

# ABSTRACTS

## ASIAN OCEANIA CONFERENCE OF PHYSICAL AND REHABILITATION MEDICINE

### MAY 16–19, 2008, NANJING, CHINA

## WELCOME TO NANJING

*Dear Colleagues,*

It is our great pleasure to welcome you to the 1<sup>st</sup> Asian Oceania Conference of Physical and Rehabilitation Medicine (AOCPRM) held in Nanjing, China during the flower season May 16–19, 2008.

With the theme “*to bring the traditional to the modern for a better quality of life for the disabled*”, this conference will provide an opportunity for exchange and communication among physiatrists and therapists. With more than 100 invited lectures from international leading experts and the submission of nearly 600 abstracts, this conference will be a grand event for international gathering in physical and rehabilitation medicine.

China is an ancient and promising country, and Nanjing is one of its most fascinating cities. The city was founded in 472 BC, and was the capital city of China for six dynasties. Nanjing is a poem that carries on for thousand years and a book to be read time and time again. You will enjoy not only the academic participation in this conference, but also a chance to explore Nanjing and the rich tradition it offers.

Please enjoy your stay at Nanjing.

*Sincerely yours,*  
**Jianan LI,**  
*Chairman,*  
*1<sup>st</sup> AOCPRM, 2008*

**Saturday May 17, 2008****07.30–08.30**

Effects of low frequency transcranial magnetic stimulation on visual spatial neglect: A pilot study	Song, Weiqun	ME001-01
Assessment and rehabilitation of human cognitive function	Luo, Yuejia	ME001-02
Selection of treatment modalities in children with dyskinetic and spastic cerebral palsy	Li, Xiaojie	ME002-01
Acupuncture and NGF in children with cerebral palsy of restoration function of plasticity of cerebra	Liu, Zhenhuan	ME002-02
Physiotherapy and rehabilitation for female pelvic floor dysfunction	Hua, Guiru	ME003-01
Recent development in the prevention, treatment and rehabilitation in osteoporosis	Li, Ling	ME003-02

**08.30–10.00**

Evaluation of patients with gait abnormalities in physical and rehabilitation medicine settings	Delarque, Alain	MS001-01
Evidence for EMG over MRI in diagnosing spinal stenosis	Haig, Andrew	MS001-02

**10.30–12.00**

Evaluation and treatment of spastic and non spastic tiptoeing in children	Evangelista, Teresita Joy	PS001-01
Can ITB therapy facilitate post-stroke functional motor recovery?	Francisco, Gerard	PS001-02
Managing the burden of spasticity following stroke	Ward, Anthony	PS001-03
Physical therapies for low back pain	Gu, Xin	PS002-01
Rehabilitation role in osteoporosis	Kuptniratsaikul, Vilai	PS002-02
The management of lumbar spinal stenosis	Lee, Peter K.W.	PS002-03
Traumatic brain injury rehabilitation: Perspectives from the red dot	Chua, Karen	PS003-01
Medical and psychosocial sequelae in the long term following traumatic brain injury	Olver, John	PS003-02
Behavioral pharmacology after traumatic brain injury	Zasler, Nathan	PS003-03

**13.30–15.00**

How does load on working memory modulate kinaesthetic motor imagery? Implications to rehabilitation of patients with neurological deficits	Sung, Connie Y. Y.	OP001-01
The underlying neuro-mechanism of cross education by different incentives at acupuncture points - fMRI study	Hu, Xi-Lian	OP001-02
The influence of closed-chain load on lower-limb proprioception in healthy adults	Li, Fang	OP001-03
Electrical stimulation of suprahyoid muscles on the stroke patients with dysphagia	Kim, Sang Jun	OP001-04
Common sources of chronic hemiplegic shoulder pain defined by ultrasonography and MRI	Choi, Eun-Seok	OP001-05
A combination of epidural spinal cord stimulation and treadmill training facilitates functional recovery after spinal cord injury in rats	Wang, Yizhao	OP001-06
'Disability identity' and life satisfaction according to the severity of disabilities in persons with spinal cord injury	Lee, Bum-Suk	OP001-07
The effects of rehabilitative training on motor function and expression GAP-43 and SYN in rats	Xiquan, Hu	OP001-08
Effect of isokinetic exercise on surface electromyography of patients after total hip arthroplasty	Li, Xueping	OP002-01
Comparative efficacy of therapeutic ultrasound and NSAIDs in the treatment of de Quervains disease	Rahman, Shahidur	OP002-02
Factors affecting proprioception recovery after anterior cruciate ligament reconstructed	Zhou, Mouwang	OP002-03
Accuracy of ultrasonographic diagnosis in soft tissue tumors: A retrospective study	Lin, Che-Sheng	OP002-04
CT follow-up on lumbar disc hernias after rapid traction	Yue, Shouwei	OP002-05
A comparison of different approaches to the early prosthetic management of transtibial amputees	Xu, Jim	OP002-06
Identification of the dystonic cervical muscles in the primary cervical dystonia (PCD) patients	Sung, Duk Hyun	OP002-07
Functional capacity after meniscus tear following arthroscopic surgery	Zhang, ZhiJie	OP002-08
Clinical observation on effect of mind needling on head SPECT and CT scanning of kids with cerebral palsy	Liu, Zhenhuan	OP003-01
Study on static standing equilibrium function of children with spastic cerebral palsy	Zhang, Lihua	OP003-02
The distribution of spastic muscles in children with severe cerebral palsy	Zou, Xiaoying	OP003-03
Botulinum toxin A in management of shoulder adduction rotation in spastic cerebral palsy	Shi, Jian	OP003-04
The combined effect of botulinum toxin type A and comprehensive rehabilitation on hip power generation in children with cerebral palsy	Liu, Lihui	OP003-05
The application of ketamine for injection of botulinum toxin type A in children with cerebral palsy	Chen, Yin	OP003-06
Expression of Nogo-A mRNA in newborn rat brain tissues	Jiang, Zhimei	OP003-07
Correlation study between the Gesell Scale and the Peabody Developmental Motor Scale among high-risk infants	Huang, Zhen	OP003-08

**15.30–17.00**

Dysphagia management in stroke patients	Han, Tai Ryoan	PS004-01
Innovative functional electrical stimulation (FES) devices	Ring, Haim	PS004-02
The application of ankle foot orthosis in patients with stroke	Tang, Simon	PS004-03
Rehabilitation for sport injury of foot and ankle	Ko, Young Jin	PS005-01
Application of musculoskeletal ultrasound in sports medicine	Tsai, Wen-Chung	PS005-02
Rehabilitation of sports and musculoskeletal injuries	Press, Joel	PS005-03
Controversies in acute management of spinal cord injuries: High-dose methylprednisolone	Ko, Hyun-Yoon	PS006-01
Autonomic dysfunction in spinal cord injury rehabilitation	Mathias, Christopher	PS006-02
Spinal cord injuries – Indian scenario	Mathur, Navnendra	PS006-03

**17.10–18.00**

How to successfully submit a scientific paper	Grimby, Gunnar	GL01
Strategies for being a successful physician administrator of a rehabilitation program	Melvin, John	GL02

**Sunday May 18, 2008****07.30–08.30**

To develop stroke-rehabilitation widely and in depth in China	Zhang, Tong	ME004-01
Rehabilitation after acute brain injury	Wang, Maobin	ME004-02
Rehabilitation of knee disorders	Zhang, Changjie	ME005-02
The study of spinal plasticity in spinal rats	Ji, Shurong	ME006-02

**08.30–10.00**

East meets West for the management of chronic musculoskeletal pain: An update on informed based rehabilitation	Imamura, Marta	MS002-01
Neuropathic pain – invasive procedures	Walsh, Nicolas	MS002-02

**10.30–12.00**

Robot-assisted motor rehabilitation of upper and lower extremities after stroke: It's evidence	Hesse ,Stefan	PS007-01
Virtual reality-based assessment and training for post-stroke unilateral neglect	Kim, Deog Young	PS007-02
Advancement in powered reciprocating gait orthosis (PRGO) and robotic arm trainer in China	Zhang, Jichuan	PS007-03
Cancer rehabilitation	Fialka-Moser, Veronika	PS008-01
New advance in myofascial pain syndrome	Hong, Chang-Zern	PS008-02
Pain and the musculoskeletal system: gender considerations	Young, Mark	PS008-03
Telerehabilitation as a model for teaching and care	Battistella, Linamara	PS009-01
Clinical efficacy of functional electrical stimulation cycling exercise	Chen, Shih-Ching	PS009-02
Effects of somatosensory inputs on corticospinal excitability during robot-assisted passive stepping in human	Nakazawa, Kimitaka	PS009-03

**13.30–15.00**

Vibratory orthosis effect on Parkinsonian's walking velocity	Forogh, Bijan	OP004-01
The influence of BWSTT on muscles strength, balance and mobility in traumatic brain injury patients with hemiplegia	Tianbao, Sun	OP004-02
Effect of electro-acupuncture on the motor recovery of stroke rats	Kim, Sang Jun	OP004-03
Significance of assessment of fall risk at initial period of gait training in stroke patients	Bian, Ren-Xiu	OP004-04
Clinical use of pulse oximetry monitoring on meal in stroke patients with dysphagia	Ko, Ping-Hsin	OP004-05
Study on the surface electromyography signal of induced associated reaction among patients with prior stroke	Zheng, Jiejiao	OP004-06
The clinical observation of ultrasound guided Botox A injection in treating extremities spasticity following stroke (5 cases report)	Zulin, Dou	OP004-07
The expression of Id2 in normal adult and EAE rat spinal cord and progesterone treatment changes	Gao, Yu	OP004-08
The diagnostic value of ultrasonographic measurement in carpal tunnel syndrome	Park, Giyoung	OP005-01
Effectiveness of joint mobilization applied with a treatment of acupuncture at ST38 (tiaokou) for shoulder injuries	Yang, Wen-jin	OP005-02
Effect of warming needle moxibustion and with acu-point injection of compound salvia on changes of serum enzymes for athletes	Bin, Shu	OP005-03

Evaluation of the effect of cervical traction in the anterior lean position seated on a newly designed chair device	Chung, Chin-Teng	OP005-04
A full 3D parametric biomechanical human skeleton model for posture and movement analysis	D'amico, Moreno	OP005-05
Tibial counter-rotator (TCR) for the tibial torsion in children	Kim, Bong-Ok	OP005-06
An instrumented 10 metres walk test for post stroke patients via foot pressure maps measurements and averaging	D'amico, Moreno	OP005-07
Intra-articular hydraulic distension for painful stiff shoulder: Rupture versus non-rupture	Kim, Keewon	OP005-08
Head acupuncture combines speech therapy correcting the language disorder of cerebral palsy children and analyze the factors of related	Li, Xiaojie	OP006-01
General analysis of speech hypoevolutism in cerebral palsy children	Chen, Xiang	OP006-02
Protective effect of cholecystokinin octapeptide on peripheral neurons	Zhou, Jiangbao	OP006-03
Clinical characteristics and influence factors on prognosis of infantile spasms: Analysis of 115 cases	Zhou, Jiangbao	OP006-04
Inhibitory effects of He-Ne laser on collagen synthesis in scar fibroblast in culture	Bin, Shu	OP006-05
The effects of radiofrequency ablation technique on scar proliferation	Xinglin, Wang	OP006-06
Electrophysiological effects of remote acupuncture on the endplate noise	Chou, Li-Wei	OP006-07
Amputation pain caused by neuromas and acupuncture	Sautreuil, Patrick	OP006-08

### 15.30–17.00

Treatment of joint contracture: an animal experiment using correction device with low-load and continuous torque	Akai, Masami	PS010-01
Rehabilitation of peripheral nerve lesions	Paternostro-Sluga, Tatjana	PS010-02
Leprosy claw hand – reconstructive surgery and rehabilitation management – Indian scenario	Varma, Ajit	PS010-03
International perspectives: education and training	Delisa, Joel	PS011-01
Education for professionals of rehabilitation medicine in China	Li, Jianan	PS011-02
Preparing rehabilitation physicians for community-based rehabilitation	Omar, Zaliha	PS011-03
Education and training in Korea	Park, Chang-il	PS011-04
20 years of PM&R education and training in Indonesia	Tulaar, Angela	PS011-05
Rehabilitation management in Laos	Phoumindr, Bouathep	PS011-06
Survey on Asian Oceania education and training in physical & rehabilitation medicine	Han, Tai Ryoony	PS011-07
Geriatric rehabilitation: current concepts	Cameron, Ian	PS012-01
Falls in elderly stroke patients: Risks and prevention	Wei, Ta-Sen	PS012-02
Preventive geriatrics: an overview from traditional Chinese medicine	Zhuo, Dahong	PS012-03

### Monday May 18, 2008

#### 07.30–08.30

The basic research and clinical applications of therapeutic exercise on diabetic rehabilitation	Jiang, Zhongli	ME007-01
An experimental study on the mechanism of exercise therapy in improving glucose metabolism of diabetic rats	Wu, Yi	ME007-02
Burn rehabilitation and hypertrophic scar	Wu, Jixiang	ME008-01
Mini-invasive surgery and postoperative rehabilitation in sports injuries	Wang, Yubin	ME009-01
Posture control and spinal stability in low back pain patients	Wang, Ninghua	ME009-02

#### 08.30–10.00

Neuroplasticity: Functional re-organization of the human brain	Lee, Tatia	MS003-01
New directions for cognitive rehabilitation: towards online monitoring of treatment-related plasticity	Soroker, Nachum	MS003-02

#### 10.30–12.00

Falls, fractures and osteoporosis in the stroke patient	Lains, Jorge	PS013-01
Stroke rehabilitation and ADL in Japan	Miyano, Staoshi	PS013-02
Transcutaneous electrical nerve stimulation on acupuncture points of stroke improved cerebral blood flow and electrophysiological activities of the brain	Yan, Tiebin	PS013-03
Role of alternative medicine in rehabilitation	Chun, Sae-il	PS014-01
The application and discussion of therapeutic methods in traditional chinese medicine in rehabilitation medicine	Yan, Juntao	PS014-02

Traditional Chinese medical rehabilitation – its opportunities and challenges facing the modern rehabilitation medicine	Zhou, Shifang	PS014-03
The early diagnosis of cerebral palsy; recently advanced neuroimaging techniques	Park, Chang-il	PS015-01
Advances in the neuromotor rehabilitation of children with cerebral palsy	Watt, Joe	PS015-02
Integration of traditional Chinese medicine (acupuncture) with Western medicine for neurohabilitation of children with neurodevelopmental disorders	Wong, Virginia	PS015-03

### 13.30–15.00

Electrophysiological effect of passive exercise on neural functional recovery of rabbits after peripheral nerve crushed injury	Zhang, Lining	OP007-01
Dose effectiveness relationship of botulinum toxin type A injection for spasticity – Chinese experience	Li, Jianan	OP007-02
Gender difference of event-related potentials in a facial expression recognition task	Lu, Xuesong	OP007-03
Long-standing deficits in spatial memory deficits and related gene expressions following recurrent prolonged neonatal seizures and forced running	Tao, Luyang	OP007-04
New training strategies for robot-aided on upper limb hemiparesis after stroke and brain injury	Bi, Sheng	OP007-05
The exploration of acupressure five-shu points combined with joint control training on limb motor function in hemiplegic patients after stroke	Hu, Feifei	OP007-06
The experimental research on the therapy of cluster needling of scalp point affect endogenous neural stem cells after cerebral infarction	Tang, Qiang	OP007-07
The brief ICF core sets for stroke in China	Chen, Xiaohong	OP007-08
Comparison of the hand ADL rehabilitation effects between the replantation of digit-severed and the myoelectric hand	Lu, Tingren	OP008-01
Cervical spine injuries resulting from sports and recreation	Ye, Chaoqun	OP008-02
Effects of selective rehabilitation on the patients with chronic low back pain	Shakoor, Abdus	OP008-03
Foot disorders and falls in older persons	Chaiwanichsiri, Dootchai	OP008-04
Effect of muscular power changes of knee joint on the balance in patients with osteoarthritis	Xu, Guohui	OP008-05
The effect of a comprehensive work rehabilitation program for workers with hand injuries in mainland China	Xu, Yanwen	OP008-06
An evaluation of the survival period of patients following discharge from an Australian inpatient rehabilitation ward	Connolly, Carol	OP008-07
Therapeutic effects of a Chinese herbal preparation on muscle strain and their mechanism in rabbits	Shu, Bin	OP008-08
Primary reason for rehabilitation services: recent experience of a medical center in Taiwan	Chen, Ssu-Yuan	OP009-01
The incidence, type and effects of complications on patients in an Australian rehabilitation ward	Connolly, Carol	OP009-02
Gender issues in the specialty of physical and rehabilitation medicine	Kim, Bong-Ok	OP009-03
The Hannover model for the implementation of rehabilitation into the undergraduate medical education	Gutenbrunner, Christoph	OP009-04
Investigation of current situation of institution rehabilitation and community-based rehabilitation in the city of Changzhi	Guo, Liyun	OP009-05
Study on the effects of shadowboxing on equilibrium function in healthy elderly persons	Qiu, Jifang	OP009-06
The effects of YiJinjing on balance of healthy older adults	Zhang, Bo-xin	OP009-07
Geriatric care in Bangladesh and their rehabilitation perspective	Rahman, Shahidur	OP009-08

### 15.30–17.00

Jobrehab – an innovative model for a job-orientated rehabilitation program for workers of the automobile and logistic industries	Gutenbrunner, Christoph	PS016-01
Research challenges and opportunities in the prevention of musculoskeletal injury and disorder in the occupational setting	Parker, Tony	PS016-02
A multidisciplinary approach for dysphagia management in the Philippines	Rey-Matias, Reynaldo R.	PS016-03
Pulmonary rehabilitation in patients with neuromuscular disease	Kang, Seong-Woong	PS017-01
The role of exercise in cardiac rehabilitation	Kavanagh, Terence	PS017-02
Effects of Tai Chi Chuan in health promotion	Wong, Alice	PS017-03
Validation of clinical instrument for use in Asia – from theory to clinical perspective	Chan, Chetwyn	PS018-01
The development and application of international classification of functioning, disability and health in China	Qiu, Zhuoying	PS018-02
Current state of the application of the ICF in physical medicine and rehabilitation	Stucki, Gerold	PS018-03

## POSTERS

Saturday May 17, 2008

- The clinical effects of herbal magnetic corsets on trunk motor functions in patients with lumbar disc herniation, *He, Chenqui* PP001-001
- Effect of PEMFs of different frequencies on biomechanical properties and bone mineral density of femur in ovariectomized rats, *He, Chenqui* PP001-002
- The application of extracorporeal shock wave in the treatment of elite athletes' chronic injuries, *Li, Jianhua* PP001-003
- Effect of convalescent physical capability training on cervical spine physio-curve, *Gao, Xiaolin* PP001-004
- The effect of walking exercise under suspending traction in the treatment of protrusion of the intervertebral disc, *Ma, Cheng* PP001-005
- Effect of isokinetic eccentric exercise in patient with knee osteoarthritis, *Gu, Xudong* PP001-006
- Effect on the nervous root cervical spondylosis with the treatments of mobilization combined with Mckenzie, *Wu, Jianfu* PP001-007
- The difference of cervical vertebrae movement before and after joint mobilization and the meridian test – with two dimension analysis device, *Tanimoto, Yukihiko* PP001-008
- Preliminary effects of radial shock wave on rehabilitation of patients with knee osteoarthritis, *Chen, Tien-Wen* PP001-009
- Sonographic study on cervical facet joint – compared with porcine and cadaver, *Chen, Hsin-Shui* PP001-010
- Role of wrist splint in patient with carpal tunnel syndrome, *Khan, Ehsannul Haque* PP001-011
- A case of mitochondrial myopathy with sleep apnea, *Lee, Be-Na* PP001-012
- Clinic observation about using nes to improve crural tumefaction, *Jiang, Tianyu* PP001-013
- Effects of ergonomics education on occupational safety and health knowledge in display screen equipment users, *Lam, Cecilia* PP001-014
- A comparison of the neck flexor and extensor muscles endurance between patients with headache and matche control subjects, *Taghizadeh, Shohreh* PP001-015
- The clinical study for lower limbs muscle activities of chondromalacia patella with surface electromyography, *Luo, Qiu* PP001-016
- The variation and impact of spinal function and isometric muscle strength in cervical spondylotic myelopathy (CSM), *Huang, Guozhi* PP001-017
- Value of ultrasonography in the evaluation of post rehabilitative shoulder, *Lin, Fong-Cheng* PP001-018
- Electrical stimulation-induced expression of angiogenesis-related growth factors in skeletal muscle, *Shen, Mei* PP001-019
- Comprehensive rehabilitation for tennis elbow, *Gao, Chong* PP001-020
- Effects of constraint-induced movement therapy on hemiplegic upper extremity motor recovery in stroke patients, *Wang, Qiang* PP001-021
- The metabolic equivalents cost in some therapeutic exercises of stroke patients, *Yan, Dong* PP001-022
- Influence of integrative rehabilitation therapy on the recovery of lower limb function from cerebral infarction, *Wang, Yan* PP001-023
- The effect of occupational therapy to upper limbs function of movement and activities of daily living on patients with hemiplegia, *Li, Yan* PP001-024
- Influence of advanced reciprocating gait orthosis on walking function in complete spinal cord injury patients, *Wu, Hua* PP001-025
- The clinical evaluation of regional cerebral blood flow change during music therapy for persistent consciousness disturbance, *Okumura, Ayumi* PP001-026
- Clinical study to control trunk for patients with stroke hemiplegia through electro-acupuncture stimulation, *Gu, Xudong* PP001-027
- Rehabilitation with earlier occupational therapy on unilateral spatial neglect post-stroke, *Zhu, Mei-Hong* PP001-028
- Optimal frequency of sacral nerve electrical stimulation to promote bowel emptying in spinal cord-injured rats, *Joo, Min-Cheol* PP001-029
- Effect of proprioception disturbance on activities of daily living (ADL) after stroke, *Liu, Jinglong* PP001-030
- Effect of unilateral spatial neglect (USN) on activities of daily living (ADL) after stroke, *Liu, Jinglong* PP001-031
- Effective observation on training for strengthening distal control ability on early stage to hemiplegic patients' motion function, *Wu, Jianfu* PP001-032
- Effects of Chinese traditional massage on shoulder pain in the restoration of shoulder subluxation, *Yang, Jianzhao* PP001-033
- Respiratory rehabilitation nursing on breath function due to SCI of cervical vertebra, *Shi, Mei-fang* PP001-034
- Transcutaneous electric nerve stimulation (TENS) and motion on shoulder pain of stroke, *Ren, Yun* PP001-035
- Study on the effects of ginsenosides rg1 and rb1 on the proliferation and protection of neural stem cells, *Shi, Yong Jiang* PP001-036
- Study of the mechanisms and effects of Ginkgolide B, *Wang, Yong-hong* PP001-037
- Clinical study on functional independence measure for patients with spinal cord injury of trauma treated by electro-acupuncture stimulation, *Gu, Xu-dong* PP001-038
- The effects of neuromuscular electrotherapy and kinesitherapy on the brachial plexus injury, *Wang, Xinglin* PP001-039
- Quadriplegia caused by critical illness polyneuropathy superimposed to diabetic neuropathy: a case report, *Li, Chia-Chen* PP001-040
- Effects of infrasound with different sound-pressure level on apoptosis in hippocampal cells of rat brain, *Liu, Zhao-hui* PP001-041
- Correlation between intramedullary signal changes in T2-weighted MRI and gait parameters of cervical spondylotic myelopathy, *Kim, Chung Reen* PP001-042
- The observation of therapeutic effects of computer-aided speech therapy on aphasia, *Wang, Hong* PP001-043
- Effectiveness of intrathecal baclofen therapy to severe spasticity, *Kagechika, Kenji* PP001-044
- Influence factor on balance ability in patients with apoplexy, *Zheng, Jiejiao* PP001-045
- To study the related factors influencing on the quality of life of stroke patients in community, *Chen, Jin* PP001-046
- A randomized controlled trial of standardized tertiary rehabilitation after stroke, *Ni, Chao-min* PP001-047
- Association of high sensitive C reaction protein with insulin resisistence in chronic spinal cord injury, *Huang, Chun Ching* PP001-048
- Emotional symptoms after stroke in rehabilitation phase, *Massakulpan, Pornpimon* PP001-049
- The metabolic equivalents cost in some therapeutic exercises of stroke patients, *Yan, Dong* PP001-050



Effects of reciprocating gait orthosis on cardiopulmonary function and ADL and walking ability in patients with spinal cord injury, <i>Wang, Jun</i>	PP001-051
Detection of language fluent characteristic on chinese aphasia evaluated by language disorders apparatus ZM2.1, <i>Chen, Zhuoming</i>	PP001-052
Study of chinese words processing mechanism in patients with Broca aphasia, <i>Chen, Zhuoming</i>	PP001-053
Study on the effects of HBO therapy on patients with earlier period aphasia, <i>Chen, Zhuoming</i>	PP001-054
The comparison of gait rehabilitation in patients with hemiplegia by walking in water and the PNEU-weight walking therapies, <i>Xu, Wei</i>	PP001-055
Clinical effectiveness comparison of underwater exercise treatment and traditional sport treatment on paralysis patients' low limbs dysfunction, <i>Fan, Jin-tao</i>	PP001-056
Clinical observation on the combined rehabilitation of moderate and severe brain trauma, <i>Zhang, Lin-ying</i>	PP001-057
Application of valpar component work sample to treatment of cognitive function impediment of patients with brain trauma, <i>Yu, Yang</i>	PP001-058
The clinical observation of curative effect of comprehensive rehabilitation therapy on persistent vegetative state after traumatic brain injury, <i>Fan, Jin-tao</i>	PP001-059
The effect of static balance test and training equipment on limb function of stroke patients, <i>Zhai Hong-wei</i>	PP001-060
A preliminary study of the reliability and validity of Montreal cognitive assessment Chinese version in Chongqing, <i>Jiai, Gegong-wei</i>	PP001-061
Expression profiling of mouse neural development related microRNAs, <i>Chen, Hong</i>	PP001-062
Functional ambulatory status and balance control in persons with traumatic brain injury and haemorrhagic stroke during in-patient rehabilitation, <i>Chao, Clare Y.L.</i>	PP001-063
Derivation of spinal motor neuron from mouse embryonic stem cells, <i>Xing, Bianzhi</i>	PP001-064
The effect of early intensive exercise on patients with hemiplegia, <i>Xu, Yanjie</i>	PP001-065
Function outcomes in patients with traumatic spinal cord injury after comprehensive rehabilitation, <i>Xie, Rong</i>	PP001-066
The effect of exercise training on locomotion and neurological functional recovery of rats after spinal cord injury, <i>Wang, Hongxing</i>	PP001-067
Experimental study of low power 660nm ga-al-as laser promoting nerve regeneration, <i>Zhang, Li-Xin</i>	PP001-068
Transcutaneous electrical nerve stimulation in treatment for symptomatic diabetic neuropathy: A systematic review of randomized controlled trials, <i>Jin, Dong-mei</i>	PP001-069
Word association for young and old adults, <i>Zhou, Liang</i>	PP001-070
Medical complications during inpatient stroke rehabilitation in Thailand: a prospective study, <i>Kitisomprayoankul, Wasuwat</i>	PP001-071
The correlation of the recovery of motor weakness of upper extremity in hemiplegic patients with SEP and MEP, <i>Lee, Jae Joon</i>	PP001-072
Preliminary study on the relationship of electrical stimulation and the nerve-needle distance in nerve block procedure, <i>Liu, Shouguo</i>	PP001-073
Developmental delay in fetal alcohol syndrome children – case report in Taiwan, <i>Kao, Mu-jung</i>	PP001-074
Comparison of brain CT and EEG of children with cerebral palsy, <i>Cao, Jianguo</i>	PP001-075
Verticalisation as rehabilitation parameter in children after correction of congenital heart defects, <i>Nikolic, Dejan</i>	PP001-076
Clinical analysis of cerebral palsy children with generalized spastic dystonia treated with botulinum toxin type A under electromyography guidance, <i>Fang, Suzhen</i>	PP001-077
Effect of electrical stimulation on gait of a child with spastic diplegic cerebral palsy: A case report, <i>Yang, Zhenhui</i>	PP001-078
The role of cadres on community-based rehabilitation program in West Sumatra Indonesia, <i>Nurdin, Aguswan</i>	PP001-079
Refractures after operative fixation in severe spastic cerebral palsy – A case report, <i>Ryu, Ji Eun</i>	PP001-080
Distribution of static deformities of bone-ankle system in Yusad study school children, <i>Nikolic, Dejan</i>	PP001-081
Effect of botulinum toxin A injection on spasticity of lower limb in standing balance of children with cerebral palsy, <i>Xu, Kaishou</i>	PP001-082
Mitochondrial respiratory chain enzyme complexes defect in children with neurological abnormalities, <i>Rha, Dong-wok</i>	PP001-083
Study on reliability and unidimension of the fine motor function measure scale for children with cerebral palsy, <i>Shi, Wei</i>	PP001-084
Correlations between gross motor and fine motor function in children with spastic cerebral palsy under 3 years old, <i>Shi, Wei</i>	PP001-085
MRI on acute and chronic bilirubin encephalopathy, <i>Tang, Xing-lu</i>	PP001-086
Recognition on rehabilitation nursing of cerebral palsy children, <i>Wang, Ji-hong</i>	PP001-087
The multiple factor correlated study of the treatment of spastic cerebral palsy, <i>Liu, Jianjun</i>	PP001-088
Treatment of cerebral palsy children with a combined method based on traditional Chinese medicine-massage and conductive education: Randomized controlled study, <i>Tang, Jiulai</i>	PP001-089
Physical exercise enhances learning ability of developmental seizure-induced cognitive deficit of rats and related gene expressions, <i>Li, Chao</i>	PP001-090
Early intervention for cognitive disorder of children with brain damage, <i>Liang, Bing</i>	PP001-091
Logopedia for the child with cerebral palsy, <i>Liang, Bing</i>	PP001-092
Effect of thai massage on behavior in autistic children, <i>Piravej, Krisna</i>	PP001-093
Evaluation of sensory and motor peripheral nerve affection in children with diabetes mellitus type II, <i>Zikic, Ana</i>	PP001-094
The effect of unilateral osteoarthritis on the bone mass density of the affected hip, <i>He, Chengqi</i>	PP001-095
Assessment of oral health care at Tonami general hospital, <i>Yura, Shinya</i>	PP001-096
Randomized double-blind placebo controlled trial assessing effect of oral cannabinoid Nabilone on pain control in fibromyalgia patients, <i>Galimova, Lena</i>	PP001-097
Current situation of mechanism and treatment causing the delayed on-set muscle soreness, <i>Wang, Wie</i>	PP001-098

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## PROGRAMME AT A GLANCE

Time	Saturday May 17, 2008	Sunday May 18, 2008	Monday May 19, 2008
08.30–17.00	<b>Poster Session</b>		
	<i>PP 001</i>	<i>PP 003</i>	<i>PP 003</i>
07.30–08.30	<b>Meet with Chinese Expert</b>		
	<i>ME 001</i> A cognition rehabilitation <i>ME 002</i> Pediatric rehabilitation <i>ME 003</i> Special Rehabilitation Issues	<i>ME 004</i> Head Injury and stroke rehabilitation <i>ME 005</i> Low Back Pain <i>ME 006</i> Spinal Cord Injury Rehabilitation	<i>ME 007</i> Diabetes Rehabilitation <i>ME 008</i> Special Rehabilitation Issues <i>ME 009</i> Sport Injury and musculoskeletal Rehabilitation
08.30–10.00	<b>Main Symposium</b>		
	<i>MS 001</i> Musculoskeletal Rehabilitation	<i>MS 002</i> Pain Management	<i>MS 003</i> Cognitive Rehabilitation
10.00–10.30	Coffee Break		
10.30–12.00	<b>Parallel Session</b>		
	<i>PS 001</i> Spasticity <i>PS 002</i> Low Back Pain and Osteoporosis <i>PS 003</i> Head injury Rehabilitation	<i>PS 007</i> Virtual Reality and Robotic Training for paretic limb <i>PS 008</i> Pain and Cancer in Rehabilitation Medicine <i>PS 009</i> Technology	<i>PS 013</i> Stroke Rehabilitation II <i>PS 014</i> Chinese Medicine/Oriental Medicine <i>PS 015</i> Pediatric Rehabilitation
12.00–13.30	Lunch Symposium		
13.30–15.00	<b>Free Paper Session</b>		
	<i>OP 001</i> Neurological Rehabilitation I <i>OP 002</i> Musculoskeletal Rehabilitation I <i>OP 003</i> Pediatric Rehabilitation I	<i>OP 004</i> Neurological Rehabilitation II <i>OP 005</i> Musculoskeletal Rehabilitation II /Rehabilitation Technology <i>OP 006</i> Pediatric Rehabilitation I/ Burn and Pain Rehabilitation	<i>OP 007</i> Neurological Rehabilitation III <i>OP 008</i> Musculoskeletal Rehabilitation III <i>OP 009</i> Rehabilitation Management & Outcome/Geriatric Rehabilitation
15.00–15.30	Coffee Break		
15.30–17.00	<b>Parallel Session</b>		
	<i>PS 004</i> Stroke Rehabilitation I <i>PS 005</i> Sport Injury & Musculoskeletal Rehabilitation <i>PS 006</i> Spinal Cord Injury Rehabilitation	<i>PS 010</i> Peripheral Nerve and Soft Tissue Rehabilitation <i>PS 011</i> Education and Training in Asian Oceania Region <i>PS 012</i> Geriatric Rehabilitation	<i>PS 016</i> Special Rehabilitation Issues <i>PS 017</i> Cardiopulmonary Rehabilitation and Exercise <i>PS 018</i> Outcome Measurement and ICF
17.10–18.00	<b>Special Lecture</b>		
	GL 01 GL 02		Closing ceremony
18.30–20.00	Conference Dinner		

## MAIN SYMPOSIA

## MS001-01

## EVALUATION OF PATIENTS WITH GAIT ABNORMALITIES IN PHYSICAL AND REHABILITATION MEDICINE SETTINGS

*Alain Delarque<sup>1</sup>, Laurent Bensoussan<sup>1</sup>, Jean-Michel Viton<sup>1</sup>, Nikos Barotsis<sup>2</sup>*

<sup>1</sup>Department of Physical and Rehabilitation Medicine, University Hospital of Marseille, University of the Mediterranean, France, <sup>2</sup>Department of Physical Medicine and Rehabilitation, Hygeia Hospital, Athens, Greece

The first step in the evaluation of patients with gait abnormalities in physical and rehabilitation medicine settings is performing a clinical examination based on the International Classification of Functioning, Disabilities and Health. Body structure, activities and participation, and environmental factors (materials and humans) must be assessed. Qualitative and quantitative assessments of gait are part of activities and participation evaluation. Scales are used to assess gait activities. The tools for gait assessment used in a laboratory environment include kinematic, kinetic, electromyography and energy consumption analyses. Other tools like videotaping, walkway study in clinical practice or ambulatory performance analysis in real life activities. The aims of instrumental gait assessment are to obtain quantifiable gait parameters, to evaluate therapeutics outcomes and to follow the course of the disease.

## MS001-02

## EVIDENCE FOR EMG OVER MRI IN DIAGNOSING SPINAL STENOSIS

*Andrew Haig*

Physical Medicine and Rehabilitation, University of Michigan, Ann Arbor, Michigan, USA

**Objectives:** To determine whether magnetic resonance imaging or electrodiagnostic testing results better relate to the clinical syndrome known as Spinal Stenosis. **Methods:** 150 persons aged 55–80 with no symptoms, mechanical back pain, or spinal stenosis based on clinical examination underwent masked magnetic resonance imaging interpretation and masked electrodiagnostic testing including paraspinous mapping needle electrodiagnostic testing of the back, 5 limb muscles, sensory, motor, F- and H-waves. All were repeated at >18 months. **Results:** Subjects with unsuspected neuromuscular disease ( $n=9$ ) and unreliable data ( $n=15$ ) were excluded. Radiologist interpretation had no relation with the clinical syndrome. Anterior-posterior spinal canal measurement statistically related to clinical stenosis ( $p=0.016$ ), but no reasonable cutoff for diagnosis could be found. Paraspinous mapping scores did separate the groups ( $p<0.05$ ). In a smaller population ( $n=49$ ) with agreement on diagnosis between radiologist, clinical physiatrist exam, and neurosurgeon's case review, paraspinous mapping score >4 was 100% specific for spinal stenosis. Neither electrodiagnostic testing nor magnetic resonance imaging findings predicted change in pain or disability at 18 months, but electrodiagnostic testing changes did relate to change in diagnostic category. **Conclusions:** Magnetic resonance imaging should not be used to confirm the presence of, or severity of the clinical syndrome known as spinal stenosis. electrodiagnostic testing is specific, and rules out hidden alternative diagnoses, but only moderately sensitive.

## MS002-01

## EAST MEETS WEST FOR THE MANAGEMENT OF CHRONIC MUSCULOSKELETAL PAIN: AN UPDATE ON INFORMED BASED REHABILITATION

*Marta Imamura*

Division of Physical Medicine and Rehabilitation, Department of Orthopaedics and Traumatology, University of São Paulo School of Medicine, São Paulo, Brazil

Contemporary pain management has shifted from symptom control to management based on the pathophysiological mechanisms of pain. The clear understanding of the complex mechanisms involved in pain generation, modulation, amplification and perpetuation plays a critical role in a comprehensive pain control program. Recently, it has been recognized that constant and intense nociceptive sensory information generated by painful, inflamed deep somatic structures produce significant neurochemical and metabolic changes and reorganizations within corresponding spinal cord segments. These changes include an increased excitability of dorsal horn neurons producing pain hypersensitivity in a segmental distribution. Together, these neurochemical changes suggest that pain induces and is partially maintained by a state of central sensitization in which an increased transmission of nociceptive information allows normally non-noxious input to be amplified and perceived as noxious stimuli. Once these complex mechanisms are present, the rationale for treatment approaches should target desensitization mechanisms. Important to note, is that these spinal cord changes may not be attenuated by blocking the original tissue damage and pain. Diagnosis of central and peripheral sensitization is very important because spinal cord neurons that normally would only be activated by noxious stimuli are now activated by normally non-noxious stimuli. The clinical manifestation of dorsal horn sensitization includes hyperalgesia of the dermatome, pressure pain sensitivity of the sclerotome and myofascial trigger points (TrP) within the myotomes, which are supplied by the sensitized spinal segment. Active myofascial TrPs present lower pressure pain threshold when compared to people with no pain or the presence of only latent TrPs. They also demonstrated the distinct in vivo biochemical milieu of muscle with significant elevated levels of substance P, calcitonin gene-related peptide, bradykinin, tumor necrosis factor- $\alpha$  and interleukin-1 $\beta$ , serotonin, and norepinephrine in the vicinity of the active myofascial TrP at the upper trapezius muscle. Overall, pH was significant lower in the active TrP. Irritative foci in the form of myofascial TrPs (MTrPs) located within the associated myotomes and tender spots in the supra/interspinous ligaments of the segment frequently lead to SSS. The mechanism consists of the nociceptive stimuli generated in the sensitized areas bombarding the dorsal horn of the spinal cord. This causes central nervous system sensitization with resultant hyperalgesia of the dermatome and sclerotome and spreads from the sensory component of the spinal segment to the anterior horn cells, which control the myotome within the territory of the SSS. The importance of SSS is emphasized by the fact that it is consistently associated with musculoskeletal pain. Failure to recognize and diagnose SSS may lead to transient benefit rather than long term relief because symptoms frequently recur. Eradication of the sensitized spinal segment by the technique of paraspinous block with 1% lidocaine prevents afferent bombardment of the dorsal horn. Subsequent needling and infiltration of the supraspinous ligaments as well as needling and infiltration of MTrPs in the myotome of the territory of the sensitized spinal segment leads to long-term relief of neuromusculoskeletal pain and dysfunction.

**MS002-02****NEUROPATHIC PAIN – INVASIVE PROCEDURES*****Nicolas Walsh***

*Department of Rehabilitation Medicine, University of Texas Health Science Center, <sup>1</sup>Pain Service, South Texas Veterans Health System, San Antonio, Texas, USA*

Neuropathic pain syndromes are present in individuals with conditions as varied as diabetic neuropathy, complex regional pain syndrome, phantom limb pain, and radiculopathy. The etiology of neuropathic pain is multi-faceted involving peripheral factors, deafferentation, sympathetically mediated pain, pain memory, and cortical reorganization. Neuropathic pain is more than likely a variable combination of the above etiologies rather than any single one. The treatment of pain in each individual must begin with understanding of pain components, accurate differentiation of the multi-factorial etiology, and appropriate diagnosis. The first line of treatment for neuropathic pain is routinely medication and adjuvant intervention. Though a large number of medical interventions for neuropathic pain have been reported, only a few studies represent randomized controlled trials. The etiology of neuropathic pain remains allusive; hence strategies for the treatment should include the safest, least invasive, and least expensive therapies. The treatment of neuropathic pain involves a spectrum of options, none of which has been proven to prevent or cure the neuropathy or nerve pain. Pain relief and functional improvement are the primary goals. When oral medication and/or nerve blocks do not adequately control the pain, implantable systems may be effective for treating peripheral neuropathic pain. These systems are designed to interrupt transmission of the pain signals from the spinal cord to the brain. The etiology of neuropathic pain remains allusive; hence strategies for the treatment should include the safest, least invasive, and least expensive therapies. The treatment of neuropathic pain involves a spectrum of options, none of which has been proven to prevent or cure the neuropathy or nerve pain. Pain relief and functional improvement are the primary goals.

**MS003-01****NEUROPLASTICITY: FUNCTIONAL RE-ORGANIZATION OF THE HUMAN BRAIN*****Tatia M.C. Lee<sup>1</sup>, Leonard S.W. Li<sup>2</sup>, Chetwyn C.H. Chan<sup>3</sup>***

*<sup>1</sup>Laboratory of Neuropsychology, Institute of Clinical Neuropsychology, MacLehose Medical Rehabilitation Centre and The University of Hong Kong, <sup>2</sup>Division of Rehabilitation Medicine, Univeristy Department of Medicine, The University of Hong Kong, <sup>3</sup>Laboratory of Applied Cognitive Neuroscience, The Hong Kong Polytechnic University, Hong Kong SAR*

*Objectives:* Human brain is a dynamic system that allows for experience-dependent functional organization as well as re-or-

ganization. This unique characteristic of the brain enables us to execute goal-oriented behaviors for the successful survival and perpetuation of the human race. *Methods:* We present findings of a series of behavioral and functional neuroimaging studies that examined 1) training-induced plasticity in healthy volunteers as well as individuals suffering from congenital sensory deprivation, and 2) the reorganization of neural circuitry for inhibitory control in a patient recovering from a cerebral vascular accident. *Results:* Via environmental influences and internal neurochemical mechanisms, the brain exercises its potential of organizing itself in such a way that its functions can be maximized. *Conclusions:* Findings enable us to understand the longitudinal changes of the brain during learning and the recovery from brain injuries.

**MS003-02****NEW DIRECTIONS FOR COGNITIVE REHABILITATION: TOWARDS ONLINE MONITORING OF TREATMENT-RELATED PLASTICITY*****Nachum Soroker***

*Neurological Rehabilitation, Loewenstein Hospital, Raanana, and Sackler Faculty of Medicine, Tel Aviv University, Israel*

Recent MR-based functional imaging research aimed to gain insight into the processes operating in recovery of function, is starting to unravel the role of brain plasticity in cognitive rehabilitation. The changes in the neural organization of behavior that follow the occurrence of focal cortical damage encompass both perilesional regions of the damaged hemisphere as well as homologous regions in the contralateral hemisphere. The purpose of the current presentation is to review the recent developments in the understanding of recovery processes in spatial neglect, and to describe a novel approach for monitored intervention in this syndrome, now under study at the Loewenstein Rehabilitation Hospital in Israel. Given the poor temporal resolution, the limited access and the high cost of standard fMRI methodology, we apply novel algorithms for the analysis of event-related EEG data to monitor the physiological effects of EEG biofeedback treatment. The aim of the intervention is to induce an increment in cortical arousal in anatomically spared peri-lesional regions likely to play a role in recovery-related functional reorganization. The sampling of the EEG is done during the performance of computerized visual search tasks before and immediately after treatment, in repeated sessions. Preliminary results from a group of neglect patients show distinct activation patterns in distributed neural networks subserving task performance. The different activation patterns are related to different levels of benefit from the intervention, shown by the individual patients. The overall prospective of the method for other domains of cognitive and sensory-motor rehabilitation will be outlined.



## PARALLEL SESSIONS

### PS001-01

#### EVALUATION AND TREATMENT OF SPASTIC AND NON-SPASTIC TIPTOEING IN CHILDREN

***Teresita Joy P. Evangelista***

*Department of Rehabilitation Medicine, University of the Philippines College of Medicine, Philippines*

For the past 15 years, more and more children with autism have been referred to Physical and Rehabilitation Medicine for developmental delays and musculoskeletal problems. Last year, I had encountered in my practice in a span of a few weeks, four autistic children walking with tiptoeing. On evaluation, these children were not spastic. What is normal and abnormal tiptoeing in children? Tiptoeing may be considered normal if it is intermittent, bilateral and up to the age of two years. In this lecture, the normal gait development in children will be reviewed. The causes of unilateral and bilateral tiptoe gait will be discussed. The difference between spastic and non-spastic tiptoeing in children will also be addressed. Evaluation of tiptoeing will also be presented. It has been reported that tiptoeing occurs in 2% of the autistic children. A case of an autistic child with tiptoeing will be presented followed by a discussion on theories of its occurrence and its treatment.

### PS001-02

#### CAN ITB THERAPY FACILITATE POST-STROKE FUNCTIONAL MOTOR RECOVERY?

***Gerard E. Francisco***

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Spastic hypertonia is a common problem that many stroke survivors experience. It is a motor disorder that co-exists with other upper motor neuron symptoms such as weakness and spasms, and signs, such as hemiplegia and incoordination. Together, this constellation of impairments profoundly impact poststroke motor recovery and inflict a significant amount of discomfort and frustration on stroke survivors and their caregivers. Treatment decision partly depends on the severity and anatomic involvement of spastic hypertonia. Neurolysis using phenol and alcohol and botulinum toxins are currently the treatment of choice for focal spastic hypertonia. For multifocal and generalized hypertonia, oral medications are utilized, but there are concerns emanating from the well-documented adverse effects of these drugs: impaired arousal, memory and cognition, drowsiness, and ataxia, to name a few. Thus, intrathecal baclofen (ITB) therapy has emerged as an option in managing regional or generalized spastic hypertonia, i.e., one that affects several muscle groups in the lower limbs with or without upper limb involvement. Initially, ITB was employed primarily to reduce severe spastic hypertonia in non-ambulant stroke survivors. Emerging evidence, however, suggest that ITB has the potential to facilitate recovery of hemiparetic upper limb strength and function and improve gait in certain groups of stroke patients. Moreover, it has been shown that while ITB significantly decreases tone on the plegic side, it does not significantly affect the strength of the non-plegic side based on clinical evaluation. Large, experimental studies in this area are scarce. Thus, the “ideal” patient for ITB therapy is yet to be described with certainty. ITB’s true effect on motor and functional recovery has not been well-defined because the small, preliminary studies have not isolated ITB’s influence from that of therapeutic exercise. Being a relatively new therapy in stroke, the long-term safety and efficacy is also yet to be defined. Future investigations

should focus on ITB’s cost efficacy and effectiveness relative to other pharmacologic, pharmacologic, and surgical interventions for spastic hypertonia.

### PS001-03

#### MANAGING THE BURDEN OF SPASTICITY FOLLOWING STROKE

***Anthony Ward***

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The management of the focal problems of spasticity management has changed considerably since the introduction of new technologies, such as botulinum toxin. The latter has been very important in the development of clinical guidelines for treatment and this has led to better utilisation of other treatments and technologies, resulting in better patient outcomes. The development of clinical pathways has assisted the creation of new treatment strategies and this is the subject of current research work. The principles of management are, therefore, to reduce sensory inputs and, in particular nociceptive stimuli, maintain a stretch on a complex of limb and trunk muscles and to use appropriate anti-spastic medication. At the same time, the biomechanical aspects need to be dealt with by the multi-professional team. Spasticity changes over time and therefore requires continual reappraisal in long-term management. The role of the team in the management of spasticity has been well-described and good nursing care, optimal posture and physical therapy underlie the basic principles of treatment. The main aims of the presentation will be to discuss: 1) The reasons why spasticity should be treated; 2) The initiation of treatment: what should be given first and when; 3) The assessment of patients for treatment; and, 4) Treatment outcomes. The presentation will be illustrated by case histories and the discussion will utilise the experience of the audience in determining ways of developing spasticity management and services for people following stroke and other central nervous system disorders. The presentation will develop a management strategy according to published clinical guidelines. The place in pharmacological armamentarium of drugs for focal, regional and generalised spasticity will be discussed, along with other means of treatment, such as physical treatments and surgery.

### PS002-01

#### PHYSICAL THERAPIES FOR LOW BACK PAIN

***Xin Gu***

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The management of low back pain has been a challenge. Physical therapies including physical modalities, lumbar traction, therapeutic exercises, mobilization and manipulation are widely recommended for low back pain patients. Up to now, there is still a lack of evidence to prove which approach is more effective than the others. Practitioners tend to choose the therapies that they are more familiar with, and researchers always group patients at random. The former is practitioner-specific, and the latter is method-specific. Both may lead to bias of the results because patients receive different treatment. As low back pain is a heterogeneous problem, the most appropriate intervention should be patient-specific. Each physical therapy has its specific mechanism to relieve pain, and it would only be meaningful when the problem or pain it resolved was relevant to the patient. The details of the patient’s history, the pain behaviour and characteristics, and the results of physical and instrumental examination provide clues to the mechanism of the pain. It is essential to choose therapies that match the patient’s profile.



**PS002-02****REHABILITATION ROLE IN OSTEOPOROSIS****Vilai Kuptniratsaikul**

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Inactivity and impaired neuromuscular function are definite risk factors of falling and hip fractures. Hip fracture is the most serious complication of osteoporosis. Exercise programs can improve strength and mobility in patients with hip fracture. Women aged 65 years or older with a high level of physical activity are associated with a reduced risk for hip fracture. Fall risk factors which should be identified to prevent falls, include reduced muscle strength, lack of coordination, hyperkyphosis, increased postural sway, slow walking speed and poor functional performance. Exercise programs can improve fall-related risk factors and reduce the incidence of falls. Improvement of back strength via back extension exercise reduces the kyphotic posture. Strong back muscles significantly correlate with a decreased risk of vertebral fractures and kyphosis (risk ratio for compression fracture was 2.7 times greater in controls than in the back exercise group). The effect of strengthening of the paraspinal muscles may not only maintain bone mineral density but also reduces the risk of vertebral fractures. All types of weight-bearing exercises including cardiovascular fitness exercises, can contribute to bone formation. Tai-chi may be an effective, safe, and practical intervention for maintaining BMD in postmenopausal women. Participants who regularly performed Tai-chi had a lower rate of falling than controls (risk ratio 0.51, 95% CI 0.36–0.73). Even though exercise has the aforementioned benefits; however, compliance is very difficult and exercise-induced gains will be lost within months after discontinuation of exercise. In conclusion, effective rehabilitation strategies include strengthening leg and back muscles, improving joint flexibility and balancing training.

**PS002-03****THE MANAGEMENT OF LUMBAR SPINAL STENOSIS****Peter Kang-Woo Lee**

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Lumbar spinal stenosis is generally defined as the narrowing of the spinal canal causing compression of content of the spinal canal. And, this compression is a result of degenerative, developmental, or congenital disorders. Often, patients with spinal stenosis complain of the neurogenic claudication that is characterized by pain during walking, numbness in low back and legs and radiating pain to foot, which may be due to neurologic compromise brought on by standing or walking and relieved by sitting. The management of the spinal stenosis can be either conservative or surgical. Conservative management is a combination of bed rest, medication, orthoses, activity modification, physical therapy, and epidural steroid injection. Majority of patients respond to conservative management and surgical management is considered for patients not improving with conservative management. But, treatment results are too diverse to establish the efficacy of any specific treatment of spinal stenosis. So, I will discuss further details on the available evidence for conservative and surgical management.

**PS003-01****TRAUMATIC BRAIN INJURY REHABILITATION: PERSPECTIVES FROM THE RED DOT****Karen Chua Sui Geok**

*Department of Rehabilitation Medicine, Tan Tock Seng Hospital, Republic of Singapore*

In Singapore, trauma remains the 5<sup>th</sup> most common cause of death and traumatic brain injury (TBI), the commonest cause of neurodisability in those aged <40 years. Rapid response teams and early implementation of evidence-based neurocritical care pathways have resulted in increased survival for severe TBI patients. Demographic and clinical profiles of TBI survivors in Singapore are similar to those in developed countries globally with road users bearing the brunt of younger injuries. TBI rehabilitation locally embraces a multidimensional, interdisciplinary physiatrist-led, neurorehabilitation model which begins early after injury. Inpatient rehabilitation programmes emphasise team-based assessments with goal attainment scaling based on the Rancho levels of cognitive function, post-traumatic amnesia and functional goal scaling and management, evidence-based medical management and appropriate neuropharmacological interventions and early cognitive-behavioural management with family education. Novel techniques such as constraint-induced movement therapy, body weight and exoskeletal-powered supported treadmill training, robotic aided upper limb rehabilitation and virtual reality training tools are in their infancy of application in the rehabilitation milieu. As we approach 2020 where ~25% of the population will be >65 years of age, burdens for TBI rehabilitation will mount as elderly TBI numbers increase. Challenges include difficulties in prognostication and triage, higher medical complication rates, longer rehabilitation lengths of stay and lower and slower functional goal attainments. Forging strong and enduring bonds with community-based services will be required to reduce the demands of TBI on the tertiary healthcare system.

**PS003-02****MEDICAL AND PSYCHOSOCIAL SEQUELAE IN THE LONG TERM FOLLOWING TRAUMATIC BRAIN INJURY****John Olver**

*Director Rehabilitation Epworth Healthcare, Department of Medicine, Monash University, Victoria, Australia*

*Introduction:* The measurement of outcome after traumatic brain injury (TBI) is linked to an increasing need to demonstrate that rehabilitation intervention is cost-effective. It is also paramount in defining the ongoing disability and handicap of an individual which becomes the basis of medicolegal settlement. In Victoria, Australia each year about 5,500 people are admitted to Emergency medicine departments with one of their diagnoses being that of traumatic brain injury. Of these 350–450 are considered to have moderate to severe injuries requiring hospital admission. Epworth Hospital in Melbourne (Australia) has a TBI rehabilitation programme which admits on average 130 individuals aged 13 years or over each year. All those admitted to Epworth Hospital's Brain Injury Rehabilitation Unit have sustained TBI as a result of a motor vehicle accident (90%) or a work-related accident (10%). All are invited for follow up assessment and interview at 1, 2, 3, 5, and 10 years post injury. The database now records 981 interviews at 1 year and 250 at 10 years. The database is also used to evaluate intervention strategies, and look at subgroups such as outcomes in elderly people or comparing outcomes after rehabilitation in city

or regional areas of Victoria. *Objectives:* In this paper elements of the data will be presented highlighting long-term medical and psychosocial sequelae. The paper will introduce some current studies looking at the effects of age on outcome, review some of the longitudinal outcome data from the database for up to 10 years and discuss future directions for research. *Method:* To date, 80 patients with TBI have been followed up at 2, 5, and 10 years post injury using a structured interview format detailing neurological symptoms, mobility, independence in daily activities, communication ability, perceived changes in cognition, behaviour, emotional control and relationship issues. The Glasgow outcome scale and CHART were also used to assess functional status. *Results:* Neurological sequelae of headaches and dizziness continue to be reported by 30% of the patients at all time intervals. There was a general increase in higher level mobility over time with 24% reporting no physical sequelae at 10 years compared to 15% at 2 years and 52% being able to engage in activities such as running and jumping. Cognitive problems including difficulties with memory, concentration and slowness of thinking were reported in about 65% of patients and did not change over the course of the reviews although fewer patients reported fatigue at 10 years than at 2 and 5 years. Half of the patients noted increases in anxiety and depression which compared to 20% in controls and 65% noted increased irritability at 2 years post injury and this frequency did not alter over the 10 years. Of those employed at 2 years post injury, 71% were still employed at 5 years and this dropped to 64% at 10 years. Recording of marital status showed that 20% fewer patients were married at 10 years compared to an age-matched population average. *Conclusion:* The cognitive and emotional affects in patients with acquired brain injury did not change between 2 and 10 years although some physical improvement was noted. There was a decline in their ability to sustain employment and they had more difficulty in forming long-term relationships. Only 26% fell in the good recovery range on the Glasgow outcome scale at ten years post injury.

#### PS003-03

### BEHAVIORAL PHARMACOLOGY AFTER TRAUMATIC BRAIN INJURY

*Nathan D. Zasler*

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This session will review current practices, research and advances in the use of psychopharmacological agents to modulate impairment in persons with neurobehavioral impairments following acquired brain injury (ABI). There remains a dearth of consolidated information on the psychopharmacologic approaches that are effective for neurobehavioral problems after ABI, as well as, the rationale for recommending specific agents. This plenary session will focus on presenting current information on psychopharmacologic assessment and management principles and practices. General caveats regarding holistic behavioral treatment principles will be reviewed. Drug treatment paradigms for persons with acquired brain injury will be discussed as will a proposed individualized methodologies for choosing drug interventions including the role of understanding the multidimensional nature of assessment and presentation of neurobehavioral impairment in persons with ABI, use of neurodiagnostic testing as an adjunct prescription guide and cautions regarding risks of treatment. Theoretical versus practical issues in psychopharmacological treatment will also be examined. Specific drugs, as well as dosages will be recommended during the discussion of each of the impairment areas. Impairment areas to be discussed will

include neurobehavioral syndromes (such as dorsolateral and medial frontal), sleep/wake cycle disorders, fatigue, libidinal alterations, depression, anxiety spectrum disorders including post-traumatic stress disorder, mania, psychosis, obsessive compulsive disorders, aggression/irritability, impulse control disorders including disinhibition and apathy. *General objectives:* Increase understanding regarding the neuromedical assessment of neurobehavioral impairment following TBI and the psychopharmacological management of these disorders. *Specific objectives:* 1) Review basic principles of pharmacotherapy in persons with ABI; 2) Examine the challenges of behavioral assessment in patients post-TBI; 3) Review the types of behavioral problems seen in post-TBI patients; 4) Analyze the evidence based data and clinical experience as related to effective pharmacological management of neurobehavioral disorders.

#### PS004-01

### DYSPHAGIA MANAGEMENT IN STROKE PATIENTS

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Dysphagia is one of the life-threatening complications in stroke patients and I would like to present a few pieces of work which were done in my department recently. The videofluorographic swallowing study is a standard method in evaluation of dysphagia. I and my co-workers already published the quantification of videofluorographic swallowing study in dysphagia: quantification of lots of videofluorographic findings based on aspiration grades. However, aspiration itself is one of the major findings of videofluorographic swallowing study and quantification based on the long-term follow-up result produces more accurate prediction of aspiration in dysphagia patients, we thought. So, based on the long-term follow-up result of dysphagia in stroke patients, we revised the quantification of videofluorographic findings. And as a result, we found that the presence of pyriform sinus residue, subglottic aspiration and inadequate tongue to palate contact were the main factors of long-term dysphagia in stroke patients. Diet modification is one of the important strategies in dysphagia management and most authors opinioned that increasing the viscosity of food has a major role to protect dysphagia patients from aspiration. So, I and my co-workers developed four groups of Korean dysphagia diet according to the test procedure in videofluorographic swallowing study. Recently, we have analyzed the temporal and biomechanical kinematic data of pharyngo-laryngeal structures during the swallowing process with motion analysis system. We measured the displacement of hyoid bone and angular movement of epiglottis in normal controls and stroke patients. And tentatively, we found that the onset latency of epiglottis and hyoid elevation were significantly delayed, however, maximal folding angle of epiglottis and maximal amplitude of hyoid bone were relatively maintained in stroke patients compared with healthy subjects.

#### PS004-02

### INNOVATIVE FUNCTIONAL ELECTRICAL STIMULATION (FES) DEVICES

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Significant improvement of both hardware and software overtime has allowed the development of devices to help with paralysis of

upper and lower limb after stroke. The NESSH200 (Handmaster) device is a hand-wrist neuroprosthesis providing arm support and electrical stimulation of arm/hand muscles by means of embedded electrodes. The activation system is individually adapted and can be used for training or function. Preliminary and case-controlled studies indicate that in complete paralysis a significant reduction in spasticity as well as collateral effects (i.e. edema and pain reduction) can be obtained whereas in partial paralysis enhanced range of motion, movement and improved function can be expected. The device can be safely operated by patients at home for hours. The NESSL300 device is a wireless radio-frequency operated device for drop foot, avoiding frequent technical drawbacks found in previous systems. After fitting and a short training period, the patient can apply the knee cage embedded stimulation electrodes and operate the system, one-handed. Random controlled trials performed showed significant improvement in all the relevant objective gait parameters: symmetry, rhythmicity, gait speed as well as in subjective feeling: comfort, security, performance in every-day life activities and quality of life. Comparative studies have also shown the NESSL300 to be superior, in all relevant parameters, to the ankle-foot orthosis. An additional study showed that effects persist over time.

#### PS004-03

### THE APPLICATION OF ANKLE FOOT ORTHOSIS IN PATIENTS WITH STROKE

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In stroke patients, walking is often hampered by dropped foot. This occurs as the muscle power of the affected leg is not strong enough to lift the foot upwards. Ankle-foot orthosis (AFO) is frequently prescribed to provide mediolateral stability of the ankle and improve ambulatory safety. Conventional AFOs were often heavy and poor in outlook. Improvements were observed in the later designed plastic posterior-leaf type AFOs. However, shoes must be worn in conjunction with the AFO. We have developed an anterior-leaf type AFO, which is lighter, easier to fabricate, and can even be worn under barefoot condition. In this study, the influence of anterior-leaf type and posterior-leaf type AFO on forefoot and hindfoot motions in stroke patients with dropped foot were studied and compared. After three-dimensional kinematic study, both AFOs did not provide dorsiflexion control in loading response and swing phase, and limited hindfoot abduction. The major beneficial effect of AFO is that it provides a secure foot contact system and force can be dispersed over a greater surface area. There were no significant differences in both AFOs in terms of hindfoot abduction, adduction, and total transverse motion. Based on the findings in this study, we highly recommend the application of anterior-type AFO in hemiplegic patients with dropped foot as it is lighter, more comfortable, and allows barefoot walking as compared with posterior-type AFO.

#### PS005-01

### REHABILITATION FOR SPORT INJURY OF FOOT AND ANKLE

*Young Jin Ko*

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Ankle sprain is a frequently encountered foot disorder. The anterior talofibular ligament is most susceptible to injury. For

treatment, after the exclusion of a complete rupture, Unna's boot is applied for 3–4 weeks. After the acute period, a lateral heel wedge is applied to prevent further injury. The deltoid ligament is less commonly involved in ankle sprain injuries, but any suspicious injury of this site requires a close inspection of any occult fractures in the talus and malleolus. In plantar fasciitis, patients complain of pain at the medial part of the calcaneus with their first step after waking up in the morning. Various taping techniques can be used to relieve pain. However, the key essence of treatment is to stretch the shortened plantar fascia. Cuboid subluxation occurs commonly in those with cavus foot who are prone to inversion sprains. Inversion during sprain pushes the cuboid out of alignment either plantarily or laterally. Treatment involves recognition of the pathology and manual reduction by a physician. Cuboid must be held in place by taping and padding for several weeks to prevent recurrence. Continuous shock from inappropriate footwear or poor exercise environment can result in stress fracture of the calcaneus or 2<sup>nd</sup> or 5<sup>th</sup> metatarsal bone. Bone scan tests should be helpful in the early diagnosis of stress fractures. Treatment consists of splinting the injured area. The key point in the rehabilitation treatment of sports-related musculoskeletal injuries is to strike a proper balance between muscle and neuromuscular function.

#### PS005-02

### APPLICATION OF MUSCULOSKELETAL ULTRASOUND IN SPORTS MEDICINE

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Musculoskeletal ultrasound examination is a rapidly growing field in sports medicine because it could provide high resolution, real-time and dynamic imaging of superficial structures such as tendons, ligaments, nerves and muscles. The aim of this presentation is to demonstrate the advantages, disadvantages of ultrasound examination as well as some important sonographic features of sports injuries such as rotator cuff tear, bursitis and planar fasciitis, etc. This presentation will also highlight the role of ultrasound to guide therapeutic interventional procedures.

#### PS005-03

### REHABILITATION OF SPORTS AND MUSCULOSKELETAL INJURIES

*Joel M. Press*

*Department of Physical Medicine and Rehabilitation, Northwestern University, Illinois, USA*

This lecture will present an overview of rehabilitation of sports and musculoskeletal injuries. The different presentations of sports injuries will be addressed as well as a framework to evaluate any type of sports or musculoskeletal injuries. This framework will serve as the basis for developing a focused approach to non-operative treatment of sports injuries. Specific techniques will be discussed that relate to sports rehabilitation including treatment of joint dysfunctions, muscle imbalances, concentric and eccentric training, and neural tension. The different phases of rehabilitation will be addressed with specific emphasis on what components of the treatment fit in which phases. A specific example of patellofemoral pain syndrome will be discussed and walked through the different phases and components of treatment.

**PS006-01****CONTROVERSIES IN ACUTE MANAGEMENT OF SPINAL CORD INJURIES: HIGH-DOSE METHYLPREDNISOLONE*****Hyun-Yoon Ko****Department of Rehabilitation Medicine, Pusan National University School of Medicine, Busan, Korea*

For the past 10 to 15 years, pharmacological treatment of acute spinal cord injury (SCI) has mainly relied on the use of steroids. The efficacy of high-dose methylprednisolone (MP) was reported in two Phase III randomized trials: NASCIS II trial in 1990 and NASCIS III trial in 1997. The NASCIS II concluded that high dose MP, if given within 8 h of injury, could mitigate some of the disability associated with these injuries. NASCIS III further refined the administration protocol. Subsequently, MP administration for acute SCI become widespread in the US and many countries, and rapidly adopted as the standard of care of acute SCI since the *post hoc* subgroup analysis of the NASCIS. The NASCIS is the only controlled multicenter clinical trial for high-dose MP as an effective neuroprotective agent in acute SCI. Other clinical trials from other parts of the world included only a small number of patients, and this limited their credibility when compared with the NASCIS studies. This is probably why many centers still use MP, despite lack of clear evidence of its efficacy, to avoid legal repercussions. Although there is an abundance of evidence from experimental work supporting the use of MP, the interpretation of these results is not easy because different animal species, experimental models, route of administration, dose of MP, and evaluation parameters were used. Actually, the clinical papers advocating the use of MP were all published by the same group of authors. Recently, the efficacy of MP has been questioned and currently is the subject of intense debate. Some suggested that MP administration might be harmful. There are numerous complications associated with the use of high dose steroids. Most commonly seen are fulminant sepsis, pulmonary emboli/pneumonia, gastrointestinal hemorrhage, and wound infections. The dosage of MP recommended by the NASCIS is the highest recommended dose of steroids prescribed in a 24- or 48-h period for any clinical condition. Considerable controversy has questioned the validity of the results of these original studies because of their scientific limitations since the NASCIS. There is insufficient evidence to support the use of high-dose MP as a standard treatment in acute SCI. Moreover, there is incomplete knowledge of the exact time course of many secondary mechanisms, and therefore the exact therapeutic window in which to arrest many of these processes is unknown. In addition, there has been a relative paucity of clinical trials for acute SCI except for methylprednisolone being routinely administered in the clinical setting. The evidence produced by some systematic reviews does not support the use of high-dose MP in acute SCI to improve neurological recovery. Until more evidence is forthcoming, the use of MP should be considered investigational only. In this talk, I will review the literature regarding methylprednisolone as a treatment for acute SCI.

