitation program in patient with congenital heart disease in Dr. Soetomo General Hospital.

SS16-04

REVISIT THE EVIDENCE OF CARDIAC REHABILITATION

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Treatment for cardiac diseases has been advanced a lot in last 20 years. Other than new pharmaceutical treatment, there are also new modalities of treatment such as stenting, biventricular pacing and stem cell transplant. The effectiveness of cardiac rehabilitation for post-acute myocardial infarction (MI) nevertheless is still shown to be high. The recent meta-analysis showed that the survival benefit after cardiac rehabilitation was similar to those studies done 20 years ago, with a reduction of recurrent MI by about 17% in one year and overall mortality by 15%. The effectiveness of cardiac rehabilitation on patients with heart failure showed modest reduction of mortality by about 4% but significant reduction of morbidity of about 40%. Cost-utility analysis also showed reduction of long-term cost of hospitalization, gain in QALY and improvement in quality of life. Exercise training in patients with cardiac diseases is more or less relatively standardized with a recommendation of combined aerobic and resistant exercise regime, as resistant exercise is shown to be safe for patients with mild to moderate heart failure. The latest evidence suggested that patients who had 25 or more sessions of training program had 20% less mortality than those who had less than 25 sessions.

ORAL PRESENTATION (MAY 23, 2012, 07.00–08.00)

Neuromuscular Rehabilitation 2

0523FP03

IMPROVEMENT OF QUIET STANDING BALANCE IN PATIENTS WITH WALLEBERG SYNDROME AFTER REHABILITATION*Eun Hye Na, Tae Sik Yoo, Soo Jeong Han**Department of Rehabilitation Medicine, Ewha Womans University School of Medicine, Korea*

Purpose: To evaluate quiet standing balance of patients with Wallenberg syndrome before and after rehabilitation. *Material and Methods:* Six patients with Wallenberg syndrome were enrolled within one month after being affected by an infarct of the lateral medulla. Quiet standing balance was assessed using posturography with eyes open and closed. The assessment was repeated after the patients had undergone rehabilitation treatment for 3–9 months, and the results of the two assessments were compared. *Results:* The quiet standing balance evaluation was performed by measurement of center of pressure (CoP) movement. In the initial test, the mean scores of mediolateral and anteroposterior speed, velocity movement, mediolateral and anteroposterior extent of CoP were all high, indicating impairments of quiet standing balance in the patients. After rehabilitation treatment, the anteroposterior speed and extent, the mediolateral speed and extent, and velocity moment of CoP showed statistically significant reductions in the eyes open condition ($p < 0.05$), and the anteroposterior speed and extent and velocity moment of CoP had decreased in the eyes closed condition ($p < 0.05$). Mediolateral speed and extent of CoP in the eyes closed condition had also decreased, but the reduction was not statistically significant. *Conclusion:* This study demonstrated improvements of quiet standing balance, especially anteroposterior balance, in patients with Wallenberg syndrome following rehabilitation. We suggest that balance training is important in the rehabilitation of Wallenberg syndrome and that, as an objective measure of balance status, posturography is useful in the assessment of quiet standing balance.

0523FP04

THE FEASIBILITY OF BAL-EX TRAINING FOR STROKE IN IMPROVING BALANCE AND QUALITY OF LIFE: A CASE STUDY*Zoolfaiz Salleh¹, Maria Justine¹, Zuraida Zainun², Haidzir Manaf¹**¹Physiotherapy Department, Faculty of Health Sciences, Puncak Alam Campus, Universiti Teknologi Mara Malaysia, ²Audiology Program, School of Health Sciences, Health Campus, Universiti Sains Malaysia, Kubang Kerian, Malaysia*

Purpose: To test the feasibility of the Bal-Ex training. Impairment in postural balance among stroke survivors has been shown to be influenced by dysfunction of motor control and sensory modalities, which in turn limits activities of daily living. We proposed a novel method for balance training that combined input from motor control and sensorimotor systems. *Materials and Methods:* One subject (female, age 56 years old, weight 56 kg, height 157 cm, body mass index 22.72 kg/m²) with history of one month stroke was involved in this study. The subject underwent five sessions of Bal-Ex training for 3 weeks. The Bal-Ex training is divided into 3 stages where each stage consists of head rotation and task oriented movements with increasing difficulty (lower to higher center of gravity; eyes opened to eyes closed). The progression of the training was done gradually according to subject's ability. The outcome measures include performance-based balance

measured by the Berg balance scale (BBS), and quality of life was measured by the Stroke Specific Quality of Life (SS-QOL). Measures were taken during baseline and after 3 weeks. *Results:* After 5 sessions of treatment, the balance performance improved from 17 to 40 while quality of life from 126 to 170. *Conclusion:* These observations verify the feasibility of the approach and suggest that the novel balance training (Bal-Ex) may be beneficial for balance performance and quality of life in stroke survivors. However, it is suggested that Bal-Ex training is to be tested in sub-acute and chronic stroke survivors.

0523FP05

THE EFFECT OF INTENSIVE REPETITION OF TRUNK MUSCLE FACILITATION ON MOTOR FUNCTIONAL RECOVERY AFTER STROKE: A RANDOMIZED CONTROLLED TRIAL*T. Hirokawa¹, S. Matsumoto¹, T. Uema¹, T. Noma¹, J. Sameshima², Kazumi Kawahira¹**¹Department of Rehabilitation, Kirishima Rehabilitation Center of Kagoshima University Hospital, ²Department of Rehabilitation, Tarumizu Municipal Medical Center, Tarumizu Chuo Hospital, Japan*

Purpose: Motor impairment of the trunk after stroke is one of the factors affecting the activities of daily living (ADL) and gait stability. However, there are few studies evaluating the effect of trunk muscle facilitation exercises (TMFE). The purpose of this research was to verify the effect of repetitive facilitation exercises on hemiplegic trunk. *Materials and Methods:* A single-blinded, randomized controlled trial was conducted. In total 30 post-stroke patients were randomly assigned to an intervention group ($n=15$) or a control group ($n=15$). The intervention group received intensive repetition of TMFE, in which physical therapist adds both the trunk rotation and lateral flexion exercises 100 times per day for 8 weeks. All of the patients participated in a conventional stroke rehabilitation program 5 times per week. Outcome was assessed at baseline, and after 4 and 8 weeks of treatment on measures of motor function and of independence in ADL; strength, Functional Reach Test (FRT), Berg Balance Scale (BBS), and 10-m walk gait velocity, and Functional Independence Measure (FIM) as an assessment tool for ADL. The protocol was approved by the Ethical Committee of Kagoshima University. *Results:* Following the intervention, there was no significant difference in improvement between the two groups for the BBS, FRT, FIM. However, trunk muscle strength ($p < 0.05$), and 10-m walk gait velocity ($p < 0.01$), showed significantly greater increases 8 weeks after exercise in the intervention group. *Conclusion:* Intensive repetition of TMFE had beneficial effects on gait velocity in post-stroke patients.

0523FP06

PHYSIOTHERAPY WITH FAMILY SUPPORT IS EFFECTIVE FOR STROKE PATIENTS IN A CONVALESCENCE REHABILITATION WARD*Y. Hirano, S. Maeshima, A. Osawa, D. Nishio, K. Takeda, M. Baba, T. Minakawa, H. Kigawa**¹Rehabilitation Center, Hanno-Seiwa Hospital, ²Department of Rehabilitation Medicine, Saitama Medical University International Medical Center, Japan*

Purpose: The purpose of this study was to clarify the effect of family participation in physiotherapy for stroke patients in a convalescence rehabilitation ward. *Materials and Methods:* Subjects were 49 hemi-

plegic patients with first-ever stroke who were discharged from our rehabilitation hospital (mean age 60.9 ± 10.5 years). Thirty-five patients had cerebral hemorrhages, and 10 had cerebral infarctions, and 4 had subarachnoid hemorrhages. We divided them into two groups; "family participation group" and "non-family participation group" in physiotherapy. Both groups took part in a regular physiotherapy program for 2 h and 30 min each day. Family participation group took more than 2 h per day for self training with caregiver. On the other hand, non-family participation group took same 2 h per day for training with physiotherapist instead of the caregiver. *Results:* Duration from admission to home evaluation, duration from onset to discharge and the length of stay in our hospital were shortened in the family participation group. There was no difference between the two groups in age, the number of family members living together, duration from onset to admission, ADL score using the Functional Independence Measure (FIM) on admission and discharge, and the FIM gain. *Conclusion:* Family participation may cause improvement of motivation for stroke patients and shorten the length of stay in a convalescence rehabilitation ward.

0523FP07

THE EFFECTS OF ROBOT-ASSISTED GAIT TRAINING SYSTEM ON AN ADULT WITH CEREBRAL PALSY: A CASE REPORT

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Purpose: For subjects with cerebral palsy (CP) surviving into adulthood, impaired ambulatory function and spasticity are major concerns with respect to quality of life (QoL). Robot-assisted gait training systems (RGTS; Lokomat) can offer the impaired legs continuous support and high repetition accuracy guidance to move in a near-normal gait pattern. It has shown potential on motor recovery in children with CP. However, there is limited report on adults with CP receiving RGTS therapy. *Materials and Methods:* Here we present a 32-year-old man with spastic diplegia, requiring crutches for ambulation. Increase in age and spasticity has added to his progressive difficulty in ambulation in recent years. After receiving 63-session (total 9 months) intervention of RGTS, we compared the differences between pre- and post-training data of walking speed, guidance force ratio, unloading weight, spasticity, and QoL. *Results:* After training, unloading weight decreased from 40 kg to 20 kg, guidance force ratio decreased from 100% to 70%, walking speed improved from 1.5 km/h to 2.3 km/h. In real daily living, the time required for him to climb up and down a ramp on his way home significantly decreased from 45 to 22 min and 50 to 25 min, respectively. The reduction of spasticity and improvement of QoL were also noted. *Conclusion:* The therapeutic effect by using a Lokomat RGTS shows a promising result for adults with CP in ambulatory function, spasticity, and QoL.

0523FP08

THE EFFECT OF DYNAMIC SUPPORTING-INDUCTION EXERCISE FOR THE AFFECTED LOWER EXTREMITY FUNCTION OF SEVERE HEMIPLEGIC PATIENTS SUFFERED STROKE

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Purpose: To evaluate the effect of dynamic supporting-induction exercise for the function of the affected lower extremity in severe hemiplegic patients suffering from stroke. *Materials and Methods:* Fourteen stroke patients satisfied all eligibility criteria, were assigned randomly to either experimental group (7 cases) or control group (7 cases). Experimental group received dynamic supporting-induction exercise, and routine standing exercise was applied for the control group. Both groups received routine training, with a total time of about 2 h per day, 5–6 times per week. At 0, 40th day, 60th

day, all subjects were given assessments with Chinese scale of clinical neurologic deficit of stroke patients (China Stroke Scale, CSS), Berg Balance Scale (BBS) and Functional Ambulation Category scale (FAC). Before training, no difference was found between the two groups. *Results:* The duration of experimental group subjects' improving supporting ability of lower limb was lower than the control group ($p < 0.05$). After training, both groups had significant improvements in the three scales ($p < 0.01$). And at 40th, there were significant differences in CSS, BBS and FAC between the two groups ($p < 0.05$); At 60th, there were significant difference in CSS ($p < 0.05$), but no difference in BBS and FAC ($p > 0.05$). *Conclusion:* Dynamic supporting-induction exercise to the affected lower extremity could decrease the duration of rehabilitation therapy of severe brain impaired patients suffering from stroke.

Musculoskeletal Rehabilitation 4

0523FP09

COMPARISON BETWEEN DIFFERENT TYPES OF SCAPULAR TAPING ON SCAPULAR KINEMATICS AND MUSCLE ACTIVATION DURING SHOULDER FLEXION

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Purpose: Normal shoulder function is based on proper scapular position and control, which are usually compromised in shoulder impingement syndrome (SIS). Alteration in scapular motion and muscle activation patterns are contributory to scapular dyskinesia associated with SIS. Different types of scapular taping have been suggested to improve activation and motion disorders in subjects with SIS. However, it was not clear if one type of taping is superior to the other. The purpose of the study was to compare scapular kinematics and muscle activation between 4 scapular taping conditions. *Materials and Methods:* Twelve healthy subjects (7 male and 5 female) with a mean age of 24 ± 2.0 years, height of 171 ± 5.7 cm, and body mass of 59 ± 8.4 kg were recruited to complete 3 repetitions of shoulder flexion in 4 taping conditions (No taping, I taping, Y taping and YI taping) with an interval of 15 min between conditions. Muscle activity was measured by surface electromyography (EMG) and kinematics was measured by electromagnetic motion tracking system. *Results:* Two-way ANOVA with repeated measures showed YI taping was superior compared to the other types of taping in increasing scapular posterior tilt and decreased internal rotation when the humerus flexed to 120° or lowered to 90°. Also, it facilitated a significantly more EMG activity in lower trapezius while there was of decrease activity in upper trapezius during the task. *Conclusion:* The study found that YI taping was superior to Y or I taping alone to facilitate scapular motion and muscle activation.

0523FP11

EFFECTIVENESS OF SUPERVISED PHYSIOTHERAPY ON PATIENTS WITH ADHESIVE CAPSULITIS OF SHOULDER

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Department of Physical Medicine and Rehabilitation BSMMU, Dhaka, Bangladesh

Purpose: To find out the effectiveness of supervised physiotherapy in patients with adhesive capsulitis. *Materials and Methods:* This was a prospective randomized study carried out in the Department of Physical Medicine and Rehabilitation, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka during January 2010 to July 2011. A total of 100 patients have been enrolled into the study with Group A had counseling, ultrasonic therapy and supervised exercise and Group

B received counseling, ultrasonic therapy and unsupervised exercise. Study parameters were VAS for pain and assessment of shoulder mobility by SPADI. Patients have been followed in every 2 weekly for 6 weeks. **Results:** In group A 20 patients (40%) were below 50 years of age and 30 patients (60%) were above 50 years of age. In group B, 26 patients (52%) were male and 24 patients (48%) were female. In both group A and B 24% had diabetes mellitus. In the group A 44% and 56% had right and left shoulder involvement, respectively. In group B 68% and 32% had right and left shoulder involvement respectively. In both groups there was progressive decrease in mean VAS pain score from the start of physiotherapy till 6 weeks. There was a statistically significant ($p=0.028$) better outcome in group A patients than Group B. **Conclusion:** Supervised physiotherapy is an effective way of treating patients with adhesive capsulitis.

0523FP12

COMPARISON OF THERAPEUTIC EFFECTS OF ULTRASOUND-GUIDED PLATELET-RICH PLASMA INJECTION AND DRY NEEDLING IN ROTATOR CUFF DISEASE

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Purpose: To compare the effects of platelet-rich plasma (PRP) injection with those of dry needling on shoulder pain and shoulder function in patients with rotator cuff disease. **Materials and Methods:** This is a single-center, prospective, randomized, double-blinded, controlled study. Thirty-nine patients with a supraspinatus tendon lesion (tendinitis or a partial tear less than 1.0 cm, but not a complete tear) who met the inclusion criteria were recruited between June 2010 and February 2011. Two dry needling procedures in the control group and 2 PRP injections in the experimental group were performed to the affected shoulder at 4-week intervals using ultrasound guidance. The shoulder pain and disability index (SPADI), passive range of motion (ROM) of the shoulder, a physician global rating scale at the 6-month follow-up, adverse effects monitoring, and an ultrasound measurement were used as outcome measures. **Results:** In both groups, the SPADIs were reduced at the 3- and 6-month follow-ups. The reduction of the SPADI in the PRP group was more significant than in the dry needling group after treatment. No severe adverse effects were observed in either group. **Conclusion:** PRP injections for rotator cuff disease provided more significant pain relief and improved arm function, but not ROM of the shoulder compared to dry needling. These findings suggest that treatment with autologous PRP injections is safe and useful for rotator cuff disease.

0523FP13

HAND GRIP STRENGTH OF RHEUMATOID ARTHRITIS PATIENTS AFTER SIX WEEKS OF CONSERVATIVE HAND EXERCISE

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Purpose: Earlier studies have shown that rheumatoid arthritis (RA) patient have decreased muscle strength, including grip strength compared to healthy people. Loss of hand grip strength is one cause of loss of hand function in patients with RA. This study was done to know effect of hand exercise to the better hand function **Materials and Methods:** The grip strength of 16 RA patients was measured using a modified sphygmomanometer. The grip strength

was compared between the right and left hand. The comparison was repeated after a period of 6 weeks of conservative hand exercises. **Results:** At baseline the right hand grip strength as a dominant hand was lower in comparison to the left hand grip strength, but not statistically significant. After 6 weeks, an improvement in both hands grip strength was obtained with 20.7% and 35%, respectively. Statistically, a significant increase only occurred in the left hand with a p -value of 0.009. **Conclusion:** Hand exercise is considered as an effective intervention for RA patients, leading to better grip strength, as well as the function of hand.

0523FP14

RANGE OF MOTION EXERCISE FOR THUMB METACARPOPHALANGEAL JOINT CONTRACTURE

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Purpose: The range of motion (ROM) of the thumb MP joint varies widely among individuals. Thus, comparison with the normal side is essential in ROM exercises for thumb MP joint. The purpose of this study was to define the difference between right and left ROM of the thumb MP joint in the normal population and to assess the utility of the normal side value as a normal indicator. **Materials and Methods:** Three hundred hands of 150 subjects (75 men, 75 women; mean age 36.2 years, range 20–49) without a history of injuries or diseases of the thumb were included. The flexion and extension were measured with a goniometer at intervals of 1°. Statistical analysis of flexion angle, extension angle, differences between men and women, and differences between right and left were carried out. **Results:** The mean flexion was 59.1° (16°–90°). The mean extension was 7.9° (–32°–58°). Both the flexion and extension were greater in women than in men. The mean difference between right and left was 4.8° (0°–28°) for flexion and that was 6.4° (0°–38°) for extension. For a p -value of 0.05, the one-sided 100th percentile of the flexion was 10.6° and that of the extension was 14.3°. For a p -value of 0.01, the one-sided 100th percentile of flexion was 15.1° and that of the extension was 20.1°. **Conclusion:** The difference between the maximum flexion and the minimum flexion was 74°. The difference between the maximum extension and the minimum extension was 90°. Due to these large differences, it appeared that some angles could not be determined as normal. In contrast, the mean differences between right and left for flexion and extension were small enough to be considered as normal indicators. The one-sided 100th percentile results showed that flexion loss of more than 11° and extension loss of more than 15° were suspicious for contracture, and that flexion loss of more than 16° and extension loss of more than 21° strongly suggested contracture.

0523FP15

THE EFFECT OF TRACTION THERAPY FOR PATIENT'S CORE MUSCLES WITH NECK PAIN

Yi Zhu

S Clinical College of Nanjing Chinese Medicine University, China

Purpose: To evaluate the efficiency of curative cervical traction for neck superficial and core muscles to treat patient with neck pain. **Materials and Methods:** 30 out-patient cases with neck pain were picked at random for samples. All of them got neck traction therapy for a total of 10 treatments. Neck superficial and core muscles strength were evaluated by manual muscle testing and stabilizer biofeedback unit respectively. **Results:** In the statistical analysis, there were great significant differences of core muscles strength between the 1st treatment comparing to the initiate, 1st treatment to 5th treatment, 5th treatment to 10th treatment ($p<0.05$). Meanwhile, the superficial muscles (both neck flexors and extensors) have no significant differences between any of the 4 data, respectively ($p>0.05$). **Conclusion:** These findings indicate that the neck traction can break the pain-guarding reflex in core muscles and increase the stability of the neck spine.

0523FP16

EFFECT OF VARIOUS BOWLER'S THROWING STYLES TO MUSCULOSKELETAL INJURIES OF UPPER EXTREMITY

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Purpose: Biomechanical analysis of various bowler's throwing styles can help understand related injury mechanisms and thus reduce injury risk. This study investigates the effects of various throwing styles to musculoskeletal injuries of upper extremity during tenpin bowling. **Materials and Methods:** Twenty-eight amateur bowlers were recruited and divided into groups, straight ($n=7$), hook ($n=7$), and spin ($n=7$), according to their accustomed bowling style. Field experiments synchronized a data logger and a camcorder to record bowler upper-limb kinematics and EMGs in a bowling game. Bowler wrist and elbow angles and four EMG values (biceps brachii, triceps brachii, and wrist flexor and extensor muscles) in the dominant upper extremity were measured. EMG data were normalized to a maximal voluntary contraction (MVC). **Results:** At ball release, high muscle loads, exceeding 100%MVC, were found in the wrist flexors and extensors of hook bowlers, while high exertion was observed in the wrist extensor of spin bowlers. Spin throws exhibited larger wrist radial deviation and peak-to-peak changes in wrist angular velocities during forward swing than did straight and hook throws. **Conclusion:** Hook throws require relatively high loading in both wrist flexors and extensors through extensors conducting eccentric contraction at ball release. Spin throws generated great wrist angular acceleration for lift movements. Repetitive eccentric extensor contraction of hook throws and great wrist angular acceleration of spin throws may raise the risk of hand-arm injuries. Injury prevention and training strategies should focus on enhancing wrist muscle strength and using proper techniques or devices.

Miscellaneous 3

0523FP17

FACTORS ASSOCIATED WITH FATTY ATROPHY OF SUPRASPINATUS AND INFRASPINATUS IN BRAIN-INJURED PATIENTS

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Purpose: To investigate factors that have correlation with fatty atrophy of supraspinatus or infraspinatus muscle in stroke or brain-injured patients. **Materials and Methods:** Sixty hemiplegic patients who had brain lesions over two weeks were included. Ultrasonography of bilateral shoulders was performed with the palm on thigh in sitting position. Fatty atrophy was graded as 0, 1 and 2 by visibility of outer contours, pennate pattern, central tendon and echogenicity. Function of upper extremity was examined by Fugl-Meyer assessment score and Modified Barthel index. Pain-free range of motion, pain, spasticity and motor power of both shoulders, Brunnstrom stage and rotator cuff tear were also measured. **Results:** Fatty atrophy was observed in 20 (33%) out of 60 patients (in 17 supraspinatus and 10 infraspinatus). Inter-rater agreement between two physiatrists was $k=0.582$ for supraspinatus and $k=0.483$ for infraspinatus. Fugl-Meyer assessment score, Modified Barthel index, Brunnstrom stage and motor power of shoulders were significantly lower in patients with fatty atrophy of supraspinatus or infraspinatus than in patients without atrophy ($p<0.05$). Rate of rotator tendon tear was higher in hemiplegic side than in contralesional side in both groups, whereas the rate showed no significant difference between two groups. Pain-

free range of motion, spasticity and hemiplegic shoulder pain did not show significant difference between two groups. **Conclusion:** Fatty atrophy of supraspinatus or infraspinatus muscle has correlation with decreased function of hemiplegic upper extremity. The rate of rotator cuff tear is not increased in patients with fatty atrophy. Therapeutic interventions to prevent fatty atrophy can be applied on hemiplegic shoulder to improve function of upper extremity.

0523FP18

WET-CUPPING: AN ALTERNATIVE THERAPY FOR PAIN RELIEF

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Purpose: To evaluate the response of innate and adaptive immunity after wet cupping histomorphology. Stress is a natural stimulus triggering inhibition of pain. Previous study revealed that wet-cupping attenuated pain. Immune cells have been shown to contain numerous opioid peptides such as beta-endorphin (END), met-enkephalin (ENK), and dynorphin-A (DYN), although the predominant opioid peptide involved in immune-cell mediated antinociception is thought to be END. Inflammation of peripheral tissue leads to increase functionality of opioid receptors on peripheral sensory neurons and to stimulate local production of endogenous opioid peptides. **Materials and Methods:** In this study, 14 Wistar male rats were randomly divided into 7 groups : group 1, control rats without treatment; group 2, response treatment after 1 h; group 3, response treatment after 3 h; group 4, response treatment after 6 h; group 5, response treatment after 24 h; group 6, response treatment after 72 h; group 7, response treatment after 168 h. We counted total mast cell, macrophage, lymphocyte and PMN in each group. **Results:** Macrophages and mast cells are dominant in 6–24 h after treatment. PMN is dominant in 72 h after treatment and lymphocyte dominant in 168 h after treatment. **Conclusion:** We assumed that wet-cupping can relieve pain because of expression immune cells, macrophage and mast cell at acute phase and lymphocyte and PMN at chronic phase.

0523FP20

CLINICAL FEATURES IN CHILDREN AND ADOLESCENTS WITH CORPUS CALLOSAL MALFORMATIONS

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Purpose: Malformation of corpus callosum causes a variety of developmental disorders. Callosal malformations are frequently associated with other central nervous system and/or somatic anomalies. We retrospectively analyzed clinical features of corpus callosal agenesis/hypoplasia and accompanying central nervous system and somatic anomalies. **Materials and Methods:** We reviewed the patients who undertook the brain magnetic resonance imaging (MRI) in our hospital between 2006 and 2011. Thirty-four patients (23 males and 11 females, 1 year to 17 years old) manifested agenesis/hypoplasia of the corpus callosum. **Results:** Callosal malformation was isolated in 12 patients, and was associated with other central nervous system malformations in 13 patients. Both central and non-central nervous system abnormalities were accompanied in 6 patients, while somatic anomalies were accompanied in three patients. Among these 34 patients, 21 patients visited our rehabilitation department due to developmental delay. Seven of them were diagnosed as cerebral palsy. Three patients with cerebral palsy accompanying other central nervous system and/or somatic anomalies showed worse level of gross motor function classification system (GMFCS level V) compared to the patients with isolated callosal malformation (two patients with GMFCS level II and two patients with GMFCS IV). Among 34 patients visiting rehabilitation department, 3 have developed normally without impairments in motor and cognitive functions. **Conclusion:** Among 34 patients with

corpus callosal malformations, 7 were diagnosed as cerebral palsy and 3 developed normally. The patients accompanying other central nervous system anomalies showed worse developmental prognosis.

0523FP21

RELATIONSHIP BETWEEN BASIC COMPONENTS OF PHYSICAL FUNCTION AND FUNCTIONAL CAPACITY OF PATIENTS IN SUB ACUTE GERIATRIC WARD CIPTO MANGUNKUSUMO HOSPITAL JAKARTA

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Purpose: To understand the relationship between basic components of physical function with functional capacity and to provide a foundation in designing program of patients in sub-acute geriatric ward. **Materials and Methods:** All patients in the sub acute geriatric ward during December 2011 were eligible ($n=33$). The basic components (BC) of physical function measured were strength (S), balance (B), flexibility (F), and coordination (C). The functional capacity evaluated with Barthel Index (BI), Geriatric Depression Scale (GDS), and Mini-Mental State of Examination (MMSE) also measured. **Results:** Patient age 69 ± 6.1 years, 2.6% had depression and 21% were cognitive impaired. Significant findings were seen in the relationship between B and C with BI ($p<0.005$) and GDS with BI ($p<0.002$). There were no significant relationship between S and F with BI ($p>0.005$), while MMSE did not relate to BI ($p 0.037$). **Conclusion:** Although each parameter of physical function were within normal limit, it does not indicate automatically that they were also accompanied by a normal functional capacity. The level of mental function also have role in functional capacity. The physical function components might be used as the foundation in designing the most rational program which can be tailored to patient to achieve the recovery of their functional capacity.

0523FP22

EVALUATION OF PHYSIOLOGICAL CONDITION AND QUALITY OF LIFE BY SUPERVISED HOSPITAL-BASED EXERCISE THERAPY FOR NON-COMMUNICABLE DISEASE

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Purpose: We examined effects of hospital based supervised exercise therapy to the patients with Non Communicable Disease (NCD) in terms of physiological condition and QOL. **Materials and Methods:** One hundred and ninety-one subjects (32 males, 159 females) were studied. Mean age was 65 ± 11 years. Cardio Pulmonary Exercise test was performed for each subjects at and anaerobic threshold (AT), the peak oxygen consumption were measured. The exercise therapy consisted of aerobic exercise, resistance training, and stretching and was supervised by certified exercise trainers. The duration of exercise was 90 min and frequency was 2 or 3 times a week. Body weight, body fat percentage, flexibility, balance, agility, and power of arm grip were measured. We used SF36 to evaluate QOL in each period of exercise therapy. **Results:** The body weight and body fat percentage significantly decreased after 3–6 months ($p<0.05$). Flexibility, arm grip power, balances significantly improved ($p<0.05$). VO₂ did not change significantly. BP (Body Pain), GH (General Health), VT (Vitality), MH (Mental Health) in SF36 were significantly improved ($p<0.05$). PF and RP in SF36 showed significant relationship to Quickness. GH, VT and SF in SF36 showed significant relationship to ATVO₂. **Conclusion:** The hospital based supervised exercise therapy showed certain effects in not only the physical condition but also QOL. There were little relation between physical and and QOL, therefore, evaluation of both physical condition and QOL should be required in NCD exercise therapy.

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0523FP23

MANY-FACET RASCH MODEL ANALYSIS OF THE RELIABILITY AND VALIDITY OF THE BRIEF ICF CORE SETS FOR CHINESE PATIENTS WITH STROKE

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Purpose: To test the reliability and validity of brief ICF Core Sets for Chinese stroke patients by Rasch model analysis. **Material and Methods:** 38 stroke patients were measured with body function of brief ICF Core Sets component for Chinese stroke patients. The qualifiers of the 20 items measured by two doctors and were analyzed by FACETS statistic software. The intra-inter reliability and validity was tested by using the separation index and separation reliability and fit analysis. **Results:** The body function of brief ICF core sets component for Chinese stroke patients has good internal consistency reliability (person separation index=6.02, person separation reliability=0.94, $\chi^2=2,158.3$, $p<0.01$). Raters had significantly different severity ($\chi^2=1,042.5$, $p=0.01$), but their ratings has good internal self-consistency (OutfitMnSq=0.92–1.12). The construct Validity is good for the body function of ICF component (separation index=10.50, separation reliability=0.80 $\chi^2=467.3$, $p=0.01$), but mis-fitting and over-fitting was respectively found in ICF items including b117, b152 and b755 by fit analysis. **Conclusion:** The body function of brief ICF core sets component for Chinese stroke patients has good reliability and validity. Many-Facet Rasch Measurement Model can provide comprehensive information and has good application prospects for the testing of reliability and validity of ICF Core Sets.

0523FP24

A PROMOTER POLYMORPHISM (RS3806798, -473T/A) OF IL15 IS ASSOCIATED WITH ISCHEMIC STROKE IN THE KOREAN POPULATION

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Purpose: Interleukin-15 (IL15) is a cytokine that affects T-cell activation and proliferation. The aim of this study was investigated whether promoter single nucleotide polymorphisms (SNP) (rs3806798, -473T/A) of IL15 were associated with the development and clinical features of ischemic stroke (IS). **Materials and Methods:** We recruited 291 control subjects and 121 IS patients. All IS patients were divided into clinical subgroups according to the scores of the National Institutes of Health Stroke Survey (NIHSS <6 and >6) and Modified Barthel Index (MBI <60 and >60). SNPstats and SPSS 18.0 were conducted to evaluate odds ratios (ORs), 95% confidence intervals (CIs), and p values. Multiple logistic regression models were performed to analyze the genetic data. **Results:** A rs3806798 SNP of IL15 was associated with the susceptibility of IS (codominant 2 model, $p=0.023$; recessive model, $p=0.025$). The rs3806798 was also associated with the NIHSS score of IS (codominant 1 model, $p=0.039$; dominant model, $p=0.034$; overdominant model, $p=0.045$). **Conclusion:** These results suggest that the promoter SNP of IL15 may be a risk factor to the susceptibility of IS in Korean population.

Miscellaneous 4

0523FP25

BOWEL CARE IN INDIVIDUALS WITH SPINAL CORD LESION

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Purpose: Neurogenic bowel dysfunction is one of the impairment caused by spinal cord lesion. The consequences of this include altered

bowel motility, loss of sphincter control, and inability to significantly increase intra abdominal pressure. An effective bowel program should address issues of fecal incontinence, constipation, effective evacuation and prevention of complications. The objective of this study were to describe bowel care program in individuals with upper motor neuron neurogenic bowel (UMNB) sary to spinal cord lesion and to explore the association between bowel care interventions, respondents' characteristics and bowel care outcome. *Materials and Methods:* This cross-sectional study was conducted in a tertiary medical centre. We included patients of 12 years old and above, with spinal cord lesion of any etiology of at least 6 months duration and has UMNB. One to one interviews were conducted using self constructed questionnaire which consisted of demographic and clinical characteristics, bowel care program, and outcome of bowel care program. *Results:* A total of 126 respondents participated in the study. Majority (79.4%) used multiple interventions for bowel care and the commonest technique of fecal evacuation was combination of suppository and digital stimulation. Duration of bowel care was less than 60 min in 71.4% of participants. Water intake of <2 liters per day was associated with shorter duration of bowel care. Satisfaction in the bowel care was associated with duration for bowel care of less than an h ($p=0.007$) and daily or every alternate day bowel care ($p=0.032$). *Conclusion:* Satisfaction in bowel care was associated with short duration of bowel program. Water intake of 2 liters or less per day and daily or every alternate day bowel program results in short duration of bowel care.

0523FP27

PROGNOSTIC FACTORS OF ACTIVITIES OF DAILY LIVING ON STROKE PATIENTS IN THE COMMUNITIES

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Purpose: In order to clarify which factor influence activities of daily living (ADL) 6 months after hospital discharge, we investigated process of hospitalization and functional status at discharge. *Materials and Methods:* Subjects were 85 stroke patients (53 males and 32 females) who were discharged from our convalescent rehabilitation ward to their homes. The age range of the patients was from 16 to 87 years, 37 patients had cerebral hemorrhages, and 40 had cerebral infarctions, and 8 had subarachnoid hemorrhages. We examined the relationship between Barthel Index (BI)/Instrumental ADL (IADL) at 6 months after discharge and patients' age, gender, the number of family members, duration from the onset to admission in our ward, duration of hospitalization, time of rehabilitation training per day, Japan Stroke Scale (JSS) and BI at discharge. *Results:* BI score at discharge and duration of hospitalization influenced BI score at 6 months after discharge. IADL at 6 months after discharge was influenced by BI at discharge, duration of hospitalization, JSS at discharge, age and gender. *Conclusion:* We concluded that the intensive rehabilitation of the recovery stage in the convalescence rehabilitation ward caused the improvement of ADL in the community.

0523FP30

LESIONAL INFILTRATION OF RECEPTOR OF NUCLEAR FACTOR-KB LIGAND+ CELLS IN EXPERIMENTAL AUTOIMMUNE NEURITIS RATS

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Purpose: Experimental autoimmune neuritis (EAN) is a T-cell-mediated autoimmune demyelinating inflammatory disease of the

peripheral nervous system (PNS). Receptor activator of NF- κ B ligand (RANKL), a member of the tumor necrosis factor (TNF) family, acts as a factor for dendritic cells and mature T cells by regulating their proliferation. This paper is primarily concerned with the expression of RANKL in sciatic nerves of EAN rats and whether Fingolimod (FTY720) treatment could alter the expression of RANKL. *Materials and Methods:* EAN was induced in male Lewis rats. Neurological severity of EAN was evaluated. Expression of RANKL in sciatic nerves of EAN rats was detected by single and double immunostaining. For treatment of EAN, FTY720 was administered. Animals from each group were randomly chosen at predetermined intervals for histological analysis. *Results:* There was a significant positive correlation between the time courses of RANKL+ cells accumulations with neurological scores of EAN rats. The major RANKL+ cells were T cells in sciatic nerves. Parallels with the amelioration of EAN process, FTY720 greatly reduced the accumulation of RANKL+ cells in sciatic nerves. *Conclusion:* RANKL may play a role in the pathologic development of EAN. Therapeutic effects of FTY720 in EAN rats might be related to the reduced infiltration of RANKL+ cells.