**PS006-02****AUTONOMIC DYSFUNCTION IN SPINAL CORD INJURY REHABILITATION*****Christopher J. Mathias****Neurovascular Medicine Unit, Imperial College London at St Mary's & Autonomic Unit, National Hospital for Neurology and Neurosurgery, Queen Square & Institute of Neurology, University College London, London, UK*

The autonomic nervous system has a cranio-sacral parasympathetic and a thoraco-columbar sympathetic outflow, each of

which supply every organ in the body. Autonomic dysfunction is common after spinal injuries, especially in high lesions where there is substantial disruption to descending spinal of sympathetic and sacral parasympathetic pathways, which are separated from cerebral control. This can result in cardiovascular, sudomotor and pelvic dysfunction (involving bladder, bowel and sexual organs), and impair key integrative control mechanisms that maintain blood pressure, heart rate and body temperature. This overview will describe autonomic dysfunction that results from spinal cord injury. There will be focus on cardiovascular and sudomotor dysfunction which can result in considerable morbidity, and sometimes in death. Bladder, bowel and sexual function will be briefly covered. Autonomic abnormalities will also be considered on a temporal basis in the stage of spinal shock and later in the chronic stage. The pathophysiological mechanisms that form the basis of therapeutic strategies to overcome the key features of autonomic dysfunction will be described. Newer approaches which quantify autonomic dysfunction, especially in relation to a more complete classification of spinal cord injuries will be discussed, as this has major implications in relation to newer repair interventions that reverse spinal injury.

**PS006-03****SPINAL CORD INJURIES - INDIAN SCENARIO*****Navnendra Mathur, Shweta Jain, Naveen Kumar, Abhishek Srivastva, Navita Purohit****Department of Physical Medicine & Rehabilitation, S.M.S. Medical College, Jaipur, India*

Spinal cord injury is one of the most dangerous causes which threaten human life, resulting in profound and long-term disability. The incidence, causes, types and pattern of injuries vary from place to place and country to country depending on infrastructural development and social needs. India is a developing country with poor infrastructure facilities. A prospective study was conducted to find the epidemiology of the spinal cord injury patients admitted to the Department of Physical Medicine & Rehabilitation from January 2000 to December 2005. During this period, spinal cord injury patient's admission incidence was 42.26 per million populations per year. Out of 1332 patients, there were 720 cases of cervical and 612 of dorso-lumbar injuries with 1064 male and 268 female, in ratio of 3.97:1. There were 1072 rural and 260 urban patients with ratio of 4.12:1. 22% and 21% of these were involved in farming and labor work, respectively. The average monthly income of a family was US\$ 75 only (INR 3000) on which average 5 persons were depended for their one month livelihood. 73% of these injuries occurred in most productive age range of 20 to 49 years, following fall from varying heights (49%) and road traffic accidents (27%) involving most mobile segments of the spine; cervical C4–5, C5–6 and dorsolumbar D12–L1 segments. Flexion compression and flexion distraction injuries in cervical spine and burst fractures in dorso-lumbar spine were the most common types of injuries causing ASIA grade A deficit in 55% of the injured patients. In the early post injury period, there was an average delay of 9 h and 5 days in bladder and bowel management, respectively. 356 patients (27%) sustained 526 different types of associated injuries, some of which posed difficulty in spinal cord injury management, delaying rehabilitation and increasing long-term disability.



## PS007-01

**ROBOT-ASSISTED MOTOR REHABILITATION OF UPPER AND LOWER EXTREMITIES AFTER STROKE: IT'S EVIDENCE***Stefan Hesse**Department of Neurological Rehabilitation, Klinik Berlin, Berlin, Germany*

The outcome of upper and lower limb rehabilitation of CNS-lesioned patients is decisive for a successful social and vocational reintegration. Modern concepts favour a most intensive therapy approach, budget constrains and the physical effort required, for instance to manually place the paretic limbs, however, limit the translation into daily clinical practice. Intelligent machines, including robots, may be a solution. For gait rehabilitation, an exoskeleton (Lokomat, AutoAmbulator) and an end-effector (Gait Trainer GT I) approach can be distinguished. The Lokomat consists of a treadmill and a powered exoskeleton to flex the hip and knees during the swing, the feet are passively moved. In stroke, one study ( $n=30$ ) did not reveal a superior effect. On the GT I, the patient is positioned on two foot plates whose movement simulate stance and swing, the vertical and horizontal movements of the CoM are controlled, fully programmable FES is optional. Two studies included 50 and 155 acute stroke patients; in both studies 4 weeks of GT I training resulted in significantly better gait ability and velocity. The positive effects persisted at follow-up six months later. For already ambulatory patients, the GT I did not effect a superior gait function when compared to intensive outdoor gait training. For upper limb rehabilitation, multiple machines have been proposed. Clinical studies compared the robots vs. sham therapy (MIT-Manus, NeReBot), vs. electrical stimulation (Bi-Manu-Track) and vs. conventional therapy (MIME). They unanimously arrived at a superior effect due to a higher therapy intensity. Currently, many more machines are in the pipeline. Again one can distinguish exoskeleton and end-effector based approaches, distinct degrees of freedom and bilateral vs. unilateral approaches. Points of debate are whether to begin the upper limb rehabilitation proximally or distally, arguments in favour of the latter are the larger cortical representation of the hand and the presumed competition between proximal and distal segments for plastic brain territory. A new frontier is brain stimulation timelocked to robot therapy to further enhance trainings-induced brain plasticity. The future will see more machines, with more degrees of freedom, more sophisticated assist modes and virtual reality. Highly warranted are comparative studies (lacking so far) of the various solutions with respect to clinical practicability, effectiveness and cost efficiency. Also, a machine will never replace the human touch of rehabilitation; it is an adjunctive tool to increase intensity.

## PS007-02

**VIRTUAL REALITY-BASED ASSESSMENT AND TRAINING FOR POST-STROKE UNILATERAL NEGLECT***Deog Young Kim**Department and Research Institute of Rehabilitation Medicine, Yonsei University, College of Medicine, Seoul, Korea*

Unilateral neglect is one of the most striking phenomenon that characterized by failure to report, respond, or orient to novel or meaningful stimuli presented to the side opposite a brain lesion. Unilateral neglect frequently disturbs the daily activities, and is also one of the poor prognostic predictors in post-stroke survivors.

The assessment of unilateral neglect is usually by conventional neuropsychologic paper and pencil tests. Though simple and rapid for clinical screening, these scales do not correlate well with patients' actual performances. Because of these problems, behavior assessments have been proposed. However, these assessments were time-consuming, complicated and not quantitative. The treatment of unilateral neglect can be approached in several ways. Main stream treatment is to increase the activation of the right hemisphere or to use compensation strategy. These trainings include monocular patching of the eye, visual scanning training, prism treatment and more. However, the evidence of their efficacy is still needed. In recent years, virtual reality (VR) technologies have begun to be used as various tools in rehabilitation medicine. VR can simulate the real-environment without the risks caused by errors, and can also give a sense of immersion in the stimulated environment with a concomitant feeling of 'presence'. Moreover, VR improves patient's motivation by the gaming effect. With these advantages, VR has been tried for unilateral neglect assessment and training. We designed two immersive virtual environments using HMD; moving ball and crossing street, and investigated their feasibility as an assessment and training tool. We concluded that the virtual environments using moving ball and crossing street were useful for assessment and treatment for post-stroke hemispatial neglect, and approach method may be important to improve it.

## PS007-03

**ADVANCEMENT IN POWERED RECIPROCATING GAIT ORTHOSIS (PRGO) AND ROBOTIC ARM TRAINER IN CHINA***Jichuan Zhang, Linhong Ji, Dewen Jin**Rehabilitation Engineering Research Centre, Tsinghua University, Beijing, China*

*Purpose:* A powered reciprocating gait orthosis (PRGO) and a robotic-assistant arm trainer for neural and motor rehabilitation have been developed at the Rehabilitation Engineering Research Centre of Tsinghua University, Beijing. The purposes of the project are to assist the paraplegics in recovery of their walking function, and to improve both diagnostic accuracy and therapeutic effect for patients who, following a stroke or traumatic brain injury, have lost the function of an arm. *Method:* This work focused on the mechanical and control system design of the gait orthosis and the robotic arm trainer. In order to simplify the mechanical system and generate expected human gait, the multi-bar walking mechanism has been adopted and designed by the optimization method. The structure of the robotic arm trainer has been designed as a combinatory system, which is capable of performing complex movements of upper limb. *Results:* The gait orthosis is designed as a single degree-of-freedom (DOF) system, each leg of the walking mechanism is actuate by only one actuator, so that the mechanical system can be simplified. The paraplegic wear the gait orthosis on both legs, and the control system automatically coordinates both legs to perform reciprocating gait. The gait orthosis is made of titanium alloy weighing about 9.6 kg. *Conclusion:* A new kind of externally powered gait orthosis with two-jointed single DOF to generate the reciprocating gait for paraplegics, and the robotic trainer for complex training of the upper limb are presented. The optimization technique was adopted in kinematic design of the walking mechanism, which makes the gait pattern as close as possible to the expected one. Based on the kinematic design, new prototypes of orthosis and robotic arm trainer have been fabricated and tested in clinic with satisfactory results.



**PS008-01****CANCER REHABILITATION*****Veronika Fialka-Moser***

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Many cancer survivors will experience physical and psychosocial sequelae that affect their everyday lives. Studies demonstrate that treatments of localised cancer have consequences that continue to wield or impact patients even for years after therapy is completed. Breast cancer is the leading cause of cancer among women worldwide. The side effects of treatment as well as inactivity secondary to treatment can impair activity and participation, decrease independence and quality of life. The restricted arm motion is one of the most common complications in the breast cancer patients. Early rehabilitation plays an important role in preserving function and returning the patient to her previous level of activity. Lymphedema of the arm is one of the most distressing and unpleasant sequelae for the patients after breast cancer surgery. Conservative therapy of lymphedema involves a complex rehabilitation program. Compliance is essential in maintaining subsequent lymphedema reduction following conservative therapy. A significant proportion of women suffer disturbances in body image and self concept. Social isolation and disruptions in family and sexual relationships are related to fears of recurrence and death. Attention to these psychological issues in rehabilitation promote the quality of life, but also improve compliance to treatment and reduce utilisation of health care in the long term. Prostate cancer is one of the most common forms of cancer diagnosed in older men. Impaired physical performance, psychological distress, fatigue, weight gain, urinary incontinence, sexual dysfunction, and changes in male body image are long-term consequences of prostate cancer. To improve participation in the activities of daily living strengthening and endurance exercise should be performed. In cases of bladder or bowel involvement special training and information programs help the patients. Pelvic-floor re-education should be considered as a first-line option in curing incontinence after radical prostatectomy. Potency is often a consideration of great concern to patients. Preoperative counselling informs the patient that erectile dysfunction can be successfully managed in most cases with therapy tailored to the goals and expectations of both the patient and the partner. Problems in head and neck cancer can also be improved by rehabilitation and will be discussed.

**PS008-02****NEW ADVANCE IN MYOFASCIAL PAIN SYNDROME*****Chang-Zern Hong***

*Department of Physical Therapy, Hungkuang University, Tai-Chung, Chinese Taipei and Department of Physical Medicine and Rehabilitation, University of California Irvine, Irvine, CA, USA*

Myofascial pain syndrome (MPS) is a clinical manifestation of active myofascial trigger points (MTrPs) which are hyperirritable spots in taut bands of skeletal muscle fibers. An active MTrP is a hyperirritable tender spot with spontaneous pain or pain in response to the movement of the attached joint, while a latent MTrP is a tender spot with referred tenderness but without spontaneous pain or spontaneous referred pain. Based on recent studies on both human and animal, there are multiple sensitized nociceptors (sensitive loci) in an MTrP region. A low-pressure stimulation to a sensitive locus may cause pain, and a stimulus with a higher pressure may cause referred pain. Local twitch

response is a sudden twitch of muscle fibers in taut bands when the sensitized nociceptors are stimulated with a high pressure (such as rapid insertion of a needle tip). Endplate noise (EPN), multiple non-propagated endplate potentials, can be frequently recorded in an MTrP region, but not in the non-MTrP region. MTrPs are usually found in the endplate zone. Previous studies have indicated that EPN can be recorded when excessive acetylcholine molecules are secreted from the motor nerve endings due to mechanical or chemical irritation. In such case, localized depolarization of muscle fibers in the endplate region may cause focal contracture of muscle fibers to form a “contracture knot” as demonstrated in electron microscope in an animal study. This is the basic mechanism of taut band formation in an MTrP region. This finding consists with the “energy-crisis hypothesis” proposed by Simons. This is further supported by the evidence of high concentrations of inflammatory substrates in an MTrP region in a recent biochemical study. Recent studies further have indicated that the prevalence of EPN is proportionate to the irritability of an MTrP, either an active or a latent one. A recent study has demonstrated that no MTrP can be identified in a bay less than one year old. It is likely that a latent MTrP is formed during the growth period in the early life (after one year of age) as a consequent of accumulation of micro-trauma to the motor unit with excessive acetylcholine leakage in the motor nerve ending subsequently. However, an active MTrP is usually induced by central sensitization in the spinal cord level elicited by a lesion remote to the MTrP. The formation of an active MTrP is probably a defense mechanism to avoid any movement (with pain) that may interfere with the healing process of this lesion. The most important strategy in MPS therapy is treating the underlying etiological lesion responsible for the activation of MTrP in order to inactivate MTrPs completely and permanently. Treatment of active MTrPs would be necessary in some situations. When treating either the active MTrPs or their underlying pathology, conservative treatment should be given prior to aggressive therapy. Effective MTrP therapies include manual therapies, physical therapy modalities, and needling. It is also important to eliminate any perpetuating factor and provide adequate education and home programs to patients, so that recurrent or chronic pain can be avoided. Many new techniques have been developed to inactivate MTrPs. It has been demonstrated in clinical studies that some of them have significant therapeutic effects. Low power laser may be effective to reduce MTrP pain based on some studies. However, the mechanism of laser therapy is still unclear. A recent animal study has demonstrated that laser application on MTrPs can reduce the EPN prevalence (the MTrP irritability). Fischer’s new techniques of local anesthetic infiltration into the whole taut band (including myotendoneal junction) and ‘Preinjection blocks’ (to reduce the pain of needle penetration) are both very effective in treating MTrP pain. Chu has modified the dry needling technique by adding electrical stimulation (“electrical twitch-obtaining intramuscular stimulation”), similar to the electrical acupuncture. Several authors have demonstrated the therapeutic effectiveness of pain control by MTrP injection with botulinum toxin A, based on the fact that it can provide presynaptic block of acetylcholine release from motor nerve endings and subsequently relieve the taut band in the MTrP region. Chou and Hong have recently developed a new technique of acupuncture therapy. This technique is similar to MTrP dry needling by insertion of the acupuncture needle into multiple sites of the MTrP region with simultaneous rotation of the needle to facilitate the needle movement. In summary, a clinician should select the best approach in treating MPS based on the scientifically established knowledge and the best clinical judgement.

**PS008-03****PAIN AND THE MUSCULOSKELETAL SYSTEM:  
GENDER CONSIDERATIONS*****Mark A. Young****Sangart, Inc. San Diego, CA, USA*

While pain is well known to affect both men and women, there is accumulating scientific evidence to suggest that both sexes experience pain in vastly different ways. A recent "Gender and Pain" symposium sponsored by the National Institute of Health (NIH) has provided a comprehensive scientific synopsis of research developments in this area. The Institute of Medicine (IOM)/National Academy of Medicine has held a landmark consensus conference on the biological differences of men and women. Anatomical, hormonal, genetic and psychosocial factors often underlie gender-related pain nuances. This presentation will highlight the key musculoskeletal diagnoses frequently treated by physiatrists that are likely to be influenced by gender specific pain. These include osteoarthritis, rheumatoid arthritis, migraine headaches, tension headaches, knee injuries, fibromyalgia, carpal tunnel syndrome, facial pain, and osteoporosis. The session will systematically review sex-related differences that distinguish men and women followed by a consideration of specific putative mechanisms proposed by scientific investigators that explain why pain experienced by men and women is so radically different. Special focus on knee degenerative joint disease and its differential gender-specific manifestations in women and men will be covered. The presentation will conclude with a brief summary to guide Physical Medicine and Rehabilitation clinicians in their recognition and practice of gender based pain evaluation and management. Objectives are to 1) provide a definition of pain; 2) to discuss gender differences and pain effects; 3) review the most common musculoskeletal pain conditions in women; 4) explore the topic of DJD-Osteoarthritis of the Knee, as it occurs in men and women and its treatment; 5) understand the relationship between altered foot biomechanics and musculoskeletal pain pathogenesis in men and women; 6) elaborate on technologic and pharmacological solutions for treating knee osteoarthritis in women; and 7) review common gender specific complementary treatments of musculoskeletal pain and gait alterations.

**PS009-01****TELEREHABILITATION AS A MODEL FOR  
TEACHING AND CARE*****Linamara Rizzo Battistella****Division of Rehabilitation Medicine, Hospital das Clinicas, School of Medicine, University of São Paulo, Brazil*

The utilization of Internet-based tools for teaching and provision of healthcare at a distance has been long established in healthcare and constitutes an important resource for Rehabilitation Medicine. We will present two examples of the utilization of Internet-based tools for healthcare assistance and learning. An interactive course based on video conferencing, use of Internet and a three-dimensional (3D) animated model. We created two courses: a) on amputee rehabilitation and b) on management of back pain. Each course was divided into four phases: videoconference session, Internet-based learning, Internet discussion list and evaluation. The evaluation submitted by the 136 participants has shown that this methodology is useful even for persons with no previous experience in e-learning. In the model of provision of healthcare at a distance, we prioritized the development of a digital protocol for the evaluation of pressure ulcers on patients with spinal cord injury. 33 ulcers were assessed either by consultation in a clinic or

through digital images, and the results of in-clinic examinations were compared with the results of examiners who received the images via Web. The protocol was effective in assessing pressure ulcers Grade I and II. The strategies of teaching and provision of healthcare at a distance permit a wider geographical scope, and ensure knowledge to be share and to benefit a larger number of healthcare professionals and patients.

**PS009-02****CLINICAL EFFICACY OF FUNCTIONAL  
ELECTRICAL STIMULATION CYCLING  
EXERCISE*****Shih-Ching Chen<sup>1</sup>, Chih-Wei Peng<sup>1</sup>, Chien-Horng Lai<sup>1</sup>,  
Mao-Hsiung Huang<sup>2</sup>, Jia-Jin Jason Chen<sup>3</sup>****<sup>1</sup>Department of PRM, Taipei Medical University and Hospital, <sup>2</sup>Department of PRM, Kaohsiung Medical University and Hospital, <sup>3</sup>Institute of Biomedical Engineering, National Cheng Kung University, Chinese Taipei*

Generally, two major types of FES-cycling ergometer, mobile and stationary, have been developed. As a locomotion device, it focused on muscle training as well as giving some mobility to patients whose muscles may still be excited. Several research groups have developed a mobile cycling system using standard or recumbent tricycles for SCI patients. They raise the possibility that FES-cycling exercise not only can get therapeutic benefit but also become a recreational activity. For stationary cycling devices, the FES cycling devices are usually used for aerobic exercise training in subjects with SCI for conditioning their muscles strength and enhancing cardiopulmonary function. A number of subsequent investigations have studied the physiological adaptations which can occur in response to regular cycling exercise. The FES cycling exercise have been demonstrated with the increase of muscle strength and endurance, increase of bone density, suppression of spasticity, improvement of cardiopulmonary function, and many other physiological and psychological benefits for subjects with SCI. This presentation provides an overview of the research findings regarding the effects of FES cycling on therapeutic benefits for candidate patients.

**PS009-03****EFFECTS OF SOMATOSENSORY INPUTS ON  
CORTICOSPINAL EXCITABILITY DURING  
ROBOT-ASSISTED PASSIVE STEPPING IN  
HUMAN*****Kimitaka Nakazawa, Kiyotaka Kamibayashi, Tsuyoshi  
Nakajima, Masami Akai****Research Institute, National Rehabilitation Center for Persons with Disabilities, Tokorozawa, Saitama, Japan*

Cortico-spinal excitability of lower limb muscles were tested while a human subject was passively stepping in a robot-driven gait orthosis on a treadmill. The robotic orthosis could generate stepping motions; as a result, the subjects required no active muscle force while stepping. We recorded the motor-evoked potentials (MEPs) induced by transcranial magnetic stimulation (TMS) from the tibialis anterior (TA) and soleus (SOL) muscles while the subject was passively stepping on the treadmill (ST) and stepping in the air (SA) and as a control while the subject was passively standing in the robotic orthosis (on the treadmill and in the air). The results showed that the TA MEPs were facilitated in the ST condition compared to the control. For all conditions, no background EMG activity (BGA) appeared in the TA, whereas a weak BGA was sometimes

observed in the SOL. These results suggest that the corticospinal excitability of the human ankle dorsi-flexor muscle is facilitated during the passive stepping motion with body-weight loading, and, therefore, load-related afferent information has a role in amplifying the corticospinal excitability during human walking.

#### PS010-01

### TREATMENT OF JOINT CONTRACTURE: AN ANIMAL EXPERIMENT USING CORRECTION DEVICE WITH LOW-LOAD AND CONTINUOUS TORQUE

*Masami Akai*

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*Purpose:* The purpose of this presentation is to clarify the relationship between mechanical stress and tissue response of a contracted knee joint in rat model and to identify the particular mechanical modality showing effectiveness for contracture correction. *Methods:* Wistar rats were operated on to immobilize knee joint with a procedure using surgical wire and were kept in flexed position for 40 days. At day 40, the tied wire was removed and after day 43, the contracted knee joint had been treated with tunable corrective devices secured by external fixation method to the femur and tibia of one lower extremity. These devices consisted of four types of motor-driving system provided several different low-load and continuous stretch torques. Continuously measuring the angle of maximum knee extension with five different conditions, its effectiveness was assessed by comparing with lower load and control group of natural recovery course. The device also had a cyclic joint movement within acquired range of motion and an oval cam mechanism producing a small distraction force to the joint along its long axis. *Results:* The results showed that appropriate range of low-load continuous torque was more effective to correct joint contracture. On the basis of this animal experiment, minimal effective torque range was identified. A new computer-controlled, gas-driving contracture correction device was developed for clinical trial. *Conclusion:* This kind of mechanical mode is only capable by fine-controlled correction device. Mechanical application in a condition with low and continuous torque is a useful treatment for fixed joint contracture.

#### PS010-02

### REHABILITATION OF PERIPHERAL NERVE LESIONS

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Peripheral nerve lesions are associated with paresis, sensory loss, pain and functional loss. The extent of functional loss depends on site and degree of the lesion, additional injuries, co-morbidities as well as capacity of regeneration. Secondary complications are frequent such as contractures of joints and soft tissue and trophic disturbances. Prognosis depends on the degree of the lesion, the length of regeneration pathway, and a well organised case management. Factors influencing regeneration are age and co-morbidities. Diagnosis is mainly based on the patient's history, clinical examination and electrophysiological data. Ultrasound and MRI examinations may add important information. Direct surgical interventions on the nerve are required if spontaneous regeneration cannot be expected. Later in the course of disease reconstructive surgery is indicated.

For rehabilitation treatment exercise therapy, occupational therapy, biofeedback training, splint prescription, electrotherapy, ultrasound therapy and massage techniques can be applied. Treatment goals are promoting motor recovery by neurophysiological exercise or stimulation techniques, increasing sensory capacity, decreasing pain, avoiding contractures, and improving function. Rehabilitation of obstetrical brachial plexus lesions is an example, which shows, how important team approach and case management can be to treat this condition in an efficient way. Rehabilitation doctors, pediatric doctors, surgeons and therapist have to work closely together to provide best care for the patient. Concerning reconstructive surgery and rehabilitation after complete loss of an extremity a new technique of selective nerve transfers and special functional reinnervation training was performed in one pilot patient. An innervation landscape including the median, ulnar and radial nerve was created on his chest wall, which the patient can use to control his artificial limb in a highly physiological movement pattern.

#### PS010-03

### LEPROSY CLAW HAND – RECONSTRUCTIVE SURGERY AND REHABILITATION MANAGEMENT – INDIAN SCENARIO

*Ajit Kumar Varma, Akshay Kumar Sinha*

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*Objectives:* Under the National Health Policy, Government of India achieved the goal of elimination of leprosy as a public health problem in the month of March 2006 when the recorded prevalence rate (PR) came down to 0.84/10,000 population. There still remain a considerable number of cured leprosy cases with partial or complete claw hand deformities. Claw Hand deformities are commonly seen in leprosy patients, which become more apparent when they spread their fingers fully. They require medical and psychological rehabilitation to improve their quality of living. *Methods:* So far the Department of Rehabilitation Medicine, Patna Medical College, India currently under the "Leprosy Reconstructive Surgery and Rehabilitation Program" admitted 136 cases, referred from the peripheral parts, between the periods of January 2004 to October 2007. The patients received pre-operative evaluation and pre-operative exercises. Under regional block/anaesthesia, Lasso procedure, Opponensplasty, and Half FPL to EPL transfer were done as required. All these patients were put through vigorous post operative exercise regimen with tendon re-education thereafter and splinting as well. *Results:* Hand function evaluations were done at the end of 3<sup>rd</sup> and 6<sup>th</sup> months. Any complications and deformities subsequent to surgery and exercises were noted. *Conclusions:* The results were extremely satisfying. The patients were able to hold, grasp and pick up objects comfortably. Leprosy cured patients with existing hand deformities must undergo the surgical rehabilitation program to improve their quality of life.

#### PS011-01

### INTERNATIONAL PERSPECTIVES: EDUCATION AND TRAINING

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*Background:* Like prevention and wellness, rehabilitation is widely accepted as essential to optimal health care. However, effective accessible services remain the exception in the global community.



Barriers to the development of international standards include lack of a universal curriculum for teaching physical medicine and rehabilitation, which would provide the cornerstone for a universal training program. A wide range of needs as well as cultural, economic and social factors, present challenges to achieving these aims. *Objective:* To work toward acceptable universal standards for international training and accreditation for professionals in physical medicine and rehabilitation. *Conclusion:* Meeting global needs for physical medicine and rehabilitation requires research and assessment of needs and resources. Further definition of existing curricula for the training of physiatrists is required, as well as identification of specific outcomes for rehabilitation and documentation of efficacy for interventions.

#### PS011-02

### EDUCATION FOR PROFESSIONALS OF REHABILITATION MEDICINE IN CHINA

**Jianan Li**

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China has a population of 1.3 billion and the current number of medical professionals is 5.4 million. The number of professionals in PRM is only 10,000, and the number is expected to reach 300,000 or more by 2050. The education of rehabilitation professionals includes: 1) *Therapist Education:* Education at university level was started in 2001 and this was expanded to 56 universities in 2007. The number of graduates at this level is about 1,000 in 2007. The majority of graduates are comprehensively educated with PT and OT skills as well as basic skills in Traditional Chinese Medicine. The specialization of PT, OT and ST education is a big challenge. The government body responsible for this level of education is the Ministry of Education. 2) *Physiatrist Education:* Medical specialist training at national level was commenced in 2007. The current training program is tentative. The Chinese Medical Doctor Association is responsible for this system. 3) *Continuous Medical Education:* This has been conducted for years at both national and provincial levels. Common format is short-term training courses in specific fields for 3 to 7 days. CME scores are required for promotion and annual assessment. 4) *General education for medical students and nursing students:* Since 1986, courses in rehabilitation medicine have been included in the curriculum of some medical universities and colleges. The major challenges of rehabilitation education in China are: *i)* Lack of qualified lecturers and teaching materials. *ii)* Conflicts with international standard for specialization of therapist education and market needs in China. *iii)* Training program adopted with China's situation for rehabilitation specialist or physiatrist.

#### PS011-03

### PREPARING REHABILITATION PHYSICIANS FOR COMMUNITY-BASED REHABILITATION

**Zaliha Omar**

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In Malaysia, training of Rehabilitation Physicians is undertaken by Ministry of Higher Education whilst credentialing for practice is done by Ministry of Health. The only Rehabilitation Medicine residency training and certification board has been based at the University of Malaya since 1997. The four-year curriculum spans over eight semesters covering basic sciences of rehabilitation, general clinical practice, core rotational condition-specific rehabilitation, community-based-rehabilitation (CBR) and elective

postings and research. CBR is managed by Departments of Social Welfare and Public Health and non-governmental organizations. Rehabilitation physicians can make a major contribution towards the success, efficiency and effectiveness of CBR for persons with disabilities. The residency training programme helps prepare candidates for such work. The CBR module aims at an in-depth understanding of the conceptual framework of CBR and its relationship to community development at large. Assignments given create opportunities for residents to participate in community development and empowerment processes for persons with disabilities in the community. Examples of tasks include lifestyle survey, application of International Classification of Functioning, Disability and Health, identification of rehabilitative resources, creation of fact sheets, studying the impact of selected rehabilitation programmes on community development, use of information network, etc. Duration is between 6 to 12 weeks. Twenty residents have graduated since the start of the training programme and the majority of them work in the Ministry of Health hospitals from where they provide support for CBR for persons with disability.

#### PS011-04

### EDUCATION AND TRAINING IN KOREA

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Modern Western medicine was introduced in 1885, when Dr. Horace Allen established the first Western medical hospital 'Kwanghye Won', which was the original Severance Hospital, Yonsei University College of Medicine. The concept and programs used in Rehabilitation Medicine for disabled people, in a modern sense, were introduced to Korea during the Korean War, which broke out in 1950. During the war, disabled people became commonplace. In 1953, Amputee Rehabilitation Centers were established in Daejeon and Seoul, especially at the Severance Hospital with the financial support of the Korea Church World Service. In addition, the National Rehabilitation Center was established in Pusan in 1953. Then, in 1959, Children's Rehabilitation Center was established with the financial support of the Korea Church World Service in Yonsei University College of Medicine. It was rebuilt as the first university-based modern Rehabilitation Hospital with 140 beds in 1987. A physiatrist is required to undergo a 4-year training course in an approved program, which places the emphasis of the clinical management of problems associated with disability for the purpose of restoring the disabled person to his optimum level. The management of various musculoskeletal problems was also emphasized. Korean Academy of Rehabilitation Medicine (KARM) provides two annual meetings (spring and fall), monthly seminars and summer training lecture. In addition, KARM conducts an in-training examination to evaluate the quality of resident training annually. We have 76 approved hospitals for resident training for Rehabilitation Medicine among all 243 resident training hospitals in Korea. As the trends for hospitals and doctors, the number of resident training hospitals for Rehabilitation Medicine has increased remarkably from 1 in 1971 to 76 in 2007. Similarly, the number of residents in Rehabilitation Medicine has steadily increased from 13 in 1983 to 364 in 2007 with the increasing number of hospitals. The post-graduate Rehabilitation Medicine M.Sc. course exists at 31 medical colleges, and the PhD course is running at 22 medical colleges now. In 1983, the national board certification system for physiatrists was established and 22 physiatrists were board-certified for the first time in Korea. The number of board-certified physiatrists has also increased from 22 in 1983 to 1049 in 2007. Currently, over 80 new board-certified physiatrists are produced annually.

**PS011-05****20 YEARS OF PM&R EDUCATION AND TRAINING IN INDONESIA***Angela B.M. Tulaar, Peni Kusumastuti**Indonesia Association of PMR Medical Specialist, Indonesia*

Medical Rehabilitation care in Indonesia has been known since the late Professor Dr. R Soeharso in 1947 established The Rehabilitation Center in Surakarta. Due to the increasing demand for rehabilitation care, the Ministry of Health extended and incorporated Medical Rehabilitation care into public hospitals. During the PELITA II, all government hospitals were instructed to develop a Preventive Rehabilitation Unit, which later on became the Medical Rehabilitation Unit (Unit Rehabilitasi Medik). Physicians were sent abroad to have Specialty Training in Physical Medicine and Rehabilitation, with the purpose to develop medical rehabilitation care as well as education and training for the Specialty in Indonesia. The PM&R Department at the Faculty of Medicine, University of Santo Tomas in Manila, The Philippines, was chosen as one of the training centers. There were 12 graduates from the center. A Specialty Organization named IDARI (Ikatan Dokter Rehabilitasi Medik Indonesia) or The Association of Indonesian Rehabilitation Medicine Specialists, was established in 1982. After a long struggle, finally in 1987 the Specialty with its Residency Training Program was recognized in the three Universities' Faculty of Medicine, namely, The University of Indonesia, Airlangga University and Diponegoro University, and a National catalogue was then published. A special body for education and training was included in the Professional organization IDARI, which is responsible for matters of PMR Specialty Education and Training. A National Board Examination was developed in 1991 to improve the quality of the graduates, which exists until now as the Biannual National Board Examination. Later on 2 more centers joined in for Residency Training Program, at the Faculty of Medicine University of Pajajaran, Bandung and the Faculty of Medicine University of Sam Ratulangi, Manado. The Curriculum undergoes periodic evaluations and revisions and has developed 7 divisions: Neuromuscular, Musculoskeletal, Pediatric, Geriatric, Cardiovascular, Pulmonary and Sports Injury Rehabilitation. Networking with satellites hospitals and institutions around the Training Centers help maximal utilization of the training facilities. For years, the educational program for PM&R specialty training continues to improve through seminars, symposiums, workshops and annual scientific meetings with inputs from renowned experts of other countries, authors of PM&R books and overseas lecturers. Board Re-Certification was implemented in 2007 for all PM&R specialists practicing in Indonesia. Since 1987 and up till 2007 the PM&R Residency Training Program of the 5 training centers have produced 315 PM&R specialists, now serving various areas of the country. In the highest educational ladder, it has produced several PhDs. Fellowship/subspecialty training (Sp2) is planned. At the moment there are 112 residents registered throughout the 5 training centers. In the community level, the Indonesian PM&R together with its sister organization, now known as the PERDOSRI, participate and play an active role in a number of projects, such as the Post Tsunami Rehabilitation in Aceh, Post Yogyakarta Earthquake and during the Poliomyelitis outbreak in Sukabumi, Lebak, and Serang.

**PS011-06****REHABILITATION MANAGEMENT IN LAOS***Bouathep Phoumindr**National Rehabilitation Medicine, Laos*

Rehabilitation Medicine is a medical branch which is very useful in the world, but in Laos it is a new one and less popular. Thirty

years ago, only physical therapists handled all patients for functional reeducation. In case of severe condition, they would be transferred to the National Rehabilitation Center in Vientiane capital where a physical therapist was the vice director. World Health Organization and Ministry of Public Health created five branches of medicine: Primitive Medicine, Preventive Medicine, Curative Medicine, Disability limitation, and Rehabilitation Medicine. Only the first and second are fully supported by the government, the rest are just partially. The main health issues for Laos population are chronic diseases such as Diabetic, Hypertension, Musculoskeletal pain and Stroke but the diagnosis and treatment are not properly handled. Therefore, Rehabilitation Medicine took up the role and tried to meet the need of this aspect of patient care. To lay the ground work, it is very important to include rehabilitation in the curriculum for medical students. We started to develop this field in 1995 and lectures were given to medical students in 1997. This curriculum was reviewed and revised completely in 2002. In 2003, the Rehabilitation medicine training was organized and run by physiatrists. Because of the large number of medical students, theory lectures were delivered with the help of orthopedic surgeons and medical doctors who had attended a short training course in this field in Thailand. Our strategic plan for the next two years is to promote this field and push the Laos government to establish rehabilitation medicine units in provincial hospitals, and then organize a short training course for physicians from rural hospitals.

**PS011-07****SURVEY ON ASIAN OCEANIA EDUCATION AND TRAINING IN PHYSICAL & REHABILITATION MEDICINE**

*Tai Ryoan Han<sup>1</sup>, John Olver<sup>2</sup>, Habibur Rahman<sup>2</sup>, Victor Frederick Voerman<sup>2</sup>, Jianan Li<sup>2</sup>, Simon F.T. Tang<sup>2</sup>, Leonard S.W. Li<sup>2</sup>, Ajit Kumar Varma<sup>2</sup>, Angela B.M. Tulaar<sup>2</sup>, Young Jin Ko<sup>2</sup>, Bouathep Phoumindr<sup>2</sup>, Zaliha Omar<sup>2</sup>, Balinnyam Avirmed<sup>2</sup>, Shaun Xiong<sup>2</sup>, Teresita Joy P. Evangelista<sup>2</sup>, Karen Chua Sui<sup>2</sup>, Sukayan Pongprapai<sup>2</sup>*

*<sup>1</sup>President, <sup>2</sup>Council Members, Asian Oceania Society of Physical and Rehabilitation Medicine*

*Objective:* This is a study to investigate the current status of education and training of PRM in Asia and Oceania regions. *Methods:* I sent a questionnaire via e-mail to each representatives of PRM in 19 Asian and Oceania countries which are the members of AOSPRM. The questionnaire contains 8 questions about national organization, current status of education and training in residents and undergraduate medical students. Each question has several sub-questions. *Results:* We received answers from representatives of all 19 countries. Among these countries, 18 countries have national organization of PRM. Organizations of 17 countries are members of international organization and most of them have some regular meetings including scientific meetings. PRM is a regular curriculum for the undergraduate medical student in 16 countries. 17 countries have specialist training of PRM. In these countries, 6 countries have 3 year training course and 4 countries have 4 year training course. 15 countries have board certification examination of PRM and 16 countries have some continuing medical education program of PRM after resident training. All countries have specialists of PRM, but Brunei and Laos have only one PRM doctor. 9 countries have government support for specialty training. 7 countries have subspecialty or fellowship program. 7 countries have additional overseas training program or scholarship for the young faculties of PMR. 10 countries have some program or scholarship for overseas trainee from other countries. 13 countries need assistance from the overseas organizations for



specialty training and 11 countries need special offer to attend the international PMR academic meetings. *Conclusion:* In 19 Asian and Oceania countries which are the members of AOSPRM, most countries have national organization and specialist training program of PMR. However, many countries still need assistance from other countries. So, PRM is still a beginning stage in the Asia and Oceania region and mutual collaboration would be mandatory for the development of PRM in this region.

#### PS012-01

### GERIATRIC REHABILITATION: CURRENT CONCEPTS

#### Ian Cameron

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*Objective:* Older people are a rapidly expanding segment of the population in most countries. Disability is more prevalent in older people than in other age groups. *Methods:* The presentation is a narrative review and commentary. *Results:* Older people make up the majority of participants in general rehabilitation programs. 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 premorbid 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. Contemporary rehabilitation practice is not confined to traditional inpatient rehabilitation units; it also occurs in the community and other non-hospital settings. *Conclusions:* Evidence suggests that rehabilitation for older people involving a coordinated multidisciplinary team of health professionals (including nurses and doctors) is effective.

#### PS012-02

### FALLS IN ELDERLY STROKE PATIENTS: RISKS AND PREVENTION

#### Ta-Sen Wei

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Accidental falls are a high risk, high volume and multi-factorial problem for stroke patients. It is also a quality index for patient care during hospitalization. Past studies have identified predisposing risk factors for stroke falls such as unstable balance, asymmetrical gait pattern, poor functional performance, spasticity, insufficient muscle strength, depression, incontinence, visual impairment, sedative medications, and environmental hazards. Hip fracture is a serious fall-related injury and an important cause of mortality in stroke patients. Research has showed several independent risk factors of fall-related hip fractures which include direct impact, transferring during standing and without support when fell. Because of the high heterogeneity of patients' conditions (severity, co-morbidity, healthcare support and culture), adequate screening and evaluation of risk factors of falls are crucial for development of prevention and intervention strategies. Objective laboratory tests, such as computerized gait and balance tests, and surface electromyography, provide essential clues for early intervention. To avoid excessive medical expenditure and manpower consumption, prevention should be focused on common, easy-to-fix, and effective-to-modify risk factors. To improve fall prevention and body control for previous fallers and those with high risk of falls, multidisciplinary interven-

tion programs such as awareness education of fall risks, reviewing drug prescriptions, appropriate gait training, reduction of spasticity (especially gastrocnemius), aggressive psychological management and modifications of hazardous environment are essential.

#### PS012-03

### PREVENTIVE GERIATRICS: AN OVERVIEW FROM TRADITIONAL CHINESE MEDICINE

#### Dahong Zhuo

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The philosophical tradition of Chinese geriatrics contains a strong preventive element closely tied to the concept of a balanced man-nature relationship and body-mind relationship. It has been emphasized that a sound mind in a sound body is essential to longevity. Moderation in physical and emotional activities is encouraged. There have been a number of approaches to longevity in traditional Chinese medicine. The preventive value of Tai Chi Chuan (a gentle "Spiritual" exercise), Chi Kung (a combination of breathing exercise, relaxation and meditation), acupressure and moxibustion on the point of Chu San Li, and tonic herbal medicines like ginseng will be discussed in this lecture. These are regarded to be helpful in improving the general health of the elderly and in promoting longevity.

#### PS013-01

### FALLS, FRACTURES AND OSTEOPOROSIS IN THE STROKE PATIENT

#### Jorge Lains

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*Objectives:* Prevention of falls and fractures must be included in the stroke patient rehabilitation care. *Methods:* Falls are among the most common and serious complication after stroke. Hemio-osteoporosis, i.e., bone mineral loss in the affected extremities relative to the intact contra-lateral side has been demonstrated. A hip fracture after stroke constitutes a serious setback in rehabilitation. *Results:* 40% of people fall within the first year after a stroke and they are up to 4 times more likely to sustain hip fractures. Falls in inpatients range from 14% to 64.5%; in community-dwelling stroke patients the incidence of one-time fall varies from 23% to 73%, and multiple falls from 12% to 47%. Hip fractures usually affect the paretic side due to higher risk of falling toward the paretic side, reduced ability to break the fall and the presence of hemio-osteoporosis. Bone loss is greater in stroke patients, with 4–7% differences in bone mineral density between the paretic and non-paretic femoral neck. The determinants of bone mineral loss are duration of hemiplegia-induced immobilization and severity of palsy. Most falls happen while walking, turning and during sit-to-stand activities and fallers mention loss of balance, misjudgment and lack of concentration. After a stroke, motor performance is consistently under conscious control and the execution of activities demands concentration and attention. *Conclusions:* The combination of impaired balance and gait, impaired cognition including perception difficulties, increases fall risk in post stroke patients. Increases in fall risk, in combination with hemio-osteoporosis, means that stroke patients are more prone to suffer fractures. Prevention of falls and hemio-osteoporosis must be included in routine assessment, treatment, and rehabilitation of stroke patients.

**PS013-02****STROKE REHABILITATION AND ADL IN JAPAN*****Satoshi Miyano****Director of Health Counseling Room of LeoPalace Resort Guam, USA*

**Objective:** ADL is one of the important evaluation tools to assess the efficacy of rehabilitation outcomes for stroke patients. Transfer activities of Barthel index, Katz score and FIM scale do not include abilities of standing up from the floor and bath-tub transfer. There is a need to evaluate abilities of stroke patients to stand up from sitting on the floor and the bath-tub transfer in Japan. **Methods:** We evaluated ADL and transfer abilities including standing up from the floor and bath-tub transfer for in-patients and out-patients with stroke in Japan. Subjects were 1018 in-patients and 141 out-patients with stroke in Japan. **Results:** Sixty-six percent became independent or modified independent in ADL after 70-day in-patient rehabilitation treatment. Sixty-one percent of the patients went back to their own homes, but 33% were transferred to another hospitals or long term care facilities. We evaluated 141 out-patients, and about 70% of them were able to stand up from the floor and bath-tub transfer independently. Walking distance was well correlated with transfer abilities, and among the patients who could stand up from the floor, 95% was also independent of bath-tub transferring. **Conclusion:** It is important to assess transfer activities including standing up from the floor and bath-tub transfer for stroke patients in Japan.

**PS013-03****TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON ACUPUNCTURE POINTS OF STROKE IMPROVED CEREBRAL BLOOD FLOW AND ELECTROPHYSIOLOGICAL ACTIVITIES OF THE BRAIN*****Tiebin Yan****Department of Rehabilitation Medicine, Second Affiliated Hospital, Sun Yat-sen University, Guangzhou, China*

**Objective:** To investigate whether transcutaneous electrical nerve stimulation (TENS) on the acupuncture points of the affected extremities of stroke subjects improves the cerebral blood flow and electrophysiological activities of the brain. **Methods:** Fifty-one subjects with first stroke, age;  $65 \pm 14.1$  years,  $5.5 \pm 3.3$  weeks post-stroke were recruited and randomly divided into two groups, TENS and control group in part one, TENS and sham TENS group in part two. Electrodes of TENS were applied on the acupuncture points of the affected extremities for 60 min. In part one ( $n=22$ ), regional cerebral blood flow was examined using single positron emission computerized tomography on two sessions with an interval of 60 min for either TENS treatment or just rest on site, respectively. In part two ( $n=29$ ), somatosensory evoked potentials were recorded twice within one session before and after TENS or sham TENS treatment on the same acupuncture points. **Results:** When compared with the control or sham TENS group, subjects in the TENS group demonstrated significant improvement of the cerebral blood flow in both affected area and the contra-lateral mirror imaging area in part one. Improvements were also found in the latency and amplitude of both N9 and N20 in the affected side in part two. The amplitude was larger and the latency was shorter. The percentage of changes was significantly different between the two groups in the study. **Conclusions:** Sixty min of TENS on the acupuncture points of the affected limbs improved the cerebral blood flow and the electrophysiological activities of the brain in subjects with first stroke.

**PS014-01****ROLE OF ALTERNATIVE MEDICINE IN REHABILITATION*****Sae-il Chun****Pochon CHA University, Seoul, Korea*

The ultimate goal of eliminating diseases and maintaining normal health is the same among Western medicine, oriental medicine and alternative medicine. At present, Western medicine tends to take a more scientific technological approach in its practice while the oriental medicine still maintains a more humanistic approach. 5000-year-old traditional medicine still challenges the 21<sup>st</sup> century scientific modern medicine in the field of clinical practices. The "disease-oriented" western medicine dichotomizes the body condition as "diseased and non-diseased" states. On the contrary, the "health-oriented" oriental medicine classifies it into "healthy and unhealthy" states. For the maintenance of normal health, five principles are emphasized. They are "eat right", "move right", "sleep right", "breathe right", and "mind right". To reverse an unhealthy condition back to normal healthy state, the methods of natural substance therapy, exercise therapy, and stimulation therapies including acupuncture, moxibustion, finger pressure, and cupping techniques. In order to eliminate the diseases, four distinct approaches namely chemical, physical, psychological, and surgical treatments are utilized. Recent international trend of globalization has brought an information explosion and transcultural exchange of science, technology, arts and medicine. There are so many different kinds of traditional medicine, hidden popular folk medicine, and various less recognized techniques and theories of healing arts. Some are originated in oriental culture while others are originated in Western culture. Authorities of Western medicine claim that only information clarified or proven by objective and scientific methodology can be recognized as a part of Western (orthodox or conventional) medicine and that all other forms of traditional medicines, folk medicines, and many other unorthodox medical techniques and theories are collectively labelled as complementary alternative medicine. Most experts are aware of the fact that traditional oriental medicine occupies relatively larger portions of clinical practices and basic researches among all the complementary alternative medicines. Above all, acupuncture maintains higher academic and research interests both in Western culture and oriental culture alike. There is clear evidence that the western medicine and oriental medicine are complimentary to each other, and that the oriental medicine and rehabilitation medicine share much in common regarding "whole person oriented" and "integrative approach". Acupuncture has great potential and a very important role in rehabilitation medicine.

**PS014-02****THE APPLICATION AND DISCUSSION OF THERAPEUTIC METHODS IN TRADITIONAL CHINESE MEDICINE IN REHABILITATION MEDICINE*****Juntao Yan****Rehabilitation Department, Yueyang Hospital Affiliated to Shanghai University of Traditional Chinese Medicine, Shanghai, China*

**Objectives:** To study the clinical application of therapeutic methods in Traditional Chinese Medicine (TCM) in rehabilitation medicine. **Methods:** TCM is a comprehensive system in academic medicine. The therapies in TCM had long history, abundant clinical experience and wealthy literature resources. Based on the studies of basic theory and clinical applications of TCM-based internal and external treatments, I will discuss the usefulness of TCM therapies for the rehabilitation of various diseases. **Results:** With

TCM therapies, the treatment period was shortened noticeably and patients' quality of life was improved significantly for diseases of the nervous, locomotor and circulatory systems. The application and timing of TCM therapeutic methods in some diseases needed to be explored further. *Conclusions:* Because of its therapeutic effect in rehabilitation medicine, TCM is attracting more attention now. There is no doubt that it will further enhance the development of rehabilitation medicine.

#### PS014-03

### TRADITIONAL CHINESE MEDICAL REHABILITATION – IT'S OPPORTUNITIES AND CHALLENGES FACING THE MODERN REHABILITATION MEDICINE

#### *Shifang Zhou*

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The practice of traditional Chinese medical rehabilitation (TCMR) has been facing a big change in its opportunities and challenges in the midst of the modern rehabilitation medicine. *Opportunities:* 1) The correlation factors between the theories and concepts behind the traditional Chinese/Oriental medicine and the modern medicine have achieved certain mutually shared agreements. One of the fundamental conceptual principles in the practice of Chinese medicine is “Yin” and “Yang”. It explained the complex relationship between human body and the influencing factors from the external environment, emphasizing comprehensive integration/unity of the internal and external environmental factors. It specifically focused in the “internal energy” which literally refers to the human body's power of resistance to illnesses. The modern medicine's concepts and theories in health have changed from the simple biologic model to the more complex biologic – psychological – social model. Such a change has facilitated the finding of more closeness and commonality in the principle concepts of the two types of medical practice. The TCMR practice largely emphasized on improving and/or adjusting the “internal energy”, using modalities like “qi kung”, “tai chi”, etc. 2) TCM treatments have its unique useful applications to overcome certain dysfunctions in the rehabilitation management. There are quite a number of functional problems such as spasticity, chronic pain, bladder & bowel dysfunctions, dysfunctions of autonomic nervous system, etc. that the modern medical rehabilitation treatment modalities cannot offer good and sustainable outcome solutions. The TCMR practice however, has a great potential to solve these rather difficult functional problems. 3) The practice of TCMR, in general highlights much of its value in preventive measures which is an important factor described in the modern rehabilitation medicine. China's society is gradually moving into an aging population. The concepts of healthy living, longevity, and rehabilitation in the Chinese medicine when appropriately applied, will be able to induce a very prominent and effective outcome for the geriatric medical problems. *Challenges:* 1) The philosophical principles of modern medicine and Chinese medicine have a big difference. This leads to marked variations in the results of research studies conducted separately under these two types of medicine. The approach of TCM emphasizes on the practitioner's experience, reasoning, broad analysis and correlation of the whole body systems in its evaluation of assessment findings. On the other hand, the modern medicine focuses more on findings of detailed microscopic assessments. Most of the treatment methods in Chinese medicine practice are usually combined multi-modalities. It is therefore rather difficult to conduct isolated or elemental analysis for its outcomes. How to evaluate the treatment outcomes in Chinese medicine and thus applying

it scientifically is still a big and difficult challenge. 2) Sense of urgency. The mode of historical development of TCM and language are the major barriers to achieve effective communications with international bodies. But the practitioners of TCM themselves do not have much awareness about these.

#### PS015-01

### THE EARLY DIAGNOSIS OF CEREBRAL PALSY; RECENTLY ADVANCED NEUROIMAGING TECHNIQUES

#### *Chang-Il Park*

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*Introduction:* Cerebral palsy (CP) is a disorder of movement and posture resulting from a non-progressive injury to an immature brain. In Korea, the incidence of CP is approximately 2.7 per 1,000 live births. The Korean hospital-based epidemiologic studies in the early 1980s reported that the frequencies of the spastic type CP ranged from 36.5% to 64.4%. Recently, according to data from 1,544 patients (1998–2006) in our institute, the most common type was spastic CP in 89.6% and followed by mixed and athetoid type. *Diagnosis:* Infantile brain is more adaptive and plastic than adult brain. In addition, abnormal postural reaction and muscle tone specific to CP are not apparent during infantile period and it is easy to normalize and prevent the joint contractures and deformities in this period. Therefore, the early diagnosis and intervention are very important in order to improve the therapeutic outcome in CP. However, making a definite diagnosis of CP is not always easy, especially during infantile period. According to our study, the most significant signs for detecting the brain dysfunction before 6 months of age are motor developmental delay, abnormal muscle tone and abnormal postural reactions. In addition, various neuroimaging techniques can assist the diagnosis. Periventricular leukomalacia (PVL) due to hypoxic ischemic insults is believed to be one of the major etiologic factors in children with spastic CP. However, children with spastic CP do not always have PVL and the exact correlation between brain damage and motor impairments still remains unclear. Conventional MRI has been unable to provide sufficient contrast to decipher fiber tract organization in the white matter. However, recently developed diffusion tensor image (DTI) can demonstrate the orientation and integrity of white matter fibers *in vivo*. DTI makes possible the visualization and appreciation of white matter tracts in the brain and provides important information about brain connectivity. In addition to morphological and anatomical abnormalities, various neurotransmitters are involved in the pathogenesis of CP. For example, GABA is a well-known inhibitory neurotransmitter in the human brain, but also known to generate an excitatory action in an immature brain and may lead to brain damage. In our study, using a recently developed positron emission tomography tracer, [18F]-fluoroflumazenil (FFMZ), which binds to the subunit of the GABAA receptor, [18F]-FFMZ bindings increased significantly in the entire bilateral precentral gyri in both patients with and without PVL. The etiological mechanisms of altered regional GABAA receptor binding in spastic CP patients are still unknown. However, these alterations of receptor binding might play an important role in the pathogenesis of motor dysfunction and spasticity in spastic CP. *Conclusion:* The early diagnosis and intervention are very important in order to improve the therapeutic outcome in CP, because infantile brain is plastic and grows fast. Motor developmental delay, abnormal muscle tone and abnormal postural reactions are very useful for detecting the brain dysfunction before 6 months of age. In addition, various newly developed neuroimaging techniques can assist the diagnosis.



**PS015-02****ADVANCES IN THE NEUROMOTOR REHABILITATION OF CHILDREN WITH CEREBRAL PALSY*****Joe Watt****Department of Pediatrics, Physical Medicine and Rehabilitation, University of Alberta, Edmonton, Alberta, Canada*

The World Health Organization (2001) International Classification of Functioning, Disability and Health provides an excellent framework in the rehabilitation of children with cerebral palsy. It mandates the assessment of all modalities used in treatment, to ensure that the perceived benefits translate into improved body structure, body function, ability and participation. Systematic reviews have found lack of convincing evidence of efficacy of conventional therapeutic modalities, including passive stretching, casting, orthotics and various developmental therapies. Spasticity management, using botulinum toxin A, selective dorsal rhizotomy and intrathecal baclofen pump, were the foci of intensive research and hope in the improvement of function and quality of life in children with cerebral palsy. Orthopedic surgery continues to be used to improve gait and treat deformities. Instrumented gait analysis adds objectivity to the decision in surgical intervention and provides accurate outcome evaluation in ambulatory children. Recently, strength training, fitness training, partial weight-relieve and under-water treadmill, have shown some encouraging results in motor performance. Constraint-induced therapy, Hand-Arm Bimanual Intensive Training and Goal Oriented Training have shown objective benefits in children with hemiplegic cerebral palsy. The many new outcome measures, fMRI and better research methodology help to demonstrate the efficacy of the newer treatment modalities. However, many alternative therapies are commonly practiced and propagated, in spite of research which showed no evidence of efficacy. Others are simply not being researched scientifically. More research is needed to understand the efficacy of all modalities used in the rehabilitation of cerebral palsy.

**PS015-03****INTEGRATION OF TRADITIONAL CHINESE MEDICINE (ACUPUNCTURE) WITH WESTERN MEDICINE FOR NEUROREHABILITATION OF CHILDREN WITH NEURODEVELOPMENTAL DISORDERS*****Virginia Wong****Division of Child Neurology, Developmental Paediatrics, Neuro-Habilitation, Department of Pediatrics and Adolescent Medicine, The University of Hong Kong, Hong Kong SAR*

We had started an innovative tripartite Program of "Child Neurology/Developmental Paediatrics/Neurorehabilitation" within Queen Mary Hospital and Duchess of Kent Children's Hospital since 1985. In 1998, we had conducted a pilot program of "Integration of Traditional Chinese Medicine and Western Medicine" in the Department of Paediatrics & Adolescent Medicine of the University of Hong Kong. We used objective outcome measures including neuroimaging such as functional MRI and PET scan of the brain to assess the outcome of acupuncture. After performing case studies of around 100 children with chronic neurological diseases, we attempted to use evidence-based medicine approach to assess the efficacy of acupuncture. We had performed 5 randomized control trials for Autism Spectrum Disorder and 1 for cerebral palsy. Pilot studies of case cohorts were conducted for Cortical Visual Impairment and drooling. Case studies on diseases which

had not shown further improvement with conventional Western Medicine Neurorehabilitation Program were also studied, including chronic facial palsy and oromotor dyspraxia. The results of our pilot "Integration of Traditional Chinese Medicine and Western Medicine" for children with neurodevelopmental disorder will be highlighted.

**PS016-01****JOBREHAB - AN INNOVATIVE MODEL FOR A JOB-ORIENTATED REHABILITATION PROGRAM FOR WORKERS OF THE AUTOMOBILE AND LOGISTIC INDUSTRIES*****Christoph Gutenbrunner, JobRehab working group****Department for Rehabilitation Medicine, Hannover Medical University, Hannover, Germany*

**Objective:** In patients with low back pain rehabilitation in close cooperation with industrial medicine is more effective than rehabilitation alone. In Germany the lack of cooperation between rehabilitation measures and the industrial medical services has been criticised repeatedly. The project JobRehab was implemented to develop a job-oriented rehabilitation program for workers with musculoskeletal conditions. **Methods:** The program has been developed by a working group including all relevant players in rehabilitation as well as scientific institutions (car factory, logistics company, rehabilitation departments, pension and health insurances). The implementation has been evaluated. **Results:** The agreed concept comprises the following elements: 1) Improved communication between industrial health services and rehabilitation departments. 2) Orientation of the interventions at the special needs of the given workplace. 3) Demand-oriented rehabilitation programs. 4) Participation of the workers at their own free will. 5) Education of all players in the process. The evaluation ( $n=65$ ) shows that most of the patients suffer from low back pain (61.5%) and from complaints of the cervical spine (20.0%). The rehabilitation doctors rated the information given by the industrial physicians as relevant (22.9%) or very relevant (56.3%). The quality of the medical report from the rehabilitation departments was rated by the vocational physicians in the majority as good (59.1%) or excellent (38.6%). **Conclusions:** The results show that the communication between rehabilitation centres and industrial health centres can be optimized. The exchange of information is useful both for rehabilitation doctors and the industrial health services. The participants give very positive ratings.

**PS016-02****RESEARCH CHALLENGES AND OPPORTUNITIES IN THE PREVENTION OF MUSCULOSKELETAL INJURY AND DISORDER IN THE OCCUPATIONAL SETTING*****Tony Parker****Institute of Health & Biomedical Innovation, Queensland University of Technology, Kelvin Grove, Australia*

Musculoskeletal injuries and disorders represent a major occupational health problem facing many industries and the associated personal and industry costs increases the importance of prevention strategies. Epidemiological data has identified a number of key physical and psychological risk factors associated with musculoskeletal injury and disorder. These include heavy lifting, forceful manual exertions, repetitive motion patterns, insufficient recovery time and dynamic or static non-neutral



body postures. Reducing exposure to these risk factors is a major goal of injury prevention strategies including ergonomic interventions, enhancement of fitness and education and training in manual handling. While these strategies have been partly successful in reducing the number of musculoskeletal injuries, their incidence remains high and may increase with an increasingly older workforce. Many disorders may occur in response to acute or cumulative damage and in the workplace may reflect progressive exposure to physical risk factors. Differentiation between acute and chronic injury is difficult due to the lack of reliable measures to monitor the impact of lower and higher frequency loads. Thus new strategies are clearly required to address this persistent problem and reduce the costs borne by industry, the community and individual workers. This presentation will discuss the outcomes of research conducted by our group designed to develop new and practical devices and technologies to measure the degree of exposure in physically demanding occupations and the influence of this exposure on musculoskeletal structures and work physiology. Implications for the design of work practices to prevent injury and rehabilitation following injury will also be discussed.

#### PS016-03

### A MULTIDISCIPLINARY APPROACH FOR DYSPHAGIA MANAGEMENT IN THE PHILIPPINES

***Reynaldo R. Rey-Matias***

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Dysphagia is experienced by as many as 50–75% of stroke patients and is responsible for the majority of aspiration pneumonia. The Agency for Health Care Policy has estimated that over 60,000 people die each year from aspiration pneumonia in the US. Aspiration in relation to swallowing is the entry of food into the airway below the vocal cords at anytime before, during or after the swallow. In the Philippines, a multidisciplinary program for dysphagia management called MD SAFE (Multidisciplinary Screening for Aspiration Free Environment) addresses this problem. The physiatrist, the otorhinolaryngologist, the neurologist, the radiologist, pulmonologist, geriatrician together with the speech, occupational therapist and the nurses coordinate with each other for the evaluation and management of dysphagia patients after stroke. According to the pathophysiological mechanisms of swallowing dysfunction, a rehabilitation program involving compensatory strategies such as postural changes and diet restraint which alters the way food flows through the oral cavity and pharynx, usually have an immediate effect to reduce aspiration. Treatment also includes exercise programs designed to have long-term effects on neuromuscular control. If a patient needs further intervention a gastroenterologist or surgeon can come in to help as shown by the protocol.

#### PS017-01

### PULMONARY REHABILITATION IN PATIENTS WITH NEUROMUSCULAR DISEASE

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In neuromuscular disease (NMD) patients with progressive muscle weakness, respiratory muscles are also affected and hypercapnia can increase gradually as the disease progresses. The

fundamental respiratory problems NMD patients experienced are decreased alveolar ventilation and coughing ability. For these reasons, it is necessary to precisely evaluate the pulmonary function to guide provision of proper inspiratory and expiratory muscle aids in order to maintain adequate respiratory function. As inspiratory muscle weakness progresses, NMD patients experience hypoventilation. At this point, respiratory support by mechanical ventilator should be initiated to relieve respiratory distress symptoms. Patients with adequate bulbar muscle strength and cognitive function can use a non-invasive ventilation aid, via a mouthpiece or a nasal mask, to resolve their hypercapnia and other associated symptoms. To assist coughing effectively, it is necessary to provide additional insufflation to patients with inspiratory muscle weakness before using abdominal thrust. Another effective method for managing airway secretions is a device which performs mechanical insufflation-exsufflation. In conclusion, taking into consideration the disease characteristics and attending to the fundamentals of the respiratory dysfunction, application of non-invasive respiratory aids has made it possible to maintain a better quality of life and to lengthen the life span of patients with NMD.

#### PS017-02

### THE ROLE OF EXERCISE IN CARDIAC REHABILITATION

***Terence Kavanagh***

*Graduate Program in Exercise Science, Faculty of Physical Health and Education, University of Toronto, Toronto, Canada*

Exercise therapy has played a role in the rehabilitation of patients with heart disease since the mid-19<sup>th</sup> century. Initially the approach was pragmatic, with the goal being alleviation of angina and improvement in functional capacity. More recently a Cochrane review of 48 randomized controlled trials indicated that patients entered into an exercise-based comprehensive cardiac rehabilitation program had a 20% and 26% reduction in all-cause and cardiac mortality, respectively, when compared with those receiving usual care. Interestingly, there was no difference in mortality between exercise-only and comprehensive programs. Physical fitness, considered a surrogate for physical activity, has now been shown to be a significant predictor of cardiac and all-cause mortality. As such, it should be incorporated into a risk stratification procedure for individuals with suspected or established vascular disease. Questions remain as to 1) the degree to which one's genotype contributes to exercise capacity, 2) whether the improvement in survival in patients attending a cardiac rehabilitation program is dependent on an improvement in physical fitness or an increase in physical activity, and 3) the mechanisms by which physical exercise benefits the cardiovascular system. These and related subjects will be addressed.

#### PS017-03

### EFFECTS OF TAI CHI CHUAN IN HEALTH PROMOTION

***Alice M.K. Wong***

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Tai Chi Chuan (TCC) was originally developed as a Chinese martial art. It has also been used as an exercise for health promotion in recent centuries. TCC has gradually become a popular exercise in the Western world and investigations are flourishing to establish its benefits. In the series of TCC study at National

Taiwan University Hospital, the rate of decline in  $\text{VO}_2$  max was nearly twice as fast in sedentary elderly as compared with those who practiced TCC regularly. When commencing TCC, the  $\text{VO}_2$  showed a fast increase in the first 3 min, and then achieved a steady-state til the end of exercise. During the steady-state, the  $\text{VO}_2$  was 20–22 ml/kg/min. Twelve months TCC training was effective for improving physical fitness in the elderly. One year TCC practice in patients with coronary artery bypass surgery showed enhanced cardiorespiratory function. In Chang Gung University of Taiwan, TCC on vasodilator function was studied by impedance plethysmography in subject's lower leg. Hyperemic arterial inflow in the elderly TCC practitioners was higher than the sedentary elderly control, and this was not significantly different from the young sedentary group. The TCC group also showed a higher level of nitric oxide metabolite (endothelial-dependent vasodilator) before and after exercise than the control group that represent better percutaneous microcirculation. For postural control study in TCC practitioners using sensory organization test, under more challenging conditions, the TCC group showed better postural control with simultaneous perturbation of vision and proprioception, and performed better in rhythmic forward-backward weight shifting test. Motor control in TCC elderly, as reflected by eye-hand coordination study, was better with reduction of displacement, movement time, pause time and skewness coefficients than the control group. Recent study in Chang Gung Retirement Village showed that one year regular TCC practice in elderly had better  $\text{VO}_2$  max, stronger back muscle strength, lesser body fat, better balance function and reaction time than control group, which might suggest that TCC practice had positive effect in overall exercise fitness for the elderly. Research evidence support that TCC practice has beneficial improvement on cardiovascular function, balance, flexibility, strength, kinesthetic sense and motor control. It is a holistic coordination exercise, with low velocity, low impact, low cost and easily accessible, is hence suitable for implementation from young to old age.

#### PS018-01

### VALIDATION OF CLINICAL INSTRUMENT FOR USE IN ASIA – FROM THEORY TO CLINICAL PERSPECTIVE

**Chetwyn C.H. Chan**

*Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong SAR*

In this presentation, the theories underlying construction and validation of clinical instruments will be explained. The classical model of validity which is commonly adopted by clinicians and researchers in rehabilitation medicine will be illustrated by our prior work on validating the Barthel Index and Cognistat for use in Chinese population. The concepts of structural and item analyses will be further elaborated with the Chinese version of Elderly Mobility Scale and URICA for chronic diseases. The importance and pitfalls of gathering evidence on reliability will be covered by our work on work capacity evaluation systems - BTE and VALPAR. The presentation will be concluded with comments on newer developments in measurement such as item response models.

#### PS018-02

### THE DEVELOPMENT AND APPLICATION OF INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH IN CHINA

**Zhuoying Qiu**

*Research Institute of Rehabilitation Information, China Rehabilitation Research Center, Beijing, China*

*Objectives:* The International Classification of Functioning, Disability and Health (International Chinese Version) had been developed and applied in many areas. This presentation will cover the development of ICF (International Chinese Version) and outline its applications in population, clinical, administrative and informational and social policy levels. *Methods:* The principles and approaches for the development of ICF (International Chinese Version) will be discussed. Four strategies had been adopted in the applications of ICF. *Results:* Progress had been made in the development and applications of ICF in disability statistics, disability certification within the ICF framework, clinical rehabilitation services and disability related policy development. *Conclusions:* The ICF (International Chinese Version), which had been developed and standardized, would have wide applications in census-based statistics of disability, clinical services, administrative and informational support, and social policy development and implementation.

#### PS018-03

### CURRENT STATE OF THE APPLICATION OF THE ICF IN PHYSICAL MEDICINE AND REHABILITATION

**Gerold Stucki**

*Department of Physical Medicine and Rehabilitation, ICF Research Branch WHO CC-FIC (DIMDI), Institute for Health and Rehabilitation Sciences, Ludwig-Maximilian University Munich, Germany. Swiss Paraplegic Research, Nottwil, Switzerland*

Rehabilitation medicine can be defined as the medicine of human functioning. Therefore, the international classification of functioning, disability and health (ICF) as approved by WHO in 2001 is of utmost importance for our specialty. The ICF is the basis for the conceptualisation of the rehabilitation strategy encompassing the curative, preventive and supportive health aspects. The ICF and the ICF-based conceptualisation of the rehabilitation strategy are again the basis for the conceptualisation of our specialty, the organisation of human functioning and rehabilitation research in distinct scientific fields and the development of research capacity with respect to academic training programs, interdisciplinary university centres and national/international collaboration networks. The conceptualisation, organisation and development of human functioning in rehabilitation based on the ICF are the topic of a number of activities of current publications. In line with these conceptual developments, there is now a wide range of activities throughout the world of rehabilitation in the development of practical tools and applications of the ICF. First of all, the ICF can serve as reference for the comparison, selection and further development of existing measures of human functioning. The Brief ICF Core Sets are the standards for reporting and planning of studies as well as for clinical encounters. The Comprehensive ICF Core Sets are the standards for multidisciplinary assessments for example in the context of rehabilitation medicine. Another important development is the operationalisation of the ICF Qualifiers to directly apply the ICF in practice and research.

## GENERAL LECTURES

## GL01

**HOW TO SUCCESSFULLY SUBMIT A SCIENTIFIC PAPER*****Gunnar Grimby***

*Professor emeritus, Rehabilitation Medicine, Institute for Neuroscience and Physiology, Sahlgrenska Academy at Gothenburg University, Gothenburg, Sweden*

The authors should choose a journal, which matches the nature and potential readership of their research. Look at the mission stated by the journal, the composition of the Editorial Board, and previously published papers. Ask for advice from senior researchers. Read then carefully and follow the Instructions to authors. Be sure that the language is correct and if you are not native speaking in the language, use a language expert. The common review process is that the Editor (or an Associate Editor) sends the manuscript to 2 or more reviewers, which are experienced in the field. They may also use a statistical consultant. Read the comments by the reviewers carefully and answer point by point. If you do not agree, state so and the dialogue will hopefully continue and the manuscript will, maybe after further revision, be accepted for publication. Many journals, however, get so many submitted manuscripts so that a large proportion of the manuscripts are rejected. You should get an explanation why the manuscript has been rejected; if not so, ask for it. Rejection rates and impact factor will be discussed.

## GL02

**STRATEGIES FOR BEING A SUCCESSFUL PHYSICIAN ADMINISTRATOR OF A REHABILITATION PROGRAM*****John L. Melvin***

*Department of Rehabilitation Medicine, Jefferson Medical College of Thomas Jefferson University, Philadelphia, USA*

*Purpose:* The purpose of this presentation is to provide rehabilitation physicians with additional knowledge and suggestions that will assist them in being successful program leaders. *Methods:* The knowledge and suggestions included in this lecture are based upon the experiences and observations of the lecturer. He has had extensive experience in developing, leading and managing rehabilitation programs. *Results:* The following are observations and perspectives the lecturer has found to be important for successful leadership of rehabilitation programs. 1) Organizational leadership is a discipline separate from medicine that has its own complexity, specific definitions and strategies for success. The successful physician leader will devote time, attention and intellectual effort towards learning and understanding this discipline. 2) This learning and understanding is best enhanced through utilizing multiple sources and approaches. a) Knowledge of oneself is important. Individual variations of leaders in their motivations and leadership styles may require different approaches when leading. b) Experiential learning is valuable, whether from personal leadership experiences or observing other leaders. c) Seeking advice from others helps in the implementation of successful programs. d) Feedback is essential for continued improvement of ones leadership. e) Like all disciplines, formal academic programs on leadership, management and administration can add to perspectives and technical skills. 3) Physician leaders are most often relatively weak in strategic planning and the management of personnel and finances. *Conclusions:* Leadership can be learned. Improvement requires an organized plan.

## MEET THE CHINESE EXPERTS

### ME001-01

#### EFFECTS OF LOW FREQUENCY TRANSCRANIAL MAGNETIC STIMULATION ON VISUAL SPATIAL NEGLECT: A PILOT STUDY

*Weiqun Song, Boqi Du, Qian Xu, Yongzhong Li, Yuejia Luo, Mao-Bin Wang*

*Department of Rehabilitation, Xuanwu Hospital, Capital Medical University, Beijing, China*

**Objectives:** The aims of this study are 1) to investigate the effects of low frequency repetitive Transcranial Magnetic Stimulation (rTMS) on patients with unilateral visual-spatial neglect resulting from right brain injury; 2) to study the brain mechanisms of unilateral visual-spatial neglect. **Methods:** 12 patients with left visual-spatial neglect had been treated with repetitive rTMS for 2 weeks, three times a day and 15 min each, the frequency of the stimulation is 1Hz. The stimulant position is the left temporal-parietal cortex. Patients performed a battery of tasks including line bisection, line cancellation before and after one session of the treatment, and the researcher compared one patient's brain activity on attention task before and after the rTMS. The attention task was completed during a rapid event-related fMRI experiment. **Results:** Regarding the behavior data on line bisection and line cancellation tasks, patients showed serious left visual-spatial neglect before treatment. By using the low frequency rTMS, we found the patients' performance improved significantly. This finding can be interpreted by the inter-hemispheric competition in the attentional network. **Conclusions:** There was a significant improvement in visual-spatial performance by using rTMS. The results of our studies support the theory of inter-hemispheric competition in the attentional network. The outcome suggested that using low frequency rTMS might be an effective rehabilitative treatment for patients with unilateral visuo-spatial neglect.

### ME001-02

#### ASSESSMENT AND REHABILITATION OF HUMAN COGNITIVE FUNCTION

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This report represents an updated review regarding cognitive assessment and cognitive rehabilitation strategy, providing an overview of the evaluation and treatment of cognitive dysfunction, from the perception, attention, memory, language, intelligence and overall function to other corresponding aspects. The development of interactive multimedia computer-assisted cognitive rehabilitation strategy could help patients to improve the cognitive function more efficiently. Cognitive assessment is valuable and commonly used for screening of cognitive impairment, rating of the severity of dysfunction, and monitoring disease progression. In clinical practice, detailed cognitive assessments influence the design of cognitive rehabilitation strategy. A wide range of tools has been developed to aid the clinicians in this process. These vary from brief screening tests, such as Mini-Mental State Examination, neurobehavioral cognitive status examination and Loewenstein Occupational Therapy Cognitive Assessment to more comprehensive tools, such as remote neuropsychological assessments and virtual reality technology. Cognitive rehabilitation is defined as a systematic, functionally oriented service to reduce cognitive disability and improve cognitive function through 1) strengthening or reestablishing the previous learned pattern of behavior; 2) establishing the new activity patterns

through compensatory mechanisms for impaired cognitive function; 3) establishing new activity patterns through external compensatory mechanisms (including individual orthosis and environmental support); 4) enabling people to adapt their impairments to improve the overall function and the quality of life. Individualized and structured cognitive rehabilitation programs are effective in facilitating recovery with cognitive dysfunction. Goal management training could improve the self-control, self-management and problem-solving abilities in intelligence disorder patients.

### ME002-01

#### SELECTION OF TREATMENT MODALITIES IN CHILDREN WITH DYSKINETIC AND SPASTIC CEREBRAL PALSY

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To review the different treatment options for children with dyskinetic and spastic cerebral palsy (CP) according to the pathophysiology, neuroanatomy, kinetics characteristic and clinical performance. The main contents are: 1) selecting the treatment methods among passive movement, assistive movement, conductive movement, active movement, the position and movement types of partial and whole, coordination, improving muscle power and muscle tone, endurance and neurodevelopment treatment in physical and occupational therapy; 2) selecting the training methods for language development, breathing control, pronunciation, the tone production, relaxing and stretching in speech therapy; 3) selecting different acu-points, methods, time of keeping the needle and head and body needling; 4) reviewing acu-points selection and treatment principle, technique and procedure of massage in traditional Chinese therapy; and 5) selecting, making and applying adaptive equipments and assistive orthotics for children with two types of CP.

### ME002-02

#### ACUPUNCTURE AND NGF IN CHILDREN WITH CEREBRAL PALSY OF RESTORATION FUNCTION OF PLASTICITY OF CEREBRA

*Zhenhuan Liu*

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**Aim:** To investigate the mechanism of and value of acupuncture in cerebral palsy rehabilitation. **Methods:** 100 spasm cerebral palsy patients from 2 to 7 years old were randomly divided into two groups. 1) *Acupuncture group:* 50 patients were treated with head acupuncture and NGF and body acupuncture. 2) *Rehabilitation training group:* 50 patients were treated with physical therapy of Bobath and Vojta methods. **Results:** The total response rate in the combined acupuncture and rehabilitation training group was obviously higher than that of the sole rehabilitation training group. After treatment the DQ value of combined treatment group was higher than that of rehabilitation group ( $p < 0.01$ ). In the combined treatment group, extent of improvement in dysphasia, brain atrophy on CT scan and recovery on brain SPECT were obvious higher than that of the stand-alone rehabilitation training group ( $t = 4.731$ ,  $t = 5.971$ ,  $p < 0.01$ ). **Conclusions:** Acupuncture can significantly increase cerebral blood flow and improve cerebral cell metabolism, facilitate partial or complete compensation of cerebral function and enhance cerebral plasticity in children with cerebral palsy.



**ME003-01****PHYSIOTHERAPY AND REHABILITATION FOR FEMALE PELVIC FLOOR DYSFUNCTION****Guiru Hua***Peking Union Medical College Hospital, Beijing, China*

Pelvic floor dysfunctions including stress urinary incontinence (SUI) and pelvic organ prolapse (POP) are common and have an adverse impact on the health and quality of life in women, especially for those in the middle and elderly age groups. Pregnancy and childbirth has an important effect on the structure and function of pelvic floor. Physiotherapy and rehabilitation are effective nonsurgical options for this kind of diseases. The management of urinary incontinence with physiotherapy and behavioral therapy aims at strengthening the pelvic muscles and improving the coordination between abdomen and pelvic organ so as to increase the urethral tone; pelvic support and resistance to the elevated intra-abdominal pressure for preventing urine loss. Pelvic muscle exercise with main focus on Levator ani is suitable for mild and moderate SUI and POP through repeatedly contracting and relaxing pelvic muscles. Using biofeedback device helps patients performing exercise correctly and building conditioned reflex. Functional electrical stimulation is used to promote blood circulation, delay muscle atrophy and improve training quality.

**ME003-02****RECENT DEVELOPMENT IN THE PREVENTION, TREATMENT AND REHABILITATION IN OSTEOPOROSIS****Ling Li***Department of Rehabilitation Medicine, The First Affiliated Hospital of PLA General Hospital, Beijing, China*

Combined therapy is always used in the prevention and therapy of osteoporosis. Appropriate diet, drug treatment and physiatric training modalities can increase intestinal absorption of  $Ca^{2+}$  and bone density, prevent the loss of sclerotin and decrease the incidence rate of fall. In this article, we described recent development in the prevention and treatment of osteoporosis (include diet, drug treatment and physiatric modalities): 1) Sufficient intake of  $Ca^{2+}$  and vitamin D facilitated the maintenance of peak bone mass and bone mass; 2) The hormone regulated the balance of  $Ca^{2+}$  and the drug inhibited the bone resorption (such as the study on the benefits of calcitonin and diphosphonate on bone density and fracture prevention); 3) Physiatric had positive effect on the maintenance of bone mineral density (such as ultraviolet therapy, magnetic therapy and kinetotherapy); 4) Vertebroplasty, kyphoplasty and the application of artificial joint could effectively decrease the time for bed rest and prevent the progression of osteoporosis.

**ME004-01****TO DEVELOP STROKE-REHABILITATION WIDELY AND IN DEPTH IN CHINA****Tong Zhang***Chinese rehabilitation research center, Beijing, China*

A large amount of data from evidence-based medicine indicated that neuro-rehabilitation could help patients suffering from neuro-pathy by improving the impaired function, ability and quality of daily life. During the period of the ninth five-year program, the clinical trial, which focused on early rehabilitation after acute stroke, has confirmed its effect on reducing mortality rate and

improving quality of survivors' living. Furthermore, the three-tier of stroke prevention research of the tenth five-year program confirmed the necessity and effectiveness of rehabilitation. During this period, neuro-clinicians' recognition of rehabilitation was heightened which helped to promote its application in stroke management. In addition, more and more patients' outcome data confirmed the efficacy of rehabilitation, which further justified its existence. All the above contributed to the rapid development of rehabilitation in our nation. Despite the achievements made in China, there is still a big gap between China and other developed countries in rehabilitation. The problems are on the following two aspects: 1) Insufficient services provisions – the scope of rehabilitation is limited. 2) A lack of expertise – the level of theoretical and clinical research needs further improvement. Hence, the future work on rehabilitation should target on both aspects.

**ME004-02****REHABILITATION AFTER ACUTE BRAIN INJURY****Mao-Bin Wang***Department of Rehabilitation Medicine, Xuanwu Hospital, Beijing, China*

Many acute brain injuries are serious and complex. They include: 1) injuries of skull vault with cranial and/or basal fracture, extradural or subdural hematoma formation, brain parenchymal and/or brainstem contusions (single and/or multiple hemorrhage or ischemic foci, etc.) and resulted in prolonged coma or persistent vegetative state, 2) serious complex injuries of other parts of the body such as: spinal fracture with or without the cord injury, multiple-rib fractures with hemo-pneumothorax, pelvis fracture and/or pelvic ring disruption, long-bone fractures, internal organ injuries (such as rupture of the liver, spleen, kidney with extra-peritoneum hematoma collection, etc). These patients are usually admitted immediately to the hospital intensive care units, and when their vital conditions are stable, they will be transferred to the rehabilitation unit even still in coma. We need to ask whether rehabilitation medicine should be involved, and when and how it should be involved; we also need to ask what is the outcome of the rehabilitation treatment and its cost-effectiveness. Some basic principles should be observed in the rehabilitation for these patients: 1) To define indications and contraindications of various interventions; 2) Early rehabilitation intervention; 3) Preventive rehabilitation; 4) Co-operation among clinical specialists; 5) Application of traditional Chinese medicine; 6) Active rehabilitation training; 7) Rehabilitation care for other organ systems; 8) Functional assessment with reference to "impairment", "activity limitation" and "participation restriction." (WHO); 9) Rehabilitation physician must be knowledgeable; 10) There should be a long-term plan for functional restoration. Community-based rehabilitation is essential; Two cases will be presented: Ms. Liu Hairuo for early rehabilitation and Mr. Luo Jinyong for prolonged rehabilitation.

**ME005-02****REHABILITATION OF KNEE DISORDERS****Changjie Zhang***Department of Rehabilitation Medicine of the Second Xiangya Hospital, Central South University, Changsha, Hunan, China*

The majority of musculoskeletal problems of the knee can be solved nonsurgically. The physiatrist must have the skills to make an accurate diagnosis and formulate a precise rehabilitation program. Proper rehabilitation requires a thorough understanding

of applied anatomy, biomechanics, and the "kinetic chain." The effects of a musculoskeletal injury are rarely, if ever, confined to a single joint, and rehabilitation programs must consider the alterations in anatomy and biomechanics that have occurred proximal, distal, and contralateral to the site of acute injury. 1) *Establish an Accurate Diagnosis*: Inherent to this task is recognizing how muscle overload injuries and tendon injuries may present. When the musculotendinous unit is subjected to tensile overload damage occurs at a cellular level. This typically produces symptoms of pain, dysfunction, and instability, and also impairs athletic performance. 2) *Acute Management*: Efforts are directed toward minimizing the effects of inflammation and controlling pain. The PRICE (protection, relative rest, ice, compression, and elevation) principle is followed. This is usually the period for judicious use of anti-inflammatory medications and pain-relieving modalities. 3) *Initial Rehabilitation*: This phase continues to focus on the promotion of proper healing. Restoration of motion helps to reduce the negative effects of immobilization, with controlled tensile loading promoting ordered collagen growth and alignment. Identification of correctable biomechanical imbalances is initiated. Many rehabilitation programs fail because they do not progress beyond this step. 4) *Correction of Imbalances*: The goals are to develop symmetric motion and symmetric strength. When motion is pain free, and when nearly full concentric strength is achieved, it is essential that an eccentric strengthening program be initiated. This is a critical step in developing a musculotendinous unit that is less likely to fail in the setting of future tensile stresses. Understanding the difference between closed kinetic chain and open kinetic chain exercises is also important. 5) *Return to Normal Function*: Cross training, aqua training, and the use of alternative conditioning formats give way to a gradual increase in activity-specific training and eventual resumption of full activity. Endurance, performance, power, and agility should also be restored.

#### ME006-02

##### THE STUDY OF SPINAL PLASTICITY IN SPINAL RATS

*Shurong Ji, Ying Zhang*

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*Objective*: To investigate the effect of locomotor training on locomotion after spinal cord injury (SCI) and its mechanism of spinal plasticity. *Methods*: 84 adult female rats were divided into Sham, SCI and BWSTT (body-weight-support treadmill training) groups. The locomotor function of all rats was evaluated by BBB scale and ACOS scale, and the morphology of intact lumbar cord (caudal to the lesion) was observed by means of light microscope and electron microscope at 7 days, 15 days and 45 days postoperatively. Using immunofluorescence double labelling and confocal microscopy, the fluorescence intensity of EphA4 and VGluT2 and EphA4/VGluT2 double-positive neurons in the ventromedial area of lumbar cord were also detected. *Results*: The rats in the BWSTT group showed a better functional recovery than those in SCI group. The ultra-structure of neurons in the lumbar anterior horn of the spinal rats showed adaptable changes following BWSTT. BWSTT markedly increased the fluorescence intensities of EphA4 and VGluT2 and EphA4/VGluT2 double-positive neuron ratio in the ventromedial area of lumbar cord of spinal rats. *Conclusion*: Locomotor training is effective in improving locomotor ability for individuals with spinal cord injury. BWSTT improves locomotion of spinal rats by promoting the neuronal plasticity of lumbar anterior horns.

#### ME007-01

##### THE BASIC RESEARCH AND CLINICAL APPLICATIONS OF THERAPEUTIC EXERCISE ON DIABETIC REHABILITATION

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Physical exercise is a primary therapeutic regimen used to treat diabetes. In a study of intracellular signaling pathways, we demonstrated that acute exercise can stimulate muscle JNK activity and p38 kinase in hyperglycemic rats. Low-intensity training may increase activities of muscle p38 MAPK in diabetic rats. Exercise training can enhance mRNA expression in both AMPK $\alpha$ 2 and GLUT4, but low intensity exercise training plus insulin may be a more secure and better alternative to improve glucose metabolism in diabetic rats. In study of diabetic complications, endurance exercise inhibited the NF $\kappa$ B activity in the dorsal root ganglia of diabetic rats. Diet plus low intensity exercise improved the expression of antiapoptotic gene and attenuated the expression of apoptotic gene in cardiac muscles of diabetic rats. Diet plus exercise training enhanced mRNA expression of skeletal muscle and plasma activity in CuZnSOD. In clinical study, we found that effects of different exercises with equal caloric consumption on metabolic factors and cardiovascular responses are homologous, suggesting that exercise form is not a crucial factor to alter the levels of blood glucose in type 2 diabetic patients, which provide a new idea for quantification of exercise prescription by use of equal caloric consumption in type 2 diabetic patients. Recently we showed that lifestyle interventional technique including exercise prescription of calculated caloric consumption can improve the glucolipid metabolism and decrease the medical costs in the type 2 diabetic patients. These results illustrated that physical exercise is an indispensable therapeutical method in diabetic rehabilitation.

#### ME007-02

##### AN EXPERIMENTAL STUDY ON THE MECHANISM OF EXERCISE THERAPY IN IMPROVING GLUCOSE METABOLISM OF DIABETIC RATS

*Yi Wu', Junfa Wu', Yong-shan Hu', Limin Sun', Ruiping Hu'*

*<sup>1</sup>Department of Rehabilitation Medicine, Huashan Hospital, <sup>2</sup>Department of Rehabilitation and Sport Medicine, Shanghai Medical School, Fudan University, Shanghai, China*

*Objective*: To investigate the mechanism of beneficial effect of exercise on diabetic rats by studying the gene transcription, protein expression and the translocation of GLUT4 and the signalling pathway in the skeletal muscle cells. *Methods*: Experimental rats were randomized into four groups: normal control group, normal exercise group, diabetic control group and diabetic exercise group. Rats in the exercise groups were submitted to swim for 6 weeks, the skeletal muscle plasma membranes and the intracellular membranes were prepared and separated, the GLUT4, PKB/Akt, ERK1/2 and AMPK protein and the GLUT4 mRNA were quantified. *Results*: The GLUT4 mRNA decreased in skeletal muscle cells compared with the normal control. The GLUT4 protein in the intracellular membranes and plasma membranes in diabetic skeletal muscle decreased ( $p < 0.05$ ). After 6 weeks of exercise training, the plasma glucose level of diabetic exercise rats decreased and plasma membranes GLUT4 protein of diabetic exercise rats increased ( $p < 0.05$ ) and intracellular membranes GLUT4 protein did not change as compared

with the diabetic rats, and the phosphorylation of PKB/Akt, ERK1/2 and AMPK protein increased ( $p < 0.05$ ). *Conclusions:* Chronic hyperglycemia may inhibit the gene expression of GLUT4 in diabetic rats. Exercise training can improve the suppressed GLUT4 expression and raise the amount of GLUT4 protein in plasma membranes in diabetic rats. The activation of PKB/Akt, ERK1/2 and AMPK after exercise may contribute to this effect.

#### ME008-01

##### BURN REHABILITATION AND HYPERTROPHIC SCAR

*Jixiang Wu, Zongnyao Wu, Hongliang Liu, Qing Yin, Qin Wang, Xiaowei Li*

*Department of Rehabilitation and Physical Therapy, Southwest Hospital, Chongqing, China*

The goals of burn rehabilitation are wound healing, scar prevention and functional recovery. The scope of burn rehabilitation include pain relief, wound coverage, positioning, splinting, exercises, occupational therapy and psychological intervention. The key is the prevention and treatment of hypertrophic scar (HS) which is the major problem in burn rehabilitation. Many studies proved that the collagen synthesis in HS increased significantly. Our study showed that collagen degradation and collagenase activity were noticeably reduced in HS. Local injection of collagenase can degrade collagen of HS, lessen and soften the scar, suggesting that the insufficient collagen degradation may be an important cause of HS. Genes, cytokine, collagen and cells are all involved in the scar formation, especially important is the transforming growth factor beta (TGF- $\beta$ ). TGF- $\beta$  is the most important cytokine in the development of HS. We found that lefty, a novel member of TGF- $\beta$  superfamily, may inhibit HS by modulating TGF signals and receptors. There are a number of treatment options for HS including surgical therapy, drug treatments, pressure therapy, silicone sheeting, laser therapy, cryotherapy, massage, radiotherapy, and so on. Monotherapy is unlikely to be significantly effective. A combination approach to therapy seems to be the best option.

#### ME009-01

##### MINI-INVASIVE SURGERY AND POSTOPERATIVE REHABILITATION IN SPORTS INJURIES

*Yubin Wang*

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*Objective:* To study the clinical significance of mini-invasive surgery and postoperative rehabilitation in sports injuries. *Method:*

Experience of our treatment of sports injuries with arthroscopic surgery technique and rehabilitation protocols in relation to the surgery during the past 10 years was summarized in the paper. *Result:* With the advanced technique of mini-invasive surgery combined with post-operative rehabilitative protocol, satisfactory results have been achieved in the treatment of sports knee injuries, such as meniscal tears, ACL and PCL ruptures; sports shoulder injuries, such as SLAP injuries, rotator cuff injuries and anterior instability of shoulder; sports ankle injuries, such as anterior impingement syndrome of ankle, free body of ankle and instability of ankle, etc. Postoperative rehabilitative braces were first used extensively in our clinical unit and experience showed that they facilitate greatly the rehabilitative process. There was still some controversy concerning the arthroscopic technique and rehabilitation protocol. *Conclusion:* Great improvement in the treatment of sports injuries has been achieved in China during the past 10 years. Based on the clinical experience, further understanding of the clinical significance of mini-invasive surgery and postoperative rehabilitative program will be critical in advancing the surgical technique and rehabilitative concept.

#### ME009-02

##### POSTURE CONTROL AND SPINAL STABILITY IN LOW BACK PAIN PATIENTS

*Ninghua Wang, Bin Xie, Chun Luo*

*Department of Physical Medicine and Rehabilitation, First Hospital Peking University, Beijing, China*

*Objectives:* This presentation is a review of the balance control and spinal stability in low back pain patients. *Methods:* We reviewed 39 published papers from Pub Medicine and Medline in the recent 10 years. *Results:* These studies demonstrated that low back patients had problems in posture control and spinal stability. Results also showed that their body centres of gravity moved more posteriorly in stable standing posture with more sway shift laterally. The “hip strategy” was poor when compared with normal people in small support base. Three possible reasons may explain the problems of balance control in low back pain patients. The first explanation is related to trunk muscle weakness and decreasing co-contraction, especially the deep muscles, like multifidus. Secondly, there is a reduction in proprioceptive sensation in low back pain patients so that they have to use visual cues more in their postural control. Lastly, there are some changes of the central nervous system in modulating the posture control. *Conclusion:* Low back pain patients have balance dysfunction. Understanding of the possible underlying mechanisms can definitely guide our clinical practices.

## ORAL PRESENTATIONS

## NEUROLOGICAL REHABILITATION I

## OP001-01

**HOW DOES LOAD ON WORKING MEMORY  
MODULATE KINAESTHETIC MOTOR IMAGERY?  
IMPLICATIONS TO REHABILITATION OF  
PATIENTS WITH NEUROLOGICAL DEFICITS**

**Connie Y.Y. Sung<sup>1</sup>, Chetwyn C.H. Chan<sup>1</sup>, Yuxia Huang<sup>2</sup>,  
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**Objective:** Mental imagery involves “seeing with mind’s eye” which is commonly used as a treatment modality in rehabilitation programs. This study aimed to use event-related potentials (ERPs) to investigate the modulating effect of loading on working memory (sensorimotor buffer) during kinaesthetic motor imagery. The complexity (simple versus complex) and length (short versus long) of the tapping sequence was manipulated. It was hypothesized that imagining more complex and longer tapping sequences would modulate the imagery processes within the sensorimotor buffer. **Methods:** 27 right-handed healthy undergraduates performed a finger tapping task of different sequential movements, during which ERPs were captured using 128-channel EEG machine. The Order x Length parameters were: a) 3 sequence orders (single-digit repetition, ordered taps, and random taps), and b) 2 sequence lengths (4 taps and 8 taps). The subjects tapped at 1 Hz according to the designated sequence during execution condition and imagined the kinaesthetic feeling as if they had physically tapped during imagery condition. **Results:** Significant differences in amplitudes of N250 and N400 at right parietal and occipito-parietal were revealed between long and short random sequences ( $p=0.005-0.022$ ), suggesting longer sequence increases the load on the sensorimotor buffer during image manipulation and maintenance processes. Whilst, significant differences in amplitude of N250 at right centro-parietal ( $p=0.029$ ) was also shown, indicating longer sequences increases the demand in generating periodic sensorimotor images as well as action planning. **Conclusion:** The results suggest that the sensorimotor buffer played significant roles in motor imagery. Nevertheless, the sensorimotor buffer was more sensitive to capacity than complexity of the information held. This study further shed light on the basis for developing clinical protocols using imagery of movements with different demand on memory load to promote regain among patients with motor deficits.

## OP001-02

**THE UNDERLYING NEURO-MECHANISM OF  
CROSS EDUCATION BY DIFFERENT INCENTIVES  
AT ACUPUNCTURE POINTS – fMRI STUDY**

**Xi-lian Hu, Li-ping Huang, Shi Zhou, Heng Xiang,  
Li-qin Zhang, Xing-feng Ma, Zheng-hui Wang**

School of Graduate, Tianjin University of Sport, Tianjin, China

**Objective:** The mechanisms of cross education remain unclear heretofore. Acupoints’ stimulation was shown effects on cross education in the respect of muscle strength increment. But their mechanisms were not revealed. The aim of this study is to map the functional areas of Zusanli (ST36) and Xiajuxu (ST39) in the cerebral cortex with different incentives that may provide new evidence for the

underlying central mechanisms of cross education. **Methods:** Six right-footed male healthy subjects volunteered for the study. All of them experienced neuromuscular electrical stimulation (NMES), manual acupuncture (MA) and electric acupuncture (EA) in turns at the acupuncture points of Zusanli and Xiajuxu at right leg according to the TCM principle of acupoint location. BOLD-fMRI was performed at the same time. Image data were investigated by Student’s group t-test analysis using SPM2 for fMRI data. **Results:** 1) At  $\alpha=0.001$  level, MA showed no significant activated areas; NMES only activated contralateral GFd and ipsilateral GTs; EA mainly activated bilateral GFm and GFd, contralateral GFi and GC; ipsilateral GPoC, GL, Cu and Th. 2) At  $\alpha=0.005$  level, MA only activated contralateral GOM; NMES mainly activated bilateral GPoC, LPi, GFm and brain stem, contralateral GFd, GC, NL, LPc, GPrC and Cb, ipsilateral GFs, INS, Hi etc.; EA mainly activated bilateral GFs, GFm, GFi, GFd, GPoC, GC, LPi, pCu, NL, Cb, U, GL, INS and brain stem, contralateral Gh and GPrC, ipsilateral Th and Cu. **Conclusions:** MA showed no significant activated areas. Both EA and NMES can activate the areas related to movement of the brain, which may provide new evidence for the underlying central mechanisms of cross education. Compared to NMES, EA can evoke more extensive areas of brain, which may indicate that EA have more influence on the areas in charge of contralateral muscle strength of brain.

## OP001-03

**THE INFLUENCE OF CLOSED-CHAIN LOAD ON  
LOWER-LIMB PROPRIOCEPTION IN HEALTHY  
ADULTS**

**Fang Li, Hui Zhang, Yong-shan Hu**

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**Objective:** Though there are several ways to evaluate the proprioception, few of them study the sense of position under different closed-chain loads. The aim of this paper is to design a new method to assess the sense of position and to study the influence of different closed-chain loads on lower-limb proprioception in healthy adults. **Method:** 37 healthy volunteers were required to rebuild the position of lower limbs on a patent closed-chain equipment. Firstly, each volunteer was asked to lie on a slide of the equipment in supine position with his foot fixed on the bilateral baroreceptors and with his eyes closed, and then to drive the slide to a marked position through his resistant movement of extensors. After going back to the original position, each volunteer was asked to relocate the slide to the marked position by means of his own sense of position. The load of resistance was 10 kg, 30 kg and 50 kg. The error values of the distance were recorded. **Results:** When the load increased gradually, the error values decreased significantly, which were  $13.9 \pm 7.4$  mm,  $6.7 \pm 3.6$  mm and  $3.2 \pm 2.6$  mm, respectively ( $p < 0.05$ ). **Conclusion:** In the closed-chain movement of lower limbs, more accurate proprioception can be formed when the load of resistance increases.

## OP001-04

**ELECTRICAL STIMULATION OF SUPRAHYOID  
MUSCLES ON THE STROKE PATIENTS WITH  
DYSPHAGIA**

**Sang Jun Kim, Ji Hyeon Choi, Han Tai Ryoon**

Department of Physical Medicine & Rehabilitation, Seoul National University, Seoul, South Korea

**Objective:** To compare the therapeutic effect of repetitive electrical stimulation of suprahyoid muscles to that of stimulation as the VitalStim protocol on the dysphagia patients with reduced laryngeal



elevation. *Methods:* This study was performed as a prospective, individual matching, single-blind, non-concurrent cohort design. Dysphagia was screened by history of reflex cough or wet voice during swallowing and confirmed by videofluoroscopic study. Among them, patients were selected when the following criteria were satisfied; 1) VFSS showing reduced laryngeal elevation during swallowing (judged by three rehabilitation doctors subjectively), 2) VFSS showing supraglottic penetration or subglottic aspiration, and 3) clinically no paralysis of vagus and glossopharyngeal nerve. We divided into 3 groups: electrical stimulation of suprahyoid muscles (ESSM) group, electrical stimulation of thyrohyoid muscle (ESTM) group (a VitalStim protocol) and conventional dysphagia management (CDM) group. Ten patients were selected among groups matching the time from stroke onset (within 1 month, 1–6 month and over 6 months), lesion location (supra- and infra-tentorial lesion) and their initial swallowing function level (ASHA scale). All patients received CDM with or without ESSM or ESTM for a month. Before and after the treatment, videofluoroscopic dysphagia scale (VDS) and ASHA NOMS swallowing level were checked. *Results:* There was no significant difference in the VDS among three groups [ $F(2, 26)=0.726, p=0.493$ ]. Six patients in the ESSM and CDM groups and 10 patients in the ESTM group showed the improvement of VDS score. Improvement of ASHA NOMS swallowing level was found in 8 patients in the ESSM group, 5 patients in the ESTM group and 4 patients in the CDM group. *Conclusions:* Although additional electrical stimulation of suprahyoid muscles or thyrohyoid muscle did not show the significant improvement compared to the conventional dysphagia management alone, more patients showed improvement of swallowing function (VDS or ASHA NOMS level) after the electrical stimulation therapy. There was no significant difference of therapeutic effect between repetitive electrical stimulation of suprahyoid muscles and the stimulation of thyrohyoid muscle.

#### OP001-05

### COMMON SOURCES OF CHRONIC HEMIPLEGIC SHOULDER PAIN DEFINED BY ULTRASONOGRAPHY AND MRI

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*Objective:* To define common sources of chronic hemiplegic shoulder pain with or without subluxation using ultrasonography (US) and MRI. *Method:* Thirty-three stroke hemiplegic patients were divided into a shoulder subluxation group (SG,  $n=19$ ) and a non-subluxation group (NG,  $n=14$ ) according to degree of vertical distance (VD) of shoulder X-ray. US and MRI findings were compared between two groups. Under fluoroscopy-guide, shoulder arthrography with distension was performed in all patient to alleviate symptoms. *Results:* In SG, mean VD was 13.67 mm, but 5.59 mm in NG ( $p<0.001$ ). US of SG vs NG revealed biceps tenosynovitis (BT, 92.3%:77.8%), subacromial bursitis (SB, 71.4%: 77.8%), partial-thickness rotator cuff tear (PTRCT, 50.0%: 44.4%), and full-thickness RCT (FTRCT, 14.3%: 0%). MRI showed PTRCT (58.3%: 44.4%), SB (58.3%: 44.4%), BT (58.3%: 33.3%), SLAP lesion (41.7%: 22.2%), FTRCT (25.0%: 22.2%). After distension arthrography, mean pain score using visual analog scale (VAS) was decreased from 7.73 to 3.38 in SG and from 7.30 to 4.00 in NG ( $p<0.05$ ). Five patients (26.3%) of SG showed VAS improvements of less than 50%, in which FTRCT and/or SLAP lesion were frequently found. *Conclusions:* In patients with chronic hemiplegic

shoulder pain, BT, SB, PTRCTs were common causes. Although distension arthrography was effective in relieving symptoms, FTRCT and/or SLAP lesions might be potential source of persistent pain in patients with subluxation.

#### OP001-06

### A COMBINATION OF EPIDURAL SPINAL CORD STIMULATION AND TREADMILL TRAINING FACILITATES FUNCTIONAL RECOVERY AFTER SPINAL CORD INJURY IN RATS

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*Objective:* Epidural spinal cord stimulation (ESCS) in combination with body weight-supported treadmill training (BWSTT) has been reported to improve locomotor function in clinically incomplete spinal cord subjects. In the current study, we developed an experimental ESCS system for investigation of potential synergistic effect with application of treadmill training and ESCS towards incomplete spinal rats. *Methods:* After adult female Sprague-Dawley rats received a contusive injury of moderate severity at vertebral level T8–9 using a weight-drop device, electrodes were placed on posterior surface of the dura to stimulate the lumbosacral spinal cord. Epidural stimulation with submotor threshold at L2 segment of the spinal cord was used during stepping on a moving treadmill band. Hindlimb function recovery in the rats was evaluated using the open field Basso, Beattie and Bresnahan (BBB) scale for gait analysis and the cell damage of lesion segment was detected by histological study. Behavioral testing was repeated once a week before and after the period of intervention. *Results:* We found that locomotor recovery was improved in the treadmill training and treadmill + ESCS groups, and BBB scores were higher than in the control group. We also observed that the treadmill + ESCS group scored significantly better than treadmill group on the BBB test, although no significant change of lesion was seen from the histological data. *Conclusions:* These findings indicate that the ESCS therapy is possible to be responsible for functional improvement by providing stimulus to the central pattern generator below the level of the lesion. Our results also suggest a continued plasticity of the spinal cord and a possible therapeutic approach for spinal cord injury.

#### OP001-07

### 'DISABILITY IDENTITY' AND LIFE SATISFACTION ACCORDING TO THE SEVERITY OF DISABILITIES IN PERSONS WITH SPINAL CORD INJURY

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*Objective:* To investigate the disability identity and life satisfaction according to the severity of disability in the spinal cord-injured persons resident in the community. *Method:* The subjects of the national wide study were 397 spinal cord-injured persons resident in the community. We investigated their disability identity, life satisfaction, depression, social integration and social support. The questionnaire included the 'Disability Identity Scale' (DIS) consisted of five sub-scales and 23 questions. The DIS had been developed by the authors. The subjects were

divided into four groups according to the severity of disability, such as motor complete tetraplegia, motor incomplete tetraplegia, motor complete paraplegia and motor incomplete paraplegia. *Results:* The scores of life satisfaction, depression and social support were not different among the four groups. However, the DIS of the motor incomplete paraplegia was lower than motor complete tetraplegia or motor complete paraplegia ( $p < 0.05$ ). The sub-scale score of the 'personal worth' and 'self-acceptance' were lower in less severely disabled persons. As the disability identity scale was higher, the life satisfaction ( $r = 0.161$ ,  $p = 0.002$ ), social integration ( $r = 0.478$ ,  $p = 0.000$ ), and social support ( $r = 0.465$ ,  $p = 0.000$ ) were higher and the depression was lower ( $r = -0.252$ ,  $p = 0.000$ ). *Conclusion:* There was no difference of life satisfaction and depression according to the severity of disability. The DIS was lower in the less severely disabled persons and significantly correlated with higher life satisfaction, higher social integration, higher social support and lower depression score. We think that the DIS will be a useful tool in evaluation of the psychological status and planning the rehabilitation strategy for persons with spinal cord injury.

#### OP001-08

##### THE EFFECTS OF REHABILITATIVE TRAINING ON MOTOR FUNCTION AND EXPRESSION GAP-43 AND SYN IN RATS

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*Objective:* To study the effects of rehabilitative training on motor function and expression of GAP-43 and SYN in rats with local cerebral infarction. *Methods:* 76 male adult SD rats were randomly divided into rehabilitative training group ( $n = 32$ ), control group ( $n = 32$ ), and sham operated group ( $n = 12$ ). Rats were subjected to left middle cerebral artery occlusion (MCAO) with the suture occlusion. Motor training programs including balancing, grasping, rotating and walking exercises were applied to the rats of the rehabilitative training group at 48 h post-operation, while those of the other two groups were reared in their original living state without any special training. The animals were given behavioral examination by Bederson test, balancing wood test, and net screen test to assess their functional outcome of motor at the 3<sup>rd</sup>, 7<sup>th</sup>, 21<sup>st</sup>, 35<sup>th</sup> day after MACO, respectively. Simultaneously, immunohistochemistry staining and Western blot were used to detect the expression of GAP-43 and SYN in peri-infarction cortex. *Results:* The scores of behavioral tests in the rehabilitative training group was better than in the control group ( $p < 0.05$ ) at the 7<sup>th</sup>, 21<sup>st</sup>, 35<sup>th</sup> day after MCAO. The immunostaining and Western blot showed that expression of GAP-43 was higher in the rehabilitative training group than in the control group ( $p < 0.05$ ) and the sham-operated group ( $p < 0.01$ ) at the 7<sup>th</sup> and 21<sup>st</sup> day post-operation, respectively, and that expression of SYN was higher in the rehabilitative training group than that in the control group ( $p < 0.05$ ) and the sham-operated group ( $p < 0.05$ ) at the 21<sup>st</sup> and 35<sup>th</sup> day post-operation, respectively. *Conclusions:* The rehabilitative training can improve functional recovery in rats with local cerebral infarction, and the function enhancement may be partially contributed to the upregulation of expression of GAP-43 and SYN in peri-infarction cortex.

## MUSCULOSKELETAL REHABILITATION I

#### OP002-01

##### EFFECT OF ISOKINETIC EXERCISE ON SURFACE ELECTROMYOGRAPHY OF PATIENTS AFTER TOTAL HIP ARTHROPLASTY

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*Objective:* To evaluate muscular function of quadriceps femoris and hamstring of the patients taking isokinetic exercise after total hip arthroplasty. *Method:* Isokinetic exercises were performed in 10 patients for 2 weeks after total hip arthroplasty. Every exercise concluded angular velocity at 60°/s, 90°/s and 120°/s. Then integrated electromyogram (iEMG) of diseased side was tested during the squat for both quadriceps femoris and hamstring before and after the procedure. *Results:* The integrated electromyogram of the quadriceps femoris and hamstring in surgery sides were significantly higher during squat after 1 week and 2 weeks isokinetic exercise. The iEMG of the quadriceps femoris/hamstring ratio in surgery sides was significantly higher after 1 week and 2 weeks isokinetic exercise. *Conclusion:* Isokinetic exercise was not only improving the strength of quadriceps femoris and hamstring of patients after total hip arthroplasty, but also the balance at the knee.

#### OP002-02

##### COMPARATIVE EFFICACY OF THERAPEUTIC ULTRASOUND AND NSAIDS IN THE TREATMENT OF DE QUERVAIN'S DISEASE

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*Objective:* To see the comparative efficacy of therapeutic ultrasound and NSAIDs in the treatment of De Quervain's disease (tenosynovitis of abductor pollicis longus and extensor pollicis brevis). *Methods:* 42 patients suffering from De Quervain's disease of either hand were randomly selected from both female and male patients with no age or occupation discrimination between the two treatment groups. Group A ( $n = 21$ ) received therapeutic ultrasound for 14 doses Group B ( $n = 21$ ) received naproxen 500 mg twice daily as NSAID and omeprazole as 20 mg twice daily for 14 days. Evaluation was made at the end of the two weeks by visual analogue scale. Pre-treatment VAS was taken as 10 for all patients as there is subjective variation of degree of pain feelings. Pain feeling is observed both at rest and active flexion of thumb across palm and resisted extension of thumb. Two patients from group A and one patient from group B were dropped at the middle of the treatment due to unknown reason. *Results:* Male female ratio was 1:1.78. Mean age of the patients was 41.25. Housewives predominate over other professions (33.3%). Outcome parameters of treatment results were obtained from VAS at the end of two weeks. Post treatment VAS was  $0.63 \pm 0.76$  in group A and  $2.55 \pm 1.82$  in group B at the end of the treatment. There was no gender or occupational variation in the treatment outcome parameters. *Conclusion:* De Quervain's disease is common among housewives and other adult professionals. Therapeutic ultrasound was found to be more effective than NSAIDs ( $p < 0.001$ ) in the treatment of De Quervain's disease and was well tolerated.

## OP002-03

**FACTORS AFFECTING PROPRIOCEPTION RECOVERY AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTED****Mouwang Zhou, Li Gu, Yapine Chen, Changlong Yu, Yingfang Ao, Hongshi Huang, Yanyan Yang***Department of Rehabilitation Medicine, Peking University Third Hospital, Beijing, China*

**Objective:** To define the factors affecting proprioception recovery after anterior cruciate ligament (ACL) reconstruction and investigate the relationship between proprioception and muscle strength. **Methods:** 36 patients who had ACL reconstruction with a semitendinosus/gracilis (STG) graft 6 months post-surgery (reconstructed group) and 13 health adults without any knee injury (control group) were involved in this study. Knee proprioception was evaluated with a passive reproduction test. The isokinetic strength was measured with the Biodex System. Statistical analysis was used to compare the proprioception of reconstructed group with control group, and to define the affecting factors, including sex, hamstring/quadriceps (H/Q) ratio and the course of injury before reconstruction. We also investigated the correlation between the passive reproduction error (PRE) and quadriceps index. **Results:** There were significant differences in proprioception between reconstructed and control knees ( $p<0.05$ ). When the course of injury before reconstruction was less than 4 months, there was linear correlation with the proprioception 6 months after the operation ( $r=0.713$ ,  $p<0.05$ ). There was a positive correlation between postoperative proprioception and the quadriceps index. **Conclusions:** There was still a deficit in knee proprioception 6 months after ACL reconstruction. Within 4 months of injury, the earlier the reconstruction was performed, the better proprioception achieved. Patients with better proprioception had a better quadriceps index.

## OP002-04

**ACCURACY OF ULTRASONOGRAPHIC DIAGNOSIS IN SOFT TISSUE TUMORS: A RETROSPECTIVE STUDY****Che-Sheng Lin, Wen-Shiang Chen, Jeng-Yi Shieh, Tyng-Guey Wang***Department of Physical Medicine & Rehabilitation, National Taiwan University Hospital, Chinese Taipei*

**Objective:** To determine the accuracy of sonographic assessment in diagnosing musculoskeletal soft tissue masses of ganglion cyst and lipoma. **Methods:** Retrospective review of patients with palpable soft tissue masses who underwent sonographic evaluation followed by biopsy or resection between the periods of January 2004 to July 2007 in a university-based hospital. Ganglion cyst had the sonographic characteristics of well-demarcated, anechoic with posterior enhancement, and avascularity. Lipoma had the sonographic characteristics of fusiform in shape with well-margined, usually had parallel echoic lines within the lesion, and located within subcutaneous level. By using these sonographic criteria and having histological proof as the definite diagnosis, the accuracy of sonographic assessments in diagnosing ganglia and lipomas were determined. **Results:** One hundred and seven patients were enrolled in this study. Histological examination yielded benign lesion in 100 cases and malignant lesion in 7 cases. Of the 100 benign lesions, there were 13 ganglion cysts and 33 lipomas. The sensitivity, specificity, positive-predictive value, and negative-predictive value of sonographic diagnosis for

ganglion cyst were 69.23%, 100%, 100%, and 95.50% ( $p<0.001$ ). The sensitivity, specificity, positive-predictive value, and negative-predictive value of sonographic diagnosis for lipoma were 74.29%, 85.92%, 72.22%, and 87.14% ( $p<0.001$ ). **Conclusions:** Sonographic examination is a reliable method in detecting ganglion cyst and lipoma.

## OP002-05

**CT FOLLOW-UP ON LUMBAR DISC HERNIAS AFTER RAPID TRACTION****Shouwei Yue, Liwenq Huang***Department of Rehabilitation, Shantong Qilu Hospital, China*

**Objective:** The purpose of this study was to assess the change of protruding material in lumbar disc hernias after rapid traction. **Methods:** 32 case of lumbar disc hernia who suffered from the medial or post-lateral protrusion were followed up three months to four years after rapid traction. The protruding materials were measured on CT screen. The protruding materials of 27/32 cases were shortened (84%), 5 enlarged slightly (16%). The ratio determination in 20 post-lateral hernia patients at pre-treatment and follow-up duration was  $0.1830\pm 0.0663$  and  $0.1300\pm 0.0618$ , respectively. In 10 cases with medial protrusion, the ratio was  $0.2337\pm 0.0858$  and  $0.1572\pm 0.0749$ , respectively ( $p<0.05$ ), at pre-treatment and follow-up period. **Conclusion:** It is indicated that the rapid traction can shorten the protruding materials, but cannot make it regress completely.

## OP002-06

**A COMPARISON OF DIFFERENT APPROACHES TO THE EARLY PROSTHETIC MANAGEMENT OF TRANSTIBIAL AMPUTEES****Jim Xu<sup>1</sup>, Friedbert Kohler<sup>1</sup>, Roger Renton<sup>1</sup>, Carol Connolly<sup>2</sup>, John Estell<sup>2</sup>***<sup>1</sup>Department of Rehabilitation Medicine Liverpool Hospital, Liverpool, <sup>2</sup>Department of Rehabilitation Medicine, Braeside Hospital, Fairfield, Australia*

**Objective:** The aim of this study was to compare mobility outcomes and time frames of trans-tibial amputees treated with four different methods of interim prostheses. **Method:** We reviewed patients' medical records for collection of data including gender, age and time frame (in number of days) of: first mobilizing after amputation; first fitting of an interim prosthesis; first mobilizing with prosthesis; mobility independence with a prosthesis; discharge from hospital; issuing of definitive prosthesis and percentage of patients who had fall. The patients groups were: group 1: patients treated with a plaster interim prosthesis manufactured by physiotherapist; group 2: patients treated by fitting of TEC (Total Environmental Control) interim prosthesis; group 3: treated by PTB (patella tendon bearing) prosthesis made by prosthetist; group 4: treated with plaster interim prosthesis manufactured by a prosthetist. **Results:** There were significant differences in the days to fitting of the prosthesis favouring the TEC and PTB group. These two groups of patient progress to independence with prosthesis significantly earlier than the other groups. TEC group tended to have a slightly higher rate of falling in hospital. There is no significant difference in the days to definitive prosthesis fitting. **Conclusion:** TEC and PTB interim prostheses potentially accelerate early prosthetic fitting and mobilisation but have no significant impact on the timeframe of fitting of definitive prosthesis.



## OP002-07

**IDENTIFICATION OF THE DYSTONIC CERVICAL MUSCLES IN THE PRIMARY CERVICAL DYSTONIA (PCD) PATIENTS****Duk Hyun Sung<sup>1</sup>, Kwang Hong Park<sup>1</sup>, Joon Young Choi<sup>2</sup>, Young Cheol Yoon<sup>3</sup>**<sup>1</sup>Physical Medicine and Rehabilitation, <sup>2</sup>Nuclear Medicine, <sup>3</sup>Radiology, Sungkyunkwan University School of Medicine/Samsung Medical Center, Seoul, Korea

**Purpose:** To document usefulness of the 18F-FDG-PET/CT in identifying the dystonic muscles and to document which dystonic muscles are responsible for abnormal posture in PCD patients. **Methods:** Eight PCD patients were evaluated with EMG-mapping and 18F-FDG-PET/CT. Dystonic muscle in EMG-mapping was defined as a muscle demonstrating turn/sec >100. And dystonic muscle was defined as a muscle demonstrating increased 18F-FDG uptake in the whole muscle area utilizing PET and fused PET/CT images by visual analysis. **Results:** Deep and superficial cervical muscles demonstrated increased 18F-FDG uptake. Obliquus capitis inferior (OCI) and splenius capitis (SPC) at the rotation side are major rotational muscles (6 of 8 and 7 of 8 torticollis patients) and SPC/OCI/longus capitis (LC) at the lateral flexion side are major lateral flexors (6 of 8/ 5 of 8/ 5 of 8 laterocollis patients) in 18F-FDG-PET/CT. SPC at the rotation side and SCM at the contralateral side are major rotational muscles (8 of 8 and 6 of 8 torticollis patients) and SPC and levator scapula at the lateral flexion side are major lateral flexors (8 of 8 and 4 of 8 laterocollis patients) in EMG-mapping. Total dystonic muscles mismatching to dystonic posture are 8 muscles in PET/CT and 15 muscles in EMG-mapping. Maximal rotation angle correlates significantly with SUVs of OCI at the rotation side ( $r=0.825, p<0.05$ ). **Conclusions:** 18F-FDG-PET/CT scan provides valuable information for identification of dystonic muscles in all layers of the neck in PCD patients, especially deep cervical muscles which can not be detected in EMG-mapping. 18F-FDG-PET/CT is more specific than EMG-mapping method, and EMG-mapping method is much sensitive but false positive rate is high. OCI at the rotation side is the most important dystonic muscle which is predominantly associated with torticollis.

## OP002-08

**FUNCTIONAL CAPACITY AFTER MENISCUS TEAR FOLLOWING ARTHROSCOPIC SURGERY****ZhiJie Zhang**

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**Objective:** To evaluate the effect of isokinetic training on muscle strength and functional capacity in patients with meniscus tear following arthroscopic surgery. **Methods:** The muscle strength of the patient's injured knee were assessed using Cybex and the AROM of knee and ankle of the affected side were assessed using goniometer before and after 4 weeks of isokinetic training. Walking speed and the discrepancy of bilateral muscle groups were also assessed before and after the training. The differences of the outcomes were compared. **Results:** After 4 weeks of isokinetic training, the muscles strength increased significantly. The discrepancy of bilateral muscle groups decreased significantly. The AROM of the injured knee and some functional activities (walking speed) were also improved. **Conclusions:** The isokinetic training is effective for improving muscle strength and functional capacity in the patients with meniscus tear following arthroscopic surgery.

**PEDIATRIC REHABILITATION I**

## OP003-01

**CLINICAL OBSERVATION ON EFFECT OF MIND NEEDLING ON HEAD SPECT AND CT SCANNING OF KIDS WITH CEREBRAL PALSY****Zhenhuan Liu**

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**Objective:** To investigate the brain functional compensation of acupuncture in cerebral palsy rehabilitation. **Method:** All 100 cerebral palsy kids were randomized into a treatment group ( $n=50$ ) and a control group ( $n=50$ ). For cases in the treatment group, points of connecting the Governor Vessels and tonifying the kidney were selected: 13 points of the Governor Vessel, Yongquan (Kid 1), Yanglingquan (GB 34), Zusanli (ST 36) and Sanyinjiao (SP 6), and points of refreshing the mind were also selected: puncturing Shenting (GV 24) toward Baihui (GV 20) and puncturing Baihui (GV 20) toward Naohu (GV 17) and Sishencong (Ex-HN 1). In addition, rehabilitation training was also combined. For cases in the control group, rehabilitation training alone was adopted. Then the clinical effect and improvement through head CT scanning and SPECT were observed. **Result:** The total effective rate of the treatment group was 84%, which was significantly higher than the 52% of the control group. After treatment, the DQ in the treatment group was significantly higher than the control group ( $p<0.01$ ). Also, the improvement rate of brain maldevelopment and brain atrophy showed by CT scan and restoration rate of brain neuron metabolic function in the treatment group were higher than for the control group ( $p<0.01$ ). **Conclusion:** Acupuncture can promote the compensation of brain function.

## OP003-02

**STUDY ON STATIC STANDING EQUILIBRIUM FUNCTION OF CHILDREN WITH SPASTIC CEREBRAL PALSY****Lihua Zhang, Jinggong Wang, Benli Yang, Liping Wang**

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**Objective:** To measure equilibrium parameter of normal children and to evaluate the extent and characteristic of equilibrium disturbance of children with spastic cerebral palsy. **Methods:** The static standing equilibrium function of 97 normal children aged 12–47 months was measured to obtain equilibrium parameter including left and right excursion, Lng, Rec area, Envaea, and L/Earea. According to the standard of the above results, the extent and characteristic of equilibrium disturbance of 110 children with spastic cerebral palsy (82 diplegia, 28 hemiplegia) were evaluated. **Results:** There was no difference in equilibrium parameter of normal children between male and female ( $p>0.05$ ). There was no difference in left and right excursion between diplegia children and normal children ( $p>0.05$ ), while the differences of other parameter were significant ( $p<0.05$ ). The difference of left and right excursion was significant between spastic hemiplegia and normal children, and Envaea and L/Earea in 12–23 months and 24–35 months group was different ( $p<0.05$ ), while Lng and Rec area were not different ( $p>0.05$ ); the difference of every parameter was significant in 36–47 months group ( $p<0.05$ ). The posturography of center of gravity of normal children presented Centripetal, and that of diplegia children presented between Centripetal and Diffusive, while that of hemiplegia children mostly



presented Forward-backward. *Conclusion:* 1) Equilibrium function of children aged 12–47 months improved with development; there was no difference between left and right, between male and female. 2) Equilibrium function was significant different between spastic and normal children, while there were no difference between left and right. 3) Center of gravity was obvious different in hemiplegia children between left and right, and the difference would be remarkable with development.

#### OP003-03

##### THE DISTRIBUTION OF SPASTIC MUSCLES IN CHILDREN WITH SEVERE CEREBRAL PALSY

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*Objective:* To analyze the distribution of spastic muscles in children with severe cerebral palsy for providing guidance of injecting botulinum toxin type A (BTX-A) selectively. *Methods:* One hundred and thirty-three children with severe cerebral palsy aged 18–72 months under ketamine-induced sedation for the injection of BTX-A were retrospectively reviewed. Summarize the manifestation of electromyography in the state of resting and stretch reflex response, and analyze the rates of spastic muscles contributed to postural control and weight bearing. The Single-factor and multifactor analysis with Logistic regression model were performed by SPSS 10.0 statistic software. *Results:* The metastasis rates of mainly spastic muscle are: 1) thigh region muscles 91% (adductors, hamstring); 2) neck and shoulder region muscles 39% (teres major, splenius, trapezius, pectoralis major levator scapulae, latissimus dorsi); 3) lower limb region muscles 18 % (gastrocnemius, soleus, tibialis posterior, flexor digitorum longus, flexor hallucis longus). Among which significant difference was noted ( $p < 0.05$ ). *Conclusion:* Besides the famous spastic muscles of thigh and lower limb region muscles, we need to care about the spasm of shoulder region muscles, such as trapezius, splenius during selecting the injection muscles of BTX-A in children with severe cerebral palsy.

#### OP003-04

##### BOTULINUM TOXIN A IN MANAGEMENT OF SHOULDER ADDUCTION ROTATION IN SPASTIC CEREBRAL PALSY

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*Objectives:* To explore the effect of botulinum toxin A (BTX-A) in treating shoulder adduction rotation of spastic cerebral palsy. *Methods:* The BTX-A is obtained from Lanzhou institute of biological products. 42 children (spastic quadriplegia and diplegia, mean age 42 months) with shoulder adduction rotation were divided into 2 groups. Group 1 ( $n=32$ ) were treated with BTX-A injection with EMG guidance at muscles of latissimus dorsi, teres major, pectoralis major, trapezius and then exercises. Dosage is 0.25–0.5 U/muscle. Group 2 ( $n=16$ ) were treated with exercises. ROM and muscle tone were assessed at 2 weeks and 12 weeks. *Results:* Significant improvement in passive ROM of shoulder forward extension and the muscle tone reduction in group 1 at 2 weeks, while no significant improvement in group 2 was observed.

At 12 weeks, significant improvement in passive ROM of shoulder forward extension (29/32) and the muscle tone reduction (31/32) in group 1. While some improvement in passive ROM of shoulder forward extension (9/14) and the muscle tone reduction (4/14) in group 2. *Conclusions:* BTX-A group and exercises group were both efficacious in improving shoulder adduction rotation, but BTX-A gave faster and longer periods of improvement. Tone reduction was greater and more prolonged in the BTX-A group.

#### OP003-05

##### THE COMBINED EFFECT OF BOTULINUM TOXIN TYPE A AND COMPREHENSIVE REHABILITATION ON HIP POWER GENERATION IN CHILDREN WITH CEREBRAL PALSY

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*Objective:* To evaluate the combined effect on hip power generation of treatment with botulinum toxin type A (BTX-A) and comprehensive rehabilitation in children with cerebral palsy. *Methods:* 65 children with CP (aged  $42.4 \pm 11.2$  months (18 to 72 months)) were classified randomly into 2 groups. The experimental group ( $n=32$ ) was assigned to be treated with BTX-A injection guided by electric stimulation and clinical analysis, besides comprehensive rehabilitation as for the control group ( $n=33$ ). The assessments hip power generation (kneel, half-kneel) were performed at baselines and 6 months of treatments. *Results:* Sixty-three children completed the study. Contrasted with the control group, the experimental group had improved hip power generation specifically ( $p < 0.01$ ) with kneel ( $p < 0.01$ ) and half-kneel ( $p < 0.01$ ) at 6 months of treatment. *Conclusion:* BTX-A injection combined with physiotherapy was more effective than physiotherapy alone in terms of reducing spasticity and improving hip functional performance in kneeling on children with spastic cerebral palsy who can sit but cannot kneel.

#### OP003-06

##### THE APPLICATION OF KETAMINE FOR INJECTION OF BOTULINUM TOXIN TYPE A IN CHILDREN WITH CEREBRAL PALSY

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*Objective:* To investigate the efficacy and adverse events for the use of ketamine-induced sedation in children with cerebral palsy undergoing injections of botulinum toxin type A (BTX-A). *Methods:* Two hundred and seven children with cerebral palsy (aged 18–96 months) under ketamine-induced sedation for BTX-A injection were retrospectively reviewed. All children were asked to fast for 6 h before injection. Physiological parameters, sedation induction times, adverse events, doses were monitored and recorded during anesthesia and recovery. Ondansetron hydrochloride 0.05–0.15 mg/kg, midazolam 0.05 mg/kg, and ketamine 0.5–2 mg/kg and supplemental administration were administered intravenously in sequence. *Results:* All children went to sleep within one minute after the initial bolus of ketamine and supplemental administration. No sedation failures occurred. Of 207 children who underwent ketamine-induced sedation for BTX-A intramuscular injection, 2

(1%) experienced severe adverse events during anesthesia, which included oxygen desaturation less than 90% (1) and bradycardia (1). 139 (67%) experienced mild adverse events, which included saliva over secreting (106), vomiting (29), agitation (4). *Conclusion:* IV ketamine is an effective method of producing profound sedation and analgesia for the intramuscular injection of BTX-A in children with cerebral palsy. Larger studies are needed to establish this drug's safety profile in the procedure because oxygen desaturation, bradycardia, agitation were noted in a few cases.

#### OP003-07

##### EXPRESSION OF NOGO-A MRNA IN NEWBORN RAT BRAIN TISSUES

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*Objective:* To observe the dynamic changes of expression of Nogo-A mRNA of the damaged neonatal rat brain after intrauterine infection. *Methods:* 40 Wistar pregnant rats on 18 days (E18) of gestation were randomly divided into two groups: lipopolysaccharide (LPS) administered group ( $n=20$ ) and control group ( $n=20$ ). On gestational days 18 and 19, pregnant rats were intraperitoneally injected with 450  $\mu\text{g}/\text{kg}$  LPS or the same doses of saline for controls. Neonatal rats selected randomly from the LPS group ( $n=40$ ) and control group ( $n=40$ ) were sacrificed at 6, 12, 24 and 48 h after delivery (10 neonatal rats each point of time for each group). The dynamic changes of expression of Nogo-A mRNA in newborn rat brain after intrauterine infection was observed by RT-PCR method. *Results:* Expression of Nogo-A mRNA in saline control group did not alter at different time points. Expression of Nogo-A mRNA in newborn rats after intrauterine infection was started to increase at 6 h ( $p<0.05$ ) and reached the peak at 12 h ( $p<0.01$ ). There were no differences in 24 h and 48 h between newborn rats after intrauterine infection and control group. *Conclusion:* The Nogo-A may be related with obstruction of the rebirth of the nerve after brain damage which were induced by intrauterine infection.

#### OP003-08

##### CORRELATION STUDY BETWEEN THE GESELL SCALE AND THE PEABODY DEVELOPMENTAL MOTOR SCALE AMONG HIGH-RISK INFANTS

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*Objective:* The aim of this study is to investigate the correlation between the Gesell Scale and the Peabody Developmental Motor Scale, 2<sup>nd</sup> edition (PDMS-2) among high-risk infants. *Methods:* Thirty-nine infants with high-risk histories and pathological neurological findings were admitted to this study. The average corrected age of infants was  $6.9 \pm 3.1$  months (from 3 to 13 months). They were tested with the Gesell Scale, Chinese version and PDMS-2 by the same therapist at the same time or within one week. The scores of fine motor and gross motor from Gesell Scale were compared with FMQ and GMQ from PDMS-2. SPSS13.0 was used for statistic analysis. *Results:* The correlation values of fine motor and gross motor between the Gesell Scale and PDMS-2 were 0.57 and 0.63, respectively, but they were 0.81 and 0.79 among the infants age from 9 to 13 months. *Conclusion:* The correlation of motor scores between the Gesell Scale, Chinese version and PDMS-2 among high-risk infants less than 13 months was acceptable.

## NEUROLOGICAL REHABILITATION II

#### OP004-01

##### VIBRATORY ORTHOSIS EFFECT ON PARKINSONIAN'S WALKING VELOCITY

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*Introduction:* Several studies showed that application of the bio-feedback could enhance the characteristics of gait in these patients. We hypothesized that step-synchronized vibration stimulation can increase the walking velocity in patients with Parkinson's disease (PD). *Method:* Fourteen patients (12 men and 2 women) with clinical diagnosis of idiopathic PD participated in this study. In this experimental study, we test the effect of a new designed vibratory orthosis on walking velocity. A simple valid clinical test, 10-m-walk test, was chosen to conduct this study. An average of two trials for the test was used in results. Two different situations are examined, at first we asked the PD patients to walk along the 10-m path while they do not use vibratory orthosis and in the second situation, they walked while donning the vibratory orthosis with motors-on. Tests were performed under on-drug state and nearly 2 h after the anti-Parkinson's medication intake. Paired *t*-test was used to compare the mean times of walking in both test situations. *Results:* There was a significant difference between the time required for walking the 10-m-walk test in motor-On state and without using vibratory orthosis ( $p=0.001$ ). *Discussion:* It seems that vibratory orthosis by creating a rhythmic vibration stimulus on each side of the lumbar in accordance with steps, cause a reeducation of the muscles and help reeducation of gait in PD patients. The high frequency vibration is a stimulus for proprioceptive receptors and makes a biofeedback for brain in choosing the best activation pattern for muscles contributed in walking. *Conclusion:* A new orthosis in rehabilitation of the PD patients is introduced that can create new ideas for rehabilitation of similar neurological diseases. This orthosis increases significantly PD patients' walking velocity evaluated by 10-m-walk test.

#### OP004-02

##### THE INFLUENCE OF BWSTT ON MUSCLES STRENGTH, BALANCE AND MOBILITY IN TRAUMATIC BRAIN INJURY PATIENTS WITH HEMIPLEGIA

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*Objectives:* To observe the effect of Body Weight Supported Treadmill Training (BWSTT) upon the muscles strength of lower extremity, balance and mobility in traumatic brain injury patients with hemiplegia. *Methods:* 63 patients of traumatic brain injury with hemiplegia due to work injury were randomly divided into the treatment group ( $n=32$ ) and control group ( $n=31$ ). There was no significant difference before treatment for sex, age, consciousness level and the time after operation between the two groups. The treatment group carried on the physical therapy and BWSTT, and the control group just received physical therapy. Isometric strength of quadriceps femoris at knee flexion of 90°, Berg balance scale and 6-min walk test were separately assessed before and after 3 months of treatment. The results were analyzed using *t*-test of statistical software SPSS11.0. *Results:* Mobility ( $p=0.03$ ) and the muscle

strength of the affected lower extremity ( $p=0.02$ ) was significantly improved compared with that of the control group, but it was not significantly different for the balance scores ( $p=0.12$ ) and lower extremity muscles strength of the non-involved side ( $p=0.85$ ) between the two groups. **Conclusion:** BWSTT could significantly improve the mobility and muscles strength of lower extremity of traumatic brain injury patients with hemiplegia, but not to the balance scores.