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0523FP32

EFFECT OF A NEUROMUSCULAR ELECTRICAL STIMULATION FOR SHOULDER SUBLUXATION IN POST-STROKE PATIENTS

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Purpose: Shoulder subluxation is a well-known complication of post-stroke patients. It is reported that the stimulation of the supraspinatus muscle and a deltoid muscle could reduce an existing subluxation. The purpose of this research is to verify the effect of a neuromuscular electrical stimulation (NMES) on shoulder subluxation. *Materials and Methods:* This before-and-after intervention trial examined 11 post-stroke patients with shoulder subluxation (mean age \pm SD, 67.3 \pm 15.2 years). The inclusion criteria were Brunnstrom Recovery Stage of upper extremity above 2. We synchronized the electric stimulus of NMES with patients' voluntary movement. We stimulated supraspinatus muscle or the deltoid muscle using the high voltage pulsed current. All patients received NMES for 15min once a day, 6 times a week, for 4 weeks. Outcome measures were the drop rate of caput humeri, upper arm length, Fugl-Meyer Assessment (FMA), Functional Independence Measure (FIM) as an assessment tool of activity of daily living (ADL), and Gibbons's reflex sympathetic dystrophy (RSD) score. *Results:* A significant improvement in shoulder subluxation was found on the outcome measures, including drop rate of caput humeri ($p=0.0002$), upper arm length ($p=0.0001$), FMA ($p=0.0016$), FIM ($p=0.0017$), and Gibbons's RSD score ($p=0.0065$). *Conclusion:* NMES might improve shoulder subluxation, motor function and ADL in post-stroke patients.

0523FP33

SPASTICITY-RELATED COMPLICATIONS IN FIRST TIME STROKE: PRELIMINARY REPORT

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Purpose: To document patient-reported spasticity-related complications at 3, 6 and 12 months post stroke. *Material and Methods:* A prospective cohort study was conducted on patients with first-time stroke, admitted to University Malaya Medical Centre within the first quarter of the study period (July-Dec 2011). Spasticity-related complications were

documented using a self-constructed objective questionnaire which includes pain, difficulty performing activities of daily living (ADL): personal, domestic or community, gait disturbance, positioning, balance impairment and negative effect on appearance. The documentation of the complications severity was measured using a 4-point Likert Scale ranging from 1 (mild) to 4 (very severe). *Results:* 21 out of 37 patients developed spasticity at 3 months post-stroke with 39.24% having MAS 1, 43.04% MAS 1+, 10.13% MAS 2, 5.06% MAS 3 and 2.53% MAS 4. 95% of the patients reported presence of spasticity-related complications. 23.5% of the independent patients with spasticity (MBI of 100), reported presence of at least one complication. Overall, the severity of complications was graded as “mild” (13.92%), “moderate” (56.96%), “severe” (26.58%) and “very severe” (2.53%). Pain was the most frequent complication reported (66.7%), followed by difficulty in performing personal ADL (61.9%) and gait disturbance (57.1%). *Conclusion:* Spasticity has significant complications even at an early stage post stroke with pain being the most frequent complication reported. The impact on long-term disability from spasticity related complications should be monitored over time.

0523FP34

COMPARISON OF THE EFFECT OF MODIFIED CONSTRAINT-INDUCED MOVEMENT THERAPY IN SUBACUTE AND CHRONIC STROKE PATIENTS

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Purpose: Constraint-induced movement therapy (CIMT) is commonly used for stroke patient to regain functional arm movement of the affected side. Most of studies had applied CIMT in chronic stroke patient, but there are only few studies in sub-acute stage of stroke. This study was performed to compare the application of modified CIMT in sub-acute and chronic stroke patient. *Materials and Methods:* Thirty-six stroke patients were recruited in this study, 18 patients were in the sub-acute and 18 in the chronic stage of stroke. Improvement of functional movement of paretic arm were evaluated by using modified Nine Hole Peg Test (NHPT), Action Research Arm Test (ARAT) and Motor Activity-Amount of Use (MAL-AOU) questionnaire before and after treatment. Modified CIMT was given 5 times a week, 1.5 h per session for 2 weeks. Mitten should be used at the unaffected hand at home for at least 5 h per day. *Results:* In both group there is a better value of NHPT, ARAT and MAL-AOU after 2 weeks treatment. The improvement of NHPT and ARAT were shown greater in the chronic stage than in the sub-acute stage, while the MAL-AOU in the sub-acute stage was greater in the chronic stage, but was statistically not significant ($p > 0.05$). *Conclusion:* This study showed that modified CIMT could improve the paretic hand function of stroke patients, in the chronic phase better than in the sub-acute phase. Further study with more samples is needed.

0523FP35

DIFFERENCE OF CORTICAL ACTIVATION PATTERN DURING MOTOR EXECUTION AND MOTOR IMAGERY ASSESSED WITH SIMULTANEOUS NEAR-INFRARED SPECTROSCOPY AND ENCEPHALOGRAPHY IN STROKE PATIENTS

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Purpose: Brain-computer interface (BCI) has recently been proposed as a neurorehabilitative tool for stroke patients. Event-related desynchronization (ERD) in EEG is often used as a signal for BCI, but few

reports are available studying activation pattern of ERD in stroke patients. The purpose of this study is to evaluate the relationship among neural activity, cerebral blood flow, and the severity of motor impairment in patients with stroke. *Materials and Methods:* We recruited 17 hemiparetic stroke patients, who received standard inpatient rehabilitation. The average time from stroke onset was 91.5 days. ERD and changes in oxy-Hb concentration were measured with simultaneous NIRS-EEG during motor execution (ME) and motor imagery (MI) of extending the fingers. The hand subitem of the Fugl-Meyer Assessment (FMA) was used for evaluating motor impairment. *Results:* During ME of the paretic hand, contralateral ERD was positively correlated with the FMA ($p < 0.05$), and ipsilateral ERD was negatively correlated with the FMA except score 0 ($p < 0.05$). Ipsilateral ERD during ME of the paretic hand was larger than that of the nonparetic hand. No significant relationship was shown between the FMA and activation pattern during MI. Some patients showed different activation pattern between ERD and Oxy-Hb. *Conclusion:* These findings suggest that the ipsilateral neural activation may contribute to the movement of the paretic hand in patients with severe paresis. The neural activity does not necessarily correspond to the changes of cerebral blood flow.

0523FP36

THE CORRELATION BETWEEN ROTATOR CUFF INJURIES OF HEMIPLEGIC SHOULDERS AND THE FUNCTIONAL OUTCOMES IN STROKE PATIENTS

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Purpose: To identify the relationship between the rotator cuff injuries and the functional outcomes including the physical findings of hemiplegic shoulders and stroke impact scale (SIS). *Materials and Methods:* Forty-seven subjects with hemiplegic shoulders who admitted to the rehabilitation unit after stroke were recruited. We used musculoskeletal sonography to evaluate soft tissue injuries of hemiplegic shoulders before discharge. Fifteen subjects without any rotator cuff injuries in hemiplegic shoulders were assigned into the group A. Thirty-two subjects with rotator cuff tendinosis or tear were assigned into the group B. The clinical parameters were recorded for each patient at admission. The physical findings of all patients were assessed by the same therapist before discharge and 6 months later. The SIS for hand function and daily activities were also assessed 6 months later. The comparisons of the changes in Brunnstrom motor recovery (BMR) stages, each domain of SIS score between these 2 groups at 6 months after stroke. *Results:* No significant differences were found in stroke type, hemiplegic side, age, gender, height, weight between the 2 groups. There were also no significant differences in the changes of BMR stages and all subdomains of SIS score. *Conclusion:* We concluded that the sub-acute soft tissue injury of hemiplegic shoulders was not related to the following motor recovery of hemiplegic shoulders and the performance of daily activities 6 months later in stroke patients.

0523FP37

LIAISON CLINICAL PATHWAY FOR STROKE PATIENTS IN REGIONAL NETWORKS OF WEST SAITAMA IN JAPAN

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Purpose: Regional cooperation was recommended for stroke patients using a liaison clinical pathway (LCP) in Japan. Stroke patients who need rehabilitation have been transferred to recovery-phase rehabilitation hospital (convalescence rehabilitation ward) with LCP as soon as possible. However, there are few reports about prognosis of rehabilitation outcome in their patients. In this study, we studied whether the evaluation of neurological severity and outcome using LCP were related. *Materials and Methods:* 819 stroke patients who used the LCP

were enrolled in this study. They consisted of 378 patients with cerebral infarction, 353 patients with cerebral hemorrhage, 78 patients with subarachnoid hemorrhage, and 10 patients with other cerebrovascular disease. Their ages varied from 11 to 98 years, and were 516 males and 303 females. The time from onset to the start of rehabilitation was 3.0 ± 4.6 days and the mean length of hospital stay was 33.8 ± 16.1 days. Collection and completeness of using the LCPs, physical and cognitive function at transfer, improvement in convalescence rehabilitation hospitals, and final outcome were investigated. **Results:** The return percentage of the LCPs from rehabilitation hospital was 78.6%. Mean length of stay in a convalescence rehabilitation hospital was 97.4 ± 59.4 days. After discharge, 501 patients (75.9%) returned home, 37 (5.6%) entered another medical hospital, 89 (13.5%) went to a nursing care facility, and 33 (5.0%) had other outcomes. There was obvious difference in mean length of stay and ADL improvement per day (FIM efficiency) among the referred convalescence rehabilitation hospitals. **Conclusion:** All healthcare facilities using the LCP need to have a common recognition of stroke rehabilitation. By using the LCP network system, rehabilitation staff in acute hospital should proactively contribute to the qualitative improvement of rehabilitation in stroke patients during the recovery period.

0523FP38

REVEAL THE DISTINCT VENTRAL OCCIPITOTEMPORAL CORTICES NECESSARY FOR VISUAL WORDS, FACES, AND PLACES RECOGNITION IN CHINESE PEOPLE BY USING NEUROPSYCHOLOGICAL TESTS AND NEUROIMAGING EXAMINATIONS

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Purpose: To reveal the distinct ventral occipitotemporal cortices necessary for visual words, faces, and places recognition in Chinese people and to compare the results with that from Non-Chinese reports. **Material and Methods:** Five patients, CYH, KY, JXD, ZMG and LPP, showing agnosia for visual words (pure alexia) or faces (prosopagnosia) or/and places, with infarctions in the left or/and right ventral occipitotemporal cortex, accepted a series of neuropsychological tests (e.g. visual perceptual processing and reading/naming of familiar words, faces and places) and structural and functional MRI examinations (CYH, KY, JXD, stimuli included Chinese characters, faces and pictures). AFNI (a special software) was adopted for analyzing distinct cortices of lesions or functional activations related to different perceptual processing (or processing deficits) of words, faces and places. **Results:** The analysis showed that the left lateral midfusiform cortex (corresponding to visual word form area, VWFA) lesion led to pure alexia (JXD); the right lateral midfusiform cortex (corresponding to fusiform face area, FFA) lesion led to prosopagnosia (ZMG and LPP); bilateral parahippocampal gyrus (included parahippocampal place area, PPA) lesions lead to place agnosia (LPP). fMRI results showed VWFA activations were found in patients without pure alexia (KY, CYH) and no VWFA activation was found in pure alexia (JXD). FFA activations were found in non-prosopagnosia patients (JXD, KY, CYH). **Conclusion:** Left/right lateral midfusiform cortex (VWFA/FFA) are necessary for visual words/faces recognition respectively. Not unilateral but bilateral parahippocampal gyri (PPA) are necessary for place recognition. These results are similar to that from non-Chinese people studies.

Musculoskeletal Miscellaneous

0523FP39

THE AGREEMENT OF SACRAL MARKER AND SEGMENTAL METHOD ON CENTER OF MASS DISPLACEMENT IN NORMAL ADULTS DURING STANDING

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Purpose: The sacral marker (SM) was considered as a simple replacement of segmental method in the measurements of center of mass (COM). However, the agreement between the two methods was not well studied. This study was designed to investigate the agreement between sacral marker method and segmental method on COM assessment. **Materials and Methods:** Twenty healthy adults participated in this study, and they completed three standing positions with double feet, left foot and right foot. SM location was captured by three dimensional motion analysis systems. Meanwhile, locations of 21 markers of segmental method were captured and used to calculate the COM location. The Bland-Altman plot was used to compare the agreement between SM and COM on anterior-posterior (AP), medial-lateral (ML) and vertical axis. Then the agreement between the mean sway amplitudes (MSA) of SM and COM were also compared. One way ANOVA was used to analyze the differences of MSAs among different standing positions. **Results:** A strong agreement was found between the SM and COM on ML and vertical axis. The agreement between MSAs of SM as compared to COM was strong on AP, ML and vertical axis. The location of COM on standing position is 16mm below, 154 mm anterior and 9.3 mm left to SM. The statistically significant differences were found among MSAs of SM and COM of three different standing positions. **Conclusion:** The agreement between SM and COM is strong, which indicated that the SM method is credible for balance assessment in normal adults during standing.

0523FP40

INTRA- AND INTER-RATER RELIABILITY IN THE MEASUREMENT OF ISOKINETIC WRIST FLEXOR AND EXTENSOR STRENGTH IN HEALTHY INDIVIDUALS

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Purpose: To determine the intra- and inter-rater reliability of the IsoMed 2000 isokinetic dynamometer by measuring the peak torque (PT) and total work (TW) generated by the wrist flexion and extension muscles in healthy subjects. **Materials and Methods:** Twenty-eight healthy subjects were divided randomly into two groups. Each subject took the test twice at a similar time of day with an interval of 7 days between sessions at 60°/sec and 180°/sec angular velocities respectively. In the first session, subjects in group A were tested by rater A and subjects in group B were tested by rater B. In the second session, all subjects were tested by rater B. During the study period, no subject underwent physical training or experienced a relevant change of life. **Results:** PT and TW values of wrist flexion measured by both raters were higher than those of wrist extension at 60°/s and 180°/s angular velocities ($p < 0.05$). The intra-rater reliability intraclass correlation coefficients of PT and TW values for wrist flexion and extension ranged from 0.65 to 0.95 at 60°/s and 180°/s angular velocities. The inter-rater reliability ICC ranged from 0.70 to 0.95. **Conclusion:** This study has demonstrated a good to excellent intra- and inter-rater reliability in the isokinetic measurement of wrist muscle strength at low and high angular velocities in healthy individuals using the IsoMed 2000 machine.

0523FP41

THE ROLE OF IL-6 AND PTH ON BONE REMODELING AFTER MODERATE INTENSITY WALKING EXERCISE ON POSTMENOPAUSAL WOMEN

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Purpose: To investigate the role of sIL-6 and sPTH changes on positive uncoupling bone remodeling (BR) after moderate intensity walking exercise in postmenopausal women. **Materials and Methods:** This study was done on 14 healthy postmenopausal women (within 1–5 year of postmenopausal period), 47–59 years old, who underwent moderate intensity walking exercise for 30 min, 3 times a week for 3 weeks. Blood sampling was performed pre exercise and 3 days after the last session of exercise. This research has been approved by Ethi-

cal Clearance Committee of Dr. Soetomo Hospital Surabaya. *Results:* There were significant increased of osteogenic index (OI), decreased sIL-6, and trends of decreased of sCTX, increased sPINP, the ratio of sPINP/CTx and sPTH post exercise. The increased OI was correlated with the decreased soleus muscle contraction. The decreased sIL-6 was correlated with the increased sPINP. The increased sPTH was correlated with the increased sCTX and ratio of sPINP/CTx. *Conclusion:* Moderate intensity walking exercise tend to cause positive uncoupling BR on postmenopausal women, which are mediated by sIL-6 and sPTH.

0523FP43

ELECTROMYOGRAPHIC AMPLITUDE COMPARISON BETWEEN STABLE AND UNSTABLE SURFACES IN THE LOWER BACK

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Purpose: To explore electromyographic amplitude on stable and unstable surfaces in the lower back. *Materials and Methods:* Electromyographic amplitude of 30 healthy people (18 male and 12 female, mean age 26.5±4.3 years) was measured with FlexComp Infiniti. Subjects performed 5 exercises on and off a Swiss ball: sit, bridge, bridge and double knee flex, reverse bridge, press-up. *Results:* 1) Bridge: a significant increased in the activation of the erector spinae on the unstable surfaces ($p<0.05$); 2) Bridge and double knee flex: a significant increased in the activation of erector spinae, external obliques and transverses abdominus/internal obliques on the unstable surfaces ($p<0.05$); 3) Reverse bridge: a significant increased in the activation of erector spinae and rectus abdominus on the unstable surfaces ($p<0.05$); 4) Press-up: a significant increased in the activation of rectus abdominus, external obliques and transverse abdominus/internal obliques on the unstable surfaces ($p<0.05$). *Conclusion:* There was evidence to suggest that the unstable surfaces provide a training stimulus for the lumbopelvic muscles.

0523FP44

COMPARISON OF WHOLE-BODY MUSCLE FATIGUE BETWEEN THE ANAEROBIC AND AEROBIC SPECIFIC TESTS IN BADMINTON PLAYERS

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Purpose: To investigate the degree of neck/trunk and upper/lower extremity muscle fatigue during the anaerobic and aerobic tests in badminton players. *Materials and Methods:* Five badminton players (21.8±2.4 years old, 3 males and 2 females) were recruited. Subjects performed the badminton-specific six points test during both the anaerobic (30 s) and aerobic (exhaustion) conditions. Muscle fatigue was assessed by the changes of the median frequency (MDF) of the electromyogram, recorded from the ipsilateral neck (sternocleidomastoides, SCM), trunk (rectus abdominis, RA), upper extremity (pectoralis major), and lower extremity (vastus medialis, VM, gastrocnemius, GA, and tibialis anterior, TA) during tests. Exhaustion was achieved when the heart rate was greater than 80% maximum and the perceived exertion was close to the highest level. *Results:* After the anaerobic test, the MDF was decreased in RA (5.7±1.9 Hz), TA (13.4±6.6 Hz), and GA (12.7±8.2 Hz) ($p<0.05$). After the aerobic test, the MDF was decreased in RA (8.0±6.3 Hz), VM (10.2±6.2 Hz), and TA (15.4±3.3 Hz) ($p<0.05$), and the SCM (25.6±23.3 Hz) and GA (20.2±17.5 Hz) showed marginal significance ($p=0.07$ and 0.061). *Conclusion:* The fatigue muscles are greater in distribution and in the amount of decreased MDF during aerobic than anaerobic test. This study showed the muscles which are frequently fatigue during a single rally (anaerobic condition) and during the late stage of badminton competition (aerobic condition), which could guide the specific training programs and may help to improve the sport performance.

0523FP45

DEVELOPMENT AND VALIDATION OF A NEW

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WEARABLE INERTIAL SENSING INSTRUMENT FOR MEASURING SHOULDER RANGE OF MOTIONS

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Purpose: To develop and validate a new wearable inertial sensing instrument by comparing it with a three-dimensional (3D) VICON motion analysis system for measuring shoulder range of motions (ROM). *Materials and Methods:* The wearable inertial sensing instrument is composed of an accelerometer, a gyroscope, and a magnetometer. The 3D VICON motion analysis system containing six cameras was used to provide independent reference measurements for the comparison of the wearable inertial sensing instrument during the validity trials. Ten healthy subjects with a mean age of 23.3 (standard deviation 1.33) years were asked to mount the wearable inertial sensing instrument on their trunk, forearm, and upper arm. They demanded to execute five shoulder motions (abduction, flexion, extension, external rotation, and internal rotation). The active shoulder range of motions was measured by the inertial sensing instrument and the 3D VICON motion analysis system simultaneously. Errors were calculated by comparing the results against the measurements obtained by the 3D VICON motion analysis system. *Results:* Good validity was found for the wearable inertial sensing instrument. The root mean square (RMS) errors are 2.53±0.90 degrees for abduction, 3.56±1.24 degrees for flexion, 3.46±1.06 degrees for extension, 2.59±1.86 degrees for external rotation, and 2.41±1.11 degrees for internal rotation. *Conclusion:* We develop a novel convenient instrument for measuring shoulder range of motions. The wearable inertial sensing instrument has good concurrent validity as compared to the 3D VICON motion analysis system in the measurement of active shoulder joint motions.

0523FP46

PROSTHETIC SATISFACTION PERCEIVED PROBLEMS AND REASONS FOR NON-USE OF PROSTHESES AMONG UNILATERAL LOWER EXTREMITY AMPUTEES

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Purpose: To determine prosthetic satisfaction level, perceived problems with prostheses and reasons for non-use prostheses among unilateral transtibial and transfemoral amputees. *Materials and Methods:* This was a cross-sectional, observational study on 94 unilateral lower extremities amputees, which prostheses were restored. Face-to-face interviews were performed on prosthetic satisfaction, perceived problem and usage status. *Results:* Aspects with least satisfaction rate were prosthesis weight (40.4%), comfort (20.6%) and ease of use (25.6%). Prosthetic users were more satisfied with prosthesis comfort (78%) compared to 50% of non-users ($p=0.03$). Prosthetic users (83%) expressed satisfaction towards ease of use of prosthesis compared to 31% of non-prosthetic users ($p=0.005$). Prosthetic users were also significantly satisfied with function (88%) compared to 56% of the non-users ($p=0.005$). 70.2% (66/94) respondents encountered at least one problem whilst 36% (34/94) reported encountering multiple problems with current prosthesis. Most frequent (25.5% respondents) problem was increased pain on residual limb with prosthesis use. 43.8% (7/16) of the non-users stopped using during the first week of acquiring the prosthesis, with a median time for discontinuation of 4 weeks (IQR: 1–12 weeks). Majority (31%) of prosthetic non-users attributed the non-use to poor prosthetic fitting. *Conclusion:* Prosthetic weight, comfort, ease of use and function were aspects which are important to unilateral lower extremity amputees. Pain on using prosthesis was the most common perceive problem encountered. Prosthetic fitting and overall quality is a priority to encourage prosthetic usage.

POSTER PRESENTATION (MAY 21, 2012)

0521PP002

THE BENEFIT OF PRONATED FEET CORRECTION ON YOUNG WOMEN TOWARDS MUSCLE INJURY PREVENTION**Maria R. Rachmawati¹, Angela B.M. Tulaar², A. Purba², M. Mansyur¹, F.H. Idris²**¹Department of Anatomy & Physical Medicine and Rehabilitation Medical Faculty of Trisakti University Jakarta, ²Department of Physical Medicine and Rehabilitation Dr. Cipto Mangunkusumo National Hospital, Medical Faculty of Indonesia University, Jakarta Indonesia

Purpose: Biomechanics disorder as pronated feet accompanied by functional leg length disparity, will increase the risk of muscle injury while walking. Muscle injury will happen continuously on young women with biomechanics disorder and will decrease the muscle function as well as the walking ability. Delayed onset muscle soreness is a subjective indicator of muscle injury. To prevent the emergence of muscle injury after walking activity, it is important to make a correction of the pronated feet which will result in reduced of delayed onset muscle soreness. The aim of this study is to analyze the benefit of pronated feet correction using foot orthoses on the subjective muscle injury indicator, in young women with pronated feet accompanied by functional leg length disparity. **Materials and Methods:** The experimental randomized double blind design involving 27 young women between 20–29 years old. The randomization results in 14 subjects using foot orthoses and 13 subjects remain as a control group. Delayed onset muscle soreness intensity was evaluated 45 h after walking test using the Visual Analogue (VAS) Scale and Delayed Onset Muscle Soreness (DOMS) scale. **Results:** Subjects characteristics in the initial study showed that both groups were similar in demographic, physiologic, kinematics measurement, and without pain complain. Subjects who have been using foot orthoses showed lower intensity of delayed onset muscle soreness 45 h after walking test using VAS scale ($p=0.001$) and DOMS scale ($p=0.003$) on the intervention group. **Conclusion:** The use of foot orthoses as a pronated feet correction in young women with biomechanic disorder as pronated feet accompanied by functional leg length disparity is useful in preventing of muscle injury on walking activity.

0521PP003

RELATIONSHIP BETWEEN KOREAN VERSION OF FALLS EFFICACY SCALE-INTERNATIONAL (KFES-I) AND KOREAN INSTRUMENTAL ACTIVITIES OF DAILY LIVING (K-IADL)**M.J. Kim, T.K. Kim, D.H. Yoon, S.H. Jang, K.H. Lee, J.H. Shin, S.B. Park**

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Purpose: Fear of falling and impairment of IADL are major risk factors of falling. To find the useful falling risk prediction instrument in elderly, we investigated the relationship between KFES-I and K-IADL. **Materials and Methods:** A cross-sectional study was done in 974 Korean residents over 40 years of age from September to November 2008. Written survey was done for community residents using questionnaires about basic demographics, falling events, fear of falling (KFES-I), and limitations of daily activities by K-IADL. Subjects were divided into two groups by age under 60 years old or more. Gathered data were analyzed and statistically processed. **Results:** In KFES-I score, subjects who answered that they did not have fear of falling had a lower square mean (LS mean) and standard error (SE) of 18.3 ± 0.3 , but those who felt fear

of falling had a significantly higher score of 21.6 ± 0.4 ($p<0.01$). But, there was no difference in K-ADL score according to the fear of falling. KFES-I score was also significantly higher in those who had a falling history within past a year ($p<0.01$), but K-IADL score did not show any significant changes depend on the falling history. KFES-I and K-IADL scores were both significantly high in a patient who had neurological disorder, and only KFES-I score was significantly high in a patient with osteoarthritis or urinary incontinence. KFES-I score was correlated with K-IADL score (Spearman's rho correlation coefficient = 0.384, $p<0.01$). Especially, KFES-I score was well correlated with K-IADL score in the group of age over 60 years old (Spearman's rho correlation coefficient = 0.404, $p<0.01$). The number of dependent K-IADL items did not show any significant correlation with KFES-I score in both age group. **Conclusion:** Fear of falling measured by KFES-I was related with the level of dependency rather than the number of dependent K-IADL items. KFES-I score was well correlated with K-IADL score in the group of age over 60 years old.

0521PP004

EFFECTS OF CONCENTRIC AND ECCENTRIC ABDOMINAL TRAINING ON LUMBAR CURVATURE AND FLEXIBILITY**Maria Justine, Rohani Haron, Zoofaiz Salleh**

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Purpose: This study aimed to measure the effects of 6-week concentric and eccentric abdominal training on lumbar curvature and lower back flexibility. **Materials and Methods:** Forty-five subjects (control (NG)=15; concentric (CG)=15; eccentric (EG)=15) from the Faculty of Health Sciences, UiTM (age = 19.78 ± 1.26 years) participated in this randomized-controlled study. The interventions were carried out group-based, 3 times per week. The training comprised of abdominal curl for CG and leg lowering for EG. Subjects performed 15 repetitions for 3 sets with 1-min interval in between sets. The NG did not participate in any exercises. Outcome measures used were lumbar curvature (flexi curve), and lower back flexibility (sit-and-reach box). The measurements were taken during baseline, at three weeks, and after six weeks of interventions. **Results:** No significant differences were noted during the baseline measurement for all three groups. At the end of the intervention, the EG showed a higher reduction in lumbar curvature by 6.55% compared to the CG which showed only 3.33% reduction, however both did not reach the significant level ($p>0.05$). The NG revealed no changes at all in lumbar curvature. For lower back flexibility, the changes were 10.46% ($p<0.01$) for CG, 7.70% ($p<0.01$) for EG, and 1.84% ($p>0.05$) for NG. **Conclusion:** This study suggests that eccentric abdominal training will lead to better improvement in lower back flexibility and greater reduction in magnitude of lumbar curvature. Therefore, it may be applied as one of the interventions for patients with low back pain.

0521PP005

OSTEOGENESIS IMPERFECTA: A CASE REPORT**Y.D. Prawitri, I.L. Wardhani**

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Purpose: Osteogenesis imperfecta (OI) is a genetic disease caused by defects in the synthesis of type I collagen. OI are classified into 4 types, based on image, genetic, and clinical manifestation. The

clinical characteristics are short stature, blue or gray sclera, hearing loss, skeletal deformities and bone fragility. Children with OI often have significant functional limitation arising from physical impairments, disease severity, motivational and socioeconomic factors. *Materials and Methods:* A 4-year-old girl diagnosed with Type I OI, with bilateral fractures on her long bone that caused angulation deformities of her lower extremities. After surgery, she felt pain at both thigh and patient of walk by herself. She could not play. Bilateral HKAFO, walker, ROM exercise, axial loading and strengthening exercise of upper and lower extremity by daily and playing activities were also planned to improve ambulation. *Results:* Application of HKFO reduced pain on the legs during standing and walking, thus patient could ambulate independently. *Conclusion:* This case shows that PM&R program played an important role as part of comprehensive management could not patient with OI. It may improve mobility, prevent fractures and contractures and immobility-induced bone loss, and increase quality of life. The patient needs long term treatment in order to achieve optimal growth and development.

0521PP006

JUVENILE DISC DISORDER CAUSING MULTIPLE CANAL STENOSIS IN A MAN ON PRODUCTIVE AGE: THE ROLE OF PM&R FOR A MULTIDIMENSIONAL RECOVERY

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Purpose: A productive age of patient with multiple canal stenosis arising from juvenile disc disorder needs comprehensive rehabilitation programs to recover muscle strength, continence of bowel and bladder, restore sexual function, as well as preventing the recurrence of multiple canal stenosis. *Materials and Methods:* A 34-year-old man with chief complaint of gradual progressive weakness of limbs since 2.5 years ago, after he fell off in sitting position while carrying 60 kg sand sacks on his upper back. He experienced weakness of the trunk, legs and arms both side, weak anal voluntary contraction, sensory deficits below the level of C4 dermatome, bowel and bladder incontinence and sexual dysfunction. MRI showed multiple canal stenosis of cervical, thoracic, and lumbar vertebra caused by disk bulging with degenerative vertebrae and Schmorl's nodes confirming Juvenile disc disorder. Cervical laminectomy was performed and PM&R Program consists of active ROM exercises, pelvic floor muscles exercises using biofeedback, electrical stimulation, gait training, TLS Orthoses, and psychologist consultation were provided. *Results:* Upper extremities muscle strength increased significantly and slightly in lower extremities. Patient achieved bladder and bowel continence. *Conclusion:* Juvenile disc disorder is a condition in which the discs are not strong enough to withstand pressure generated within. Diagnosis of juvenile disc disorder established by the presence of displacements of intervertebral disk tissue into vertebral body in MRI, known as Schmorl's nodes. Comprehensive PM&R management of juvenile disc disorder are aimed to recover the most optimal muscle strength, to obtain continence for bladder and bowel, to restore sexual function and to prevent the recurrence of canal stenoses, and therefore self esteem and quality of life of patient will be improved.

0521PP007

CERVICAL MYELOPATHY SUPERIMPOSED BY FRACTURE DISLOCATION C1–C2 AIS D: A CASE REPORT

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Purpose: Cervical myelopathy is the most common cervical cord lesion after middle age. Cervical spondylosis remains the most common form of central canal compromise and resultant myelopathy with slow progression. The symptoms are sensory dysfunction, weakness and proprioception deficit which is more severe in the lower than upper limb. The cervical pain might be symmetrical with a typically insidious onset. Patients may experience acute onset with a preceding traumatic event. *Materials and Methods:* A case of a 53-year-old male with tetraparesis. Two years ago, patient often experienced repeated fall during walking. Since 5 months ago, pain occurs at the cervical part. Physical examination revealed a prominent weakness of the lower limb, as compared to the upper limb, loss of joint position, numbness at all extremities below C1 and increased deep tendon reflexes. He underwent Crutchfield traction for 4 weeks and was planned to undergo laminoplasty surgery. Rehabilitation programs prescribed were proper positioning, pelvic twist, breathing exercise, and active range of motion, sensory re-sensitization, strengthening and proprioception exercise and the use of Philadelphia brace. *Results:* After 3 months of hospitalization, there were improvement of the joint position, sensory and muscle strength. *Conclusion:* With proper comprehensive rehabilitation management, patient condition could be improved even though they are candidates of laminoplasty surgery.

0521PP008

THE PREDICTORS OF OVERWEIGHT FOR CHILDREN WITH MOTOR DELAY AGED 0–6 YEARS

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Purpose: Previous studies have shown that children with motor delay (MD) would have higher possibility of being overweight. The purposes of this study were to investigate the anthropometry status distribution and the predictors for overweight and obesity among children with MD aged 0–6 years in Taiwan. *Materials and Methods:* A total of 106 children with motor delay aged 9 to 73 months were recruited. The anthropometry status of overweight was classified by Body Mass Index (BMI) $\geq 85^{\text{th}}$ percentile. The children's total daily energy intake was recorded by 24-h dietary recall, and the time spent on every activity patterns was measured with Daily Routine and Activity Questionnaires for Young Children. The difference of anthropometry status distribution between children with MD and typically developed children was tested by chi-square statistics. Logistic regression was used to analyze the multiple predictors for overweight in children with MD. *Results:* The proportion of children classified as normal BMI was less in children with MD aged 0–3 years than in typically developed children ($\chi^2=10.2-41.9$, $p<0.01$). Higher daily energy intake (OR=1.00, $p=0.04$), used of anti-epileptics medication (OR=12.47, $p=0.02$), low socioeconomic status (OR=4.81, $p=0.05$), and more time spent on floor activity (OR=1.01, $p=0.03$) could predict overweight in children with MD. *Conclusion:* The percentage of normal BMI in young children with MD was much lower than the normal children. The potential predictors for overweight among children with MD need to be monitored for disease prevention and health promotion in early intervention programs.

0521PP009

INFECTIOUS SITUATION IN ELDERLY STROKE PATIENTS UNDERGOING REHABILITATION**Chien-Min Chen¹, Hung-Chih Hsu¹, Wen-San Tsai¹, Chang-Zern Hong²**¹Department of Physical Medicine and Rehabilitation, Chang Gung Memorial Hospital, Chiayi, ²Department of Physical Therapy, Hung Kuang University, Taichung County, Taiwan

Purpose: The present study illustrated infectious situation and examined risk factors among patients in rehabilitation wards. **Materials and Methods:** The study enrolled 341 acute stroke patients (age ≥ 65 years). Assessment of risk factors was done by comparison of patients with or without infection. Possible precipitating factors in each comparison were included in the statistical analysis. **Results:** Ninety-five patients experienced infections. The most common type in the rehabilitation ward was urinary tract infection. Patients without infection had a shorter rehabilitation ward stay compared with those with infection (19 vs 31 days, $p < 0.01$). The frequency of ischemic stroke was significantly lower in the infection group (55.8%) than in the non-infection group (70.3%) ($p < 0.05$). Intensive care center stay (63.2% vs 37.4%, $p < 0.01$), stroke-induced impaired consciousness (55.8% vs 38.2%, $p < 0.01$), post-void residual urine volume > 50 ml (30.5% vs 11%, $p < 0.01$), Foley tube catheterization (71.6% vs 42.3%, $p < 0.01$), and nasogastric tube feeding (73.7% vs 52%, $p < 0.01$) were more frequently seen in the infection group than in the non-infection group. **Conclusion:** The information obtained from the present study help clinicians to identify risks factors for infection.

0521PP010

ELECTRODIAGNOSTIC EVALUATION OF STATIN INDUCED NEUROPATHY**Mohammad Reza Emad, Hosein Ardjmand**

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Purpose: Different groups of drugs play an important role in producing peripheral neuropathy (PNP). Few case reports and articles have mentioned the possibility of PNP as a statin side effect although this is not well established. The aim of this research is to put light on this issue again. **Materials and Methods:** This is a case control study with 2 groups and 39 persons in each. Patients in case group were on statins at least for 6 month with no possible causes of PNP. In both groups sensory and motor function (amplitude, latency, conduction velocity) for peripheral nerves (tibial, peroneal, sural, median, ulnar) were evaluated in electrodiagnosis lab and then the prevalence of PNP and mean of amplitude, latency, conduction velocity of each nerve were compared in both groups. **Results:** There were no meaningful differences between two groups in incidence of three different definitions for PNP: 1) Two abnormal findings in two nerves (L or R); 2) Two abnormal findings in three nerves; and 3) Two abnormal findings in three different nerves bilaterally. Although p -value was too close to be meaningful for the 1st definition of PNP (0.055). In the next step the means of amplitude, latency and conduction velocity for each nerve were compared and there was a meaningful difference just about peroneal motor Amplitude ($p = 0.048$) and sural amplitude ($p = 0.036$). **Conclusion:** There were no meaningful differences between the incidence of PNP in two groups for all of 3 definitions (for 1st one it was too close ($p = 0.055$)) but in the 2nd part of comparison meaningful differences between amplitudes of peroneal motor and sural nerves were detected. Put these findings together it is wise to say that statins could cause some changes in peripheral nerves (especially axonal type) but these changes are not that much to show frank clinical manifestations.