#### OP004-03

##### EFFECT OF ELECTRO-ACUPUNCTURE ON THE MOTOR RECOVERY OF STROKE RATS

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**Objectives:** We evaluated the effect of acupuncture at the stroke rats. **Methods:** Sixty 5-week-old male Sprague-Dawley rats were subjected to the occlusion of the left middle cerebral artery and both vertebral arteries by the modified Longa's method for permanent ischemic injury. Three days after the operation, we checked the Garcia's motor behavior index, rota rod performance test and the modified foot fault test and divided them into 4 groups (control, exercise, acupuncture and exercise with acupuncture) according to their Garcia's indices. The exercise group was trained by the treadmill and the acupuncture group was given the electro-acupuncture at the six areas (single Baihui, Dazhui and bilateral Quichi and Zusanli) for 30 min daily, respectively. The exercise with acupuncture group received both treatments. They were assessed at the follow-up after 10-day treatment program. After all the assessment, all rats were expired and their brains were extracted for the measurement of the infarct volume. **Results:** Garcia's index and modified foot fault test were improved at all groups except the control after 10 days treatment but rota rod performance test was not different between pre- and post-treatment at all group. No superiority was found among the acupuncture, exercise and combined therapy. There was no difference of the infarct volume among four groups. **Conclusions:** Exercise and acupuncture are beneficial to the motor recovery of the stroke rats.

#### OP004-04

##### SIGNIFICANCE OF ASSESSMENT OF FALL RISK AT INITIAL PERIOD OF GAIT TRAINING IN STROKE PATIENTS

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**Objectives:** The aim of this study was to reveal the relationships between fall risk at initial period of gait training and fall for 3 months after initial assessment in stroke patients. **Methods:** Forty-two middle cerebral arterial territory infarction patients (21 men, 21 women, age  $60.5 \pm 15.4$  years, duration  $30.9 \pm 20.4$  days) who started gait training were recruited. The patients with unilateral hemineglect, visual disturbance, ataxia, syncope, vestibular disease, and peripheral neuropathy were excluded. We assessed Mini-Mental Status Examination (MMSE), Brunnström stages of motor recovery (BS), modified Barthel Index (MBI), Functional independence measure (FIM), Functional ambulation categories classification (FACC), Berg balance scale (BBS), Dynamic gait index (DGI) and Tinetti performance oriented mobility assessment (POMA) at initial gait training and 3 months after initial assessment. **Results:** 1) Fifteen of the forty-two patients experienced

fall. First fall occurred at  $46.8 \pm 21.3$  days after stroke onset and at  $14.2 \pm 12.4$  days after the initiation of gait training. The frequencies of fall for 3 months were once in 9 patients, twice in 3 patients, and three times in 3 patients. 2) The patients with no injury or mild contusion were most frequent. Fall mainly occurred in the bedroom, bathroom, and living room during the transfer. 3) There were significant differences of age and functional scales between faller and non-faller groups ( $p<0.05$ ). **Conclusions:** It would be useful to assess the fall risk at initial period of gait training in stroke patients for predicting fall in the next 3 months.

#### OP004-05

##### CLINICAL USE OF PULSE OXIMETRY MONITORING ON MEAL IN STROKE PATIENTS WITH DYSPHAGIA

**Ping-Hsin Ko<sup>1</sup>, Ssu-Yuan Chen<sup>1</sup>, Yeun-Chung Chang<sup>2</sup>, Tzu-Yu Hsiao<sup>3</sup>, Tyng-Guey Wang<sup>1</sup>**

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**Objective:** To define the clinical use of pulse oximetry during meal as a tool in detecting aspiration in dysphagic stroke patients and to examine the correlation between desaturation and aspiration on VFSS. **Methods:** 60 stroke patients were enrolled in this nonrandomized, prospective, double-blind study. Compare the oxygen saturation ( $SpO_2$ ) during meal in two groups of stroke patients (clinical non-aspirators and possible aspirators) by pulse oximetry. Among patients who underwent VFSS ( $n=20$ ), the occurrence of desaturation and aspiration on VFSS were also correlated. A decrease in  $SpO_2$  exceeding and equals to 3% on pulse oximetry was considered as significant desaturation. Bolus or portion of bolus passing through the vocal cords and entering the subglottic space was defined as aspiration on VFSS. **Results:** There was no statistical difference of oxygen saturation during meal between the clinical non-aspirators and possible aspirators. No significant correlation between desaturation and aspiration on VFSS was found ( $p=0.65$ ). Among patients who underwent VFSS, the sensitivity of pulse oximetry during meal time in detecting aspiration on VFSS was 100%, the specificity was 7.7%, the positive predictive rate was 36.8% and the negative predictive value was 100%. **Conclusions:** In clinical settings, pulse oximetry monitoring during meal has little role in differentiating aspirators and non-aspirators among stroke patients who were permitted to have oral feeding.

#### OP004-06

##### STUDY ON THE SURFACE ELECTROMYOGRAPHY SIGNAL OF INDUCED ASSOCIATED REACTION AMONG PATIENTS WITH PRIOR STROKE

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**Objective:** To observe the effects of concentric and eccentric training on the induced associated reaction. **Methods:** Twenty-two patients with prior stroke and twenty-two healthy subjects were observed. Surface electromyographic (sEMG) data of the upper limb and lower limb in the affected sides were recorded when concentric and eccentric exercise was conducted in the non-affected side. **Result:** The sEMG amplitudes of the affected upper limb flexor are higher during eccentric exercise condition than during concentric condition ( $p<0.05$ ), while sEMG amplitudes of the affected lower limb adductor were higher during concentric condition than during eccentric



condition ( $p < 0.05$ ). *Conclusion:* To induce the association reaction of affected sides actively, eccentric exercise might be pertinent training method for the upper limb flexor in the early stage of stroke, while concentric exercise is better for the adductor of lower limb.

#### OP004-07

### THE CLINICAL OBSERVATION OF ULTRASOUND GUIDED BOTOX A INJECTION IN TREATING EXTREMITIES SPASTICITY FOLLOWING STROKE

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*Objectives:* To evaluate the feasibility and its value of ultrasound guided BOTOX A injection technique in treating extremities spasticity following stroke. *Methods:* 5 patients with extremity spasticity following stroke were recruited in the clinical study. Under guideline of upper and lower limb muscle color atlas, combined with color ultrasound examination, the botulinum toxin type A (BTX-A) was injected into muscles as follows: flexor carpi radialis, flexor carpi ulnaris, superficial/deep flexor muscle of fingers, flexor hallucis longus, long palmar muscle, soleus, gastrocnemius, tibialis posterior, flexor digitorum longus, etc. The outcome after BTX-A injection was assessed by modified Ashworth scale (MAS), Fugl-Meyer Assessment-upper limb function, Motor-Functional Independence Measure-upper limb, step length and velocity at the baseline, 2-weeks and 4-weeks after treatment, respectively. *Results:* Compared the scores of MAS, FMA-upper limb, FIM-upper limb, step length and velocity after 2 and 4 weeks with those before treatment, there is significant difference statistically ( $p < 0.05$ ). *Conclusion:* Under localized atlas, ultrasound guided BOTOX A injection technique is an accurate positioning method in using BTX-A to treat extremities muscle spasticity. Compared with other muscle injection localization, ultrasound guided method possess higher practical value.

#### OP004-08

### THE EXPRESSION OF ID2 IN NORMAL ADULT AND EAE RAT SPINAL CORD AND PROGESTERONE TREATMENT CHANGES

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*Objective:* To observe the expression of Id2 in normal rat and the different time of experimental autoimmune encephalomyelitis (EAE) rat spinal cord and progesterone treatment changes and to find out whether the progesterone mechanism by regulating the expression of Id2. *Methods:* Immunohistochemical technique to examine the Id2 in normal and EAE rat spinal cord and progesterone treatment changes. *Results:* Id2 extensively distributed in normal rat of spinal cord in cervical, thoracic, lumbar and sacral segments of the gray and white matter. In EAE 6-day Id2 come to its maximum, then it decreases gradually. The lowest expression appears after 8 days, then it increase gradually, in 10 and 15 days it is still higher level of expression. After progesterone treatment, the expression of Id2 was significantly lower. In 6-day Id2 it decreases most. In 15<sup>th</sup> day, the decrease compared to EAE group still shows a significant difference. Id2 co-expression with CC-1 +oligodendrocyte in normal and EAE model. *Conclusions:* The distributions of Id2 in rat spinal cord is in consonance with the pathogenesis of EAE characterized by a relapse-remission course and

progressive deterioration, suggesting that the pathogenesis of multiple sclerosis may closely relate to Id2. Therapeutic mechanism of progesterone on the multiple sclerosis may affect the expression of the Id2. Id2 was mainly expressed in oligodendrocyte suggesting a potential role of Id2 in the differentiation and proliferation of oligodendrocyte which was responsible for central nerve myelination.

### MUSCULOSKELETAL REHABILITATION II / REHABILITATION TECHNOLOGY

#### OP005-01

### THE DIAGNOSTIC VALUE OF ULTRASONOGRAPHIC MEASUREMENT IN CARPAL TUNNEL SYNDROME

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*Objective:* To evaluate the usefulness of ultrasonographic measurement for assessing the severity of carpal tunnel syndrome (CTS) and its value in the diagnosis of CTS determined by nerve conduction studies (NCS). *Method:* One hundred and twenty-eight hands with CTS in 100 consecutive patients and 61 hands without CTS in 40 healthy volunteers were included. The severity of CTS was graded according to the neurophysiological grading scale (NGS) based on the results of NCS. The following ultrasonographic measurements were used: cross sectional area (CSA) and flattening ratio at the distal radioulnar joint, the pisiform, and the hamate, swelling ratio, and palmar displacement of flexor retinaculum. *Results:* All ultrasonographic measurements in hands with CTS were significantly greater than in hands without CTS ( $p < 0.01$ ). Ultrasonographic measurements such as CSA at all levels, flattening ratio at the hamate, swelling ratio, and palmar displacement, were significantly correlated with NGS ( $p < 0.01$ ), and the measurement with the highest correlation was CSA at the pisiform ( $r = 0.529$ ,  $p < 0.001$ ). CSA equal or higher than 9 mm<sup>2</sup> at the pisiform showed sensitivity, specificity, accuracy, positive, and negative predictive values for CTS of 93.7%, 91.8%, 93.1%, 96%, and 87.5%, respectively. *Conclusion:* The median nerve CSA at the pisiform highly reflected the severity of CTS and was found to be highly sensitive and specific for the diagnosis of CTS. Therefore, the median nerve CSA at the pisiform is recommended as a single ultrasonographic measurement in patients with CTS.

#### OP005-02

### EFFECTIVENESS OF JOINT MOBILIZATION APPLIED WITH A TREATMENT OF ACUPUNCTURE AT ST38 (TIAOKOU) FOR SHOULDER INJURIES

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*Objective:* This study seeks to evaluate the effectiveness of joint mobilization applied with a treatment of acupuncture at ST38 (tiaokou) for shoulder injuries. *Methods:* A study was made of 60 patients with presenting symptoms of painful shoulder and a diagnosis of subacromial syndrome (Shoulder Impingement and Adhesive Capsulitis, etc.). The patients were randomized into two groups: 1) experimental (joint mobilization + acupuncture); 2) control (joint mobilization). The treatment took 3 weeks. Blinded evaluation was done by an independent observer in both groups,



and analysis was independent. The measured variable was a change produced on JOA Scale. Evaluation would be made at 0, 4, 8 and 12 weeks after treatment. *Results:* Both two treatments could effectively relieve shoulder pain and improve ROM of the shoulder joint with increasing shoulder activity. Joint mobilization after the treatment with acupuncture at ST38 (tiaokou) was found much better than using only joint mobilization. *Conclusions:* The treatment with acupuncture at ST38 (tiaokou) can relieve pain immediately to facilitate the implementation of joint mobilization while reducing spasm to enhance the efficiency of joint mobilization. It is more valuable than as a point located at leg, ST38 (tiaokou) makes it possible to implement acupuncture and joint mobilization at the same time. This method overcomes the loss of effect when doing the joint mobilization after pulling out the needle. Joint mobilization applied with a treatment of acupuncture at ST38 (tiaokou) can obviously improve the therapeutic effect for subacromial syndrome, and shorten the period needed for treatment, which is more cost effective.

#### OP005-03

##### EFFECT OF WARMING NEEDLE MOXIBUSTION AND WITH ACU-POINT INJECTION OF COMPOUND SALVIA ON CHANGES OF SERUM ENZYMES FOR ATHLETES

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*Objectives:* To explore the effect of warming needle moxibustion and with Acu-point injection of compound salvia on the sports ability for athletes. *Methods:* 20 subjects were divided into experimental group ( $n=10$ ) and control group ( $n=10$ ). 10 subjects in experimental group were treated by warming needle moxibustion on "ZuSanLi" point of two sides once every day with retention for 30 min, and given injection of 1 ml of salvia injection composite into Acu-point "NeiGuang" on the either side continuously for five days, the last one was done after race. Another 10 subjects served as control. The venous blood in two groups was obtained simultaneously to assay the five enzymes (LDH, CK, GOT, PK, SOD) before race. On the fifth day, blood was obtained to assay the activity of five enzymes after 1, 16 and 24 h, respectively when 5000 m race ended. *Results:* The result showed that warming needle moxibustion and injection of salvia injection composite into Acu-point caused the recovery of CK in advance; the activity of SOD was kept stable relatively, and different significantly compared with control group at corresponding time ( $p<0.01$ ,  $p<0.001$ ). *Conclusions:* The result demonstrated that warming needle moxibustion and injection of salvia injection composite into Acu-point can produce good effects for athletes, promote the recovery after race and increase the sports ability.

#### OP005-04

##### EVALUATION OF THE EFFECT OF CERVICAL TRACTION IN THE ANTERIOR LEAN POSITION SEATED ON A NEWLY DESIGNED CHAIR DEVICE

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*Objective:* Seated cervical traction is usually done in the upright position. To our knowledge, traction position with anterior lean

has not yet been described. The purpose of this study was to develop a new cervical traction position with spin in the anterior lean position on a newly designed chair device. Quantitative measurement of disc height changes was also performed. *Methods:* Thirty healthy adult subjects without recent history of cervical syndrome were tested in traditional sitting position and anterior-lean seated position on a specially designed chair device to evaluate the effect of cervical traction on disc height changes. *Results:* Anterior lean traction created much better total disc height changes from C3/C4 to C6/C7 compared to baseline ( $p<0.05$ ). When anterior lean position was used, the disc height was increased significantly on anterior C3-4 ( $p<0.01$ ) and C5-6 ( $p<0.01$ ) compared to that of the traditional seated position. There was also a significant increase in disc height on posterior C3-4 ( $p=0.01$ ), C4-5 ( $p=0.01$ ) and C5-6 ( $p=0.02$ ). *Conclusion:* Both traditional and anterior lean seated cervical traction effectively lengthened the anterior and posterior C3/C4 to C6/C7 disc heights. However, the anterior lean position created much better disc space lengthening, which might provide a better clinical therapeutic effect.

#### OP005-05

##### A FULL 3D PARAMETRIC BIOMECHANICAL HUMAN SKELETON MODEL FOR POSTURE AND MOVEMENT ANALYSIS

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*Objectives:* Spine and posture disorders cover large interest in rehabilitation. Quantitative functional evaluation represents the main goal in movement/gait analysis. However, very few studies outline the behaviour of spine during posture and movement and gait analysis. To overcome such limits, we propose a complete 3D parametric biomechanical skeleton model to be used in quantitative analysis. *Methods:* Posture and movement/gait analysis are performed by 3D Opto-electronic stereo-photogrammetric measurements of body landmarks labeled by passive markers. Depending on different analysis purposes, the model (based on anatomical findings reported in literature and on specially developed processing procedures) can work at different stages of complexity. It can be scaled to fit the subject's skeleton by using different acquisition protocols involving assorted body labeling providing subject's anthropometric measurements. To analyse static posture, a 27 markers protocol has been set. A 49 markers protocol is adopted for full skeleton movement/gait analysis. The model is able to fully integrate data deriving from force platforms, SEMG, foot pressure maps. The possibility to compute the average of cyclic or repetitive tasks (multiple strides) has been included as well. To this aim complex signal processing and optimisation of procedures have been developed. *Results:* Hundreds of patients with different posture and movement disorders have been analysed with this approach. The collected quantitative outcomes allow identifying and precisely differentiating pathological patterns proving its usefulness in clinical and rehabilitation field. *Conclusions:* The model is the first proposed in literature, to authors' knowledge, and it enables to perform a full kinematic and kinetic analysis with particular focus on the spine.

## OP005-06

**TIBIAL COUNTER-ROTATOR (TCR) FOR THE TIBIAL TORSION IN CHILDREN*****Bong-Ok Kim<sup>1</sup>, In Su Chang<sup>2</sup>, In-Sik Francis Park<sup>3</sup>****<sup>1</sup>Department of Rehabilitation Medicine, Brain Research Institute, Hungnam National University, <sup>2</sup>Department of Prosthetics and Orthotics, Sooncheon First University, <sup>3</sup>Biomechanics.Inc., South Korea*

*Objective:* Tibial torsion is one of the frequent causes of in-toeing gait in children. If the torsional angle is higher than physiologic level, intervention is expected by the parents. Medical community needs to respond to the needs of the patients instead of simple waiting to be 6 years old. *Methods:* Tibial Counter-Rotator (TCR) was designed to give the constant counter-rotation on the tibia applied as a night splint while avoiding the rotation of femur as it is applied with the knee flexed at 90°. Twenty children aged 2 to 6 years with tibial torsion were involved in this study with an age-matched control group. The change of tibial torsion angle in 2 years was measured with and without TCR and analyzed statistically. *Results:* The patients with tibial torsion and treated with TCR showed significant improvement of tibial torsion angle after 2 years. TCR was well accepted by the patients and care givers. Failure rate was negligible. *Conclusions:* TCR is a safe and reliable orthotic device for the children with tibial torsion.

## OP005-07

**AN INSTRUMENTED 10 METRES WALK TEST FOR POST STROKE PATIENTS VIA FOOT PRESSURE MAPS MEASUREMENTS AND AVERAGING*****Moreno d'Amico<sup>1</sup>, Piero Roncoletta<sup>2</sup>, Walter Branchini<sup>1</sup>, Francesca Ciarrocca<sup>1</sup>, Maura Tomassini<sup>1</sup>, Massimo Vallasciani<sup>1</sup>****<sup>1</sup>L.A.M.P.O. (Laboratorio Analisi del Movimento e Postura) – Istituto Di Riabilitazione Picena (MC), <sup>2</sup>Bioengineering & Biomedicine Company S.r.l., Pescara, Italy*

*Objective:* A simple instrumented protocol and automatic processing procedure to involve quantitative parameters in the 10 m walk-test for post stroke patients' evaluation is proposed. *Methods:* The experimental set-up is based on pressure insole system (PEDAR Novel Gmb). Each insole consists of matrix of pressure cells working at a given sampling rate. The usual raw data consist of a set of pressure distribution maps obtained indifferently from normal floor or treadmill walking. The device implicitly acts as a chronograph. After 3 standing posture measurements, three 10-m-walk test trials are recorded. *Results:* From such multiple gait cycles, the developed procedure automatically identifies each stride phase and after a complex processing also the mean stride phase is computed. A set of biomechanical parameters are extracted, such as the centre of pressure patterns, vertical forces patterns, time phases analysis, average step lengths, mean stride and its variability, stances symmetry and so on. Ten patients have been analysed in this pilot study aiming to establish among all the parameters the optimal set to be used to fully describe the foot/floor interaction in post stroke patients. This optimal set allowed defining the statistical framework to perform pre- and post-treatment comparison. *Conclusions:* The evaluation of asymmetrical load distributions, their temporal patterns and related biomechanical compensatory mechanisms correlated to static postural analysis, deeply enriched the clinical significance of the 10-m-walk-test improving the clinical understanding of stroke patient status as well as his/her rehabilitation planning and monitoring.

## OP005-08

**INTRA-ARTICULAR HYDRAULIC DISTENSION FOR PAINFUL STIFF SHOULDER: RUPTURE VERSUS NON-RUPTURE*****Keewon Kim<sup>1</sup>, Sun G. Chung<sup>1</sup>, Tae Uk Kim<sup>1</sup>, Gyu Jin Lee<sup>2</sup>, Jaho Leigh<sup>1</sup>****<sup>1</sup>Department of Physical Medicine and Rehabilitation, and <sup>2</sup>Department of Medical Engineering, Seoul National University Hospital, Seoul, South Korea*

*Objective:* Intra-articular hydraulic distension (IHD) has been proven to be effective for the treatment of painful stiff shoulder (PSS) but has not been widely used clinically due to the concern of rupturing capsules. In this study, we devised real-time pressure and volume monitoring technique with which we could infuse the largest volume possible without rupturing capsules and we investigated whether IHD without rupturing capsule (capsule-preserving IHD) yielded different outcome compared to IHD with rupturing capsule (capsule-rupturing IHD). *Methods:* 47 patients diagnosed as PSS were evaluated for range of motion (ROM), pain (VAS) and possible structural lesions such as rotator cuff tear by ultrasonographic exam and they have been performed IHD, capsule-preserving or capsule-rupturing. Capsule-preserving IHD was achieved by stopping infusion just before rupture by observing plastic-deformation phase in the pressure-volume curve by monitoring of intra-articular pressure. The outcome was evaluated in short-term (3 days after IHD) and mid-term (3 weeks after IHD) follow-up. *Results:* Among 47 patients, 29 patients were assigned to capsule-preserving IHD and 18 patients to capsule-rupturing IHD. 19 patients from capsule-preserving group did not reach plastic deformation phase because of pain or other reasons and 10 patients from capsule-rupturing group did not reach plastic deformation phase because of premature rupture. Capsule-preserving IHD resulted in better improvement in ROM on both short-term and mid-term follow-up and the difference was valid whether IHD reached plastic-deformation phase or not. But pain improvement was not significantly different between two groups. Pressure-volume curve of IHD was steeper when patient could not reach plastic deformation and was related to less ROM improvement in short-term follow-up. The total volume of IHD was related to more ROM improvement in short-term follow-up. *Conclusion:* Intra-articular hydraulic distension infusing as much volume as possible without rupturing capsule showed better results in ROM improvement compared to capsule-rupturing IHD for the treatment of PSS.

**PEDIATRIC REHABILITATION I / BURN AND PAIN REHABILITATION**

## OP006-01

**HEAD ACUPUNCTURE COMBINES SPEECH THERAPY CORRECTING THE LANGUAGE DISORDER OF CEREBRAL PALSY CHILDREN AND ANALYZE THE FACTORS OF RELATED*****Xiaojie Li, Yuqi Yang, Zhihai Lu****Department of Children with Cerebral Palsy, College of Rehabilitation Medicine of Jiamusi University, Jiamusi City, Heilongjiang Province, China*

*Objective:* To explore the therapeutic effect of head acupuncture combining speech therapy and to analyze the relations of the types of speech disorder and degree of illness and level of mental retardation. *Methods:* 155 cerebral palsy (CP) children were selected and assessed through the examination of CRRC <s-s>, dysarthria

scale and intelligent test before and after treatment. All patients were excluded auditory disorders. Three groups were divided with 30 for control group (group 1), 76 for speech and language training (group 2) and 49 for head acupuncture combining speech and language training (group 3). Reassessment after three months and data was analysed. *Results:* 1) There was significant difference in the effective rate ( $p<0.01$ ) with 60% of group 1, 88.4% of group 2 and 95.9% of group 3. 2) The effect seemed to be more significant for delayed language development disorder (DLDD) than others ( $p<0.01$ ). The higher the level of function and the higher the score of intelligence was, the better therapeutic effect was achieved ( $p<0.01$ ). *Conclusion:* More therapeutic effect was observed in group 2 and group 3, with group 3 even showing more improvement. The DLDD seemed to benefit more than the others. The better therapeutic effect could be achieved with subjects of higher level of function and the higher score in intelligence.

#### OP006-02

### GENERAL ANALYSIS OF SPEECH HYPOEVOLUTISM IN CEREBRAL PALSY CHILDREN

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*Objective:* To analyze the speech development and its correlation with motor development, interpersonal communication and object performance in cerebral palsy children. *Method:* To analyze 38 cases in cerebral palsy children who were under 3 years old and admitted from September 2004 to December 2006. All of them were accepted with the Gesell development scale test. *Result:* Among these 38 cases, ratio of boy to girl was 2.45:1 and speech development scores under the normal level were with a high percentage of 89%. The Pearson correlation analysis showed that speech development had a positive correlation with motor development, interpersonal communication, object performance ( $p<0.001$ ), respectively. *Conclusion:* There are 89% (34/38) cases in cerebral palsy accompanied with hypoevolutism of speech development and cognition development. It suggests that more attention should be paid to speech development and cognition development besides to motor development for the cerebral palsy children.

#### OP006-03

### PROTECTIVE EFFECT OF CHOLECYSTOKININ OCTAPEPTIDE ON PERIPHERAL NEURONS

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*Objective:* To investigate the effect of cholecystokinin octapeptide (CCK-8) on the injury of *in vitro* cultured rat dorsal root ganglia neurons (DRGn) induced by the nitric oxide donor-sodium nitroprusside. *Methods:* At 72 h after planting, primary cultured DRGn were randomly divided into five groups: normal group, model group (sodium nitroprusside injury) and experimental groups (pretreated with different concentration of CCK-8 before injury). All the groups were kept cultivating for 24 h after injury. Then morphological feature of apoptosis were observed by fluorescence microscopy and terminal deoxynucleotidyl transferase-mediated nick end labeling (TUNEL) was used to detect the apoptosis. Immunocytochemistry was used to detect the protein expression of nerve growth factor (NGF) and growth-associated protein 43 (GAP-43). *Results:* There was obvious apoptosis phenomenon induced by 200  $\mu\text{mol/l}$  sodium

nitroprusside injury (the apoptosis rate was 49.77%). The NGF and GAP-43 protein could increase gently. While after pretreating with CCK-8, the apoptosis rate of DRGn decreased remarkably (the apoptosis rate was 28.38%), the protein expression of NGF and GAP-43 increased significantly as compared with the model group ( $p<0.05$ ). *Conclusion:* CCK-8 can inhibit the neurotoxicity of nitric oxide and protect DRGn from the injury induced by sodium nitroprusside. Also it can increase the expression of NGF protein and GAP-43 protein after injury, and that may be one of the neuro-protective mechanisms of CCK-8.

#### OP006-04

### CLINICAL CHARACTERISTICS AND INFLUENCE FACTORS ON PROGNOSIS OF INFANTILE SPASMS: ANALYSIS OF 115 CASES

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*Objective:* To summarize clinical characteristics of infantile spasms and analyze influencing factors for prognosis, and providing theoretical evidence for diagnosis, treatment and prognostic judgement. *Methods:* The database of 115 children diagnosed as infantile spasms in our hospital from 1996 to 2006 was reviewed, regarding sex, age of onset, pattern of spasms, neurodevelopment, etiology, EEG and treatment. *Results:* Peak age of onset of infantile spasms ranged from 3 to 8 months. The clinical seizure patterns included flexor, extensor, mixed extensor-flexor, subtle spasms and limb predominance, shown in 69.57%, 5.22%, 12.17%, 5.22% and 7.83%, respectively. The etiology included cryptogenic ( $n=34$ , 29.57%) and symptomatic ( $n=81$ , 70.43%). In the symptomatic group, the major underlying causes were perinatal asphyxia, brain malformation or dysplasia, and intrauterine asphyxia. As to the EEG, several patterns were identified, including hypsarrhythmia ( $n=37$ , 32.17%), modified hypsarrhythmia ( $n=50$ , 50.43%) and other interictal pattern ( $n=20$ , 17.39%). Corticosteroid, clonazepam, valproate, topiramate and ACTH were used in this study. Among 77 newly diagnosed cases, 38 were free of spasms within 14 days after treatment. 20 cases still suffered from spasms after 14 days. 27 cases were followed up, in which 2 died, 13 were free of seizure, and 12 still suffered from convulsion, with 7 evolved into other seizure type. Several influence factors were analyzed in relation to seizure control and neurodevelopment, only a symptomatic etiology had a positive correlation with poor outcome. *Conclusions:* The seizure control and neurodevelopment of infantile spasms of cryptogenic group were better than those of symptomatic group.

#### OP006-05

### INHIBITORY EFFECTS OF HE-NE LASER ON COLLAGEN SYNTHESIS IN SCAR FIBROBLAST IN CULTURE

**Bin Shu<sup>1</sup>, Zongming Huang<sup>2</sup>, Chuanfeng Shu<sup>2</sup>, Xiangqin Fang<sup>2</sup>, Xiang Li<sup>2</sup>, Peng Xu<sup>2</sup>, Ziqin Yu<sup>2</sup>**

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*Objective:* In order to explore the inhibitory effects of He-Ne laser repeated irradiation on collagen production of scar fibroblasts. *Methods:* Cultured fibroblasts derived from hypertrophic scars (HS) were irradiated with He-Ne laser for 30 min at various power



densities (10 mW/cm<sup>2</sup>, 50 mW/cm<sup>2</sup>, 100 mW/cm<sup>2</sup> and 150 mW/cm<sup>2</sup>), once a day for 3 consecutive days. At 24 h after repeated irradiation collagen production and type I procollagen mRNA level of fibroblasts were respectively measured by the incorporation of [<sup>3</sup>H] proline and blot hybridization techniques. *Results:* Collagen synthesis and type I procollagen mRNA level remained unchanged at power density of 10 mW/cm<sup>2</sup> or 50 mW/cm<sup>2</sup>. Compared with control, collagen synthesis and type I procollagen mRNA level were significantly decreased at power densities of 100 mW/cm<sup>2</sup> or 150 mW/cm<sup>2</sup> ( $p < 0.05$ ). Type I procollagen mRNA level at power density of 150 mW/cm<sup>2</sup> was lower than that at power density of 100 mW/cm<sup>2</sup> ( $p < 0.05$ ). *Conclusions:* Repeated He-Ne laser irradiation at power densities of 100 mW/cm<sup>2</sup> or 150 mW/cm<sup>2</sup> can suppress collagen synthesis of cultured fibroblasts in HS. The cause may associate with down-regulation of type I procollagen mRNA expression.

#### OP006-06

##### THE EFFECTS OF RADIOFREQUENCY ABLATION TECHNIQUE ON SCAR PROLIFERATION

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*Objective:* To explore the effects of radiofrequency ablation on promoting absorption of scar proliferation parts, relieving scar pain and itching, and joint motion degree confined by scar contracture. *Method:* 22 patients with scar proliferation were studied, among them 3 cases with scar area of  $5.4 \pm 4.0$  cm<sup>2</sup> produced by burn and cold injury including 1 case with metacarpophalangeal joint motion dysfunction after scar contracture by 2 times skin grafting, including 8 cases with scar itching and 4 cases with moderate scar pain, with scar length of 1.2 to 14 cm. The scars after 4 months to 30 years post onset were treated 1 time by radiofrequency ablation (developed by Physiotherapy of PLA General Hospital), and then the scar shapes, pain level and itching degree were observed. The scar shapes were followed up for 8 months to 2 years. The pain level was evaluated by brief McGill pain table followed up for 1-2 months. *Results:* The scar proliferation parts (scleromata) in 14 cases were basically absorbed, the scar volumes in 7 cases were reduced to more than 50%, and the scar volume in 1 case was unchanged. The metacarpophalangeal joint motion degree confined by scar contracture was increased to 15°, the scar itching in 8 cases and the scar pain in 4 cases were basically relieved. *Conclusion:* The technique established by our radiofrequency ablation promotes scar absorption of proliferation part, relieves scar itching and pain, increases joint motion degree confined by scar contracture.

#### OP006-07

##### ELECTROPHYSIOLOGICAL EFFECTS OF REMOTE ACUPUNCTURE ON THE ENDPLATE NOISE

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*Objectives:* This controlled study was designed to investigate the remote effect of acupuncture on the endplate noise (EPN) in the myofascial trigger point (MTrP) of upper trapezius muscle. *Methods:* Patients with active MTrPs in upper trapezius muscles were

divided in 3 groups. Patients in the control group received placebo acupuncture (Group C) and those in the other 2 groups received traditional acupuncture (Group T) and new acupuncture (Group N) therapy, respectively. Two acupuncture points, Wai-guan (TE-5) and Qu-chi (LI-11) were treated. A new acupuncture technique with the needle screwed in-and-out to elicited local twitch responses was applied for the Group N patients. Tracings of EPN were recorded from the upper trapezius muscle before, during, and after remote acupuncture therapy. The average amplitude of EPN was measured as an indicator of MTrP irritability. *Results:* Comparing to Group C, the average of EPN amplitude was significant reduced in both Group T and Group N after therapy, and the amplitude change was much remarkable in Group N than Group T. *Conclusions:* It appears that the MTrP irritability can be suppressed after remote acupuncture treatment, with the best effectiveness after the new acupuncture therapy. It is suggested that this new technique can be applied remotely to treat the proximal MTrPs.

#### OP006-08

##### AMPUTATION PAIN CAUSED BY NEUROMAS AND ACUPUNCTURE

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*Objective:* To show the effect of acupuncture in the management pain due to amputation neuroma. The pain is characterized by electric shock sensations. Pain medications most often do not bring adequate relief. The presence of neuromas is demonstrated by ultrasounds or RMI. The neuroma pain appears long after the amputation. Assessed with palpation or percussion, they differ from both phantom sensations (hallucinatory) and phantom pain (alloghallucinatory) and from pain of a poorly fitted prosthesis. *Methods:* 10 amputees: 2 women, 8 men. *Context:* 9 traumatic amputations, 1 vascular amputation. *Location:* 1 wrist, 3 femoral, 5 tibial and 1 trans-metatarsal. Acupuncture treatment is mainly local. Needles are located around the neuroma and properly manipulated to avoid exacerbating the neuroma pain. *Results:* The results were considered as excellent in two patients, good in six and nil in two. In eight patients out of ten, acupuncture was more effective than potent analgesics. *Conclusion:* The use of acupuncture therapy in physical medicine for neuroma pain in amputees is an alternative and complementary option to analgesic medication. It also enhances our understanding of the neuro-physiopathology of neuroma pain.

#### NEUROLOGICAL REHABILITATION III

#### OP007-01

##### ELECTROPHYSIOLOGICAL EFFECT OF PASSIVE EXERCISE ON NEURAL FUNCTIONAL RECOVERY OF RABBITS AFTER PERIPHERAL NERVE CRUSHED INJURY

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*Objectives:* To investigate the effect of exercise training on neural functional recovery in rabbits after peripheral nerve crushed injury. *Methods:* 24 rabbits were divided into an exercise training group and splinting group. A special device with aerocyst was used to crush tibial nerves for establishing models. The rabbits in the ex-



ercise training group were given passive exercise for 20 min daily for 3 weeks and the splinting group was only splinted. **Results:** On the 21<sup>st</sup> day of injury, the amplitude was increased in the exercise training group, as compared with the splinting group, but there was no significant difference. The latency in the exercise training group was shorter than the splinting group. The nerve conduction velocity of exercise training group was faster than the splinting group. The thickness of myelin sheath, average numbers of myelinated nerve fibers per area and diameter of regenerating axon was larger than the splinting group. The wet weight and diameter of musculus triceps surae of exercise training group were bigger than the splinting group, and it was significantly different between the two groups. **Conclusion:** The passive exercise for rabbits after tibial nerve crushed injury helps to improve the early recovery of motor function.

#### OP007-02

### DOSE EFFECTIVENESS RELATIONSHIP OF BOTULINUM TOXIN TYPE A INJECTION FOR SPASTICITY – CHINESE EXPERIENCE

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**Objective:** To investigate dose-effectiveness of botulinum toxin type A on muscle spasticity in patients with upper motor neuron syndrome. **Methods:** Forty-eight patients with spasticity were divided into low dose group (LD) and normal dose group (ND) for injection of Botox during past 3 years. The dosage of LD was defined as the dose equal or less than 50% of the ND. All subjects were qualified by the significant spasticity which interfered with activity of daily living (ADL) and locomotion. The injections were guided by electrical stimulation on selected motor points. The Modified Ashworth Scale (MAS) and locomotion were assessed two weeks post injection. **Results:** The reduction of MAS is  $1.25 \pm 0.23$  in LD ( $p < 0.05$ ) and  $1.28 \pm 0.20$  in ND. There was no difference between groups ( $p < 0.05$ ). The correlation coefficient in MAS reduction after injection between LD and ND was 0.23 ( $p > 0.05$ ). The improvement of ADL and locomotion were also significant ( $p < 0.05$ ) in the two groups but the difference between groups was not significant ( $p > 0.05$ ). The improvement of MAS and functions was not correlated significantly with severity of spasticity and dosage. **Conclusion:** Low dose of Botox injection might be efficient to produce reasonable functional improvement compared with the normal dose. The injection technique and rehabilitation training specific to target function are essential for the low dose injection.

#### OP007-03

### GENDER DIFFERENCE OF EVENT-RELATED POTENTIALS IN A FACIAL EXPRESSION RECOGNITION TASK

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**Objective:** To investigate the characteristics of spatiotemporal pattern of gender differences in event-related potentials of face expression processing. **Methods:** Thirty-one participants (18 males and 13 females, age 18–35) performed an implicit facial recognition task, schematic pictures of three expressions (positive, neutral and negative) as stimuli. The differences of reaction time and accuracy rate were compared during males and females group with group t-test, the spatiotemporal pattern of the emotional wave (waveform differences between either the positive or the negative and the neutral) between genders was investigated, and the differ-

ences of face-specific N210 component were compared within each gender with paired t-test. **Results:** There were significant emotional wave differences between males and females, the significant effect of different emotional wave (positive-neutral) between the males group and females group distribute from the right to the left scalp gradually at 100–200 ms, bilateral scalp (left scalp predominance) at 260–280 ms, frontal region at 360–380 ms; significant effect of different emotional wave (negative-neutral) between the males group and females group distribute at right scalp at 360–380 ms, from left scalp to posterior region at 500–520 ms. The N210 latency was delayed at the left hemisphere T5 to the right hemisphere T6 in females ( $p < 0.05$ ). **Conclusion:** There are gender differences in event-related potentials of face processing to emotional stimuli. The latency of N210 showed right hemisphere dominance in females. This suggests that the study on facial emotional recognition should be considered the gender of the subjects.

#### OP007-04

### LONG-STANDING DEFICITS IN SPATIAL MEMORY DEFICITS AND RELATED GENE EXPRESSIONS FOLLOWING RECURRENT PROLONGED NEONATAL SEIZURES AND FORCED RUNNING

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**Objective:** To evaluate the long-term effects of prolonged neonatal seizures and forced running on learning, memory, and the expressions of zinc transporter 1 (ZnT1) and GluR2 in hippocampus. **Methods:** The authors assigned 12 neonatal rats for each group: the single-seizure group (SS), the recurrent-seizure group (RS) and the control group. Morris water-maze test were performed at P27–P31, P58–P61, P80–P82, meanwhile at P51–P56, the RS and SS groups were submitted to forced running exercise. In situ hybridization and immunohistochemistry method were used to detect the expression of ZnT1 mRNA and GluR2 protein in hippocampus. **Results:** The escape latency of RS group was much longer than that of control group in the first two maze tests. After physical exercise, the difference in three groups is not significant in the last maze test. There was decreased frequency of taxis strategy in RS group than that in SS and control groups in the three memory probe tests. The expression levels of ZnT1 mRNA in CA3 were much higher meanwhile the level of GluR2 protein was much lower in RS group than that in SS and control groups. **Conclusions:** Recurrent prolonged neonatal seizures caused long-term cognitive deficit in adulthood, while forced running could improve the learning but not memory capacity in RS group, which may be associated with the up-regulated expression of ZnT1 mRNA and down-regulated expression of GluR2 in CA3.

#### OP007-05

### NEW TRAINING STRATEGIES FOR ROBOT-AIDED ON UPPER LIMB HEMIPARESIS AFTER STROKE AND BRAIN INJURY

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**Objective:** To investigate the effects of robot assistant training on upper limbs of patients with stroke and brain injury. Robot-

aided training in the company of recent technologic advances can supply safe, intensive and task-specific intervention to persons with mild to severe motor impairments after neurological injury. *Methods:* This is a baseline, pre-post treatment comparison study. Twenty-two persons with chronic stroke and brain injury were enrolled in the research. The upper extremity compound movements (UECM) rehabilitation training robot was designed as a constrained straight-line path and exterior-oriented circle path exercises. Subjects carried out new training strategies, passive or active constrained straight-line path exercise and exterior-oriented circle movements on the robot according to their motor abilities for 45 min 20 times for 4 weeks. The Fugl-Meyer test of upper-extremity function, Motor Status Score (MSS) and Modified Ashworth scales (MAS) of elbow joints were carried out during 4 weeks before robotic training, one day before robotic training and one day after robotic training. *Results:* Fugl-Meyer assessment and MSS of motor impairment were significantly increased after treatment ( $p < 0.001$ ). MAS were significantly decreased in elbow flexor ( $p = 0.001$ ) and not significantly reduced in elbow extensor ( $p = 0.061$ ) compared with baseline assessment. *Conclusions:* UECM robot-aided training could reduce the upper limb impairments in patients with chronic stroke and brain injury. This may be attributed to straight reaching and an exterior-oriented circle path training. It may reduce spasticity due to upper motor neurone injury mainly by repetitive stretching.

#### OP007-06

### THE EXPLORATION OF ACUPRESSURE FIVE-SHU POINTS COMBINED WITH JOINT CONTROL TRAINING ON LIMB MOTOR FUNCTION IN HEMIPLEGIC PATIENTS AFTER STROKE

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*Objective:* To explore the effect of acupressure Five-shu Points combined with task of knee and ankle control training of lower limb after stroke. *Method:* Total 42 first-onset patients with stable stroke within 3 months with criteria of standing balance  $> 2$ , paralytic side can support 50–70% of body weight, Brunnström's scale  $> 2$  and paralytic side with Ashworth scale  $< 3$  were recruited. Informed consent form was signed. Patients were randomly divided into therapy and control groups. Conventional neurology therapies were given to all patients. The patients in the therapy group were given acupressure Five-shu points combined with task of strength training and lower limb joints control, once a day, 20–25 min every time, 5 times a week, totally for 1 month. Functional performance will be assessed by Fugl-Meyer assessment (FMA), functional ambulation category (FAC), and functional independence measure (FIM). *Results:* The muscle spasm in patients of the therapy group was obviously lower than that of the control group, and the hemiplegic gait in patients of the therapy group was remarkably better than that of the control group. *Conclusion:* Same kinds of Five-shu points are located on similar position (most of Five-shu point are located around the joints), and have obvious differences between Yang-channels and Yin-channels. With the Yellow Emperor's Internal Classic's theory, combining with modern clinical measures could improve the therapy towards stroke patients' muscle spasm and hemiplegic gait.

#### OP007-07

### THE EXPERIMENTAL RESEARCH ON THE THERAPY OF CLUSTER NEEDLING OF SCALP POINT AFFECT ENDOGENOUS NEURAL STEM CELLS AFTER CEREBRAL INFARCTION

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*Objective:* To observe the effect of the cluster needling of scalp point therapy on the proliferation, migration and differentiation of endogenous NSC. This therapy can promote adult neurogenesis, repair and reconstitution of neural networks. *Methods:* Dil was injected into the lateral ventricle for prelabeling the SVZ cells. The method of pulsed BrdU was used to label new cells. FGF-2mRNA and NCAMmRNA after focal ischemia was determined by *in situ* hybridization. The differentiation cells were identified by double immunofluorescent staining and were observed with laser confocal microscope. *Results:* This therapy promote the expression of FGF-2 and NCAM in neuron cytoplasm, glial cell cytoplasm and endothelium with a significant difference compared with the two other groups; Expression of BrdU/NeuN and BrdU/GFAP-positive cells in cluster needling of scalp point group was also more than the two other groups. At 21d point, three labeled positive cells were significantly increased when compared with the two other groups. *Conclusion:* The cluster needling of scalp point therapy can promote NSC in neuroproliferation center-SVZ proliferation after focal ischemia, and to reduce the diminishment of proliferation with time. The cluster needling of scalp point therapy can promote Dil-label cells in SVZ to migrate to striatum and cortex of peri-infarct region and differentiate into neurons and astrocytes.

#### OP007-08

### THE BRIEF ICF CORE SETS FOR STROKE IN CHINA

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*Objective:* To identify the Brief ICF Core Sets for patients with stroke in China. *Methods:* Using two kinds of questionnaires to record the information about the patients with stroke, one is the Case Report Form for clinicians and health professionals; the other is the Case Report Form for the patients with stroke. Then entering the information into the SPSS13.0 for windows, calculating the frequencies of the items of the comprehensive ICF Core Sets, the item whose frequency is above 30% will be chosen as one of the First-phase Brief ICF Core Sets for stroke in China. Then choosing 20 exports in rehabilitation as investigation subjects, the questionnaire is also the comprehensive ICF Core Sets for patients with stroke. We send the questionnaires to the exports by e-mail, then entering the information into the SPSS13.0 for windows, calculating the frequencies of the items of the comprehensive ICF Core Sets, the item whose frequency is above 50% will be chosen as one of the Second-phase Brief ICF Core Sets for patients with stroke in China. Finally, we integrate the two results to identify the final Brief ICF Core Sets for patients with stroke. *Results:* 74 second-level categories are included in the Brief ICF Core Sets with 20 categories from the component body function, 1 from body structure, 34 from activities and participation, and 19 from environment factors. *Conclusion:* The integration of preliminary clinical investigation and exports opinion lead to the identification of Brief ICF Core Sets for patients with stroke in China. It still needs to be validated with the later investigation.

**MUSCULOSKELETAL REHABILITATION III****OP008-01****COMPARISON OF THE HAND ADL REHABILITATION EFFECTS BETWEEN THE REPLANTATION OF DIGIT-SEVERED AND THE MYOELECTRIC HAND****Tingren Lu, Qingtai Li***Department of Hand, Beijing Jishuitan Hospital, Beijing, China*

**Objective:** To compare the postoperative rehabilitation effects between the replantation of digit-severed and the myoelectric hand. **Methods:** A retrospective analysis was performed in 54 patients. The respective average follow-up was  $1.84 \pm 0.30$  months for the myoelectric hand group (14 patients) and  $24.50 \pm 5.08$  months for the replantation of digit-severed group (40 patients). The hand ADL function (including hanging, grasping of material, picking up coin, picking up needle, knotting, buttoning, writing, hammering, using screwdriver, opening a lid of jar) was evaluated with the method and criteria of China Hand Surgical Association to digit-severed replantation. **Results:** The mean age was 25.8 years for the myoelectric group and 27.4 years for the replantation of digit-severed group. The hand ADL score was  $7.50 \pm 0.63$  for the myoelectric group and  $13.025 \pm 1.59$  for the replantation of digit-severed group with a significant difference between the two groups ( $F=43.025, p<0.001$ , covariance test). **Conclusion:** The hand ADL score of the myoelectric group was better than the replantation of digit-severed group.

**OP008-02****CERVICAL SPINE INJURIES RESULTING FROM SPORTS AND RECREATION****Chaoqun Ye<sup>1</sup>, Jianjun Li<sup>2</sup>, Tiansheng Sun<sup>3</sup>, Fan Zhang<sup>1</sup>, Jun Zhou<sup>1</sup>, Yuqin Zhang<sup>1</sup>***<sup>1</sup>Department of Hygiene and Rehabilitation, The Capital Physical College, <sup>2</sup>China Rehabilitation Research Center, <sup>3</sup>Department of Orthopedics, The Beijing Army General Hospital, Beijing, China*

**Objective:** Determine the characteristics of cervical spine injuries resulting from sports and recreation, and instigate measures to prevent it. **Methods:** A retrospective review of all C-spine injuries induced by sports and recreation referred to four hospitals and two rehabilitation centers in Beijing between January 1994 and December 2006. **Results:** A total of 56 victims were identified. The average age of individuals was  $27.55 \pm 11.722$  years. Males were involved in 83.1% of the injuries whereas the female accounted for 16.9%. Diving in public swimming pool with 34 (60%) injuries was the most frequent cause, followed by gymnastics accidents with 5 injuries (8.9%). Game responsible for 7.2%, was ranked the third. Burst fractures were the most common fracture type and seen in 26 cases (46%), followed by dislocation (37%). The other injuries type included: disc protrusions, spinous process fractures, etc, accounted for 13.8%. Forty-six percent of the patients incurred complete neurological injuries, 53% incomplete. Forty-seven percent of the injuries occurred at level C4. 3.4% of patients with ASIA A level died in the emergency department. 3.4% with ASIA D level recovered completely. Contributing factors to injury varied with sports type. All these factors were related to unawareness of safety. **Conclusion:** The most common cause of C-spine injury resulting from sports and recreation seen among male younger adults was predominantly as a result of diving accidents. Burst fractures and dislocation were the main injury types. Ninety-eight percent of patients had neurological deficit. The predominant reason of injury was lack of awareness for safety.

**OP008-03****EFFECTS OF SELECTIVE REHABILITATION ON THE PATIENTS WITH CHRONIC LOW BACK PAIN****Abdus Shakoor, Abul Salek, Tariqul Islam***Physical Medicine and Rehabilitation, BSMMU, Dhaka, Bangladesh*

**Objective:** To observe the effects of selective rehabilitation on the patients with chronic low back pain. **Methods:** The study was conducted in the Department of Physical Medicine & Rehabilitation, BSMMU, Shahabagh, Dhaka, Bangladesh. A total of 139 patients were selected for the study according to the selection criteria. They were divided randomly into two groups: Group A and Group B. Group A was treated with NSAID and Rehabilitation treatment and Group B was treated with NSAID only. NSAID in the form of naproxen (250 mg) twice daily orally was prescribed in both the groups. The drug was used from only one company to avoid any difference in efficacy. **Rehabilitation treatments:** ADLs, Assistive Devices and Exercise were given in Group A only. The patients were followed-up weekly for 8 weeks and the outcome was recorded in an assessment data sheet. Assessment of the patients were done by a visual analogue scale, Schober's test, Oswestry Disability Index and Modified Zung Index. Both paired and unpaired Student's test and Chi-squared test was done as required, to see the level of significance. Ethical clearance was taken from the proper authority in Bangladesh. **Results:** Improvement was found in both groups after treatment ( $p=0$ ). But in comparison between two groups, more improvement was found in the group receiving selective rehabilitation treatment ( $p=0$ ). **Conclusions:** Rehabilitation treatment is effective in chronic low back pain.

**OP008-04****FOOT DISORDERS AND FALLS IN OLDER PERSONS****Dootchai Chaiwanichsiri<sup>1</sup>, Siriporn Janchai<sup>1</sup>, Natthiya Tuntisriwat<sup>2</sup>***<sup>1</sup>Department of Rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, <sup>2</sup>Thai Red Cross Rehabilitation Center, Samutprakarn, Thailand*

**Objective:** To study aging foot disorders and their associations with falls in healthy elderly. **Methods:** Healthy volunteers aged 60–80 years who were independent in self-care and walking were recruited from urban communities in Bangkok. Health status, fall rate, foot problems, footprints, foot dimensions and footwear were evaluated. Walking performance was assessed with timed get up & go test and 6-m walking speed. **Results:** There were 213 subjects: 108 men, 105 women with mean age of  $68.6 \pm 5.4$  years. Foot deformities presented in 87% and were not significantly associated with walking performance or falls. Foot pain was found in 14%; from plantar fasciitis, moderate to severe hallux valgus, callus, metatarsalgia, and inappropriate footwear used. Falls were reported in 29.5% in women and in 12.9% in men. Multivariable analyses demonstrated that fall risk factors were female gender ( $OR=2.4, 95\% CI=1.13-5.12$ ), plantar fasciitis ( $OR=6.8, 95\% CI=1.5231-02$ ), and knee osteoarthritis ( $OR=3.6, 95\% CI=1.71-7.59$ ). Subgroup analyses revealed that visual deficit associated with falls in women ( $OR=4.7, 95\% CI=1.75-12.73$ ), and impaired foot protective sensation also associated with falls in men ( $OR=5.1, 95\% CI=1.46-18.38$ ). **Conclusion:** Despite high prevalence, foot deformities were mostly asymptomatic. Plantar fasciitis had high impact on falls in healthy elderly. Aging foot assessment and foot pain management play important roles in fall prevention.



## OP008-05

**EFFECT OF MUSCULAR POWER CHANGES OF KNEE JOINT ON THE BALANCE IN PATIENTS WITH OSTEOARTHRITIS****Guohui Xu, Jiejiao Zheng***Rehabilitation Department of Huadong Hospital, China*

**Objective:** To explore the effect of knee joint muscular power changes on the balance in patients with osteoarthritis. **Methods:** Isokinetic test and computerized static posturography were performed and their parameters were obtained in 50 controlled subjects and 50 age-matched patients with OA of the knee. **Results:** 1) Isokinetic data including peak torque (PT), total power (TW), average power (AP) and torque acceleration energy (TAE) were significantly decreased in the patients with OA of knee joint compared with the control ( $p < 0.01$ ), while there was no statistical difference in Hamstring/Quadriceps ratio index (H/Q) ratio between two groups. 2) Posturographical measurements including the covered area (CA), length of sway (LOS), sway ratio index (SRI) and LOS/CA ratio were significantly increased in patients with OA of the knee compared with the control ( $p < 0.01$ ). **Conclusion:** 1) The muscular power of knee joint was decreased as well as balance function in the patients with OA. 2) There was close positive relationship between the decrease of muscular power in the knee joint and balance capability. Much attention should be attached to enhance knee muscular power, especially keep the equilibrium between extension and flexion action in order to improve the balance of body for the patients of knee OA.

## OP008-06

**THE EFFECT OF A COMPREHENSIVE WORK REHABILITATION PROGRAM FOR WORKERS WITH HAND INJURIES IN MAINLAND CHINA****Yanwen Xu, Xunwen Lu, Xiaoshan Yang***Department of Work and Social Rehabilitation, Guangdong Provincial Work Injury Rehabilitation Center, Guangzhou, China*

**Objective:** The purpose of the study was attempted to determine the effects of a Comprehensive Work Rehabilitation Program on return to work for workers with hand injury. **Methods:** The study followed a quasi-experimental design. One hundred and twenty-five patients were involved in the present study with age of  $34.95 \pm 9.98$  years old. Participants in an 8 weeks comprehensive work rehabilitation program, which included case management, work hardening, training and placement services, were followed up for one month. Three assessments were conducted at the time of the beginning of the 1<sup>st</sup> week, the 4<sup>th</sup> week and at the end of the 8<sup>th</sup> week. The comprehensive work rehabilitation program outcomes were gathered 8 variables during the time of follow-up. **Results:** The return to work rate of the participants was 72% at one month after the program, most of them return to the same company and same job (37.6%) and the same company but different job (32.8%). Case management and work readiness were shown to be the main factors, which significantly influenced the outcomes of return to work. The work readiness scale LASER Action subscale (OR=3.0, 95% CI=1.213-10.334) was the most significant factor predicting the return to work outcomes. **Conclusions:** Combination of physical, emotional factors with a case management system in a comprehensive work rehabilitation program appeared to be an effective way of facilitating those workers with hand injury back to productivity. The results shed light on the development of a return to work intervention programs and clinical pathways for workers with hand injury.

## OP008-07

**AN EVALUATION OF THE SURVIVAL PERIOD OF PATIENTS FOLLOWING DISCHARGE FROM AN AUSTRALIAN INPATIENT REHABILITATION WARD****Carol Connolly, John Estell, Friedbert Kohler, Roger Renton***Rehabilitation Department, Braeside Hospital, Fairfield, Australia*

**Objectives:** Many of the underlying conditions which require an admission to a rehabilitation ward for rehabilitation care have significantly increased mortality rates compared to those of the normal population. It has been demonstrated that rehabilitation results in increased quality of life and minimised dependency but little is known of the survival period of this patient group. The aim of this study was to determine the survival period of patients following an inpatient episode of rehabilitation. **Methods:** All patients admitted to the Braeside Rehabilitation Unit from January 1997 until December 1998 were identified. We determined the last date of patient contact, date of death, or searched for date of death on the National Death Register (Australian Institute of Health and Welfare). **Results:** 697 patients were admitted during the reference period. 72 patients died within one year of admission. At eight years, 218 patients were known to have died. 231 patients had further contact with the health service 5 or more years after their inpatient admission. 44 patients had no further contact with the health service after their discharge. Sub-group analyses for Strokes and Orthopaedic conditions will be presented. **Conclusions:** The preliminary analysis reveals that 90% of rehabilitation inpatients survive more than twelve months after their rehabilitation admission and one-third to one-half survive 5 years or more. This has implications for community services and health care provision.

## OP008-08

**THERAPEUTIC EFFECTS OF A CHINESE HERBAL PREPARATION ON MUSCLE STRAIN AND THEIR MECHANISM IN RABBITS****Bin Shu, Haoyue Deng, Xiang Zhang, Wanglin Jiang, Dingguo Miao, Xiang Li, Nu Lin, Ziqin Yu***Department of Rehabilitation Medicine, Daping Hospital, Third Military Medical University, Chongqing, China*

**Objective:** To explore the therapeutic effects of a Chinese herbal preparation consisting of 12 kinds of Chinese herbs such as Flos Carthami and Radix Notoginseng, etc., on muscle strains and their mechanism. **Methods:** In 120 adult rabbits, the left tibialis anterior (TA) muscle was stretched to injured and randomized into the treatment group and control group. The TA muscle in the treated group was locally treated with a Chinese herbal preparation. Histological, enzymohistochemical and biomechanical changes of TA muscle in two groups were studied on the 0, 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 7<sup>th</sup> day after strain. **Results:** On the 1<sup>st</sup> and 2<sup>nd</sup> day, few inflammatory cells were seen and mainly located in the necrotic muscle fibers at the injured site in the treated group while a large number of them were found at the injured site and its adjacent tissue in the nontreated group. On the 3<sup>rd</sup> day, the activities of CCO, ATPase, a-GPD, MDH and SDH were significantly higher in the treated group than in the nontreated group ( $p < 0.05$ ). On the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> day, the contractile force was remarkably higher in the treated group than in the non-treated group ( $p < 0.05$ ). On the 1<sup>st</sup> and 2<sup>nd</sup> day after strain, the ultimate failure load was markedly higher in the treated group than in the non-treated group ( $p < 0.05$ ). **Conclusions:**



This Chinese herbal preparation not only alleviated the inflammatory reaction and prevented the passive strength and contractile force from being decreased but also promoted the regeneration of muscle fibers. The reason of which might be that the preparation selectively stimulates the phagocytes and enhances the activity of cellular oxidases.

## **REHABILITATION MANAGEMENT & OUTCOME / GERIATRIC REHABILITATION**

### **OP009-01**

#### **PRIMARY REASON FOR REHABILITATION SERVICES: RECENT EXPERIENCE OF A MEDICAL CENTER IN TAIWAN**

***Chung-Po Su, Ssu-Yuan Chen, Tyng-Guey Wang, Yen-Ho Wang, I-Nan Lien***

*Department of Physical Medicine & Rehabilitation, National Taiwan University Hospital, Taipei, Chinese Taipei*

**Objective:** To better understand current rehabilitation services utilization and project the future trend, this study was conducted to investigate the primary reason for rehabilitation services in a medical center in Taiwan. **Methods:** We reviewed records of those patients who visited rehabilitation clinics (4,305 new and 12,163 returned patients) or received rehabilitation consultation during their hospital stay (1,345 patients) between June 2007 and October 2007 at the National Taiwan University Hospital. The primary diagnosis of study patients was classified into 12 groups: musculoskeletal and soft tissue diseases, brain diseases, spinal cord diseases, peripheral neuropathy, myopathy, fractures and amputations, developmental and language disorders, cardiovascular diseases, respiratory system diseases, burn, cancer, and other unclassified. **Results:** Musculoskeletal and soft tissue diseases were the most common reason for outpatient rehabilitation services (55.0% of total outpatient clinic visits; 67.6% of new clinic visits), followed by brain diseases (17.6%) and developmental and language disorders (13.9%). In contrast, brain diseases (33.8%), cancer (14.4%), and cardiovascular diseases (12.3%) were the top 3 reasons for psychiatric consultation during inpatient care. **Conclusion:** As compared with a previous study in 1991, we observed an increase in cancer diagnosis in psychiatric consultation during hospitalization and also an increase in brain diseases and developmental and language disorders for outpatient rehabilitation services. The proportion of the elderly and pediatric patients was increased as well. It is crucial for health providers to understand these trends to better serve our rehabilitation patients.

### **OP009-02**

#### **THE INCIDENCE, TYPE AND EFFECTS OF COMPLICATIONS ON PATIENTS IN AN AUSTRALIAN REHABILITATION WARD**

***Carol Connolly<sup>1</sup>, Friedbert Kohler<sup>1</sup>, John Estell<sup>1</sup>, Jim Xu<sup>2</sup>***

*<sup>1</sup>Rehabilitation, Braeside Hospital, Fairfield, <sup>2</sup>Rehabilitation, Liverpool Hospital, Liverpool, Australia*

**Objectives:** Medical Rehabilitation is a complex process with a high risk for potential complications during an admission. Complications impact on morbidity, mortality and length of stay. Prevention or minimisation may result in better quality and

decreased cost. Urinary tract infection, decubitus ulcers, pneumonia, constipation, venothromboembolic disease and falls are at least partially preventable and it is worthwhile concentrating on these. The aim of this study was to determine the type, incidence and effects of preventable complications arising in patients in a rehabilitation ward. **Methods:** All patients admitted in a two-year period from January 2000 until December 2001 were identified. The medical records were reviewed to determine the incidence of complications. Correlations between incidence of complications, diagnostic group, length of stay, age of patient, discharge destination, and severity of disability as indicated by their admission FIM (Functional Independence Measure) scores were explored. **Results:** 776 patients were identified in the two-year period. There were 619 complications, occurring in 359 patients. 224 complications were falls occurring in 141 patients. A higher rate of complications correlated with older patients, low FIM admission scores, increase length of stay and discharge to residential care. **Conclusions:** Complications occur frequently during rehabilitation and significantly influence outcomes.

### **OP009-03**

#### **GENDER ISSUES IN THE SPECIALTY OF PHYSICAL AND REHABILITATION MEDICINE**

***Bong-Ok Kim<sup>1</sup>, Kyung-Ah Park<sup>2</sup>, Su Young Chung<sup>3</sup>***

*<sup>1</sup>Department of Rehabilitation Medicine, Chungnam National University Hospital, <sup>2</sup>Brain Research Institute, Chungnam National University, <sup>3</sup>Korean Medical Women's Association, Korea*

**Objective:** With the increasing number of female physicians in Korea, more than 20% of the resident physicians and the staff members in the training hospitals for Rehabilitation Medicine (RM) in Korea are female. As about 40% of medical students who are currently enrolled in 41 medical schools in Korea are female it is easily expected to have more female physicians, who would apply for residency in RM. The issues in medical community including training hospitals and the attitudes of the faculties, who are involved in selection of and training residents, are needed to be understood. **Methods:** A survey has been conducted in the training hospitals for RM in Korea to understand current status of female residents and staffs about the issues that they have to speak out. The areas of survey included selection policies of the program, faculty members' attitudes towards female residents and staffs, GD and SH, pregnancy and maternity leaves and job opportunities after the specialty training, especially while they are raising young children, etc. **Results:** The result of this survey will be discussed in detail to facilitate further discussions in terms of the differences in the countries of the Asia and Oceania. **Conclusions:** Gender issues should be one of the important topics in the curriculum of Rehabilitation Medicine as the specialists are facing difficulties through their career.

### **OP009-04**

#### **THE HANNOVER MODEL FOR THE IMPLEMENTATION OF REHABILITATION INTO THE UNDERGRADUATE MEDICAL EDUCATION**

***Christoph Gutenbrunner***

*Department of Rehabilitation Medicine & Coordination Centre for Rehabilitation Research, Hannover Medical University, Hannover, Germany*

**Objectives:** Since 2003 in Germany a mandatory cross-sectional course has been established including physical medicine, rehabilitation and naturopathy. A concept to implement PRM into

the curriculum was performed aiming at representation into all phases of the curriculum. *Methods:* The Hannover model includes the following courses and lectures: 1) at the begin of the studies a four weeks course Introduction to Medicine in which basic and clinical subjects take part. Rehabilitation is fully integrated (inclusive the ICF model); 2) some single lectures on PRM in other fields; 3) a two-weeks course Rehabilitation, Physical Medicine, Naturopathy with lectures, hands-on seminars and bed-side teaching; 4) optional courses on the social model of rehabilitation (one week course); 5) opportunity to perform one third of the last year of the medical curriculum in a rehab department. *Results:* Every course was evaluated using a standardised questionnaire. The overall rating (scale 1-15 points) of the Introduction to Medicine was very good (week 2:  $11.0 \pm 0.1$ ). The PRM-course initially was rated good but not excellent ( $9.1 \pm 0.3$ ). Therefore the curriculum was optimized and a textbook has been published. In the re-evaluation the score improved significantly ( $12.6 \pm 0.3$ ). *Conclusions:* The Hannover Curriculum for PRM introduced lessons and courses in all phases of the medical studies with special focus on the start of the curriculum and the end. The ICF-model as well as the practical use is subject to the lectures and courses. The evaluation of these courses led to good and excellent results.

#### OP009-05

### INVESTIGATION OF CURRENT SITUATION OF INSTITUTION REHABILITATION AND COMMUNITY-BASED REHABILITATION IN THE CITY OF CHANGZHI

*Liyun Guo, Changqing Shi, Wenjun Li, Shangshan Zhang*  
Rehabilitation Department, Heping Hospital of Changzhi Medical College, Changzhi, Shanxi Province, China

*Objectives:* To find current situation and influential factors of development of institution rehabilitation and community-based rehabilitation in the city of Changzhi. *Methods:* Investigation questionnaire was made and sent to the objects, including some personnel of rehabilitation departments and related departments in general hospitals and community health service centers, and finished in regulation time. SPSS10.0 was used to statistics and analyze the data. *Results:* 668 questionnaires were sent out, and the effective recovery rate was 66.8%. In three Level-3A hospitals, rehabilitation departments had been set up, and there are professional rehabilitation physicians and rehabilitation therapists. Advanced technology such as kinetotherapy, occupational therapy, speech therapy and psychotherapy were used as main therapeutic means. In most Level-2 and below hospitals and community health service centers, there were physiotherapy department or acupuncture department but not rehabilitation department, and physical therapy, acupuncture or massage were used as main therapeutic means. The main factors influencing the development of rehabilitation in our city are professionals lacking, public not understanding rehabilitation, the shortage of funds and rehabilitation instruments. 51.2% subjects had incorrect and ambiguous understands of the concept of rehabilitation, most of them were working in Level-2 or below hospitals. *Conclusions:* The development of rehabilitation medicine is extremely unbalanced in the city. Some rehabilitation department in Level-3A hospital is advanced in clinic and scientific research, but in most hospitals rehabilitation medicine is undeveloped. The unbalance is caused by social factors and medical factors. There is apparent isolate between general hospital rehabilitation and community rehabilitation.

#### OP009-06

### STUDY ON THE EFFECTS OF SHADOWBOXING ON EQUILIBRIUM FUNCTION IN HEALTHY ELDERLY PERSONS

*Jifang Qiu, Tingjian Jin, Juebao Li, Xiaolin Liu, Tongcai Tan, Dawei Zhang, Xiangming Ye, Jian Lin, Xiuying Lin*

Department of Rehabilitation Medicine, Zhejiang Provincial People's Hospital, Hangzhou, China

*Objective:* To investigate the effects of shadowboxing and non-exercise on equilibrium function in healthy elderly persons. *Method:* Twenty healthy elderly persons were divided into two groups based on whether they took part in shadowboxing or no exercise: shadowboxing group ( $n=10$ , mean age  $66.1 \pm 7.5$  years old) regularly practicing shadowboxing exercise for more than 3 months and the control group ( $n=10$ ,  $68.6 \pm 11.8$  years old) not practicing any regular exercise. Persons in both groups of shadowboxing and non-exercise were tested using balance performance monitor (BPM) in terms of their equilibrium function during eye-open and eye-closed, which included swinging area, swinging frequency, maximum swinging angle, swinging regions, length of swinging pathway, maximum swinging, rate of speed and distribution of the center of gravity. Analysis of variance was adopted to compare the indices of tests in both groups. *Results:* Among the indices of the BPM tests, there was significant difference between the shadowboxing group and non-exercise group in swinging frequency during eye-closed ( $1.7 \pm 0.3$ Hz versus  $2.6 \pm 3.0$ Hz,  $p < 0.05$ ). There were also significant differences between the groups of shadowboxing and non-exercise in maximum swinging angle, length of swinging pathway during both open-eye (maximum swinging angle,  $0.8 \pm 0.5^\circ$  versus  $1.2 \pm 0.9^\circ$ , length of swinging pathway,  $282.2 \pm 91.5$  mm versus  $435.2 \pm 322.4$  mm,  $p < 0.05$ ) and eye-closed (maximum swinging angle,  $0.7 \pm 0.6^\circ$  versus  $1.4 \pm 1.3^\circ$ , length of swinging pathway,  $56.8 \pm 198.8$  mm versus  $62.2 \pm 482.1$  mm,  $p < 0.05$ ). *Conclusion:* Regular shadowboxing exercise can improve the body equilibrium function in healthy elderly persons.