0521PP011

THE EFFECTIVENESS OF MOUTH-OPENING EXERCISE IN PATIENTS WITH CHRONIC CLOSED LOCK OF THE TEMPOROMANDIBULAR JOINT**Shinya Yura¹, Kenji Kagechika², Yasutaka Takagi³**¹Department of Oral and Maxillofacial Surgery, Tonami General Hospital, ²Department of Rehabilitation, Tonami General Hospital, ³Department of Orthopedics, Tonami General Hospital, Japan

Purpose: Mouth-opening exercise or arthrocentesis is an easy and minimally invasive procedure in patients with closed lock of the temporomandibular joint. We describe these two procedures and study the effectiveness of the procedures in closed lock cases. **Materials and Methods:** Mouth-opening exercise was enforced on 24 chronic lock cases without severe joint pain. In 45 chronic lock cases with severe joint pain, arthrocentesis under sufficient hydraulic pressure and opening exercise was performed. The patients with mouth-opening exercise continued opening, protrusive, and lateral excursive exercises with the thumb and forefinger of both hands. Arthrocentesis was performed by the same surgeon according to the technique of Yura et al. Maximum mouth opening and joint pain were measured at the initial visit and after 2 weeks, 4 weeks. Differences in the therapeutic results were statistically analyzed with Mann-Whitney's U test between these two groups. **Results:** Two and four weeks after these two procedures, ranges of maximum mouth opening and joint pain at maximum mouth opening improved significantly ($p < 0.001$). There are no significant differences in the therapeutic results between these two groups. **Conclusion:** The result indicates that the Mouth-opening exercise is an easy and highly efficient procedure in closed lock cases.

0521PP012

INTER-RATER RELIABILITY AND VALIDITY OF THE HARRIS INFANT NEUROMOTOR TEST IN TAIWANESE INFANTS**Sheng Chin Tsai¹, Wen-Yu Liu¹, Chin Man Wang², Alice M.K. Wong^{1,2,3}, Ray In Lin², Chih Hsiu-Cheng¹, Fang Jie Chen¹**¹Chang Gung University, Taoyuan, Taiwan, ²Chang Gung Medical Foundation, Lin Kao Medical Center, Taoyuan, Taiwan and ³Chang Gung Medical Foundation, Taoyuan Branch, Taoyuan, Taiwan

Purpose: The Harris Infant Neuromotor Test (HINT) has been developed to detect atypical neuromotor development, as well as cognitive and behavioral concerns, in infants. It has shown good sensitivity and specificity of the infant's development in Canada. Previous studies indicated that the HINT norms developed originally from Canadian infants was also appropriate for application to USA infants. The purpose of this study was to examine the inter-rater reliability and construct validity of the HINT, as well as the concurrent validity between the Alberta Infant Motor Scale (AIMS) and the HINT in Taiwanese infants. **Materials and Methods:** There were 43 Taiwanese infants (23 boys and 20 girls; mean age: 8.1 ± 2.7 months) participated in this study. The videos of their motor behaviors were scored by two physical therapists individually by using the AIMS and the HINT. The data were analyzed using the ICC for the inter-rater reliability study, and the Spearman's rank correlation coefficient for the concurrent validity study. The infants were divided into two groups (the high-risk group vs the no risk group) based upon their referral resources and conditions. The known-groups method was used to assess the construct validity of HINT. **Results:** The inter-rater reliability varied from 0.74 to 0.96. The correlations between the AIMS and the HINT were moderate to excellent ($r = -0.53$ to -0.90). The results of known-group comparison showed that there were statistically significance of the HINT between the two groups ($p < 0.005$). **Conclusion:** The results

support that the HINT is a valid and reliable instrument in assessing the Taiwanese infants.

0521PP013

CHARCOT'S JOINT – REHABILITATION MEDICINE APPROACH

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Purpose: A case of Charcot's joint with its rehabilitation medicine approach is reported comprehensively. *Materials and Methods:* A 55-years-old female had painless swelling painlessly and crooked right ankle for 3 months. She had history of diabetic mellitus, hypertension, and obesity. She ambulated with double axillaries crutches. Physical examinations revealed proprioception and sensory disturbance, without inflammation. There were limited range of motion and decreased manual muscle test for her right ankle, toes and big toe. Radiographic findings supported the diagnosis of Charcot's joint. Blood laboratory findings supported the metabolic syndrome. The patient was treated by right PTB patent bottom with accommodation shoes. Exercise is prescript for glycemic and weight control. *Results:* Functional ambulation increased through improving effective loading and protecting the particular joint and controlling glycemic and obesity by exercise. *Conclusion:* In this case, Charcot's joint was a consequence of combination of impaired joint sensation and excessive mechanical load. Rehabilitation program can increase functional ambulation and add quality of life for Charcot's joint with metabolic syndrome patient.

0521PP014

TREATMENT OF ACUTE SPINAL CORD INJURY WITH INTRAVENOUS INFUSION OF A GINSENG SAPONIN, GINSENOSE RB1

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Purpose: Red ginseng root has been used clinically by many Asian people for thousands of years without any adverse effects. One of the major components of red ginseng root is ginsenoside Rb1 (gRb1). Previously, we showed that intravenous infusion of gRb1 ameliorated ischaemic brain damage through upregulation of an anti-apoptotic factor, Bcl-xL and that topical application of gRb1 to burn wound lesion facilitated wound healing through up-regulation of vascular endothelial growth factor (VEGF). The above favorable actions of gRb1 on the ischaemic brain prompted us to investigate its effectiveness on acute spinal cord injury (SCI). *Materials and Methods:* The 12th thoracic cord of each adult male Wistar rat was compressed extradurally with a bar weighing 20 g for 20 min. Thirty min later, gRb1 dissolved in saline or saline alone (vehicle) was infused into the left femoral vein for 7 days. The motor function of each rat was evaluated by measuring locomotor activity, rearing activity and BBB scores. Thereafter, the spinal cord was subjected to histopathological and immunoblot analyses. *Results:* All animals with SCI survived until the end of the experiments and exhibited abnormal motor function. Compared with the vehicle-treated group, the gRb1-treated groups showed significant improvement of the locomotor activity, rearing activity and BBB score in a dose-dependent manner after SCI. In support of these physiological findings, gRb1 treatment ameliorated histopathological damage of the injured spinal cord, and upregulated Bcl-xL and VEGF expressions in the injured spinal cord as revealed by the immunoblot analyses. *Conclusion:* Intravenously infusible gRb1 which augments the expressions of BCL-xL and VEGF, if proved to be effective in clinical studies, can be a promising tool for the treatment of patients with SCI.

0521PP015

EXTRACORPAL SHOCK WAVE THERAPY ON REHABILITATION OF CERVICAL SPONDYLOSIS WITH NUCHAL LIGAMENT CALCIFICATION

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Purpose: To investigate the effects of extracorporeal shockwave therapy (ESWT) on rehabilitation of cervical spondylosis with nuchal ligament calcification under various guided. *Materials and Methods:* 60 patients with spondylosis cervical radiculopathy and calcification of posterior neck soft tissue were selected and randomly assigned to three groups A, B and C (20 patients in each group). Patients in group A received regular rehabilitation with 20 min of hot packs and underwent 15 min intermittent cervical traction three times per week for 6 weeks, from 15% to 25% body weight. Patients in Group B received regular rehabilitation as those in group A and ESWT (2000 impulses, 0.27 mJ/mm²) over the calcific nuchal ligament guided by X-ray image, and Patients in Group C received the same treatment as in group B but the ESWT were guided by musculoskeletal sonography. The therapeutic effects were evaluated by changes range of motion (ROM) of cervical spine including flexion, extension, lateral bending and rotation, visual analogue pain scale, and upper limb H-reflex response before and after treatment and at follow-up 3 months later. *Results:* Each treated group reduced pain significantly after treatment and at follow-up. However, patients in Groups B and C showed more improvements in ROM and neck pain relief after treatment. Furthermore, patients in Group C showed more quickly relieved cervical radiculopathy after treatment and better cervical ROM at follow-up than Group B. *Conclusion:* ESWT is an adjuvant treatment in management of cervical spondylosis with calcification of posterior neck soft tissue and results in more functional improvements.

0521PP016

CORRELATION OF RADIOLOGIC AND SONOGRAPHIC FINDINGS WITH SCORE OF WOMAC QUESTIONNAIRE IN UNILATERAL KNEE OSTEOARTHRITIS

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Purpose: Among the elderly, knee osteoarthritis is the leading cause of chronic disability in developed countries. The aim of this investigation was to determine the correlation of radiological findings with score of WOMAC questionnaire in unilateral knee osteoarthritis. *Materials and Methods:* In a randomized trial, 30 patients with chronic pain due to knee osteoarthritis were recruited. For all patients, pain intensity (based on WOMAC) and radiological findings (average thickness of articular cartilage based on sonographic results and intensity of osteoarthritis based on X-ray findings) were determined. *Results:* Score of WOMAC questionnaire was 38.13±17.03. Average thickness of articular cartilage of patients and control group in both position of lateral diameter and medial diameter were 1.88±0.37, 2.02±0.1 and 1.92±0.28, 2.08±0.32, respectively. *Conclusion:* The analyses of variance showed that there were no significant correlations between radiological findings with score of WOMAC questionnaire. However, Average thickness of articular cartilage (lateral and medial diameter) of control group was significantly greater than patients. Conversely, intensity of osteoarthritis of patients based on Kellgren and Lawrence scale was significantly greater than control.

0521PP017

EFFECTIVENESS OF CALCITONIN INJECTION IN THE TREATMENT OF LUMBAR SPINAL STENOSIS

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Purpose: Lumbar spinal stenosis (LSS) is 2% of back pain etiologies. Its age prevalence is in 6th and 7th decades and in these ages patients have also other diseases and performing an operation may have some risks for them. Calcitonin increases blood supply to nerve tissue and elevates the level of beta-endorphins. So, it may improve pain and function of these patients. **Materials and Methods:** Thirty patients with proved LSS have been chosen and received weekly 100 IU intramuscular injection of calcitonin for 4 weeks. Before and after treatment, their pain and function were measured with Visual Analogue Scale (VAS) and Oswestry Disability Index questionnaire (ODI), respectively. **Results:** Seventeen patients were female and 13 patients were male and their mean age was 62.8 years. The difference of VAS results was not statistically significant. However, the evaluation of 4 from 10 questions of ODI were statistically significant before and after treatment {pain intensity ($p=0.02$), lifting ($p=0.014$), standing ($p=0.015$), social life ($p=0.042$)}. Also, the difference of disability percent of patients that finally was extracted from ODI was statistically significant ($p=0.014$). **Conclusion:** It seems that intramuscular injection of calcitonin may be an effective method in the treatment of lumbar spinal stenosis.

0521PP018

EFFECT OF TREADMILL WALKING TRAINING ON TRUNK MUSCLES ENDURANCE IN PEOPLE WITH AND WITHOUT LOW BACK PAIN

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Purpose: Low back pain is a common health complaint. People with low back pain frequently avoid daily activities, and limit their work and leisure activity, which may lead to physical de-conditioning, specifically loss of strength and endurance of lower trunk muscles. Insufficient muscle endurance may further cause disability. Current studies suggest that endurance training for back muscle can improve muscle endurance, back pain and disability condition. Furthermore, walking is one of popular aerobic exercises that is easy to do and at low risk. Treadmill walking has been shown the evidence to improve pain and disability in people with low back pain, yet not be focused on trunk muscle endurance. The purpose of this study is to compare the effects of treadmill walking training on muscle endurance, pain and disability between people with and without low back pain. **Materials and Methods:** A repeat-measured study is designed for ten participants with chronic low back pain (>3 months) and ten healthy adults will be recruited to receive intervention of 8 session treadmill walking training, also include ten people with low back pain of control. Outcome measures include visual analog scale (VAS) for pain, the Roland-Morris Disability Questionnaire (RMDQ) for disability, and trunk muscle endurance test with Ito test and median frequency slope of trunk muscles during walking test for all groups before and after interventions. **Results:** This result demonstrated that for a patient with lower back pain after treadmill walking training are may have a potential to improve not only pain and disability, but also changes in trunk muscle endurance confirmed by clinical and EMG test. Furthermore, people with healthy was also improved trunk muscle endurance capacity after treadmill walking training. **Conclusion:** This investigation will

provide the evidence to the effect of treadmill walking on trunk muscle endurance for clinical consideration.

0521PP019

ARTERIOVENOUS MALFORMATION INCIDENTALLY FOUND IN HEMATOMA AFTER CONTUSION: A CASE REPORT

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Purpose: There are many cases of swelling followed trauma or contusion. Sometimes swelling occurred as mass-like lesion, such as seroma, hematoma, for which aspiration could be considered. If swelling had active bleeding due to vascular injury, aspiration would be dangerous. Reports of vascular abnormality (AVM, AVF, etc) associated trauma or contusion were rare. **Materials and Methods:** A man who had a swelling like a mass on lateral side of right hip visited at our clinic. 10 days ago, he has got a contusion on left buttock after slip down in stairs. And then swelling size increased slowly and gradually. Ultrasound examination was performed. There was heterogeneously hypoechoic fluid collection. Arterial pulse through VL fascia was found in gray scale view, arterial blood flow was seen in Power Doppler (PD) mode, duplex mode. To confirm vascular malformation, CT angiography and arteriography was performed. We concluded as Arteriovenous Malformation. Radiologist performed embolization of multiple AV shunt. **Results:** Occult vascular malformation was incidentally found after contusion with ultrasound. **Conclusion:** Ultrasound examination should be performed on post-traumatic mass-like swelling especially in patients with history of hip surgery.

0521PP020

SUBEPIDERMAL EDEMA IN DIABETIC FOOT

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Purpose: Skin blood flow plays an important role in maintaining the health of the skin. Interstitial edema may impede oxygen diffusion to the skin. This study examined the association between skin blood flow and edema, and epidermal thickness in the feet of people with and without diabetic neuropathy as compared to a healthy control group. **Materials and Methods:** Eighty-seven subjects, including 19 people with diabetic neuropathy and foot ulceration, 35 people with diabetes but without neuropathy, and 33 non-diabetic healthy controls participated in the study. High frequency ultrasonography was used to measure the epidermal thickness and edema in papillary skin at the big toe as reflected by the thickness of the subepidermal low echogenic band (SLEB). The capillary nutritive blood flow was measured by the video capillaroscopy while the skin blood flux was monitored by laser-Doppler flowmetry. **Results:** There was a 7.2% increase in epidermal thickness in those with diabetes but without neuropathy, and a 16.5% decrease in people with diabetic neuropathy and foot ulceration as compared with the healthy controls (all $p<0.05$). The SLEB thickness increased in all diabetic subjects, to a greater degree in those with neuropathy and ulceration than in those without (64.7% vs 11.8%, $p<0.001$). Skin blood flux was shown to be higher in the diabetic groups than in the controls (all $p<0.05$). A significant fair negative correlation ($p=0.002$, $r=-0.366$) was demonstrated between the SLEB and epidermal thickness at the pulp of the big toe, while no significant correlation was demonstrated between skin blood flow and epidermal thickness (all $p>0.05$). **Conclusion:** An increase in subepidermal edema was demonstrated in people with diabetic neuropathy and ulceration, which may partly contribute to the decrease in epidermal thickness at the pulp of the big toe.

0521PP021

POTT'S DISEASE WITH CERVICAL DISLOCATION: A CASE REPORT**H.N. Nurhikmah, I. Lukitra Wardhani***Department of Physical Medicine and Rehabilitation, School of Medicine Airlangga University, Dr. Soetomo General Hospital, Surabaya, Indonesia*

Purpose: To present the case of patient with weakness all extremities due to pott's disease and recovered almost fully after comprehensive rehabilitation programs. **Case:** A case of female, 18 years old with tetraplegia C3 ASIA C due to Pott's disease and dislocation of C5-C6. The problems were non ambulation, weakness of all extremities, sensory loss below dermatomes C3, and total dependency. MRI showed a paravertebral abscess formation on the level of C3 until C6 and dislocation of C5 to C6. She underwent debridement and stabilization surgery and took anti tuberculosis drugs. The patient was then mobilized using Philadelphia cervical collar. **Results:** After 3 months of intensive rehabilitation, the ROM could be maintain, the sensory and strength of all extremities was improved, she can do the daily activities living independently and patient could ambulate. **Conclusion:** Pott's disease is the most common extrapulmonary manifestation of tuberculosis in the spine, which is caused by Mycobacterium tuberculosis. With a comprehensive rehabilitation management, patient with C3 Tetraplegia ASIA C due to of Pott's disease could improve and achieve the functional capacity and her quality of life.

0521PP022

INTRATHECAL BACLOFEN THERAPY FOR SEVERE SPASTICITY**Yasutaka Takagi¹, Hiroshi Yamada¹, Yoshimitsu Kanazawa¹, Hidehumi Ebara¹, Yuu Mikami¹, Takashi Yamamoto¹, Kenji Kagechika²***¹Department of Orthopaedic Surgery, Tonami General Hospital, Tonami, ²Department of Rehabilitation, Kanazawa Medical University, Uchinada, Japan*

Purpose: To determine the outcome of intrathecal baclofen (ITB) therapy in patients with severe spasticity. **Materials and Methods:** Baclofen 50 µg was administered to 23 patients who had severe spasticity due to spinal cord injury (21), cerebral infarction (1), hereditary spastic paraplegia (1) in lumbar puncture as a schooling injection, and the pump burial operation were performed to 16 patients. The change of spasticity was evaluated by the Ashworth score points. **Results:** The improvement of the spasticity was remarkably admitted in all cases, and the pain from the spasticity disappeared. The pain was reduced by adjusting the amount of the medicine without the exacerbation of the spasticity. Two catheter-related complications were found. Additional operations of the exchange of the catheter were needed. The improvement of the spasticity was recovered of additional operations. **Conclusion:** In Japan, 25 cases have been clinically examined since 2002, and remarkable clinical effects were proved. And since April 2006, 627 cases have been implanted of a programmable subcutaneous pump by the end of December 2011. The spasticity of the patients who doesn't obtain the improvement by taking oral treatment is improved enough, and the reduction of the pain is seen. ITB therapeutic effect is as expected and could improve the patient and family's quality of life that can be proved from the experience of these series.

0521PP023

PAPASE AS TREATMENT OPTION FOR OVERGRANULATING WOUND**M.M. Nadia, T.Y. Chung***Department of Rehabilitation Medicine, Faculty of Medicine, University of Malaya, Malaysia*

Purpose: Overgranulation (also commonly known as hypergranulation) is a common problem in chronic wound management.

Materials and Methods: We described a case of a 57-year-old lady with chronic left diabetic foot ulcer for 6 years complicated with overgranulation for a year. She was treated with multiple treatment options among which include wait and see option and hydrocortisone 1% which were not effective and have delayed the healing process of her ulcer. We then decided to use crushed papase tablet applied to her ulcer after a normal saline dressing and prior to an application of secondary dressing. She was clearly instructed on the dressing technique to be done daily at home and only been monitored weekly in foot care clinic. **Results:** The over-granulating tissue was resolved within a month and we are currently continuing her care to promote epithelization. **Conclusion:** Papase is a brand name for papain which is derived from *Carica papaya*. It contains cysteine protease that could digest protein substrates. Its usage in wound management to date was described as enzymatic debridement of necrotic tissue. However, its potential as over-granulation treatment option needs to be explored further in a larger study sample.

0521PP024

THE EFFECTS OF DRY NEEDLING THERAPY INDUCED BETA-ENDORPHIN IN THE MYOFASCIAL TRIGGER POINTS**Li-Wei Chou, Yueh-Ling Hsieh, Chang-Zern Hong, Shun-An Yang***Department of Physical Medicine and Rehabilitation, China Medical University Hospital, Taichung, School of Chinese Medicine, College of Chinese Medicine, China Medical University, Taichung, Department of Physical Therapy, China Medical University, Taichung, Department of Physical Therapy, Hungkuang University, Taichung, Taiwan*

Purpose: Dry needling at the myofascial trigger points (MTrPs) is an effective treatment for management of myofascial pain syndrome. Vascular endothelial growth factor (VEGF) is a signal protein produced by cells that stimulates vasculogenesis and angiogenesis. It is part of the system that restores the oxygen supply to tissues when blood circulation is inadequate. The opioid peptide, β -endorphin, has been shown to involve in analgesia. However, biochemical effects of dry needling associated with antinociception were still unclear. To have a better understanding on the analgesic effects of dry needling for treating MTrPs, the levels of β -endorphin and VEGF of the skeletal muscles were investigated. **Materials and Methods:** New Zealand rabbits (2.5–3.0 kg) were investigated in this study. Dry needling or sham operation was applied to the myofascial trigger spots (MTrSs, equivalent to human MTrP) of the biceps femoris for 3 min per day for one and five consecutive days. The protein levels of β -endorphin and VEGF were measured by western blot immediately after treatment and on the follow-up days of the treatments. **Results:** The 5-day dry needling treatment enhanced β -endorphin and VEGF levels, but not for only 1-day treatment. These proteins were also increased 5 days after ceasing 1-day and 5-day dry needling. **Conclusion:** Long-term dry needling can increase the biochemical associated with analgesia and angiogenesis, β -endorphin and VEGF, to modulate pain and enhance circulation in skeletal muscles containing MTrSs.

0521PP025

COMPARISON OF THE ANALGESIC EFFECTS OF LOW- AND HIGH-INTENSITY LASER THERAPY COMBINED WITH INTRAARTICULAR HYALURONAN INJECTION ON ADJUVANT-INDUCED ARTHRITIS IN RATS**Fang-Chuen Huang, Yueh-Ling Hsieh***Department of Physical Therapy, Graduate Institute of Rehabilitation Science, China Medical University, Taichung, Taiwan*

Purpose: Intra-articular injection of hyaluronan (IAHA) is a potential clinical option for the treatment of rheumatoid arthritis (RA), but

its analgesic effect was still limited. Low-level laser therapy is the proven and recommended intervention for managing RA on pain, but the dosage of laser therapy is still controversy. The purpose of this study was to investigate the effects of combined use of low- or high-intensity laser therapy (LILT or HILT) with IAHA on pain and inflammation in rats with complete Freund's adjuvant-induced arthritis (CIA). *Materials and Methods:* Monoarthritis was induced in adult male Sprague-Dawley (250–300 g) via intraarticular injection of complete Freund's adjuvant into the tibiotarsal joint. The CIA animals were divided into 4 groups: control (no treatments), IAHA, LILT+IAHA, HILT+IAHA groups. Seven days after CIA, combined use of laser therapy and IAHA were administered for 7 consecutive days and once every other day respectively. Functional evaluations of edema and pain behavior, histology, and pro-inflammatory cytokines were performed. *Results:* The mechanical withdrawal pain threshold and pro-inflammatory cytokines were significantly improved in HILT+IAHA group when compared with those in the IAHA, LILT+IAHA and control groups. *Conclusion:* This study findings suggest that combined use of HILT and IAHA can decrease hyperanalgesia through modifying pro-inflammatory cytokines. Therefore, HILT will be substantial and feasible for alleviation of pain and inflammation on CIA model treated with IAHA.

0521PP026

RELIABILITY OF POSTUROGRAPHY WITH NEWLY DEVELOPED AUTOMATIC CALIBRATION BALANCE SYSTEM

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Purpose: To examine the reliability of posturography with newly developed automatic calibration balance system. *Materials and Methods:* Seventeen patients who were capable of standing without assistive devices (14 males and 3 females, age between 26–64 years old) participated in this study: 9 for the newly developed automatic calibration balance system (I Balance S (CyberMedic®, Korea)) and 8 for Biodex Balance System SD (Biodex Medical System®, New York, USA). Mean center of gravity (COG) sway velocity, total distance, maximum velocity (MV), average movement degree (AMD), maximum excursion (ME) and directional control (DC) were measured by I Balance S. Overall stability index and overall directional control score were measured by Biodex Balance System SD. For the accurate measurement, the COG was automatically calibrated to zero before each measurement by I Balance S. Each subject was tested once by examiner A and twice by examiner B. The intraclass correlation coefficients (ICC) were calculated to assess the inter-rater and intra-rater reliability. *Results:* The inter-rater reliabilities were higher in the I Balance S (ICC, 0.782–0.974) than in Biodex Balance System (ICC, 0.384–0.756). And the intra-rater reliabilities were similar between I Balance S (ICC, 0.736–0.982) and Biodex Balance System SD (ICC, 0.878–0.970). *Conclusion:* I Balance S using automatic calibration balance system is a reliable posturography to be used in balance assessment.

0521PP027

REHABILITATION OF ELECTRICAL BURN HAND INJURY

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Purpose: High voltage electrical injuries result in extensive deep tissue damage and are associated with multiple complications and long rehabilitation process. The strategic management can both be challenging and complex begins at the moment of the injury and continues through the rehabilitation period. *Case:* A man, 30 years old,

with a chief complaint rigid of both hands and wrists and unable to grasp after exposed to high voltage electrical burn 7 months ago. He was hospitalized for 2 months and underwent several surgeries. For activities of daily living (ADLs), almost all were performed with assistance. Findings on physical examination for both hands: dry wound, reduced muscle mass, limited range of motion (ROM), and decreased of manual muscle testing (MMT) & sensibility. Electromyography (EMG) showed the presence of motor and sensory axonal bilateral lesions in the median, ulnar and radial nerves. Barthel index (BI) was found as severe disability and Depression, Anxiety and Stress Scales (DASS-42) indicated severe depression. Rehabilitation programs given were education, ROM exercise followed by stretching, electrical stimulation on both intrinsic hand muscles, ADLs training and supportive therapy. *Conclusion:* In 2 months therapy there was improvement for ROM & MMT and increased of functional outcomes and DASS-42 scales. For the next step, we are planning to give adjustment tools to allow the patient to perform ADLs independently and prepare him for getting a job with the existing conditions.

0521PP028

PROPRIOCEPTION OF SCAPULOTHORACIC JOINTS IN INDIVIDUALS WITH AND WITHOUT SHOULDER IMPINGEMENT SYNDROME

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Purpose: Proprioception deficit is suggested as a contributor to scapular dyskinesis and often emphasized in the rehabilitation following shoulder impingement. However, very few studies described the measurement method for scapular proprioception and its interaction with shoulder impingement syndrome. Therefore, the purpose of this study was to describe and compare scapular proprioception in subjects with and without shoulder impingement syndrome. *Materials and Methods:* Twenty patients with shoulder impingement and 20 matched controls were participating in this study. The scapular proprioception was measured as joint reposition errors in 4 scapular movements (elevation, depression, protraction, retraction). The subject was asked to reposition their scapula to the maximum and reference position in each movement. The Liberty electromagnetic tracking system was used for recording joint kinematics. We used two-way repeated measures analysis of variance to examine the group differences in scapular reposition errors with the level of significance set at 0.05. *Results:* A significant group by side interaction was observed ($p < 0.05$), with significantly larger reposition errors in patient's injured shoulder as compared to the non-injured side and the controls ($p < 0.05$). Handedness did not have a significant effect on the scapular reposition errors ($p > 0.05$). *Conclusion:* Scapular proprioception was impaired in impinged shoulders, which should be considered when assessing and treating patients with shoulder impingement.

0521PP029

DRY NEEDLING FOR TREATING MYOFASCIAL TRIGGER POINTS MAY AUGMENT B-ENDORPHIN LEVELS OF PROXIMAL SKELETAL MUSCLES IN RABBITS

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Purpose: The remote effectiveness of dry needling therapy for pain control of myofascial trigger points (MTTrPs) has been demonstrated

in many clinical studies. The opioid peptide, β -endorphin, has been shown to involve in analgesia. However, little is known about the biochemicals of antinociception affected by the dry needling of a distal MTrPs. This study aimed to investigate the remote effect of dry needling on the levels of β -endorphin, substance p (SP), and inducible nitric oxide synthase (iNOS) of the proximal muscles. *Materials and Methods:* New Zealand rabbits (2.5–3.0 kg) were used in this study. Animals received dry needling or sham operation at myofascial trigger spots (MTrSs, similar to human MTrPs) of a unilateral gastrocnemius with duration of 3 min per day for 1 and 5 consecutive days. Western blot analysis was performed to determine the protein levels of β -endorphin, SP and iNOS in bilateral biceps femoris muscles containing MTrSs. *Results:* The protein levels of β -endorphin, SP and iNOS were not changed by 1 dosage of dry needling. However, 5 dosages of dry needling markedly increased the β -endorphin and decreased iNOS in bilateral biceps femoris ipsilaterally and contralaterally to dry needling site after five dosages of dry needling. No significant difference in SP levels was found between dry needling and sham operation. *Conclusion:* The antinociception effect of dry needling to distal MTrP may involve in modulating the β -endorphin of endogenous opioid system.

0521PP030**KLIPPEL TRENAUNAY SYNDROME IN 3 MONTHS BABY: A CASE REPORT**

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Purpose: To describe the rehabilitation management of a rare case, Klippel treunay syndrome (KTS). *Materials and Methods:* A 3-month-old baby girl with KTS and motoric delayed, with complaint of delay ability to raise her head. She had KTS's triad of right hemihypertrophy, port wine appearances on several parts of the body and varicose vein in her limb. Another finding was the lack of hearing function. There was Corpus Callosum hypoplasia from MRI. This syndrome revealed hypertrophy symptom which usually affected the limb from one side of the body. There had been many theories for etiology, including abnormalities in vascular or lymphatic flow and chromosomal abnormalities. In addition, Corpus Callosum hypoplasia, which is detected on MRI, could play a role in delaying motor milestone achievement. Rehabilitation program consists of head control facilitation, audio stimulation and manual lymph drainage. Follow up include regular evaluations for growth and development, hemihypertrophy measurement and functioning. Psychological supported were given to the parents with educations about the disorder, home programs and rehabilitation planning. *Results:* After 2 months of rehabilitation programs and home exercises, she has a better control of her head and improvement in her hearing ability but yet still encounter mobility for rolling by herself. Right hemihypertrophy was quite distinct her face and extremities. Corrective shoes might be necessary by the time she starts standing. Her mother accepted the conditions and will try to achieve appropriate goals by stimulating her child regularly. *Conclusion:* Comprehensive rehabilitation management can limit physical deformity, achieve optimal developmental milestone and support parents to arrange the best management for the child's future.

0521PP031**ABOVE KNEE AMPUTATION AND LUNG METASTATIC OSTEOSARCOMA: A PALLIATIVE REHABILITATION CASE REPORT**

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Purpose: To present rehabilitation intervention to a girl with post above knee amputation and lung metastatic due to osteosarcoma. *Materials and Methods:* Case report of 18-year-old tailor girl with history post above knee amputation because of left distal femur osteosarcoma that she suffered 8 months before she came to our outpatient rehabilitation unit. She wants to walk with limb prothesa but from physical examination there were general weakness, profuse cough, dyspnea and anemia. Radiologic examination revealed multiple nodule lesions of both lungs. Then, she hospitalized for general reconditioning and palliative chemotherapy, finally she postponed to use limb prothesa. We also give rehabilitation program to optimized breathing, increase cardiopulmonary endurance, strengthen stump, increased quality of life and advised the patients' family in regard to appropriate care as a strategy for palliative rehabilitation. The comprehensive rehabilitation program continued at outpatient rehabilitation unit. *Results:* After serial physical therapy, there were increased of count test and chest expansion, strength of left hip, Barthel Index and patient return to her previous activity. *Conclusion:* Physical Medicine and Rehabilitation play an important role in palliative management of patient with terminal stage of osteosarcoma.

0521PP032**NEW ULTRASOUND METHOD IN THE DIAGNOSIS OF FROZEN SHOULDER**

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Purpose: To evaluate the feasibility of the new ultrasound method in the diagnosis of frozen shoulder. *Materials and Methods:* Eighty-four patients were recruited. All the patients had unilateral shoulder pain and were diagnosed frozen shoulder with frozen stage. Clinical evaluation was assessed using passive range of flexion, abduction, internal and external rotations, Cyriax's severity stage of the frozen shoulder, and visual analogue scale (VAS) score. A physiatrist performed ultrasound and arthrography together. The distance between coracoid process and lesser tuberosity at the end range of external rotation was measured using ultrasound. Two measurements were taken for intra-rater reliability. The external rotation (ER) ratio was determined as the ratio of the mean distance in the affected side divided by that in the unaffected side. The glenohumeral joint volume was measured using single contrast arthrography. *Results:* The mean distances of affected and unaffected shoulders were 30.1 mm and 41.7 mm. Intra-class correlation coefficients of the repeated measurements in the affected and unaffected shoulders were 0.978 and 0.947. The ER ratio was significantly correlated with the range of external rotation (mean 41.3°, $r=0.589$, $p<0.01$), internal rotation (mean 21.9°, $r=0.405$, $p<0.01$), flexion (mean 121.0°, $r=0.325$, $p<0.01$) and abduction (mean 117.6°, $r=0.379$, $p<0.01$), with the joint volume (mean 10.6 ml, $r=0.316$, $p<0.01$), and with Cyriax's severity stages (mean 2.7, $r=0.286$, $p<0.01$). However, the ER ratio was not correlated with VAS score. *Conclusion:* The new ultrasound method, the ER ratio, can be a useful imaging in diagnosing frozen shoulder by objectively measuring the limitation of motion of shoulder.

0521PP033**EFFECT OF 45° RECLINING SITTING POSTURE ON SWALLOWING IN THE PATIENT WITH DYSPHAGIA**

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Purpose: To find the effect of 45° reclining sitting posture on swallowing in the patient with dysphagia. *Materials and Method:*

Twenty-five patients with dysphagia were evaluated. Videofluoroscopic Swallowing Study (VFSS) was done for each patient in 90° erect and then 45° reclining sitting posture. Patients swallowed 5 kinds of boluses twice: sequentially 2 ml thin liquid, 5 ml thin liquid, thick liquid, yogurt and cooked rice with barium to provide contrast. Penetration-Aspiration Scale (PAS), Oral Transit Time (OTT), Pharyngeal Delay Time (PDT), Pharyngeal Transit Time (PTT), residue in valleculae and pyriform sinuses, premature bolus loss and nasal penetration were analyzed. We compared the results of VFSS in 45° reclining sitting posture with those in 90° erect sitting posture. *Results:* The mean PAS on 2 ml thin liquid in 45° reclining sitting posture was 2.92 ± 2.69 and that in 90° erect sitting posture was 1.28 ± 0.67 . The mean PAS on 2 ml thin liquid decreased significantly in 45° reclining sitting posture ($p=0.007$). And the mean PAS on 5ml thin liquid in 45° reclining sitting posture showed decreasing tendency. The residue in valleculae decreased significantly on all kinds of boluses in 45° reclining sitting posture ($p=0.000, 0.002, 0.003, 0.000, 0.020$, respectively). And, the residue in pyriform sinuses increased significantly on 5ml thin liquid, thick liquid and yogurt ($p=0.031, 0.020, 0.002$, respectively). There were no significant differences in OTT, PDT, PTT, premature bolus loss and nasal penetration in both postures. *Conclusion:* In this study, PAS on 2 ml thin liquid and residue in valleculae on all kinds of boluses were decreased in 45° reclining sitting posture. So, we suppose that 45° reclining sitting posture on swallowing is beneficial for the patient with penetration or aspiration on small amounts of thin liquid and large amount of residue in valleculae.

0521PP034

THE EFFECT OF POSITION OF IMMOBILIZATION UPON THE TENSILE PROPERTIES IN INJURED ACHILLES TENDON OF RAT

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Purpose: To examine the effect of the posture upon the tensile properties in injured Achilles tendon of rat for an initial period of immobilization. *Materials and Methods:* Forty-two male Sprague-Dawley rats (Taconic Laboratories; 8 weeks old, 240–300 g) were used. Eighteen rats received a total transection of the right Achilles tendon to mimic a total tendon rupture and divided into three groups of 3 rats each. Ankle of group A was immobilized at 60° of plantarflexion posture with a synthetic cast. Ankle of group B was immobilized at neutral posture with a cast. Ankle of group C was immobilized at 60° of dorsiflexion posture with a cast. The other 18 rats received a hemi-transection of the right Achilles tendon to mimic a partial tendon rupture and divided into three groups as above. Another 6 rats were kept free as control. After 14 days, we dissected the Achilles tendon of each group. We analyzed maximum force (N), stiffness (N/mm), energy uptake (J) using a testing machine (Universal testing machine 5569, Instron, USA). For histological assessments of collagen organization, The Achilles tendon of 6 rats from each groups were reserved for histologist evaluation. Hematoxylin-Eosin and Picrosirius staining was done for the collagen fiber status. *Results:* Compared to the control group, the other 3 groups showed significantly decreased values of maximum force, stiffness and energy except the energy of group C in total tenotomy. There were no significant differences among the other three groups. In comparison among test groups A, B, C, Maximum force of Group C was significantly higher. *Conclusion:* Dorsiflexion posture in partial ruptured Achilles tendon showed better healing effect than other immobilized postures. However, in total ruptured, dorsiflexion posture showed better healing tendency only. Further study considering the duration of immobilization or the effect of new treatment is needed.

0521PP035

REHABILITATION IN TYPE V (SCHATZKER) TIBIAL PLATEAU FRACTURE POST OPEN REDUCTION AND INTERNAL FIXATION: A CASE REPORT

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Background: Tibial plateau fracture involves the proximal aspect or metaphysis of the tibia and frequently the articular surface as well. They are subdivided into six types by Schatzker. Type V is a bicondylar fracture involving both plateaus. It is also known as an inverted Y fracture and usually associated with an articular injury. *Case:* A 24-year-old male was referred to Rehabilitation Department from Orthopedic Department two weeks ago after an Open Reduction and Internal Fixation on his right tibial plateau. He had a history of motorcycle accident 8 months ago. He felt pain on the right knee with restricted right knee range of motion. The rehabilitation program consist of strengthening exercise, range of motion exercise, gentle stretching exercise on hamstring and quadriceps muscles and gait training with bilateral crutches. The prescription is given based on the time after surgery and the stage of bone healing that can be seen in the x-ray examination. *Results:* After 8 months the range of motion increased, the pain was decreased, but still getting worst when he lift heavy weight. Now, he was able to walk full weight bearing without crutches, and able return to work. *Conclusion:* Rehabilitation program could improve functional outcome of patient with Type V (Schatzker) Tibial Plateau Fracture post Open Reduction and Internal Fixation.

0521PP036

EFFECTS OF ELECTROACUPUNCTURE ON RECENT STROKE WITH INCOMPLETE BLADDER EMPTYING – A PRELIMINARY STUDY

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Purpose: Incomplete bladder emptying (IBE) was defined as having a post-void residual (PVR) urine volume greater than 100 ml on two consecutive days. IBE is common among patients with stroke and might necessitate indwelling or intermittent catheterization. IBE is correlated with urinary tract infection, which could impede progress in rehabilitation and increase medical costs. The treatment of patients with IBE included bladder retraining and biofeedback, medication, or botulinum toxin injection, but none of these managements is completely effective. *Materials and Methods:* All patients with acute stroke admitted to the rehabilitation ward between August 2010 and April 2011 were included to check for PVR urine volume. Electroacupuncture (EA) (1Hz, 20 min) on the acu-points including Sanyinjiao (SP6), ciliao (BL32) and Panguangshu (BL28) were selected to treat stroke patients with IBE for a total of ten times of treatment (five times/week). Bladder diaries including the spontaneous voiding volume and PVR urine volume were recorded during the treatment course. *Results:* Nine of 49 patients (18%) had IBE. Seven stroke patients with IBE were treated with EA. Increased spontaneous voiding volume and decreased PVR urine volume were noted after 10 times EA. *Conclusion:* EA may have beneficial effects

on improvement in stroke survivors with IBE and could be another safe modality to improve the urination function.

0521PP037

LINEAR SCLERODERMA IN CHILDHOOD: A CASE REPORT

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Purpose: Linear Scleroderma (LS) encompasses a rare, poorly understood spectrum of conditions that can lead to disabling musculoskeletal complications. The purpose of this case report was to describe the importance of comprehensive, multi-disciplinary management of a rare case of LS. **Materials and Methods:** A 6.5-year-old girl with tip-toeing gait, drop foot, generalized muscle atrophy and hyperpigmentation following Blaschko's lines of embryological development, right ankle flexion contracture, flexion contracture of fifth digit of right foot and third digit of right hand. She had a history of white line on the right back of the leg and stiffness of third digit of the right hand (age 1.5 years), was initially diagnosed and treated as leprosy, was pronounced release from treatment (age 3.5 years). At the moment, pathologic findings supported scleroderma; electro diagnostic study resulted in axonal neuropathy of right upper and lower extremity nerve samples without denervation. The PM&R program consisted of posture correction, sense of symmetry and verticality, exercise program to maintain joint alignment, stability and muscle strength. Orthopedic program included Achilles tendon lengthening and release of flexion contracture of third digit of left hand. Ankle Foot Orthosis (AFO) and occupational therapy for daily activities were prescribed following surgical procedure. No further treatment from dermatology clinic. **Results:** Nine months after intervention, she developed ankle joint contracture, 4-cm leg-length discrepancy and postural scoliosis. Customized accommodation shoes were prescribed to improve ambulation and we continued the program. **Conclusion:** Early and prompt diagnosis, comprehensive multi-disciplinary management, continuous rehabilitation and education for patient and family would be helpful in managing joint contracture and functional impairment of patients with LS.

0521PP038

EVALUATION OF CHANGE IN DYNAMIC PROPERTY OF VESSEL WALL, DYNAMIC DEFORMABILITY AND STRENGTH OF ARTERIOSCLEROTIC AND RUPTURED BLOOD VESSEL BY ULTRASOUND

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Purpose: Of this study is establishment of metrology that detects progress of arteriosclerosis and new diagnostic method of stiffness parameter of carotid artery by ultrasound. **Materials and Methods:** Measurement principle is that arteriosclerotic and the ruptured blood vessels appear as a change in the dynamic property of the vessel wall (dynamic deformability and strength). Then, the change in the vessel diameter according to the ictus is measured from the echo view, and stiffness (Eth) and blood vessel rupture strength of the vessel wall are evaluated by biomechanics. The feature of this method: Stiffness (Eth) is evaluated according to the several echo dynamic

scenes and the blood pressure. The vessel diameter can be measured from the echo view. On the other hand, the distortion depends on the speed of the external force because the blood vessel has both elasticity and the viscosity characters. **Result and Conclusion:** It was admitted that one axis stretch condition necessary to measure strength of the material, equivalent Eth notation to the tensile test result was appropriate. As a result, the thing that a blood vessel of lower extremity was about as much as seven times harder than the carotid artery was shown. In the future it is possible to apply it to other blood vessels such as aorta abdominalis, and artery of lower extremities to be able to evaluate arteriosclerosis by ultrasound.

0521PP039

EARLY RECOVERY CHANGES OF HIP ABDUCTOR, KNEE EXTENSOR AND FLEXOR STRENGTH AFTER TOTAL HIP ARTHROPLASTY

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Purpose: The purpose of this study was to clarify the hip abductor, knee extensor and flexor strength after total hip arthroplasty (THA) and to evaluate the ratios of postoperative/preoperative in these muscle strength. **Materials and Methods:** Thirty-one patients with THA, all subjects were female with the mean age of 60.6 ± 7, participated in the study. The pre and postoperative hip abductor strength were measured using a μ-Tas MF1 and knee joint muscle strength were using a biodex machine, and were compared the ratio of postoperative/preoperative in each muscle strength. **Results:** Although the postoperative hip abductor strength was significantly smaller than the preoperative abductor strength at one week after surgery, no significant difference between the pre and postoperative for the hip abductor strength at two weeks. The postoperative knee extensor strength at three weeks was significantly smaller than preoperative, and knee flexor strength was not significant difference between the pre and postoperative. **Conclusion:** This study suggested that the main cause of postoperative hip abductor strength decreased at one week was pain by directed surgery and postoperative knee extensor strength decreased was thought about mainly disuse muscle weakness. Furthermore, it was suggested that postoperative knee flexor strength was not so decreased due to the influence of two joint muscles.

0521PP040

THE IMPROVEMENT OF SPASTICITY AND KINETIC CHANGE AFTER BOTULINUM TOXIN INJECTION IN POST-STROKE UPPER LIMB SPASTICITY

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Purpose: There are a variety of behavioral, physical and pharmacological therapeutic options in treating the patients with functional impairment with upper extremity (UE) after stroke; botulinum toxin injection is one of these effective treatments. However, there was lacking of empirical study to investigate the improvement process of the effectiveness. **Materials and Methods:** The present study was a prospective design. Eligibility subjects were chronic and stable

condition of stroke with upper limb spasticity. All of them were undertook the same dosage of botulinum toxin injection by the same physiatrist. To investigate the muscle strength recovery process of UE, Modified Ashworth Scale, Microfet 2 hand hold dynamometer and Jamar dynamometer were using for assessing the spasticity, muscle strength of UE and grip strength; during the strength assessment, surface electromyography (Biopac MP150) was capture the muscle firing condition at the same duration. There were four times of assessment: two weeks, four weeks, eight weeks and twelve weeks after injection. **Results:** Total six subjects were included (four male and two female, age: 55.5±4.57). The present result showed that after two weeks of botulinum toxin injection had a significant decrease of spasticity and muscle strength in elbow flexors, wrist extensors and wrist flexors. After four weeks the injected muscle firing amplitude had become the lowest level and progress to increase following eight weeks investigation. **Conclusion:** With the combination of variety of UE rehabilitation programs, the botulinum toxin injection could be beneficial to the chronic stroke patients which not only to decrease the spasticity but to improve the function of UE.

0521PP041

THE IMMEDIATE EFFECT OF ELASTIC MEDICAL TAPING IN ATHLETES: DISCUSSION KINETIC AND SURFACE EMG CHANGE

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Purpose: To investigate the effect of the elastic medical taping in athletes. **Materials and Methods:** Subjects were recruited from the collegiate sports team, total 20 subjects were included. (Age: 22.62±2.13 years, body height: 170.62±1.94 cm, body weight: 68.32±8.1 kg). In present study, we use isokinetic muscle testing machine to test the muscle performance of knee extensor in athletes, and then had isokinetic fatigue test. After muscle group of the knee extensor fatigue, the elastic medical tape was applied on the subjects in experimental group. The statistical method to test the mean force, maximal isometric force, rate of force development, impulse of muscle, and EMG firing of quadriceps was ANOVA. The significant level was 0.05. **Results:** After isokinetic fatigue testing, the mean muscle force had significant improvement in elastic medical tape group. ($p < 0.05$); the maximal isometric muscle force, the rate of force development in 50 ms, 100 ms, 150 ms, 200 ms, and the impulse of muscle in 50 ms, 100 ms, 150 ms all were had significant improvement in taping group. The EMG firing rate in 150 ms of taping group was significant decreased in taping group. **Conclusion:** The present study showed that the elastic medical taping could increase the rate of force development and impulse of muscle in athletes, furthermore, applied the elastic medical tape on knee extensor after fatigue testing also had a positive impact of mean force and maximal isometric strength.

0521PP042

VOXEL-BASED STATISTICAL ANALYSIS OF BRAIN METABOLISM IN PATIENTS WITH GROWTH HORMONE DEFICIENCY AFTER TRAUMATIC BRAIN INJURY: A PILOT STUDY OF F-18 FDG POSITRON EMISSION TOMOGRAPHY

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Purpose: The present pilot study was aimed to investigate the regional cerebral metabolism related with growth hormone deficiency (GHD) after traumatic brain injury (TBI) by using voxel-based statistical analysis of F-18 fluorodeoxyglucose positron emission tomography (F-18 FDG PET) images. **Materials and Methods:** Thirteen patients with diffuse axonal injury with or without minimal intracranial hemorrhage following TBI were enrolled. They underwent the brain F-18 FDG PET study and an insulin tolerance test (ITT). According to the results of ITT, they were divided into two groups: patients with GHD and normal controls without GHD. We performed the voxel-based statistical analysis of brain metabolism and compared the regional cerebral glucose metabolism shown on F-18 FDG PET from 5 patients with GHD with those from 8 normal controls without GHD. Analysis was conducted using SPM2 to identify regions where decreased changes in regional cerebral glucose metabolism significantly related with GHD. **Results:** Compared with control groups, patients with GHD after TBI demonstrated decreased cerebral glucose metabolism in the left superior frontal, right middle frontal, left orbito-frontal, and left middle cingulate, right superior temporal and supramarginal cortices ($p < 0.005$). **Conclusion:** Our findings are suggestive of the brain region influenced by growth hormone deficiency following TBI. These cortical areas are involved in regulation of intellectual function, executive function and working memory. Further studies are needed to identify neurophysiological substrate of growth hormone in cognitive function.

0521PP043

HIGH PLASMA LEPTIN LEVELS ARE ASSOCIATED WITH FUNCTIONAL OUTCOME AND DEPRESSION IN POST STROKE PATIENTS

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Purpose: To investigate whether plasma leptin levels might be associated with functional outcome, cognitive function and depression in post stroke patients. **Materials and Methods:** We studied 130 patients experienced a first episode of stroke of more than 3 months' duration without previous history of depression or speech disorders. Data were collected on demographic data, depressive mood (Beck Depression Inventory - BDI), independence in activities of daily living (Functional Independence Measure - FIM), cognition (Korean Mini Mental State Examination - K-MMSE) and serum levels of leptin measured by enzyme-linked immunosorbent assay (ELISA). These patients were divided into 2 groups: patients with depression (BDI >15) and controls without depression. And they were also separated into 3 groups according to the level of leptin: 20 mg/dl, 20–30 mg/dl, >30 mg/dl. Statistical analysis was conducted to identify difference of serum leptin levels between patients with depression and those without depression, and to identify difference of FIM, K-MMSE scores between groups separated by serum leptin levels. **Results:** Patients with depressive mood symptom showed higher serum leptin levels compared with controls. {38.5 (25.1–59.2) vs 8.2 (4.9–17.8) ng/ml, $p < 0.01$ }. Highest leptin level group (>30 mg/dl) showed statistically significant lower K-MMSE, FIM scores than the other 2 groups. **Conclusion:** High plasma leptin level appears to be associated with increased disability, cognitive deficits and depression after stroke, independently of other adverse predictors.

0521PP044

THE DIFFERENCE OF THE TRUNK ACCELERATION DURING GAIT BETWEEN FUNCTIONAL AMBULATION CATEGORIES IN THE STROKE PATIENTS

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Purpose: Functional Ambulation Categories (FAC) is used to classify the patients according to functional ambulation, and might represent their dynamic stability during gait. The purpose of this study was to compare the gait stability between FACs. **Materials and Methods:** Thirty-one stroke hemiplegic patients who were classified into category 3 or above were participated in this study (age: 63.0±10.2 years, days from onset: 110.3±39.7 days, right hemiplegia = 14, left hemiplegia = 17). Tri-axial accelerometer (Microstone, Co Ltd, Japan) was fixed with elastic belt over the L3 spinous process, and the sampling rate was 200 Hz. Subjects were required to walk two trials along a 10 m walkway at comfortable speeds. The variables (gait velocity, root mean square: RMS, auto-correlation: AC, step ratio: SR) were calculated from the acceleration data obtained from three gait cycles. These variables were compared between categories by Steel-Dwass test. The statistical significance was set at 0.05. **Results:** Gait velocity of category 3 subjects was significantly slower than category 4 and 5 subjects ($p<0.01$). RMS of category 3 subjects was significantly larger ($p<0.01$), and AC and SR of category 3 subjects were significantly smaller ($p<0.05$) than other subjects. **Conclusion:** The results of this study suggested that category 3 subjects were more unstable to walk than category 4 and 5 subjects on the level surface. There was no difference of gait variables between category 4 and 5 subjects. These results might attribute to the walking task which might be easy for these patients.

0521PP045

REHABILITATION OF PATIENT WITH OSTEOPOROSIS AND COMPRESSION FRACTURE OF L1-5 DUE TO PROLONGED USE OF GLUCOCORTICOID DRUG BECAUSE OF WAGENER DISEASE

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Purpose: Wagener disease (WG) is a unique clinic-pathological disease characterized by necrotizing granulomatous vasculitis of the upper and lower respiratory tract, segmental glomerulonephritis and small vessel vasculitis. WG can cause life-threatening condition like alveolar hemorrhage. Long-term survivals become possible with prednisone and cyclophosphamide. **Case Description:** A 40-year-old female patient has taken prednisone and cyclophosphamide for 2 years, referred from orthopedic department. The main complaint is pain in lower back. On physical examination, there are visual and hearing impairment, the bridge of nose is destroyed and slight lumbar kyphoscoliosis. The X-ray: compression fractures at L1-5 and osteoporosis. **Discussion:** Problem list are autoimun disease with the impending necrotizing granulomatous vasculitis of other organs, visual and hearing impairment, osteoporosis, compression fracture, slight lumbar kyphoscoliosis, pain. The PM&R problem is mobilization and ADL with the risk of falls. To reach optimal function, we have to ensure safe mobilization and prevention of falls. The program consists of treatment for pain, isometric strengthening exercises for the trunk & abdominal muscles, exercises for balance

& coordination, provide a TLSO to protect the spine. The attention to the therapy regimen and impending necrotizing granulomatous can prevent further disability.

0521PP046

WILL NON-AMBULATORY CHILDREN WITH SPASTIC CEREBRAL PALSY BE BENEFITTED BY WALKING EXPERIENCE WITH ROBOTIC ASSISTANCE BY WALKBOT_K®?

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Purpose: To report short-term experience with the new robotic walking assistance with Walkbot_K® in children with spastic cerebral palsy who are not ambulatory. **Materials and Methods:** Ten non-ambulatory children with spastic cerebral palsy who had been treated with conservative methods including neurodevelopmental technique, orthotics and Botox® injections were included in this study. Robotic walking assistance was given by Walkbot_K® which is an innovative and powerful robot-assisted gait training system developed for children. Walkbot_K® is composed of hip, knee and ankle joints with separately driven by a motor with decelerator. With body weight suspension programmed partial weight bearing is provided over a treadmill. Subjects were trained for walking with Walkbot_K® for twelve weeks, two sessions a week, 30 min per session. Gross motor function with GMFM, modified Ashworth Scale, GMFCS scale were evaluated before and after the training with statistical analysis. **Results:** All children in this study were excited with this new experience with Walkbot_K® with positive outcome in all of the measured parameters. **Conclusion:** This positive result with Walkbot_K® in non-ambulatory children with spastic cerebral palsy is demanding further clinical study with more subjects and double blind control trial to see if it is helpful to improve gross motor function in non-ambulatory children with spastic cerebral palsy.

0521PP047

EXPERIENCE WITH WALKBOT_K® IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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Purpose: To report short-term experience with the new robotic walking assistance with Walkbot_K® in children with spastic cerebral palsy. **Materials and Methods:** Seven children with spastic cerebral palsy who had been treated with conservative methods including neurodevelopmental technique, orthotics and Botox® injections and had some experience of independent walking with or without walking aid were included in this study. Robotic walking assistance was given by Walkbot_K® which is an innovative and powerful robot-assisted gait training system developed for children. Walkbot_K® is composed of hip, knee and ankle joints with separately driven by a motor with decelerator. With body weight suspension programmed partial weight bearing is provided over a treadmill. Subjects were trained for walking with Walkbot_K® for twelve weeks, two sessions a week, 30 min per session. Gait speed, muscle activation patterns with dynamic EMG and other parameters of walking were measured before and after the training with statistical analysis. **Result:** All children in this study were excited with this new experience with Walkbot_K® with positive outcome in most of the gait parameters measured. **Conclusion:** This positive result with Walkbot_K® in children with spastic cerebral palsy is demanding further clinical study with more subjects and

double blind control trial as it would be a good alternative method of gait training in patients with spastic cerebral palsy.

0521PP048

EFFECT OF LUMBOSACRAL ORTHOSIS ON THE TRUNK MUSCLE STRENGTH IN PATIENTS WITH LOW BACK PAIN

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Purpose: The effect of lumbosacral orthosis (LSO) on paraspinal and abdominal muscular strength has been studied many time in the past with diverse outcome. This study was conducted to evaluate the effect of LSO on paraspinal and abdominal muscular strength in patients with low back pain who were over fifty years of age. **Materials and Methods:** The subjects of this study were 30 adults who complained of low back pain, without radicular symptom, neurologic impairment, history of spine compression fracture or previous spine surgery. And we evaluated Visual analog scale (VAS) and Oswestry disability index were measured in these subjects. We made random sample of 3 subsets by choosing 10 among 30 to be control group, soft LSO wearing group, and rigid LSO wearing group. They were asked to wear the orthosis from the moment they get up in the morning until they go to bed at night. Subjects who wear the orthosis less than 12 h a day were excluded. With Biodex system 4® isokinetic and isometric strength of trunk flexor and extensor muscles were measured three times; before, 2 weeks, and 4 weeks after bracing, for comparison. **Results:** In the evaluation after 4 weeks with bracing, there was significant decrease of isometric extensor strength among the control group ($p < 0.05$). In the evaluation after 2 weeks, both soft and rigid LSO wearing groups showed significant increase in isometric flexor strength ($p < 0.05$). In the evaluation after 4 weeks, both soft and rigid LSO wearing groups showed significant increase in isometric flexor and extensor strength and isokinetic extensor muscle strength ($p < 0.05$). **Conclusion:** The use of LSO in low back pain patients resulted in increased trunk muscle strength, improved VAS and functional ability. Wearing orthoses as well as exercises to strengthen the trunk muscles would be beneficial in the treatment of low back pain.

0521PP049

REHABILITATION MANAGEMENT FOR TRAUMATIC SPINAL CORD INJURY WITH PREGNANCY

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Background: Spinal cord rehabilitation (SCI) aim on optimal independency according to the level of injury. Pregnancy will make rehabilitation for SCI patient more difficult. **Case:** A 25-year-old woman, presented with acute onset of paraplegia due to fracture on T12 vertebral level (T11 ASIA A), after an earthquake in Padang, West Sumatra, Indonesia. The patient was G3P1A1 with gestational age (GA) 13 weeks during the incident. Mobilization for this patient was difficult because of bleeding, prolonged bed rest and pressure ulcer. In this patient, nutrition support was required in ulcer healing and fetal development. Decreased lung capacity, because of the pregnancy, became another problem. During exercise, blood pressure should always be monitored and controlled since blood pressure instability can occur both in SCI patients and pregnancy. Intermittent Catheterization Program (ICP) was given initially, but suspended in 29 weeks GA because of bleeding, low bladder capacity and high fluid requirement in pregnancy. At GA 32 weeks, patient had cesarean section procedure due to active bleeding. The infant weight was healthy. Exercise for independent activities of

daily living on wheelchair was then resumed after one week of bed rest. After 35 weeks of hospitalization, the patient was discharged after achieving independency in all activities of daily living. The patient and her daughter were on healthy condition. **Conclusion:** Pregnant SCI patients require special rehabilitation management. A specific standardized procedure might be needed.

0521PP051

COMPREHENSIVE REHABILITATION OF PATIENTS WITH LIMB AMPUTATION AFTER CRUSH INJURIES SUSTAINED DURING THE WENCHUAN EARTHQUAKE

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Purpose: To investigate the effects of comprehensive rehabilitation on the amputated stumps after crushing injuries sustained during the Wenchuan earthquake. **Materials and Methods:** Sixty-eight patients (74 stumps) were treated with postoperative wound care, maintenance of correct limb position, stump shaping, exercise, ultraviolet, infrared, paraffin, and electrical nerve stimulation therapies, audio electrotherapy, joint mobilization, and massage until discharged. The impact of these therapies was assessed the by stump healing and occurrence of complications postoperatively. **Results:** Fifty-six stumps (75.68%) healed in an average time of 78.88 ± 17.73 days (range 18–89 days) and swelling was eliminated in 38 stumps (51.35%). Only six stumps (8.11%) did not heal during a mean of ≥ 90 days (range 90–237) and 24 stumps (32.43%) had joint contractures. **Conclusion:** The incidence of adverse amputation stumps after the earthquake crushing was high. Comprehensive rehabilitation had a positive effect on promoting wound healing, eliminating of stump pain, recovering limb function, improving daily living function, sociability in amputees, and creating the necessary conditions for prosthetic limbs and future gait training.

0521PP052

CORRECTING BOWLEGS CHILD WITH BLOUNT'S DISEASE USING CUSTOMIZED KAFO

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Purpose: Blount's disease is a developmental disorder characterized by endochondral ossification disordered of medial part of the proximal tibial epiphysis resulting in multiplanar deformities of the lower limb. **Materials and Methods:** A 29-month-old boy has "O" shape leg since he was able to walk. Every month his body weight increased one kilogram. No delayed of the DDST. The body weight was 22 kg and he walked with wide base gait. From X-Ray, Tibio Femoral Angle (TFA) was 30° at both sides. The Metaphyseal Diaphyseal Angle (MDA) was 30° at right side and 20° at left side. His Parents refused to get an operation. We treated this patient using customized Knee Ankle Foot Orthosis (KAFO) and consulted him to the Nutrition Department. **Results:** After 5 weeks of treatment, his body weight decreased by 2 kg. The child continued to use the customized KAFO and walked independently. **Conclusion:** Comprehensive rehabilitation program for a child with Blount's disease could be applied to reduce the progression of the gene varus and allowed the child to ambulate independently without the use of brace.

0521PP053

THE EFFECT OF PRESSURE ON RHEUMATOID ARTHRITIC KNEE IN A RHEUMATIC RAT MODEL

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Purpose: It is commonly known that rheumatoid arthritis (RA) pain and/or functional incapacity is related to weather conditions. Several studies demonstrated that simulated pressure changes augmented pain behavior changes in controlled animal studies. The purpose of our study was to evaluate the pain behavioral change and biophysiological effect of pressure in long duration of experiment using controlled animal model. **Materials and Methods:** After inducing arthritic animal model by injecting Complete Freund's adjuvant (0.1 or 0.2 % of CFA) into the knee joint of 32 rats, they were randomly allocated into 1, 1.5 and 2.5 atm pressure group. During 14 days of experiment, pain behavior, morphologic changes and serological changes were assessed daily. **Results:** The range of motion of the joints decreased in 1 and 2.5 atm groups. However, significant differences between the groups were observed only at day 3. When 0.1% of CFA were injected, weight bearing force was most increased in 2.5 atm and 1.5 atm group followed next. Zymographic analysis was used for serologic assessment. When 0.1% of CFA were injected, samples from 2.5 atm group showed lower levels of MMP-9 activity compared with the samples from 1 atm at day 14. **Conclusion:** The high pressure appears to be successful in relieving neuropathic pain for an extended period of time by decreasing inflammatory process, and thus should be considered as an alternative measure for therapy of the knee with rheumatoid arthritis.

0521PP054

INTRAVENOUS INFUSION OF DIHYDROGINESINOSIDE RB1 AMELIORATES ISCHEMIC BRAIN DAMAGE THROUGH UP-REGULATION OF BCL-XL AND VEGF

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Purpose: Red ginseng root (Panax Ginseng CA Meyer) has been used clinically by many Asian people for thousands of years without any detrimental effects. One of the major components of Red ginseng root is ginsenoside Rb1 (gRb1). Previously, we showed that intravenous infusion of dgRb1 ameliorated ischemic brain damage through up-regulation of an anti-apoptotic factor, Bcl-xL and that topical application of gRb1 to burn wound lesion facilitated wound healing through up-regulation of vascular endothelial growth factor (VEGF). In the present study, we produced dihydroginsenoside Rb1 (dgRb1), a stable chemical derivative of gRb1, and investigated the effect of dgRb1 on ischemic brain damage in rat. **Materials and Methods:** Intravenous infusion of dgRb1 to stroke-prone spontaneously hypertensive rats with permanent occlusion of the unilateral middle cerebral artery distal to the striate branches. **Results:** Intravenous infusion of dgRb1 significantly ameliorated ischemia-induced place navigation disability and caused an approximately 50% decrease in the infarct volume in comparison with vehicle-infused ischemic controls. Subsequent in vitro studies showed that dgRb1 could up-regulate the expression of not only Bcl-xL, but also VEGF in neurons. We also showed that dgRb1-induced expression of bcl-xl and VEGF mRNA was HRE (hypoxia response element) and STRE (signal transducers and activators of transcription 5 (Stat5) response elements) dependent, respectively. **Conclusion:** The results suggest that dgRb1, if proved to be effective in clinical studies, can be a promising tool for the treatment of patients with acute cerebral stroke.

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0521PP055

GRAPHICAL MODELING OF COMPREHENSIVE INTERNATIONAL CLASSIFICATION OF FUNCTIONING (ICF) CORE SETS FOR DIABETES MELLITUS

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Purpose: To provide new supports for studies of functioning in diabetes mellitus by functioning mapping based on the International Classification of Functioning, Disability and Health (ICF). **Materials and Methods:** Graphical modeling was based on a convenience sample of 200 diabetic persons. The 99 categories of comprehensive ICF core sets for diabetes mellitus were defined as variables. Missing values were imputed by multiple imputation method. The "least absolute shrinkage and selection operator" was used for mining conditional dependencies between the variables. Bootstrap resampling method and confidence interval approach were used to enhance the reliability and validity of model selection. R software and Pajek 2.04 were used for graphical modeling and analysis. **Results:** In the 99 ICF categories, there are 61 interconnected categories which organized into the maximal independent component in the functioning mapping. A 2-core composed of 44 categories can be decomposed from the maximal component. "s220"(structure of eyeball), "s6100"(kidneys), "d760"(family relationships), "d455"(moving around) and "d450"(walking) are centrally positioned categories because of their high connections. **Conclusion:** Functioning mapping by graphical modeling can reveal complex relational structures embedded in functioning categories. These relational structures have evidences from clinical knowledge. They also provide clues for using ICF to guide clinical practices and scientific studies in diabetic persons.

0521PP056

CARDIAC REHABILITATION OF PATIENT WITH TETRALOGY OF FALLOT WITH TOTAL CORRECTION BY BEATING HEART TECHNIQUE: A CASE REPORT

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Purpose: To perform cardiac rehabilitation of patient with Tetralogy of Fallot and to inform the advantage of beating heart surgery that is more helpful for cardiac rehabilitation intervention. **Materials and Methods:** We present a case of beating heart surgery of Tetralogy of Fallot (the first technique done in Southeast Asia for TOF) of a 5-year-old boy with comprehensive management of pre-operative and post-operative rehabilitation. Initial management of the cardiac rehabilitation aims to avoid and minimize the deconditioning effect and to raise a better level of activity daily living. Gain capability to perform a normal activity as his age and improve his quality of life would be our long term goal. Before the surgery, the patient had practiced effective coughing and breathing exercise and after the surgery, we did a chest physiotherapy, effective coughing exercise, and gradual mobilization program. **Results:** Before operation, he will be fatigue after walking less than 100 m, 2 weeks after surgery and rehabilitation; he achieved 150 m without fatigue. There is a tendency that he achieved independency in some activity earlier and got shorter length of post operative hospital stay than some other patient with the same condition performed different technique of surgery. **Conclusion:** Beating heart surgery is a way to perform surgery without stopping the heart. The heart continuously beating and circulate blood to heart's muscle during operation. In common technique, the heart stopped for surgery, the surgeon must restart it and reintroduce blood into the tissue. This is called reperfusion. Sometime reperfusion can be damage and known as reperfusion injury. The consequences are rehabilitation management after sur-

gery would have a lot of limitation and the length of post operative hospital stay would prolonged. A better technique of surgery played an important role in P&RM management of Tetralogy of Fallot.

0521PP057

FACIOSCAPULOHUMERAL MUSCULAR DYSTROPHY: A CASE REPORT

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Purpose: The role of Rehabilitation management is to gain optimal functional capacities, maintain independent function, prevent physical deformity, and ability to participate in the community with a satisfying quality of life. **Materials and Methods:** A 30-year-old male was diagnosed as Facioscapulohumeral Muscular Dystrophy (FSHD). Patient's complaint was the slowly progressive weakness of both upper extremities and facial muscles. He had difficulty in doing ADL, had no facial expression, lost self confidence and was isolated from social life that caused him to lose his job. Physical examination revealed weakness of both upper extremities, which is more prominent on the right side, weakness of facial muscles, winging scapula, and shoulder subluxation. Comprehensive rehabilitation programs included maintain and of flexibility of the joints, strengthening of the preserving muscles with precaution to avoid fatigue, breathing exercise, cardiovascular endurance exercises, occupational therapy to learn using preserving muscles and assistive devices in doing ADL, wearing shoulder support, also having psychiatrics consultation. **Results:** He is still able to maintain his functional abilities, muscle strength, and cardiovascular endurance. He began to accept his condition and enjoy his family's acceptance. He was trying to improve self confidence and to find a new job suitable for him. **Conclusion:** FSHD, an autosomal dominant disorder, is a muscular dystrophy with a typically slowly progressive muscular weakness in the facial and shoulder girdle musculature. Problems leads to disability and handicap requires prompt and proper comprehensive rehabilitation management.

0521PP058

THE EFFECT OF VIDEO FEEDBACK ON UNILATERAL SPATIAL NEGLECT IN STROKE PATIENTS

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Purpose: The aim of this study was to investigate the effect of video feedback therapy on unilateral spatial neglect in stroke patients. **Materials and Methods:** Thirty-nine stroke patients who had unilateral spatial neglect were enrolled and randomly assigned to one of two groups, the case group or the control group. There were no significant differences in baseline characteristic between the case group and the control group. The case group received video feedback therapy in addition to the conventional neglect therapy for 20 min per day, five days per week, for four weeks. The occupational therapist videotaped the subjects in the case group during the conventional neglect therapy. The video feedback group was given the opportunity to review their performances on video, after the therapy. However, the control group received only the conventional neglect therapy. The effect of therapy was assessed with line bisection, letter cancellation test, baking tray task and Korean version of modified Barthel index (K-MBI) before and after treatment. **Results:** There were no significant differences in initial values between two groups. After 4 weeks of therapy, there were significant improvements in line bisection, letter cancellation test and K-MBI score ($p < 0.05$) in the video feedback group compared to the control group. However there was no significant improvement in baking tray task ($p > 0.05$) in either groups. **Conclusion:** Video feedback therapy is considered to be one of the therapeutic methods for improvement of unilateral spatial neglect and functional ability in stroke patients and further controlled studies need to be performed.

0521PP061

PROFILE OF LOW BACK PAIN IN MEDICAL REHABILITATION DEPARTMENT OF KARIADI HOSPITAL SEMARANG

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Purpose: To describe Low Back Pain (LBP) profile in medical rehabilitation department of Kariadi Hospital Semarang. **Materials and Methods:** This study was designed as retrospective cross-sectional study of patients in Medical Rehabilitation Department during August 2009 until August 2011. **Results:** The total LBP patient was 111 patients, consisted of 47 men and 64 women. The majority of the age group was 47–57 years. The most employment profile that related to their LBP was private employee consist of 22 patients (19.82 %). The most common cause was the Hernia Nucleus Pulposus (HNP) as seen from radiological result. Physical modalities used for treatment were more than one. The most frequently used physical modality was MWD, followed by SWD, and TENS. The compliance of the patients were almost spread evenly for good and poor compliance. From all of those patients, who had improvement from the treatment were 50.45%, while the remain 49.55% had been difficult to be evaluated. **Conclusion:** The majority of LBP patients in medical rehabilitation department of Kariadi Hospital Semarang during 2009 until 2011 were women. Most of them were private employee, with HNP as the most common cause. Physical modality that mostly used was MWD. Nearly half of those patients had improvement, while the rest had been difficult to be evaluated because of the irregular visit or drop out.

0521PP062

THREE POINT PRESSURE PRINCIPLES OF KNEE EXTENSION DEVICE FOR LACK OF KNEE EXTENSION AFTER ACL RECONSTRUCTION

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Purpose: To describe the knee extension device as tools for increasing knee range of motion after ACL reconstruction. **Materials and Methods:** Keeping knee function after ACL reconstruction was most important things. Leg is ambulation property and need normal knee range of motion to perform good gait cycle. If full knee extension did not reach after rehabilitation program, the rehabilitation intervention must to do. Extension device was tools to help stretching and maximizing of knee in hyperextension position. This device use three point pressure principle that one point on the knee and two points on proximal and distal side of knee. Patient was following instruction to let his leg place at this device for after ultrasound diathermy and stretching exercise. **Results:** After several weeks, there was improvement knee range of motion. **Conclusion:** The comprehensive rehabilitation management for knee extension problem after ACL reconstruction needs innovation and creativity to reach the ultimate goal.

0521PP064

SEATING MODIFICATION FOR NEGLECTED DUCHENNE MUSCULAR DYSTROPHY PATIENT

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Purpose: To describe how a seating modification can be used to maximize hand function and minimizing discomfort for neglected Duchenne Muscular Dystrophy patient with multiple deformities and financial problem. **Case:** A 15-year-old boy with weakness of his hands due to

dystrophy, 45 degrees Cobb's angle's thoracolumbal scoliosis, bilateral contracture of the hip, the knee, and the ankle, only lying down on a bed for six years. We conducted chest physical therapy, passive range of motion exercise for the upper extremities, and occupational therapy for maximizing hand function. The progression of his neuromuscular conditions are challenging us to design a seating modification from the less expensive materials but allow the patient to do some activities on the seating and maintain correct position with some form of firm but comfortable support. *Results:* After providing a seating modification, the patient is able to do some activities while sitting and it can maintain the patient in a correct and comfortable position. His new chair has already made a great difference to his quality of life. *Conclusion:* The modification of available equipment and some physical therapy can encourage anything which makes an individual's life more independent and enjoying leisure and hobby comfortably.