#### OP009-07

### THE EFFECTS OF YIJINJING ON BALANCE OF HEALTHY OLDER ADULTS

*Bo-xin Zhang, Wen-jin Yang, Yu-xiao Xie, Shu Shen*

Department of Physical Medicine and Rehabilitation, China-Japan Friendship Hospital, Beijing, China

*Objectives:* To evaluate the effect of YiJinjing on balance of healthy older adults. *Methods:* Sixty healthy older adults (over age 60) were randomized to participate in YiJinjing group (40 min/day, 3 days/week for 3 months) or a control group (Step training with same time and frequency). Measurements of body balance were carried out before and after the training by the computerized tests of Equi-Test and the simple method of balance ability (including standing on one leg with the eyes closed, Romberg, etc). *Results:* The improvements of body balance were more significant in YiJinjing group than control group. *Conclusions:* As a traditional healthy exercise, YiJinjing can improve not only muscle strength and body flexibility, but also the ability of balance. The motion design of YiJinjing is variegated and moderateness. There is plentiful intensification of somesthesia, visual and vestibular sense, as head-eye coordinated, support surface changed and focus transferred, etc. At the same time it contains the ingenious transformation in the maintenance of balance between the dynamic process of adjustment (action conditioning) and Static adjustment

(muscle coordination). Specially, the action is to limit limbs to keep balance with the minimal support surface. It will strengthen the coordination of muscles. YiJinjing is an ideal and practical exercise for older adults with some troubles of balance.

#### OP009-08

### GERIATRIC CARE IN BANGLADESH AND THEIR REHABILITATION PERSPECTIVE

***Shahidur Rahman, Mohd Taslim Uddin, Abdus Shakoor***  
*Physmed, BSM Medical University, Dhaka, Bangladesh*

*Objectives:* 1) To see the demography of geriatric population and their health status in Bangladesh. 2) To make a rehabilitation plan to get rid of geriatric disability. 3) To make recommendation to the government to include geriatric care in our master health plan.

*Methods:* Review was done by using vital statistic data of the aged population of bureau of statistics of Bangladesh government and old care institutions *Results:* Published data on demography by National Bureau of Statistics in July 2002 showed that the per-

centage of aged population had increased significantly during the last few years. They also showed that oldest old age group was higher in rural area but average percentage of aged population and life expectancy was higher in urban areas. As the population was aging, there was an increase in both the prevalence of chronic condition and activity limitation. As the number of older population is increasing day by day, our health care delivery system is burdened with aged patients. *Conclusion:* So rapidly growing developing country like Bangladesh should incorporate geriatric patient rehabilitation concepts in their master health plan. The opening of a geriatric rehabilitation unit under the supervision of physical medicine and rehabilitation department in Bangabandhu sheikh Mujib Medical University, the only public medical university and centre of excellence, is under process. This is a great hope for geriatric care in Bangladesh. Probin Hitoshi Sangha (old welfare association) is giving limited health and social welfare care in Dhaka. There are some other old homes in Bangladesh giving primarily nursing care to old patients. Old home system in Bangladesh is very scarce because of sociocultural and familial bindings.

## POSTER PRESENTATION

## PP001-001

**THE CLINICAL EFFECTS OF HERBAL MAGNETIC CORSETS ON TRUNK MOTOR FUNCTIONS IN PATIENTS WITH LUMBAR DISC HERNIATION**

**Chengqi He, Homer Yu, Xiaohong Wang, Mingfu Ding, Qun Lan, Mei Han**

Rehabilitation Medical Center of West China Hospital, Sichuan University, China

**Objective:** To determine the clinical effects of herbal magnetic corsets on trunk motor functions in patients with lumbar disc herniation. **Design:** A randomized control trial. **Setting:** The outpatient and inpatient departments of the Rehabilitation Center of the West China Hospital. **Patients:** 60 patients with clinically diagnosed lumbar disc herniation were included in the study. **Method:** Both groups received lumbar traction, medium frequency electrotherapy and massage whereas the experimental group wore herbal magnetic corsets in addition. **Main outcome measures:** Trunk motor functions were assessed before treatment and at 1 week, 2 weeks and 4 weeks after intervention. **Results:** Both groups reported improvements in trunk motor functions after treatment ( $p < 0.05$  or  $p < 0.001$ ). However, the experimental group reported a gradually increasing trunk motor functions leading to a better curative effects than observed in the control group (group comparison  $p < 0.05$ ). **Conclusion:** Herbal magnetic corsets can facilitate the trunk motor functions in patients with lumbar disc herniation, but the therapeutic mechanism is not clear and further studies are needed in the future.

## PP001-002

**EFFECT OF PEMFS OF DIFFERENT FREQUENCIES ON BIOMECHANICAL PROPERTIES AND BONE MINERAL DENSITY OF FEMUR IN OVARIECTOMIZED RATS**

**Chengqi He<sup>1</sup>, Homer Yu<sup>2</sup>, Wei Wang<sup>1</sup>, Deng Xiao<sup>1</sup>, Lin Yang<sup>1</sup>, Zhongjie Lei<sup>1</sup>**

<sup>1</sup>Rehabilitation Medical Center of West China Hospital of Sichuan University, <sup>2</sup>No.1 Hospital of Suzhou University, China

**Objective:** The purpose of this study was to observe the effect of PEMFs of different frequencies on biomechanical properties and bone mineral density of femur in ovariectomized rats, so as to find out the frequency for the best therapeutic efficacy. **Materials and Methods:** Fifty female SD rats were randomly divided into five groups: (1) SHAM control (no PEMFs treatment), (2) OVX control (no PEMFs treatment), (3) OVX I (PEMFs treatment at 2Hz frequency with 3.8mT intensity), (4) OVX II (PEMFs treatment at 8HZ frequency with 3.8mT intensity), and (5) OVX III (PEMFs treatment at 16Hz frequency with 3.8mT intensity). All rats were subject to bilateral ovariectomy except those in the SHAM control group. Biomechanical properties and Bone mineral density (BMD) of femur were assessed at 30 days after PEMFs treatment. **Results:** The SHAM control, OVX II and OVX III groups showed significantly better biomechanical properties than the OVX control and OVX I groups ( $p < 0.05$  or  $p < 0.01$ ). The BMD values of the OVX control group were significantly lower than that of the other 4 groups ( $p < 0.05$  or  $p < 0.01$ ), but the difference in BMD values was not significant among the other 4 groups ( $p > 0.05$ ). **Conclusion:** PEMFs can

maintain the bone biomechanical properties and prevent bone mineral density decrease in ovariectomized rats. 8-16Hz PEMFs may be the frequencies for the best therapeutic efficacy of PEMFs on osteoporosis.

## PP001-003

**THE APPLICATION OF EXTRACORPOREAL SHOCK WAVE IN THE TREATMENT OF ELITE ATHLETES' CHRONIC INJURIES**

**Jianhua Li<sup>1</sup>, Zhisheng Xu<sup>1</sup>, Tao Wu<sup>1</sup>, Zhaoqi Han<sup>2</sup>, Linghua You<sup>2</sup>**

<sup>1</sup>Sir Run Run Shaw Hospital Medical College Zhejiang University, <sup>2</sup>Zhejiang Sports Vocational Education And Technical College, China

**Objective:** To analyze the effectiveness of ESWT in treating chronic sports injuries. **Methods:** Ninety-nine athletes (56 males, 42 females) were recruited for this study. Chronic injuries sustained during training (basketball, badminton, tennis, swimming, gymnastics, volleyball) were treated using ESWT (SWISS DolorClast&reg;). All patients were evaluated pain and discomfortableness prior to and following treatment. Patients with varying symptoms affecting various loci were shocked 1000–2200 times at 0.08-0.16 mJ/mm<sup>2</sup> at multiple pulse mode: repetition rate 1–15 Hz, twice a week. **Results:** Significant results ( $p < 0.01$ ) were obtained using VAS Scale – analyzing recovery within the three (tendon injury, osteoarthritis, paratenon injury) treated groups. **Conclusion:** Extracorporeal shock wave therapy is a safe, effective, and noninvasive treatment for chronic sports injuries. Our studies reveal that seven to fourteen treatments can lead to adequate recovery with few complications.

## PP001-004

**EFFECT OF CONVALESCENT PHYSICAL CAPABILITY TRAINING ON CERVICAL SPINE PHYSIO-CURVE**

**Xiaolin Gao<sup>1</sup>, Lihua Zhu<sup>2</sup>**

<sup>1</sup>China Institute of Sport Science and <sup>2</sup>Beijing Sports University, China

**Objective:** By observing the effect of convalescent physical capability training project on cervical spine physio-curve, to find out a new way to treat the cervical spine illness. **Methods:** According to modern Convalescent Physical Capability Training concept and cervical muscle situation of cervical spine illness, the project was made to rebuild the weak cervical muscle for restoring the balance of strength of cervical muscle. Eighty cases with cervical spine illness were divided into Convalescent Physical Capability Training group (40 cases) and routine manipulation group (40 cases) randomly. The treatment was done three times a week for 2 months. The data of cervical spine curve was measured by Borden method pre-treatment and post-treatment, comparing the change value between two groups after the treatment. **Results:** After treatment, the change value of cervical spine physio-curve in Convalescent Physical Capability Training and routine manipulation groups were  $3.60 \pm 1.32$  mm and  $2.34 \pm 1.72$  mm, respectively. There was significant difference between two groups ( $p < 0.05$ ). **Conclusion:** convalescent physical capability training could improve or restore cervical spine physio-curve significantly. It was an important method for prevention and rehabilitation of cervical spine illness.



## PP001-005

### THE EFFECT OF WALKING EXERCISE UNDER SUSPENDING TRACTION IN THE TREATMENT OF PROTRUSION OF THE INTERVERTEBRAL DISC

**Cheng Ma**

Centre Hospital Department of Rehabilitation, China

**Objective:** To observe the effect of walking exercise under suspending traction in the treatment of protrusion of the intervertebral disc. **Methods:** The equipment of Partial Body Weight Support was improved and than its traction function was used with treadmill to treat the patients of protrusion of the intervertebral disc. Fifty-five cases were assessed using the scale of lower back pain, and at the same time ECG were used at the beginning of treatment and as follow-up after treatment of half a year. **Results:** The results showed satisfied effect happened for this treatment and ECG results showed obvious improvement occurred after half a year of treatment. **Conclusion:** The effect of walking exercise under suspending traction in the treatment of protrusion of the intervertebral disc is good and further investigation is also needed to study its mechanisms.

## PP001-006

### EFFECT OF ISOKINETIC ECCENTRIC EXERCISE IN PATIENT WITH KNEE OSTEOARTHRITIS

**Xu-dong Gu<sup>1</sup>, Jianhua Li<sup>2</sup>, Zhisheng Xu<sup>1</sup>, Xiongwei Zhang<sup>1</sup>, Zhiliang Yu<sup>1</sup>, Yan Li<sup>1</sup>, Hua Wu<sup>1</sup>, Wei Wang<sup>1</sup>**

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**Objective:** To explore the effect of rehabilitation treatment to the patients with knee osteoarthritis through isokinetic eccentric exercise. **Method:** 40 cases including 70 knees with osteoarthritis are taken isokinetic eccentric exercise through using the test of Cybex-6000 and its isokinetic exercise system 3 times per week during 4 weeks. Peak of moment, single largest work, average power and accelerate energy of moment of isokinetic speed in 60°/s, 120°/s and 180°/s are test prior and post-exercise. The degree of pain in sick knee and ability of functional performance are compared and contrasted prior and post-exercise. **Results:** The parameters of extensor and flexor group are obviously increased, and the parameters of flexors in knee are increased most obviously; the marks of pain in sick knee and ability of functional performance also improved. **Conclusion:** Isokinetic eccentric exercise can improve the parameters of extensor and flexor group in knees with joint osteoarthritis, particularly improve that of flexor in knee; meanwhile, the degree of pain is decreased and the functional performance is improved.

## PP001-007

### EFFECT ON THE NERVOUS ROOT CERVICAL SPONDYLOSIS WITH THE TREATMENTS OF MOBILIZATION COMBINED WITH MCKENZIE

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**Objective:** To explore effect on nervous root cervical spondylosis with the treatments of mobilization combined with Mckenzie. **Methods:** 180 patients who got nervous root cervical spondylosis were studied. They were randomly divided into A group (mobilization), B group (Mckenzie) and C group (combined treatment) with 60 cases in each group. All patients received routine rehabilitation interventions, and then the effect was assessed after 2 treatment

processes. **Results:** According to Redit analysis, C group improved significantly ( $p < 0.05$ ). **Conclusion:** Treatment of nerve root involvement in cervical spondylosis with mobilization combined with Mckenzie would be the best approach and meaningful to be used in clinical settings.

## PP001-008

### THE DIFFERENCE OF CERVICAL VERTEBRAE MOVEMENT BEFORE AND AFTER JOINT MOBILIZATION AND THE MERIDIAN TEST – WITH TWO DIMENSION ANALYSIS DEVICE

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**Objectives:** Both joint mobilization and the Meridian test are treatment method which improve the musculoskeletal pain and system. The purpose of this study is to investigate the difference of dynamic alignment of cervical vertebrae before and after each treatment method, and the difference of the result between joint mobilization and the Meridian test. **Method:** Four subjects with no past history of spine participated. They moved the cervical vertebrae, flexion and extension, at standing. And Cine-Radiographic measurement of dynamic alignment of cervical vertebrae was taken. Afterwards, I gave each subject joint mobilization (AKA-Hakata method) and Cine-Radiographic measurement was taken. Later, the same subjects were measured similarly before and after the Meridian test. The data obtained from two measurements were analyzed with two dimension operation analysis device (Hu-Tech Co.Ltd MMpro-2DdA). We compared the difference of dynamic alignment of cervical vertebrae before and after each treatment, and the tendency of the change between both treatments. **Results:** After joint mobilization, the range of motion of cervical vertebrae was bigger and cervical vertebrae moved more smoothly. The substantial change was not admitted in the movement of cervical vertebrae before and after the Meridian test. **Conclusion:** As this result, joint mobilization influenced the dynamic alignment of cervical vertebrae, but the Meridian test did not. Both joint mobilization and the Meridian test are treatment methods which improve the musculoskeletal pain and system. However, it seems that the point that each treatment method effects is different.

## PP001-009

### PRELIMINARY EFFECTS OF RADIAL SHOCK WAVE ON REHABILITATION OF PATIENTS WITH KNEE OSTEOARTHRITIS

**Tien-Wen Chen<sup>1</sup>, Ming-Chang Wen<sup>1</sup>, Chia-Ling Lee<sup>2</sup>, Chia-Hsin Chen<sup>2</sup>, Mao-Hsiung Huang<sup>2</sup>**

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**Objectives:** Radial shock wave therapy are different from the traditional shock wave therapy with the shock wave energy first applied to the therapeutic head then gradually decreased the shock wave energy to the tissue in a radial pattern. There are reports about decrease area or loss of calcification in the treatment of shoulder rotator cuff tendon. But there is no related report in the human knee joint. **Methods:** We collect 30 patients with osteoarthritis of knee joint. Use muscular sonography and X-ray imaging to classify the knee joint by Gartner and Simons classification. The first group is 10 patients with inflammation. The second group is 10 patients with tendon calcification. The third group is 10 patients with tendon calcification and degenerative ossification. Each group

are equally divided to group A and group B by random. Group A patients received general rehabilitation management and radial shock wave therapy once per week for 6 weeks. Group B receive general rehabilitation management as control group. Each patient had received VAS, range of motion, Lequense's index, and ambulation speed and muscle strength. *Results:* All radial shock wave treatment groups are better than the control group in pain scale, range of motion, functional ability, ambulation speed and muscle strength. *Conclusions:* Further follow-up study is needed for the change of calcification and fibrosis.

#### PP001-010

### SONOGRAPHIC STUDY ON CERVICAL FACET JOINT – COMPARED WITH PORCINE AND CADAVER

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*Objective:* This project was designed to investigate the sonographic pictures of human cervical facet joint. The traditional methods in localizing and treating the facet joint include application of the fluoroscopical guidance. The major advantage is having accurate localization, and the disadvantages include the involvement of multiple complex procedures, the expensive cost, and the possible high exposure of radiation. In the recent decades, the application of diagnostic ultrasound has been better accurate in identifying soft tissue lesions and less expensive. Unfortunately, there is no standard procedure and interpretation in sonographic assessment of cervical facet joint. *Methods:* In order to verify anatomic structure of cervical facet under sonographic examination, the porcine and cadaver facet joints were used for this study. A GE ultrasound machine with 12 MHz lineal probe was used. Frozen and fresh porcine necks were assessed. The neck was approached from the dorsal aspect to detect the expected facet joint location. Under the ultrasound guiding, the cervical facet joint was injected with methylene blue. Then, the porcine facet were dissected to confirm the location of porcine facet joint comparing to the finding on sonogram. Then we repeated the procedure in the cadaver neck and defined the location of cadaver facet joint. *Results:* In the sonographic study, the longitudinal view of multi-level cervical facet in dorsal approach is a saw-like picture, and uni-level cervical facet showed a reverse triangular hypoechoic picture. *Conclusion:* Dorsal approach to detect cervical facet joint with high resolution ultrasound is an easy, safe, and useful procedure.

#### PP001-011

### ROLE OF WRIST SPLINT IN PATIENT WITH CARPAL TUNNEL SYNDROME

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*Objective:* To see the socio-demographic pattern, clinical pattern & effect of wrist splint on carpal tunnel syndrome. *Methods and Design:* Randomized controlled study. In our study 51 hands in

34 patients with carpal tunnel syndrome were included. They were divided randomly into two groups. Group A (splinted group) were treated by wrist splint, drugs and ergonomics. Group B (non-splinted group) were treated by drugs and ergonomics only. Outcomes were measured by Visual Analogue Scale (VAS) and Levine Symptom Severity Scale (LSSS) at second, fourth, and sixth week follow-up visits. *Results:* At the beginning of the observation the mean VAS was 6.54 in Splinted and 7.00 in Non-splinted group. The *t*-test showed there was non-significant difference in the means of the both groups ( $p=0.381$ ). But after 4 weeks of treatment with medicines and with or without a splint the mean VAS was decreased in both the two groups. But the decrease was significantly different in the group with Splints. The mean VAS was 2.48 in Splinted group and Non-splinted group 4.09 ( $p=0.000$ ) at the end of the study. *Conclusion:* Splint helps in decreasing symptoms of Carpal Tunnel Syndrome if treated in addition with drugs and ergonomics.

#### PP001-012

### A CASE OF MITOCHONDRIAL MYOPATHY WITH SLEEP APNEA

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*Objectives:* Mitochondrial myopathies are caused by genetic mutations and reveal broad clinical manifestations involving various organs, especially the muscle, brain and heart. *Case Report:* A 21-year-old man presented with a traffic accident related low back pain, and due to an incidental finding of sleep apnea a detailed evaluation was under taken. He had symptoms of daytime sleepiness and mild motor weakness which were more apparent during jogging. Physical examination disclosed mild proximal limb weakness (4/5 on the MRC scale) with normal strength distally. Tendon reflexes were hypoactive and general muscle atrophy were observed. On polysomnography, sleep apnea index was 3.5, which was not within the criteria of sleep apnea. However, hypoxia was observed during REM sleep state and the oxygen saturation fell as low as 64%. Electrodiagnostic evaluation did not reveal any definite evidence of the myopathy. To evaluate for congenital myopathy, muscle biopsy was done. On modified Gomori stain, ragged red fibers were showed and ultra-structurally increased numbers of abnormal mitochondria were observed and thus a diagnosis of mitochondrial myopathy was concluded. *Conclusion:* There are various symptoms and signs in mitochondrial myopathy, thus a detailed history and physical examination, as well as specific biochemical examination and histopathologic examination through the muscle biopsy should be performed. In this case, the patient did not show any apparent symptoms, but through detailed clinical history taking and sufficient physical examination, we were able to diagnose mitochondrial myopathy.

#### PP001-013

### CLINIC OBSERVATION ABOUT USING NES TO IMPROVE CRURAL TUMEFACATION

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*Objective:* To explore why the crus fracture with infection or trauma cannot recover for a long time because of the tumefaction

and find out a way to deal with it. *Methods:* 10 cases including 7 males and 3 females with ages from 22 to 72 were followed. 3 of them were with tibia and fibula fractures with continuous tumefaction after surgeries. Among them, one's fibula did not recover and the bone scab had not formed over 3 months. There were 3 diabetics with skin infection for a long time, 2 erysipelas with continuous tumefaction and 2 with trauma on the crus with tissue bleeding inside with prolonged tumefaction. All the 10 cases were treated by the neuromuscular electrical stimulation (NES) for 6 days per treatment period. Effects were observed after 2 periods. *Results:* After 2 periods of treatment, the efficacy was 100% ( $p=0.0078$ , Stata7.0, command "signtest"). Among the three with tibia and fibula fractures, one was cured with the tumefaction completely recovered and the other two showed effects with the tumefaction starting mitigating and completely recovered after continuing NES. Two with trauma on the crus showed effects and three with diabetes cured with infection totally cicatrizing. Among the two with erysipelas, one was cured and the other one showed some effects. *Conclusions:* Contracting and relaxing muscle is an important element to accelerate the extremity vein and lymph returning, which is effective for the extremity tumefaction from different causes. NES can stimulate muscle contraction, which then improve the extremity vein and lymph returning and speed up the blood circulating to help the extremity diseases healed.

#### PP001-014

### EFFECTS OF ERGONOMICS EDUCATION ON OCCUPATIONAL SAFETY AND HEALTH KNOWLEDGE IN DISPLAY SCREEN EQUIPMENT USERS

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*Objective:* To investigate the effectiveness of ergonomics-training method for Display Screen Equipment (DSE) users. *Methods:* Thirty-six DSE users of both sexes with the mean age of  $42.5 \pm 8.5$  were recruited from the Outpatient Physiotherapy Department of Kowloon Hospital. Study participants were randomly assigned into 1) Pamphlet Group (PG) ( $n=21$ ) and 2) Ergonomics-Workshop Group (EWG) ( $n=15$ ). Both groups received physiotherapy intervention for their referred conditions. Two pamphlets were given to each subject in PG, while a 30-min ergonomics training and demonstration of exercises were delivered to EWG by physiotherapist. A 12-item questionnaire was developed for measuring the knowledge of safe use of DSE. Both groups completed a pre- and post-test questionnaire with a 2-week interval. Analysis of variance with repeated measures was used to compare the effectiveness in improving the Occupational Safety and Health (OSH) knowledge. *Results:* There was significant increase in within group questionnaire scores for both groups ( $p<0.05$ ). Significant difference was also found in the scores gain between the groups ( $p<0.05$ ). The average improvement of score was significantly larger in EWG (45.5%) than PG (19.2%). *Conclusions:* The ergonomics-workshop for DSE users was a more effective means to improve OSH knowledge when compared with the pamphlet group. The study has also paved way for further follow up investigation on the behavioral change at work place and the corresponding effect on prevention of recurrence and management of musculoskeletal disorders in DSE users.

#### PP001-015

### A COMPARISON OF THE NECK FLEXOR AND EXTENSOR MUSCLES ENDURANCE BETWEEN PATIENTS WITH HEADACHE AND MATCHED CONTROL SUBJECTS

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*Objective:* Neck muscles endurance may be changed in patients with headache. The aim of this study was to compare the neck flexor and extensor muscles endurance between subjects with tension headache and migraine and asymptomatic matched control subjects. *Methods:* One hundred and four female students participated in the present study (52 headache patients and 52 matched control subjects). From the headache group, 23 patients had tension headache and 29 patients had migraine. The endurance of the neck muscles was assessed by a Chronometer. The neck flexion and extension were performed by the subjects while lying down on their back or abdomen and holding each position against the gravity force as much as they can hold these positions. *Results:* There was no significant difference for the neck flexor and extensor muscle endurance between subjects with tension headache and matched control subjects ( $p>0.05$ ). However the extensor muscles strength in patients with migraine type headache was more significant compare to matched control subjects ( $p=0.001$ ) there was no significant difference in the neck flexor muscles endurance between two subjects group. *Conclusion:* The comparison of the neck flexor and extensor muscles endurance in matched control subjects and patients with migraine and tension headache revealed that only the neck extensor muscles endurance was more in the subjects suffering from migraine compare to healthy subjects.

#### PP001-016

### THE CLINICAL STUDY FOR LOWER LIMBS MUSCLE ACTIVITIES OF CHONDROMALACIA PATELLA WITH SURFACE ELECTROMYOGRAPHY

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*Objective:* Knee pain is common in sports activities and the chondromalacia patella (CMP) is the most common cause of chronic knee pain. Most of athletes, especially for female, who need much time in jumping or running performance, often complain severe knee pain. Some patients may also have a vague sense of "tightness" or "fullness" in the knee area. Some athletes will select operation. However they still feel the knee pain and muscle weakness after surgery. What are the underlying neuromuscular mechanisms linking pain to movement and motor control? How to reduce pain and improve their sports performance? The surface electromyography (sEMG) will be used to investigate the functional significance of muscle pain on knee joint control during walking. *Methods:* sEMG recordings of vastus medialis oblique (VMO), vastus lateralis (VL), biceps femoris, semitendinosus, tibialis anterior and gastrocnemius or soleus muscles were synchronized with the treadmill walking in different speed with pain tolerating. *Results:* During test, the EMG activity in the VMO and VL muscles was reduced and hamstring EMG activity were unaffected by pain. Interestingly, soleus activities were observed with more change than gastrocnemius when the



treadmill walking speed increased from 3.0 km/h to 3.5 km/h (the maximum pain tolerated speed for patient). *Conclusion:* The results may have clinically important implications for rehabilitation and training of patients with CMP.

#### PP001-017

### THE VARIATION AND IMPACT OF SPINAL FUNCTION AND ISOMETRIC MUSCLE STRENGTH IN CERVICAL SPONDYLOTIC MYELOPATHY (CSM)

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*Objective:* According to the change of the lower limbs of cervical spondylotic myelopathy (CSM) patients with kinetic biomechanics, we adopted functional assessment of CSM with isometric muscle strength test to investigate the maximum isometric muscle strength, and the motor pattern of myoideum *in vivo* to identify regular pattern of generation and development in CSM. *Methods:* 11 patients with CSM were chosen as the test group and 11 normal adults were chosen as the control group. The isometric muscle strength was tested by system "Good Strength from Mega Company". All subjects had the function evaluation of the spine cord. They did maximum isometric muscle strength test when the ankle joint was maintained in the range of flexion of 60°. The movements of flexion and extension were carried out 3 times each, and each time lasted 5s. *Result:* No significant difference of age, body height, body mass, body mass index and gender composition ratio between two groups. There was significant difference in statistics in the aspects of spinal function. The data of the test group were much lower than that of the control group ( $p < 0.01$ ). Similar findings were also in the parameters of muscle strength. *Conclusion:* These abnormalities of muscle strength and imbalance were associated with the descent of the correlated function of CSM.

#### PP001-018

### VALUE OF ULTRASONOGRAPHY IN THE EVALUATION OF POST REHABILITATIVE SHOULDER

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*Objective:* There is great variation between the rehabilitative results of shoulders undergoing surgical repair for rotator cuff tear. The study was designed to determine whether ultrasonographic evaluation can clarify and define the image variations in post rehabilitative shoulders. *Methods:* The patients with full-thickness rotator cuff receiving surgical repair were collected from January 2003 to October 2004. These patients entered rehabilitation programs for more than 2 months. During this period, sonographic examination was done for post-operative shoulders at the interval of 1-2 months. Meanwhile, the range of motion (ROM) of post-operative shoulders was recorded. The study was designed to classify the characteristics of post-operative shoulders in sonography and intended to differentiate between the sonographic appearances of shoulders with poor rehabilitative results (limited ROM) and those of shoulders with good rehabilitative results (free ROM). *Results:* There were 21 patients enrolled. After rehabilitation, the postoperative shoulders with limited ROM were 10. The unique characteristic of sonographic appearance in these patients differentiating that of post rehabilitative shoulder with free ROM is the severity of loss of soft tissue planes surrounding rotator cuff. There were 9 post rehabilitative shoulders with limited ROM showing severe-degree loss of soft tissue planes; yet, no post rehabilitative shoulders with free ROM demonstrated

severe-degree loss of soft tissue planes. *Conclusions:* Severe-degree loss of soft tissue planes surrounding rotator cuff interferes with the training effect of post surgical rehabilitation. The condition can be easily demonstrated by sonographic examination. Early and regular evaluation with sonography will be valuable in adjusting the rehabilitative programs for post-surgical shoulders.

#### PP001-019

### ELECTRICAL STIMULATION-INDUCED EXPRESSION OF ANGIOGENESIS-RELATED GROWTH FACTORS IN SKELETAL MUSCLE

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*Objective:* To explore the mechanism of electrical stimulation (ES) induced collateral capillary growth in skeletal muscle, which may play an important role in rehabilitation of patients with peripheral vascular diseases. *Methods:* We used real-time PCR to examine the different mRNA expression of angiopoietin-1 (Ang-1), angiopoietin-2 (Ang-2) and hepatocyte growth factor (HGF) of gastrocnemius muscle in a rabbit sciatic nerve stimulation model between 1Hz and 40Hz. Muscles were taken after 1 h ES. *Results:* Ang-1 was increased in 1Hz group and 40Hz group vs. control group, and was the highest in 40Hz group ( $p < 0.05$  compared with 1Hz group). No significant differences were observed in the expression of Ang-2 and HGF among the three groups. In 40Hz group, the increase in Ang-1 mRNA was correlated to the increase in femoral venous plasma lactate concentration. *Conclusion:* 1) Ang-1 but not Ang-2 and HGF gene expression is upregulated in rabbit muscle by ES. 2) ES on 40Hz, which produces muscle hypoxia, may result in more significantly increase of Ang-1 than that on 1Hz.

#### PP001-020

### COMPREHENSIVE REHABILITATION FOR TENNIS ELBOW

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*Objective:* To evaluate the therapeutic effect of comprehensive rehabilitation for tennis elbow. *Methods:* The fifty patients suffered from tennis elbow were treated with block treatment, physical, massage, movement therapy and other comprehensive rehabilitation therapies and then to observe their improvement in clinical signs and symptoms. *Results:* It was shown that the incidence of recovery with excellence rate, improvement rate, and total effective rate was 68.25%, 17.16%, 13.18%, 98.59%, respectively. *Conclusion:* It is an effective method to deal with tennis elbow through treating with block treatment, physical, massage, movement therapy and other comprehensive rehabilitation therapies.

#### PP001-021

### EFFECTS OF CONSTRAINT-INDUCED MOVEMENT THERAPY ON HEMIPLEGIC UPPER EXTREMITY MOTOR RECOVERY IN STROKE PATIENTS

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*Objectives:* The aim of this study is to investigate the effects of constraint-induced movement therapy (CIMT) on hemiplegic up-



per extremity motor recovery in stroke patients and compare with intensive training therapy (ITT) and conventional training therapy (CTT). *Methods:* Thirty stroke patients keeping with enrolling criterion were randomly divided into 3 groups: CTT group (10 cases), ITT group (10 cases), and CIMT group (10 cases). Patients in CTT group received CTT for 45 min one day. Patients in ITT group received the same occupational treatment as in CTT group but for a period of 4 h one day. Patients in CIMT group received the same occupational treatment and same period of time as in CTT group, but were given CIMT additionally, involving restriction of movement of the intact upper extremity by placing it in a sling for 90% of waking hours. Wolf motor function test (WMFT) was carried out before treatment, two-weeks and four-weeks after treatment. *Results:* In each group, functional ability (FA) scores and grip strength in WMFT increased significantly after treatment, while performance time in WMFT decreased significantly after treatment. The FA improvement was more significant in ITT and CIMT group than that in CTT group. There was no significant difference of FA between ITT and CIMT group. *Conclusions:* Both ITT and CIMT could improve the motor function of upper extremity of stroke patients effectively.

#### PP001-022

### THE METABOLIC EQUIVALENTS COST IN SOME THERAPEUTIC EXERCISES OF STROKE PATIENTS.

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*Objective:* To observe the metabolic equivalents (METS) cost in some therapeutic exercises. *Methods:* Eighteen stroke patients participated in the test. K4b2 Pulmonary Function Equipment was used to record oxygen consumption of the following eight states, which are relaxing sitting position, sit-to-stand transfers, hip extension when standing, weight loading of the involved leg, raising of involved leg, climbing stairs, walking 60 m and also completing these mentioned exercises continuously. METS of these exercises were calculated. *Results:* METS of relaxing sitting position is 1.024, while that of sit-to-stand transfers is 2.854, hip extension when standing is 2.079, weight loading of the involved leg is 2.159, raising of involved leg is 2.247, climbing stairs is 2.865, walking 60 m is 2.590 and consecutive exercise is 2.999. *Conclusion:* The calculation of METS in therapeutic exercises may ensure the safety for the training of the stroke patients with cardiovascular diseases.

#### PP001-023

### INFLUENCE OF INTEGRATIVE REHABILITATION THERAPY ON THE RECOVERY OF LOWER LIMB FUNCTION FROM CEREBRAL INFARCTION

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*Objective:* To discuss the influence of integrative rehabilitation therapy on the recovery of lower limb function of patients with cerebral infarction for finding a more effective method to improve lower limb function after cerebral infarction. *Methods:* 40 patients with cerebral infarction were randomly divided into 8 groups: group A to group H. There were 5 patients in each group. All patients were treated by routine therapy in neuropathic department, while all patients received the cluster needling of scalp acupuncture; functional

electrical stimulation (FES) and rehabilitation therapy with different combination by different levels which are depend on length of treatment. *Result:* There is a significant improvement ( $p < 0.05$ ) of the deficiency of neural function of lower limb, the motor function of lower limb, walking function and ADL after cerebral infarction by effect of each other between cluster needling of scalp acupuncture and rehabilitation therapy and functional electrical stimulation. *Conclusions:* 1) The simplex cluster needling of scalp acupuncture and simplex rehabilitation therapy and simplex functional electrical stimulation can improve the deficiency of neural function of lower limb, the motor function of lower limb, walking function and ADL after cerebral infarction. 2) The best project in the experiment is that cluster needling of scalp acupuncture in 2 months and rehabilitation therapy in 2 months and functional electrical stimulation in 2 months are combined.

#### PP001-024

### THE EFFECT OF OCCUPATIONAL THERAPY TO UPPER LIMBS FUNCTION OF MOVEMENT AND ACTIVITIES OF DAILY LIVING ON PATIENTS WITH HEMIPLEGIA

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*Objective:* To investigate the effect of occupational therapy to upper limbs function of movement and activities of daily living on patients with hemiplegia, and provide scientific and reasonable training program for the patients with hemiplegia. *Methods:* Fifty-one cases patients with hemiplegia were randomly divided into treatment group ( $n=26$ ) and control group ( $n=25$ ). Both of the two groups were received routine rehabilitative training, and besides, patients in the treatment group were received occupational therapy twice a day scale before and after treatments by the Fugl-Meyer scale, the evaluation of ADL, and the function of hand. *Results:* Comparison, Fugl-Meyer scale, the evaluation of ADL and the function of hand all were better than before ( $p < 0.05$ ). *Conclusion:* Occupational therapy can strengthen the upper hand function training, and effectively improve coordination, activity of daily living and quality of life.

#### PP001-025

### INFLUENCE OF ADVANCED RECIPROCATING GAIT ORTHOSIS ON WALKING FUNCTION IN COMPLETE SPINAL CORD INJURY PATIENTS

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*Objective:* To explore the value of advanced reciprocating gait orthosis (ARGO) combined with comprehensive rehabilitation treatment in complete spinal cord injury (SCI) patients. *Methods:* Twelve patients with complete SCI in T4-L2 were fitted with ARGO. Before and after equipped, comprehensive rehabilitative exercises were conducted the patients. After training, the ambulation function of patients was examined and evaluated in a time limit, the activity daily life (ADL) were examined and evaluated by Barthel index and Functional Independence Measure (FIM). *Results:* The ambulation function of patient improved marked after the treatment. The Barthel index and ADL evaluation of complete SCI patients were significantly improved. All 12 patients can achieve therapeutic or functional ambulation. *Conclusion:* With the aid of ARGO, patients suffer from complete SCI below T4 can achieve functional walking and improve the quality of life.

## PP001-026

**THE CLINICAL EVALUATION OF REGIONAL CEREBRAL BLOOD FLOW CHANGE DURING MUSIC THERAPY FOR PERSISTENT CONSCIOUSNESS DISTURBANCE**

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*Objective:* 99mTc-ECD SPECT has the advantage for the task with motion such as neurorehabilitation, because the SPECT has early stabilization and no reverse diffusion after venous injection. *Methods:* In this study, using ECD-SPECT with brain easy analysis tool (BEAT), we will evaluate the regional cerebral blood flow change during music therapy for persistent consciousness disturbance. SPECT examinations were performed for eight persistent consciousness disturbance patients after traumatic brain injury. For the control study, each patient was scanned during 16 min on 10 min after ECD injection. For the activation study, each patient was scanned in the same time protocol as the control after the ECD was injected for the patient during the music therapy. Using BEAT, the count normalization between the control and activation was performed and the regional cerebral blood flow subtracted area was mapped on each individual MRI of the patient. *Results:* The SPECT activation map with BEAT during music therapy showed the common activation area on superior temporal lobes as ROI analysis. The statistical significant cerebral blood flow increased area for individual patient was the prefrontal, anterior cingulate cortex, thalamus, occipital cortex and basal ganglia, respectively. The music therapy activated not only the auditory area, but also the area that was related to cognition. *Conclusion:* In future, this method may be useful to evaluate the affect of the other neurorehabilitation except the music therapy.

## PP001-027

**CLINICAL STUDY TO CONTROL TRUNK FOR PATIENTS WITH STROKE HEMIPLEGIA THROUGH ELECTRO-ACUPUNCTURE STIMULATION**

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*Objective:* To explore the effect of trunk control for patients with stroke hemiplegia through electro-acupuncture stimulation. *Methods:* 72 cases were divided into two groups randomly; 42 cases as a treatment group were treated by electro-acupuncture stimulation add kinesiotherapy; 30 cases as a control group were treated through kinesiotherapy; an assessment of Sheikh for controlling trunk was used before and after one month treatment. *Result:* The scores of Sheikh of treatment group were  $24.87 \pm 18.66$ ,  $50.07 \pm 23.98$  before and after treatment separately,  $p < 0.01$ ; as control group the scores of Sheikh were  $26.31 \pm 19.12$ ,  $42.33 \pm 21.56$  before and after treatment separately,  $p < 0.01$ . There were significant differences ( $p < 0.05$ ) between two groups of the scores after treatment. *Conclusion:* Electro-acupuncture stimulation add kinesiotherapy can obviously promote the ability of trunk control for patients with hemiplegia after stroke.

## PP001-028

**REHABILITATION WITH EARLIER OCCUPATIONAL THERAPY ON UNITATERAL SPATIAL NEGLECT POST-STROKE**

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*Objective:* To observe the effect of rehabilitation with earlier OT on unilateral spatial neglect (USN) post-stroke. *Methods:* 92 patients

with USN were randomly divided into treatment group (46 cases) and control group (46 cases). The case control group was treated by clinical processing conventionally and facilitation technique after syndrome were stable. The patients in the treatment group were treated with earlier rehabilitation in relearning of activity of daily living on the kinesiotherapy foundation, and they were given selective OT with emphasis. *Results:* Effect of the treatment group are superior to that of the control group in scoring points of Fugl-Meyer and the Barthel index ( $p < 0.01$ ). *Conclusion:* The abilities of activity of daily living and movement of the patients post-stroke are enhanced with earlier OT and kinesiotherapy.

## PP001-029

**OPTIMAL FREQUENCY OF SACRAL NERVE ELECTRICAL STIMULATION TO PROMOTE BOWEL EMPTYING IN SPINAL CORD-INJURED RATS**

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*Objective:* Loss of bowel function, that is, the difficulty of defecation is one of the major symptoms in spinal cord injured patients. The sacral nerve electrical stimulation (SNES) has been used to promote bowel emptying in the spinal cord injured animals or patients. However, optimal parameter of SNES to promote bowel emptying was not established yet. *Method:* A total of 31 adult Sprague-Dawley female rats were used. A complete spinal cord trans-section was performed surgically at the T10 cord level. The electrodes for electrical stimulation were implanted to 24 rats in the sacral spinal cord region (S2-S4). Frequencies were 10Hz, 30Hz, and 50Hz, for each group. Electrical stimulation was applied 4 h per day (2h/2h, morning/evening) from the first evening of the operative day. We measured the body weight (BW), the amounts of consumed food and water in each animal, as well as the number and the weight of fecal pellet every morning. *Result:* The stool output was significantly higher in the group of 30Hz stimulation from post-operated 2<sup>nd</sup> days to post-operated 6<sup>th</sup> days than other frequency groups or spinal cord injured only group. *Conclusion:* These results suggest that electrical stimulation could be used to promote bowel emptying in spinal cord injured patients and it is important to use an optimal frequency of stimulation for best improvement of bowel symptoms.

## PP001-030

**EFFECT OF PROPRIOCEPTION DISTURBANCE ON ACTIVITIES OF DAILY LIVING (ADL) AFTER STROKE**

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*Objective:* To evaluate the effect of proprioception disturbance on basic activities of daily living (B-ADL) after stroke. *Methods:* 67 stroke patients consecutively admitted to the Heilongjiang Province Rehabilitation Hospital were classified upon admission as having proprioception disturbance (group A;  $n=32$ ; 47% of the entire sample) or not (group B;  $n=35$ ; 53% of the sample). By 'thumb finding' test, 'heel-knee-shin' test and 'up or down' test, we examined the proprioception. When 2 of the 3 tests are abnormal or more, we

thought the patient had proprioception disturbance. Both groups received standard rehabilitation treatment including daily physiotherapy, occupational therapy, traditional Chinese medicine and other therapy in accord with individual needs. The Modified Barthel Index (MBI) was used to assess patients' capacity in B-ADL. Assessment was done upon admission to rehabilitation and 8 weeks afterwards. *Results:* Mean MBI scores at admission of the difference between the groups did not reach statistical significance ( $t=1.87$ ,  $p>0.05$ ). After 8 weeks of intensive rehabilitation treatment, the MBI scores of both groups improved significantly ( $t=3.11$ ,  $p<0.01$ ) and the average score of group A was lower than that of group B ( $p<0.05$ ). *Conclusion:* The existence of proprioception disturbance affects significantly the functional outcome of stroke patients.

#### PP001-031

### EFFECT OF UNILATERAL SPATIAL NEGLECT (USN) ON ACTIVITIES OF DAILY LIVING (ADL) AFTER STROKE

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*Objective:* To evaluate the effect of unilateral spatial neglect (USN) on basic activities of daily living (B-ADL) after stroke. *Methods:* 81 stroke patients with left hemiplegia admitted to the Heilongjiang Province Rehabilitation Hospital were classified upon admission as having USN (group A;  $n=32$ ; 39.5% of the entire sample) or not (group B;  $n=49$ ; 60.5% of the sample). The age of all was between 35 and 75 without aphasia and obvious dementia. By 'cross-out', 'digit cancellation', 'line-bisection', clock drawing, 'free hand drawing', we examined the unilateral spatial neglect. When 3 of the 5 tests are abnormal or more, we thought the patient had unilateral spatial neglect. Both groups received standard rehabilitation treatment at most 6 weeks after stroke onset, including daily physiotherapy, occupational therapy, traditional Chinese medicine and other therapy in accord with individual needs. The Modified Barthel Index (MBI) was used to assess patients' capacity in B-ADL. Assessment was done upon admission to rehabilitation and 8 weeks afterwards. *Results:* Mean MBI scores of the difference between the groups at admission did not reach statistical significance ( $t=1.77$ ,  $p>0.05$ ). After 8 weeks, both groups improved significantly ( $t=3.71$ ,  $p<0.01$ ) and the average score of group A was lower than that of group B ( $p<0.05$ ). *Conclusion:* The existence of unilateral spatial neglect affects significantly the functional outcome of stroke patients.

#### PP001-032

### EFFECTIVE OBSERVATION ON TRAINING FOR STRENGTHENING DISTAL CONTROL ABILITY ON EARLY STAGE TO HEMIPLEGIC PATIENTS' MOTION FUNCTION

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*Objective:* To explore and observe the effectiveness of strengthening distal control ability training on motion function of hemiplegic patients at early stage. *Methods:* 60 patients who got stroke were randomly divided into group A and group B with 30 cases in each. All patients received routine rehabilitation interventions. Group A was given to the treatment of strengthening distal control ability training on early stage, but group B was only given simply strengthening limbs function training. Berg balance scale and

Barthel index scale were used to evaluate the status of two groups before and after the treatments. *Results:* Group A had higher scores than group B and group A improved significantly ( $p<0.05$ ). *Conclusion:* Strengthening distal control ability training could improve hemiplegic patients' motion function on early stage.

#### PP001-033

### EFFECTS OF CHINESE TRADITIONAL MASSAGE ON SHOULDER PAIN IN THE RESTORATION OF SHOULDER SUBLUXATION

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*Objective:* In the restoration place to observe the effects of Chinese Traditional Massage on shoulder pain caused by subluxation and motor function recovery of the upper extremities in patients after stroke. *Methods:* 60 hemiplegic patients after stroke with shoulder pain related to shoulder subluxation and functional disorder were randomly divided into two groups. Both of the groups were treated with Chinese Traditional Massage and usual rehabilitation including physiotherapy, occupational therapy, but without acupuncture. All patients were treated with therapy on the shoulder at most 6-weeks after onset. When making massage treatment, one of groups was in the place of restoration, but the other was not. The recovery of the patient's shoulder pain, and movement function of upper extremities were assessed with short form McGill pain questionnaire and Fugl-Meyer assessment of upper extremity before and 6-weeks after treatment. *Results:* The shoulder subluxation, shoulder pain and movement function of the upper extremities were improved after treatment with both groups, and the assessment of the restoration group showed better effect ( $p<0.01$ ). The score of MPQ in the treatment group was significantly lower than that in the control group ( $p<0.01$ ), while the score of FMA was higher ( $p<0.05$ ). *Conclusion:* Chinese Traditional Massage in the restoration place can facilitate the recovery of shoulder subluxation, shoulder pain after stroke.

#### PP001-034

### RESPIRATORY REHABILITATION NURSING ON BREATH FUNCTION DUE TO SCI OF CERVICAL VERTEBRA

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*Objective:* To observe the curative effect of respiratory system rehabilitation nursing intervention on breath function due to spinal cord injury of cervical vertebra. *Methods:* 48 cases were randomly divided into treatment group ( $n=24$ ) and control group ( $n=24$ ). Two groups of patients were treated by the same rehabilitation training and common nursing. The cases of treatment group received additional rehabilitation nursing intervention of respiratory system. Lungs function on MVV (passing spirit of most greatly independently), FEV1 (shout spirit quantity in 1<sup>st</sup> second by made an effortest to shout spirit quantity after effortest shouting) and the incidence of lung infection of the cases of treatment group were compared with the cases of the control group after 30 days. *Result:* MVV and FEV1 were increased ( $p<0.05$ ) and the rates of the lungs infection were reduced ( $p<0.05$ ) on both groups of patients but the effect of the treatment group was better than that of control group ( $p<0.05$ ). *Conclusion:* There has the better practical significance in improving respiratory



function and reducing lung infection of patients due to spinal cord injury of cervical vertebra after respiratory system rehabilitation nursing.

## PP001-035

### TRANSCUTANEOUS ELECTRIC NERVE STIMULATION (TENS) AND MOTION ON SHOULDER PAIN OF STROKE

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**Objective:** To observe the curative effect of transcutaneous electric nerve stimulation (TENS) and motion therapy on shoulder pain due to stroke. **Methods:** 60 patients of shoulder pain due to stroke were randomly divided into treatment group (30 cases) and control group (30 cases). The patients in the treatment group were treated with transcutaneous electric nerve stimulation (TENS) and motion therapy. The cases of the control group were treated with transcutaneous electric nerve stimulation (TENS) only. All patients were evaluated with visual analogous score of pain (VAS) and Fugl-Meyer evaluating measure list before and after treatment. **Result:** Effects of the treatment group are superior to effects of the control group in terms of reducing pain and decreased range of motion of shoulder joint, and enhancing upper limbs movement function of the affected side ( $p < 0.01$ ). **Conclusion:** The therapeutic effect of transcutaneous electric nerve stimulation (TENS) and motion therapy on shoulder pain due to stroke is satisfactory.

## PP001-036

### STUDY ON THE EFFECTS OF GINSENOSES Rg1 AND Rb1 ON THE PROLIFERATION AND PROTECTION OF NEURAL STEM CELLS

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**Objective:** To study the mechanism of ginsenoside Rg1 and Rb1 on the proliferation and protection of NSCs. **Methods:** The proliferation of NSCs tested by Cytometry and MTT assay, the expression of STAT3 detected by immunocytochemistry. The protective effect of Rg1 and Rb1 on the NSCs by neurotoxic model of NSCs has been set up by use of Glu, the surviving rate tested by MTT assay, the apoptosis rate measured by TUNEL staining. **Results:** 1) It has the strongest promotive effect for NSCs to proliferate in 40  $\mu$ M group in which proliferated cells reaches the highest number at 4d with obvious difference contrasting to the control. 2) in the control group with cell survival rate of 11.3%. the survival rate of Rg1 and Rb1 group are 58.6% and 62.3%, respectively, which are obviously different with the Glu groups. The cells in Rg1 and Rb1 groups survive with rate of apoptosis cells of 21.6% and 20.2%, respectively, which show obviously difference with the Glu groups. **Conclusions:** Ginsenoside Rg1 and Rb1 can promote the proliferation of SVZa NSCs and have protective effect to SVZa NSCs. Rg1 and Rb1 can protect and promotion proliferation of NSCs by anti-neurotoxicity of Glu, which may be related to the increase of STAT3 expressions.

## PP001-037

### STUDY OF THE MECHANISMS AND EFFECTS OF GINKGOLIDE B

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**Objective:** To observe the effect of GKB on the differentiation of NSCs, and explore the mechanisms of its action. **Methods:** NSCs were dissociated from SVZa of fetal SD rats, cultured in differentiation medium containing different consistency of GKB. The neurite number, length and cell body area were measured, then  $\beta$ -Tubulin, GFAP, CC-1 expression were detected, Cytokine factory-SOCS2, transcription factory-Id2 were also immunostained. **Results:** 1) NSCs was successful isolated, cultured and identified 2) Ginkgolide B increases neurites number and length and cell body area. 3) Ginkgolide B increases the percentage of  $\beta$ -Tubulin positive neuron-like cells and GFAP positive astrocyte-like cells. 4) Ginkgolide B increases the percentage of SOCS2 positive cells and the mean optical densities of SOCS2 immunoreactive products. and decreases the percentage of Id2 positive cells and the mean optical densities of Id2 immunoreactive products. **Conclusion:** Ginkgolide B promotes neurite growth, enhances the neurites number and length and cell body area, promotes NSCs to differentiation into neuron and astrocyte, simultaneously upregulates SOCS2 expression and downregulates Id2 expression. Ginkgolide B might promote NSCs to differentiate into neuron and mature neural structure and function by upregulating SOCS2 expression and downregulating Id2 expression.

## PP001-038

### CLINICAL STUDY ON FUNCTIONAL INDEPENDENCE MEASURE FOR PATIENTS WITH SPINAL CORD INJURY OF TRAUMA TREATED BY ELECTRO-ACUPUNCTURE STIMULATION

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**Objective:** To study the functional independence measure (FIM) for patients with spinal cord injury (SCI), treated by electro-acupuncture stimulation. **Methods:** 62 cases with SCI were divided into two groups randomly, 32 cases were treatment group, who were taken by electro-acupuncture stimulation, physical therapy (PT) and occupational therapy (OT); 30 cases were control group, treated by PT and OT. FIM was assessed before and after treatment. **Results:** The total scores of FIM of the two groups were more improved after the treatment ( $p < 0.01$ ). However, the total scores of FIM of the treatment group ( $97.78 \pm 19.55$ ) was higher than that of control group ( $87.53 \pm 16.67$ ),  $p < 0.01$ ; as well as the efficiency of in-patient which were  $0.62 \pm 0.42$  and  $0.51 \pm 0.25$  ( $p < 0.05$ ). **Conclusion:** The abilities of functional independence of patients with SCI, treated by electro-acupuncture stimulation, PT and OT, were improved obviously, and the efficiency of in-patient was also promoted, which shows that an effective therapy is recommended for the patients with SCI in clinical rehabilitation.



PP001-039

### THE EFFECTS OF NEUROMUSCULAR ELECTROTHERAPY AND KINESITHERAPY ON THE BRACHIAL PLEXUS INJURY

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**Objectives:** To explore the effects of neuromuscular electrotherapy and kinesitherapy on brachial plexus injury. **Methods:** 20 patients with brachial plexus injury were studied in our work. The myoelectrograms were checked in 18 cases in which 10 cases had non-visible motor unites, 8 cases with a few motor unites. The involved muscles were stimulated by NMR-neuromuscular restorer for 10–15 min per muscle combined with kinesitherapy for 20–30 mins. The patients were followed up for 18–58 months. **Results:** In 11 cases with upper brachial plexus injuries, 9 cases (including 2 cases by nerve grafting) recovered to excellent, one case to moderate and one case to less moderate grades by Mallett shoulder joint evaluation (pre and post rehabilitation comparison ( $p < 0.05$ )) and 10 cases to excellent and one case to less moderate grades by Gilbert elbow joint evaluation. ( $p < 0.05$ ). In 8 cases with total brachial plexus injuries, 4 cases recovered to excellent, 3 cases to less moderate and one case to poor grades by Mallett evaluation ( $p < 0.05$ ) and 7 cases to excellent and one case to less moderate grades by Gilbert evaluation ( $p < 0.05$ ). One case with lower brachial plexus injury recovered to excellent grade by Raimondi hand joint evaluation. The rehabilitation group is significantly superior to the follow-up group treated by the operative neurolysis ( $p < 0.05$ ). **Conclusion:** Neuromuscular electrotherapy combined with kinesitherapy is effective on the brachial plexus injury.

PP001-040

### QUADRIPLEGIA CAUSED BY CRITICAL ILLNESS POLYNEUROPATHY SUPERIMPOSED TO DIABETIC NEUROPATHY: A CASE REPORT

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**Objective:** To describe a patient with critical illness polyneuropathy superimposed to diabetic neuropathy and suggest a helpful diagnostic approach to this entity. **Methods:** We present a case report, with a focus on clinical features, electrophysiological study, differential diagnosis, and rehabilitation outcome. **Result:** A 42-year-old man with previous history of diabetic polyneuropathy developed flaccid quadriplegia with respiratory failure after septic shock due to liver abscess. After excluding other possible etiologies such as central nervous system lesions, neuromuscular junction disease or myopathy, polyneuropathy was diagnosed. Because pre-existing polyneuropathy history complicated the differential diagnosis, we performed a comprehensive work-up to rule out other systemic diseases or metabolic disorders which may cause polyneuropathy. On the basis of the clinical course and the electrophysiological study, the diagnosis of critical illness polyneuropathy superimposed to diabetic neuropathy was established. After 6 months of rehabilitation, the patient was able to ambulate with a walker under supervision and perform the activities of daily living with partial assistance. **Conclusion:** Critical illness polyneuropathy commonly occurs in critically ill patients and presents as limb weakness and difficulty in weaning from the ventilator. However, it is often mistaken for deconditioning and neglected in the differential diagnosis lists for quadriplegia in the ICU. Early diagnosis and prevention of

this condition are important to reduce the incidence and the cost of hospital stay. Neurorehabilitation should be arranged as early as possible to improve the outcome.

PP001-041

### EFFECTS OF INFRASOUND WITH DIFFERENT SOUND-PRESSURE LEVEL ON APOPTOSIS IN HIPPOCAMPAL CELLS OF RAT BRAIN

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**Objective:** To investigate the effect of infrasound on apoptosis of hippocampus of rat brain and to provide rehabilitation guideline for its injury. **Methods:** Eighty-eight male SD rats were randomized into eleven groups: control group, 90dB/1d, 7d, 14d, 21d and 28d; 130dB/1d, 7d, 14d, 21d and 28d infrasound exposed groups. The text groups were put to an infrasound field with 8Hz, 90dB or 130dB Sound-Pressure Level, each day for 2 h. Acute cell separation and flow cytometer (FCM) techniques were used for measurement of apoptosis ratio in hippocampal cells. **Results:** Compared with control group, no increase of apoptosis ratio was observed in 90dB/1d, 130dB/1d and 130dB/7d groups ( $p > 0.05$ ), but there are increases of that in 90dB/7d ( $p < 0.01$ ), 90dB/14d ( $p < 0.01$ ), 90dB/21d ( $p < 0.05$ ), 130dB/14d ( $p < 0.01$ ) and 130dB/21d ( $p < 0.05$ ) groups, reaching the peak level in 90dB/14d group ( $p < 0.01$  vs. all of others), and restoring in 90dB/28d and 130dB/28d groups ( $p > 0.05$  vs. control group). **Conclusions:** These changes showed that 8Hz, 90dB/130dB infrasound definitely induced increases of apoptosis ratio in the hippocampal cells in certain time infrasound exposure, which showed there are damages occurred in the infrasound field with 90dB or 130dB, but the adaptation appear after a longer period of infrasound exposure. It suggests that infrasound influences the capability of learning and memory by inducing apoptosis of hippocampus.

PP001-042

### CORRELATION BETWEEN INTRAMEDULLARY SIGNAL CHANGES IN T2-WEIGHTED MRI AND GAIT PARAMETERS OF CERVICAL SPONDYLOTIC MYELOPATHY

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**Objectives:** Relationship between increased high signal intensity (HSI) in T2-weighted cervical spine magnetic resonance image (MRI) and prognosis has been discussed, but it isn't clear yet. Japanese Orthopedic Association (JOA) and Nurik scales are the most common tools for evaluating gait functions of cervical spondylotic myelopathy (CSM) patients. But they have shown vague and subjective results. This study uses computerized three-dimensional gait analysis to evaluate gait parameters of CSM patients, and analyze relationship between parameters and increased HSI. **Methods:** Thirty-six CSM patients expected for surgical operation were selected. Gait analysis (Eagle system, Motionanalysis) and cervical spine MRI were taken, and modified JOA and Nurik scales were evaluated. Two radiologists classified

patients into intense HSI group, faint HSI group and no HSI group. *Results:* HSI groups showed slower gait speed, longer step time, more decreased single limb support, and more increased double limb support than no HSI group significantly ( $p < 0.05$ ). In HSI groups, the more increased in signal intensity in MRI, the slower gait speed, longer step time, more decreased single limb support and more increased double limb support are observed. *Conclusions:* Increased HSI may predict gait function of CSM and the more intense in HSI, the more disturbed in gait function. Thus gait analysis may be a useful tool for evaluating gait functions in CSM and superior to modified JOA and Nurik scales.

#### PP001-043

### THE OBSERVATION OF THERAPEUTIC EFFECTS OF COMPUTER-AIDED SPEECH THERAPY ON APHASIA

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*Objectives:* This study used language disorder diagnosis apparatus ZM2.1 in speech therapy for aphasic patients, aiming at observing the therapeutic effects of computer aided speech therapy on aphasia. *Methods:* 20 aphasic patients received a 4-weeks' speech therapy individually with the rehabilitation system of language disorder diagnosis apparatus ZM2.1, 3-5 days one week, 30-60 min per times. Before the therapy and after 2 and 4 weeks, the scores of the following sub-items of language function including simple instruction, complicated instruction, whether or not, meaning expression and recitation were tested with the same apparatus, handled with SPSS10.0 statistically and compared within groups with the t-test. The total effective therapeutic percentage were evaluated by the number of remarkable progressive sub-items, no progressive items indicated no effective, at least one remarkable progressive item indicated effective, all remarkable progressive items indicated remarkable effective. *Results:* After 4 weeks' therapy, the language function of the 20 patients was all improved. After 2 weeks, the sub-item recitation ( $p < 0.05$ ) and meaning expression ( $p < 0.01$ ) improved significantly. After 4 weeks, besides the above two sub-items, simple instruction ( $p < 0.01$ ) and whether or not ( $p < 0.05$ ) were also improved significantly. The total effectiveness was 100%. *Conclusions:* The computer-aided speech therapy can improve the language function of Chinese aphasics effectively.

#### PP001-044

### EFFECTIVENESS OF INTRATHECAL BACLOFEN THERAPY TO SEVERE SPASTICITY

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*Objective:* To describe the outcome of intrathecal baclofen (ITB) therapy in patients with severe spasticity. *Methods:* The baclofen of 50 µg was administered to 12 patients who had severe spasticity due to spinal cord injury in lumbar puncture as a schooling inspection, and the pump burial operation were performed to eight patients. The change in the spasticity was evaluated by the Ashworth score points. *Results:* The improvement of the

spasticity was remarkably reduced in all cases, and the pain that came from the spasticity disappeared. The pain was reduced by adjusting the amount of medicine without the exacerbation of the spasticity and it became former walking ability though it became difficult to walk temporarily by reducing the spasticity in the cases who could walk before. Moreover, there was a case to whom the substantial contents of rehabilitation was able to be done after improving the spasticity. Neither the side effect nor the complication by this treatment was significant. *Conclusions:* The spasticity of these patients, who does not obtain the improvement previously by other means, improves markedly with this treatment. Reduction of pain is also seen. The ITB therapeutic effect is expected that also improves patient and family's QOL.

#### PP001-045

### INFLUENCE FACTOR ON BALANCE ABILITY IN PATIENTS WITH APOPLEXY

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*Objective:* To study the influence factor on balance ability and to explore the intervention therapy in patients with apoplexy. *Methods:* Fifty-eight articles were retrieved in the evidence-based medicine (EBM) database on line. The system review and the Meta-analysis were performed on those articles. *Results:* "The apoplexy patient's balance ability was related to proprioception closely in the rehabilitation process." was mentioned in forty-nine papers. Otherwise, nine papers were rejected according criteria of EBM. *Conclusion:* The apoplexy patient's balance ability was related to proprioception closely in the rehabilitation process. Proprioception training is important to develop proprioception restoration, then to prevent the fall risk in the patients after apoplexy.

#### PP001-046

### TO STUDY THE RELATED FACTORS INFLUENCING ON THE QUALITY OF LIFE OF STROKE PATIENTS IN COMMUNITY

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*Objective:* To explore the related factors influencing on the quality of life of stroke patients in community. *Methods:* 304 stroke patients in community were randomly divided the control group ( $n=153$ ) and rehabilitation group ( $n=151$ ). All were prospectively followed-up for 5 months, the patients of rehabilitation group were treated with regular following-up, functional assessment and CBR, the control group only treated with homochronous following-up and functional assessment, no rehabilitation. The Chinese version of WHOQOL-BREF was a rating scale of QOL. The improvement of QOL (denoted with difference between the WHOQOL-BREF scores in investigative beginning point and its 5 months later) was the observational ending point for all patients, and it was apply to assess their QOL. Single factor analysis and multielement stepwise regression analysis was used, and some main related factors influencing on the QOL of stroke patients were detected. *Results:* The quality of life is related with their group information, age class, the course of disease, the WHOQOL-BREF scores and functional comprehensive assessment scores in the investigative beginning point for stroke patients in community, and hypertension, smoking,

high fat diet or not. *Conclusion:* Earlier systematized CBR can improve their QOL for stroke patients in community, and normal blood pressure, smoke abatement, diet with low salt and low fat can accelerate their rehabilitation proceeding.

**PP001-047**

**A RANDOMIZED CONTROLLED TRIAL OF STANDARDIZED TERTIARY REHABILITATION AFTER STROKE**

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*Objective:* To compare a Standardized Tertiary Rehabilitation program with simple hospital-based medical treatment in terms of hospital stay, functional outcome, quality of life, and costs. *Methods:* Stroke patients were allocated randomly to the Tertiary Rehabilitation group ( $n=51$ ) or usual inpatient care group ( $n=51$ ). The patients in the rehabilitation group were given Standardized Tertiary Rehabilitation. The usual inpatient care group without any standardized rehabilitation treatment was only given the routine internal medicine treatment. Assessments were completed at randomization, the end of the 1<sup>st</sup> month, the end of the 3<sup>rd</sup> month and the end of the 6<sup>th</sup> month by the MBI, FMA, and WHOQOL-BREF. Cost data were simultaneously collected. *Results:* Two groups did not differ at baseline or 1 month later with respect to FMA, MBI and WHOQOL-BREF. Although scores on the aforesaid outcome measures for both groups improved in 3 month and 6 month after stroke, the scores of rehab group were higher than those of the control groups, there was statistically significant difference in 2 groups. LOHS was not statistically significant difference in 2 groups. Rehab group have better cost-effectiveness than control groups. *Conclusions:* Standardized tertiary rehabilitation program as a mixed model has a strong, positive impact on outcome of patients with acute cerebral stroke, is likely to lead to increased patient choice and good cost-effective and appropriate for the situation of China.

**PP001-048**

**ASSOCIATION OF HIGH SENSITIVE C REACTION PROTEIN WITH INSULIN RESISTANCE IN CHRONIC SPINAL CORD INJURY**

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*Objective:* Improved acute and chronic medical management in spinal cord injury (SCI) has contributed to lengthened survival, which has allowed for the occurrence of more chronic disease in this population. Metabolic syndrome and type II diabetes in SCI have been shown to be more prevalent and earlier onset than able-bodied subjects. High sensitive C-reaction protein (HsCRP), a kind of inflammatory marker, has been shown to be a direct participant in atherogenesis and insulin resistance formation. However, SCI patients tend to have urinary tract or other infections throughout their lives, which may influence the level of HsCRP. Therefore, the aim of this study is to assess the relationship between HsCRP and insulin resistance in the chronic SCI patients. *Methods:* Forty-two subjects with SCI for more than six months were recruited.

The homeostasis model insulin resistance index (HOMA-R) was used to evaluate insulin sensitivity. *Results:* A positive correlation between HsCRP and HOMA-R ( $r=0.7745$ ,  $p<0.0001$ ) was noted. When subjects divided according to level of HsCRP into three groups, insulin resistance was increased significantly with HsCRP more than 3.0 mg/l. *Conclusion:* We found that elevated levels of HsCRP have increased insulin resistance in our subjects. HsCRP may provide a valuable tool for identifying young-and middle-age chronic SCI patients at risk of metabolic syndrome, type II diabetics, even coronary heart disease in primary prevention.

**PP001-049**

**EMOTIONAL SYMPTOMS AFTER STROKE IN REHABILITATION PHASE**

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*Objectives:* To determine the occurrence of anxiety and depressive symptoms in stroke rehabilitation phase and to identify associated factors include impact on functional outcome and quality of life (QOL). *Methods:* The stroke patients from 9 rehabilitation centers admitted during March and December 2006 were enrolled. Anxiety and depressive symptoms were evaluated using the Hospital Anxiety and Depressive Scales (HADS) on admission and discharge. Factors associated with anxiety and depressive symptoms were identified using univariate and multiple logistic regression analyses. Functional ability and QOL using Barthel Index (BI) and WHOQOL-BREF questionnaires respectively were also recorded and analyzed. *Results:* 251 patients were identified. 25.5% of the patients suffered from anxiety symptoms, 37.8% from depressive symptoms and 17.5% from both. Anxiety symptoms were associated with depressive symptoms (OR 5.49, 95% CI 2.89–10.43). Depressive symptoms were related to anxiety symptoms (OR 5.88, 95% CI 3.15–10.99) and female gender (OR 1.81, 95% CI 1.04–3.16). Patients with anxiety and depressive symptoms had low functional ability and QOL than patients without symptoms on admission and at discharge. After rehabilitation program patients without anxiety symptoms show improvement in functional outcome and QOL. However, both patients with or without depressive symptoms have improvement in functional outcome after rehabilitation but in QOL aspect patients without depressive symptoms show more items improvement. *Conclusions:* Symptoms of anxiety and depression are common after stroke. They have correlated with each other, female gender also related to depressive symptoms. Patients with anxiety and depressive symptoms have low functional ability and quality of life than those without symptoms.

**PP001-050**

**THE METABOLIC EQUIVALENTS COST IN SOME THERAPEUTIC EXERCISES OF STROKE PATIENTS**

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*Objective:* To observe the metabolic equivalents (METS) cost in some therapeutic exercises. *Methods:* Eighteen stroke patients participated in the test. K4b2 Pulmonary Function Equipment was



used to record oxygen consumption of the following eight states, which are relaxing sitting position, sit-to-stand transfers, hip extension when standing, weight loading of the involved leg, raising of involved leg, climbing stairs, walking 60 m and also completing these mentioned exercises continuously. METS of these exercises were calculated. *Results*: METS of relaxing sitting position is 1.024, while that of sit-to-stand transfers is 2.854, hip extension when standing is 2.079, weight loading of the involved leg is 2.159, raising of involved leg is 2.247, climbing stairs is 2.865, walking 60 m is 2.590 and consecutive exercise is 2.999. *Conclusions*: The calculation of METS in therapeutic exercises may ensure the safety for the training of the stroke patients with cardiovascular diseases.

#### PP001-051

### EFFECTS OF RECIPROCATING GAIT ORTHOSIS ON CARDIOPULMONARY FUNCTION AND ADL AND WALKING ABILITY IN PATIENTS WITH SPINAL CORD INJURY

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*Objective*: To observe the effects of Reciprocating Gait Orthosis (RGO) on cardiopulmonary function and ADL and walking ability in patients with SCI at above T6 levels. *Methods*: Forty patients with spinal cord injury at above T6 level were randomly divided into the treatment group (18 cases) and the control group (22 cases). Patients in the control group were only treated with routine comprehensive rehabilitation, treatment group was treated with routine treatment and walking exercise with RGO. The functions of all patients were assessed by resting heart rate, blood pressure, maximal oxygen consumption, oxygen saturation, vital capacity, forced vital capacity, maximal voluntary ventilation, forced expiratory volume in the first second, modified Barthel Index, Functional Independent Measure before and after rehabilitation intervention and the walking distances were also measured (ten-meter walking test and 6-minute walking distance). *Results*: After 12 weeks intervention, cardiopulmonary function and ADL of all patients were significantly increased, and improvement of ability in treatment group was superior to that in control group ( $p < 0.05$ ). Functional gait was achieved in 11 of the 18 patients with RGO, and therapeutic ambulation in the rest 7 patients. *Conclusion*: Reciprocating gait orthosis combined with comprehensive rehabilitation have clinical effects on cardiopulmonary function and ADL and walking ability in patients with SCI at above T6 levels.

#### PP001-052

### DETECTION OF LANGUAGE FLUENT CHARACTERISTIC ON CHINESE APHASIA EVALUATED BY LANGUAGE DISORDERS APPARATUS ZM2.1

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*Objective*: To test the reliability and validity of apparatus ZM2.1 for Diagnosis and Treatment of Language Disorders (For short: Language Disorders ZM2.1) through evaluating language fluent characteristic. *Methods*: Using language disorders ZM2.1 and ABC to evaluate the language fluent characteristic of 58 patients with aphasia separately within 3 days. *Results*: There was a high correlation between language speed measured by Language Disorders

ZM2.1 and fluency scores evaluated by ABC, Spearman's correlation coefficient was 0.721 ( $p < 0.01$ ). The results of the language fluent characteristic evaluated by Language Disorders ZM2.1 and ABC were coherence, Kappa value were 0.717 ( $p < 0.01$ ), and the coincidence rate of the diagnose results were 81%. *Conclusion*: The consistency of Language Disorders ZM2.1 and ABC to evaluate the language fluent characteristic was good. Both ABC and Language Disorders ZM2.1 are good and available tools for measuring language fluent characteristic of aphasia.

#### PP001-053

### STUDY OF CHINESE WORDS PROCESSING MECHANISM IN PATIENTS WITH BROCA APHASIA

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*Objective*: To explore Chinese processing mechanism in a patient with Broca aphasia so as to offering accordance for speech rehabilitation. *Methods*: Three patients and 10 normal people, were conducted the test of orthographic, semantic information and phonological. Compare the scores each group with Chi-square test. *Results*: There is no significant difference between two groups in the vocabulary identification ( $p > 0.05$ ). There is significant difference in the identification picture from vocabularies, the identification vocabulary from pictures and the vocabulary identification from sound ( $p < 0.05$ ). There is no significant difference in the vocabulary identification from homophony ( $p > 0.05$ ). *Conclusion*: The patients with Broca aphasia are independent in the course of the orthographic input, and the ability to retrieve semantic information from orthographic activation word which also independent probably without phonological lexicon.

#### PP001-054

### STUDY ON THE EFFECTS OF HBO THERAPY ON PATIENTS WITH EARLIER PERIOD APHASIA

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*Objective*: To explore the effects of hyperbaric oxygen (HBO) therapy on language function of earlier period aphasics. *Methods*: Forty earlier period aphasics after light and medium cerebral trauma and stroke were divided into therapy group and control group (each 20 patients) spontaneously. All the patients received routine therapy, and patients in therapy group received HBO therapy which contained three courses. The language function (including 11 sub-items) was tested with the Apparatus ZM2.1 for Diagnosis and Treatment of Language Disorders. *Result*: The comparison of the therapeutic effects between the therapy group and the control group: The scores of language function were all increased after the 1<sup>st</sup> course which were not significant ( $p > 0.05$ ); except the sub-item of auditory-and-read words, the scores of the rest 10 sub-items are significantly higher than those of the control group after the 2<sup>nd</sup> course ( $p < 0.05$ ). After the 3<sup>rd</sup> course, all 11 sub-items were improved significantly ( $p < 0.05$ ). The comparison of the therapeutic effects before and after each course of the therapy group: only the scores of the advanced dictation, voice expression and semantic expression increased significantly after the 1<sup>st</sup> and the 2<sup>nd</sup> course ( $p < 0.05$ ). *Conclusion*: The HBO therapy might facilitate the recovery of the language function. The result would facilitate the original recovery velocity and not be focused on some language functions and much more obvious in the 1<sup>st</sup> and the 2<sup>nd</sup> course.



PP001-055

### THE COMPARISON OF GAIT REHABILITATION IN PATIENTS WITH HEMIPLEGIA BY WALKING IN WATER AND THE PNEU-WEIGHT WALKING THERAPIES

**Wei Xu, Lin-ying Zhang, Jin-tao Fan**

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**Objectives:** To compare the effectiveness of gait rehabilitation in patients with hemiplegic by walking in water and the Pneu-weight walking therapies. **Methods:** Seventy-six patients were randomly divided into two groups. 40 patients were given the therapy of walking in water, 36 patients as the control group were trained by Pneu-weight walking. Comparison of the improving on walking ability of two groups was made before and after each therapy. At the same time, statistical analysis was performed by score and the more effective therapy was decided based on the score. **Results:** The result showed that walking ability of two groups after each therapy. In therapy of walking in water group, 30 out of 40 patients have improved significantly and 8 out of 40 have improved. In control group, 16 out of 33 patients have improved significantly, 17 out of 33 have improved. This result has significant statistic difference ( $p < 0.05$ ). **Conclusions:** The walking in water is the more effective therapy for the gait rehabilitation of patient with hemiplegic than the Pneu-weight walking therapy.

PP001-056

### CLINICAL EFFECTIVENESS COMPARISON OF UNDERWATER EXERCISE TREATMENT AND TRADITIONAL SPORT TREATMENT ON PARALYSIS PATIENTS' LOW LIMBS DYSFUNCTION

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**Objectives:** To compare the clinical effectiveness of underwater exercise therapy on paralysis patients' low limbs dysfunction. **Methods:** One hundred patients with paralysis were randomly divided into two groups. Fifty-three patients (group 1) were treated with underwater exercise treatment, while the other forty-seven patients (group 2) were treated with traditional sport treatment. Fugl-Meyer scores were evaluated in two groups. **Results:** The scores of Fugl-Meyer of two groups are elevated ( $p < 0.05$ ). Furthermore, for group 1 compared with group 2, the scores of Fugl-Meyer in group 1 were much higher ( $p < 0.05$ ). **Conclusions:** The underwater exercise treatment show better curative effect on patients with paralysis than traditional sport treatment.

PP001-057

### CLINICAL OBSERVATION ON THE COMBINED REHABILITATION OF MODERATE AND SEVERE BRAIN TRAUMA

**Lin-ying Zhang, Jin-tao Fan, Yang Yu, Wei Xu, Xi-dong Zhou, Yu-juan Guo, Yi Zhang, Ruo-ying Li, Yue Zhang**

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**Objectives:** To observe the effects of combined rehabilitation on the functional disturbance including consciousness, sports and cognition of forty-three patients with brain trauma. **Methods:** Sixty-eight patients with brain injury diagnosed were recruited. Every patient's Glasgow Coma Scale (GCS) was less than 12. The functions of all cases were evaluated before, during and after treatment. Memory,

concentration and thinking were detected with simplified methods in the early stage of brain trauma. When patients could take part in actively, Valpar method was performed to assess the advanced function of brain and nerve-psychological function. According to the difference of every patient, daily rehabilitation training was adopted, in proper and gradual sequence, and everyone insist on it. **Results:** Among the 43 patients half year treating, except for 1 patient not recovering yet in persistent vegetative state, the rest 42 patients has been dramatically improved in their consciousness, athletics and perceiving capability. **Conclusions:** The brain injury rehabilitation has great potential for recovery. More than 60% of this group of patients is young people. It has therapeutic effects from 2 months to 6 months and provides the initial reference for the treatment time.

PP001-058

### APPLICATION OF VALPAR COMPONENT WORK SAMPLE TO TREATMENT OF COGNITIVE FUNCTION IMPEDIMENT OF PATIENTS WITH BRAIN TRAUMA

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**Objectives:** To investigate the effects of Valpar Component Work Sample (VCWS) on treatment of cognitive function impediment caused by brain trauma. **Methods:** All 232 patients with cognitive function impediment caused by brain trauma were divided into VCWS Group ( $n=120$ ) and Control Group ( $n=112$ ) randomly. VCWS3 Numerical Sorting, VCW6 Independent Problem, VCW7 Multi-level Sorting were applied to VCWS Group for cognitive function training, and regular rehabilitation therapy to the Control Group. MMSE was used to evaluate patients' cognitive functions before and after treatment. **Results:** There was a marked difference between VCWS Group and Control Group ( $p < 0.01$ ). For both groups, there were also significant improvements in cognitive function before and after treatment ( $p < 0.05$ ). **Conclusions:** Both Valpar Component Work Sample and regular rehabilitation therapy are effective to improve cognitive function of patients with brain trauma. Effects of Valpar Component Work Sample is more remarkable.

PP001-059

### THE CLINICAL OBSERVATION OF CURATIVE EFFECT OF COMPREHENSIVE REHABILITATION THERAPY ON PERSISTENT VEGETATIVE STATE AFTER TRAUMATIC BRAIN INJURY

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**Objectives:** To discuss the curative effect of comprehensive rehabilitation therapy on persistent vegetative state after traumatic brain injury. **Methods:** Twenty-two patients were randomly allocated into two groups. The first group ( $n=11$ ) was therapy group which based on conventional neurosurgery therapy (surgery, medicament, sub-low temperature, etc.) combined with comprehensive rehabilitation therapy, and the other group ( $n=22$ ) was control group only bestowed conventional neurosurgery. The therapeutic effect was evaluated by Glasgow Coma Scale and Glasgow Outcome Scale. **Results:** The rate of recovery of consciousness: therapy group was 54.5% and control group was 27.3%; the rate of good recovery in consciousness: therapy group was 45.5% and control group was 18.2%. **Conclusions:**

Comprehensive rehabilitation therapy can accelerate recovery of consciousness from vegetative state after traumatic brain injury and improve the prognosis.

#### PP001-060

### THE EFFECT OF STATIC BALANCE TEST AND TRAINING EQUIPMENT ON LIMB FUNCTION OF STROKE PATIENTS

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**Objective:** To study the effect of static balance test and training equipment on limb function of stroke patients. **Methods:** Sixty stroke patients were divided into an experiment group ( $n=30$ ) and a control group ( $n=30$ ). All patients were treated with routine medication; the experiment group were tested and trained with PH-A static balance test and training equipment in addition to the routine treatment. All patients were observed and treated forty days. The patients were assessed with Berg Balance Scale (BBS) and Modified Barthel Index. **Results:** The BBS scores and MBI scores in each group and between two groups showed a significant difference ( $p<0.01$ ). The scores in the experiment group were superior to that in the control group ( $p<0.05$ ). **Conclusion:** The application of static balance test and training equipment has more improving effect on the function recovery than the routine rehabilitation training in the stroke patients.

#### PP001-061

### A PRELIMINARY STUDY OF THE RELIABILITY AND VALIDITY OF MONTREAL COGNITIVE ASSESSMENT CHINESE VERSION IN CHONGQING

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**Objective:** To study the validity and reliability of the Montreal Cognitive Assessment (MoCA) Chinese version in Chongqing. **Methods:** Using Chinese version of MoCA translated by Wang wei We recruited two groups of volunteers to participate in the study. One group consisted of 20 patients with brain disorders (patient group). The other group consisted of 30 subjects without neurological disorders (control group). All the subjects were assessed with MoCA and Mini-Mental State Examination (MMSE) within one session, and respectively by two independent raters. Scores of MoCA and MMSE were analyzed with Spearman correlation coefficient to test the validity of MoCA. Intraclass correlation coefficient (ICC) were used to examine the inter-rater reliability of MoCA. And Mann-Whitney test was used to detect the sensitivity of MoCA. **Results:** There was high correlation between the scores of MoCA and that of MMSE ( $r=0.902, p<0.001$ ). There were high correlation in all items of MoCA between the two assessment tools (ICC: 0.913-1.000). The total scores of MoCA were  $11.82 \pm 4.23$  in the patient group and  $26.2 \pm 2.64$  in the control group with significant difference between the two groups ( $p<0.01$ ). **Conclusion:** The Chinese version of MoCA is valid, reliable and sensitive. It can be used clinically to evaluate the Chongqing subjects with mid and severe cognitive problems.

#### PP001-062

### EXPRESSION PROFILING OF MOUSE NEURAL DEVELOPMENT RELATED MICRORNAS

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**Objective:** The microRNAs (miRNAs) are some small non-coding transcripts of 18-25 nucleotides which play important roles in developmental regulation. This study aims to find some mouse neural development related mRNAs. **Methods:** We described miRNA expression profiling in E8.5 mouse neural tube using microarray analysis in order to explore molecule mechanism of neurogenesis. **Results:** The data in this study showed that there were 74 up-regulated and 65 down-regulated miRNAs. Then the target genes of all these miRNAs were predicted by bio information method ([http://pictar.bio.nyu.edu/cgi-bin/PicTar\\_vertebrate.cgi](http://pictar.bio.nyu.edu/cgi-bin/PicTar_vertebrate.cgi)). Some neural development related genes do have target site of the miRNAs(miR-19, miR-327, miR-199\*so on). **Conclusions:** Although the exactly function of the miRNAs need further study, this data implicated that microRNA might play an important role in neural development *in vivo*.

#### PP001-063

### FUNCTIONAL AMBULATORY STATUS AND BALANCE CONTROL IN PERSONS WITH TRAUMATIC BRAIN INJURY AND HAEMORRHAGIC STROKE DURING IN-PATIENT REHABILITATION

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**Objective:** To evaluate the functional ambulatory status and balance control among people with traumatic brain injury (TBI) and haemorrhagic stroke during in-patient rehabilitation and to explore the relationship between demographic variables, functional ambulatory status, balance control and cognitive status with length of stay (LOS) and discharge destination. **Methods:** We retrospectively analyzed the functional ambulatory status and balance control in a total of 159 patients with TBI ( $n=61$ ) and haemorrhagic stroke ( $n=98$ ) who had completed the in-patient rehabilitation programme in a local rehabilitation hospital. Demographic data and outcome variables including: age, sex, time since injury before rehabilitation admission, Functional Ambulation Categories (FAC), Berg Balance Scale (BBS) and Mini-Mental State Examination (MMSE) scores at admission and discharge, in-patient rehabilitation LOS and discharge destination were retrieved. **Results:** There was significant increase (all  $p<0.001$ ) of the FAC and BBS scores for both the TBI and haemorrhagic stroke groups upon completion of the in-patient rehabilitation. Age was shown to have fair correlation with discharge destination in haemorrhagic stroke group. Other demographic variables did not show correlation (all  $p>0.05$ ) with LOS and discharged destination. Admission and discharge FAC and BBS scores showed a fair to moderate correlation while cognition showed a fair correlation with LOS and discharge destination in both groups. **Conclusions:** Both TBI and haemorrhagic stroke persons gained significant improvement in functional ambulatory status and balance control after in-patient rehabilitation. These two functional outcomes, together with age and cognitive function, were shown to have correlation with the aggregated clinical outcome of LOS and discharge destination.

PP001-064

**DERIVATION OF SPINAL MOTOR NEURON FROM MOUSE EMBRYONIC STEM CELLS*****Bianzhi Xing<sup>1</sup>, Hong Chen<sup>2</sup>****<sup>1</sup>Department of Neurology, and <sup>2</sup>Department of Rehabilitation, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China*

**Objective:** Embryonic stem (ES) cells are able to differentiate into all type of cells in the body and therefore can provide a great promise to diseases caused by cell loss such as spinal cord injury, stroke and so on. **Method:** So in this study, the mouse embryonic stem cells were induced into spinal motor neuron by 4 stages method. Cell markers were identified by immunocytochemistry and the differentiation rate was analysis by fluorescence-activated cell sorting (FACS). **Results:** Mouse ES cells were induced into HB9 positive cells and the differentiation rate was about 40 per cent. **Conclusion:** These results indicated that ES cells can be directed to spinal motor neuron with specific factors, which will provide promising future for diseases due to motor neuron loss.

PP001-065

**THE EFFECT OF EARLY INTENSIVE EXERCISE ON PATIENTS WITH HEMIPLEGIA*****Yanjie Xu****Rehabilitation Department, The Disabled Person's Rehabilitation Center of Liaoning Province, China*

**Objectives:** To investigate the effect of early intensive exercise on patients with hemiplegia after stroke, in order to find an effective rehabilitative method to help the patients. **Methods:** Randomly dividing 57 patients with hemiplegia into two groups: 28 cases in early intensive exercise group and 29 cases in traditional rehabilitation group. The first group patients were given 2 h intensive exercise every day in early period after stroke with gradual progressive and by the end of the first 3 months the intensive exercise time was 6 h a day. Both the affected extremities and the healthy extremities exercised. The second group was given traditional rehabilitation therapy by using the healthy extremities taking place of the affected extremities. Fugl-Meyer assessment (FMA) and Barthel index assessment on ability of daily living (ADL) were done at the end of 3 months. **Results:** According to the assessments, the patients in early intensive exercise group exhibited greater motor changes on FMA and Barthel index than the patients in the traditional rehabilitation therapy group. There were significant difference between the two groups ( $p < 0.01$  and  $p < 0.05$ ). **Conclusions:** early intensive exercise on patients with hemiplegia after stroke is very effective. Early intensive exercise can facilitate the affected upper extremity's function improved.

PP001-066

**FUNCTION OUTCOMES IN PATIENTS WITH TRAUMATIC SPINAL CORD INJURY AFTER COMPREHENSIVE REHABILITATION*****Rong Xie, Jin-xian Li, Zhen-guo Shi, Hui-lin Liu, Nu-re Zai***  
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**Objective:** To investigate the final outcomes in patients with traumatic spinal cord injury (SCI) after receiving comprehensive

rehabilitation. **Methods:** Fifty patients (35 male, 15 female, aged 8 to 62 years) with traumatic SCI at different levels and different degree of injury were studied (of which 19 was in cervical, 23 in thoracic and 8 in lumbar, 20 with complete and 30 with incomplete lesions). The patients received their comprehensive rehabilitation at their early or middle stage of injury (from 7 day to 6 months after injury). The comprehensive rehabilitation program included functional electrical stimulation (FES), respiratory training, muscle strengthening exercise, balance and transfer training, sphincter muscle training, psychology consult, medications, complications prevention and treatment. The function of the patients was assessed before and after rehabilitation by ASIA Impairment Scale and functional independence measure (FIM) (including self-cares, sphincter control, transfer ability and motor ability). The median length of rehabilitation program was  $44.58 \pm 25.14$  days. **Results:** There were significant increase of patient's ASIA motor scores (from  $46.20 \pm 18.12$  to  $55.66 \pm 22.05$ ,  $p < 0.001$ ) and FIM (from  $27.37 \pm 19.17$  to  $35.37 \pm 20.32$ ,  $p < 0.001$ ) after completing comprehensive rehabilitation program. However, there were no significant changes of ASIA sensory scores especially in patient with complete lesions ( $p > 0.05$ ). **Conclusions:** The comprehensive rehabilitation program significantly improves ASIA motor scores and FIM in patients with early or mid stage of SCI.

PP001-067

**THE EFFECT OF EXERCISE TRAINING ON LOCOMOTION AND NEUROLOGICAL FUNCTIONAL RECOVERY OF RATS AFTER SPINAL CORD INJURY*****Honxing Wang<sup>1</sup>, Dongchen Xu<sup>1</sup>, Li Yao<sup>2</sup>, Xiaoting Lei<sup>3</sup>, Xinsheng Ding<sup>3</sup>, Tong Wang<sup>1</sup>****<sup>1</sup>Department of Rehabilitation Medicine, <sup>2</sup>Spine Surgery Center, and <sup>3</sup>Department of Neurology, the First Affiliated Hospital of Nanjing Medical University, Nanjing, China*

**Objectives:** To observe the effect of exercise training on locomotion and neurological functional recovery of rat after spinal cord injury (SCI). **Methods:** Seventy-five SD rats were selected to make SCI model at T10 level by extradural compression using modified Allen's stall with damage energy of 40g-cm force. Body-weight supported treadmill training was adopted at one week after SCI, lasted 20–25 min per day, 5 days a week for 4 weeks. Locomotion and neurological functions were evaluated by inclined plane tests, modified Tarlov scores, Basso-Beattie-Bresnahan (BBB) scales and somatosensory evoked potential (SEP) respectively before injury and 1 days, 3 days, 5 days, 7 days, 14 days, 21 days, 28 days after injury. **Results:** 1) locomotion: in control group, the angles of inclined plane, Tarlov scores and BBB scales increased significantly at 7 and 14 days ( $p < 0.05$ ), and there were no more significant changes with the elongation of process ( $p > 0.05$ ); in training group, the values of three items at 14 days increased more significantly than those of control group, and increased continuously at 21 and 28 days ( $p < 0.05$ ). 2) Neurological function: in control group, the latency of SEP decreased gradually from 1 day to 21 days after SCI, and no further improve was found at 28 days; in training group, the latency decrease continuously from 7 days to 28 days after SCI, it was shorter significantly than control group at 14, 21 and 28 days ( $p < 0.05$ ). **Conclusion:** Exercise training may improve the locomotion and neurological functions and shorten the recovery process of rat after SCI.



## PP001-068

**EXPERIMENTAL STUDY OF LOW POWER 660NM GA-AL-AS LASER PROMOTING NERVE REGENERATION****Li-Xin Zhang<sup>1</sup>, Xiao-Jie Tong<sup>2</sup>, Hua Jia<sup>1</sup>, Zhen-Hua Li<sup>1</sup>, Xiu-Hua Yuan<sup>1</sup>**<sup>1</sup>Department of Rehabilitation Medicine, the 1<sup>st</sup> Affiliated Hospital, and <sup>2</sup>Department of Human Anatomy, the Basic College of Scientific Medicine, China Medical University, China

**Objectives:** To observe the effect of low power 660 nm Ga-al-as laser therapy (LPLT) on nerve regeneration after acellular nerve allografts repairing the sciatic nerve gap of rats and discuss its acting mechanisms. **Methods:** The acellular nerve allografts, treated by hypotonic-chemical detergent, were put on the 10 mm gap of the sciatic nerve in the rat. After 24 h of operation, LPLT was administered. 12 weeks after operation, nerve conduction velocity, the restoring rate of tibial muscle wet weight, myelinated nerve number, brain-derived neurotrophic factor (BDNF) and calcitonin gene-related peptide (CGRP) protein and mRNA expression of spinal cord and muscle at injury site were observed and analyzed statistically. **Results:** Compare to acellular nerve allografts alone, LPLT could increase nerve conduction velocity, the restoring rate of tibial muscle wet weight, myelinated nerve numbers, BDNF and CGRP protein and mRNA expression of spinal cord and muscle at injury site, the difference of which were statistically significant. **Conclusions:** These findings demonstrate that 660 nm LPLT upregulates BDNF and CGRP protein and mRNA expression and increases the rate of regeneration and target reinnervation after acellular nerve allografts repairing the sciatic nerve gap of rats.

## PP001-069

**TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION IN TREATMENT FOR SYMPTOMATIC DIABETIC NEUROPATHY: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED TRIALS****Dong-mei Jin<sup>1</sup>, Tiebin Yan<sup>1</sup>, Deng-feng Geng<sup>2</sup>**<sup>1</sup>Department of Rehabilitation Medicine, and <sup>2</sup>Department of Cardiology, 2<sup>nd</sup> Affiliated Hospital, Sun Yat-sen University, China

**Objective:** To evaluate the effectiveness and safety of transcutaneous electrical nerve stimulation (TENS) on symptomatic diabetic neuropathy. **Method:** Electronic databases such as PUBMED (1989, October 2007), EMBASE (1989, October 2007), Cochrane Central Register of Controlled Trials (Issue 1, 2007), and Chinese Biomedical Database (1979, October 2007) were searched by using the mesh and text keywords as “TENS” and “diabetic neuropathy”. References from these trials were scrutinized to reveal additional citations. Randomized controlled trials (RCTs) about the effect of TENS on symptomatic diabetic neuropathy were included. Studies were selected and data were extracted independently by 2 reviewers. Meta-analysis was performed using RevMan 4.2.7 software. **Result:** Three RCTs involving 78 patients were included in this study. The quality of the three RCTs was well. Compared with sham-stimulation, TENS therapy significantly reduced the score in pain (SMD -2.35, 95% CI [-4.24, -0.46]). In addition, compared with sham-stimulation, TENS treatment significantly reduced the score in numbness (WMD -0.18, 95% CI [-0.32, -0.05]). No serious side effect was reported in TENS therapy group. **Conclusion:** TENS therapy is a safe and promising strategy in relieving pain and improving symptoms in patients with symptomatic diabetic neuropathy. Since the number of patients enrolled in RCTs to

date is modest, further studies are still warranted to provide accumulating evidence on the effect of TENS on symptomatic diabetic neuropathy.

## PP001-070

**WORD ASSOCIATION FOR YOUNG AND OLD ADULTS****Liang Zhou, Zhongli Jiang, Feng Lin**

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**Objective:** We investigated the differences of word association between young and old adults from Chinese. **Method:** Word association data were obtained from two cohorts of Chinese adults. A free word association test was administered to young adults ( $n=50$ ) and old adults ( $n=50$ ) with Kent-Rosanoff list which had been translated into Chinese. Variability of the type of response across cohorts was examined in terms of Deese's criteria. Three measures of response heterogeneity were calculated for each stimulus item: association frequency of the dominant response (ADOM), number of all responses (NAR) and number of unique responses (NUR). The word association network of two cohorts of adults was studied respectively using graph theory and network analysis methods. **Result:** Compared with young cohort, the old adults elicited more paradigmatic responses than the young, so they made fewer syntagmatic responses. The old adults also evidenced a characteristic pattern of responses, which showed marked increase in ADOM and reduction in NAR and NUR. Word association network both possessed small-world structure characterized by the combination of highly clustered neighborhoods and short average path length. Moreover, the distributions of the number of connections followed power laws that indicated scale-free pattern of connectivity, with most nodes having relatively few connections joined together through small number of hubs with many connections. **Conclusion:** Comparison of the word association between young and old adults indicated that there was significant deviation between two cohorts. Small-world and scale-free network structures were found in word association network for both two cohorts.

## PP001-071

**MEDICAL COMPLICATIONS DURING INPATIENT STROKE REHABILITATION IN THAILAND: A PROSPECTIVE STUDY****Wasuwat Kitisomprayoonkul<sup>1</sup>, Peeraporn Sungkapo<sup>1</sup>, Suganya Taveemanoon<sup>2</sup>, Dootchai Chaiwanichsiri<sup>1</sup>**<sup>1</sup>Department of Rehabilitation Medicine, Faculty of Medicine, King Chulalongkorn Memorial Hospital, and <sup>2</sup>The Thai Red Cross Rehabilitation Center, Thailand

**Objectives:** To identify the incidence and factors affecting development of medical complications during inpatient stroke rehabilitation. **Methods:** Stroke patients ( $n=118$ ) admitted to the Thai Red Cross Rehabilitation Center between August 2006 and January 2007 were prospectively evaluated throughout inpatient rehabilitation to identify incidence of newly developed complications. **Results:** Eighty-three patients (70.3%) experienced at least one complication. The common complications were depression (56.6%), musculoskeletal pain (28%), urinary tract infection (UTI) (17.8%) and complex regional pain syndrome (CRPS) type I (15.3%). Others were pneumonia (4.2%), cardiovascular complications (4.2%), falls (4.2%), upper GI bleeding (3.2%), seizure (2.5%), and pressure ulcer (1.7%). Fourteen patients (11.8%) were



referred to the acute care hospital because severe medical complications. History of myocardial infarction, low admission Barthel ADL Index (BAI), urinary incontinence, indwelling catheterization and dysphagia were associated with development of complications ( $p < 0.05$ ). No factors affecting post-stroke depression were found. The factors affecting development of UTI was indwelling catheterization (RR 78.86,  $p < 0.001$ ), CRPS type I was limit range of motion (RR 3.13,  $p = 0.035$ ), Pneumonia was aspiration (RR 145.33,  $p < 0.001$ ), and cardiovascular complication was history of myocardial infarction (RR 7.70,  $p = 0.037$ ). **Conclusions:** The incidence of medical complication is 70.3%. Depression, musculoskeletal pain, UTI and CRPS type I are the common complications. The factors affecting development of complications are low admission BAI, history of myocardial infarction, urinary incontinence, indwelling catheterization and dysphagia. Awareness of complication and its affecting factors may improve prevention and management.

#### PP001-072

### THE CORRELATION OF THE RECOVERY OF MOTOR WEAKNESS OF UPPER EXTREMITY IN HEMIPLEGIC PATIENTS WITH SEP AND MEP

**Jae Joon Lee, Han Young Jung**

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**Objectives:** The recovery of motor weakness in subjects with stroke is one of the most important goals of rehabilitation. We checked the correlation of the recovery of motor weakness of upper limb with SEP and MEP in subjects with stroke. **Methods:** We enrolled 59 subjects (34 men, mean age: 56.7 years) with first ever stroke in MCA territory without problems in peripheral nerves. We executed SEP and MEP within 1 month from onset time. At that time, Manual Function Test (MFT) and selecting the scores of self-care in Functional Independence Measure (FIM) were done (MFT1, Fsc1). MFT and FIM were assessed every other week until there is no more improvement (MFT2, Fsc2). We divided the subjects into 2 groups according to each SEP and MEP results with presence of response, respectively. Putting together both, they were divided into 3 groups: both absent, any one absent and both present. Data analysis was done to get the correlation of MFT or FIM with SEP or MEP alone and with the result of putting together both. **Results:** Each SEP and MEP had correlation with MFT1 and MFT2 ( $p < 0.05$ ). The result putting together SEP and MEP has higher correlation with MFT1 and MFT2 than SEP or MEP alone ( $p < 0.05$ ). **Conclusion:** SEP and MEP have correlation with MFT and putting together both is better in detecting the recovery of motor weakness of upper limb in hemiplegic subjects with stroke.

#### PP001-073

### PRELIMINARY STUDY ON THE RELATIONSHIP OF ELECTRICAL STIMULATION AND THE NERVE-NEEDLE DISTANCE IN NERVE BLOCK PROCEDURE

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**Objective:** To explore the relationship of electrical stimulation and the nerve-needle distance in nerve block procedure. **Method:** Five New Zealand white rabbits were selected for experiment. Pentobarbital (30 mg/kg) was employed for general anesthesia. A longitudinal incision was performed in the posterior thigh to expose the tibial nerve. Totally 10 nerves were studied. The

nerve-needle distance was located by using a 3-dimensional manipulator. The nerve-needle distances of 0 mm, 1 mm, 2 mm, 3 mm, 4 mm and 5 mm were chosen for testing motor response to the electrical stimulation from the needle. The lowest intensity of electrical current to induce muscle contraction was recorded for all distance. **Results:** The electrical current at the needle-nerve distances of 0 mm, 1 mm, 2 mm, 3 mm, 4 mm and 5 mm were  $0.28 \pm 0.07$  mA,  $0.34 \pm 0.08$  mA,  $0.44 \pm 0.10$  mA,  $0.58 \pm 0.15$  mA,  $0.74 \pm 0.17$  mA and  $0.91 \pm 0.21$  mA, respectively. The linear regression analysis showed regression equation was  $Y = 0.23 + 0.13x$  ( $r^2 = 0.967$ ). **Conclusion:** The linear regression showed positive correlation of electrical stimulation and the nerve-needle distance in nerve block procedure.

#### PP001-074

### DEVELOPMENTAL DELAY IN FETAL ALCOHOL SYNDROME CHILDREN – CASE REPORT IN TAIWAN

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**Objective:** Fetal Alcohol Syndrome (FAS) is one of the common causes of mental retardation in the western world. It may contribute to higher alcoholism prevalence in the area. Given that there is alcohol consumption history during pregnancy, to diagnose with criteria of (1) Abnormal central nervous system function, (2) Growth retardation (height and weight 10% below normal range), and (3) Facial disfiguration such as small head circumference, flat philtrum, and thin upper lip. Cases fulfill the above three conditions can be diagnosed FAS. Cases fulfill the first and the second conditions accompanying facial disfiguration are termed Fetal Alcohol Effect (FAE). FAS and FAE are generally termed Fetal Alcohol Spectrum Disorder. **Case report:** We collaborate with a pediatric nursing institute in eastern Taiwan to analyze three FAS children. Testing methods include pre-school Chinese Child Development Inventory (CCDI) and Behavior Style Questionnaire (BSQ). We tested children between the age of 4 years old and 4 year and 11 months old. The results show developmental delay in all categories of CCDI especially in fine motor, logical comprehension, and social interaction development. In BSQ results, low persistence and high threshold are commonly observed. **Discussion:** The results can provide our rehabilitation team more confidence in intervention of FAS education and therapy, and a trans-discipline intervention model is recommended.

#### PP001-075

### COMPARISON OF BRAIN CT AND EEG OF CHILDREN WITH CEREBRAL PALSY

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**Objective:** To analyze and compare the brain CT with the EEG of cerebral palsy (CP) children and further explore their clinical value. **Methods:** Fifty-four CP children were assessed by brain CT scan and EEG at the same period. **Results:** Abnormal rate of brain CT was 59.3%, including expansion of ventricles of brain, atrophy of cortex, cerebromalacia; abnormal rate of EEG was 72.12%, including low voltage, allorhythmia of slow wave, de-

letion of sleep-spindle wave and attack wave. The coincidence rate of the two ways was 46.3%, and there was no obviously different between both. *Conclusion:* The study can provide reliably scientific basis for diagnosing CP if combining brain CT with EEG.

**PP001-076**

**VERTICALISATION AS REHABILITATION  
PARAMETER IN CHILDREN AFTER  
CORRECTION OF CONGENITAL HEART  
DEFECTS**

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*Objective:* Aim of this study is to present optimal and expected duration of verticalisation in children after correction of CHD. *Methods:* We evaluated 236 children treated at University Children Hospital in Belgrade during 2002–2007 period. Due to type of CHD we divided children into 7 groups: group with ventricular septal defect (VSD), group with atrial septal defect (ASD), group with ductus arteriosus persistens (DAP), group with coarctation of the aorta (CoA), group with tetralogy of Fallot (ToF), group with transposition of the great arteries (TGA) and group with the stenosis of the aorta (StA). The values as median and standard deviation (SD) are expressed in days. *Results:* We had 64 patients with VSD and duration of implementation for verticalisation was 4.97 and SD 1.46, 64 children with ASD with implementation of verticalisation of 4.50 and SD 1.21, 40 children with DAP with duration of implementation of 4.10 and SD 1.61, 25 children with CoA with duration of verticalisation 4.68 and SD 1.75, 34 patients with ToF with duration of verticalisation 7.62 and SD 6.36, 2 children with TGA with implementation of verticalisation of 3.50 and SD 0.71 and 7 patients with StA with duration of verticalisation of 5.57 and SD 1.13. *Conclusions:* Optimal duration of verticalisation is from 3 to 13 days due to type of CHD. Expected duration for VSD, ASD, DAP, CoA, TGA and StA is from 3 to 6 days and for ToF from 7 to 8 days.

**PP001-077**

**CLINICAL ANALYSIS OF CEREBRAL PALSY  
CHILDREN WITH GENERALIZED SPASTIC  
DYSTONIA TREATED WITH BOTULINUM  
TOXIN TYPE A UNDER ELECTROMYOGRAPHY  
GUIDANCE**

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*Departments of <sup>1</sup>Pediatrics, <sup>2</sup>Rehabilitation, <sup>3</sup>Electromyogram, and <sup>4</sup>Anesthesiology, Zhujiang Hospital of Southern Medical University, China*

*Objective:* To study the efficiency of injecting Botulinum Toxin type A on cerebral palsy (CP) children with severe generalized spastic dystonia. *Methods:* 6 CP children with severe generalized spastic dystonia (aged 6–10 years old) who received the treatment of BTX-A intramuscular injection under ketamine-induced sedation after careful clinical assessment and electromyography (EMG) studies were retrospectively reviewed. All of them were initially treated with baclofen, phenobarbital and chloral hydrate and so on, but there were only a limited effect on spastic dystonia. All of them were so irritable that they couldn't receive oral-feed and hard to go to sleep naturally. Decreasing of mus-

cular tension and development of symmetrical posture were prospected. *Results:* The muscular tension began to decrease, and symmetrical posture began develop on the second day after the treatment. Five of them were in good shape one year later combined with comprehensive rehabilitation. The other one without any rehabilitation was not as good as them, but better than before. *Conclusion:* BTX-A intramuscular injection under ketamine-induced sedation after careful clinical assessment and electromyography (EMG) studies can give a significant improvement of symptoms and quality of life to CP children with severe generalized spastic dystonia.

**PP001-078**

**EFFECT OF ELECTRICAL STIMULATION ON  
GAIT OF A CHILD WITH SPASTIC DIPLEGIC  
CEREBRAL PALSY: A CASE REPORT**

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*Objective:* To examine the effects of electrical stimulation (ES) combined with passive stretching on impairments and gait of a 4.2-year-old child with spastic diplegic cerebral palsy (CP). *Methods:* Passive stretching was applied to spastic muscles of low limbs and ES was administered to the plantar-flexors of both legs in 15 min sessions, 20 times for a total period of four weeks. Pre- and post-testing included assessment of dynamic and passive dorsiflexion of the ankle joints which were measured using a goniometer as an angle of possible maximal dorsiflexion with the knee extended and flexed, gait speed was measured by stopwatch (made in china), Spasticity which was graded using the Modified Ashworth Scale, and Gait on videotape which was analyzed by observational gait scale (OGS). *Results:* The child showed an overall improvement in gait quality occurred as reflected by the positive changes in Initial foot contact and Timing of heel rise; however, impairment level results were inconsistent and may not be effective at discerning change in a clinical setting. *Conclusion:* In this study, ES combined with passive stretching may be effective on gait of the subject. Methodological limitations of the study prevent firm conclusions and more subjects and the randomized controlled trials are needed to further document its significance.

**PP001-079**

**THE ROLE OF CADRES ON COMMUNITY-  
BASED REHABILITATION PROGRAM IN WEST  
SUMATRA, INDONESIA**

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*Objective:* The major objectives of Community Based Rehabilitation (CBR) are to ensure that people with disabilities being able to maximize their physical and mental abilities, to access regular services and opportunities in order that they could become active contributors for the community, and to activate community within which the human rights of people with disabilities are promoted and protected through changes, for example, by removing barriers to their participation. *Methods:* Cadres are community members who work as volunteers by giving their time each week to carry out such activities that could assist people with disabilities and their family members. People with disabilities and their family

members can take action as cadres themselves. Data gathered by cadres will be further analyzed by professionals. *Results:* In West Sumatra, the roles of cadres have apparently been significant in bringing CBR programs into success since it was established in 2001 in the concern that cadres has been bridging professionals to people with disabilities and their families. *Conclusion:* Cadres have obviously played an important role in CBR programs in Indonesia.

#### PP001-080

### REFRACTURES AFTER OPERATIVE FIXATION IN SEVERE SPASTIC CEREBRAL PALSY – A CASE REPORT

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*Objective:* Fracture frequently occurs in individuals with severe cerebral palsy because their bones usually have low bone density, deformity such as contracture, and developmental disability. *Case report:* We experienced a 12-year-old spastic cerebral palsy female who sustained recurrent right femur fracture. A first femur fracture occurred when she had been moved passively by mental retarded children in residential care. She underwent internal fixation using plate and screws, but seventeen days after operation, spasticity of legs aggravated and re-fracture happened at the fixation site. She underwent re-operative fixation. She again sustained a fracture at the top of the plate and had to receive a third operation. She was referred to us for scissor-pattern of legs and then we performed obturator nerve block. *Conclusion:* We think that her recurrent fracture might be related with ignored risk factor of re-fracture such as uncontrolled spasticity.

#### PP001-081

### DISTRIBUTION OF STATIC DEFORMITIES OF BONE-ANKLE SYSTEM IN YUSAD STUDY SCHOOL CHILDREN

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*Objective:* Most of static deformities are congenital in origin, but also, acquired due to physical inactivity, non healthy diet and lack of sport activities. If not treated timely, these deformities can cause severe physical limitations in adulthood. Aim of our study was to estimate prevalence of such deformities among school children and to monitor their trends after 5 years. *Methods:* We followed children from YUSAD study for 5 years that were initially screened at 13 Centers in Serbia. First examination was when children had 10 years and second at 15 years of life. For diagnostic tools we used anamnesis, medical examination and imaging techniques. *Results:* In our study we had 4225 children. At age of 10 years we found 5.36% of deformities from what Kypho-lordosis in 0.40%, Scoliosis in 0.73%, foot deformities in 2.51% and other skeletal deformities in 1.71%. At age of 15 years we found 8.76% deformities from what Kypho-lordosis in 1.21%, scoliosis in 1.40%, foot deformities 2.2% and other skeletal deformities in 3.95%. *Conclusions:* From results achieved we can conclude that there was increase in static deformities of bone-ankle system. This data suggest more intensive and effective implementation of preventive measures.

#### PP001-082

### EFFECT OF BOTULINUM TOXIN A INJECTION ON SPASTICITY OF LOWER LIMB IN STANDING BALANCE OF CHILDREN WITH CEREBRAL PALSY

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*Objective:* To investigate the effects of BTX injection on spasticity of lower limb in standing posture and balance control of children with spastic CP. *Methods:* Sixty-seven children with CP were randomly assigned into 2 groups to receive BTX-A injection on spastic muscle of lower limb plus PT, or only PT. PT lasted for 90 min per session, 5 days weekly for 2 weeks every other 3 months. The other period, PT was applied by the caregivers. The standing posture and balance control was assessed with balance performance monitor at the beginning, and at 3<sup>rd</sup> and 6<sup>th</sup> month after treatment. *Results:* When comparing with the results before treatment, the improvement of standing posture and balance control (path length, covered area and sway index) was statistically significant after 3 and 6 months of treatment ( $p < 0.001$ ) during both eyes open and eyes closed trial. Furthermore, the differences of standing posture and balance control (path length, covered area and sway index) between 2 groups at 3 and 6 months examination were also statistically significant during both eyes open and eyes closed trial. *Conclusion:* When compared with the control group, BTX-A injection on the affected lower extremity was more effective in terms of improving standing posture and balance control in children with the spastic CP.

#### PP001-083

### MITOCHONDRIAL RESPIRATORY CHAIN ENZYME COMPLEXES DEFECT IN CHILDREN WITH NEUROLOGICAL ABNORMALITIES

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*Objective:* Mitochondrial cytopathies represent a heterogeneous group of multisystem disorder that preferentially affect the muscle and nervous systems. Mitochondrial respiratory chain enzyme complexes (MRC) defect can be the cause of many unexplained neurological disorders including epilepsy, cerebral palsy, delayed development and hypotonia. In infants, the diagnosis may be very difficult because of atypical clinical presentations. So we characterize clinical and laboratory features for MRC defects for more precise diagnosis. *Method:* We retrospectively reviewed clinical features, brain MRI, MR spectroscopy findings, and muscle biopsy findings of 16 patients who showed defects in MRC activity, confirmed by biochemical assay from spectrophotometry in muscle. *Result:* In clinical features, 6 patients had uncontrolled seizure and 6 patients had developmental regression. In T2-weighted image of brain MRI, 6 patients showed bilateral symmetric high signal intensity at deep nucleus, 4 patients showed bilateral symmetric high signal intensity at white matter and 6 patients showed diffuse brain atrophy. 12 patients showed lactate peak at 1.33ppm in MRS. 9 patients showed abnormal electron microscopic findings of muscle tissues. In light microscopic findings of muscle tissues, 7 patients showed ragged red fiber and 2 patients showed ragged blue fiber. *Conclusion:* In the patients with uncontrolled seizure activity and developmental regression, the mitochondrial cytopathies should be added to the list of differential diagnoses. Characteristic brain MRI findings of



bilateral symmetric high SI at deep nucleus and/or white matter in T2-weighted image and lactate elevation in MRS can be useful in the diagnosis of mitochondrial cytopathies.

**PP001-084**

**STUDY ON RELIABILITY AND UNIDIMENSION OF THE FINE MOTOR FUNCTION MEASURE SCALE FOR CHILDREN WITH CEREBRAL PALSY**

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*Rehabilitation Center of Children's Hospital of Fudan University, China*

*Objective:* To analyze unidimension, internal reliability and external reliability of the Fine Motor Function Measure Scale (FMFM) for Children with Cerebral Palsy. *Methods:* 696 children with cerebral palsy participated in the study. 481 males (69.1%) and 215 females, the average age is 30.0 months (SD 25.9 months). The 86 test items formed FMFM sampling scale. 86 test items of FMFM sampling scale and 696 samples were analyzed by Rasch analysis using the partial credit model. The first 24 samples were included for test-retest reliability study with a interval of 1 to 7 days were analyzed. 49 samples were selected for interscorer reliability analysis. *Results:* After three screenings, among the remained 61 items, the misfit items were 3, less than 5% of all, suggesting that the majority items of this measure were good in unidimension. Correlations between sample ability scores of different items were analyzed and results indicated that FMFM had good test-free person measurement. Correlations between items difficulty values of different samples were also analyzed and results confirmed that FMFM had good sample-free item calibration. FMFM had good test-retest reliability (ICC=0.9893) as well as good interscorer reliability (ICC=0.9961). *Conclusions:* FMFM had excellent unidimension, internal reliability and external reliability, which would lay good foundation for future usage of FMFM.

**PP001-085**

**CORRELATIONS BETWEEN GROSS MOTOR AND FINE MOTOR FUNCTION IN CHILDREN WITH SPASTIC CEREBRAL PALSY UNDER 3 YEARS OLD**

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*Objectives:* The aim of this study was to compare the correlation between gross motor and fine motor function in children with spastic cerebral palsy (CP) under 3 years old. *Methods:* Two hundred and forty-eight children with spastic CP (179 male, 69 female; mean age 18 months, SD 9.1 months, age range 2 to 36 months) were included as participants. Motor assessments were carried out using Gross motor function measure (GMFM) and Peabody developmental motor scale-fine motor (PDMS-FM) at the same time. *Results:* Various levels of correlations ( $r=0.29-0.89, p<0.01$ ) have been found between GMFM scores and PDMS-FM scores across age and type of children with CP. *Conclusions:* There existed strong correlation between gross motor and fine motor function development in children with spastic CP under 3 years old. The combination of gross motor and fine motor treatment should be emphasized in very young CP children across age and type. Fine motor training must combine with gross motor training when treating children with CP across age and anatomical distribution.

**PP001-086**

**MRI ON ACUTE AND CHRONIC BILIRUBIN ENCEPHALOPATHY**

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*Objective:* The study was conducted to find out whether there are characteristic MRI features of acute and chronic bilirubin encephalopathy. *Methods:* MRI was performed in 9 infants with chronic bilirubin encephalopathy and 9 neonates with acute bilirubin encephalopathy. All subjects experienced neonatal indirect hyperbilirubinemia as the result of ABO incompatibility or glucose-6-phosphate dehydrogenase deficiency in the neonatal period. *Results:* In 9 infants with chronic bilirubin who have been described as athetotic cerebral palsy, T2-weighted images showed symmetrical high intensity signals in the the globus pallidus bilaterally. In 6 of 9 neonates with acute hyperbilirubinaemia, T1-weighted images showed symmetrical high intensity signal in the the globus pallidus bilaterally. Five of six neonates showing T1-weighted hyperintense globus pallidus lesions had normal neurological development and one has been described as athetotic cerebral palsy. *Conclusion:* The bilateral increase in high intensity signals in the globus pallidus on T2-weighted images were the characteristic finding of chronic bilirubin encephalopathy and the finding can predict poor outcome of these children. While the bilateral increase in high intensity signals in the globus pallidus on T1-weighted images may be the characteristic finding of acute bilirubin encephalopathy, it cannot predict the outcome of acute bilirubin encephalopathy.

**PP001-087**

**RECOGNIZATION ON REHABILITATION NURSING OF CEREBRAL PALSY CHILDREN**

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*Objective:* To investigate the significant value of rehabilitation nursing or cerebral palsy children and explore the role played in rehabilitation. *Methods:* The cause of disease and the data collected by rehabilitation nursing were analysed retrospectively on forty cerebral palsy children, who were treated in our department. *Results:* Among these sick children, thirty of them were affected with walking abnormal (75%), eight with the functional abnormal of upper limbs (22%) and 2 with serious logopathy (5%). It showed that the quality of life of the sick children by rehabilitation treatment and nursing was enhanced in accordance with their special characteristics. *Conclusion:* Early diagnosis and early rehabilitation treatment and nursing can decrease the rate of "hider", and improve the quality of life and relieve the burden of families.

**PP001-088**

**THE MULTIPLE FACTOR CORRELATED STUDY OF THE TREATMENT OF SPASTIC CEREBRAL PALSY**

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*Objective:* To investigate the relationship between the optimal dose of BTX-A and the spasticity of cerebral palsy. *Methods:*



From June 2003 to December 2004, 39 children with CP was treated by BTX-A to release the spasticity in our hospital. Among these children, 23 children of CP (male 15, female 8, mean age  $60.7 \pm 26.9$  months, range 33 to 145 months) had good therapeutic effect. BTX-A was made by Lanzhou Institute of Biological Products. The equipments used included nerve block insulated needles which were made in Japan, injection syringe, electric paste, surface electrode, wire, and stimulator. According to the muscles and nerves anatomical position, the cathode of the stimulator was pasted by adhesive plaster in the antagonist's skin. The insulated needle was connected with the anode of the stimulator and punctured the skin through the nerve block sign. The needle was adjusted until the muscle can contract with the least intensity of current and then medicine was injected. *Results:* There is no correlation between the optimal unit dose of BTX-A and the sex, age, body weight, diagnosis type, GMFCS level, etiological factor and the injections. There is linear positive correlation between the optimal unit dose of BTX-A and the Modified Ashworth Scale. *Conclusion:* The initial formula of the optimal dose: dose =  $(1 + \text{coefficient} \times \text{MAS}) \times \text{body weight}$ .

#### PP001-089

### TREATMENT OF CEREBRAL PALSY CHILDREN WITH A COMBINED METHOD BASED ON TRADITIONAL CHINESE MEDICINE-MASSAGE AND CONDUCTIVE EDUCATION: RANDOMIZED CONTROLLED STUDY

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*Objective:* To observe and evaluate a method that is effective and practical for treatment of cerebral palsy (CP) children in China. *Method:* 119 cerebral palsy children aged between 3 and 14 years old were randomly chosen and divided into two groups. One group was treated with conductive education. Meanwhile the other group by a new CP treatment model created that combined traditional Chinese medicine-massage and conductive education. The results were compared and studied after 1-year follow-up. *Results:* The majority of CP patients improved greatly in motor capacities after treatment. There are significant differences in the effective rate between the simple conductive education group (67%) and comprehensive treatment group (85%) ( $p < 0.05$ ). No significant difference in the ratio of development quotient (DQ) to intelligence quotient (IQ) was observed between the two groups ( $p > 0.05$ ). *Conclusion:* This combined therapy method, based on traditional Chinese medicine and conductive education, is an effective and practical treatment strategy for CP children, but it has insignificant effect on DO/IQ of CP children.

#### PP001-090

### PHYSICAL EXERCISE ENHANCES LEARNING ABILITY OF DEVELOPMENTAL SEIZURE-INDUCED COGNITIVE DEFICIT OF RATS AND RELATED GENE EXPRESSIONS

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*Objective:* To explore the long-term effects of penicillin-induced developmental seizures and physical exercise on learning, memory and the expression of zinc transporter 1 (ZnT1) and CaMKII in

hippocampus. *Methods:* The authors assigned six rats for each group: the control group (CONT1), the control plus exercise group (CONT2), the seizure group (EXP1) and the seizure plus exercise group (EXP2). At P39–P43, P61–P64, Morris water-maze test were performed. At P49–P54, the CONT2 and EXP2 groups were submitted to an aerobic exercise program. RT-PCR method was used to detect the expression of ZnT1, ZnT3 and CaMK II mRNA in hippocampus. *Results:* In the first Morris water-maze test, the escape latency in d2 was much longer than that in controls. The memory analysis showed that the scores were much worse in the two seizure groups than that in controls in the first maze test. However, the score was much worse only in the EXP1 group (but not in the EXP2) than that in controls in the second maze test. RT-PCR results showed that the expression of ZnT1 was much lower in EXP1 than that in other three groups; meanwhile, the expression of CaMK II was significantly higher in EXP1 than that in CONT1 and CONT2. *Conclusions:* Recurrent developmental seizures caused long-term effects on learning and memory, which may be associated with the down-regulated ZnT1 expression and elevated CaMK II mRNA in hippocampus. Physical exercise could improve learning but not memory capacity of seizure group, which may be associated with the up-regulated ZnT1 expression in hippocampus.

#### PP001-091

### EARLY INTERVENTION FOR COGNITIVE DISORDER OF CHILDREN WITH BRAIN DAMAGE

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*Objective:* To evaluate that the early intervention for cognitive disorder could potentially improve the damaged brain and increase the rehabilitation effect through an analysis of the effect of the early intervention for child with brain damage and cognitive disorder. *Method:* The corrective therapy provided for cognitive disorder was based on the characteristics of child physical growth and mental development: 1) NDT, 2) Perceptive development therapy, 3) Perceptive game training, 4) Cognitive education intervention, 5) Ability of daily life (ADL) training, etc. *Results:* Among 212 children treated with early intervention, all of them showed obvious increase in DQ, IQ test by 30–60 after treatment, 80% of them got the basic independent living ability, more than 90% of them could be admitted to the ordinary kindergarten or primary school and some of them had the same learning ability as other healthy ones, which laid a good foundation for their education. *Conclusion:* If we pay attention to the early growth and application of comprehensive technology, the integration of rehabilitation and special education can promote the harmonious application of the brain and maximize the potential for the child to re-integrate with the community with optimal development.

#### PP001-092

### LOGOPEDIA FOR THE CHILD WITH CEREBRAL PALSY

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*Objective:* To discuss the logopedia for the child with cerebral palsy. *Method:* 1) Medical diagnosis and treatment, 2) Speech Therapy (2.1 Postural control training; 2.2 Dysarthria training;

2.3 Cervical muscle training), 3) Respiration and vocalization training (3.1 Initial vocalization training; 3.2 Auditory memory and auditory recognition training; 3.3 Mimic vocalization- active vocalization training), 4) Language understanding training, 5) Central aphasic training (5.1 Traditional Chinese scalp acupuncture therapy; 5.2 Intervention for cognitive education; 5.3 Application of auxiliary language and communication system). *Results:* Among 110 children treated, about 80% of them acquired the language ability after the comprehensive intervention in the development of feeding, swallowing, chewing, oral cavity movement, vocalization, language understanding and communication, etc. *Discussion:* 75% of the children with cerebral palsy suffer from the disorder of language communication. Early intervention with physiotherapy, medical treatment, special education, psychology, engineering and social practice makes it possible for the children to improve the ability of vocabulary use and language communication in their actual life. Combining the teaching of cognition and language communication with medical training, guided by the need for communication in actual life and aiming on survival education, is effective therapy for functional communication for the child with cerebral palsy.

#### PP001-093

##### EFFECT OF THAI MASSAGE ON BEHAVIOR IN AUTISTIC CHILDREN

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*Objective:* To assess the effect of Thai massage on major behavior disturbances in Thai Autistic children. *Method:* Experimental controlled study of autistic patients, aged 3–10 were recruited. All were assessed with the Conners' Parent Questionnaire, Conners' Teacher Questionnaire and Sleep Diary. They were divided into 2 groups by using blocked randomization. The control group received standard sensory stimulation and behavior development program for duration of 8 weeks. The experimental group received Thai massage treatment in addition to standard program for duration of 8 weeks. Both groups were re-assessed at the end of the 8<sup>th</sup> week. The results were analyzed with standard statistical methodology. *Results:* Thirty autistic children: 19 boys and 11 girls mean aged 5.00 to 1.94 year were enrolled. Each group had fifteen children. The demographic and baseline data were not statistical different. In the experimental group, the mean scores of all items in Conners' Parent Questionnaire at the end of the 8th week were not different significantly and also control group except for impulsivity-hyperactivity. Contrary, the mean scores of all items in Conners' Teacher Questionnaire and sleep diary were significantly improved in both groups. When compared among groups, the mean different scores of Conners' Parent Questionnaire, Conners' Teacher Questionnaire and sleep diary did not differ significantly. However the experimental group had higher mean different scores of anxiety and inattention-passivity items than control group. *Conclusion:* The combination of Thai massage and developmental stimulation program might have a beneficial effect on anxiety and inattention-passivity behavior in autistic children.

#### PP001-094

##### EVALUATION OF SENSORY AND MOTOR PERIPHERAL NERVE AFFECTION IN CHILDREN WITH DIABETES MELLITUS TYPE II

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*Objective:* Patients with Diabetes Mellitus (DM) type II usually suffer from polyneuropathy. Aim was to evaluate changes on peripheral nervous system by describing them with results of electrodiagnostics tools. *Method:* We had 28 patients with diabetes type II age 10–18 years treated at University children's Hospital in Belgrade during 2003–2007. Two groups were evaluated due to presence of clinical manifestations that included pain in legs and sensibility changes: group without ( $n=12$ ) and group with neurological manifestations ( $n=16$ ). Motor Conductive Velocity (MCV) for peroneal and tibial nerve, Sensory Conductive Velocity (SCV) for sural nerve and Electromyography (EMG) of small muscles of foot were investigated. *Results:* In first group SCV for sural nerve was moderately reduced with prolonged terminal latencies, while we found descreet changes for MCV for tibial and peroneal nerve. EMG showed action potentials with normal characteristics with occasional higher amplitudes without track reduction. In second group SCV for sural nerve showed significantly prolonged terminal latencies as well as MCV for tibial and peroneal nerve. EMG findings had predominantly neuropathic potentials with high amplitudes and prolonged conduction with highly significant track reduction. *Conclusion:* Children with present sensory manifestations are severely affected both with nerves and muscles but with greater severity of sural nerve and evaluated small muscles of foot. This indicates importance of early detection of children with high risk for DM type II to avoid further development of neuromuscular pathology.

#### PP001-095

##### THE EFFECT OF UNILATERAL OSTEOARTHRITIS ON THE BONE MASS DENSITY OF THE AFFECTED HIP

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*Objectives:* Bone mass density (BMD) examination of the hip is one of the most important measurements to assess osteoporosis in rehabilitation. But the BMD of the hips may be affected by co-arthritis. This study is to detect the effect of osteoarthritis on the BMD of the affected hip in patients with unilateral co-arthritis. *Method:* Forty-one patients who had been final diagnosed as unilateral osteoarthritis received the examining of BMD of bilateral hips by dual energy X-ray absorptiometry. The results were analyzed through statistics as the following: contrasting the deference between the two side mean BMD, and the two side BMD of neck, *Results:* The statistical results show that there are statistical significance difference between the unaffected side and the OA side in mean BMD of hip ( $\alpha=0.05$ ,  $p=0.02$ ). The BMD of neck area of the affected side is higher than the unaffected side, and there was statistical significance in the difference=0.002. The BMD of the Ward area and the G.T. area were higher than the unaffected side, but there were no statistical significance ( $p<0.05$ ). *Conclusion:* Osteoarthritis may increase the local BMD of the hip. The area of neck may be the most sensitive area.

PP001-096

**ASSESSMENT OF ORAL HEALTH CARE AT TONAMI GENERAL HOSPITAL*****Shinya Yura<sup>1</sup>, Yuri Izumiyama<sup>1</sup>, Kenji Kagechika<sup>2</sup>****<sup>1</sup>Oral and Maxillofacial Surgery, and <sup>2</sup>Rehabilitation, Tonami General Hospital, Tonami, Japan*

**Objectives:** We describe the medical team approach and assessment of oral health care at Tonami General Hospital. **Patients:** Three hundred and sixty inpatients who examined intra-oral conditions and general physical conditions with the oral health care assessment participated in this study. **Methods:** With respect to intra-oral conditions, we examined value of oral cleaning, salivary wetness, furred tongue and oral malodor. The oral condition was evaluated with a total grade (4–16) of these four items. To study the factors related to the oral condition, the patients were examined presence of denture, sex, age, coma levels, eating situations, breathing situations and bedridden situations. **Results:** The patients with a poor oral condition (more than 8 in total) were found in 16 cases (4.4%). A significant relation was found between the oral condition and coma levels. **Conclusion:** These results indicate that active intervention of oral health care is necessary for patients with coma especially. Understanding of these results may be useful for the work of inexperienced or busy ward nurses.

PP001-097

**RANDOMIZED DOUBLE-BLIND PLACEBO CONTROLLED TRIAL ASSESSING EFFECT OF ORAL CANNABINOID NABILONE ON PAIN CONTROL IN FIBROMYALGIA PATIENTS*****Lena Galimova, Ryan Skrabek****Physical Medicine and Rehabilitation Program of University of Manitoba, Health Sciences Centre, Canada*

**Objective:** The objective of this study is to determine the benefit of Nabilone in pain management and improvement of quality of life in patients with fibromyalgia. **Method:** A randomized, double-blind, placebo-controlled trial was conducted with 40 fibromyalgia patients. After a baseline assessment, the treatment group was titrated up on Nabilone, from 0.5 mg PO at bedtime to 1 mg BID over 4 weeks. At the 2 and 4 week visits, the primary outcome measures, visual analogue scale (VAS) for pain, the number of tender points, the average tender point pain threshold, and the Fibromyalgia Impact Questionnaire (FIQ) were evaluated. Patients in the control group received a placebo. Following a 4-week washout period, patients returned for a reassessment of the primary outcome measures. **Result:** An interim analysis of the first 33 patients, reveals a significant decrease in the VAS (mean difference 2.025,  $p < 0.025$ ), improvement in function on the FIQ (mean difference 12.99,  $p < 0.02$ ), and decrease in anxiety (mean difference 1.96,  $p < 0.02$ ), in the Nabilone group at 4 weeks, without a significant increase in side effects. **Conclusion:** Nabilone appears to be a reasonable, well tolerated, treatment option in patients with fibromyalgia, with significant benefits in pain relief and improved function.

PP001-098

**CURRENT SITUATION OF MECHANISM AND TREATMENT CAUSING THE DELAYED ON-SET MUSCLE SORENESS*****Wei Wang, Xun-dong Gul****Rehabilitation Medicine Center of Jiaxing Second Hospital, China*

**Objective:** Delayed onset muscle soreness (DOMS) is seen as a synthetic effect that involves in different systems of the whole

body at various levels. The research on delayed onset muscle soreness has passed 100 years, but the pathology and mechanism of DOMS has not been fully understood, and there is not any efficient therapeutics either. **Methods:** Through the summary, analysis and synthesis of the domestic and international relevant documents. **Results:** The article discussed extensively the potential mechanism, prevention and treatment of DOMS in sports, in order to provide theoretic basis for sports training and interrelated sports practice study by writer. **Conclusion:** Personal views and experience on DOMS.

PP001-099

**THE EXPRESSION OF LEFTY IN ADULT NORMAL SKIN, HUMAN FETAL SKIN AND HYPERTROPHIC SCAR*****Xiaowei Li, Deying Chen****Department of Physical Medicine and Rehabilitation, Southwest Hospital, China*

**Objective:** To study the role of lefty in the hypertrophic scarring and fetal scarless wound healing by observing the expression of lefty in the adult normal skin (NS), human fetal skin (FS) and hypertrophic scar (HS). **Method:** The expression of the lefty in NS, FS and HS was semi-determined by immunofluorescence. The number of positive cell is counted and the result was analyzed by SPSS 11.0. **Result:** The expression of lefty is obviously higher in the FS and NS than that in HS ( $p < 0.01$ ), and the one in FS is higher than that in NS ( $p < 0.05$ ). **Conclusion:** The result suggests lefty may inhibit the formation of HS and the high expression may be related to the fetal scarless wound healing. This provides us a new possibility to prevent and cure HS. But the mechanism needs further study.

PP001-100

**HYPERSENSITIVITY OF MUSCLE AFFERENTS AT LATENT MYOFASCIAL TRIGGER POINTS*****Lian-Tao Li<sup>1</sup>, Hong-You Ge<sup>2</sup>, Shou-Wei Yue<sup>1</sup>, Lars Arendt-Nielsen<sup>2</sup>****<sup>1</sup>Shandong University, China, and <sup>2</sup>Aalborg University, Aalborg, Denmark*

**Objective:** The purpose of the study was to assess the nociceptor and non-nociceptor sensitivity at latent myofascial trigger points (MTrPs). **Methods:** Eleven healthy volunteers participated in this study, which consisted of three sessions of electromyography-guided intramuscular injection with a week-interval in between. In each session, a bolus of either hypertonic saline (6%, 0.1 ml, each) or glutamate (0.1 ml, 0.5M, each) or isotonic saline (0.9%, 0.1 ml, each) was randomly injected, respectively, into a latent MTrP and a non-MTrP located in the right or left gastrocnemius medialis muscle with a 20 minute-interval between the two injections. Following each injection, subjects were asked to rate the perceived pain intensity on an electronic visual analogue scale (VAS). Maximal pain intensity (VASpeak), the area under the curve (VASauc), and local and referred pain areas were extracted. **Results:** Hypertonic saline, glutamate and isotonic saline into the latent MTrPs induced a higher VASpeak and larger VASauc than the non-MTrP (All,  $p < 0.05$ ). Furthermore, those MTrPs with referred pain following injections were found to show higher VASpeak and larger VASauc than those without referred pain (both,  $p < 0.001$ ). **Conclusion:** There exists hypersensitivity of both nociceptors and non-nociceptors at latent MTrPs and the occurrence of referred muscle pain is associated with higher sensitivity of nociceptive muscle afferents at latent MTrPs.