0521PP065

KINEMATIC ANALYSIS OF SPIKING MOVEMENT IN VOLLEYBALL PLAYERS WITH SHOULDER PAIN

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Purpose: Eighty percent of the shoulder injury is caused by spiking movement among volleyball players. However, there has been no study examining shoulder kinematics during spiking movements in injured players. Therefore, the purpose of this study was to compare the movement of glenohumeral joint, scapula, and trunk during spiking between volleyball players with and without shoulder pain. *Materials and Methods:* We plan to recruit 20 university volleyball league players with shoulder pain and 20 controls for the study. Ten players of each group finished the data collection so far. An electromagnetic tracking system was used to collect kinematic data of the upper limb and trunk during spiking movement. Two-way analysis of variance was used to compare the between group differences. The study was approved by the ethical committee of National Yang-Ming University, Taipei (IRB number 1000091). *Results:* Subjects with shoulder pain demonstrated less glenohumeral horizontal adduction angle at 3 time points: ball contact ($p=0.017$), occurrence of maximum shoulder horizontal abduction ($p=0.044$) and of the maximum glenohumeral external rotation ($p=0.026$) as compared to the controls. There was a trend of less scapular poster tilting in the injured group at the moment of ball contact ($p=0.053$). *Conclusion:* Decreased glenohumeral horizontal adduction was associated with shoulder pain in university volleyball players, which should be addressed in training and treatment of young volleyball players.

0521PP069

REHABILITATION MANAGEMENT OF PROLONG MECHANICAL VENTILATOR IN CHRONIC INFLAMMATORY DEMYELINATING POLYNEUROPATHY PATIENT

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Background: The mechanical ventilatory support is needed when the ventilatory and gas exchange capabilities of the respiratory system fail. In chronic inflammatory demyelinating polyneuropathy, respiratory failure could happened, accompanied by deconditioning syndrome after long immobilization. There are many important issues involved in the management of a prolong mechanically ventilated patient. Factors such as cardiorespiratory system, psychological factor, and neuromuscular competence, must be considered to succeed the weaning process. *Case report:* A 4-year-old girl, referred to RSCM from other hospital, was ventilator-dependent for 10 months, and had

general weakness. She was conscious, active, could sit by leaning on bed, on ventilator with tracheostomy, and intake via NGT. The hemodynamic system was stable, no paresis of n.cranialis, chest was in normal limit except the slem at upper region lobes. Extremities were hypotrophies. *Materials and Methods:* The main goal was to improve the functional capacity. We started the programs: patient spent time mostly sitting without back support, chest expansion exercise, strengthening of lower extremities muscles, standing using AFO and backslab, balance exercise, as well as psychosocial support. All programs were done while playing. *Results:* After 2 months programs, she could breath spontaneously in 1 h and stand independently. One month later she could walk independently and ride the 4-wheel bicycle with gradually increased distance, and 2-h spontaneous breathing. After 4 months program, she could take the ventilator off about for 3 h, and could eat orally. *Conclusion:* Rehabilitation program has important role to increase functional capacity and make the recovery process faster for prolong mechanical ventilator patient e.c. CIDP.

0521PP070

THE SYNERGISTIC EFFECTS OF COLD-WATER SWIMMING EXERCISE IN COMBINATION WITH MESENCHYMAL STEM CELL THERAPY ON SCIATIC NERVE CRUSH INJURY

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Purpose: Exercise and hypothermia have therapeutic benefits for nerve regeneration. In our previous study, amniotic fluid mesenchymal stem cells (MSCs) can augment growth of injured nerve, but full recovery of nerve function after MSCs transplantation was still limited. Therefore, the aim of this study was designed to investigate the synergistic effects of cold-water swimming exercise (CWS) combined with MSC transplantation in animals with crushed nerve injury on functional recovery. *Materials and Methods:* Peripheral nerve injury was induced in Sprague Dawley rats weighting 250 to 300 g by crushing a sciatic nerve using a vessel clamp with duration of 20 min. The MSC were embedded in fibrin glue and delivered to the injured site. CWS (19°, 5 min/day) was administered 12 h after operation for seven consecutive days. Sciatic function index (SFI), vertical activity (VA) of locomotion, angle of ankle (AA), electrophysiological studies, and histological analysis were evaluated to assess functional recovery and nerve regeneration. *Results:* The deterioration of neurological function was attenuated by CWS combined with MSC therapy. The combined therapy caused the most significantly beneficial effects. CWS treatment improved SFI, VA, AA, electrophysiology and suppressed the inflammatory responses which correlated with increased nerve regeneration. *Conclusion:* These findings suggest that a CWS combined with MSC treatment can protect against sciatic nerve crush injury through modifying cellular environments, making it favorable for regeneration. Therefore, environmental reconditioning of injured site by combination of hypothermia and exercise will be substantial and feasible for nerve repair on crush nerve model treated with MSCs.

0521PP071

ELECTRICAL STIMULATION COMBINED WITH AMNIOTIC FLUID MESENCHYMAL STEM CELLS ENHANCE FUNCTIONAL RECOVERY AFTER PERIPHERAL NERVE INJURY

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Purpose: Regeneration of peripheral nerves is remarkably restrained across traumatic injuries, limiting recovery of function. Various tech-

niques have been investigated to enhance peripheral nerve regeneration including the application of electrical stimulation (ES) and the administration of amniotic fluid mesenchymal stem cells (MSCs). The purpose of this study was to investigate the effects of combining ES and MSCs therapies, in comparison to each sole modality, on peripheral nerve regeneration in a rat model with crush-injured sciatic nerve. *Materials and Methods:* Forty male Sprague-Dawley rats (250–300 g) with standard crush injuries on the sciatic nerves were equally distributed into four groups; the control (no treatment), ES, MSC, and the combination groups. Immediately after injury, The MSCs were embedded in fibrin glue and delivered to the injured site. ES was delivered 20 mins/day and current intensity was 3 times of the threshold for denervated muscle contraction and consisted of trains of 100 Hz pulses every 0.5 s for 7 days. Sciatic function index (SFI), vertical activity (VA) of locomotion, angle of ankle (AA), electrophysiological, and histological studies were followed up for 4 weeks. *Results:* Significant improvement in SFI, VA, AA, amplitudes and latencies of compound muscle action potentials were found in the ES-MSC combination group. But morphological study showed no significant differences among four groups. *Conclusion:* Both the ES and the MSC treatments were effective techniques enhancing functional recovery following a crush nerve injury in rats. The combined ES-MSC treatment on peripheral nerve injury showed superior recovery compared to a sole modality.

0521PP072

CLINICAL OBSERVATION OF ACUPUNCTURE TREATMENT ON PARKINSON'S DISEASE

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Purpose: Observation and study of acupuncture for patients with spasticity and Parkinson activities of daily living (ADL) of the clinical efficacy. *Materials and Methods:* Choose 60 patients of Parkinson disease, then divided into treatment and control groups. One treatment group of 32 patients, use Integrated rehabilitation therapy and acupuncture therapy for treatment; The use of the control group, 28 cases of simple application of an integrated rehabilitation approach. Comprehensive rehabilitation treatment, including exercise therapy, Occupational Therapy, Speech therapy, ADL training, Cognitive Therapy, Swallowing therapy and other modern methods of rehabilitation. Before treatment and 60 days after application of all selected cases, modified Ashworth Scale and Barthel Index, respectively, evaluation of the patient's muscle tone and level of ADL. *Results:* Two groups before treatment and 60 days after treatment and ADL assessment of muscle tone compared to the results of the treatment group than the control group ($p < 0.05$). *Conclusion:* Parkinson's patients in the acupuncture treatment can be effective in improving spasticity and improve ADL ability.

0521PP073

CLINICAL OBSERVATION OF THE EARLY REHABILITATION THERAPY WITH THE INTEGRATIVE TRADITIONAL AND WESTERN MEDICINE IN STROKE TREATMENT

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Purpose: To observe the therapeutic effect of rehabilitation therapy with the integrative traditional and western medicine in stroke treatment. *Materials and Methods:* A total of 180 patients were randomly divided into three groups, each 60 cases. All observed objects were under conventional Neurology drug treatment. Group A, which under early rehabilitation and acupuncture treatment, is called the group of rehabilitation with integrative traditional and western medicine (ie, early rehabilitation with acupuncture); Group B, which under acupuncture treatment, is called the acupuncture group; Group C, which under early rehabilitation therapy, is called the early rehabilitation

group. Compare the motor function and activities of daily living (ADL) of each group before and after treatment. *Results:* The Brunnstrom classification and the Barthel of each group were improved in varying degrees after the rehabilitation therapy. Group C is superior to Group B ($p < 0.05$); Group A is significantly better than Group B and Group C ($p < 0.01$). *Conclusion:* Rehabilitation therapy with the integrative traditional and western medicine has a good effect for stroke patients to improve motor function and activities of daily living.

0521PP074

REHABILITATION FOR DISABLED INDONESIA MILITARY

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Purpose: To explain the military rehabilitation programs in Military Rehabilitation Center in Indonesia. The principles of programs are based on three in one rehabilitation program, that means all of military disabled get a medical rehabilitation, vocational rehabilitation and social rehabilitation. *Materials and Methods:* Evaluation of daily observation and self experiences for the military rehabilitation programs in the Rehabilitation Center. The capacity of annual rehabilitation program is 150 disabled, 2 times a year and within timeframe 4–5 month. Medical rehabilitation programs are examining disability, assessment of general medical problem and physically qualified to do the vocational training safely, and also a kind of programs physical therapy, occupational therapy, speech therapy, orthotic prosthetic, many kind of exercise, fitness and hydrotherapy include. In hospital they get a operation to repair or correction of physical disability if possible. Vocational rehabilitation program for disabled souldiers who eligible for training may enroll for screening and preparing by comprehensive team consists of psychologist, social worker and vocational instructors. They get vocational training course, and there are 15 types of vocational training course in Rehabilitation Center, such as: Automotive, Motorcycle, Tailor, Electronic, Welding, Cooling System, Mixed Farming, Screen Printing, Photography, Computer Techniques, Computer Operation, Mobile Phone, Music, Body Massage, Furniture coursing. Social Rehabilitation evaluated the cultural background of the soldier, family living, a motivation for and participation in this rehabilitation and also outcome of program. During the program, they accompanied soldier and give them a mental and psycho supporting. Social rehab team have an aftercare program or home visit program to reevaluation and recheck how much benefits of the training after they back to home or basecamp and the influences for the upgrade their revenue or welfare for them and their family. *Results:* At the finished program they get a "Certification of Training" base on end report training, jobsite inspection, analysis of job tasks and evaluation of the proposed appointee's abilities and disabilities. Rehabilitation team also give advice that the individually has the ability to perform the duties of position is physically able to do the job safely and can maintain himself in the new work environment, preparing them to take a new job chance if they cannot return to military professional. *Conclusion:* The Rehabilitation Center will guide the disabled Indonesia military through the three in one rehabilitation programs to a worthy, independent and prosperous life.

0521PP076

THE EFFECT OF DAILY LIFE HABITUS ON PROPRIOCEPTION IN COLLEGE STUDENTS

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Purpose: To investigate the effect of daily life habitus, such as sitting for long h to study hard or play a computer games, on proprioception

in college students. **Material and Methods:** Thirty college students (17 men, 13 women; age 25.5 ± 2.6 years; body mass index: 23.1 ± 3.2 kg/m²) studying in Jeonnam Province or Gwangju City were participated in. We check the metabolic equivalent of task (MET) and VO₂max by performing exercise tolerance test (Med-Track ST 55, Quinton, USA; Trueone 2400 Metabolic system, Parvo Medics, USA) by Modified Bruce Protocol. Also, we evaluated the proprioception and balance by using 3-dimension dynamic posturography system (PRO-KIN system, TecnoBody S.r.l., Dalmine BG, Italy). All students were asked to answer the Questionnaire of daily life habitus. **Results:** 1) There were significant differences between men and women in VO₂max and Maximal METs. 2) In questionnaire, only 13.5 percent of the students were doing regular exercise. 3) There were significant correlations between duration of strengthening exercise and METs in men and women ($r=0.378$, $p=0.042$; $r=0.745$, $p=0.000$), duration of strengthening exercise and VO₂max in men and women ($r=0.392$, $p=0.043$; $r=0.456$, $p=0.011$). 4) There were significant correlations between duration of sitting and average trace error in both lower extremities ($r=0.408$, $r=0.463$; $r=0.508$, $r=0.358$, $p<0.05$). **Conclusion:** Keeping a sitting position for long time may cause loss of proprioception, even in young healthy adults. Therefore, active mobilization is recommended for the prevention of decreasing proprioception and the prone to sedentary lifestyle.

0521PP077

FACTORS ASSOCIATED WITH MOTOR FUNCTION IN PRESCHOOL CHILDREN WITH CEREBRAL PALSY – A 6-MONTH FOLLOW-UP

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Purpose: The motor functions varied among children with cerebral palsy (CP). However, few studies investigate the relationship between balance ability and motor function in preschool children with CP. This study will identify the factors predicting motor function at 6-month follow-up in preschool children with CP. **Materials and Methods:** Fifty-four children with CP (37 boys and 17 girls), aged 1.5–6 years, were collected. The clinical related variables at the initial stage included Modified Ashworth Scale (MAS), Spinal Alignment and Range of Motion Measure (SAROMM), Selective Motor Control Scale (SMC), and Pediatric Balance Scale (PBS). Final outcome at six months was Gross Motor Function Measure (GMFM-66). **Results:** Pearson correlation demonstrated muscle tone ($r=-0.68$, $p<0.001$), spinal alignment ($r=-0.66$, $p=0.001$), range of motion ($r=-0.67$, $p<0.001$), SMC ($r=0.77$, $p<0.001$), and PBS scores ($r=0.90$, $p<0.001$) were significantly correlated with GMFM-66 scores. Regression analysis revealed initial PBS score, SMC and spinal alignment were mainly associated with GMFM-66 scores at 6-month follow-up (adjusted $R^2=0.87$, $p<0.001$). **Conclusion:** These findings suggest selective motor control and spinal alignment, and especially balance ability, played the dominant predictors in determining final motor function in preschool children with CP. The data provided in this study may allow clinicians in predicting the motor function and planning treatment strategy for preschool children with CP.

0521PP078

ULTRASOUND AND ELECTRICAL STIMULATION-GUIDED MEDIAN NERVE BLOCK IN TREATING SEVERE WRIST AND FINGER FLEXION SPASTICITY

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Purpose: Patients with severe wrist & finger flexion spasticity interfere with daily skin care, cutting nails and change of clothes.

Forceful opening of the wrist & fingers by carers may cause pain & muscle spasm. The median nerve at the elbow level is superficial and can easily be identified under ultrasound scanning and confirmed with electrical stimulation. The median nerve is blocked with 5% aqueous Phenol to reduce the spasticity of wrist and finger flexor muscles. **Materials and Methods:** This is a retrospective case series study where records of all patients received 1st median nerve blocks from January to October 2011 with at least 3 months' follow-up were retrieved for analysis. The effectiveness was measured using Modified Ashworth Score (MAS 0–5) at 1 month and 3 month follow-up. **Results:** 11 intraneural median nerve blocks was performed on 7 patients under ultrasound guidance and confirmed with electrical stimulation of minimal current of <0.3 mA at 2 Hz, 0.1 ms. MAS of wrist flexion significantly reduced from baseline of 3.00 ± 1.09 to 1.18 ± 1.72 ($p=0.007$) and 1.27 ± 1.85 ($p=0.01$) at 1 month and 3 month respectively. MAS of finger flexion significantly reduced from baseline of 3.82 ± 1.17 to 1.91 ± 1.13 ($p=0.004$) and 2.09 ± 1.64 ($p=0.011$) at 1 month and 3 month, respectively. No complication was reported. **Conclusion:** Blocking the median nerve at elbow level using 5% aqueous Phenol under ultrasound and electrical stimulation guidance is safe and effective in reducing severe wrist & finger flexor spasticity. However, the duration of action and long-term effect needed further follow-up study.

0521PP079

THE USE OF STANDARDIZED OUTCOME MEASURES IN REHABILITATION CENTERS IN KOREA

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Purpose: The objective of present study was to identify the rehabilitation outcome measures currently used in Korea. **Materials and Methods:** The survey was conducted by e-mail questionnaire to 165 rehabilitation centers in Korea. Data from the returned questionnaires were entered into a Microsoft Excel and subjected to descriptive and simple quantitative analysis. **Results:** A total of 81 (52%) responses were received. Of these, 80% units collected some outcome assessment measure as part of routine clinical practice. K-MBI (Korean Modified Barthel Index) (74%) and FIM (59%) were the most popular global outcome measures. The K-BBS (Korean Berg Balance Scale) (53%) were used most frequently for balance measure. Upper extremity function was checked with Jebsen hand function test (65%) and hand grip strength (63%). MMSE was most popular cognitive function test (78%). K-WAB (Korean Western Aphasia Battery) were the most popular language test (67%). 67% units used outcome results for discussion and goal setting. 78% units responded that they would use a standardized outcome measures if there is an agreed standardized outcome measures and standardized outcome measure method (84%), standardized outcome measure lists (65%) were noted as an essential prerequisites for regular standardized outcome measure use. **Conclusion:** The survey demonstrated that quite widespread use of outcome assessments in routine clinical rehabilitation within Korea. There is also an agreement need for standardized outcome measure.

0521PP080

PREDICTORS FOR IDENTIFYING PATIENTS WITH PATELLOFEMORAL PAIN SYNDROME RESPONDING TO THE NEURODYNAMIC APPROACH

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Purpose: Previous researchers suggested that exceeded mechano-sensitivity of the femoral nerve might contribute to the symptoms

of the patellofemoral pain, which could be assessed and treated by the neurodynamic approach. Therefore, the purpose of this study was to identify the clinical predictors determining patients with patellofemoral pain (PFPS) who responded successfully to femoral nerve mobilization. *Materials and Methods:* We have completed data collection in 32 PFPS patients (9 males, 23 females) so far. The femoral slump test (FST) and physical examinations were performed before and after femoral nerve mobilization treatment. Fifty percent pain reduction or > moderate improvement on a global rating scale were considered as successful treatment. The logistic regression analysis was used to identify clinical predictors. *Results:* Fifteen (immediately) and 19 (6 treatments) subjects had successful treatment responses. A positive FST was identified as the clinical predictor for the immediate effect while a positive FST and age >30 years were identified as predictors for successful 6 treatments. Application of the clinical predictors resulted in a positive likelihood ratio of 14.7 and 3.25 for immediate and short-term treatment effect, and the probability of successful treatment improved from 46.2% to 91% and from 59% to 82%, respectively. We plan to complete data collection of 50 subjects before May. *Conclusion:* A positive femoral slump test indicated the need of femoral nerve neurodynamic treatment, but validation of the prediction rule is necessary before widespread clinical use can be recommended.

0521PP081

EFFECT OF JIN'S THREE-NEEDLE THERAPY COMBINED WITH NERVE REHABILITATION RECONSTRUCTION THERAPY ON CHILDREN WITH CEREBRAL PALSY

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Purpose: To investigate the effect of Jin's three-needle therapy combined with nerve rehabilitation reconstruction therapy on lower extremities motor function in children with spastic diplegic cerebral palsy (CP). *Materials and Methods:* 90 spastic diplegic CP children were randomly divided into treatment group, Jin's three-needle group, and control group with 30 cases in each group. All children were treated with Bobath technique, massage and cerebral circulation therapy, while those of treatment group were added Jin's three-needle therapy combined with electromyographic biofeedback therapy by nerve rehabilitation reconstruction instrument. And those of Jin's three-needle group were added Jin's three-needle therapy. The modified Ashworth scale was performed to evaluate the muscle tone of lower limbs, and other clinical evaluations were performed to assess the range of passive motion with protractor and the motor function with gross motor function measure (GMFM). *Results:* The lower extremities function of all children in three groups improved in different extent ($p < 0.01-0.001$) and the effect of treatment group was superior to other groups ($p < 0.05-0.01$). *Conclusion:* The Jin's three-needle therapy combined with nerve rehabilitation reconstruction therapy in the treatment for children with spastic diplegic cerebral palsy can decrease the muscle tone and improve the range of passive motion, as well as the motor function of lower extremities.

0521PP082

EFFECTIVITY OF LIGHT EMITTING DIODE AS AN ADJUVANT THERAPY IN DECREASING BLOOD VISCOSITY ON CEREBROVASCULAR DISEASE STROKE ISCHAEMIC

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Purpose: Hyperviscosity atherosclerosis is often the direct cause of cerebral infarction and other serious diseases. The binding of glucose molecules, cholesterol, and other substances on the erythrocyte surface will increase blood viscosity. Effect of Laser bio-battery can cause break up of the blood group anti-adhesion, making smooth flow, thus increasing oxygen-carrying capacity. The effectivity of Light Emitting Diode (LED) as an adjuvant therapy in decreasing blood viscosity on Cerebrovascular Disease (CVD) has not been known yet. *Materials and Methods:* Eleven chronic CVD SI Patients with no other illnesses were included in this study. LED was performed using wrist low-intensity laser self-cultivation irradiation with wavelength of 650 nm, 1 single treatment, 40 min, power output 20 watt, equal with 2 W/m² intensity. There is no wash out medication for present illness in this study. *Results:* 11 patients (9 men and 2 women) with mean (SD) age 60.6 (±12.4) years old, BMI 23.3 (±12.3), onset from 1st stroke 7.1 (±6.9) years. Based on normality test, had been found that the data showed normal distribution. According to that, we decided to use T test dependent %, decreased hematocrit 4.35%, mean difference 1,73 ($p=0.024$). There were one patient who had increased and 2 other patients had no change of hematocrit. *Conclusion:* Low-intensity laser irradiation had the effect of decreasing the blood viscosity among CVD SI patients. It could be considered as an adjuvant therapy in the management approach for prevention and treatment of cerebrovascular diseases.

0521PP083

THE RELATIONSHIPS AMONG ABDOMINAL OBESITY, SOCIAL DETERMINANTS OF HEALTH AND PHYSICAL STRENGTH IN BALI, INDONESIA – COMPARISON BETWEEN RURAL AREA AND ISOLATED ISLAND

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Purpose: The present study was aimed to compare the prevalence of obesity between a rural area and an isolated island exposed to westernization in Bali, Indonesia, and to clarify the associations with obesity, diet, exercise, physical strength and social determinants of health (SDH). *Material and Methods:* One hundred and fourteen people between the ages of 40 to 74 years were eligible for the study. This survey conducted in a village as a rural area (R) and an isolated Island as an area exposed to westernization (W). We used the questionnaires and measured anthropometry, blood analysis and grip strength (GS). We defined Body mass index (BMI) ≥25 and waist circumference ≥90 cm for men or ≥80 cm for women as abdominal obesity (AO). Data was analyzed for comparison between R area and W area by gender and for associations with risk factors and AO using multiple logistic regression analysis. *Results:* Between R area and in W area, AO prevalence was no significant difference. However, average BMI for women in W area was higher than R area ($p < 0.05$). Education level for men in W area was lower than R area ($p < 0.05$). With multivariate logistic regression analysis, having smoking habit, lower education, lower income and lower GS per body weight consistently contributed to having AO ($p < 0.05$). *Conclusion:* AO would be related closely to SDH than the difference of area. GS per body weight besides SDH may be remarkable in AO and become a prognostic index of the AO in Indonesians.

0521PP084

CHRONIC EXERCISE AUGMENTS RENO-PROTECTIVE EFFECT OF GRANULOCYTE COLONY-STIMULATING FACTOR AND ENHANCES ENDURANCE IN CHRONIC RENAL FAILURE (CRF) RATS

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Purpose: Granulocyte colony-stimulating factor (G-CSF) is a kind of cytokine that enhances differentiation and multiplication of neutrophil, and enhances function of maturity neutrophil. Furthermore, G-CSF has effects of antiapoptosis, anti-inflammatory, multiplication and migration of a vascular endothelial cell. There are a few reports that G-CSF has a reno-protective effect in acute renal failure. Therefore, we assessed the effects of a combination of chronic exercise and the G-CSF that application to noninvasive regenerative therapy is expected. **Materials and Methods:** Male 5/6-nephrectomized WKY rats were divided into four groups according to the following treatments: 1) no treatment (C); 2) G-CSF (5 µg/kg/day, sc); 3) exercise with treadmill running (20m/min for 60 min/day, 5 days/week) (EX)+G-CSF; and 4) sham operation (S). The rats were then treated for 12 weeks. **Results:** The 24 h-urinary excretion of protein, serum creatinine in the EX+G-CSF group, and the BUN in the G-CSF and EX+G-CSF groups were significantly lower than those in the C group. The IGS in the G-CSF and EX+G-CSF groups were significantly lower than that in the C group. The α -smooth muscle actin in the glomerulus was the lowest in the EX+G-CSF group. **Conclusion:** These results suggest that both chronic exercise and G-CSF have reno-protective effects in CRF model. They also suggest that the simultaneous treatment of chronic exercise and G-CSF can enhance endurance with the reno-protective effects.

0521PP085

COMPARISON OF PULSED ULTRASOUND AND CONTINUOUS ULTRASOUND THERAPY EFFECT IN CARPAL TUNNEL SYNDROME (CTS)

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Purpose: To compare pulsed ultrasound (US) and continuous ultrasound therapy effect in carpal tunnel syndrome (CTS). **Materials and Methods:** The subject of this study was mild and moderate CTS patients. Subjects were randomly divided into 2 groups. Group I: continuous US therapy 3 MHz, 0.5 W/cm², Group II: pulsed US therapy with 20 % duty cycle of the same frequency and intensity. Treatments were applied over carpal tunnel area, 5 min per session, daily (5 sessions/ week) for 10 sessions. Visual analogue scale (VAS) was obtained before therapy, everyday, and after therapy. Electroneurographic study was performed before and after therapy. **Results:** Significant VAS improvement was obtained in all groups (I. $p=0.000$; II. $p=0.000$) but no significant difference was observed between groups (before treatment and after 5th therapy, $p=0.273$; after 5th therapy and post treatment $p=0.546$). There was no sensory peak latency improvement in either groups (I. $p=0.089$; II. $p=0.058$), but motor distal latency improved significantly in both groups (I. $p=0.024$; II. $p=0.006$). No statistically significant difference was observed between groups in sensory peak latency ($p=0.287$) nor in motor distal latency ($p=0.424$). **Conclusion:** Continuous and pulsed (20% duty cycle) US therapy 3 MHz, 0.5 W/cm², 5 min per session, daily (5 sessions/ week) for 10 sessions, improved VAS and motor distal latency, but not the sensory peak latency in either groups. No significant difference was found between continuous and pulsed US therapy in this study.

0521PP086

A PILOT STUDY OF KINESIO TAPE'S IMMEDIATE EFFECT ON TREATING PATIENTS WITH KNEE OSTEOARTHRITIS

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Purpose: The purpose of this pilot study was to investigate immediate effect of Kinesio Tape (KT) on treating patients with knee osteoarthritis (KOA). **Material and Methods:** 40 KOA patients matched in age, gender, weight and stage were randomly divided into study group (applied KT and routine local modalities) and control group (only using local modalities) 0.20 cases were included in each group. Visual analogue scale (VAS), Swelling evaluation (from Lequesne, SL) and Western Ontario and McMaster University Osteoarthritis Index (WOMAC) were managed to evaluate the degree of pain, swelling and knee function as a whole. **Results:** The baseline and related scale of KOA before treatment were not significantly different ($p>0.05$). The VAS and SL in study group were significantly different than that of control group at 3rd day ($p<0.05$, $t=7.2163$ and $t=4.8472$). There was no significant difference in between two groups at 7th day after therapy as far as VAS and SL were concerned, but the results of study group were still slightly larger than that of control group. The WOMAC showed a significantly difference at 3rd and 7th day (Fwomac 12.6, $p<0.05$). No evidence of obviously allergic event was recorded. **Conclusion:** KT could be an effective method of integral therapy on KOA, and mechanism of KT and optimal choice of its applications still invite further studies.

0521PP087

THE DEMOGRAPHIC DATA OF PATIENTS WHO UNDERWENT VIDEO FLUOROSCOPIC SWALLOWING STUDIES

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Purpose: Few long-term, large scale studies have investigated demographic features, etiologies and outcome of dysphagia patients who underwent video fluoroscopic swallowing study (VFSS). In this study, we describe demographic features and functional outcomes of these patients. **Materials and Methods:** We reviewed retrospectively medical records of 4,377 dysphagia patients (2,783 males and 1,594 females) who have undergone VFSS in Seoul National University Hospital from April 2002 through December 2009. The following parameters were recorded and analyzed: patient's sex, age, the departments requesting the study, etiologies of dysphagia and the level of swallowing function. **Results:** The number of VFSS has increased over threefold (from 333 to 1,056) between 2003 and 2009. The age group of 7th decade was the largest ($n=1,229$), and 2,651 cases (60.6%) were over the age of 60. The most common etiology of dysphagia was brain lesion such as stroke ($n=1,565$, 35.8%) and brain tumor (470, 10.7%), which explains 2,413 (55.1%) cases. The second most common etiology was local structural lesions such as tumor in the oral cavity, pharynx and larynx ($n=646$, 14.8%). About one third of the studies ($n=1,490$, 34.1%) were referred by the departments other than the department of rehabilitation medicine (12.5%, 5.5%, and 4.6%; from the department of internal medicine, neurosurgery, and neurology, respectively). **Conclusion:** The number of VFSS has increased dramatically in the recent decade. About one third of the studies were referred from other departments, and half of the cases had brain lesions. Examiner of the VFSS and swallowing therapist should be well trained to manage various disease conditions. Future prospective studies will be required on the prevalence, changes in the age distribution and causes of dysphagia.

POSTER PRESENTATION (MAY 22, 2012)

0522PP02

MEDICAL REHABILITATION EVALUATION IN AN 11-YEAR-OLD GIRL WITH CERVICAL 3–5 SYRINGOMYELIA**A. Guritno, Handojo Pudjowidyanto***Department of Physical Medicine and Rehabilitation, Medical Faculty of Diponegoro University, Dr Kariadi General Hospital, Semarang, Indonesia*

Background: Syringomyelia is a clinical syndrome that results from an enlarging syrinx. Two types of syringomyelia are often distinguished: communicating and non-communicating. Communicating syringomyelia is caused by an enlargement of the central canal within the spinal cord. Non-communicating syringomyelia is caused by syrinx developing within the gray matter of the spinal cord. **Case:** An 11-year-old girl referred from pediatric department with syringomyelia in cervical level with clinical manifestation of weakness in both shoulders and upper arms. Her daily activities (dressing, bathing, toileting, grooming, eating) were assisted by her parents, but she could move independently. She got physiotherapy program such as active assisted ROM exercise, finger ladder, and shoulder pulley exercise. Occupational therapy program such as playing dough, hammer board, Velcro board, replacing board were given. After 3 months of therapy, her ability to move her lower arm had been increased.

0522PP05

A STUDY OF CIRCADIAN RHYTHM AND AUTONOMIC NERVOUS SYSTEM ACTIVITY USING POWER SPECTRAL ANALYSIS OF HEART RATE VARIABILITY IN PARKINSON'S DISEASE**Junichi Kato¹, Masahito Murakami², Yoshitaka Otan², Kazumasa Yokoyama³***¹Department of Internal Medicine, Hyogo Prefectural Rehabilitation Hospital at Nishi-Harima, ²Department of Physical Therapy, Faculty of Rehabilitation, Kobe International University, ³Department of Neurology, Hyogo Prefectural Rehabilitation Hospital at Nishi-Harima, Kobe, Japan*

Purpose: This study was designed to investigate the effects of autonomic cardiovascular functions on heart rate variability and the circadian rhythm in Parkinson's disease (PD). **Materials and Methods:** We characterized the sympathovagal balance and autonomic responsiveness employing power spectral analysis of heart rate variability in 16 PD patients (68±10 years) and 7 healthy volunteers (71±6 years). For evaluation of the autonomic function, the subjects were attached to an active tracer, AC301 (GMS Co., Tokyo), for 24 h and ECG R-R intervals were measured. HRV power spectral analysis was performed using analytical software employing the maximum entropy method, MemCalc method. Low frequency (LF), high frequency (HF), and low frequency-to-high frequency ratio (LF/HF) values, as well as the heart rate (HR) and CVR-R intervals of heart rate variability were compared during the day-time and the night-time in both groups. **Results:** LF values in the day-time were significantly lower than in the night-time in the PD group ($p<0.05$). LF/HF values in the day-time and the night-time in the PD group were significantly lower than those in the control group ($p<0.05$). HR and CVR-R values in the night-time were significantly lower than the daytime values in both groups. The circadian rhythm tended to disappear in the day-time and the night-time in PD patients. **Conclusion:** These results suggest that there are decreases in the circadian rhythm and abnormal autonomic cardiovascular functions, which are related to the sympathovagal

balance of heart rate variability, as measured by power spectral analysis in PD patients.

0522PP06

FACTORS ASSOCIATED WITH FIRST ADMISSION AND REFERRAL FOR STROKE IN SOUTH KOREA**J.H. Leigh¹, J.H. Park², Moon Suk Bang¹***¹Department of Physical Medicine and Rehabilitation, ²Department of Health Policy and Management, Seoul National University College of Medicine, Korea*

Purpose: To investigate the factors associated with facilities for the first admission after stroke and referral facility for subacute rehabilitation to observe the continuum of care. **Materials and Methods:** Data of admission service usage and cost of stroke disabled, which were identified using National Disability Registry (2006), from 2005 to 2008 were obtained from the national health insurance review and assessment service. Length of stay (LOS) and medical cost of first admission and second referral to various type of medical facility, such as general hospital (GH), district hospital (DH), long-term care hospital (LCH) and clinics (C), and association with age, sex, stroke severity, residential area, health insurance type, emergency medical facility in town were analyzed. **Results:** Of newly registered stroke disabled, 83.1% were admitted in GH and, then, referred to home, GH, DH, LCH, C in 29.4%, 48.1%, 9.1%, 7.5%, 5.9%, respectively. First and total LOS of patients admitted in LCH first (172 days, 281 days) is significantly longer than those in GH first (48 days, 137 days) or DH first (51 days, 131 days), respectively. Tendency toward first admission to LCH, not GH, was higher in the elderly (more than 65 years) than the younger (OR 2.63–5.22); in females than males (OR 1.42–2.44); in severely disabled than mildly (OR 1.60–3.06); in those who did not have emergency medical facility in town than who did (OR 1.02–2.25). Continuance of rehabilitation was higher in mildly disabled (OR 1.35–1.79); for those with medical aids than with national health insurance (OR 6.06–9.35). **Conclusion:** Difference were observed in total and first-admission LOS, depending on the type of medical facility. Supporting accessibility to emergency medical facility and affordability is needed to shorten LOS with efficient, continuous treatment.

0522PP07

THE REHABILITATIVE APPROACHES FOR RESPIRATOR DEPENDENT SEVERELY DISABLED CHILDREN AT THE FIRST DISCHARGE TO HOME FROM NEONATAL OR PEDIATRIC INTENSIVE CARE UNIT**Kaoruko Takada, Naohisa Kikuchi, Hironobu Sashika***Department of Rehabilitation Medicine, Yokohama City University School of Medicine, Japan*

Purpose: By the development of the neonatal and pediatric intensive medical care, severely disabled children depending on respirator have increased. The aim of this study is to clarify the problems of the rehabilitative intervention for these severely disabled children to promote well growth. **Materials and Methods:** Clinical records of recent 5 years in our hospital were studied retrospectively. Inclusion criteria of the subject were as follows: less than 6 years old at the time of home discharge; treated in the neonatal or pediatric intensive care unit; and depending on the respirator at the time of home discharge. The investigation items were length of stay (LOS), neurological state, inpatient rehabilitation programs, physical function at discharge, prepared equipment for discharge, and services of the home rehabilitation. **Results:** The number of patients was 8.

The mean LOS was 346 days. All patients were quadriplegia (5 spastic and 3 flaccid). Five cases produced joint contractures in spite of daily ROM exercise. Six cases were prescribed the compact wheel chair to load with a set of respirator. All of their parents were instructed the daily home exercise programs. In many cases, it was difficult to prepare pediatric home rehabilitation resources. *Conclusion:* We investigated the rehabilitative approaches for the severely disabled children depended on respirator. The prepared equipment at discharge was thought to be suitable, but the pediatric home rehabilitation resources were not good enough.