## PP001-101

**EFFECT OF SCALP ACUPUNCTURE (SA) AND MOTOR RELEARNING PROGRAM (MRP) THERAPY ON MOTOR FUNCTION OF STROKE****Jian-ming Fu, Xu-dong Gu, Jia-yu Wang, Yunhai Yao, Min Gu, Yun Ren, Han-kui Yin, Liang Li***Rehabilitation Medicine Center, Jiaxing Second Hospital, China*

**Objective:** To observe the effect of scalp acupuncture (SA) and motor relearning program (MRP) therapy on motor function of stroke patients. **Methods:** 86 patients of stroke with motor dysfunction were randomly divided into treatment group ( $n=43$ ) and control group ( $n=43$ ). The patients in the treatment group were treated with scalp acupuncture (SA) and motor relearning program (MRP) therapy. The cases of the control group were treated with motor relearning program (MRP) therapy and common exercise. All patients were evaluated with Barthel Index (BI) and Fugl-Meyer Assessment (FMA) before and after treatment. **Result:** After 2 months treatment, the scores of BI and FMA of the patients in the treatment group and the control group were better than before treatment ( $<0.05$ ). The scores of BI and FMA of the patients in the treatment group were also superior to the control group ( $p<0.01$ ). **Conclusion:** Scalp acupuncture and motor relearning program (MRP) therapy can efficiently promote the recovery of motor function and ADL.

## PP001-102

**TRACTION AND POINT INJECTION ON PROLAPSE OF LUMBAR INTERVERTEBRA DISC****Jian-ming Fu, Xu-dong Gu, Yunhai Yao, Xiongwei Zhang***Rehabilitation Medicine Center, Jiaxing Second Hospital, China*

**Objective:** To observe the curative effect of lumbar traction and huantiao point injection on crura pain of prolapse of lumbar intervertebra disc. **Methods:** 86 cases with crura pain of prolapse of lumbar intervertebra disc were randomly divided into treatment group and control group. The patients in the treatment group were treated by huantiao point injection and lumbar traction and the control group was treated by lumbar traction only. **Result:** The recovery rate (88.4%) in the treatment group were higher than that of control group (58.1%) ( $p<0.01$ ) after 3 weeks. **Conclusion:** Lumbar traction and huantiao point injection on crura pain of prolapse of lumbar intervertebra disc superior to lumbar traction only.

## PP001-103

**A HOSPITAL-BASED SURVEY OF MILD ROAD TRAFFIC INJURY CASES IN THAILAND****Wutichai Permsirivanich<sup>1</sup>, Daranee Suvapan<sup>2</sup>***<sup>1</sup>Department of Orthopaedic Surgery and Rehabilitation, Faculty of Medicine, Prince of Songkla University, <sup>2</sup>The Sirindhorn National Medical Rehabilitation Center, Thailand*

**Objectives:** To study patterns of road traffic injuries in Thailand and to analyze the leading causes of referral to an emergency room in cases of mild injury. **Methods:** The prospective data were derived from eight hospitals in the Injury Surveillance Hospital Network, between Dec 2005 and Jun 2006. All demographic and injury data were recorded using a clinical record form which was developed by the Sirindhorn National Medical Rehabilitation Center. **Results:** A total of 14,698 road traffic victims were referred to one of the participating ERs during the study period. Of those, 53.5% were in the age group 15 to 29 years, 63.5% were male, 48.8% worked as laborers, 83.7% had had a motorcycle accident, 69.6% of the

motorcycle accident victims had not been wearing a helmet, 86.1% of the car accident victims had not been wearing a seatbelt, 19.7% had been consuming alcohol, 29.7% of the accidents had occurred in the evening (5–9 pm), the most common injury was an open wound at a lower limb (24.8%), followed by injury of the lower limb (23.3%) and injury of the head (19.1%), and 2.8% of the cases were hospitalized. **Conclusions:** This study demonstrated that the burden of injury among Thai people and injuries exist in every form and affect every age group and gender.

## PP001-104

**AMBULATORY LEFT VENTRICULAR ASSIST DEVICES: OUTCOMES OF AN INPATIENT REHABILITATION PROGRAM****Malcolm Bowman, Kathryn Brooke, Steven Faux, Clive Sun, Steven Wilson***Department of Rehabilitation Medicine, Sacred Heart Rehabilitation Unit, St Vincents Hospital, Australia*

**Objectives:** The past decade has seen the development of implantable left ventricular assist devices (LVAD) as a management option for end stage heart failure. LVAD therapy improves cardiac output and exercise capacity, and may be used as bridging therapy (whilst awaiting heart transplantation) or as destination therapy (to prolong life for end stage disease). There is a paucity of information regarding the role of multidisciplinary rehabilitation for this condition. **Methods:** A retrospective audit of data from consecutive admissions to the Sacred Heart Rehabilitation Unit between 2004 and 2007 following insertion of LVAD. **Results:** A total of 9 patients were admitted for rehabilitation. Mean admission Functional Independence Measure (FIM) was 91, and mean discharge FIM was 100. Complications included embolic stroke, arrhythmia, cardiac failure, and infection. Improvements in exercise parameters were achieved. **Conclusions:** The main role of rehabilitation following LVAD insertion is for those patients with severe debility and for neurological complications. Rehabilitation improves physical function, but precise guidelines for exercise training are yet to be determined. The LVAD is a complex device and medical complication rates are relatively high.

## PP001-105

**INPATIENT REHABILITATION FOLLOWING CARDIO-PULMONARY TRANSPLANTATION****Malcolm Bowman, Kathryn Brooke, Steven Faux, Clive Sun, Stephen Wilson***Department of Rehabilitation Medicine, Sacred Heart Rehabilitation Unit, St Vincents Hospital, Australia*

**Objectives:** Organ transplantation is now a realistic management option for patients with end stage cardiac or pulmonary disease, with five-year survival rates of greater than 70%. Physical therapy and multidisciplinary rehabilitation is now an integral part of the management. The purpose of this paper is to provide an overview of the rehabilitation management following heart and lung transplantation, and to provide outcomes of an inpatient rehabilitation programme. **Methods:** A retrospective audit of data for all cardio-pulmonary transplant patients admitted to the Sacred Heart Rehabilitation Unit between 2002 and 2007. **Results:** A total of 69 patients underwent inpatient rehabilitation. These included 23 heart, 30 bilateral lung, 12 single lung and 4 combined heart/lung transplants. Mean admission Independence Measure Functional (FIM) was 92, and the mean discharge FIM was 102. Interruptions to the rehabilitation programs occurred for 33% of patients, mainly due to graft rejection or sepsis. **Conclusions:** The rehabilitation of



the cardio-pulmonary transplant recipient can be complicated by factors including graft rejection, opportunistic infection, neurological complications, deconditioning, psychosocial issues and the effects of chronic disease. Transplant recipients require complex immunosuppressive medication regimes, with complications including proximal muscle wasting, neuropathy and tremor. Cardiac transplant recipients have additional limiting factors including autonomic denervation, diastolic dysfunction, and vasculopathy. This paper demonstrates the benefits of inpatient rehabilitation, and the complex management issues for this condition.

#### PP001-106

### TO OBSERVE THE EFFECT OF ELECTRICAL STIMULATION TO CEREBELLAR FASTIGIAL NUCLEUS ON POST-STROKE INSOMNIA

**Liang Li**

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**Objective:** To observe the effect of electrical stimulation to cerebellar fastigial nucleus on post-stroke insomnia. **Methods:** 56 insomnia patients were randomly divided into the treatment group ( $n=28$ ) and control group ( $n=28$ ). All patients were treated with routine therapy. Patients in the treatment group were also given electrical stimulation to cerebellar fastigial nucleus. Assessment was done after 30 days treatment. **Results:** The effect rate was 84% in treatment group and 58% in control group, which showed a significant difference between two groups ( $p<0.05$ ). **Conclusion:** Electrical stimulation to cerebellar fastigial nucleus on post-stroke insomnia was effective, safe and easy to operate.

#### PP001-107

### WILLINGNESS OF NURSING HOME RESIDENTS WITH COMPETENT COGNITION TO RECEIVE REHABILITATION PROGRAM

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**Objective:** This study was designed to find out the willingness of the acceptance of rehabilitation therapy of the cognitively competent nursing-home residents, and the analysis of its associative factors. **Methods:** Samples of this study were taken from two large nursing homes in Taiwan. Eighty subjects, with a score above 13 in the Mini Mental State Examination (MMSE), were recruited for the collection of data in a set of constructive questionnaires, which included information about individual characteristics, involved diseases, functional status, social and psychological factors, comprehension and experience of rehabilitation. Data were collected through reviews of nursing home records, face-to-face interviews with trained research assistants, and functional assessments by senior staff in the nursing homes. **Results:** Fifty-three (66.2%) residents expressed their willingness to accept rehabilitation in the nursing home. Sixty-one residents (76%) had previous experience in rehabilitation; however, they still had inadequate comprehension of rehabilitation. It was also found that the nursing-home residents who expressed high willingness to accept the rehabilitation program were those who had a short length of stay in the nursing home, early immigrants, persons with confidence in recovery, or had previous experience and confidence in rehabilitation. **Conclusions:** The enhancement of the

nursing-home residents' willingness to receive rehabilitation therapy for functional improvement is an important issue.

#### PP001-108

### THE EFFICACY OF PULMONARY REHABILITATION PROGRAM FOR PATIENTS WITH NSCLC AFTER SINGLE LOBE RESECTION OF THE LUNG

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**Objective:** To study the efficacy of pulmonary rehabilitation program (PRP) for patients with non-small cell lung cancer (NSCLC) after single lobe resection of the lung. **Methods:** Sixteen patients with NSCLC were taken into the case group receiving the 3-week PRP after single lobe resection of the lung. Another 20 patients who had the similar clinicopathological characteristics were taken as controls after the similar operations. **Results:** Although there were no statistical difference between the two groups for all the functional parameters before operations, the differences of FVC (2.21 l versus 1.77 l,  $p<0.05$ ), FEV1 (1.75 l versus 1.43 l,  $p<0.05$ ), MVV (91.2 l versus 82.4 l,  $p<0.05$ ), and the 6WMD (380.8 m versus 302.1 m;  $p<0.01$ ) 3 weeks later after operations were significant between the two groups. **Conclusions:** The postoperative 3-week PRP will improve the respiratory function and exercise endurance significantly in NSCLC patients after receiving single lobe resection.

#### PP001-109

### EARLY DIAGNOSTICS AND TREATMENT OF CHILDREN WITH OBSTETRICAL BRACHIAL PLEXUS LESION

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**Objectives:** Diagnostics of Obstetrical Brachial Plexus (OBP) lesion is founded by clinical, electroneurophysiological and imaging evaluation. Rehabilitation program includes Physical therapy with continuous monitoring. Aim of early diagnostics and rehabilitation is maximal functional recovery of paralytic muscle of affected extremity. **Methods:** During 2000–2007 period we evaluated 194 children. Functional status, electromyography (EMG) and somatosensory evoked potentials (SEP) were used to evaluate severity and level of lesion. **Results:** Reinervational onset in EMG and SEP findings within 3 months of lesion, pointed neuropraxic lesion with good prognosis. Denervational potentials after that period suggested poor prognosis pointing neurotmesis. **Conclusion:** Recovery of these patients depends on severity of lesion and adequate rehabilitation. Importance of early diagnostics and therapy is prevention of sequelae due to decreased function of affected extremity.

#### PP001-110

### THE INFLUENCE OF DIFFERENT PHYSICAL FACTORS ON THE TRANSCUTANEOUS ABSORPTION OF MESACONITINE IN VITRO

**Cuiping Yin, Shouwei Yue**

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**Objective:** To compare the acceleration effect of three physical factors in mesaconitine percutaneous absorption. **Methods:** Using high performance liquid chromatography (HPLC) method to establish

the standard curve of peak area (Y) and content (X,  $\mu\text{g}$ ). Adult rats were randomly divided into 4 groups ( $n=7$ ). One group was for free percutaneous absorption, the others were intervened with different facilitative physical factors: ultrasound, pulse current and direct current. Skins were harvested from the back of anaesthetic rats. The samples were obtained from receiving solution after treatment of 10 min, 20 min, 30 min, 40 min, 50 min, separately. Detecting the content of mesaconitine, and calculate Q (accumulative permeation quantity) at each correspond time. We obtained the J (percutaneous speed) from the Q-t curve and compared them in each group. **Results:** The percutaneous speeds J of free absorption group, ultrasound group, pulse current group and direct current group were 4.168, 6.111, 12.268, 12.623  $\mu\text{g}/\text{cm}^2/\text{min}$ , respectively. There was no significantly statistical differences of J between free group and ultrasound group ( $p>0.05$ ). Comparing the pulse current group and free group, the direct current group and free group, all have statistical differences ( $p<0.05$ ). There are no statistical differences of J between the pulse current group and direct current group ( $p>0.05$ ). **Conclusion:** Phonopresis has little effect on the absorption of mesaconitine. Direct current and pulse current can promote the transcutaneous absorption of mesaconitine.

#### PP001-111

### OUTCOMES IN PATIENTS AGED 90 YEARS AND OLDER WITH HIP FRACTURES

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**Objective:** To study the functional outcomes after hip fracture in those aged 90 years and older (old elderly) compared to the young elderly (aged 65-89 years). **Methods:** A retrospective medical records review was undertaken of all patients aged 65 years and older with minimal trauma hip fractures admitted to Hornsby Ku-ring-gai Hospital (Australia) in July 2003 to December 2005. **Results:** Of the 331 patients identified, 92 (28%) were aged 90 years and older (mean age 86 years). The old elderly were more likely to be female (90% vs. 75%,  $p=0.002$ ), have a higher prevalence of cognitive impairment (71% vs. 58%,  $p=0.043$ ) and less likely to be still living in the community pre-fracture (32% vs. 53%,  $p<0.001$ ). The old elderly are just as likely to survive the acute admission (92.3% vs. 94.6%,  $p=0.276$ ) and to be offered inpatient rehabilitation (51% vs. 58%,  $p=0.215$ ). Age did not affect the length of stay in the acute ward (mean of 12 days) or the rehabilitation phase (mean of 28 days). However, the old elderly are much less likely to achieve independent mobility on hospital discharge (30% vs. 45%,  $p=0.024$ ). For those who received multidisciplinary rehabilitation, the old elderly are less likely to return to pre-fracture living status (42% vs. 60%,  $p=0.02$ ).

#### PP001-112

### THE ROLE OF COMPUTERIZED INFRARED IMAGING AS AN OBJECTIVE ASSESSMENT TOOL IN DIAGNOSING CHRONIC PAIN

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**Objectives:** To assess the role of computerized infrared imaging in diagnosing persisting chronic pain. **Methods:** Two patients presenting with persisting chronic pain over two years. They had been treated with several therapeutic interventions (medications, therapy) with no significant clinical improvement. Computerized Infrared

Imaging (CII) was performed on each patient to rule out Spinal Segmental Sensitization. **Results:** Data from CII revealed significant heat asymmetry, (greater than 1.0°C in the affected segment compared to the contralateral one), in each patient. This was helpful in making the diagnosis of Spinal Segmental Sensitization in each case. The findings on CII were helpful in guiding further management decision in this group of patients who were not responding to treatment. CII is a sensitive, non-invasive test that objectively documents cutaneous temperature patterns which reflect the underlying physiological state of the sympathetic nervous system. Pain fibers are closed associated with sympathetic nervous system fibers. **Conclusions:** CII is a potentially valuable objective tool in the evaluation of patients with persisting pain and suspected Spinal Segmental Sensitization who are not responding to treatment.

#### PP001-113

### EVALUATION BASED ON LOW-FREQUENCY IMPULSE ELECTROTHERAPY FOR RECONSTRUCT OF UPPER-LIMB'S FUNCTION AFTER STROKE

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**Objectives:** Low-frequency impulse electrotherapy was applied to improve the function of upper-limbs after stroke. Surface EMG and traditional scales evaluated the function of upper-limb before and after treatment respectively, observing low-frequency electrical stimulation on the reconstruction of the function of upper-limb after impairment of central nervous system. To study the correlation between surface EMG and traditional scales. **Methods:** We recruited 20 hemiparetic patients (Lovett's Muscle strength classification 0-2) 2 weeks to 2 months after stroke into 5 groups randomly. Comparing standard rehabilitation treatment with standard treatment plus low-frequency impulse electrotherapy (1 time 30 min daily for 50 days) that was designed by Orthogonal test which includes L4(23). Upper-limb disability was assessed by the surface EMG, Fugel-Meyer Functional evaluation scale, CSS scale, Barthel ADL scale respectively. The eigenvalues of surface EMG were extracted into progressing. **Results:** The eigenvalue of surface EMG and score of traditional scales after every patient's treatment were significantly greater than that of pre-treatment. The eigenvalue of surface EMG and the score of traditional scales had some relevance to pulse shape, pulse frequency, electrodes placed site by orthogonal test. The optimal result was from intermittent wave, 50Hz, movement point. **Conclusion:** Low-frequency impulse electrotherapy can improve the function of patients with hemiparetic limbs as standard rehabilitation treatment does. Compared with traditional scales, surface EMG signal can evaluate varied muscles movements, function of nerves and muscles accurately and quantitatively.

#### PP001-114

### EFFECTS OF INTERMITTENT PNEUMATIC COMPRESSION ON BLOOD PRESSURE

**Zhao Ma**

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**Objective:** To research the effects of intermittent pneumatic compression (IPC) on blood pressure. **Methods:** Thirty-six subjects (6 healthy volunteers, 19 hypertensive patients, 11 normotensive patients) participated in the study; the single lower limbs of all patients were treated with IPC from 2005 to 2007 in the rehabili-

tation department. The blood pressure of every healthy volunteer was measured 6 times for each of 5 IPC treatments (physiologic program, 20 min, 150 mmHg for one treatment). The systolic pressure of healthy volunteers at just lying on the back and at having been lying on the back for 20 min (before the treatment) was significantly different ( $p < 0.01$ ). The diastolic pressure of healthy volunteers at having been lying on the back for 20 min (before the treatment) and at the cessation of treatment was significantly different ( $p < 0.05$ ). As the results, the blood pressure of every patient was measured 3 times (before the treatment, treating 10 min, the treatment cessation) for each of 10 IPC treatments (physiologic program, 20 min, 150 mmHg for one treatment), then hypertensive patients group and normotensive patients group were statistic analyzed respectively. **Results:** The blood pressure of the hypertensive patients group and normotensive patients group was insignificance ( $p > 0.05$ ). **Conclusions:** There is no effect of IPC on blood pressure by the research results, which is similar to other similar researches and IPC can be used safely in the clinic.

#### PP001-115

### MAGNETIC STIMULATION OF SACRAL ROOTS FOR TREATMENT OF DETRUSOR OVERACTIVITY AND URGE INCONTINENCE

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**Objective:** To observe the effect of magnetic stimulation of sacral roots on detrusor overactivity and urge incontinence after spinal cord disease. **Methods:** 15 cases with detrusor overactivity and urge incontinence after spinal cord disease were treated with magnetic stimulation of sacral roots for 10 days. Voiding diary, quality of life score and urodynamic investigation were applied to evaluate the effect. **Results:** Mean voiding number of 24h after treatment was decreased. Mean urine volume was increased, mean number of incontinence was decreased and quality of life score was improved after treatment. Urge incontinence improved by 85.7%. The results of urodynamic investigation showed bladder capacity at first desire to void and maximum cystometric capacity were significantly increased after stimulation. Detrusor pressure at storage was decreased after stimulation. **Conclusion:** Magnetic stimulation of sacral roots can improve urinary frequency and urge incontinence of patients with detrusor overactivity after spinal cord disease by suppressing detrusor overactivity, increasing cystometric capacity. Magnetic stimulation of sacral roots maybe an alternative promising rehabilitation treatment technique.

#### PP001-116

### OSTEOPOROSIS IN THE PRACTICE OF REHABILITATION MEDICINE: A DESCRIPTIVE STUDY ON THE KNOWLEDGE AND MANAGEMENT OF FILIPINO PHYSIATRISTS

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**Objective:** This paper aims to describe the current picture of osteoporosis management among Physiatrist in the Philippines.

**Methods:** A questionnaire was developed, pre-tested and distributed by the Philippine Academy Rehabilitation Medicine Special Interest Group Concerned with Osteoporosis Rehabilitation and Education (PSCORE) to all accredited Physiatrists. **Results:** A total of 120 Physiatrist completed the questionnaire. In all 67 (56%) questionnaires were returned. Physiatrist ranging from 25 to 55 years of age consisting mostly of Fellows (53%) comprised the respondent population. Ninety-nine percent reported treating osteoporosis patients. Forty-eight percent of the Physiatrist refer to Orthopedic Surgeons for co-management. Of the different diagnostic options available, radiologic studies emerged as the most reasonably accessible (90%). Central DXA was considered the gold standard for the diagnosis by 96% of the Physiatrists. With the treatment options available, most physiatrist were able to identify the existing different medications locally – 100% used bisphosphonates and 96% in combination with calcium and vitamin D. Among the study population 63% are highly confident that they can treat their osteoporotic patients adequately. With the non-pharmacologic approach to osteoporosis, therapeutic exercises and balance/coordination exercises are the most commonly prescribed. **Conclusion:** In the Philippines, given the potentially huge impact on society of osteoporosis, it is of primary importance to assess the extent the awareness of the physicians specifically Physiatry, tasked to care for patients with osteoporosis.

#### PP001-117

### COMMUNICATION MEANS OF CERVICAL CORD INJURY PATIENTS WHO ARE RESPIRATOR DEPENDENT QUADRIPLEGIA

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**Objective:** To evaluate the effectiveness of speaking valve when cervical cord injury patients who are respirator dependent quadriplegia use the speech input system. With a speaking valve they can utter voice and communicate of his own accord. In addition, the uttered voice is able to be recognized with the speech input system and to be shown on the computer as a character. **Methods:** We use the speaking valve which was designed and invented by Passy-Muir Co (California, USA). **Results:** At the beginning the voice training is done for ten minutes and the rest is taken for five minutes. 800 characters can be input in about 25 min. But because of tendency to misidentification knowledge of consonant, about 90% of input characters were correct. **Conclusion:** A past communication device required time to input the character and was expensive. However, the recognition of the voice was possible enough this time by a cheap device on the market. The training of the repetition is necessary to raise the recognition rate though the utterance will become possible in a short time. Moreover, it is necessary to keep a vocal condition, and to devise vocalism. Motivation to the patient's own utterance is an important factor, too. If this system is synchronized with the environmental control device and the internet, social participation of the patients becomes possible.



## PP001-118

**REPORT OF DISTRACTION EXTERNAL FIXATOR IN THE SPINAL CORD INJURY*****Sha-sha Li<sup>1</sup>, Jun-yan Lu<sup>1</sup>, Yu-yin Zheng<sup>1</sup>, Song-he Jiang<sup>1</sup>, Hai-yan Lin<sup>1</sup>, Fang Zhang<sup>1</sup>****<sup>1</sup>PM&R Department, 2<sup>nd</sup> Affiliated Hospital of Wenzhou Medical College, China*

**Objectives:** To solve the dilemma between rehabilitation training and orthopedic postoperative care in the acute phase. **Methods:** Invent a lower thoracic distraction external fixator device, and have a clinic observation. **Results:** When the force to the brace was 150N, the distraction external fixation device can increase the height of the brace between T12 and T10 effectively, and kept it a little higher than that in a common phase when the patient sat up straight and bear own weight; while it did not have great effect on the latter height. **Conclusions:** The patient, who wears the bracing with external fixation device of lower thoracic vertebra after operation which fixes outside of the ventri-centrum, can decrease the pressures of lower thoracic vertebra from the bodyweight together with the internal fixation device backward and strengthen the stability of the injury spinal column accordingly.

## PP001-119

**MANAGEMENT OF UPPER EXTREMITY LYMPHEDEMA FOLLOWING BREAST CANCER SURGERY*****Songbo Huang****Department of Rehabilitation Medicine, Beijing Hospital, China*

**Objective:** This study is to provide a comprehensive approach to management of upper extremity lymphedema and examine its effectiveness. **Methods:** 19 patients were treated with sequential multiple chambers pneumatic pumps 20 min per day except Saturday and Sunday for two month, and were educated about positioning, self massage, and the factors which may initiate and worsen lymphedema, and should be avoided. The circumferences at several points along the limb and the thickness of the palm were measured. Pain was evaluated with VAS. **Results:** It is significant reduced the intensity of pain in the involved upper extremity resulting from lymphedema, VAS from  $6 \pm 1.5$  (pre-treatment) to  $2 \pm 0.8$  (post-treatment). The volume of the proximal part of the involved upper extremity is significant reduced after two month therapy; however the volume of the distal part of and the thickness of the palm is less reduced. In one patient with elephantiasis, his skin of the proximal part has been changed into nearly normal skin, but the same change did not occur in the distal part. **Conclusion:** The combination of sequential multiple chambers pneumatic pump and education is an effective approach to management of upper extremity lymphedema

## PP001-120

**TELESCOPING OF PHANTOM LIMB PAIN AND STUMP PAIN IN A TRANSHUMERAL AMPUTEE*****Joon-Sung Kim<sup>1</sup>, Jeong-yi Kwon<sup>2</sup>, Tae-Woo Kim<sup>2</sup>, Won-Il Lee<sup>2</sup>****<sup>1</sup>Rehabilitation Medicine, The Catholic university of Korea, St. Vincent's hospital, Suwon, and <sup>2</sup>Rehabilitation Medicine The Catholic university of Korea, St. Mary's Hospital, South Korea*

**Objective:** Pain is a common problem following amputation; but identifying the etiology and the proper treatment are often challenging when phantom limb pain and stump pain are combined. **Case Report:** We report a case of a 35-year-old amputee, who lost her

right arm in a motor vehicle accident, and who subsequently suffered from phantom limb pain and stump pain. She complained of a severe phantom limb pain, which she described as a burning sensation, and she also complained of stump pain and tenderness at admission. We applied pain modalities-TENS, desensitization, bandaging-on the stump, we continued pain medications and injection therapy. With management on the stump pain, the phantom limb sensation showed ongoing telescoping. At discharge, telescoping of the phantom limb sensation reached metacarpal bone level and phantom pain of the wrist disappeared. The remnant phantom limb pain of finger tips and stump pain diminished to 3 points on the visual analogue scale at discharge. Finally, she successfully adapted to a cosmetic prosthesis and did not complain of aggravation of her stump or of phantom limb pain following the prosthesis application. **Conclusion:** The pattern of phantom limb pain changes according to the treatment.

## PP001-121

**THE CORRELATION BETWEEN FASCIAE AND ACUPOINTS IN CENTRAL FACIAL PARALYSIS REHABILITATION*****Chunxiao Wan<sup>1</sup>, Jianan Li<sup>2</sup>****<sup>1</sup>Department of Rehabilitation, Wuxi No. 2 People's Hospital affiliated with Nanjing Medical University, <sup>2</sup>Nanjing Medical University, China*

**Objective:** To observe the correlation between fasciae and clinically effective acupoints in central facial paralysis rehabilitation. **Methods:** 30 patients with central facial paralysis were randomly recruited and the following clinically effective rehabilitation acupoints were selected: Xiaguan (ST7), Sibai (ST2), Qianliao (SI18), Yifeng (TE17), Baihui (GV20), Zusanli (ST37), Hegu (LI4). All the chosen acupoints were located according to The National Standards of the People's Republic of China: the Meridian and Acupoint Standards, published in 1990. Sterilization and insertion were performed on these acupoints. A doctor recorded the depths and the directions of the acupoints where the 'Qi' was reached. Then the patients were placed in the magnetic resonance imaging (MRI) room, lying quietly on their back with fish oil capsules pasted on the acupoints. The scanning loops for the head and the knee joint were adopted. Spin Echo Sequence (sagittal and transverse view T1 weighted imaging) was introduced to examine the acupoints on the head with 4-mm-thick layer and 1 mm layer interval. The same method was also adopted to scan the acupoints on the lower extremities with 5-mm-thick layer and 1 mm layer interval. The connections between the Qi-reaching points and their surrounding tissues were observed. **Results:** MRI showed that the Qi-reaching points of the clinically effective acupoints in central facial paralysis rehabilitation were located in the places with thickened fascia where connective tissues, nerves and blood vessels meet. **Conclusions:** Acupoints in central facial paralysis rehabilitation are closely correlated with their fascia.

## PP001-122

**ANALYZING MUSCULOSKELETAL OUTCOME MEASURES, AS PRESENT PAIN, DEVELOPING PAIN AND RECURRENT PAIN, WITH A COMBINATION OF REGRESSION MODELS*****Anna Ekman, Eva Andersson, Mats Hagberg****Occupational and Environmental Medicine, Sahlgrenska University Hospital and Academy at Gothenburg University UGOT, Sweden*

**Objective:** To suggest longitudinal regression models in the analysis of developing and recurrent musculoskeletal pain. To



determine if these analyses can indicate whether investigated risk factors can be considered long-term or short-term risk factors. *Methods:* Three regression models were used (Marginal, Poisson and Markov transition model) analyzing the musculoskeletal outcomes present pain and a yearly period of pain for at least 7 days, in neck or upper extremities in a prospective cohort, 1204 university students, with a baseline questionnaire and yearly follow-ups. *Results:* High demands, computer use pattern and perceived stress were both short- and long-term risk factors while smoking and work-home imbalance were long-term risk factors. To have diagnosed asthma was associated with musculoskeletal pain. Perceived stress and to have diagnosed asthma seemed to be of greater importance for recurrent pain than for developing pain, but were risk factors in both cases. Computer use pattern was a risk factor for developing pain. *Conclusion:* To get a quick-acting change, in the occurrence of musculoskeletal pain, it might be effective to lower the demands, adjust the computer use pattern and to lower the perceived stress. To make a persistent decrease in the occurrence of pain it might be effective to stop smoking and to make persistent changes in the risk factors mentioned above. Effective prevention might focus on adjusting the computer use pattern, while rehabilitation could start with lowering the perceived stress. Hence, analyzing data by combining the suggested regression models might be useful to better understand the process of occurrence of musculoskeletal pain.

#### PP001-123

### INVESTIGATE THE LOW BACK PAIN (LBP) OF CLINIC NURSES IN A 3<sup>RD</sup> GRADE HOSPITAL

**Guan Xin**

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*Objective:* To investigate the incidence of low back pain (LBP) of clinic nurses in a 3<sup>rd</sup> grade hospital and the related occupational factors of LBP, with an aim at improving the health of nurses. *Method:* To survey with the questionnaire, which was designed by us, in 692 nurses. *Results:* The incidence of LBP in nurses was 97.4%. A significant difference was found between the incidence of LBP and ages, years of working experience, frequencies of night shift, frequencies of bow, duration of bow or different change of departments. *Conclusion:* The hospital should recognize the situations of LBP in nurses and improve their health.

#### PP001-124

### THE INFLUENCE OF EXERCISE CAPACITY AND CARDIOVASCULAR FUNCTION IN THE CHD FOLLOWING A 12-WEEK EXERCISE-BASED CARDIAC REHABILITATION PROGRAM

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*Objective:* To evaluate the influence of exercise capacity by cardiac rehabilitation program. *Methods:* Forty CHD patients performed a graded exercise test on treadmill. The details of this study were described to the subjects and their written informed consent was obtained. The modified Bruce treadmill protocol was used for the graded exercise test. The criteria to end the exercise test followed the American College of Sports Medicine (ACSM) guidelines (1995). Before the graded exercise, the Cardiac Output and Ejection Fraction were recorded by echocardiography. During exercise testing, Ratings of perceived exertion was measured using the 15 point scale. It was recorded

during the last minute of every exercise stage for both systolic and diastolic blood pressure. Oxygen uptake, RER and heart rate were measured by open circuit spirometry every 30 seconds using a totally integrated metabolic analyzer. A 12-lead ECG was observed continuously by a clinician and summary recordings made every three minutes. Rate-pressure product was calculated by multiplying HR by systolic blood pressure. *Results:* The same protocol was performed after 12-week exercise-based cardiac rehabilitation program showed improvement. *Conclusion:* These results demonstrated that improvements in exercise capacity and cardiovascular function in the CHD can be achieved through a 12-week exercise-based cardiac rehabilitation program.

#### PP001-125

### EFFECTS OF CHINESE TUINA ON THE MUSCLE STRENGTH OF LOWER LIMB OF SARCOPENIA

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*Objectives:* To observe effects of prevention and cure sarcopenia by Chinese Tuina and explore its mechanism. *Methods:* The speed of rising from seat and squatting position were measured and the knee extensor functions were evaluated by Isokinetic testing in 19 young control volunteers, 15 control patients with sarcopenia, and 10 treatment patients with sarcopenia before and after treatment. The patients were treated by Chinese Tuina manipulation for 8 weeks. *Results:* The results revealed that the speed of rising from one's seat and from squatting position, and the knee extensor functional indexes, such as Peak Torque, Peak torque/Body weight, average power and total work were reduced in control patients. After treatment, the speed of rising from squatting position and the knee extensor functional indexes in 180°/s were obviously increased. *Conclusions:* Chinese Tuina treatment could delay the aging of skeletal muscle by elevating the function of fast muscle fibers, and improve the muscle function of sarcopenia patients by increasing their resistance and bursting strength.

#### PP001-126

### PREDICTING DISABILITY DAYS IN PATIENTS WITH LOW BACK PAIN

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*Objectives:* The objective of this study is to evaluate the predicting factors for disability days in patients with low back pain. *Methods:* Cross-sectional surveys of symptoms severity, disability status, and disability days in patients with low back pain at ambulatory clinics. Every patient received physical examination and was asked to complete a set of questionnaires, including the Roland and Morris Disability Questionnaire for disability status and Visual Analog Scale for pain intensity. The "disability days" was defined as restricted activity days or work absence days during the previous 4 weeks because of back pain. Data were analyzed by simple correlation and multiple linear regression between "disability days" and its determinants. *Results:* 232 patients with low back pain were consecutively recruited from

several clinics of physical medicine and rehabilitation. The mean disability days during the previous 4 weeks was  $4.6 \pm 8.4$  days. The Results of physical examination indicated that lumbosacral radiculopathy was the only physical factor moderately correlated with disability days ( $r=0.22, p<0.05$ ). The significant predictors for disability days included age, disability status, and lumbosacral radiculopathy. *Conclusions:* The disability days of patients with low back pain seemed to depend more on functional status than on simple pain intensity. Future intervention may need to put more emphasis on improving functional status for the patients with low back pain.

#### PP001-127

### EARLY PULMONARY REHABILITATION IMPROVES CARDIORESPIRATORY FUNCTION IN BILATERAL SEQUENTIAL LUNG TRANSPLANTATION RECIPIENTS: REPORT OF TWO CASES

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*Objectives:* For patients with end-stage pulmonary disease, lung transplantation has become a promising treatment to improve their survival and quality of life. Most recipients have a limited exercise capacity despite nearly normal pulmonary function after double lung transplantation. Nevertheless, the effect of early pulmonary rehabilitation (PR) for patients with lung transplantation is scarce in the literature. *Methods:* We reported two patients with bilateral sequential lung transplantation (BLTx) who received an early PR program in this study. Patient A was a 38-year-old female of Sauropus androgynus related bronchiolitis obliterans who started inpatient PR from the 3<sup>rd</sup> day and outpatient PR from the 72<sup>nd</sup> day after BLTx. Patient B was a 56-year-old female of lymphangioleiomyomatosis who started inpatient PR from the 6<sup>th</sup> day and outpatient PR from the 63<sup>rd</sup> day after BLTx. Outcome measurements included pulmonary function tests and cardiopulmonary exercise testing before BLTx, before outpatient PR, and after outpatient PR. *Results:* The results revealed that the cardiorespiratory function in lung transplant recipients during the early postoperative phase was low, but their peak oxygen consumption and peak workload might improve after outpatient PR (patient A: peak oxygen consumption from 15.8 to 16.9 ml/kg/min and peak workload from 50 to 70 watt after 16-week training; patient B: from 9.0 to 12.6 ml/kg/min and from 6 to 20 watt after 10-week training). *Conclusions:* For recipients of lung transplantation, an early PR program should be considered to enhance the functional capacity and quality of life.

#### PP001-128

### PHOTODYNAMIC INHIBITION OF LED-ACTIVATED MPPA IN HUMAN OVARIAN CARCINOMA CELLS

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*Objectives:* The main focus of this study was to investigate the photochemical biological effect of Lighting Emitting Diode (LED)-activated MPPa on the inhibition of human ovar-

ian carcinoma cells. *Methods:* A special LED equipment was employed to investigate the photochemical biological effect of MPPa 24 h after photodynamic therapy in human ovarian carcinoma cells by inverted microscopy and MTT reduction assay. *Results:* Inverted microscopy and MTT reduction assay showed that the photodynamic inhibition of LED-activated MPPa in human ovarian carcinoma was extraordinarily significant. The photocytotoxicity of MPPa indicated light-dose dependent characteristics in human ovarian carcinoma cells, but proliferation was promoted by LED irradiation alone. *Conclusion:* LED-activated MPPa could effectively kill human ovarian carcinoma cells and LED will become an alternative light source for photodynamic therapy.

#### PP001-129

### THE EFFECTS OF FOOT REFLEXOTHERAPY IN DECREASE OF PAIN AND DISABILITY IN PATIENTS WITH CHRONIC LOW BACK PAIN

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*Objectives:* Chronic low back pain is a common disorder which has not complete satisfactory treatment. The aim of this study was to evaluate the effectiveness of foot reflexotherapy on pain, disability and vertebral column mobility of patients with chronic low back pain. *Methods:* Thirty patients with chronic low back pain were participated in the present study and were divided in two groups. Fifteen patients as control group have been received routine Physiotherapy treatment and 15 patients as the intervention group have been received foot reflexotherapy in addition to routine physiotherapy. Evaluation of pain, disability and vertebral mobility was done by Visual Analogue Scale (VAS), Oswestry disability index and Meter respectively prior, and after treatment session. Also pain evaluation was repeated 2 weeks follow the last treatment session. *Results:* After treatment pain and disability were decreased significantly in intervention group in compared to control group ( $p=0.003, p=0.037$ , respectively). In follow-up there was no significant difference between 2 groups in pain reduction. Mobility has not been improved in both groups after treatment sessions. *Conclusions:* Foot reflexotherapy seems to be an effective intervention for improvement of pain and disability of chronic low back pain patients in short period, but it is not efficient for vertebral mobility improvement.

#### PP001-130

### STUDY ON AGNOSIA AND APRAXIA OF HEMIPLEGIC PATIENTS

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*Objectives:* To explore the effect of rehabilitation training on agnosia and apraxia of hemiplegic patients. *Methods:* 90 hemiplegic patients were evaluated by agnosia and apraxia tables to observe the proportion of different kinds of agnosia and apaxia. Patients with agnosia and apraxia were trained by occupational therapists, 30 min each session, once a day, for one course of treatment (1-3 months). *Results:* 23 of 90 (25.5%) hemiplegic patients had agnosia or apraxia. The score of the 23 agnosia and apraxia patients improved from  $32.56 \pm 3.14$  to  $45.02 \pm 2.72$  after treatment ( $p<0.05$ ). *Conclusion:* Agnosia and apaxia are common among the hemiplegic patients. They should be discovered early and be managed with timely rehabilitation.

## PP001-131

**THE EFFECT OF EXERCISE ON SERUM HORMONE AND OVARIAN MORPHOLOGY IN RATS WITH POLYCYSTIC OVARY SYNDROME*****Shuwei Qiu, Zhongli Jiang****Department of Rehabilitation Medicine, First Affiliated Hospital of Nanjing Medical University, China*

**Objective:** We explored the effect of exercise on serum insulin, serum sex hormone and ovarian morphology in rats with polycystic ovary syndrome (PCOS). **Method:** Seventeen Wistar rats of 21-day-old were randomly divided to PCOS exercise group ( $n=6$ ), PCOS non-exercise group ( $n=6$ ) and non-PCOS control group ( $n=5$ ). PCOS models were induced by injection of testosterone propionate, while control rats were injected with tea oil. The exercise rats were trained by swimming with 120 min/day for 15 days. At the end of the experiment, blood glucose and insulin (INS), estrogen (E2), progesterone (P) and testosterone (T) in serum were determined by RIA and ovarian morphology was evaluated by Image-Pro Plus 6.0. **Result:** The levels of INS, E2, P and T in serum were significantly lower in PCOS exercise group than that in non-exercise group ( $p<0.05$ ). The ratios of FBG/FINS in PCOS exercise group increased significantly compared with PCOS non-exercise group ( $p<0.05$ ). The levels of serum sex hormones in PCOS exercise group were similar to non-PCOS control group. Ovarian morphology showed that the amounts of preantral follicles and atretic follicles significantly decreased ( $p<0.05$ ) and the amounts of antral follicles and corpus luteum significantly increased ( $p<0.05$ ) in PCOS exercise group compared with PCOS non-exercise group. The changes of ovarian morphology in PCOS exercise group were similar to non-PCOS control group. **Conclusion:** Short-term exercise can improve insulin sensibility, decrease the levels of serum androgen and E2, and recover normal ovarian morphology, suggesting that exercise training is the basic therapeutic means for patients with PCOS.

## PP001-132

**ROAD TRAFFIC INJURIES AND DISABILITY: THE INCIDENCE AND TYPE OF DISABILITY IN THAILAND*****Darane Suvapan, Wutichai Permsirivanich****Department of Orthopaedic and Rehabilitation, Faculty of Medicine, Prince of Songkla University, Thailand*

**Objective:** The objective was to examine the incidence and types of disability 6 months after road traffic injuries (RTIs) were sustained in Thailand. **Method:** The prospective data were derived from the severely victims from 8 Injury Surveillance Hospital Networks between December 2005 and June 2006. Disabilities were assessed during admission and 6 months after the RTIs by using standardized protocols from the Sirindhorn National Medical Rehabilitation Center (SNMRC), then classified into 5 groups: visual impairment, hearing/communication impairment, mobility impairment, psychological/behavior impairment, and intellectual/learning impairment. The data were analyzed using program R. **Result:** 9,658 subjects were included in the primary data of the survey, 82.0% having had a motor vehicle accident. The majority of the subjects (75.3% were male, 42.7% were in the age group 15 to 29 years, and after 6 months, 443 subjects (4.6%) had a disability. Analysis of type of disability showed that mobility impairment (75.6%) was most common followed by visual impairment and psychological/behavioural impairment equally (7.4%), hearing/communication impairment (5.0%) and intellectual/learning impairment (4.6%). **Conclusion:** This study found the epidemiology of RTI-related disability to be

much higher in Thailand than in industrialized countries. This study found a high percentage of long-term impairment and disability associated with RTIs.

## PP001-133

**THE SHORT-TERM EFFECT OF WHEELCHAIR TAI CHI ON THE AUTOMATIC NERVOUS MODULATION IN SUBJECTS WITH CHRONIC SPINAL CORD INJURY*****Kwan-Hwa Lin, Chia-Cheng Lin, Ying-Chen Chen****School and Institute of Physical Therapy, National Taiwan University, Chinese Taipei*

**Objective:** Significant imbalance in autonomic nervous modulation have been reported in subjects with spinal cord injury (SCI) compared with a non-injured population. It is not clear whether wheelchair Tai Chi exercise would enhance the balance of autonomic nervous activity in subjects with spinal cord injury. **Methods:** Ten SCI subjects (5 tetraplegics and 5 paraplegics) who had practiced wheelchair Tai Chi exercise were recruited. Their heart rate variability (HRV) was recorded by handheld HRV device (CheckMyHeart Handheld HRV, DailyCare BioMedical, Inc. Taiwan) in seated position before and after performing wheelchair Tai Chi. **Results:** The pre-and post-exercise analysis indicated that there were no significant differences in the total power, very low frequency, low frequency and high frequency, whereas LFnu and LF/HF decreased significantly ( $p<0.05$ ) and HFnu increased significantly ( $p<0.05$ ) both in the tetraplegic and the paraplegic groups. The heart rate decreased significantly in tetraplegic group while there was no obvious change in paraplegic group. **Conclusions:** The short-term effect of wheelchair Tai Chi was to enhance vagal activity and balanced sympathovagal activity in subjects following chronic cord injury.

## PP001-134

**IMMUNOHISTOCHEMICAL ANALYSIS OF CORONARY COLLATERAL DEVELOPMENT IN PIGS*****Xiang-Bo Meng, Jianan Li, Xiao Lu****Department of Rehabilitation Medicine, The First Affiliated Hospital of Nanjing Medical University, China*

**Objective:** To study the feasibility of applying immunohistochemical assay in coronary collateral development in mini pigs, which will be methodological foundation in mechanism of cardiac rehabilitation. **Methods:** An animal model of controllable myocardial ischemia was established in 45 mini pigs. The animals were equally divided into the sham-operated group (SO), sedentary ischemic group (SI) and exercise training group (ET). Repeated transient myocardial ischemia was induced by inflation of balloon constrictor or aerobic exercise training for 8 weeks. The myocardium attributed to the oblique marginal artery was finally sampled at the end point of the study for measurement of capillary density (CD). The methods of the measurement were HE staining and immunohistochemical assay labeled by Factor VIII-RA. The reproductivity of the two methods for CD analysis was studied. **Results:** Both methods demonstrated significant increase of myocardial CD in ET, which was significantly higher than SI ( $p<0.01$ ) and SO ( $p<0.01$ ). Furthermore, the myocardial CD in SI was also higher than SO ( $p<0.01$ ). The CD analyzed by immunohistochemistry was higher than HE ( $p<0.05$ ). The reproducibility between HE staining and immunohistochemical assay was found excellent ( $p>0.05$ ). Coronary collateral blood flow (CCBF) was positively correlated with



CD analyzed by both methods. The correlation coefficient between immunohistochemical assay and CCBF was significantly higher than HE staining ( $p < 0.05$ ). *Conclusion:* Immunohistochemical assay is an accurate and reliable method for quantitative analysis of the coronary collateral development in mini pigs.

#### PP001-135

### EFFECTS OF DIFFERENT EXERCISES WITH EQUAL CALORIC CONSUMES ON METABOLIC FACTORS AND CARDIOVASCULAR RESPONSES IN TYPE 2 DIABETIC PATIENTS

**Zhongli Jiang, Lili Liu**

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*Objective:* We explored the effects of different exercises with equal caloric consumes on metabolic factors and cardiovascular responses in order to provide individually exercise prescriptions for type 2 diabetic patients. *Method:* Thirteen patients with type 2 diabetes were in for this exercise programs of equal caloric consumes with motorized treadmill and cycle ergometer, respectively by gas exchange analyzers (k4b2). The blood glucose, heart rate, blood pressure and gas exchange parameters were monitored during exercises. *Result:* The levels of blood glucose after exercise decreased significantly compared with pre-exercise. There were not significant differences in the reductions of blood glucose between different exercises of treadmill and ergometer with equal caloric consumes, but there were significant differences in  $VE/VO_2$ ,  $VE/VCO_2$  and target heart rate between different exercises. *Conclusion:* The effects of different exercises with equal caloric consumes on metabolic factors and cardiovascular responses are homologous, suggesting that exercise form is not a crucial factor to adjust the levels of blood glucose in type 2 diabetic patients, which provide a new idea for quantity of exercise prescription by use of equal caloric consumes in type 2 diabetic patients.

#### PP001-136

### FOLLOW-UP EFFECTS OF INCREASED PHYSICAL ACTIVITY ON THE GLUCOLIPID METABOLIC FACTORS AND MEDICAL COSTS IN TYPE 2 DIABETIC PATIENTS

**Zhongli Jiang, Hui Guo**

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*Objective:* We explore the effect of the exercise prescription of caloric consumes quantified by the unit of week on the metabolic factors and medical costs in type 2 diabetic patients. *Method:* Seventy-five patients with type 2 diabetes were divided into interventional group (IG) and control group (CG). The lifestyle interventional technique including exercise prescription of quantified caloric consumes was used in IG but was not used in CG. The other indexes of caloric intakes and consumes, body measurement index, glucolipid metabolic index and medical costs were observed before and after 6 months in both two groups. *Result:* After 6 months, exercise caloric consumes were significantly higher in IG than that in CG. The indexes such as caloric intakes, BMI, blood pressure, fast blood glucose, HbA1c, TC, TG, LDL and medical costs decreased significantly in IG compared with CG. *Conclusion:* The lifestyle interventional technique including exercise prescription of quantified caloric consumes can improve the glucolipid metabolism and decrease the medical costs in the type 2 diabetic patients.

#### PP001-137

### INVESTIGATION OF THE LIFESTYLE CHARACTERISTIC IN PATIENTS WITH NON-ALCOHOLIC FATTY LIVER

**Zhongli Jiang, Chuyan Wu**

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*Objective:* We investigated the lifestyle characteristic in patients with non-alcoholic fatty liver disease (NAFL). *Methods:* The patients with simple fatty liver ( $n=43$ ) and with nonalcoholic steatohepatitis ( $n=51$ ) and control subjects ( $n=74$ ) were investigated to observe their living conditions, physical examination indexes and behavioral characteristics. These data were analyzed by ANOVA and covariance analysis. *Results:* The higher body index and some serum indexes such as ALT, glucose, triglyceride and cholesterol increased significantly in patients with NAFL compared with control subjects. Lifestyle characteristics such as eating fast, little exercise, feeling fatigue and less communication with others in patients with NAFL were significantly higher than that in control subjects. There was significantly misunderstanding on recognitions of constitution in patients with NASH. *Conclusions:* The patients with NAFL almost accompany "three high risk" symptoms of hyperlipidemia, hypertension and hyperglycemia, and have more lifestyle problems in recognition of constitution, diet behavior and poor exercise pattern. Both cognitive behavior therapy and scientific exercise counseling can help to prevent occurrence and development of this disease.

#### PP001-138

### STUDY ON RAT MODEL WITH POLYCYSTIC OVARY SYNDROME FOR EXERCISE INTERVENTION

**Zhongli Jiang**

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*Objective:* We established rat model with polycystic ovary syndrome for exercise intervention and observed the changes of serum hormone and ovarian morphology during this processes. *Method:* Fifty of female Wistar rats at 21 days of age were randomly divided into experimental group ( $n=25$ ) and control group ( $n=25$ ). The experimental rats were subcutaneously injected with testosterone propionate, while control rats were injected with tea oil. The body fat index, ovarian weight, fasting blood glucose and serum insulin (FINS), serum estrogen (E2), serum progesterone (P), serum testosterone (T) and ovarian morphology were analyzed during the experiments. *Result:* At 28 days after injection of testosterone propionate, the levels of INS, E2 and T in serum increased significantly and ratios of FBG/FINS decreased significantly. The pathology of ovarian showed remarkable changes of multiple follicular cysts and significant increases in the ratios of follicular cysts to normal follicle after injection of testosterone propionate. The levels of serum E2 increased significantly after 7 days with injection of testosterone propionate. Ovarian morphology showed a relative thinned granulosa cell layer and a thickened theca cell layer at 7 and 14 days after injection of testosterone propionate. The amounts of atretic follicles and preantral follicles significantly increased respectively at 21 and 28 days after injection of testosterone propionate. *Conclusion:* The rat model with PCOS induced by injection of testosterone propionate for 28 days are characteristic of hyperinsulinemia, abnormal sex hormone and multiple follicular cysts, which keeps on stability for long times. The rat model with PCOS can be used to study exercise intervention.



PP001-139

**WORD NETWORK ANALYSIS FOR SOCIAL REPRESENTATION ABOUT PAIN COMPLAINTS*****Feng Lin, Zhongli Jiang****Department of Rehabilitation Medicine, The First Affiliated Hospital of Nanjing Medical University, China*

**Objective:** In clinical activities, patients often poured out pain complaints with various aspects in front of doctors. Description and understand for pain glossary were inconsistent between patients with different gender and clinical doctors. Social representation of pain is a system for expression and communication amongst individuals by providing common codes for naming and classifying pain descriptions. The study was to explore effects of gender on social representation of pain. **Methods:** One hundred and sixty adults (80 males and 80 females) participated in an investigation of questionnaires and asked to reply any three words associated with pain complaints. The data from questionnaires were composed to associated words networks by Pajek 1.14 and networks analyses were used by Ucinet 6.166. **Results:** The associated words between the different gender groups reflected the distribution of body symptoms, emotions, treating behaviors and activities of daily living. We extracted main components from associated word networks of different gender and found that male adults were apt to express words about treating behavior but female adults were inclined to describe words about emotions. We also found scale-free structures (power law degree distribution) and small-world properties (larger clustering coefficient and shorter average shortest path length) in all associated word networks. **Conclusions:** The social representation of pain may involve in various expressions including somatic, psychological, social functional and medical seeking behaviors. The people with different gender represent different behavior pattern.

PP001-140

**NETWORK COMPARISON OF WORD ASSOCIATION MEMORIES IN YOUNG AND OLD ADULTS*****Feng Lin, Zhongli Jiang****Department of Rehabilitation Medicine, The First Affiliated Hospital of Nanjing Medical University, China*

**Objective:** Aging has been recognized as an influence on memory organization. The structure of word associative memories can be represented by word associative network. This study explored the differences of word associative networks from young and old adults. **Methods:** One hundred Chinese adults (50 young and 50 old) were recruited to participate in this study. Subjects were asked to reply the first word called to their mind corresponding to each word in Kent-Rosanof list. Word associative networks were constructed by common words from two groups with Pajek 1.14 and were analyzed with Ucinet 6.166. **Results:** The network density in old subjects was significantly lower than that in young adults ( $p < 0.01$ ). The degree centralization in old subjects was significantly higher than that in young adults (chi square=6.189,  $p = 0.0129$ ). Pearson correlation coefficients of local variables between young and old cohorts were all lower than 0.6 (degree 0.5602, betweenness 0.2104, closeness 0.5334, 1<sup>st</sup> clustering coefficient 0.4627 and 2<sup>nd</sup> clustering coefficient 0.1337). **Conclusion:** Chinese old cohort has sparser but more centralized word associative networks, implying that the structure of associative memories in old people is more stable and stereotyped.

PP001-141

**A TEST PIECE DESIGN FOR DYNAMIC FOOT PRESSURE MEASUREMENT*****Mu-Jung Kao<sup>1</sup>, Ming-Jor Lo<sup>2</sup>, Cheng-Kung Cheng<sup>2</sup>, Kuo-Wei Chuang<sup>1</sup>****<sup>1</sup>Department of Physical Medicine and Rehabilitation, Taipei City Hospital, and <sup>2</sup>Institute of Rehabilitation Science and Technology, National Yang Ming University, Chinese Taipei*

**Objective:** Current commercial foot pressure systems are expensive and complicate to operate. The purpose of this study was to design an insole-style test piece for a quick and easy dynamic foot pressure test. **Method:** The material used is TPE-PS shock absorption foam. When assembled within the specially designed module for dynamic foot pressure testing, the test foam pieces will exhibit the stamping effect from the foot pressure. The resulting foam pieces will show similar foot pressure distributions as compared to those from the "print mat method". The gait evaluation for foot pressure was designed to optimize the effectiveness of the foam within the module. This provides the best resulting foot pressure patterns for analysis and creation of a foot pressure distribution diagram. **Results:** The 5 mm test piece with fastening sheet could be used to execute the foot pressure during walking by the validation of T&T Medilogic foot pressure test. 250 steps with speed of 112 step/min is the best condition to perform the test when comparing with foot print method. **Conclusions:** The specially designed foam test piece has the advantages of low cost-of-material and zero maintenance, easy and quick operation, test results can be read immediately by visual inspection, and the foam can also be used to evaluate the foot pressure distribution of custom insoles as a follow up service to patients.

PP001-142

**VALUE DISCUSSION OF THE STRETCH TRAINING ON THE TRUNK MUSCLES IN THE REHABILITATION OF THE NON-SPECIFIC LOW BACK PAIN*****Jie Huang, Lerong Sun, Lanfen Ren****The Department of Rehabilitation of the First Hospital of Yichang, China*

**Objective:** To explore the effects and value of the stretch training on the trunk muscles in the non-specific low back pain patients. **Methods:** 42 non-specific low back pain patients were divided into control and training groups randomly. Physical therapy was used in the control group, while the stretch training on the trunk muscles and the same physical therapy were used in the training group. The pain intensity of 42 subjects were evaluated respectively with visual analogue scale (VAS) at 4 points (before the treatment, after 1 course of treatment, 1 month and 3 months from the beginning of the participation). The scores of VAS were analyzed with SPSS11.0. **Results:** Results of the two groups after 1 course of treatment, 1 month and 3 months stretch training indicated that, all of the scores of VAS were significantly different ( $p < 0.05$ ). **Conclusions:** Stretch training on the trunk muscles had the positive clinical therapeutic effects on rehabilitation of non-specific low back pain patients, and it possibly had a long term effect in the improvement of symptoms which might be an important clinical value.

## PP001-143

**TEMPORAL PHENOMENON OF MYOCARDIAL ISCHEMIA AND AEROBIC EXERCISE-INDUCED VEGF EXPRESSION – AN EXPERIMENTAL STUDY****Feng Qiu, Jianan Li, Xiao Lu***Department of Rehabilitation Medicine, the First Affiliated Hospital of Nanjing Medical University, China*

**Objectives:** To study the temporal phenomenon of myocardial ischemia and aerobic exercise training induced expression of vascular endothelial growth factor (VEGF) in swine models of controllable myocardial ischemia. **Methods:** Twenty-four miniature swines were randomly assigned to control group (CG), ischemia group (IG) and exercise group (EG). A controllable hydraulic balloon catheter was placed to the first marginal branch of left circumflex coronary artery. Subjects in IG and EG received transient coronary occlusion for 2 min repeated twice a day for 8 weeks. Subjects in EG received 30 min aerobic exercise training on treadmill with intermittent high intensity duration of 2 min which repeated twice a session. Blood samples were obtained every 2 weeks. The ischemic area of the myocardium was also sampled after the completion of the 8-week experiment. VEGF in serum were analyzed by ELISA and VEGF in myocardium was measured by Western Blot. **Results:** 1) VEGF serum level on week 2 in IG was significantly higher than that in CG ( $p < 0.05$ ) and then reached plateau ( $p > 0.05$ ). 2) EG demonstrated the significant increase of VEGF from baseline to week 4 ( $p < 0.05$ ), and then reached the plateau ( $p > 0.05$ ). 3) VEGF in serum was positively correlated that in myocardium ( $r = 0.826$ ,  $p < 0.01$ ). **Conclusion:** Intermittent myocardial ischemia and aerobic exercise training induced VEGF expression reaches peak on week 2 and week 4, respectively, and then reaches plateau.

## PP001-144

**VOCATIONAL REINTEGRATION AMONG THE THAI LOWER LIMB AMPUTEES****Piyapat Dajpratham<sup>1</sup>, Suchat Tantinirama<sup>2</sup>, Pranee Lukkapihonchur<sup>3</sup>, Siriluck Kaewnaree<sup>1</sup>***<sup>1</sup>Department of Rehabilitation Medicine, Faculty of Medicine Siriraj Hospital, Bangkok, <sup>2</sup>Department of Rehabilitation Medicine, Prapokkklao Hospital, Chanthaburi Province, <sup>3</sup>Division of Rehabilitation Medicine, Ratchaburi Hospital, Ratchaburi Province, Bangkok, Thailand*

**Objective:** To study the rate of vocational reintegration, factors associated with vocational reintegration among the lower limb amputees. **Methods:** The postal survey with the questionnaires to 1,300 amputees who received the lower limb prostheses from 2001–2005 was conducted. Three hundred and nine questionnaires were completed among 321 returned questionnaires (response rate 24.7%). **Results:** Two hundred and forty-seven males and 62 females with age ranging from 18–82 years old participated. The rate of vocational reintegration was 66.7%. Demographically; the employed group had less diabetes mellitus ( $p = 0.001$ ), higher educational level ( $p = 0.004$ ), were younger at the time of amputation ( $p < 0.001$ ) and etiologies of amputation were blast injury from mines and congenital problems ( $p = 0.005$ ). Prosthetic use and problems; the employed group used no gait aids ( $p < 0.001$ ), had satisfactory to good wearing comfort ( $p = 0.005$ ), wore prostheses longer hours per day ( $p < 0.001$ ). The factors associated with vocational reintegration were etiologies of amputation from the blast injury from mines and congenital problems (OR 3.3), educational level from secondary school (OR 2.3), at least satisfactory to good wearing comfort (OR 1.16), and younger at the time of amputation (OR 0.97), respectively. **Conclusions:** This

information can assist the rehabilitation personnel to encourage the vocational reintegration among the lower limb amputees.

## PP001-145

**DOES PASSIVE SLR TEST OF HAMSTRING MUSCLE LENGTH REFLECT LEVELS OF HAMSTRING MUSCLES ACTIVITY IN CHRONIC LOW BACK PAIN SUBJECTS?****Soraya Pirouzi<sup>1</sup>, Julie Hides<sup>2</sup>, Carolyn Richardson<sup>2</sup>, Rowena Toppenberg<sup>2</sup>***<sup>1</sup>Physiotherapy department, Rehabilitation Faculty, Shiraz University of Medical Sciences, Shiraz, Fars, Iran, and <sup>2</sup>Physiotherapy division, School of Health and Rehabilitation Sciences, Australia*

**Objective:** Hamstring tightness can be associated with various clinical problems. It is commonly proposed that restricted straight leg raising (SLR) because of tight hamstring muscles is one of the characteristics of LBP patients. Some previous studies have found early activity and overactivity of the HS muscles, as measured with electromyography (EMG), in LBP subjects. The relationship between overactive HS muscles and short or tight HS muscles has not been investigated in subjects with LBP. Hamstring muscle length and the sensitivity of the passive SLR test in chronic low back pain (CLBP) who demonstrated the hyper activity in the HS muscle compared to matched controls were investigated. **Methods:** The hamstring muscle length was measured using a passive SLR test on 60 subjects (30 CLBP patients and 30 matched control subjects) who also performed trunk rotation exertion with various levels of external trunk support, related to different functional tasks. **Results:** There was no significant difference in the HS muscles length between the right and left side in either group ( $p = 0.54$ ). There was not a significant relationship between HS muscle length and the amount of HS muscle activity in any of the rotation tasks in both groups (all  $p > 0.08$  in control groups and  $p > 0.10$  in the CLBP group). **Conclusion:** This study provided evidence of no difference between CLBP and matched controls in the amount of SLR and no correlation between HS muscles activity during low level of trunk axial rotation and the amount of passive SLR.

## PP001-146

**A COMPARISON OF THE EFFECT OF DEEP AND SUPERFICIAL HEAT ON ANKLE JOINT POSITION SENSE IN HEALTHY SUBJECTS****Farzaneh Moslemi-Haghighi, Farahnaz Ghaffarinejad, Soraya Pirouzi***Physiotherapy department, Rehabilitation Faculty, Shiraz University of Medical Sciences, Iran*

**Objective:** Heat therapy is one of the natural treatments that can affect the information transferred by the proprioceptive receptors. Heat has an effect on the conduction velocity of peripheral nerves but the exact effect of two kinds of deep and superficial heat on the ankle joint position sense is not known clearly. This study aimed to compare the effect of deep and superficial heat on the ankle joint position sense. **Methods:** Thirty healthy male students aged between 18 to 30 years participated in this study. Deep heat by short wave diathermy and superficial heat by water with the temperature of 42°C were applied for 15 min in two sessions for all participants. Active and passive ankle joint position in dorsiflexion and plantarflexion were measured by pedal goniometer prior to and after heat application. During superficial heat therapy temperature of skin in the antero-lateral side was recorded with

Mercusic thermometer. The Non Parametric paired T-test Wilcoxon and Non Parametric Paired T-test Mann-Whitney were used to analyze the data. *Results:* Although the superficial heat had no effect on the ankle joint position sense, there was a significant increase in the accuracy of active dorsiflexion after the deep heat therapy. *Conclusion:* According to the results, deep heat therapy improves passive ankle joint position sense in plantarflexion; however it worsens the active joint position sense in dorsiflexion. Therefore, it seems that after applying deep heat therapy on ankle joint, exercise prescriptions need to be cautious.

#### PP001-147

### COMPARISON OF THE EFFECTS OF COLDNESS ON LATENCY AND NERVE CONDUCTION VELOCITY OF MEDIAN NERVE IN STUDENTS OF REHABILITATION FACULTY

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*Objective:* Temperature is effective on latency and nerve conduction velocity. The aim of this study was to investigate the effects of coldness on the latency and conduction velocity of motor & sensory fibers of median nerve and their comparison together. *Methods:* Thirty-two healthy subjects (aged 18 to 28 years, mean  $22.25 \pm 2.2$ ) participated in this study. Temperature of the skin at wrist was measured then latency and nerve conduction velocity of sensory and motor fibers of the right median nerve were recorded. After cooling, parameters were recorded again. Paired t- test was used for statistical analysis. *Results:* Proximal and distal latency increased in motor & sensory fibers of median nerve. There was a significant difference between before and after intervention ( $p < 0.001$ ). Nerve conduction velocity of motor & sensory fibers decreased significantly after cooling ( $p < 0.001$ ). The comparison between variations percentage of proximal and distal latency with variations percentage of nerve conduction velocity in motor & sensory fibers of median nerve demonstrated a significant difference ( $p < 0.001$ ). *Conclusion:* Coldness application increases proximal and distal latency of motor & sensory fibers of median nerve and also reduces their nerve conduction velocity. Mean variations percentage of nerve conduction velocity was less than mean variations percentage of latency. Therefore in electrophysiologic testing of this nerve, especially in cold seasons, use of nerve conduction velocity in diagnostic testing is more reliable than latency since the former has less alternation when exposed to coldness.

#### PP001-148

### HEMODYNAMICS AND NEUROHORMONE REACTIONS TO ACUPOINTS STIMULATION IN PATIENTS WITH TYPE 2 DIABETES

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*Objective:* We assessed the vascular and neurohormone reactions to AES in patients with type 2 DM (T2DM). In this study, we attempted to clarify the possible mechanism of acupoint electrical stimulation (AES) in diabetic mellitus patients. *Methods:* Forty-two T2DM patients (13 men and 29 women) were recruited from

the metabolic clinic in a teaching hospital. The diagnosis of T2DM was based upon criteria. They had been treated with a disease management program. They were randomized assigned into two groups: AES group and control group. For patients in the AES group, electric stimulation was applied via 2 pairs of disposable self-adhesive electrodes (2.5×2.5 cm) on the left Neiguan (P6), Quze (PC3), Xuehai (SP10), and Yinlingquan (SP9) acupuncture points. Patients in the control group received no electric stimulation. Vascular reaction, plasma nitrate/nitrite, adrenaline and endorphin were measured in all patients before and after intervention. The vascular reaction was assessed by plethysmography. We used the Griess reagent-based colorimetric method to measure the plasma concentration of nitrate/nitrite. The serum concentration of adrenaline and  $\beta$ -endorphin were analyzed by commercial enzyme-linked immunosorbent assay (ELISA) kits. *Results:* The AES group had significantly ( $p < 0.05$ ) lower venous tone, and higher plasma adrenaline, endorphin level than the control group. There was no significant difference in plasma nitrate/nitrite and blood pressure between groups. *Conclusions:* AES stimulation on certain acupuncture points may decrease venous tone but not blood pressure in T2 DM patients. The flow-induced venous tone changes may be partially caused by the humoral pathway.