0522PP08

HIGH CONCENTRATION OF DEXTROGLUCOSE FACILITATES PRODUCTION OF TYPE 2 COLLAGEN SYNTHESIS AND INHIBITING DEGRADATION ENZYME ACTIVITY VIA REACTIVE OXYGEN SPECIES IN RABBIT CHONDROCYTES

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Purpose: We tried to figure out the effectiveness of different concentrations of dextroglucose on the formation and degradation of extracellular matrix of rabbit chondrocytes and their relationship with inflammatory and oxidative cytokines. *Materials and Methods:* HIG-82 rabbit chondrocytes were cultured with different concentration of dextroglucose (10, 30, 40 and 50 mmol) for up to 72 h. After treatment, RNA were extracted for real-time polymerase chain reaction (qRT-PCR) reactions, native-gel electrophoresis of type 1 and type 2 collagen formation, Western blot for type 1 and 2 collagen, immune-fluorescence for intracellular collagen distribution analysis, MTS (3-(4, 5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium) assay as viability tests, measurement of intracellular reactive oxygen species (ROS) by flow cytometry, and gelatin zymography in gel and direct matrix metalloproteinase 9 (MMP-9) enzyme activity assay were performed respectively. *Results:* qRT-PCR reactions revealed significant increase in the formation of type 2 collagen and transforming growth factor beta in cells treated with 30 mmol of dextroglucose ($p < 0.05$), and significant increase of type 2 collagen in 40 mmol of glucose compared to those from untreated cells. Western blot revealed similar responses in type 2 collagen expression in 30 mmol. There is a sequential decrease fold of activity of MMP-9 in 30, 40 and 50 mmol treatment (0.99, 0.95 and 0.93, respectively). ROS analysis revealed sequential increased responses in 30, 40 and 50 mmol in 24, 48 h compared to untreated cells. *Conclusion:* These results are suggestive of higher concentrations of dextroglucose can facilitate regeneration by promoting synthesis of type 2 collagen in rabbit chondrocytes and inhibit expression of degradation enzymes, which are related to increased activities of reactive oxygen species.

0522PP09

CARDIAC REHABILITATION IN A PATIENT WITH TRIPLE VESSELS DISEASE: A CASE REPORT

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Purpose: To provide optimal cardiovascular and respiratory conditions after Coronary Artery Bypass Graft (CABG) in a patient with Three Vessels Disease (TVD). *Materials and Methods:* A 43-year-

old male who worked as cleaning service, was diagnosed with TVD pro CABG, DCFC II NYHA. The result of coronary angiography was stenosis of 90% in distal Left Main Coronary Artery, 80% at Left Descendent Artery and 70% at Left Coronary Circumflex. The risk factors of the patient were obesity, family history of cardiac disease, dyslipidemia and heavy smoking. He experienced the first heart attack 4 months before hospitalization. The rehabilitation programs were given pre and post surgery, which include breathing exercise, effective cough exercise, active range of motion, early mobilization, and aerobic exercise, exercise stress test and weight reduction program. *Results:* After 3 months (phase II) cardiac rehabilitation, patient was able to do his activities of daily living without cardiac complain and he could return to his work. *Conclusion:* TVD is a common cardiovascular disease with significant blockage in three coronary arteries, often requiring invasive procedures such as stenting and or CABG. CABG is the first treatment of choice for TVD which usually give a good prognosis in young adult. Cardiac rehabilitation plays an important role in achieving a satisfying quality of life of CAD survivors after surgery.

0522PP10

“SIAMESE BOYS”: THE HABILITATION CHALLENGE

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Background: Conjoint twins were found in one per 50.000–100.000 births. “Siamese twin” is a rare abnormality with approximately 25% are male. The majority of these twins (70%) are fused at the thorax and/or abdomen (thoraco-omphalopagus). Morbidity and mortality rates are high in conjoint twins despite the development in techniques of radiological imaging, anesthesia, and surgery. Prognosis depends on the fusion site, complexity, and spread of shared organs, and accompanying anomalies. Only 40%–60% of conjoint twins are delivered alive, and of those, 35% are lost in first 24 hours. *Case Description:* The twin was borned from first normal pregnancy with spontaneous delivery, total body weight of 2,700 g, tetrapus, had 2 separate organs except for the pericardium and hepar, which were fused. They were neglected by their parents. At the present time, they were prepared for separation and was consulted to physical medicine and rehabilitation after 13 months with global delay development, (inability to sit, grasp, play peek a boo using single, double consonant words and oral hypersensitivity). *Discussion:* After therapy, both of them reached a higher stage of development. They were provided with play ground area, made up of foam, with 15 cm thickness, and a custom made adaptive chair with casters, back seat, arm support with adjustable height, face to face, covered with foam and cushion; facilitated with speech therapy, oromotor stimulation for changing food consistency and baby tooth brush which were stimulated at the same time. At the age of 16 months, they were able to sit, hold crayon with full grasp of the palm, cast objects, play peek a boo, shout for attention, do simple commands, retrieve an object hidden in their view and able to eat food with the consistency appropriate to their age.

0522PP11

SPINA BIFIDA IN ADOLESCENT WITH CONGENITAL TALIPES EQUINO VARUS POST HAMSTRING RELEASE

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Background: Spina bifida is a group of neural tube defect caused by congenital dysraphic malformations of the vertebral column and spinal

cord. It has two major types: spina bifida occulta and spina bifida cystica or aperta. Spina bifida occulta dysraphism affects primarily the vertebrae, the neural and meningeal elements are not herniated. At early age, some cases may appear asymptomatic and will need observation for progressive symptoms that may develop during the growing years from tethered cord. Spina bifida is a congenital deformity that commonly followed by disability especially equinus foot. *Case:* A 16-year-old girl with weakness of both lower extremities since two years ago was presented in this study. Her right hamstring was released. From physical examination, the study found scoliosis and hyperlordotic trunk, dry post surgery wound, ambulation with bilateral forearm crutches and the needs for assistance for long distance walking. Climbing or going down the stairs and transfer from sitting to standing. In gait examination, there was no heel strike on both sides. On the left leg, there was weakness of gluteus maximus muscle, genu recurvatum at mid stance and drop foot. She had poor standing balance with limited knee's and ankle's range of motion. There were positive Thomas test, positive Elly test, decreased muscle strength below the level of L2, positive signs Upper Motor Neuron involvement. One 1 cm tumor was found on the gluteal fold and examination of residual volume of bladder revealed a 40cc residual volume. Rehabilitation programs included: education, flexibility exercise of joint of the lower extremities, increase muscle strength for fair and good grade by doing active voluntary contraction. Electrical stimulation was applied to poor until trace activity grade, gait training with KAFO, sit to stand exercise. *Results:* Joint flexibility of the lower extremities were maintained, muscle strength and thus mobilization were also improved. *Conclusion:* Comprehensive rehabilitation program had improved the mobilization of spinal bifida patient.

0522PP012

THE COMPARISON OF SEQUENTIAL FINGER MOVEMENT BETWEEN SHAM STIMULATION VERSUS CONTROL GROUPS

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Purpose: To observe and compare effects repetitive sham transcranial magnetic stimulation (rTMS) versus control groups on sequential finger movements. *Materials and Methods:* Twenty eight healthy volunteers participated in this study and were divided by two groups. Those were the sham stimulation group and the other control group: sham group ($n=20$, who receive sham rTMS), control group ($n=8$, who did not receive rTMS). Sham groups were received sham stimulation on contralateral hemisphere by doing left finger sequential movement. Main outcome was measured using MIDI (Musical Instrument Digital Interface), keyboard-pressing task with left fingers was monitored before and after sham rTMS or resting for finger sequential movements (task duration, reaction time, accuracy). *Results:* No difference of baseline value between the sham and control groups. There were improvements in finger sequential movements such as accuracy on control group compared to sham rTMS group ($p<0.05$). *Conclusion:* The control group who did not receive sham rTMS had better result than sham rTMS group on sequential finger movements.

0522PP013

COMPARISON BETWEEN FUNCTIONAL ELECTRICAL STIMULATION AND VOLUNTARY CONTRACTION INDUCED BRAIN ACTIVATION BY FMRI

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Purpose: To observe brain activations by functional electrical stimulation (FES), voluntary contraction, and electrical stimulation com-

bined with voluntary contraction. *Materials and Methods:* Twenty-four healthy right-handed subjects enrolled. We performed block design which consists of three sessions. 1st session: only voluntary contraction; 2nd session: FES-induced wrist extension movement, and 3rd session: simultaneous voluntary and FES-induced movement. To investigate inter session variability; group analysis was applied using one-way ANOVA after correction of false discovery rate. *Results:* In voluntary contraction alone, brain activations were observed in contralateral MI, thalamus, bilateral SMA, SI, SII, and cerebellum. During FES-induced wrist movement, brain activation was observed in the contralateral MI, SI, SMA, thalamus, ipsilateral SII and cerebellum. During FES-induced movement combined with voluntary contraction, brain activation was found in the contralateral MI, anterior cingulate cortex, SMA, ipsilateral cerebellum, bilateral SII and SI. The activated brain regions of the MI, SI, cerebellum and SMA were largest during voluntary contraction alone and smallest during FES alone. The activated brain regions of the SII were largest during voluntary contraction combined with FES and smallest during FES contraction alone. The brain activation extents of the MI, SI and SII were largest during voluntary contraction alone and smallest during FES alone. *Conclusion:* These findings suggest that voluntary contractions combined with FES are more effective for brain activation than FES only movements for rehabilitation therapy.

0522PP014

PROTEUS SYNDROME: A RARE CASE OF FEET GIGANTISM

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Purpose: The present case study is a rare case, less than 100 cases reported world wide. Proteus syndrome is a syndrome of disproportionate, asymmetric overgrowth of body parts and dysregulated adipose tissue. *Case:* Young lady, 16 years old, with history of lower extremities disproportionally overgrowth, malformation and dysregulation with macrodactily and syndactily. Last year, she underwent surgery to reduce the overgrowth, also had amputation of the toes. She felt embarrassed with her feet condition and would like to have closed shoes. On examination, we found that she had disproportionate legs, amputee of the toes on both legs except for the big toes, with the normal appearance of the trunk and upper extremities. From X-ray examination, there were deformities of the feet and metatarsal amputee of 2nd to 5th digits of both legs. We gave her accommodative shoes, endurance exercise and psychological support. The patient did not feel embarrassed anymore and was able to join the the community with more confidence. *Conclusion:* The function of malformed feet of patient with Proteus syndrome can be optimized to achieve a better quality of life.

0522PP015

MARFAN SYNDROME: A CASE REPORT

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Background: Marfan syndrome is a dominantly inherited disease of connective tissue with diverse manifestations, involving primarily the skeletal, ocular, and cardiovascular systems. The symptoms worsen as the person gets older. Correct and timely diagnosis is essential in order to provide optimal therapy and prevent serious complications. *Case:* A 10-year-old girl, diagnosed with Marfan syndrome, with chief complaint of humpback since 4-month-old which was getting worse as the patient got older. She had difficulty doing exercise at school because she often experienced short of

breath. Physical examination revealed a thin posture girl with long limbs, high myopia, severe scoliosis, decreasing chest expansion and joints hyperlaxity. Standard scoliosis vertebral X-ray showed that there was scoliosis 80° curve at level T2-L2 vertebral, right convexity with apex at T9, which was still flexible, but her family refused to undergo surgery. Rehabilitation program consists of education about her condition, breathing exercise, strengthening exercise, endurance exercise, scoliosis exercise, and MSO brace. Rehabilitation program gave her a better understanding about her condition, better strength, endurance and flexibility to do her activities. **Conclusion:** Rehabilitation program prevents her from complication of prolonged immobilization which is usually occurring in Marfan syndrome patient. Early diagnosis and comprehensive rehabilitation is important to maintain function and prevent further complications to give an optimal quality of life.

0522PP017

MIXED CONNECTIVE TISSUE DISEASE (MCTD) IN AN ADULT: A CASE REPORT

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Case: To present a rare case about a 35-year-old woman with MCTD. She is bed ridden in supine position and severely dependent in ADL. She has general weakness, multiple contractures and stiffness, pain at almost all joints when moved, deformity of the fingers, and scleroderma. Laboratory examination showed positive antibodies Anti U1-RNP. MCTD is an uncommon autoimmune disorder that causes overlapping features of three connective tissue diseases i.e lupus, scleroderma, and polymyositis. Internationally, the prevalence of MCTD has been reported to be 2.7 cases per 100,000 populations. The symptoms of the disease started three and a half years ago. However, the diagnosis was only recently established and she was provided with an intensive rehabilitation program since 3 months ago, along with medications from Internal medicine and Dermatology. The Rehabilitation program consisted of breathing exercise, proper positioning, range of motion exercise, gentle stretching of the stiff and contracted joints, isometric exercise, occupational therapy for ADL and hand function, and a modified wheelchair. **Results:** After 3 months of therapy she has less pain, improved ROM, better ADL and is ambulatory with a modified wheelchair. **Conclusion:** An early rehabilitation program would have maintained range of motion, long term mobility, strength and endurance and prevented joint contractures. In this neglected case, the goals of the rehabilitation program are to prevent more complications due to prolonged immobilization, increase flexibility of the joints, ambulation, and improve quality of life.

0522PP018

SPINA BIFIDA: A CASE REPORT

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Background: Spina bifida is the second most common cause of disability in children. The National Spina Bifida Association documented more than 70,000 individuals in the United States living with spina bifida. Spina bifida is a complex disorder causing has physical, psychological, and social implications. **Case:** A case of spina bifida cystica in a 9-year-old girl is presented. The problems of this patient were abnormal gait due to complex deformity of both feet, right hip dislocation, leg length discrepancy (1.5 cm), weakness of both legs, laxity of knees, atrophy of both leg muscles (worse on the right side), neurogenic bladder and bowel, and poor nutritional status.

Radiological examination showed defect vertebrae at level L4 until sacrum, spina bifida at level L5 until S4, tethered cord and posterior spinal lipoma. The Rehabilitation program consist of strengthening of the lower extremity muscles through exercise and electrical stimulation, HKAFO for the right and KAFO for the left leg, as well as bladder and bowel training were prescribed. **Results:** The patient was still on an ongoing rehabilitation program. She had improved urinary continence with regular CIC three times a day and defecation was regulated by routine bowel enema. **Conclusion:** Exercise and electrical stimulation improves muscle strength of both leg muscles. Bladder and bowel training makes her more confident to play with her friends. The HKAFO and KAFO are hoped to improve the gait and reduce deformities. Long term management and follow up are very important throughout the growth and development period.

0522PP019

DYSPHAGIA AFTER ANTERIOR C-SPINE SURGERY: PROSPECTIVE PRE AND POST-OPERATIVE VIDEOFLUOROSCOPIC SWALLOWING STUDIES

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Purpose: Preoperative and postoperative videofluoroscopic swallowing studies (VFSS) were compared to evaluate the changes after surgery and its relations with dysphagia symptoms in the patients who had treated with anterior cervical spine surgery. **Materials and Methods:** Preoperative and postoperative VFSSs were done for all eligible patients. The oral transit time (OTT), pharyngeal delay time (PDT), pharyngeal response time (PRT) and pharyngeal transit time (PTT) were measured in the VFSS. Using the Image J software, the thickness of prevertebral soft tissue was measured from digitized VFSS images. The hyoid bone movement and the upper esophageal sphincter (UES) diameter were measured serially frame by frame. **Results:** Total 20 patients were eligible. The PTT in postoperative studies was not significantly different from that of preoperative studies. The PDT was relatively increased in postoperative studies ($p > 0.05$), and the PRT was significantly decreased ($p < 0.05$). The hyoid bone movement was not significantly changed between pre and postoperative VFSS studies. The maximal distance of UES opening was significantly reduced in the postoperative study ($p < 0.05$). The time to widest opening of UES was significantly prolonged ($p < 0.05$) and though the total duration of UES opening was not significant ($p < 0.05$). The thickness of prevertebral soft tissue was significantly increased in the postoperative study ($p < 0.05$). When we compared the changes according to the existence of dysphagia symptoms, the changes of prevertebral soft tissue thickness was significantly greater in the patients with dysphagia symptoms ($p < 0.05$). **Conclusion:** Pharyngeal sensory dysfunction and inadequate motor response to sensory feed back from the pharyngeal region due to soft tissue edema might affect the clinical symptom and abnormal findings of VFSS after anterior cervical spine surgery.

0522PP020

ZOTEPINE INDUCED HEMICHOREA SUBSIDED AFTER DISCONTINUING THE MEDICINE

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Purpose: We report a case of chorea on unilateral upper and lower extremities after taking zotepine which was alleviated after discontinuing the medicine in a patient. **Materials and Methods:** Head mitted neurosurgery part and had undergone decompression surgery of this meningioma. Subsequently, the patient exhibited

a confused mental status and symptom of delirium on the 4th day after surgery. Lorazepam and haloperidol soon administered. On the 16th day after surgery, 25 mg of zotepine was given to the patient orally and his mental confusion and irritability were decreased on 5 days after starting of zotepine, where as abnormal involuntary movements occurred abruptly. Zotepine was discontinued and brain MRI (T2 FLAIR) was checked. On the 24th day after surgery (3 days after discontinuing of zotepine), the abnormal movement slowly decreased without aggravation of confusion and irritability. *Results:* In this patient, haloperidol was worsening the abnormal movement. Why exposure to neuroleptics produces chorea is not clear. However, our hypothesis is that the brain lesion damaged by infarction messed up the sub thalamopallidal relation, in which D2 receptor blocking acts aberrantly. *Conclusion:* We concluded that the Zotepine induced hemichorea in a patient with stroke in the midbrain after decompression surgery of huge meningioma.

0522PP021

THE ASSOCIATION BETWEEN ORBITAL-MEATAL LINE ANGLE AND CERVICAL LORDOTIC CURVE

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Purpose: The average cervical spine lordotic curve is approximately 21–22 degree measured between C2 and C7 by Cobb method or Posterior Tangent Method. The average head tilt angle is traditionally measured by orbital-meatal line to horizontal line in sitting position. When people lie down in supine position, the head tilt links with neck movement. The cervical spine becomes more lordotic when head tilt higher; while the cervical spine become more kyphotic when head tilt lower. To measure the change of cervical lordotic curve safe and non-invasive, we aim to measure the association between the angle of orbital-meatal line externally and cervical lordotic curve by X-ray. *Materials and Methods:* Six participants were recruited. Two lead markers were placed on the tragus and the canthus. Participants were asked to be in supine position on a table. They were filmed laterally by light beam of the X-ray machine, with 5 different angles (–20, –10, 0, 10, 20), measured from the orbital-meatal line to the vertical line. We used posterior tangent method to calculate the cervical lordotic curve, from C2 and C7. Then we analyzed the relationship between the orbital-meatal line (to vertical) angle and cervical lordotic curve. *Results:* Positive correlation was noted between orbital-meatal line angle and cervical lordotic curve. *Conclusion:* We demonstrate the association between the angle of orbital-meatal line and cervical lordotic curve in supine position. We hope we could apply this method in custom-made pillow manufacture in the future.

0522PP022

WRIST AND FINGERS HAND FLEXION - EXTENSION EXERCISE WITH AND WITHOUT MIRROR THERAPY ON SELF CARE FUNCTIONAL RECOVERY IN ISCHEMIC STROKE PATIENTS

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Purpose: To compare the efficacy between wrist and fingers hand flexion extension exercise with and without mirror therapy on self care functional recovery in ischemic stroke patient ≤ 1 year. *Materials and Methods:* Experimental, randomized pre and post controlled group design. Twenty-six patients post stroke ≤ 1 year, aged from 45–75 years. Two groups were randomly established. The first group received exercise therapy and mirror therapy, the second group received exercise therapy without mirror therapy. Both of groups were treated 3 times per weeks for 4 weeks. The

Brunnstrom stages of motor recovery, strength of affected upper limb assessed by the Motricity index, and upper limb functioning (self-care items of the FIM instrument). *Results:* The scores of the Motricity index for the upper limb improved more significant in the mirror group than in the control group after 4 weeks of treatment ($p < 0.05$), but at the Brunnstrom stages and the FIM self-care score were not significantly different between the groups ($p > 0.05$). *Conclusion:* Exercise therapy with mirror therapy improved the motoric recovery (the Motricity index) more significantly, but at the Brunnstrom stages and functional recovery of the upper limb were not significantly different between the groups.

0522PP023

ARE THE CURRENT DIAGNOSTIC CRITERIA OF DYSAUTONOMIA SUITABLE FOR PATIENTS WITH HYPERSYMPATHETIC ACTIVITY DURING REHABILITATION STAGE?

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Purpose: We further discussed the two criteria of dysautonomia in order to provide useful information for clinical practice. *Material and Methods:* There were currently the two diagnostic criteria of dysautonomia, respectively proposed by Blackman J and Baguley IJ, and both criteria emphasized the frequency of dysautonomia. We reported two cases of brain injury, who presented hypersympathetic activity during chronic rehabilitation phase. *Results:* According to the criteria of Blackman and Baguley, the two patients could not be diagnosed as dysautonomia, but their sympathetic activity could not be explained by other reasons. *Conclusion:* On the basis of the significant distinction, we suggest that the two diagnostic criteria might be more suitable for patients in acute stage, and a new criterion of dysautonomia should be established for patients with hypersympathetic activity in chronic rehabilitation phase, which do not stress the frequency of episode.

0522PP024

PROPRIOCEPTION OF SCAPULOTHORACIC JOINTS IN INDIVIDUALS WITH AND WITHOUT SHOULDER IMPINGEMENT SYNDROME

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Purpose: Proprioception deficit is suggested as a contributor to scapular dyskinesis and often emphasized in the rehabilitation following shoulder impingement. However, very few studies described the measurement method for scapular proprioception and its interaction with shoulder impingement syndrome. Therefore, the purpose of this study was to describe and compare scapular proprioception in subjects with and without shoulder impingement syndrome. *Materials and Methods:* Twenty patients with shoulder impingement and 20 matched controls participated this study. The scapular proprioception was measured as joint reposition errors in 4 scapular movements (elevation, depression, protraction, retraction). The subject was asked to reposition their scapula to the maximum and reference position in each movement. The Liberty electromagnetic tracking system was used for recording joint kinematics. We used two-way repeated measures analysis of variance to examine the group differences in scapular reposition errors with the level of significance set at 0.05. This study was approved by the ethical committee of National Yang-Ming University, Taipei (IRB number 1000013), and sponsored by National Science Council, Taiwan (100-2911-I-010-011). *Results:* A significant Group by Side interaction was observed ($p < 0.05$), with significantly larger reposition errors in patient's injured shoulder as compared to the non-injured side and the controls ($p < 0.05$). Handedness did not have a significant effect

on the scapular reposition errors ($p>0.05$) *Conclusion:* Scapular proprioception was impaired in impinged shoulders, which should be considered when assessing and treating patients with shoulder impingement.

0522PP025

LOWE SYNDROME WITH RECURRENT FRACTURES

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Purpose: To report therapeutic experience of a Lowe syndrome patient presenting recurrent fractures. *Case:* A 10-year-old boy visited our clinic because of developmental delay. He had several operation histories due to cataract, glaucoma, cryptorchidism, left femur deformity, and multiple pathologic fractures. He revealed short stature and developmental quotient (DQ) was 6%. He represented the typical facial features in Lowe syndrome included deep set small eyes, frontal bossing, elongated face, flat occiput, parietal prominence and mongoloid slant to eye. The manual muscle test showed good grade in all extremities and contracture was significant in both ankle joints. Intermittent seizure occurred spontaneously. Electroencephalography showed moderate abnormality. In laboratory findings, alkaline phosphatase and lactate dehydrogenase was increased and proteinuria was revealed. The 99m Tc-HDP 3-phase bone scan was mild and irregular increased perfusion and uptake in left femur body and distal tibia. He could not participate in active rehabilitation program continuously due to recurrent fractures in both lower extremities. We performed gentle PROM exercise of all major joint, tilt table standing, functional electrical stimulation and neurodevelopmental treatment for 40 min at a time, twice a day, and 5 days a week. In addition to this management, whirl pool therapy with warm water was performed carefully for 20 min at a time and once a day. *Conclusion:* We report our clinical experience on a rare case of Lowe syndrome presenting with recurrent fracture in both lower extremities.

0522PP026

INTER-ARM DIFFERENCE IN BLOOD PRESSURE MEASUREMENT IN HEMIPLEGIC PATIENT

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Purpose: Several studies have indicated the presence of significant inter-arm blood pressure (BP) differences normally. We aimed to define the effect of hemiplegia on blood pressure measurement. *Materials and Methods:* We enrolled patients with hemiplegia caused by stroke from rehabilitation ward and outpatient department of St. Vincent Hospital. We excluded patients with double hemiplegia, uncontrolled hypertension or another arterial disease. 20 patients were included in our study. Demographic and clinical data were collected from medial recordings. Blood pressure was measured on both upper limbs by a doctor using electric sphygmomanometer on supine position after 5–10 min resting. Another rehabilitation medicine doctor performed physical examination of hemiplegic arm, such as muscle power and spasticity. *Results:* When the enrolled patients were subdivided according to sex, hemiplegic site, tone and muscle power, most of measured blood pressure in the affected and unaffected arm was similar. But a significant difference was found when the patients were subdivided according to the tone of the arm. In spastic hemiplegia, the systolic blood pressure of affected arm is 127.0 ± 18.2 , the systolic blood pressure of non-affected arm is

117.4 ± 17.3 . The diastolic blood pressure of affected arm is 80.4 ± 13.4 , that of non-affected arm is 71.1 ± 5.9 . In flaccid hemiplegia, the systolic blood pressure of affected arm is 129.0 ± 18.7 , the systolic blood pressure of non-affected arm is 132.0 ± 19.2 . The diastolic blood pressure of affected arm is 75.9 ± 6.7 , that of non-affected arm is 77.6 ± 9.0 . Most of patients with spastic hemiplegia had higher systolic and diastolic blood pressure in affected arm compared with normal arm. *Conclusion:* The result of this study found significant association between spasticity of upper limb and measured blood pressure. This study demonstrated that increased muscle tone of the hemiplegic arm can influence the measured blood pressure. It is thus recommended that blood pressure should be measured in unaffected arm in hemiplegic patient.

0522PP027

REHABILITATION OF LEFT ATRIAL MYXOMA PATIENT: A CASE REPORT

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Background: Atrial myxoma is the most common primary heart tumors, with nonspecific symptoms. Myxoma account for 40–50% of primary cardiac tumors, 75–85% occurs in the left atrial cavity. Complications are congestive heart failure, sudden death, cardiac arrhythmias, infection and embolization. *Case:* A 67-year-old woman with breathlessness since 10 months, which became better when she was lying on right side. Echocardiography showed a mobile large Myxoma at left Atrium and EF 56%. The result for functional assessment was Katz index G, Norton score 13, FIM on admission 47, Minnesota score 85. Resection had been done at Sept 23rd 2011. *Results:* Post operative rehabilitation was started with early mobilization and activities of daily living (ADL) as tolerance. 6MWT before discharge (2.5 METS), RPE 11. The rehabilitation program was continued as a home program until ADL according to 5–7 METS.

0522PP028

BRACHIAL PLEXUS INJURY WITH NEGLECTED POST REPOSITION GLENOHUMERAL JOINT DISLOCATION: A CASE REPORT

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Background: Brachial plexus injury is the pathologic dysfunction of the brachial plexus, a complex peripheral nerve structure in the proximal upper extremity. There are many possible causes of brachial plexus injury including direct trauma (the most common), local compression, tumor, idiopathic, radiation, post operative and birth injury. *Case:* A 59-year-old man with neglected post reposition glenohumeral joint dislocation after fell from 3 m height of ceiling. Neglected occurs for nearly two months after reposition by immobilization of left shoulder, arm, forearm and hand resulted shoulder ROM (range of motion) limitation in all planes as well as the elbow joint, wrist and fingers, weakness of the muscles innervated by C5–T1 root, and hypoesthesia at dorsum manus and 1–4th left finger. This impairment lead to disability and handicap in performing activity of daily living and his vocational skills such as making the desk or chair could not sell “nasi bungkus”, and also could not ride motorcycle. During the last 2 months most of his activity had been done at home. The medical rehabilitation short term goals are to prevent complications, improve ROM of the left upper limb joint and the hand function. The long term goals are to improve his quality of life and return to work. The rehabilitation program which includes physiotherapy consist of infrared at left shoulder to hand region, functional electrical stimulation and occupational therapy to improve left upper limb ROM, strength of

muscle, fine motor, sensibility/re-education and ADL as well as vocational activity. Medical social worker program was done in order to assist the patient to get appropriate job in accordance to his capability and also psychologist for psychological evaluation and provide mental support.

0522PP029

REHABILITATION OF COMPLICATED LUPUS ERYTHEMATOSUS

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Purpose: Systemic lupus erythematosus, often abbreviated as SLE or lupus, is a systemic autoimmune disease that attacks the body's cells and tissue, causing inflammation and tissue damage at any part of the body. A study has found that patients with SLE report symptoms of depression and cognitive dysfunction. Beside that, the psychological distress causes worsening of SLE activity. Severe SLE is treated with steroids, which relieve many symptoms. Unfortunately, serious and even life-threatening complications have been associated with long-term steroid use. **Case:** A 27-year-old woman, has been immobilized since 6 months because of pathological fracture of spine. She was just lying on bed and afraid to sit. She was diagnosed with LE since 9 years ago and got Methylprednisolone, Azathioprine, Cyclosporine and Chloroquine. There were history of intracerebral hemorrhage, menometrorrhagia, and cataracts surgery. History of family member who died because of renal failure due to SLE was also admitted. Barthel Index was 6 and DASS-42 showed moderate depression. Physical examination found tachycardia, moon face, positive babinski sign, atrophy of muscles, and normal for others. Bone Mass Densitometry revealed Z score -3.1 SD. Management with multidisciplinary approach was important for this patient. Calcium lactate, and Ibandronic acid were added for her medication. We give endurance exercise, gradual mobilization with TLSO and promoting axial loading to prevent further complications of immobilization. The energy conservation techniques were also given to her. Our goal was improving her functional independency, but after several months the patient still afraid to sit. **Conclusion:** Rehabilitation of this patient is a big challenge because the disease itself and psychologic problem interferes our goal.

0522PP030

MAPPING AN OBESITY REHABILITATION PROTOCOL TO INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF) CORE SET

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Purpose: The purpose of this study was to evaluate obesity rehabilitation intervention protocol in our department by mapping it against the International Classification of Functioning, Disability and Health (ICF) core set for obesity. **Material and Methods:** The contents of our department obesity rehabilitation intervention protocol were linked to the categories of obesity ICF core set by applying ICF linking rules. **Results:** In the four domains of "body function", "body structure", "activities and participation" and "environmental factors", the numbers of matching categories were 23, 24, 3, 11, respectively, in which objective evaluation were 82.61%, 90.91%, 79.17%, 100%, respectively. The matching total numbers were 61 categories, accounting for 55.96% in 109 of obesity ICF comprehensive core set. Clinicians and rehabilitation therapists fully assumed assessment operation of "body structure" and "environmental factors" respectively. The assessment operation of "body functions" and "activities and participation" was

mainly assumed by the rehabilitation therapists, and also involved sometimes by clinicians. **Conclusion:** Current obesity rehabilitation protocol accords basically with requirements of obesity ICF core set, in which the domains of body structure and environmental factors need to be further, improved.

0522PP031

REHABILITATION PROGRAM IN SYRINGOMYELIA PATIENT WITH BALANCE PROBLEM: A CASE REPORT

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Purpose: Syringomyelia is a disorder in which a cyst forms within the spinal cord and it is commonly associated with Chiari type I malformation. This case was to investigate the result of comprehensive rehabilitation program in syringomyelia patient. **Case:** A 46-year-old woman with syringomyelia and Chiari type I malformation was recruited in this study. This patient had weakness, atrophy, and sensory deficit of both upper extremities hand function and ADL disturbance. She also had second curve thoracolumbar scoliosis with no respiratory problem. After decompression and drainage surgery, she had ambulation problem due to sensory deficit of lower extremity and balance disturbance with normal muscle strength of the lower extremity. She worried about her condition. The rehabilitation program consists of static and dynamic balance exercise, sensory reeducation, occupational therapy, and psychological support. We evaluated ADL with Barthel Index and balance with Berg Balance Scale. **Results:** Two months after she received the rehabilitation program, there was improvement of balance and ADL function. The score of the Berg Balance Scale item 1 to 7 (from 14 items) was increased from 4/28 to 26/28 and the Barthel index score was increased from 40/100 to 80/100. **Conclusion:** The comprehensive rehabilitation program plays an important role to improve the functional capacity and the quality of life of patient with syringomyelia.

0522PP032

STREETER'S DISEASE AND CONGENITAL TALIPES EQUINOVARUS

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Purpose: Streeter's disease is a complex disorder characterized by constricting rings, acrosyndactily or, often amputations of the extremities of neonates. Congenital Talipes Equinovarus (CTEV) is a congenital deformity involving one foot or both. The affected foot appears rotated internally at the ankle. This case was to show the increased functional ambulation, hand function and quality of life of patient with Streeter's disease and Congenital Talipes Equinovarus (CTEV). **Case:** A 12-month-old boy presented constricting rings of the left cruris and both foot bent, diagnosed as Streeter's Disease and CTEV. The problem of this child were left cruris constricting rings, left dorsum pedis oedema, syndactily of digiti I, III, IV, V right manus and CTEV of both foot (from total Pirani's Score 1,5°/2,5°). The X – ray showed that both tibia and fibula were normal and there were CTEV bilateral. The patient was given serial casting more than 15 times. Rehabilitation program includes stretching of both ankle, stroking massage for left dorsum pedis, 90° plantar stop AFO splint and health education. **Results:** Two months after he received the rehabilitation program, there was improvement of left dorsum pedis. Oedema was reduced and total Pirani's score became 1,5°/2°. **Conclusion:** Comprehensive management of rehabilitation and the patient's (his family) compliance play an important role in the outcome of PM&R program.

0522PP034

REHABILITATION IN NEGLECTED CASE OF TYPE II SPINAL MUSCULAR ATROPHY: A CASE REPORT**Hermilawaty, S.M. Mei Wulan***Department of Physical Medicine and Rehabilitation, School of Medicine Airlangga University, Dr. Soetomo General Hospital, Surabaya, Indonesia*

Background: Spinal Muscular Atrophy (SMA) type II is a slowly progressive condition affecting proximal musculature more than distal and is apparent in the first 6 to 18 months of life which is caused by autosomal recessive inheritance. **Case:** An 8-year-old boy showed a prominent weakness of proximal musculature as compared to the distal and the lower extremity was more affected than upper extremity since he was 1 year old. He also had delayed motor milestone, kyphoscoliosis, hypotonia and contracture. The sensory and proprioception were normal. The patient was totally dependent. The electrodiagnostic finding showed irregularly discharged activity and CPK of 60.4 U/l. The patient was diagnosed with Spinal Muscular Atrophy (SMA) type II. Rehabilitation programs consisted of Munster Scoliosis Orthosis (MSO), modified wheelchair, modified feeding tools and stationery, breathing exercise, ROM exercise and psychological counseling. Our goals are to preserve the best residual functional capacity, prevent further the spinal curve and maintain ROM. **Results:** The patient showed progression in functional capability for ambulation, improving psychological status and quality of life. **Conclusion:** Comprehensive rehabilitation program in SMA type II could help patient to gain optimal and independent function in the community with good quality of life.

0522PP035

NEGLECTED CASE: A WOMAN WITH DISABLING LEPROSY**Jeris S. Paongan, I. Putu Alit Pawana***Department of Physical Medicine and Rehabilitation, School of Medicine Airlangga University, Dr. Soetomo General Hospital, Surabaya, Indonesia*

Purpose: To describe disabling leprosy with comprehensive rehabilitation management and to alert the clinicians for the potential disabling diseases like leprosy. **Materials and Methods:** A case report of a 62-year-old woman with leprosy ulcer and deformity at hands and feet. The woman had difficulty walking because of the deformity, ulcers and proprioceptive problem since two years ago. Her hands function was decreased as a result of nerve damage. There were atrophy at thenar and hypothenar muscles, contracture of fingers and toes, thickening of ulnar nerve and edema at both legs. The ultimate rehabilitation programs are SOS (soaking, oiling, scrapping), occupational therapy (hand function, adaptive equipment), proprioceptive exercise and gait training with accommodation shoes. **Results:** Patient's ulcers were healing, she was able to walk with normal gait, was able to do activities of daily living and occupational function after 4 months. **Conclusion:** With proper comprehensive rehabilitation management, we even the worst complication of disabling leprosy could be prevented and the quality of life of patient could be improved.

0522PP036

REHABILITATION PROGRAM IN POTT'S DISEASE: A CASE REPORT**Ninik Dwiastuti, Nuniek Nugraheni***Department of Physical Medicine and Rehabilitation, School of Medicine Airlangga University, Dr. Soetomo General Hospital, Surabaya, Indonesia*

Background: Pott's disease, also known as tuberculous spondylitis, is a granulomatous chronic infection caused by Mycobacterium tuberculosis that affects the spine. Spine is the most common location of extra pulmonary TB. Comprehensive management of Pott's disease consists of medication, surgical treatment and rehabilitation program. **Case:** A 32-year-old female diagnosed with T7 paraplegia AIS C was recruited. The main problems were immobility, weakness of both legs, kyphotic deformity of the spine, sensory deficit starting from dermatome T8 and below, disturbance of ADL (Barthel Index=45) and anxiety. She underwent debridement and posterior stabilization surgery. The rehabilitation programs consist of proper positioning, log rolling every 2 h, breathing exercise, ROM exercise, transfer exercise, sitting balance and tolerance exercises, sitting mobilization with orthoses (TLSO) and ambulation with wheelchair. Education and psychological support were included in rehabilitation program. **Results:** The patient showed improvement in both sensory and motor function, She was able to sit without hand support, could ambulate using wheelchair and an improvement functional independence (Barthel index=70). The rehabilitation program was continued with regular evaluation regularly. **Conclusion:** Rehabilitation program can manage patient with Pott's disease to prevent complication caused by prolong immobilization and paraplegia, increase functional independence and quality of life.

0522PP037

THE COMPARISON OF EFFECTS SUPRASCAPULAR NERVE BLOCK, INTRA-ARTICULAR STEROID INJECTION AND A COMBINATION OF TWO INJECTIONS IN THE HEMIPLEGIC SHOULDER**J.H. Mun¹, P.S. Jun¹, H.J. Jeong²***¹Department of Physical Medicine and Rehabilitation, Dong-Eui Hospital, ²Department of Physical Medicine and Rehabilitation, Kosin University College of Medicine, Busan, Korea*

Purpose: Intra-articular steroid injections and suprascapular nerve block (SSNB) are accepted as the treatment approaches for shoulder pain that may contribute to the rehabilitation of hemiplegic patients. The aim of our study is to determine which injection technique was effective for patients with hemiplegic shoulder between SSNB, Intra-articular steroid injection and a combination of two injections. **Materials and Methods:** We recruited 20 patients (9 men, 11 women) with hemiplegic shoulder pain after stroke. Suprascapular nerve block was performed in 6 patients, intra-articular steroid injection in 7 patients and a combination of two injections in 7 patients. Suprascapular nerve block with 1% lidocain 5 ml, intra-articular steroid injection with a mixture of 1% lidocaine 9 ml and triamcinolone 40 mg, a combination of two injections were performed on the patients in hemiplegic shoulder pain with ultrasonography guided. Range of motion (ROM) values at the moment that pain started and passive maximum range of motion values were recorded. Pain intensity levels using the visual analogue scale (VAS) at these two ranges of motion values were also taken. Four repeated measures were performed on pre-injection, post 1 h, 1 week, 1 month. Data were analyzed by repeated measures ANOVA with significance level of 0.05. **Results:** The mean age was 63.00±10.54 years. The mean time since stroke was 17.25±15.18 weeks. All of ROM values and VAS scores were important differences in repeated measures $p < 0.05$, except internal rotation ROM and VAS score at pain started ($p > 0.05$). There were no significant differences determined in measurements between SSNB, intra-articular steroid injection and a combination of two injection groups ($p > 0.05$). However, flexion VAS score at passive maximum ROM was significant difference between SSNB, intra-articular steroid injection and a combination of two injections groups ($p = 0.05$). **Conclusion:** Three injection procedures have a similar effect in hemiplegic shoulder pain. However, a combination of two injections can decrease more the pain intensity at shoulder flexion in hemiplegic shoulder pain than SSNB or intra-articular steroid injection.

0522PP038

SCOLIOSIS AND TIP-TOEING GAIT IN SPINAL MUSCULAR ATROPHY PATIENT TYPE 3: A CASE REPORT

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Purpose: To plan a carefully management and holistic multidisciplinary care in spinal muscular atrophy (SMA) patients type 3. **Case:** A 14-year-old boy with Type 3 Spinal Muscular Atrophy and scoliosis. The X-ray of vertebra showed a 32° C-curved scoliosis on T12-L4, right convexity with apex at L1 which still flexible. He had a tip-toe gait, muscle weakness of upper and lower limbs, stiffness of fingers, muscles fasciculation, and pseudo-hypertrophy of biceps and gastrocnemius. He had difficulty in performing daily activities due to his condition. Electrodiagnostic study, exercises, and orthosis was provided. The electrodiagnostic study supported the diagnosis of Type 3 SMA. Patient was able to do upright position using brace and felt with the use of shoe insole. **Conclusion:** With a carefully planned management and holistic multidisciplinary care, we can maintain function, prevent further complications, and improve quality of life of patient with Type 3 SMA.

0522PP039

BIOCHEMICAL EFFECTS OF LOW-INTENSITY 660-NM LASER ON MYOFASCIAL TRIGGER POINTS OF RABBIT SKELETAL MUSCLES

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Purpose: Low-level laser therapy (LLLT) is one of the most recently employed treatments in myofascial trigger points (MTrP) for pain control. But their biochemical effects associated with nociception and inflammation are still unclear. Therefore, the aim of this study was to investigate the influences of LLLT applied to myofascial trigger points (MTrP) on tumor necrosis factor- α (TNF- α) and β -endorphin in the taut band and substance P (SP) in the dorsal root ganglion (DRG). **Materials and Methods:** New Zealand rabbits (2.5–3.0 kg) were used in this study. A continuous 660-nm Ga-Al-As diode laser with dose of 27 or 72 J/cm² or sham irradiation with 0 J/cm² was applied to rabbit's myofascial trigger spots (MTrS) for 5 consecutive days. Effects of LLLT on MTrS of rabbit skeletal muscles were determined by immunoassays for TNF- α and β -endorphin in biceps femoris containing MTrS and SP in DRG immediately after treatment and follow up after ceasing treatment. **Results:** The SP level in DRG was significantly decreased after LLLT with both dosages compared to those after sham irradiation. However, the TNF- α level in MTrS-containing muscle was also decreased after LLLT with 27 J/cm², but elevated after LLLT with 72 J/cm². In addition, the β -endorphin level was not affected by both doses of LLLT. **Conclusion:** A possible mechanism for myofascial pain relief with low-dose LLLT may result from suppression of the levels of inflammatory cytokine TNF- α in MTrP-containing taut band and SP in DRG. However, high-dose LLLT may induce increase of pro-inflammatory cytokine content in MTrP.

0522PP040

FORMAT OF CERTIFICATION IN POSTGRADUATE MEDICAL EDUCATION IN PHYSICAL MEDICINE AND REHABILITATION

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Background and Observations: There appears to be a need for uniformity of provision of medical education and certification in Physical Medicine and Rehabilitation (PMR) over the national and international arena. Also PMR has bizarre nomenclature like Medical Rehabilitation, Physical Medicine and Rehabilitation or Physical Medicine Rheumatology and Rehabilitation across the continents. Like other specialties, subspecialties in PMR are also appearing. The statutory is the harmonization and improvement of quality in PMR Medical education. Royal College of physicians and surgeons in the UK during 1960's was offering post graduate medical certificate in Physical Medicine and Rehabilitation (PMR) under the title: Diploma in Physical Medicine and Rehab. Subsequently this has been changed to Diploma in Medical Rehabilitation. PMR in India, Pakistan and some other Asian countries are also offering rather bizarre format certificates. Bangladesh during late 1980s started PMR certification and postgraduate Medical education as FCPS (Fellowship). There are varied opinions regarding FCPS as it is a lengthy course and output number is not keeping pace with great demands of the specialty. Hence MD degree was started in the Medical University (BSMMU). Students were starting the course with great enthusiasm but statistics shows only 10% of the enrolled students could successfully complete the course so far. Same picture is shown in India and Pakistan also. Recently Residency in PMR has been promising and again it has 4 years and 5 years format (PG1-PG4/PG5). Evaluation and Equalization of format is a need at the stage. This observation also focuses a concern of enrollment criteria in to the courses and the evaluation process for certification at end of the course. Our goal is to restore each patient to the highest possible level of medical, psychological, social and vocational function. This requires a person to be qualified accordingly to meet the national and international challenges. **Conclusion:** Like other specialties this is very true with Rehabilitation Medicine. We should work on the issues. Rehab Medicine has been graded the most promising specialty in the Millennium. Needs of nations may vary but the standard should be the same although. Through the national, regional and international societies we can disseminate the message to all concern to meet the upcoming challenge.

0522PP041

CAN ANTERIOR KNEE LAXITY BE USED AS A RISK PREDICTOR FOR ANTERIOR CRUCIATE LIGAMENT INJURY?

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Purpose: Joint laxity was considered one of risk factors for anterior cruciate ligament (ACL) injury. This study aimed to investigate the possibility of using anterior knee laxity as a risk predictor in non-injured sides of unilateral ACL deficient (ACLD) patients. **Materials and Methods:** Forty unilateral ACLD patients and forty healthy volunteers were recruited. Their anterior knee laxities were tested using KT-2000 knee ligament arthrometer, and the load-displacement curves were separated into three regions by stiffness changes using a self-written MATLAB program. The displacement of each region was recorded and denoted as D1, D2, and D3. The slope in each region, the stiffness (denoted as k1, k2, and k3), was also calculated. Independent *t*-test was used to compare the displacement and stiffness of each region between the control group and the non-injured knees of the ACLD group. The ROC curve of each variable was created for the analysis of potential risk predictors.

Results: The results showed significant differences in displacements and stiffness between the control and the non-injured knees of the ACLD group. The ROC analysis showed k3 had the largest area under curve (AUC) with the value of 0.748 ($p < 0.001$), followed by D2 with AUC=0.662 ($p = 0.05$). **Conclusion:** This study demonstrated different characteristics in anterior knee laxity of the non-injured sides of ACLD patients compared to healthy controls. Stiffness in the high loading region in anterior knee laxity test (k3) could be considered a potential risk predictor for ACL injury.

0522PP042

MULTIPLE MYELOMA WITH MULTIPLE COMPRESSION FRACTURES: A CASE REPORT

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Purpose: To evaluate the effect of comprehensive rehabilitation management on multiple myeloma to reduce pain and maintain function. **Case:** A 54-year-old woman came with constant pain at right upper back (VAS 6) that has been treated with palliative management for 3 months (paracetamol, codein, meloxicam, bisphosphonate, and chemotherapy). She also complained of difficulty of breathing with reduced chest expansion, especially when doing activities. Kyphotic posture and upper back spasm were seen. Lumbosacral MRI showed vertebrae collapse of Th7, Th9, multiple compression of Th12, L1, L4, and moderate bilateral foramina stenosis at vertebrae level of L3–4 and L4–5. Pathologic findings revealed plasmacytoma. Rehabilitation program consists of posture correction, chest expansion exercise, physical modalities (TENS and cold pack), and Thoracolumbosacral Corset. **Results:** After 2 months (twice a week) of rehabilitation program, pain was relieved and chest expansion was normal. **Conclusion:** The patient can do activities well without pain and breathing normally. Rehabilitation management has an important role on multiple myeloma to maintain function, prevent further complication, and increase quality of life.

0522PP043

A RARE CASE OF BOWED LEG DUE TO PATHOLOGIC FRACTURE IN POLIOSTOTIC FIBROUS DYSPLASIA LIKE TUMOR INDUCED RICKETS

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Background: Fibrous dysplasia is a tumor like lesion due to replacement of medullary bone with fibrous tissue causing an expansion and weakening of the bone involved. The lesion can cause pathological fractures and visible deformities. Rickets is a softening of bones in children due to deficiency or impaired vitamin D, magnesium, phosphorus or calcium metabolism. **Case:** A boy 2.5 years of age presented with a bowed left leg and pathological fractures of left femur and tibia, diagnosed as poliostotic fibrous dysplasia like tumor induced rickets. The problems of this child were bowed leg, inability to crawl and walk due to pain and fractures, leg length discrepancy, sign of rickets, failure to thrive, vitamin D2 deficiency, hypophosphatemia, and hyperphosphaturia. X-ray showed pathological fractures of left femur and tibia, bilateral cupping and fraying of the humerus, radius, ulna, femur, tibia and fibula. The rehabilitation program included careful range of motion exercise, ambulation with bilateral Hip Knee Ankle Foot Orthosis with ischial seat and gait training. The Patient was given alendronate, octreotid, vitamin D and calcium supplementation. **Results:** The patient could ambulate using a walker. Improvement was seen in blood and urine phosphate

values. The patient is still continued the rehabilitation programs and medication. **Conclusion:** Appropriate orthotics provides protection and support to the lower extremities, and allows independent ambulation with reduced risk for fractures and no pain.

0522PP044

THE EFFECT OF WEIGHTED KYPHOORTHOSIS ON BALANCE OF WOMEN WITH OSTEOPOROSIS

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Purpose: Falling in the old osteoporotic people is one of the most important causes of mortality & morbidity. Using of weighted kyphoorthosis (WKO) for fall prevention is inconclusive. The goal of this study was to assess the effect of WKO on balance parameter of osteoporotic patients. **Materials and Methods:** In a clinical trial study 31 women with primary osteoporosis via accessible sampling method were divided in 2 groups: control (14=exercise) and case (9= exercise+WKO). Patients assessed for paraclinical tests of balance including: Sit to stand, walk Across, Step Quick turn and Limits of stability (LOS) tests before & after 4 weeks of intervention, using balance master equipment. Intervention included 4 weeks home based daily exercises program (weight bearing including walking, balance and back strengthening exercise (according to sinaki's back extension exe. in Mayo Foundation) in both groups, and WKO only in cases. WKO applied twice a day, each time half to an h and by the weight of 750 gram. **Results:** At the beginning there was no difference between groups in demographic and balance parameters. Speed in walk across test improved in both groups without statistical difference between 2 groups but Mean of EPE in LOS test and turn time in SQT test significantly improved in cases ($p < 0.05$). **Conclusion:** WKO can improve turn time & mean of MXE in LOS test as the most reliable tests for determining the balance stability.

0522PP047

DYNAMIC SONOELASTOGRAPHIC FINDINGS OF MEDIAL GASTROCNEMIUS IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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Purpose: To study the elastic properties of the medial gastrocnemius (GCM) in children with spastic cerebral palsy (CP). **Materials and Methods:** The study protocol was approved by the Research Ethics Committee of the hospital, and the informed consent was provided by each child's parent. Twenty-seven spastic legs (group 1) and 26 normal legs (group 2) were included. The Modified Ashworth Scale (MAS) of the ankle in group 1 was assessed by a physical therapist. A physiatrist performed ultrasound and dynamic sonoelastography (DS) together, measured the thickness of GCM, and calculated GCM ratio in both groups. On color-scaled DS, the DS score of the GCM was graded from DS 1 (purple to green: soft) to DS 4 (red: stiff), and the color histogram of the GCM was subsequently analyzed. Strain ratio (SR) and local shear wave (SWV) velocity were calculated in GCM and soleus using acoustic radiation force impulse imaging. **Results:** The GCM ratio in group 1 was significantly smaller than that in group 2. The DS score of GCM in group 1 was significantly higher than that in group 2. The Median red/blue pixel values in group 1 were significantly higher/lower than those in group 2 on color histogram. The SR in group 1 was significantly lower than that in group 2, and the SWV of GCM in group 1 was higher than that in group 2. There are significant correlations between MAS and DS parameters. **Conclusion:** DS demonstrated differences in muscle stiffness between spastic and normal GCM in CP.

0522PP048

DIAGNOSTIC VALUE OF REAL-TIME SONOELASTOGRAPHY IN CONGENITAL MUSCULAR TORTICOLLIS

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Purpose: To evaluate the possible use of the real-time sonoelastography in infants with congenital muscular torticollis (CMT) in predicting the outcomes of the treatment. **Materials and Methods:** Twenty infants (group 1), who were above the sternocleidomastoid muscles (SCM) thickness of 10 mm, and sonoelastography score (SS) 4 with the entire length of the muscle, was involved and 30 infants (group 2), who was below the SCM thickness of 10 mm and SS 3 without that, were included. A physiatrist performed B-mode ultrasound and sonoelastography together, measured the thickness of SCM, and calculated cross sectional area (CSA) of involved SCM in both groups. On color-scaled sonoelastography, the SS of the SCM was graded from SS score 1 (purple to green: soft) to 4 (red: stiff), and the color histogram of the SCM was subsequently analyzed. **Results:** The thickness and CSA of SCM in group 1 was significantly larger than that in group 2, respectively. The median red pixel values in group 1 were significantly higher than those in group 2 on color histogram. In group 1, the mass in the affected SCM muscle was completely disappeared in 16 infants (80%), and the residual mass was detected in 4 infants (20%) on B-mode ultrasound at the final outcome. However, the mass in the affected SCM muscle was completely disappeared in all the infants of group 2. **Conclusion:** These findings suggest that real-time sonoelastography, although an ancillary technique to conventional ultrasound, may predict the treatment outcomes of CMT.

0522PP049

EFFECTS OF HOME PROGRAM INTERVENTION FOR PRESCHOOL CHILDREN WITH DEVELOPMENTAL DELAY: A PRELIMINARY STUDY

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Purpose: This study aimed to investigate the effects of home program intervention for preschool children with developmental delay. **Materials and Methods:** Nineteen children with developmental delay (age, 1.5–5 years) were divided into a home-program intervention ($n=10$) and control groups ($n=9$). The home program intervention was demonstrated by the therapist in the clinic (1.5 h/sessions, 2 sessions/week for 8 weeks). In the clinic, the therapists provides direct treatment for the child, demonstrating tasks and modeling teaching skills to the parent. Then, the therapists and parents discussed about the treatment plan for the child to be implemented in the home setting. All participants received Comprehensive Developmental Inventory for Infants and Toddlers (CDIIT) assessments, including the cognition, receptive language, expressive language, gross motor, fine motor, social, and self-care domains, at baseline and after 8 week (post-treatment). A development quotient (DQ) was determined for each domain as a percentage of the developmental age divided by the chronological age. **Results:** At post-treatment, ANCOVA showed large effects in expressive language and gross motor domains between two groups. The home-program intervention group displayed greater expressive language and gross motor DQs at post-treatment than control group ($p<0.05$). However, the DQs in the other domains did not differ significantly between the two groups. **Conclusion:** The results suggest the home-program intervention can

enhance development in young children with developmental delay, especially motor and speech functions. These findings can encourage professionals and parents to design the cost-efficient home-program intervention of extending programming to the home.

0522PP050

EXPRESSION CHANGES OF TRANSCRIPTION FACTOR EN1 IN THE MIDBRAIN OF MICE MODEL OF PARKINSON DISEASE

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Purpose: To characterize the expression changes of transcription factor EN1 in the midbrain and locomotor activity of Parkinson disease (PD) mice model in acute stage after 6-OHDA injection. **Materials and Methods:** PD mice models were induced by intrastriatal 6-OHDA injections. The open-field test was used to assess their behavior. The expressions of EN1 and TH in the midbrain were examined in 24 h after operations by immunohistochemistry and immunofluorescence. **Results:** Compared to control mice, the behavior of model mice was noticeable affected, which recovered in 7 days. Their total distance travelled recovered after the injection, but didn't contrast sharply with control group. The time spent in the centre-area exhibited a gradual diminution which indicates an increased anxious state. Compared with control sides, the expression of EN1 in the experimental sides decreased 3–9 h after injections and became apparent after 12–18 h and significant after 21 h, with $65.2\pm 22.3\%$ ($p<0.05$) at 18 h. Similar to EN1, the TH-positive dopaminergic neurons reduced over time. But its reductions were later than EN1, with apparent and noticeable changes 15 or 18 h after the operation separately, $68.3\pm 1.2\%$ ($p<0.05$) at 18 h. In the midbrain, EN1 was located mainly in the nucleus and less in cytoplasm. **Conclusion:** Activity of model group altered and their anxiety index rose after 6-OHDA injection. The EN1 or TH positive neurons both decreased as time goes by, with the alterations of EN1 earlier than TH, which might suggest that the apoptosis of dopaminergic neurons and clinical symptoms of PD related to the reductions of EN1 protein to some extent.

0522PP051

DISTRIBUTION AND EXPRESSION PATTERN OF CANNABINOID RECEPTORS CB1 AND CB2 IN BRAIN OF SD RATS

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Purpose: Cannabinoid is mainly used for multiple sclerosis (MS), motor neuron disease, chronic intractable pain and drug-induced vomiting. The aim of this study was to investigate the distribution of two types of cannabinoid receptors CB1 and CB2 in the whole brain, in order to find a basis for further study on the functions of cannabinoid and the two receptors. **Materials and Methods:** Ten adult SD rats were employed in this study. Immunohistochemical method was used to demonstrate the expression of CB1 and CB2 receptors in different regions of adult rat brain. Immunofluorescence staining was used to examine the cell types. **Results:** 1) The CB2 positive cells were much more in the callosum and white matter of cerebellum than CB1 positive cells. CB2 positive cells showed long cell processes in the regions of pons, medulla oblongata, cerebellum white matter and callosum. The CB1 receptors only existed in the callosum and medulla oblongata. 2) CB1 receptor was mainly expressed in the neurons in the cerebral cortex, hippocampus and cerebellum Purkinje cell layer. A few oligodendrocytes expressed CB1 receptor in cerebral cortex; few astrocytes expressed CB1 receptors in cerebellum white matter. The major cell types positive to CB2 receptor were the neurons, oligodendrocytes and astro-

cytes. *Conclusion:* Cannabinoid receptors CB1 and CB2 are widely expressed in the brain. The two types of receptors are similarly distributed in most brain regions, but there is certain difference of the same receptor in different brain regions. The similar distribution may suggest that they are involved in some patho-physiological processes. Differences in the number and staining parts of cannabinoid receptor-positive cells in different brains suggest that the two receptors may play different roles. These results will lay a foundation for the further study of cannabinoid receptors.

0522PP052

MODIFIED CIMT IN A CHILD WITH UPPER-EXTREMITY DYSFUNCTION AFTER CEREBRAL INFARCTION: A CASE REPORT

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Purpose: This report aims to describe the use of mCIMT to improve upper-extremity dysfunction. *Case:* A rare case of a 5-year-old boy with cerebral infarction due to meningitis with cellulitis at dorsum nasi and preseptal right and left eyes and abscess at left palpebra. He had right hemiplegic, spasticity, and paresis of facial nerve. He received rehabilitation management includes physical therapy, occupational therapy (OT) and orthotic. He already could ambulate independently but the upper-extremity still weak functionally. As hand function is the most disabling aspect of motor impairment after cerebral infarction, we were interested to applied modified constraint-induce movement therapy (mCIMT). mCIMT with intensive training session of OT for the paretic upper-extremity was 30 min/day, for 3 days/week, for 4 weeks, and restraint time of the non paretic upper-extremity was less than 6 h a day. The motor function was assessed with Pediatric Motor Activity Log (PMAL) two times, before and after therapy. *Results:* After 4 weeks, there was significant improvement for PMAL score. No adverse events related to splint use. *Conclusion:* mCIMT used to prevent overcome learned nonuse and induce cortical reorganization. Several case-reports revealed the benefit of mCIMT for hemiplegic children. In this case, mCIMT must be a feasible alternative intervention for child with upper-extremity dysfunction after stroke, because it could increase the use of paretic upper limb in daily living activities.

0522PP053

NEUROFIBROMATOSIS WITH CONGENITAL PSEUDARTHROSIS: A CASE REPORT

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Purpose: Neurofibromatosis Type I (NF-1) is a progressive disease. NF-1 is an autosomal dominant disease and it can manifest in many different ways in many different tissues. Its incidence is 1 per 3,000 births. Congenital pseudarthrosis is comparatively rare and affects about 3% of people with Neurofibromatosis Type 1 (NF-1). *Case:* A 3-year-old girl, who had NF-1, has been operated for congenital pseudarthrosis of tibia. She had café-au-lait spots at the body and extremities, and had congenital bowing of the tibia during the perinatal period, shortening the limb along with inability to bear weight, the typical procurvatum deformity. The pseudarthrosis area is covered with a periosteal graft taken from over the inner table of iliac crest along with bone graft and internal fixation. This report was to describe a rehabilitation management to recover complete mobility and obtain gait independency. The child had done rehabilitation program and was able to ambulate independently with KAFO after 2 months. The patient got programs physical therapy, modality

and orthotic. Early diagnosis, comprehensive rehabilitation, long term management and regular follow-up are very important for the child growth and development to provide give better quality of life. *Conclusion:* Treatment of congenital pseudo-arthritis in NF-1 remains challenging. The goal is to obtain and maintain union while minimizing deformity. Appropriate handling will allow the child to obtain gait independency.

0522PP055

DEVELOPMENT OF LIFESTYLE SELF-ASSESSMENT SCALE IN PATIENTS WITH PCOS AND ANALYSIS OF RELIABILITY AND VALIDITY

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Purpose: The purpose of this study was to develop a lifestyle self-assessment scale being suitable for patients with polycystic ovary syndrome (PCOS) and test its reliability and validity. *Materials and Methods:* Ninety-eight patients with PCOS were surveyed by behavior questionnaire including somatic symptom, psychological behavior, life habits and social function. The lifestyle self-assessment scale for PCOS including 19 items was generated by factor analysis with cutting items and adjusting structure and tests of the reliability and validity. Then, 40 patients with PCOS and 40 healthy controls were surveyed to test the scale's discriminant validity. *Results:* The lifestyle self-assessment scale for PCOS was consisted by 19 items which generated 5 factors (each characteristic root >1, cumulative rate = 56.625%). The Cronbach's α was 0.626–0.826 and the Intra-class Correlation Coefficient was 0.709–0.822. There were significant differences in three factors containing exercise consciousness, physique cognition and rhythm of life in the scale between PCOS and control groups. *Conclusion:* This scale accords with the living habits characteristics of PCOS patients and can provide guidance and basis for lifestyle intervention.

0522PP056

THE EFFECT OF STRENGTH IN ANKLE MOVEMENT IN PATIENTS WITH PERONEUS LONGUS TENDON AS AUTOGRAFTS FOR LIGAMENT RECONSTRUCTION: A CASE SERIES STUDY

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Background: Hamstring tendon graft, bone-patellar tendon-bone graft and quadriceps tendon-bone graft are popular grafts in the use of ACL reconstruction surgery. However, it is difficult choice for patients who need multiple ligament reconstruction or second ligament reconstruction. Therefore, peroneus longus tendon may be an alternative choice for these patients. *Materials and Methods:* There are six isokinetic tests of ankle in five patients who use peroneus longus tendon for the reconstruction of ACL or PCL. *Results:* The follow up duration are between 162 to 463 days after surgery (average=265 days). The average muscle powers of ankle part in harvest side with comparison to healthy side are -2% to -12% deficits in dorsiflexion, -11% to 6% deficit in plantar flexion, 29% to 42% deficit in eversion and 28% to 44% deficit in inversion. *Conclusion:* The main effect of muscle power in ankle part of patients who receive peroneus longus tendon graft surgery in half to one and half year is thirty to forty percent deficit in eversion and inversion. Further long term follow-up and functional evaluation studies are needed to document the true progression in the harvest site.

0522PP057

THE EFFECT OF EARLY REHABILITATION OF THE PATIENT ON MECHANICAL VENTILATOR DUE TO RESPIRATORY FAILURE

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Background: Physiological changes of prolong immobilization could be detrimental and affect all body systems. These complications can delay and interfere weaning program of patient on mechanical ventilator due to respiratory failure. Early rehabilitation help to diminish deconditioning effects and maintain muscle function. **Case:** A 39-years old unconscious male patient was put on mechanical ventilator in SIMV mode due to respiratory failure. Since day one he was in intensive care unit (ICU), he got passive rehabilitation care such as bed turning every 2 h, chest physical therapy and postural drainage to clear the sputum retention, manual pressure technique, and passive joints of motion and stretching exercise. After the patient was conscious and the ventilator mode was changed to CPAP two weeks later, program was changed to deep diaphragmatic controlled breathing, effective coughing mechanism, and active/active assistive exercise, and mobilization gradually onto sitting position. Weaning process was in line with the rehabilitation progress. He could then walk with moderate endurance at discharge. **Conclusion:** Passive rehabilitation was effective for patients on mechanical ventilator. Although the patient was on ventilator for 2 weeks, the course of recovery to the maximum functional ability was faster.

0522PP058

REHABILITATION OF CHRONIC INFLAMMATORY DEMYELINATING POLIRADICULONEUROPATHY PATIENT

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Background: Chronic Inflammatory Demyelinating Poliradiculoneuropathy (CIDP) is an uncommon disease and affected peripheral nerves and nerve roots, characterized by slowly progressive weakness and a loss of sensation in the legs and arms. The course of CIDP widely varied, some may have spontaneous recovery, while others have partial recovery with relapses in between. Rehabilitation programs are an important component of the care of patients with CIDP. **Case:** A 9-year-old girl patient was unable to stand for more than 10 s, fell while walking and must be carried by her father when she went to school. Physical examination showed muscle weakness of all limbs with manual muscle strength (MMT) 2 for left wrist and fingers; 5 and 4 for hips and knees respectively and MMT 0 for ankles and toes muscles. Deep tendon reflexes were decreased. Radiology findings demonstrated osteoporosis and slight thoracic scoliosis. Rehabilitation programs include ultrasound modality, stretching and strengthening exercise, were given gradually depend on the patient condition, and ankle foot orthosis (AFO) to improve ambulation. MCP knuckle bender for left hand was prescribed to improve hand function. **Conclusion:** The rehabilitation efforts for this patient should be designed in accordance with the course of the disease. The goals were to prevent deformities and to enhance optimal function.

0522PP059

THE IMPORTANCE OF KAFO WITH ORTHOPAEDIC SHOES TO STABILIZE WALKING IN PATIENT WITH BLOUNT DISEASE

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Background: Blount Disease is a progressive children's disease that cause varus angle of the proximal tibia. It is also associated with an internal torsion of the tibia and characterized with endochondral ossification of the medial tibial epiphysis. **Case:** A 4-year-old boy with "O" shape of the left leg since the age of 2 years. The patients was prescribed a programs including education about the disease, the aggravating factors such as obesity, KAFO with orthopaedic shoes, dietary management with balance nutrition for obesity and play therapy exercise. **Results:** The patient performed a 15 m walking test before and after using the brace. The result before using the brace is 23 s and after 2 weeks using the brace is 19 s. The patient was evaluated every 3 months. Using KAFO with Orthopaedic Shoes and reducing body weight may improve the speed of walking in patient with tibia vara. **Conclusion:** Using KAFO with orthopaedic shoes in patient with Blount's Disease which had tibia vara will increase the walking speed.

0522PP061

REHABILITATION PROGRAMS IN C2 TETRAPLEGIA AIS A: A CASE REPORT

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Purpose: Comprehensive treatments and rehabilitation medicine programs allow many people with a Spinal Cord Injury (SCI) to lead productive and independent lives. **Case:** A case of C2 tetraplegi AIS A in 54-year-old male is presented. His problems are upper and lower limbs weakness after fell down from 2.5 m height. There was an open wound at his head but no loss of consciousness reported. Physical examination revealed no motor preserved and deficit sensory at level C3 below. Unilateral facet dislocation C3–4 in radiographic examination was found. Comprehensive rehabilitation program consist of immobilization, log rolling, active breathing exercise, passive ROM exercise for upper and lower limbs. He underwent Crutchfield traction for 2 weeks and then laminoplasty. The following programs were gradual mobilization, sitting balance, active assistive ROM, and endurance exercise, electrical stimulation, appropriate TLSO, and psychological support. **Results:** The patient is still in ongoing management program. There were improvement on both motor and sensory function of upper and lower limbs, and diagnosed as AIS C. **Conclusion:** Exercises, modality and spinal orthoses help him mobilize from lying to sitting and avoid complication of prolong immobilization. Psychological support plays important role to achieve good compliance for long term management and follow-up.

0522PP062

STROKE HEMIPLEGIA ALTERNANS: A CASE REPORT

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Purpose: To show the management of dysphagia using electrical stimulation application. **Case:** A 52-year-old male who had a second stroke attack (thrombotic infarction) due to hypertension. At first attack, he got slight weakness at right body and second attack after 4 months. The brain damaged at the same cerebral area. He had weakness on right body, left side central type facial palsy (alternans), dysarthria, dysphagia and hypesthesia. Dysphagia and dysarthria were more prominent than other disturbances; he could not swallow anything including the saliva. Electrical stimulation therapy was performed on

hyoid muscle four sessions, and an h each session. The swallowing disturbance was reduced after 4 time's electrical stimulation; he didn't complaint about difficulty swallowing especially in swallowing saliva. Electrical stimulation study for stroke with dysphagia stimulated muscles tone, indicated by the reduction of swallowing time required. *Conclusion:* Electrical stimulation is one of the modality that we can choose for management of dysphagia.

0522PP063**COMPREHENSIVE TREATMENT OF TYPE I OSTEOGENESIS IMPERFECTA: A CASE REPORT**

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Background: Osteogenesis imperfecta (OI) is a metabolic bone disorder which is caused by mutation in type 1 collagen characterized by fractures following minor trauma and often associated with development of bony deformities. OI is classified into 8 types, based on image, genetic, and clinical manifestation. Treatment is directed toward preventing or controlling the symptoms, maximizing independent mobility, and developing optimal bone mass and muscle strength. *Case:* A 13-year-old boy, referred from orthopedic outpatient clinic with OI post Sis-Kebab procedure. The chief complaint was inability to walk after he tripped over his other leg and fell down while walking with a walker. He has had a Sis-Kebab operation twice at his left leg. He complained of pain at his left knee caused by the nail which extruded into the soft tissue (VAS 4–5). Other clinical findings are blue sclerae, amelogenesis imperfecta, atrophy and weakness at the lower extremities, and a 4 cm leg length discrepancy. The Rehabilitation program consist of active ROM exercise, isometric exercise for upper and lower extremities, axial loading for his lower extremities, ambulation with double HKAFO with ischial weight bearing, training in energy conservation and strategies in doing ADL safely and efficiently, paracetamol for pain relief, and education regarding activities to avoid. *Results:* He is able to stand and learns to walk with less pain. *Conclusion:* A team approach, including Rehabilitation Medicine, is important to manage patient with OI to achieve independent ambulation and ADL.

0522PP064**DEVELOPMENT AND VALIDATION OF A NEW SPASTICITY EVALUATION SYSTEM FOR SPASTICITY IN UPPER LIMB OF PATIENT WITH STROKE**

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Purpose: To develop and validate a new spasticity evaluation system for spasticity in upper limb of patient with stroke. *Materials and Methods:* We injected botulinum toxin type A (Botox) 200 units into the Pronator Teres and Biceps Brachii muscles a patient with spastic quadriplegia. The spasticity evaluation system included a rotational mechanism, an AC servo motor, a motion controller, position sensors, custom-made torque sensors, and a safety device. It was designed to surpass the clinical manual assessments by combining both constant speed and constant torque controls. The system could stretch the patient's forearm for supination movement. The quantitative index in supination, passive stretching angle was formulated. The changes of spasticity after Botox injection were assessed by the modified Ashworth scale and our equipment. *Results:* After Botox injection, the difference

between 1 week and 4 weeks of passive stretching angle was 3.3 degree. After 6 weeks, the angle revealed a gradually decrease. The change at 6 weeks and 12 weeks were 8.0 and 16.6 degrees, respectively. After 16 weeks, the angle remained approximately at value of 12 weeks. The modified Ashworth scale of forearm pronation showed a slight regression from 3 to 4 after 6 weeks. It indicated that the effects of Botox gradually disappear after 6 weeks and the spasticity returned to baseline in 12 weeks. *Conclusion:* We develop and validate a novel evaluation system for spasticity in upper limb of patient with stroke. This system provides objective and quantifiable information for measurement of spasticity to supplement clinical manual examination.

0522PP065**IMPROVED BLADDER EMPTYING IN CYSTOPATHY BY PUDENDAL AFFERENT STIMULATION IN DIABETIC RATS**

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Purpose: Diabetic cystopathy is typically manifested by bladder voiding dysfunction, and many patients are often refractory to pharmacologic, behavioral, and surgical treatment. We sought to determine whether electrical stimulation of the sensory branch of the pudendal nerve could engage an augmenting reflex and thereby improve bladder emptying in a diabetic animal model with cystopathy. *Materials and Methods:* The efficiency of bladder emptying with electrical stimulation of the sensory branch of the pudendal nerve under different stimulation intensities was measured in rats at 8 or 18 weeks after the induction of diabetes by streptozotocin. *Results:* The voiding efficiency (VE) was reduced from 74%±4% to 30%±8% in rats with diabetes for 8 weeks and from 73%±6% to 20%±6% in rats with diabetes for 18 weeks. Electrical stimulation at lower intensities (0.025–0.05 mA) applied to the pudendal sensory nerve did not affect the VE in rats with diabetes for 18 weeks but increased the VE in rats with diabetes for 8 weeks. Subsequently, when the stimulation intensity was elevated to 0.1–0.3 mA, the VEs in rats with diabetes for both 8 and 18 weeks increased to 40%–50%. The increase in the VE was mediated by increases in the duration of bladder contractions. *Conclusion:* The results of the present study are consistent with the essential role of pudendal sensory feedback in efficient bladder emptying, and electrical activation of the pudendal nerve afferents was efficient in restoring the voiding function in a diabetic animal with cystopathy. This could provide an approach to improve bladder emptying in diabetic patients with voiding dysfunction.

0522PP066**PENILE PLETHYSMOGRAPHY IN PATIENTS WITH SPINAL CORD INJURY**

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Purpose: Penile Plethysmography (PP) is a tool for assessing changes in blood flow in the penis. The sympathetic nerves to the penis originate from the T10 to L2 spinal segments, and it is related to penile blood flow regarding erectile dysfunction. We investigated the relationship between PP and preservation of the thoracic sympathetic trunk outflow in patients with spinal cord injury. *Materials and Methods:* We enrolled 25 males with spinal cord injury. The mean age was 45.8 years (range 18–74 years). The neurological

levels of spinal cord injury were included from C3 to L2 levels. The patients were classified into two categories according to the injured level (above T9 and below T10 levels) and completion (AIS A and B-D). We measured both brachial and ankle blood pressures, penile blood pressure to calculate the Ankle Brachial Index (ABI) and Penile Brachial Index (PBI). The PBI and ABI were measured using PP (Nicolet VasoGuard™). Interdependence of such variable quantities was assessed using independent samples *t*-test. **Results:** The mean PBI were 1.05 in above T9 group and 1.18 in below T10 group. PBI showed reliable difference between the two groups ($p=0.047$). However, there was no significant difference between the two groups regarding completion of spinal cord injury. **Conclusion:** The PBI has a positive relationship with the preservation of thoracic sympathetic trunk outflow. PP would be useful to evaluate quantitative penile blood flow in patients with spinal cord injury. Further studies related to the actual erectile function and relationship with drug provocation effect in patients with SCI is required.

0522PP067

COMPARISON OF THE URODYNAMIC PARAMETERS AT THE TIME OF VESICO-URETERAL REFLUX IN NEUROGENIC BLADDER

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Purpose: The purpose of this study is to compare the parameters of urodynamic study at the time of vesicoureteral reflux (VUR) in overactive and underactive bladder with VUR. **Materials and Methods:** Thirty-four spinal cord injury patients with VUR which was confirmed by cystourethrography (29 men, 5 women; mean age 46.4±17.7; mean duration of illness 95±88 months) were enrolled. According to the urodynamic study, 16 patients were included in the overactive group and 18 were in the underactive detrusor group. We made statistical comparisons between the two groups by using the SPSS 18.0 non-parametric test for each urodynamic parameters: the onset time of VUR and the pressure of detrusor, bladder capacity and compliance at maximum cystometric capacity or leak-point pressure. **Results:** The pressure of detrusor, bladder capacity and detrusor compliance of patients with overactive detrusor at the point of VUR were 16.6±19.0 mmH₂O, 115.0±78.2 ml and 39.2±62.8 ml/mmH₂O, respectively. The parameters in patients with underactive detrusor were 9.2±9.3 mmH₂O, 252.5±172.0 ml and 62.6±123.0 ml/mmH₂O, respectively. The detrusor pressure, bladder capacity and compliance of patients with overactive detrusor at maximum cystometric capacity were 61.2±28.0 mmH₂O, 245.7±117.0 ml and 11.8±18.0 ml/mmH₂O; 25.1±18.9 mmH₂O, 435.3±148.9 ml and 33.7±36.9 ml/mmH₂O, respectively in patients with underactive detrusor. The differences between the two groups at the point of VUR were statistically significant in bladder capacity and compliance ($p<0.05$). The relationship between maximum cystometric capacity and the detrusor pressure, bladder capacity and compliance at the point of VUR shows no significant difference. **Conclusion:** We concluded that VUR in overactive detrusor is developing at the lower filling volume compared with underactive detrusor.

0522PP068

THE EFFECT OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON WRITING IN DYSGRAPHIA

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Purpose: To investigate the effect of transcranial Direct Current Stimulation (tDCS) on writing function in dysgraphia. **Materials and Methods:** An A-B design was used in this study. A 47-year-old male stroke patient with Gerstmann's syndrome presenting dysgraphia 7 months after parietal infarction was treated with word writing training for 10 sessions in phase A and writing training coupled with tDCS for another 10 sessions in phase B. The anodal tDCS was placed over left P3 (International EEG 10–20 system), the cathodal tDCS placed over right shoulder; 20 min a day. Writing evaluations were implemented before and after each phase using Psycholinguistic Assessment in Chinese Aphasia (PACA). **Results:** The language assessment before writing training showed impairment in orthographic output lexicon and orthographic output buffer. There was no significant change in dictation, writing names of pictures and writing of personal information after writing training. The accuracy of dictation, improved from 13/35 to 26/35, writing names of pictures (from 8/35 to 25/35) and writing of personal information (from 16/32 to 31/32), Chinese character delayed-copy (from 6/20 to 18/20) were significantly improved after writing training coupled with tDCS ($p<0.05$). Writing errors such as substitution and omission of Chinese character components and stroke omission were significantly reduced ($p<0.05$). **Conclusion:** Anodal tDCS over the left parietal lobe can improve writing ability in dysgraphic patients with Gerstmann's syndrome with repairment of the orthographic output lexicon and the orthographic output buffer. tDCS may provide a new tool for dysgraphia rehabilitation.

0522PP069

CHANGES OF RADIOLOGIC INDICATORS WITH CUSTOM-MADE RIGID FOOT ORTHOSIS IN CHILDREN WITH PES PLANUS

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Purpose: To identify the therapeutic effect of the custom-made rigid foot orthosis (RFO) in children with pes planus. **Materials and Methods:** Medical record of 28 children were reviewed retrospectively who had been diagnosed as pes planus, fitted with RFO and had more than two consecutive radiologic studies. The anteroposterior talocalcaneal angles (APTCA) and lateral talocalcaneal angles (LTTCA), the lateral talometatarsal angles (LTTMA) and the calcaneal pitch (CP) of both feet were measured to evaluate the foot alignment. Children were divided into two groups by age. Pes planus was diagnosed when either of the feet had greater than 4 degrees valgus of resting calcaneal stance position angle and indicators showed greater than 40 degrees in APTCA and LTTCA, greater than 13 degrees in LTTMA, lesser than 35 degrees of CP. The children were then fitted with a pair of RFO and recommended to walk with heel strike and reciprocal arm swing to normalize gait pattern. The follow up clinical evaluation with radiologic study was done after 3 month. The changes in radiologic studies were compared with statistical analysis. **Results:** With RFO, all radiologic indicators changed toward corrective direction. There were statistically significant improvements in anteroposterior TCA in children over six years old and calcaneal pitch in both groups. ($p<0.05$) The mean value of anteroposterior TCA reduction was 1.1 degree and calcaneal pitch increase was 3.3 degree in older group and 2.9 degree in younger group. **Conclusion:** This study showed that RFO is effective in the treatment of children with pes planus regardless of age. The prospective evaluation with radiographic study at regular intervals in comparison with the age matched children would be necessary to confirm the therapeutic effect of RFO in children with pes planus.

0522PP070

REHABILITATION OF PATIENT WITH LEFT BELOW KNEE AMPUTATION AND RIGHT HEMIPLEGIA: CASE REPORT*Jinwan Seong, Dongseok Yang**Department of Physical Medicine & Rehabilitation, Ulsan University Hospital, Jeonhwadong, Dongku, Ulsan, Korea)*

Purpose: To report that an improvement of walking ability of a patient with left below knee amputation and right hemiplegia due to left basal ganglia hemorrhage. **Case:** The patient was a 46-year-old man. 35 years ago, he suffered the left below knee amputation due to a traffic accident. He wore left foot prosthesis and learned to walk without supports. On May 27, 2009, he developed left basal ganglia hemorrhage. For the purpose of rehabilitation to regain the ability to walk, he was admitted to Ulsan university Hospital at next day. At the time of admission, his right upper and lower extremities weakness was severe. He required minimal assistance to come to sit and maximum assistance to maintain a standing position. A verrucous hyperplasia, oblique cutted state at tibia and fibular bone, contact dermatitis were happened at left previous amputation site. Furthermore, a cutted fibular bone was longer than a tibia bone and the shape of amputation site was nearly fish-mouth. Therefore, the previous foot prosthesis was of no use for him to walk. For regaining the ability to walk, he was undergone a revision operation at the previous left amputation site and remaking of foot prosthesis. After a revision operation and rehabilitation program used by remade foot prosthesis about 1 year, finally, he was able to functional ambulation with single cane. The initial MBI score was 36 points, however, the last one was improved to 49 points. It is represented that the patient's ADL and functional ability was improved.

0522PP071

CLINICAL EFFECTS OF A COMBINED PROTOCOL OF LOW-FREQUENCY REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION AND AN INTENSIVE REHABILITATION PROGRAM ON GAIT AND LOWER-LIMB MOTOR FUNCTION IN PATIENTS WITH POSTSTROKE HEMIPARESIS*Yutaka Yoshida¹, Haga Yusuke¹, Hiroaki Harashima¹, Shigeto Watanabe¹, Akiko Ono¹, Miki Kojima¹, Toshihiro Sato¹, Eri Ikehara¹, Satoshi Miyano¹, Wataru Kakuda², Masahiro Abo²**¹Department of Rehabilitation Medicine, Tokyo General Hospital, Tokyo, ²Department of Rehabilitation Medicine, The Jikei University School of Medicine, Tokyo, Japan*

Purpose: Combined protocol of low-frequency rTMS and intensive occupational therapy (OT) has been reported to be useful for patients with upper-limb poststroke hemiparesis by our group. However, to our knowledge, the combination of low-frequency rTMS and physical therapy (PT) including gait training has not been reported. Therefore, the aim of this present study was to clarify the safety and feasibility of our combined protocol of low-frequency rTMS and OT/PT and to elucidate the effects of the protocol on gait and upper- and lower-limb motor function in patients with poststroke hemiparesis. **Materials and Methods:** The subjects were 132 patients (mean age: 61.7±11.5 years) with hemiparesis after stroke. During a 15-day hospitalization, 22 treatment sessions consisting of low-frequency rTMS (20 min), face to face treatment (60 min), and self training (60 min) were provided to all patients. The face to face treatment consisted of both individual OT and PT. Both gait and upper- and lower-limb motor functions were evaluated before and after the protocol. **Results:** All patients completed the protocol without any adverse effects. After completion of the protocol, the scores of the 10 m maximum walking test, the timed-up-and-go test, the dynamic gait index, and the functional balance scale improved

statistically. In addition, the Fugl-Meyer assessment and the Wolf Motor Function Test showed significant improvements in upper-limb motor function. **Conclusion:** Our combined protocol including low-frequency rTMS and intensive OT/PT is a safe and useful rehabilitation approach for patients with poststroke hemiparesis.

0522PP072

CORRELATIONS OF SIT-TO-STAND MOTION CHARACTERISTICS AND WALKING ABILITY IN STROKE PATIENTS WITH FALLS*Masahito Murakami, Yoshitaka Otani, Keisuke Itotani, Noriaki Maeda, Junichi Kato**Department of Physical Therapy, Faculty of Rehabilitation, Kobe International University, Department of Physical Therapy, Faculty of Rehabilitation, Hyogo Prefectural Rehabilitation Center at Nishi-Harima, Department of Sports Rehabilitation, Division of Physical Therapy and Occupational Therapy Sciences, Graduate School of Health Sciences, Hiroshima University, Department of Internal Medicine, Hyogo Prefectural Rehabilitation Center at Nishi-Harima, Japan*

Purpose: The aim of this present study was to establish a standard for the prediction of falls by using information available for stroke patients with and without falls by assessing sit-to-stand (STS), 6 min walking test, 10 m gait speed and Timed "Up & Go" test (TUG). **Material and Methods:** Participants included 14 stroke patients (10 male and 4 female; 61.0±10 years) hospitalized stood still and performed STS motion on two force plates (G-620, Anima Co Ltd, Japan). And the time required STS motion was calculated from the vertical ground reaction forces. STS motion was divided into three phases and the vertical ground reaction forces were calculated for each phase. In addition, postural sway after STS motion used a coefficient of variance of the vertical ground reaction forces. 6 min walking test and 10 m gait speed indices of gait ability. TUG indices of balance ability. **Results:** As a result, the time required STS motion was significantly longer in fallers than in non-fallers. And CV after STS motion was larger in fallers than in stroke non-fallers. The correlation coefficients for the variables show a strong correlation between CV and 6 min walking test, 10 m gait speed and TUG. **Conclusion:** These results suggest that STS motion may be useful measure for identifying stroke patients at risk for falls. Postural sway after STS motion is closely related to gait and balance ability in stroke patients.

0522PP73

DEEP VEIN THROMBOSIS IN INTRACTABLE COMPLEX REGIONAL PAIN SYNDROME*Sam-Gyu Lee, Jeong-Hoo Lee, Min-Keun Song, Hyo-Jeong Seon, Hyun-Sik Yun, Jae-Young Han, In-Sung Choi**Department of Physical & Rehabilitation Medicine, Research Institute of Medical Sciences, Center for Aging and Geriatrics, Regional CardioCerebroVascular Center, Chonnam National University Medical School & Hospital, Gwangju City, Republic of Korea*

Purpose: To report our therapeutic experience on deep vein thrombosis (DVT) in a patient with intractable Complex Regional Pain Syndrome (CRPS). **Case:** A 57-year-old woman complained of severe pain and aggravated swelling in her left lower leg. The patient had been diagnosed as CRPS type I about 28 months ago. She had taken rehabilitative managements for about 2 years. In laboratory findings, fibrinogen degradation products (FDP) and D-dimer were within normal range. Lymphoscintigraphy was non-specific. The left lower extremity venous CT-angiography (VCTA) confirmed the DVT at proximal peroneal vein and distal popliteal vein, which was conducted for the evaluation of long-term immobilization and continuous edema of left lower extremity. We managed her to take a bed rest and elevate left leg with elastic bandage compression

in early stages. Heparinization by intravenous injection was done for 1 week and she took a warfarin for 2~5mg/day to adjust dose as target INR 2.0~3.0. Follow-up left lower extremity VCTA after 1 month of medical treatment, there was no definite evidence of DVT. **Conclusion:** Intractable CRPS patients have the possibilities to develop DVT because of immobilization associated with severe pain. Active evaluation and early management for the edema, that is easy to be overlooked and common symptom in both conditions, will be needed.

0522PP074

COST OF OUTPATIENT STROKE REHABILITATION IN MALAYSIA

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Purpose: Cerebrovascular disease is the fifth most common cause of mortality and accounts for 7% to 12% of the total burden of disease in Malaysia. Majority of studies have focused on medical cost related to inpatient care rather than outpatient or community care; much less is available on travel and out-of-pocket from non-medical costs. We sought to investigate the direct cost of and resources for outpatient stroke rehabilitation. **Materials and Methods:** Data was collected from 49 patients with acute first-ever stroke who attended outpatient stroke rehabilitation sessions. A self-constructed questionnaire was used to determine demographic data, stroke characteristics and outpatient rehabilitation cost incurred by patients. Those costs were divided into medical cost (charges for rehabilitation physician consultation and therapy sessions), and non-medical cost (attendant care, traveling for hospital visits, out-of-pocket, and aids/ adaptation). **Results:** The mean age was 62.8 years, and 57.1% were male, and 41 (83.7%) patients had an ischemic stroke. Mean length of stay was 14.3 days. Mean National Institutes of Health Stroke Scale score at admission was 9.4 and 83.7% of patients were found to be hypertensive. Of all patients, only 18.4% had higher education, and 49% were employed before stroke. Total average cost was MYR 1696 (166–14,234), out of which, 86% was spent on non medical cost. More than half (69.4%) of the patients went for community therapy; spending an average of MYR 45.4 per session. Initial NIHSS score was the main determinant of the costs of out-patient stroke rehabilitation ($p < 0.001$). **Conclusion:** The direct cost of stroke incurred by patients in this study was found to be low, with a significant amount spent on non-medical causes as compared to the direct medical cause (stroke).

0522PP075

FURTHER EVALUATION OF HABILITATION PROGRAMS OF A CHILD WITH CEREBRAL PALSY AFTER SECOND STEM CELL TRANSPLANTATION

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Background: Cerebral palsy is a disorder in development of movement and posture. It limits physical activity which is attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. Stem cell transplantation (SCT) is a proposed treatment for the disease especially when “state of the art” therapy is not effective. **Case:** A boy, age 5 years and 7 months old, was previously diagnosed with a spastic diplegic cerebral palsy. He received two SCT and habilitation programs. Prior to SCT programs he could only crawl, required support to stand up and babbling. This case study uses Gross Motor Function Classification System (GMFCS), the Denver scale, and Early Language Milestone (ELM) scale to assess the effectiveness of the SCT treatment. After the first SCT,

there are improvements in all three scaling system result. GMFCS level changes level IV to level III. In terms of the Denver II, the gross motor sector improves from 9 months to 12.5 months; the fine motor sector improves from 24 months to 31.5 months; the social personal sector from 17 months to 29 months; the language sector from 4.5 months 18 months. For ELM scale, there are improvement in Auditory Expressive (AE) from 4.5 months to 13 months and global language from 3 months to 7 months. After the second SCT and continued habilitation programs, the three scaling system results show further signification improvements. GMFCS improves from level III to level II. For Denver II, in gross motor sector, the child is able to walk and run independently; for fine motor and social personal sector, the child is able to move the thumb and made vertical line; for language sector the child is more alert to voice. As for ELM scale, improvements are observed in Alert to Voice (AR) and global language from 7 months to 12 months. **Conclusion:** Beside showing the effectiveness of SCT treatment, we also found that habilitation programs helped to stimulates new cells to become functional cells and in assisting the migration of the new cell into the injured areas.

0522PP076

MEASUREMENT RELIABILITY OF SPIKING MOVEMENT KINEMATICS IN VOLLEYBALL PLAYERS

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Purpose: Spiking is an important scoring technique in volleyball competition, which involves large overhead shoulder movement and could predispose athletes to higher risks of shoulder pathology. However, studies describing spiking kinematics are scarce. The aim of this study was therefore to describe the movement pattern and to determine the measurement reliability of the spiking kinematics in volleyball players. **Materials and Methods:** We recruited 10 asymptomatic college volleyball players for this study. An electromagnetic tracking system LibertyTM was used to record kinematics of the scapula, humerus and trunk during spiking. The spiking movement was performed indoors with the ball hung from the ceiling. Five repetitions of each spiking movement (cross body and straight forward) were performed for each session, and two sessions of testing were conducted during the same day. An intra-class correlation coefficient (ICC) model was used to calculate the measurement repeatability. **Results:** Before ball contact, shoulder elevated with external rotation and the scapula rotated upwards and tilted posteriorly. A large shoulder horizontal adduction was observed during the follow through stage. Measurement reliability of the spiking kinematics was good to excellent for shoulder rotations in sagittal and frontal planes and in all directions of scapular and trunk movement with ICCs 0.800–0.996. **Conclusion:** With clear definitions of movement kinematics and testing procedures, the within day reliability reached good to excellent for measuring spiking kinematics in volleyball players. A large shoulder horizontal adduction might put volleyball players in high risks of shoulder impingement.

0522PP077

REHABILITATION PROGRAM ON BILATERAL HEMIMELIA TIBIA: A CASE REPORT

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Purpose: Hemimelia tibia or longitudinal deficiency of tibia is a congenital limb deficiency where the whole tibia bone is absent. It occurs in 1 per 1,000,000 births. Clinical picture includes varus foot,

a short leg, and an unstable knee, or ankle, or both. The treatment of choice is disarticulation of the knee, but the use of orthotics or prosthetics without surgical intervention is also an option in treatment. *Materials and Methods:* A 16-month-old boy diagnosed with bilateral hemimelia tibia. Both of his tibial bones are absent, known by his parents since birth. The parents refused the disarticulation of the knee. The patient was already able to crawl, to sit, and started learning to stand. We gave the patient bilateral knee ankle foot orthosis with ischial weight-bearing, patten bottom, and thigh cuff. *Results:* The patient is still adapting with the orthosis and cannot ambulate with the orthosis yet. We hope by the time, he adapt to the orthosis and able to walk independently using the orthosis. *Conclusion:* We can manage patient with bilateral hemimelia by using custom made orthosis without surgical intervention.

0522PP078

A PRELIMINARY STUDY ON EXPLORING MOTOR DEVELOPMENT OF VERY LOW BIRTH WEIGHT PREMATURE BABY IN PRESCHOOL AGE

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Purpose: The main purposes of this study are to 1) understand the motor development of very low birth weight premature baby in preschool age, and 2) analyze the possible factors affecting motor development on these children. *Materials and Methods:* This is a cross-sectional study. A convenient sample of 48 preschool-aged children born prematurely with very low birth weight, 27 boys and 21 girls (mean age 3.6 years), were recruited. All participants' motor performance was evaluated by Peabody development motor scale (PEMS-II), and their visual functions were examined by pediatric ophthalmologists. To understand the related factor of motor development, the basic data of the participants including sex, birth weight, gestational age, complications of prematurity were collected. One sample *t*-test was used to compare the motor development of our participants to the norm of PDMS-II. Independent *t*-test was used to compare the motor development in children with different related factors. *Results:* The development of gross motor, fine motor and global motor in the study group were significant lower than the norm of PDMS-II. The motor development on the group without intraventricular hemorrhage (IVH) or with grade I of IVH was significant better than the group with grade II and III of IVH. The motor performance on the group with normal visual acuity and mild abnormal was better than the group with moderately and severely impaired visual function. *Conclusion:* We concluded that the motor development of preschool children born prematurely with very low birth weight was significantly more delay than children of the same age. The factors related to motor development delay in these prematurely children are IVH, and visual functions.

0522PP079

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH HAMSTRING TENDON OR PATELLAR TENDON AUTOGRAFT EXHIBIT DIFFERENT MUSCLE STRENGTH

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Purpose: We hypothesize long term results of ACL reconstruction with hamstring auto-graft or patellar tendon auto-graft, isokinetic performance will be the same. The purpose of the study is to quantify and interpret the isokinetic properties between two auto grafts. *Material and Methods:* Ten patients were included in this study. There are five subjects in patellar tendon auto-graft group and another five patients in hamstring tendon auto-graft group. Lysholm score, anterior drawer test and Lachman test were evaluated. Isokinetic contraction were performed at angular velocity of 60 d/s, 120 d/s, 180 d/s, followed by maximum voluntary isometric contraction at 45 degrees and 90 degrees of knee flexion. *Results:* There was a statistic significant difference between normal knee and reconstructed knee at angular velocity of 180 degrees concentric knee flexion in hamstring tendon auto-graft group. The Z value was -1.88 ($p=0.048$) There was a statistic significant difference at angular velocity of 120 degrees concentric knee extension in patellar tendon auto-graft group. The Z value was -1.91 ($p=0.042$). There was a statistic significant difference in isometric contraction at 90 degrees of knee extension in patellar tendon auto-graft group. The Z value was -2.02 ($p=0.04$). *Conclusion:* Deficiency in knee flexion muscle strength after harvesting hamstring tendon and in knee extensor muscle strength after harvest quadriceps tendon may persist longer than it was expected.

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0522PP080

REHABILITATION FOR A PATIENT WITH ANTI-N-METHYL-D-ASPARTATE RECEPTOR ENCEPHALITIS: A CASE REPORT AND LITERATURE REVIEW

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Background: Anti-N-methyl-D-aspartate receptor (anti-NMDAR) encephalitis is characterized by psychosis, memory deficits, seizures, language disintegration, catatonia, dyskinesia, and autonomic and breathing instability. The patient is usually hospitalized for 3–4 months in acute stage, followed by months of rehabilitation. Substantial recovery is observed in more than 75% of patients in inverse order of symptoms. *Case:* We reported a 3 year- and 2 month-old girl with initial presentation of personality change, followed by irritable crying, headache, unsteady gait, vomiting and involuntary movement in successive order. Meningoencephalitis was impressed and the etiologic investigation showed negative results for infection and space occupying lesion of brain. CSF analysis revealed pleocytosis with lymphocyte predominant. NMDAR antibody analysis was positive. For the severe dystonia and irritability, the patient was sedated for 6 months. She responded poorly to IVIG treatment, plasmaphoresis, or methylprednisolone. Cyclophosphamide and rituximab were given instead. Dystonia or involuntary movement did not aggravate since then. Psychiatrists were consulted for rehabilitation. Seven months after the onset, the patient improved gradually with less dystonic posture and involuntary movement. Facilitation, posture and strengthening training were applied, and her motor function improved to independent ambulation. The patient was able to respond to simple verbal order one year after the onset of the disease. Activity of daily living like heavy hygiene is still dependent. *Conclusion:* For an unknown cause of encephalitis with some characteristic symptoms, anti-NMDAR encephalitis should be suspected. Physical and behavioral rehabilitation are usually necessary for these patients.

0522PP081

CERVICAL SCIWORA IN AN 8-YEAR-OLD CHILD: CASE REPORT

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Background: Motor vehicle-related injuries are the most common cause of spinal cord injury (SCI) in children. As there are differences in the anatomical, physiological and the developmental stages of the spinal column compare to adult, children, especially younger than 8 years have significantly higher incidence of SCIWORA (spinal cord injury without radiologic abnormality), delayed onset of neurological deficit, and more neurological complete lesion than those of older children and adults. **Case:** We presented a case of an 8-year-old girl who was involved in a motor vehicles accident presented with delayed complete cervical SCI with negative finding on plain spinal X-ray and CT scan of brain and spinal cord. However, MRI showed spinal cord edema from C5 to C7 with interspinous ligamentous injury at C6/C7 and C7/T1 levels. She was treated conservatively with cervical orthosis and had undergone 2 month of inpatient intensive rehabilitation and followed by outpatient physical and occupational therapy. After 6 month of injury, she showed minimal neurological improvement. **Discussion:** Several studies related to the outcome in rehabilitation of SCIWORA in children showed several factors influenced the neurological recovery and functional outcome. **Conclusion:** Besides thorough history and clinical assessment, MRI plays an important role in diagnosing SCIWORA and has a significant prognostic value and rehabilitation outcome.

0522PP082

MEASUREMENT METHODS FOR PROPRIOCEPTION PERFORMANCE OF SCAPULATHORACIC JOINT

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Purpose: Shoulder dysfunction is often accompanied by scapular dyskinesis and proprioception deficits. However, previous studies of the shoulder proprioception focus on the glenohumeral (GH) joint; data on the proprioception performance of the scapulothoracic (ST) joint are limited. Therefore, the purposes of this study were to establish the testing method for measuring scapular proprioception and to verify its measurement reliability; and to compare the scapular proprioception between dominated and non-dominated arms in healthy individuals. **Materials and Methods:** Ten healthy subjects participated in this study. Scapular proprioception was measured as the joint reposition errors in four scapular movements: elevation, depression, protraction and retraction, with arm supported and unsupported. The Liberty electromagnetic tracking system was used to collect the joint kinematics. The measurement reliability was calculated using intra-class correlation coefficients (ICC). Paired *t*-test was used to compare the scapular joint reposition errors between dominated and non-dominated arms. The level of significance was set at $\alpha=0.05$. **Results:** The reliability was good to excellent ($ICC>0.8$) for measuring scapular reposition errors when the arm was supported. The joint reposition errors were not significantly different between dominated and non-dominated arms ($p>0.05$). **Conclusion:** With carefully defined procedures, scapular proprioception performance could be measured reliably during scapulothoracic movement, and the measurement repeatability improved when the arm was supported during the test. Handedness did not influence the scapular proprioception in healthy young individuals.

0522PP083

REHABILITATION FOR A PATIENT WITH NON OPERATIVE POST STROKE ARTERIOVENOUS MALFORMATION

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Introduction: Arteriovenous malformation (AVM) consists of a tangle of dilated vessels that form an abnormal communication between the arterial and venous systems. Arteries carry oxygen rich blood away from the heart to the body's cell; veins return oxygen depleted blood to the lungs and heart. The presence of an AVM disrupts this vital cyclical process. Arteriovenous malformations occur in all parts of the cerebrum, brainstem, and cerebellum (and spinal cord), but the larger ones are more frequently found in the central part of a cerebral hemisphere. When hemorrhage occurs, blood may enter the subarachnoid space, since most AVMs lie within cerebral tissue, bleeding is more than likely to be intracerebral as well, causing a hemiparesis, hemiplegia, and so forth, or even death. **Case description:** Patient was 27 years old, female referred from neurology department. The patient complained weakness on the left side and could not stand. Physical examination showed muscle strength of left extremities 0, poor balance, coordination and proprioception. The rehabilitation problems of this patient were mobilization, activities of daily living, occupational and psychosocial. Rehabilitation program consist of strengthening exercise, gradual mobilization to standing and walking, balance exercises, fine motor exercises and increasing cardio-respiratory endurance with treadmill and ergocycle. **Discussion:** The patient is a young female in the productive age, she work as a teacher in elementary school. She has good compliance to do the exercise that we give. Right now she can walk independently with hemiparetic gait and still have endurance problem. We continue to give her endurance exercise and gait training to improve her gait pattern.

0522PP084

EFFECTS OF EEG BIOFEEDBACK IN THE TREATMENT OF ATTENTION DEFICITS IN CHILDREN WITH CEREBRAL PALSY: A PRELIMINARY STUDY

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Purpose: Cerebral Palsy (CP) often accompanies with other problems, such as attention deficits. EEG biofeedback has been used as a treatment for children with attention deficits or mental retardation. This research project was aimed to investigate the effects of EEG biofeedback in the treatment of attention deficits in children with CP. **Materials and Methods:** Twelve children with spastic CP associated with attention deficits (4–12 years) were randomly assigned to receive EEG-biofeedback training ($n=6$) or to the control ($n=6$) group. The EEG biofeedback program was carried out on the basis of 1 h/day, two days/week, for 10 weeks (a total of 20 sessions). The Continuous Performance Test (CPT) and Conners' Rating Scale (CRS) were used as the outcome measures. **Results:** The preliminary analysis revealed that EEG-biofeedback group showed a trend of improvement in the CRS subscores (psychosomatic problem, impulsivity-hyperactivity) than control group, however, it did not achieve significant differences between two groups. For CPT measures, EEG-biofeedback training induced greater gains in the hit-reaction time subscores than control intervention. However, there were no significant differences in the Omissions or Commissions subscores between the EEG-biofeedback and control groups. **Conclusion:** These findings may imply there was a trend of improvement in the attention problems for children with CP after EEG-biofeedback training, but more subjects are needed to draw a conclusion.

0522PP085

POST-OPERATIVE ASSESSEMENT OF ACTIVITIES OF DAILY LIVING AFTER SURGICAL REPAIR OF ARTHROSCOPIC ROTATOR CUFF

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Purpose: This study aimed to assess activities of daily living (ADL) after surgical repair of arthroscopic rotator cuff by the Quick Disabilities of the Arm, Shoulder, and Hand questionnaire (Quick DASH) compared to two conventional assessments in Japan, as the Japanese Orthopedic Association (JOA) score and the Barthel Index (BI). *Materials and Methods:* A 70-year-old man could not raise his right upper limb. This definite diagnosis using MRI was supraspinatus tear with fatty infiltration of the muscle belly. Arthroscopic rotator cuff repair using the single-row technique. After surgery (AS) to protect the repair, the arm and shoulder was immobilized in upper extremity orthosis for 6 weeks. The passive range of motion (ROM) into flexion, internal rotation and external rotation began the next day AS. The active ROM began 6 weeks AS. The assessments of ADL were assessed with Quick DASH, JOA score and BI every week from 6 weeks to 20 weeks AS. *Results:* At 6 weeks AS, Quick DASH was still 36 points because that this assessment kept high points about disability of “hard house work”. At the same time, JOA score was 91 points and BI was 100 points, these scores were enough as a good ADL. At 20 weeks AS, his disability about “hard house work” made improved so that all disability parts of Quick DASH became 0 point. On the other hand, the conventional two assessments were almost same compared to at 6 weeks, as that JOA score was 95 points and BI was 100 points. *Conclusion:* Quick DASH is an easy-to-use and sensitive to make an outcome of rehabilitation after surgical repair of arthroscopic rotator cuff combined with conventional assessments (JOA score and BI). This approach of Quick DASH could make also good benefits to save time and costs of out-patients in municipal hospital.

0522PP086

LEFT HEMIPARALEXIA IS NOT DERIVED FROM LEFT HEMINEGLECT BUT FROM DISCONNECTION OF NEURAL PATHWAY FOR VISUAL WORD FORM PROCESSING

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Purpose: To further clarify the two controversial explanations of left hemiparalexia (reading errors in left part of words), one is disruption of visual word form processing pathway, and the other is left hemineglect dyslexia. *Materials and Methods:* A patient KY, with infarctions in the splenium and the left ventral medial occipitotemporal area,

accepted a series of cognitive neuropsychological tests (e.g. reading Chinese characters presented tachistoscopically in central or left/right visual field (VF), lexical decision, gap direction (up, down, right, left) judgment of modified Landolt’s rings presented simultaneously in left and right VF, gender judgment of Chimeric faces (half male half female)) and multimodal MRI examinations (e.g. high resolution structural MRI, Diffusion Tensor Tractography (DTT) and functional MRI (fMRI)). *Results:* KY made reading errors in the left part of characters presented in central VF (left hemiparalexia) and in the whole characters presented in left VF (left hemialexia). Meanwhile, he performed abnormally in lexical decision. However, he made comparable correct gap direction judgment no matter the Landolt’s rings were in left or in right VF. Furthermore, KY made gender determination significantly basing on the left half face of chimeric faces. DTT revealed the disconnection of splenium pathway, critical for visual information transmission between two hemispheres. fMRI indicated characters in the left VF could not activate the visual word form area (in left lateral midfusiform cortex). *Conclusion:* All findings above are in consistence with the idea that left hemiparalexia is not derived from left hemineglect but from disconnection of visual word form processing pathway.

0521PP01

EFFECTS OF THE BALANCE CONTROL TRAINER IN HEMIPARETIC PATIENTS WITH CHRONIC STROKE

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Purpose: To investigate training effects on balance and gait ability using balance control trainer of lower extremity in hemiparetic patients with chronic stroke. *Materials and Methods:* Forty hemiparetic patients who can stand with moderate assist included in this study. All patients were injured at least 6 months. The experimental group ($n=20$) underwent training with the Balance Control Trainer for 20 min/day, 5 day/week for 4 weeks in addition to concurrent conventional rehabilitation training. The control group ($n=20$) underwent only the conventional rehabilitation training. The Balance Control Trainer is designed to measure weight shift as well as the knee flexion angle on the affected side, thus taking into consideration the vertical movements of the centre of gravity during the apple erasing game activity, which allows simultaneous visual feedback based on the data collected. Functional Ambulation Category (FAC), Berg Balance Scale (BBS), 6 meters walking test (6mWT), Timed Up and Go (TUG), and the Modified Barthel Index (MBI) were the tools used for evaluating balance and gait abilities. All study participants were assessed before training and 4 weeks of training. *Results:* At 4 weeks, statistically significant improvements were observed on 6mWT, TUG, and BBS testing in the experimental group, but only on 6mWT testing in the control group ($p<0.05$). After training period, subjects in experimental group showed more improvement than those in control group in 6mWT, TUG, and BBS. ($p<0.05$) *Conclusion:* We think the balance control trainer of lower extremity can be a useful tool for treatment of balance and gait ability in hemiparetic patients with chronic stroke.

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