#### PP002-001

### THE EFFECT OF SPASTICITY OF THE HEMIPARETIC PATIENTS SUFFERED FROM APOPLEXY TREATED WITH SANYINSHUJINGAO

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*Objective:* To observe the effect of spasticity of the hemiparetic patients suffered from apoplexy, who were treated with "SANYINSHUJINGAO" in order to provide a scientific clinical evidence for external treatment. SANYINSHUJINGAO is a Chinese topical cream. *Methods:* Sixty hospital patients, selected randomly, suffered from cerebral infarction, were divided into a therapy group and a control group. The patients of therapy group were treated with the routine rehabilitation plus the "SANYINSHUJINGAO", the course of treatment of which was forty-five days. Spasm scores of limbs were monitored according to the modified Ashworth Measuring scale and Barthel ADL Index. Similar data also collected in the control group for comparison. *Results:* The scores showed more improvement in the therapy group than that in the control group ( $p < 0.05$ ). *Conclusion:* The level of limb Spasm was reduced through SANYINSHUJINGAO, it could be a beneficial supplement to rehabilitation therapies of the Traditional Chinese Medicine.

#### PP002-002

### THE STUDY OF WALKING BIO-RESONANCE ESSENCE IN YOUTH

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*Objective:* The aim of this study was to explore the internal walking bio-resonance essence in normal youth in order to discover ideal walking state of lowest energy expenditure. *Methods:* Ten young male participants were involved in this study, average 16.2 years, mean height 1.73 m and mean weight 56.1 kg. The time-space parameters were collected by Motion Analysis System and oxygen cost was obtained by a Cosmed K4b2 portable gas analysis system. The self-selected, comfortable walking frequency was recorded through three dimensional gait analyses. The participants walked



according to 80% and 120% comfortable walking frequency. The walking speed, oxygen consumption and oxygen cost of different walking frequency were analyzed by one-way ANOVA, significant level:  $p < 0.05$ . *Results*: The comfortable walking frequency was  $107.60 \pm 1.78$  s/min. Eighty percent and 120% comfortable walking frequency were  $85.80 \pm 7.45$  and  $128.60 \pm 10.46$  s/min. The comparison of oxygen consumption in three conditions were significantly different ( $p = 0.007$ ), and the oxygen cost were  $0.14 \pm 0.04$ ,  $1.93 \pm 0.05$  and  $0.99 \pm 0.03$  ml/m/kg, respectively. Oxygen cost of different walking frequency had significant increase ( $p = 0.011$ ). *Conclusion*: The ideal walking state is a nature, self-selected, comfortable walking rhythm and energy consumption and oxygen cost are lowest. Otherwise, increasing and reducing walking frequency would raise energy expenditure.

#### PP002-003

### A COMPARISON OF THREE TYPES OF HAMSTRING MUSCLE STRETCHING ON THE MUSCLE POWER

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*Objective*: In spite of the known effects of stretching on muscles, its effect on muscle power is not fully known. The purpose of this study is to investigate and compare the effect of 3 types of static stretching of the hamstring muscle (Hsm) (stretching from proximal head, stretching from distal head and stretching from both heads) on Hsm power. *Methods*: This semi-experimental study was done on 30 healthy female students aged between 18 to 25 years old. Static stretching from proximal head, distal head and both heads of the muscle in dominant leg were performed for each participant, in 3 nonconsecutive days. A paired t-test and ANOVA were applied for analyzing of data. *Results*: In comparison of muscle power before and immediately after applying static stretching, there was a trend toward decreased the Hsm power in stretching from distal head and both heads of the muscle but the contrast is failed to statistically significantly different (6% and 6.8% decrease of muscle power). When stretching was applied from the proximal head of the Hsm, the muscle power reduced significantly. ( $p = 0.01$ ). *Conclusion*: Considering of negative effect of applying static stretching from proximal head, distal head and both heads of the Hsm, on the Hsm power, it seems that performed exercise with the purpose of increasing muscle power, immediately after applying static stretching should be in caution. These techniques with the intension of warm up do not have positive effect in increasing the muscle power.

#### PP002-004

### QUANTITATIVE EVALUATION BY ULTRASONOGRAPHY FOR SEVERITY OF FEMORAL CONDYLE CARTILAGE EROSION

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*Objective*: To investigate the feasibility of quantitative ultrasonography (US) evaluation, by histogram analysis and thickness, on the severity of osteoarthritic femoral condyle cartilage erosion.

*Methods*: Eighty-seven patients going to receive knee arthroplasty were recruited. Before surgery, US examinations of the severity of femoral condyle cartilage erosion, by regarding parameters of echo level of histogram and width, were performed by the first examiner twice and the second examiner once. After surgery, the lateral and medial distal femoral condyles were sent to pathologic department to evaluate histologic change of cartilage and grade the severity of erosion as grades 1 to 4. The reliability and validity of quantitative US examination, including echo level and width, were analyzed. *Results*: The intraoperator and interoperator reliability of parameters of US examination revealed moderate to high and moderate, respectively. The echo level of the specimen with histologic grade 1 tended to be lower, but no statistic significance was found by ANOVA. A receiver operating characteristics (ROC) curve revealed histologic grading greater to grade 1 had significant higher echo level. *Conclusion*: Quantitative US evaluation, by histogram analysis and thickness measurement, for femoral condyle cartilage erosion has better reliability. Echo level could distinguish mild from more severe femoral cartilage erosion.

#### PP002-005

### BIOMECHANICAL CHANGES IN PATELLAR TENDON AFTER IMMOBILIZATION

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*Objective*: The biomechanical changes in ligament/tendon following immobilization have been investigated extensively, however mainly on ligament/tendon-bone complex, not the substance itself. Therefore, the purpose of this study is to investigate the effect of immobilization on patellar tendon (PT) itself in a rabbit model. *Methods*: 20 rabbits were randomly assigned into two groups. Left hindlimbs of rabbits in the immobilized group were immobilized for six weeks, while those in the control group served as controls. The biomechanical properties were examined not only on patellar tendon (PT)-bone complex, but also on PT substance by using constitutive equation. The ultra-structure of PT was also observed to understand its morphological mechanism. *Results*: The results showed that immobilization decreased the tensile strength and tangent modulus of PT-bone complex to 64.44 and 53.08% of the control values, respectively. In addition, significant difference was found between two groups in two material constants of PT ( $p < 0.01$ ), and the theoretical curves of stress-strain relationship of PT based on the averaged material constants were totally different. What is more, ultra-structural observation revealed that the proportion of the smaller and immature fibrils increased sharply in the immobilized group. *Conclusion*: Our study demonstrated that immobilization not only causes biomechanical alterations of PT-bone complex, but also PT substance itself. Changes in the collagen fibrils in PT following immobilization would contribute to the decrease in its tensile strength.

#### PP002-006

### GAIT ANALYSIS FOLLOWING BILATERAL TOTAL KNEE REPLACEMENT: A CASE REPORT

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*Objective*: A case study approach using gait analysis to further demonstrate individual characteristics in terms of improvement



over time, joint kinematics and muscle activities of the lower limb following total knee replacement (TKR). *Methods:* A 67-year-old male who had undertaken bilateral revision TKR 6 months before the study was tested. A Vicon motion analysis system was used to collect and analyse movements of bilateral lower limbs, synchronized with recordings of the electromyographic activity of three lower leg muscles. Davis marker set was adopted and a rigid body model was used to describe the 3-dimensional movements of the lower limb joints. The values were compared with data derived from a previous evaluation conducted 6 years earlier, prior to the primary TKR and with normative data for the same age group. *Results:* After surgery, the subject's cadence and velocity increased significantly to nearly normal range for the same age group. Pre- and post-operative values for double support period and time in stance were similar but were greater than normal values. Postoperatively the subject tended to adopt a standing position and walking style with the knee flexed consistent with his habitual posture shown pre-operatively. Decreased excursion of the knee during the stride was shown, accompanied with flexed hip and decreased ankle plantarflexion. Prolonged knee flexor and extensor co-activation was apparent both pre- and post-operatively. *Conclusions:* Although the subject walked with a near normal velocity, the kinematics of the joints of lower limb differed from the normal pattern. The prolonged co-activation of the antagonistic muscles of the knee may contribute to the abnormal kinematics.

#### PP002-007

### CALCIUM INTAKE, QUANTITATIVE CALCANEAL ULTRASOUND AND VERTEBRAL FRACTURES IN A POPULATION-BASED STUDY IN SOUTHERN ITALY

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*Objective:* The aims of our study were to quantify nutritional calcium intake in a population of post-menopausal women living in Southern Italy and to compare this and stiffness values to presence and number of vertebral fractures. *Methods:* We examined 741 post-menopausal women. 581 women had prevalent vertebral fractures measured through computerized morphometric examination. 160 women had not any vertebral fracture. We measured bone mineral density and calcaneal bone stiffness by QUS (quantitative ultrasound device - Achilles Express, GE). *Results:* In our sample population, the mean daily calcium dietary intake was 480,63 mg/day. It was slightly higher in no fractured women (mean 502.88 mg/day), than in those with more than 1 vertebral fracture (mean 455.40 mg/day). In all our population, however, the daily calcium intake resulted to be very far from the minimum required. As for stiffness values, the analysis of the data showed a significant reduction in fractured women. In particular, mean stiffness values in no fractured women was 82.06, while in women with at least 1 vertebral fracture the mean stiffness value was about 68.56. The multi-variate non parametric analysis (Kruskal-Wallis test) showed that both daily calcium intake and stiffness are related to presence and number of vertebral fractures. *Conclusions:* Calcium supplementation should be strongly recommended to all osteoporotic patients. QUS may be an effective and useful tool for epidemiologic screening of osteoporotic patients. In fact, low calcaneal stiffness resulted to be strongly associated with the presence and number of vertebral fragility fractures.

#### PP002-008

### KNEE JOINT LIMITATION OF MOTION: THE EFFECTS OF INTENSIVE ISOMETRIC CONTRACTION EXERCISE TRAINING AT SUBMAXIMUM ANGLE OF MOTION

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*Objective:* Most knee joints will develop range of motion (ROM) limitation when they are immobilized for more than 3 months. This study was to explore the therapeutic effects of intensive isometric contraction exercise training (IICET) at submaximum angle of motion for patients with knee joint limitation of motion. *Methods:* Twenty-eight patients with femur fracture were recruited to participate in this study and randomized by 2 groups. All patients had knee joint limitation of motion caused by immobilization of more than 5 months. Their knee joint ROM showed no significant differences ( $p>0.05$ ). The 14 patients in IICET group were trained by IICET at submaximum angle of motion in addition to muscle strength training within the whole ROM. The 14 patients in control group were trained only by muscle strength training within the whole ROM. Before the training, all patients were treated by joint mobilization maneuver and passive joint motion (4 times per week). SPSS10.0 was used for statistical analyses. *Results:* After 45-115 days, there were significant ROM differences between two groups. The times of treatment in each group showed no significant differences ( $p>0.05$ ). The patients of IICET group showed larger knee flexion ROM than control group ( $p<0.05$ ). The extension ROM of IICET group showed no significant differences between two groups ( $p>0.05$ ). *Conclusion:* In addition to muscle strength training within the whole ROM, intensive isometric contraction exercise training at submaximum angle of motion is available for patients with knee joint limitation of motion and can increase their flexion ROM.

#### PP002-009

### PILOT STUDY OF 3D GAIT ANALYSIS FOR MEASUREMENT OF GASTROCNEMIUS LENGTH

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*Objective:* To explore the application of 3D gait analysis for a dynamic measurement of gastrocnemius length. *Method:* The pathology model of tightness of ankle plantar flexion was established victims of poliomyelitis (12 male patients aged  $17.25 \pm 0.62$  years. Ten age-matched normal were included as the control. The 3D motion analysis system was employed to archive the data of segmental motion on walking. Mathematic modeling was established to calculate the length of gastrocnemius. Degree of the ankle dorsiflexion was measured by goniometer. *Result:* The length of gastrocnemius was significant correlated with ankle dorsiflexion ( $p<0.05$ ). The equation of linear regression between the relative gastrocnemius length and the ankle joint dorsiflexion angle was significant ( $p<0.01$ ). *Conclusion:* Ankle joint dorsiflexion angle during walking by 3D motion analysis may estimate the length of gastrocnemius, which is an important reference for orthopedic surgery and rehabilitation.

## PP002-010

**PREDICTABILITY OF CLINICAL SYMPTOMS IN PATIENTS WITH CERVICOGENIC HEADACHE****JiaPei Hong***Department of Rehabilitation, Chang Gung Memorial Hospital, Taoyuan County, Chinese Taipei*

**Objective:** Cervicogenic headache is a syndrome characterized by chronic hemicranial pain that is referred to the head from either bony structures or soft tissues of the neck. The trigeminocervical nucleus is a region of the upper cervical spinal cord where sensory nerve fibers in the descending tract of the trigeminal nerve (trigeminal nucleus caudalis) are believed to interact with sensory fibers from the upper cervical roots. Diagnostic imaging such as radiography, magnetic resonance imaging (MRI), and computed tomography (CT) myelography cannot confirm the diagnosis of cervicogenic headache. The purpose of study is to determine the predictability of clinical involvement with demographic information and the dynamic radiographic image. **Methods:** Forty-four subjects suffering from frequent headaches that fulfilled the International Headache Society criteria for cervicogenic headache were recruited from our rehabilitation outpatient clinic. All of them received cervical dynamic radiography including extension and flexion views. The abnormality was measured by Modified Yale's Criteria, which can define subtle injury and malalignment of spine. **Results:** Result of clinical involvement is as odds ratio, with dichotomous dependent variable. Results of demography and radiogram are as predictors, with a set of independent variables. The fitness of the model and the predictability of clinical involvement are estimated by logistic regression analysis. **Conclusion:** The results suggest the independent variables selected seem to be almost inclusive of all the possible predictors, shown in the logistic regression model.

## PP002-011

**THE STUDY OF ELBOW ISOKINETIC TEST-RETEST IN THE HEALTHY YOUNGSTERS****Guo-xin Wang, Wen-Hong Chen***Department of Rehabilitation Medicine, The First Affiliated Hospital of Nanjing Medical University, Nanjing, Jiangsu, China*

**Objective:** To observe the difference of isokinetic test-retest of elbow flexors and extensors in the healthy youngsters. **Method:** Twenty third-year students in Rehabilitation programmes in the university were studied. Their bilateral elbow flexors and extensors were tested twice with a same procedure within a week at 60, 90 and 180°, respectively. The peak torque (PT), total work (TW), average power (AP), set total work (STW) difference of isokinetic test-retest were compared with t-test and the degrees of the difference were calculated (retest value - test value/test value). **Results:** The TW, STW differences of elbow extensors at 60° were significant ( $p < 0.05$ ), the other item differences of elbow extensors were not significant ( $p > 0.05$ ). The PT difference at 60° and STW differences at every speed of elbow flexors were not significant ( $p > 0.05$ ), the other item differences of elbow flexors were significant ( $p < 0.05$ ). The average values of isokinetic test-retest were approximate, but the degrees of every volunteer's change of isokinetic test-retest had much difference. **Conclusion:** Elbow isokinetic test-retest can be used to compare the differences between/among groups but is not certain to compare the individual's change.

## PP002-012

**STUDIES ON EFFECT OF ALTERNATIVE MAGNETIC FIELD ON THE STEROID-INDUCED AVASCULAR NECROSIS OF FEMORAL HEAD IN RABBITS****Hongyun Qino, Xue-song Lu, Bei-bei Wang, Yang Xia***Rehabilitation Medical Department, Zhongda Hospital, Southeast University, Nanjing, Jiangsu Province, China*

**Objective:** To observe effect of the alternative magnetic field on the steroid induced avascular necrosis of femoral head in rabbits to provide the theoretical basis for clinical application. **Methods:** 24 adult rabbits were divided randomly into three groups, i.e. control group (group A), routine model group (group B), and experimental group (group C), with 8 animals for each groups. Dexamethasone (DXM) was administrated in a dosage of 2.5 mg/kg via intramuscular route to reproduce the aseptic necrosis of femoral head (ANFH) model in group B and C, and rabbits in group C were exposed to low frequency the alternative magnetic field for 4 weeks, while only isotonic physiological saline was given to the animals in group A. At 8th week, the pathological examination were adopted to observed the pathomorphology of bone of the femoral head, blood viscosity, serum cholesterol and triglyceride were measured and analyzed statistically with the three groups. **Results:** Animal histomorphological examination found severe femoral head necrosis in group B, while in group C only indicated mild necrosis, the number of empty lacuna in group B was obviously higher than that in group C ( $p < 0.01$ ); and blood viscosity, serum cholesterol and triglyceride had significantly descended in group C compared with group B ( $p < 0.01$ ). **Conclusions:** The alternative magnetic field was effective for the avascular necrosis of femoral head in rabbits at early stage.

## PP002-013

**INTERVENTIONAL EFFECT TO IMPROVED MOBILIZATION ON THE DYSFUNCTION OF FRACTURED SHOULDER JOINT****Li Wan, Guo-xin Wang***Department of Rehabilitation Medicine, First Affiliated Hospital of Nanjing Medical University-Nanjing Jiangsu Province, China*

**Objective:** Sports therapy combined with physical therapy and manual massage is a conventional method for treatment of shoulder joint dysfunction after fracture. We aimed to investigate the interventional effect of shoulder joint mobilization plus the above method on the dysfunction of shoulder joint. **Methods:** Ninety patients with dysfunction of shoulder joint hospitalized in the department of rehabilitation medicine, first affiliated hospital of Nanjing Medical University between January 2006 and December 2007 were randomly divided into mobilization group ( $n=45$ ) and control group ( $n=45$ ). Patients in the control group received physical therapy firstly then sports therapy about 1 h/day and finally manual massage. 10 days were as a course for a total of 3 courses uninterruptedly. Patients in the mobilization group received the therapy as in the control group added with shoulder joint mobilization 1.5 to 2.0 h/day. **Results:** All the 90 patients were analyzed. The angles of ROM of anteflexion post-extension, adduction and abduction after 3 courses of treatment were ( $113 \pm 18$ )°, ( $39 \pm 7$ )°, ( $36 \pm 6$ )°, ( $118 \pm 15$ )° respectively in the mobilization group, significantly improved as compared with the control group [ $(87 \pm 11)$ °, ( $30 \pm 6$ )°, ( $25 \pm 7$ )°, ( $79 \pm 16$ )°] ( $t=3.01$  to  $5.17$ ,  $p < 0.01$ ). The angles of ROM of anteflexion, post-extension, adduction and abduction in either group were ameliorated after mobilization as compared with before mobilization ( $t=3.75$  to  $7.96$ ,  $p < 0.01$ ). **Conclusion:** Shoulder joint

mobilization can obviously improve the motor function of shoulder joint, which may be involved in its function of dragging peripheral soft tissues of joint directly, separating adhesion in a short time and keeping the soft tissues elastic and extensible, and thus can improve the ROM of joints.

#### PP002-014

### THE EFFECT OF MANUAL THERAPY TO NON-SPECIFIC CHRONIC LOW BACK PAIN

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**Objective:** To observe the treatment effect of the manual therapy in non-specific Chronic Low Back Pain (LBP) patients, especially for those who did not have significant improvement with the treatment by Electrophysical Therapy (EPT) modalities. **Methods:** Study design: Pre- and Post- intervention repeated measures. Group: Two male patients with chronic LBP. Main Outcome Measures: Visual analog scale (VAS) and a Chinese version of Aberdeen back pain scale were used to assess pain intensity and subjective impairment related to back pain respectively at initial assessment and final treatment session. In addition, active range-of-motion (ROM) of total trunk forward flexion was assessed by measuring the fingertip-to-floor distance at maximum flexion. Two subjects were treated with lumbar spine postero-anterior (PA) mobilization followed by sham ultrasound for 10 min. Treatment dosage including grading, direction, repetitions and total duration of mobilization as well as expected level of pain was decided according to the findings of individual assessments of the subject's joint dysfunction. The mobilization intervention consisted of a PA mobilization manually applied to the spinous process of the most symptomatic spinal level for three 1-min duration and 5 consecutive sessions as a standardized treatment protocol. Both subjects received right unilateral PA based on our assessment. **Results:** After five sessions of treatment, a slight improvement in active ROM of lumbar flexion and lateral flexion, as well as decreases in both VAS score and Aberdeen Low Back Pain score was observed. **Conclusion:** Manual therapy has positive effect in relief of pain, improvement of active movement and reduction of functional disability in patients with chronic LBP.

#### PP002-015

### THE PREVALENCE OF SHOULDER IMPINGEMENT SYNDROME IN MEN VOLLEY-BALL ATHLETES

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**Objective:** Risk of injuries in sports is common. This study was done to determine the prevalence of shoulder impingement syndrome in men volley-ball athletes. **Methods:** This study was conducted on 70 men volley-ball athletes within 17–30 years old range that were selected by simple sampling. Data were collected by questionnaire and doing especial clinical tests. For data analysis, t-student and chi-square tests were used. **Results:** Results showed that the prevalence of shoulder impingement is 22.9%. The supraspinatus and infraspinatus tendons had more involvement (75%, 62.5%, respectively). Also cases had a significant decrement in power of external rotator muscles and range of motion of flexion, abduction and external rotation of dominant shoulder joint. **Conclusion:** Because of high prevalence of shoulder impingement, the correct exercise and proper training can be essential to prevent the syndrome.

#### PP002-016

### LOW-LEVEL LASER THERAPY PROMOTING FIBROBLAST VIABILITY AND GENE EXPRESSION IN ACHILLES TENDON FIBROBLASTS

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**Purpose:** Achilles tendon problem are very common in sports medicine. Low-level laser therapy (LLLT) is common in rehabilitation applications in decreasing pain, reducing inflammatory processes and promoting tissue healing. This study examines the effects of the proliferation of Achilles tendon fibroblasts after using different LLLT doses. **Methods:** Porcine ankle sections purchased from a local wholesale meat supplier were dissected to obtain fibroblasts of Achilles tendon. Four groups of cultured fibroblasts were exposed to LLLT and harvested after 24 h. Control groups were cultured identically with no LLLT. Other groups respectively received 1J/cm<sup>2</sup>, 2J/cm<sup>2</sup>, and 3J/cm<sup>2</sup>. Cell viability and mRNA expression of collagen I and decorin were measured. Cell viability was measured by MTT assay after 24 h irradiation. **Results:** The result revealed a significant increase in the cell counts in irradiated groups. The changes compared with the control group were 13%, 30%, and 12% in group 2, group 3, and group 4, respectively. Moreover, the results showed higher cell number in group 3 than that in groups 2 and 4. The overall m-RNA proliferation of fibroblasts significantly increased in all cultures treated with LLLT. **Conclusions:** The LLLT may lead to improved and more effective tissue healing by promoting collagen I and decorin synthesis and cell viability. The optimal LLLT dose in this study is 2J/cm<sup>2</sup>. Understanding the dose effects of cell and gene expressions while applying LLLT will hopefully lead to greater insight into both injury and rehabilitation of the Achilles tendon.

#### PP002-017

### TREATMENT OF INFECTIOUS NONUNION OF TIBIA IN ELDERLY PATIENT USING ILIZAROV EXTERNAL FIXATOR – A CASE REPORT

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**Objective:** The treatment of infectious nonunion of tibia in elderly patient sometimes needs a very long time to heal. We report a case of infectious nonunion of tibia after plate fixation. **Methods:** A 68-year-old woman suffered her right tibia plateau fracture. And it had been fixed with LCP plate laterally and reconstruction plate medially. Six weeks after the operation, MRSA infection occurred at the skin ulcer. Debridement, metal removal, gastrocnemius muscle flap and Ilizarov external fixation was performed. MRSA infection was healed, however no new bone formation obtained. In six months after Ilizarov external fixation, curettage at nonunion bone and iliac bone graft was done. Gradually MRSA infection relapsed in the skin flap and no new bone formation obtained during partial weight bearing period. In four and half months after the iliac bone graft, fibula was partially resected and Ilizarov external fixator was compressed between the first and second ring. In three months after the compression, callus formed in the nonunion area and Ilizarov



external fixator was removed. Total period of Ilizarov external fixator was thirteen months. *Results:* She could walk without a cane and had mild ROM limitation of knee and ankle joints. *Conclusions:* MRSA infected tibia fracture could not obtain bone union. We then resected fibula and compressed Ilizarov external fixator between the first and second ring and finally we obtained bone union. The Ilizarov method of compression for nonunion is a very useful method for the treatment of infectious nonunion of tibia.

#### PP002-018

### A CASE REPORT OF REPLACEMENT OF GIANT CELL TUMOR OF PELVIC BONE WITH A CERAMIC IMPLANT – 20 YEARS SURVIVAL CASE

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*Objective:* Giant cell tumor (GCT) of bone is benign tumor but the removal of aggressive GCT by curettage alone has the high risk of local recurrence. We report a 20-year survival case of GCT of bone in the pelvis replaced with a ceramic implant. *Methods:* A fifty-four-year-old woman who had pain in her left hip joint for two years consulted our hospital on 12/15/1982. Roentgenogram of her pelvis showed a large tumor in size 13 cm length which extended from the ischium to the ilium. A needle biopsy diagnosed GCT of bone (Grade II). She eagerly hoped limb-sparing treatment. Two stage operation was planned. Partial hemipelvic excision in en bloc preserving the lower extremity was operated first on 2/10/1983. The bony defect and dead space were filled with bone cement. Bone cement was removed and a specifically designed alumina ceramic implant including Bioceram hip prosthesis was placed on 3/24/1983. *Results:* In eight months after operations she could walk indoors without a cane and stand on the involved extremity. In 20 years after the operation, she died by gastric cancer on April 2003. Autopsy was done and femoral component showed no loosening and her left pelvis did not have local recurrence. *Conclusion:* In Japan, alumina ceramic implants including Bioceram hip prosthesis were replaced for resected pelvic tumors from 1983 to 1995. Total number was 23 cases. This patient was the first case in Japan and was the longest survival case in Japan.

#### PP002-019

### TAYLOR SPATIAL FRAME IN THE LOWER LIMBS – TWO CASE REPORTS

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*Objective:* The Taylor Spatial Frame (TSF), a unique external fixation system, can treat a variety of fractures, nonunion, and malunions. The TSF uses the slow correction principles of the Ilizarov system using a six-axis deformity analysis with a computer program. In this study, we present and evaluate its use in our hospital. *Methods:* A 23-year-old man suffered his left tibia Gustilo type II open fracture. Immediately we fixed the fracture with the TSF and fracture

displacement was measured and corrected by the computer program. In three months after the TSF fixation, we obtained bone union and the TSF was removed. A 52-year-old man suffered his right tibia open fracture 11 years ago. His right leg showed 2.5 cm short, and mechanical axis was placed in the medial side of right knee joint. We performed osteotomy in the tibia and fixed with the TSF. We gradually performed deformity correction and bone lengthening in conjunction with a software program. The TSF was removed after five months. Leg discrepancy has disappeared and mechanical axis has placed in the center of right knee joint. *Results:* Two cases were treated successfully with the TSF. *Conclusion:* We believe the TSF is an excellent and useful tool for acute fracture, limb lengthening, deformity correction, malunion, and nonunion.

#### PP002-020

### EFFECTIVENESS OF SHOCK WAVE THERAPY FOR PATIENT WITH CHRONIC PLANTAR FASCIITIS

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*Objective:* To evaluate the effectiveness of extracorporeal shock wave therapy for chronic plantar fasciitis and to determine the side effects of this treatment. *Methods:* From 2005 to 2006, a prospective study, 37 patients were diagnosed plantar fasciitis by rheumatologists and physicians in Rehabilitation of Centre Orthopaedic-Rheumatology and Rehabilitation of E Hospital in Hanoi, Vietnam. All patients received the application of 1000–1500 impulses of low-energy of extracorporeal shock wave/time, 5 treatments given at weekly interval (Apparatus Shock wave HK ESWO-AJ-II Made in China). The main outcome measure: Pain on Visual Analogue Scale (VAS) and walking ability measured before treatment, secondary outcome measure on Roles & Maudsley Scale, VAS, and walking ability at 12 weeks, 6 months. Side effects were reported by participants during and after treatment. *Results:* A significant decreased of pain on VAS and increase of walking ability was seen at 12 weeks and 6 months ( $p < 0.001$ ). Treatment was good and excellent on Roles and Maudsley Scale in 57.6% patient at 12 week and 82.8% at 6 months after treatment ( $p < 0.001$ ). A few side effects were reported: Feeling of numbness locally. All patients were afraid of pain and noise from apparatus. *Conclusions:* Shock wave therapy was effective for chronic plantar fasciitis and safe for patient, with minimal side effects such as local numbness during treatment.

#### PP002-021

### THE EFFECTS OF EXERCISE TRAINING ON MOTOR FUNCTION OF ACUTE CEREBRAL INFARCTION RAT

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*Objective:* To investigate the effect of rehabilitation training on motor function in hemiparetic rats. *Methods:* 16 healthy male wistar rats, weighing 250 to 300 g and were randomly divided into the model group (A) with eight, rehabilitation training group (B) with eight. Line was used to block the middle cerebral artery to prepare animal model of cerebral infarction. After preparing module, model group was farmed in ordinary cage without treatment but the training group is rehabilitated in place with mesh roller trainer



rotation. Within the training, walking on the balance beam, rotating to stick on the training of 30 min carried out every day. Indicators for nerve function including scores on the balance beam, the rods, net roller were assessed at 24 h, 7 days post-operation. **Results:** Motor function scores after operating 7 days ( $n=8 \pm S$ ) of Group A and B were Bederson ( $1.88 \pm 0.35$  vs  $1.38 \pm 0.52$ ,  $p < 0.05$ ), balance beam ( $3.88 \pm 0.64$  vs  $3.13 \pm 0.64$ ,  $p < 0.05$ ); rod test ( $2.38 \pm 0.52$  vs  $1.88 \pm 0.64$ ,  $p > 0.05$ ); net roller test ( $2.25 \pm 0.46$  vs  $1.63 \pm 0.52$ ,  $p < 0.01$ ). **Conclusion:** Rehabilitation training has increased function of balance, walking, grasping ability and strength of limb muscle in rats with cerebral infarction.

#### PP002-022

### HYDROCEPHALUS POST TBI: UNIVERSITY MALAYA MEDICAL CENTRE (UMMC) EXPERIENCE

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**Objective:** To describe the clinical presentations and outcome of hydrocephalus post TBI in 5 patients referred for rehabilitation management in UMMC. Ventriculomegaly post TBI is a common finding but incidence of true hydrocephalus post TBI is between 1–2% (generally of communicating in nature). It is important to identify post TBI hydrocephalus as it can occur during acute, subacute and chronic care of patients. Post TBI hydrocephalus can significantly affect neurological and functional recovery of patients and treating clinicians must be vigilant in monitoring them. Any functional changes post TBI should alert clinicians of possible hydrocephalus. **Setting:** Acute care setting hospital with dedicated beds for neurosurgical rehabilitation. **Methods:** Case reports of 5 patients with TBI. **Conclusion:** Post TBI Hydrocephalus can occur during acute, subacute and chronic care of patients. Patients who are at greater risks are those, who have sustained severe TBI, have longer duration of coma and have had decompressive craniectomy. It is potentially a treatable condition and it influences functional outcome.

#### PP002-023

### THE PREVALENCE OF DEPRESSION IN PHYSICAL THERAPY STUDENTS

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**Objectives:** Psychological stress is the most common problem in human societies. In young people particular factors such as age and social behavior affected by psychological stress. The aim of this study is the prevalence of depression in physical therapy students. **Methods:** This is a cross sectional study which was done on all physiotherapy students. 119 students were evaluated by questionnaire. Data were collected by standard's Beck questionnaire for depression and another questionnaire for demographic characteristics such as gender, age, marital and year of studying. The statistical methods consist of Chi-square test, Pearson test, Likelihood ratio and Fisher's exact test. **Results:** According to the results 54.2% of female students and 41.7% of male students

suffered from depression. The married students had 30% depression and singles had 55%. Students of the first year had 62.5% depression, second year had 53.8%, third year had 63.3% and fourth year had 38.2%. There was no correlation between gender, marital and year of study with depression. **Conclusion:** The rate of prevalence of depression among physiotherapy students is very high. It seems that the families and university authorities need to consider the psycho-intellectual condition of students during the year of education.

#### PP002-024

### CHANGES IN CEREBRAL CURRENT SOURCE DISTRIBUTION BY ELECTRICAL WRIST STIMULATION IN PATIENTS WITH RIGHT HEMIPARESIS

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**Objective:** To investigate the changes of brain current source distribution by electrical wrist stimulation in patients with right hemiparesis. **Method:** Ten patients with left MCA territory infarction were enrolled. The electroencephalography (EEGs) included the two artifact-free 5 min segments recording of the resting and the electrical stimulation state (applied to the right extensor carpi radialis muscle). The segments were used to obtain cross-spectral LORETA (low resolution brain electromagnetic tomography) images. The frequency spectrums are set as delta (1–3 Hz), theta (4–7 Hz), alpha (8–12 Hz), beta-1 (13–18 Hz), beta-2 (19–21 Hz) and beta-3 band (22–30 Hz). **Results:** The current source densities of the theta band induced by the electrical stimulation decreased significantly in the ipsilateral superior and middle temporal gyrus ( $p < 0.01$ ). The current source densities of the beta 2 and 3 band induced by the electrical stimulation increased significantly in the contralateral superior, middle, and inferior frontal gyrus, superior and the middle temporal gyrus, the anterior cingulate, and extranuclear ( $p < 0.01$ ). **Conclusion:** EEG changes observed after FES applied to a paretic limb supports the proposal that electrical stimulation may enhance the benefit of customary neurorehabilitative treatments and possibly motor learning.

#### PP002-025

### CLINICAL ANALYSIS OF TRAUMATIC SPINAL CORD INJURY

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**Objective:** Retrospective review of the clinical manifestations traumatic spinal cord injuries and to evaluate their changes and mechanism, and to find out the appropriate rehabilitative management. **Methods:** Retrospective review and analysis of clinical manifestations of fifty traumatic spinal cord injuries. **Results:** All the patients have different degree dysfunction of mobility, sensory and sphincter. And there were 46% patients complicating with urinary tract infection, 32% with pulmonary infection, 12% with orthostatic hypotension, and 20% with pressure ulcer (all of them occurred outside the rehabilitation hospital). 1 case of venous thrombosis occurred at 30<sup>th</sup> day after injury. Blood

tests of these patients showed that there were 6.25% of them suffered from kaliopenia, 16.67% from hyponatremia, 46.67% from hypoproteinemia, 48.89% from hypo-albuminemia, and 16.67% of them complicated with increase of urea nitrogen, 6.25% of increased creatinine, 10.42% of increased fasting blood glucose, 68.8% of high D-dimer. *Conclusions:* Traumatic spinal cord injuries are intricate impairment of nerve system, which not only brings the dysfunction of mobility, sensory and sphincter but also brings a series of complications and blood biochemical changes and secondary changes in haemodynamics. Therefore, when dealing with the patients suffered from traumatic spinal cord injury, all these primary and secondary changes must be considered.

#### PP002-026

### EFFECT OF COMPREHENSIVE REHABILITATION-THERAPY ON LOCOMOTOR FUNCTION AND THE ABILITY OF DAILY LIVING (ADL) IN HEMIPLEGIC PATIENTS AFTER STROKE

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*Objective:* To investigate the effect of comprehensive rehabilitation therapy on locomotor function and ability of daily living (ADL) in hemiplegic patients after stroke. *Methods:* 60 patients with hemiparesis after stroke were randomized to two groups: rehabilitation group and control group. Both groups were given traditional therapies: drug therapy, electrotherapy and acupuncture treatment. In addition to these therapies, neuromuscular facilitation technology and neural network reconstruction (Danmeter AutoMove AM800) were given to the rehabilitation group. Patients were evaluated with Fugl-Meyer Scale and Barthel Index before intervention and 3 months after intervention respectively. *Results:* After 3 months, Fugl-Meyer scales and Barthel Index in rehabilitation group were significantly improved. Significant difference was found between control group and rehabilitation group ( $p < 0.05$ ). *Conclusion:* Comprehensive rehabilitation therapy could improve locomotor function and ADL in hemiplegic patients after stroke.

#### PP002-027

### EFFECTS OF PELVIC ELECTRICAL STIMULATION ON NEUROGENIC BLADDER OF PATIENTS WITH SPINAL CORD INJURY: A PRELIMINARY STUDY

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*Objective:* Neurogenic bladder is one of major problems in patients with spinal cord injury (SCI). This study investigated the effects of pelvic electrical stimulation on neurogenic bladder of patients with SCI. *Method:* It was a prospective, pre- and post-treatment trial. Ten patients (9 male and 1 female with age at  $32.74 \pm 6.11$  years) with neurogenic bladder caused by complete or incomplete suprasacral SCI were recruited and treated by pelvic electrical stimulation twice a day for 6 weeks. The parameters of stimulation were 10-50 Hz and 30 min per session. Urodynamic examination and voiding diary were performed before and after 6 week treatment to evaluate the treatment effects. *Result:* After 6 week treatment, eight of ten patients showed sympto-

matic improvement while the rest two patients demonstrated no changes in incontinence. Mean numbers of voids per day were decreased from  $13.5 \pm 2.9$  before treatment to  $9.0 \pm 2.2$  after treatment ( $p < 0.01$ ). Mean voided volume was increased from  $175 \pm 38.6$  ml to  $214 \pm 28.8$  ml ( $p < 0.01$ ), and mean incontinent episodes per day was decreased from  $6 \pm 3.7$  to  $3 \pm 2.2$  ( $p < 0.01$ ). The maximum cystometric capacity was increased and detrusor pressure at retention was decreased. *Conclusion:* Pelvic electrical stimulation could improve urinary frequency and incontinence, increase cystometric capacity of patients with neurogenic bladder caused by spinal cord injury. Further studies must be carried out to identify the best stimulation parameters and to verify the long term results.

#### PP002-028

### CASE REPORT OF PAROXYSMAL NOCTURNAL HEMOGLOBINURIA RELATED CEREBRAL INFARCTION

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*Objective:* Paroxysmal nocturnal hemoglobinuria (PNH) is a rare acquired disorder caused by a somatic mutation in the hematopoietic stem cell resulting in a loss of the complement regulatory proteins on the membrane of blood cells. That increases the tendency for complement to damage blood cells, and after a series of reactions, hemolytic and thrombotic episodes can be suffered. In review of past reports, PNH-related thrombosis usually occurs in venous system, and it does rarely in artery. *Case Report:* In our case, this male patient suffered from dark urine and anemia once after each febrile episode since senior high school, and then PNH was diagnosed and long term medication control was applied, but compliance of part of medication was not well due to side effect. Besides, no past history of hypertension, diabetes mellitus, hyperlipidemia, nor smoking was noted. Family history of stroke was also denied. However, in his age of 52, arterial cerebral infarction was suffered, and there was thrombosis in right middle cerebral artery in length of about 10 cm, so primary intra-arterial thrombolysis was not indicated. Emergent decompression operation was done to decrease intracranial pressure. After condition stabilized, rehabilitation programs were initiated with partial improvement, but complications of craniectomy still could be seen. *Result:* Rehabilitation programs for this patient were similar to other stroke patients, but because infectious event in PNH patient can induce hemolytic episode, prevention of risk of infection increased by stroke, including urinary tract infection and aspiration pneumonia, will be more important.

#### PP002-029

### THE EFFECTS OF ALCOHOL NEUROLYSIS OF TIBIAL NERVE MOTOR BRANCHES TO THE GASTROCNEMIUS MUSCLE FOR SPASTIC FOOT DROP PATIENTS

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*Objective:* To observe the efficiency of alcohol neurolysis of tibial nerve motor branches to the gastrocnemius muscle in

treatment of spastic foot drop in patients with spinal cord injury and traumatic brain injury. *Methods:* Twelve patients with ankle plantarflexor spasticity had accepted motor branch block (MBB) of the tibial nerve to the gastrocnemius muscle with 99.9% ethyl alcohol. The severity of spasticity was assessed before and after motor branch block (0 h, 24 h, 7 days, one month and three months), using the Modified Ashworth Scale (MAS) score of ankle plantarflexor, clonus score of the ankle, and the passive range of motion (PROM) of ankle dorsiflexion. The Friedman test was used to compare Means before and after the motor branch block. *Results:* The MAS score was reduced in 11 patients during the 3-month follow-up, and spasticity reappeared at the level of the pre-MBB state in 1 patient who need repeated motor block. The mean values before and after treatment were as follows: MAS scores were  $2.67 \pm 0.65$  vs  $1.83 \pm 0.72$ ; Clonus scores were  $1.83 \pm 0.83$  vs  $1.00 \pm 0.85$ ; PROM were  $-18.33^\circ \pm 11.54^\circ$  vs  $-3.75^\circ \pm 8.56^\circ$ . No serious complications were observed during the 3-month follow-up period. *Conclusions:* MBB of the tibial nerve to the gastrocnemius muscle is effective and safe for relieving localized muscle spasticity of the ankle plantarflexors in patients with upper motor neuron disease.

#### PP002-030

##### PREVALENCE AND MANAGEMENT OF POST-STROKE SPASTICITY: THE MULTICENTER STUDY

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*Objectives:* To study the prevalence, associated factors and management of poststroke spasticity. *Methods:* The Thai stroke rehabilitation registry (TSRR) was conducted among 9 rehabilitation centers. All subjects received the conventional rehabilitation program until they reached their rehabilitation goals or discharge criteria. The Brunnstrom motor recovery stage, Barthel Index, Thai Mental State Examination, Modified Ashworth Scale (MAS), and WHOQOL-BREF-Thai (26 items) questionnaires were used to assess the motor recovery, functional disability, cognition, spasticity and quality of life respectively. The management of spasticity was also recorded. *Results:* There were 327 patients with mean age 60.95 years participating in the study. The prevalence of poststroke spasticity was 41.6%. Spasticity with MAS grade 1 was found in majority. The patients with spasticity had significantly longer duration after stroke ( $p=0.049$ ), had the Brunnstrom motor recovery stages of arm ( $p=0.003$ ), hand ( $p=0.001$ ) and leg ( $p=0.000$ ) significantly lower than the nonspasticity group. The factors associated with spasticity were Brunnstrom motor recovery stage 1–2 of the leg with the odds ratio being 5.37 (95% CI=2.27–12.71). Management of spasticity was demonstrated in 83 patients (25.4%). Therapeutic exercise was the mainstay of management. *Conclusion:* Spasticity was a common complication after stroke. Although the prevalence was quite high, spasticity with MAS grade 1 was found in majority. The associated factor was the Brunnstrom motor recovery stage of the leg. Therapeutic exercise was the mainstay of the management.

#### PP002-031

##### BRAIN ACTIVATION DURING EXTERNAL STIMULATIONS AFTER SPINAL CORD INJURY – A FUNCTIONAL MAGNETIC RESONANCE (FMRI) STUDY

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*Objective:* To assess nerve activity in the brain of after spinal cord injury by multi-stimulation model functional magnetic resonance imaging (fMRI). To explore the change of nerve activity in the brain different degree and level of SCI patients. *Methods:* We scanned the 6 patients and 6 healthy controls during 4 different external stimulation tasks. In the 6 SCI patients, 3 of them were complete SCI at level C5, C6 and C7. Others were incomplete SCI at level TH6, TH10 and TH11. All of SCI patients have more than 6 month after injury. Brain activations were recorded under four conditions: passive movement of left lower limb-PMLLL (straight leg raise) by the therapists, including 1) one leg movement and 2) double legs alteration movement, mental imagining to move their legs at the same methods with 3) left leg movement and 4) double legs alteration movement – MLLL and MIDLL. All the subjects are required to close their eyes during the experiment. *Results:* Patients in comparison to healthy controls fMRI demonstrated variability Activation maps In the PMLLL item and the MLLL item, however no variability Activation maps In the PMDLL item and the MIDLL item. Mental image motion in comparison to demonstrated variability Activation maps for patients and healthy controls. Different degree and different level of SCI patients demonstrated variability Activation maps. *Conclusions:* Non-motion comparison to ambi-motion maybe promotion more activation in the brain of SCI patients. Mental image compare with the passive motion had more activation in the both groups. There are different appearance areas in the different degree and level of SCI patients.

#### PP002-032

##### EXPLORE THE MECHANISM AND TREATMENT APPROACH OF LEFT HEMIPARALEXIA BY INTEGRATING NEUROPSYCHOLOGICAL TEST AND NEUROIMAGING STUDY

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*Objectives:* To explore the mechanism underlying left hemiparalexia ascribed to lesions in left splenium of corpus callosum and to develop a mechanism-based treatment. *Methods:* The patient was required to look straight ahead at the fixation point and read aloud 60 compound and 36 single Chinese characters tachistosopically presented in central or divided visual fields (CVF, LVF/RVF), respectively. In fMRI experiment, the patient read silently 80 Chinese compound characters tachistosopically presented either to his RVF or LVF. Diffusion tensor tractography (DTT) was used to reveal the fibers critical for reading. An experimental treatment was also adopted in which the patient was cued to fixed on the left edge of every character and



read it aloud. *Results*: The left radicals of centrally flashed compound characters and single characters presented in LVF were identified less correctly than right radicals or characters in RVF ( $p < 0.001$ ). LVF rather than RVF characters activated the left mid-fusiform gyrus which was critical for reading and labeled as VWFA (visual word form area). DTT revealed a damaged fiber tract of forceps major which disconnected the transference of visual information between left and right visual cortexes. The experimental treatment induced improved reading performance in the patient after adopting the devised fixing strategy ( $p < 0.001$ ). *Conclusions*: The left hemiparalexia was due to interruption of LVF (right visual cortex) characters information to left VWFA caused by splenial lesions. Fixing on the left edge of a character to project the whole character into RVF (left visual cortex) is a mechanism-based and effective treatment approach.

#### PP002-033

### EFFECT OF PANAX NOTOGINSENG SAPONIN ON LEARNING AND MEMORY IMPAIRMENT INDUCED BY BETA-AMYLOID PEPTIDE (1-40) AND ITS MECHANISM OF ACTION

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*Objective*: Increased oxidative stress resulting from free radical damage to cellular function is associated with a number of neurodegenerative diseases, in particular with Alzheimer's disease (AD). The deposition of beta-amyloid peptide (A $\beta$ ) has been suggested as the central disease-causing and disease-promoting event for the disease, and the pathological role of A $\beta$  was partially mediated by oxidative stress. Here we investigated the effects of panax notoginseng saponin (PNS), a Chinese traditional medicine, on the learning and memory impairment in Sprague-Dawley rats induced by aggregated A $\beta$  (1-40). *Methods*: The learning-memory ability was measured by applying Morris water maze (MWM) test. Oxidative stress was evaluated by using biochemical analysis, western blotting and reverse transcriptase-polymerase chain reaction (RT-PCR). *Results*: PNS (200 mg/kg/day, p.o., 4 weeks) significantly ameliorated the learning and memory impairment induced by A $\beta$  (1-40). PNS decreased the latencies and swim distances of rats to reach a hidden platform and improved the corresponding changes in search strategies occurred in the MWM test, and PNS increased step-through latencies also. Biochemical analysis, western blotting and RT-PCR showed that PNS was also found to prevent significantly the decline of Mn-, Cu, Zn-superoxide dismutases (Mn- and Cu, Zn-SOD), total anti-oxidative capabilities (T-AOC), glutathione peroxidase (GSH-Px), and glutathione reductase (GSSG-R) activities, the increase of MDA content in the cortex and hippocampus of rat brain induced by A $\beta$ . *Conclusion*: The results suggest that PNS improves significantly the learning and memory impairment in mice induced by A $\beta$ , and this effect may be attributed to its antioxidation.

#### PP002-034

### THE EFFECT OF BODYWEIGHT-SUPPORTED TREADMILL TRAINING ON DROP FOOT OF HEMIPLEGIA

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*Objective*: To investigate the effects of bodyweight-supported treadmill training (BWSTT) in improving muscle control in the ankle joint of hemiplegic patients. *Methods*: Thirty-nine hemiplegic patients aged  $63.07 \pm 6.87$  years and had an onset of stroke for  $67.1 \pm 13.77$

days were randomly divided into a BWSTT group ( $n=19$ ) and a control group ( $n=20$ ). Both groups received conventional physical therapy (PT). Meanwhile, BWSTT group received BWSTT for 30 min a session; 5 days a week, 8 weeks were one complete duration. The BWSTT was started in a condition of 40% weight bearing relief and 0.2 km/h treadmill speed. The working parameters were adjusted along with patients' improving pacing function. Outcome measurements included muscle strength of the affected ankle muscles assessed with surface electromyography (sEMG). The integrated EMG of the ankle dorsiflexor (tibialis anterior TA) and plantar-flexors (MG) and the co-contraction ration of agonist and antagonist were analyzed pre- and post-treatment. *Results*: No significant differences were found between the two groups before treatments ( $p > 0.05$ ). All subjects increased their muscle strength of the affected TA and MG after treatments. But compared with the control group, those in the BWSTT group reinforced muscle strength of the affected TA, reduced in term of spasticity development in the affected plantar-flexors, decreased co-contraction ration of the antagonist muscle of the ankle joint. *Conclusion*: BWSTT may enhance the ankle muscle function of stroke, by facilitating agonist contraction and decrease antagonist co-contraction.

#### PP002-035

### A BRIEF OVERVIEW OF TRAUMATIC BRAIN INJURY REHABILITATION IN MAINLAND CHINA

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*Objective*: To provide an overview of the epidemiology, medical and rehabilitation issues for traumatic brain injury (TBI) in Mainland. *Methods*: We included publications indexed in CHKD from 2002 to 2007. *Results*: TBI in Mainland China is common, epidemiologic investigation data shows that the incidence rate of TBI during the latest years has exceeded 10/100,000. In the Common causes, Traffic accidents (53.39%), criminal assaults (18.67%) and injury by falling (15.20%) list the top 3. Hyperbaric oxygen (HBO), mild hypothermia and acupuncture have been used widely in clinic. Early rehabilitation has been shown to improve functional outcome. Physical therapy and occupational therapy are the common modalities of TBI rehabilitation. Cognitive rehabilitation and neuropsychiatric treatment are more recognized and developed than before. But there are still some deficits, including the deficient standardization of therapy and the lack of rehabilitation professional people and so on. *Conclusion*: Rehabilitation of TBI is very important due to the high incidence rate and high morbidity in mainland. Early rehabilitation should be developed. Standardization of therapy should be intensified. More professional people should be trained.

#### PP002-036

### THE CHANGES IN GAIT AFTER BOTULINUM TOXIN INJECTION INTO THE PARETIC UPPER LIMB IN STROKE PATIENTS

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*Objective*: Botulinum toxin, an antispastic agent, is used in stroke patients to improve motor function. Clinically, changes in gait after botulinum toxin injection into paretic upper limb were observed. The purpose of this study is to investigate the biomechanical changes



in gait after botulinum toxin injection into the upper limb in stroke patients. *Methods:* Ambulatory hemiplegic stroke patients with significant spasticity in the paretic upper limb were recruited at least 3 months after stroke. Botulinum toxin was injected into the belly of the biceps brachii and other spastic muscles of the paretic upper limb. Modified Ashworth scale and modified Tardieu scale were used to evaluate spasticity. Vicon 460 motion analysis system was used for evaluation of the changes on gait. The outcome assessments were performed before and 2, 4, 6, 12 weeks after the injection. Paired t-test was used to compare the pre-injection and post-injection data. *Results:* Ten patients were recruited in this study. Modified Ashworth scale and modified Tardieu scale of the biceps brachii showed significant reduction of spasticity after treatment of botulinum toxin. The effect lasted for 12 weeks. Gait parameters including step length and step width changed significantly after botulinum toxin injection. Joint range of motion of paretic side including shoulder abduction and adduction, shoulder flexion, extension, knee abduction and adduction also increased significantly. *Conclusion:* In our study, botulinum toxin injections in the paretic upper limb of the stroke patients not only reduce spasticity of the upper limb but also change the gait performance.

#### PP002-037

##### A CASE SERIES OF TRACHEOSTOMIZED PATIENTS USING "COUGH-ASSIST"

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*Objective:* Cough-Assist was proven to be effective for improving lung function of neuromuscular diseases (NMD) patients. This machine has been clinically used for tracheostomized patient. However the effect was not well documented in literature. *Methods:* This is a case series describing the effects of Cough-Assist on a group of tracheostomized patients from October 2005 to July 2007. Hospital records were reviewed before and after the patients were prescribed the Cough-Assist. *Results:* 10 tracheostomized patients were recruited, 3 are female and 7 are male. 7 are NMD ventilator users, 1 is stroke patient and 2 are patients with encephalitis aged from 24 to 81. No complication was detected after 8,760 operation cycles from these patients. Number of chest infection was significantly decreased from 4.3/year to 0.9/year after using Cough-Assist ( $p < 0.01$ ). Number of suction catheters usage was reduced from 12.8/day to 5.2/day ( $p < 0.05$ ). Airway compliance of the ventilator users increased 7.6 ml/cm H<sub>2</sub>O ( $p = 0.043$ ). Forced vital capacity was increased for 70 ml ( $p = 0.3$ ). *Conclusion:* Cough-Assist is safe when used in tracheostomized patients. It reduced the number of chest infection for these patients and possibly improved the lung compliance. However, the number of patients in this series was small and the study period was short, the effect on lung volume and mortality needs further larger studies to evaluate.

#### PP002-038

##### STUDY OF THE RELATIONSHIP AMONG SOMATOSENSORY EVOKED POTENTIAL AND ICH SCALES IN PROGNOSISING PREDICTION IN PATIENTS WITH INTRACEREBRAL HEMORRHAGE

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*Objective:* This study aims at prognosis evaluation in patients with intracerebral hemorrhage (ICH) by using Short-latency somatosen-

sory evoked potentials (SEP) and ICH scales. *Methods:* Sixty-one patients with ICH received SEP examination within 7 days after onset of ICH. ICH scales included original ICH scale (OICH), modified ICH scale (MICH), new ICH scale (NICH). ICH scales, National Institutes of Health Stroke Scale (NIHSS), Barthel Index (BI) were measured on admission. NIHSS, BI, modified Rankin scale (MRS) was measured 3 months later. *Results:* There was significant difference between ICH patients' healthy limb and sick one in P40 incubation period of the popliteal nerve at the acute stage. The amplitude in sick limb was lower than that in healthy one. P40 incubation of popliteal nerve on admission was positive correlation with NIHSS grade on admission, NIHSS grade and MRS grade after 3 months. The amplitude of P40 was positive correlation with BI on admission and after 3 months. The more abnormality of SEP, the higher grade of NIHSS, MRS and the lower grade of BI would be. ICH scales were positively correlated among NIHSS on admission, MRS and NIHSS after 3 months. SEP P40 incubation was positively correlated with MICH, and amplitude was negatively correlated with MICH. *Conclusions:* To evaluate the limbs' function, SEP, OICH, MICH, NICH are in close correlation with the limbs' function prognosis. The combination of evoked potentials and ICH scales may help predict the prognosis of the patients with ICH.

#### PP002-039

##### THE ACTIVATION EFFECTS OF ELECTRO-ACUPUNCTURE COMBINED WITH TRANSCRANIAL MAGNETIC STIMULATION ON ENDOGENOUS NEURAL STEM CELL IN RATS WITH ISCHEMIA

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*Objective:* To study the effect of electroacupuncture (EA) combined with repeated transcranial magnetic stimulation (rTMS) on the endogenous NSC, learning and memory result in rats with ischemia. *Methods:* One hundred and twenty male Wistar rats were randomly divided into five groups: a normal group, a model group, an EA group, a rTMS group and an EA plus rTMS group. After the establishment of MCAO, the rats in various groups were accordingly treated with EA, rTMS or EA plus rTMS, respectively. Then the histological section, the expressions of Brdu, step-down avoidance tests were observed. *Results:* In EA, rTMS, EA plus rTMS group, the numbers of Brdu labeled cells in SVZ, SGZ increased at 7 and 14 days compared with the model group ( $p < 0.05$ ). The expression of Brdu around SVZ and SGZ of the three treatment groups increased, especially in the EA plus rTMS group. At 7, 14 and 28 days there was improvement in the score of step-down avoidance test in EA, rTMS, EA plus rTMS group compared with the model group ( $p < 0.05$ ), it was better in the EA plus rTMS group than that in EA or rTMS group. *Conclusion:* EA plus rTMS can promote the proliferation of NSC, the recovery of the cerebral infarcted neural functions and improve learning and memory abilities after cerebral ischemia.

#### PP002-040

##### THE EFFECTS OF REPETITIVE ELECTRICAL STIMULATION OF THE COMMON PERONEAL NERVE ON WALKING SPEED IN POSTSTROKE HEMIPLEGIA

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*Objective:* To determine the effect of electrical stimulation of the common peroneal nerve on walking speed in chronic stroke sur-

vivors with a drop foot. *Methods:* Thirteen stroke survivors with hemiplegia with drop foot who fulfill the predefined inclusion and exclusion criteria were included in the study. Walking speed, assessed both by a six-minute walk test (6MWT) and by using a 10-m walkway, were obtained before and after repetitive electrical stimulation of the common peroneal nerve (at a frequency of 25 Hz, repeated every minute with a total of 10-min duration, 3 times/week). The procedure was done for 4 weeks. *Results:* Electrical stimulation of the common peroneal nerve resulted in a 49% improvement of walking speed measured with the 6MWT. Comfortable walking speed measured on a 10-m walkway was also significantly improved in favor of electrical stimulation of the common peroneal nerve ( $p < 0.05$ ). *Conclusions:* The results of this study show that electrical stimulation of the common peroneal nerve increases walking speed in the sample of stroke survivors.

**PP002-041****TETHERED CORD SYNDROME, SPINAL CORD TAPER, FILUM TERMINALE***Binshang Lan, Yiheng Liu**Orthopaedics Department, Xi'an Jiaotong University Secondly Appertain Hospital, Xi'an City, Shanxi Province, China*

*Objective:* To find out the relationship between spinal cord injury and filum terminale traction in tethered cord syndrome (TCS) and the condition of recovery. *Methods:* New type of chronic and progressing filum terminale traction model of TCS was constructed and traction was removed after different time. The relationship between spinal cord injury and filum terminale traction in tethered cord syndrome (TCS) and the condition of recovery were found out by evoked potential, electron microscope and pathological section. *Results:* Spinal cord injury aggravated along with lengthening drag time in cat TCS. Spinal cord injury recovered along with lengthening recovering time in cat TCS. The function and structure of neuron changed after metabolism changed along with chronic spinal drag injury of TCS. *Conclusion:* The earlier filum terminale was loosened the better spinal injury recovered. Operations should be carried out as soon as possible.

**PP002-042****EFFECTS OF TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION ON THE ACUPOINTS ON SOMATOSENSORY EVOKED POTENTIALS OF STROKE PATIENTS***Ni Wei<sup>1</sup>, Tiebin Yan<sup>1</sup>, Christina Hui-Chan<sup>2</sup>, Yuegui Chen<sup>1</sup>**<sup>1</sup>Department of Rehabilitation Medicine, Second Affiliated Hospital, Sun Yat-sen University, Guangzhou, and <sup>2</sup>Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong, China*

*Objective:* To investigate whether 45 minutes transcutaneous electrical nerve stimulation (TENS) on the acupoints improves the somatosensory evoked potentials (SEP) of stroke subjects. *Methods:* Twenty-nine subjects with first stroke were recruited and randomly divided into two groups. TENS group ( $n=15$ ; 9 male, 6 female, aged  $63.5 \pm 10.8$ ) and placebo TENS group ( $n=14$ , 8 male, 6 female, aged  $64.3 \pm 8.3$ ). Electrodes were applied to the acupoints of the affected upper limb (LI15, LI11, TE5 and L14). SEP was recorded before and after the 45 min treatment. It was recorded twice, each for 150 repeated stimulation. The latency and amplitude of N9, N20 were selected for analyses. *Results:* No significant difference was found in the baseline between groups. However, the amplitude of N9 and N20, and the latency of N20 were significant difference between

the affected and unaffected side. Significant difference was found in the latency and amplitude of both N9 and N20 in the affected side after treatment in the treatment group ( $p < 0.05$ ), the amplitude was larger and the latency was shorter. After treatment, the latency of N20 of treatment group is shorter than the placebo one ( $p < 0.05$ ). No significant difference was found in the unaffected side on the same group and in the placebo group in both amplitude and latency of N9 and N20 ( $p > 0.05$ ). *Conclusion:* Forty-five minutes of TENS treatment on acupoints of the affected upper limb improved the SEP of the subjects with stroke.

**PP002-043****THE ASSESSMENT OF QUALITY OF LIFE OF THE PATIENTS WITH STROKE IN ACUTE TERM***Guo Tiecheng**Department of Rehabilitation Medicine, Wuhan Tongji Hospital, Wuhan City, China*

*Objective:* To assess the quality of life of patients with stroke in acute term, and to justify the relationships of the quality of life of the acute stroke patients to the age, sex and location of the abnormality in the cerebral. And to determine whether all the dimensions of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) are applicable to the stroke patients. *Method:* We used SF-36 to assess the quality of life of acute stroke patients, and used the self-made scale of the general condition to record the information on age, sex and location of the abnormality in the cerebral. Cross-sectional study was taken. The statistical methods used included descriptive statistical methods and independent-sample t-test. We also calculated floor effect and ceiling effect. *Results:* The quality of life of the acute stroke patients in all the dimensions of the SF-36 were reduced, especially in the physical function and the role physical and the role emotions. In our cases, some dimensions of the SF-36 were related to the age and sex of the patients, but all the dimensions of the SF-36 were uncorrelated to the location of the abnormality in the cerebral. In addition, there were ceiling effects and floor effects in some dimensions of the scale. *Conclusion:* The acute stroke affects the quality of life of the patients substantially, and the disease has different influences on different dimensions of the scale. It is advisable to use another appropriate scale with SF-36 when being used to assess the patients with a lower or higher level.

**PP002-044****REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION AS TREATMENT IN ESSENTIAL TREMOR AND PARKINSON'S DISEASE***Wangyan Wangyan**Department of Neurology, Tianjin Huanhu Hospital, Tianjin, China*

*Objective:* Studying the therapeutic effects of low frequency repetitive transcranial magnetic stimulation in essential tremor (ET) and Parkinson's disease (PD). *Methods:* We evaluated 47 ET patients and 43 PD patients with the scale of TRS, UPDRS and Hoehn & Yahr. *Results:* 1) After rTMS treatment, ET groups' clinical scale TRS, TRS I, TRS II, TRS III were reduced. ET groups' RMT of the contralateral serious limb increased greatly after treatment. There was no difference in contralateral MEP amplitude, CL, CMCT, CSP and ipsilateral RMT, MEP amplitude, CL, CMCT, CSP before and after treatment. 2) After rTMS treatment, PD groups' clinical scale UPDRS, UPDRS I, UPDRS II, UPDRS III, Hoehn & Yahr were reduced. PD groups' contralateral RMT of the serious limb increased greatly, contralateral MEP amplitude was reduced, contralateral

CL, CMCT and CSP was prolonged greatly after treatment. There was no difference in ipsilateral RMT, MEP amplitude, CL, CMCT and CSP before and after treatment. 3) There was no correlation between contralateral, ipsilateral MEP, CSP of more serious limb and course of disease, clinical scale in ET and PD. *Conclusions:* The low frequency rTMS is efficient to relieve the clinical symptoms of ET and PD. rTMS affects the cerebellum-thalamus-cortical loop in ET. rTMS of the prefrontal cortex may induced the release of the endogenous dopamine to increase the intercortical inhibition and increase the blood flood to the focal brain in PD.

#### PP002-045

### CONN'S SYNDROME COMPLICATED WITH INTRACEREBRAL HEMORRHAGE: A CASE REPORT

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Hypertension is the most important risk factor of intracerebral hemorrhage. Treating comorbid hypertension is major component of the rehabilitation treatment of stroke patients. *Case Report:* We present a 54-year-old male patient of right putaminal hemorrhage, who has hypertension for more than 20 years and is without regular medical control. After admitted, poor controlled blood pressure is still noted with combined medical treatment, and interferes with the progress of rehabilitation program. Lab data showed a low serum potassium level, increased plasma aldosterone, and depressed plasma rennin activity. Further image study with abdominal computed tomography revealed two left suprarenal nodules, and aldosterone-producing adrenal adenoma is suspected. Surgical removal of the tumor may be necessary to achieve a better blood pressure level, and thus reduces risk of recurrent stroke. *Discussion:* Conn's syndrome (primary aldosteronism) is a syndrome associated with hypersecretion of the mineralocorticoid aldosterone resulting from: 1) aldosterone-producing adrenal adenoma (50%), 2) bilateral idiopathic hyperplasia – idiopathic aldosteronism (40%), 3) Aldosterone secreting carcinoma. Conn's syndrome accounts for 1% of cases of hypertension, usually occurs between the ages of 30 to 50, and is twice as common in women as in men. Clinical presentation includes: hypertension (often responds poorly to treatment), hypokalemia, hypersecretion of aldosterone resulting in low plasma rennin activity, muscle weakness, fatigue, polyuria and is often associated with polydipsia. If adrenal adenoma is demonstrated, adrenalectomy is treatment of choice. Dietary sodium restriction and aldosterone antagonist are also effective in many cases.

#### PP002-046

### THE ESTABLISHMENT OF EXPERIMENTAL INTRACEREBRAL HEMORRHAGIC MODEL AND PATHOLOGICAL AND BEHAVIORAL CHANGES IN RATS

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*Objective:* To make a model of intracerebral hemorrhage (ICH) in rat and to study the changes in the behavior and tissue structure during absorption of the hematoma. *Methods:* A model of ICH was established by stereotactically injection of 0.5U bacterial collagenase VII per 2.5 ul NS into caudate nucleus in the rats. The behavior of

rats with ICH was studied by Bederson score, beam-walking test, bilateral forepaws grasp and measurement of forelimb placing. The change in histology was observed. *Results:* The successful ratio of this model was 80%. The behavioral change was significant in rats of experimental group compared to the rats of control group. There were obvious hematomas at 6h after hemorrhage and the size, shape and position of hematomas were stable. The diameter of hematoma was about 3.0–3.5 mm. In the earlier period, the neuronal cells were swelling. A lot of glial cells, endothelial cells of vessel and neuronal cells appeared around the hematoma in the late period. *Conclusions:* The ICH model in rat by intracerebrally injection of collagenase was reproducible. The obvious behavioral change and histological changes were similar to clinical patient with ICH.

#### PP002-047

### EXERCISE TRAINING EFFECT ON FUNCTIONAL RECOVERY AFTER INTRACEREBRAL HEMORRHAGE IN RATS

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*Objective:* To determine whether exercise training can enhance the functional recovery after intracerebral hemorrhage (ICH) in rats. *Methods:* The 90 male SD rats were randomized into 3 groups, A: wheel-running group, rats with ICH to running-wheel ( $n=30$ ); B: control group, rats with ICH to normal cages ( $n=30$ ); C: sham operated rats to normal cages ( $n=30$ ). Animals were given a battery of tests that aimed to assess, posture-reflex, balance function, muscle strength and forelimb placing at 24 h, 3, 7, 14, 21, 28 days after the operation. *Results:* Rats with ICH to wheel-running performed significantly better than rats in group B in balance, muscle strength and forelimb placing. Sham-operated rats had no obvious dysfunction. *Conclusion:* Exercise training can improve the functional recovery after ICH in rats.

#### PP002-048

### THE EXERCISE EFFECT ON APOPTOSIS OF NEURONAL CELLS SURROUNDING BRAIN TISSUE AND HISTOLOGICAL CHANGES IN ICH RATS

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*Objective:* To investigate the effects of cage-running exercise on apoptosis of neuronal cells surrounding the hematoma and histological changes of hippocampus in ICH rats. *Methods:* Eighty-eight male SD rats (weight, 270 to 300 g) were randomly divided into three groups, trial group (ICH with EX  $n=40$ ), control group (ICH with no EX,  $n=40$ ) and sham operated group (no ICH, no EX,  $n=8$ ). The rats brains were removed at 24 h, 7, 14, 21, 28 days after ICH. Terminal deoxynucleotidyl transferase-mediated deoxyuridine triphosphate-biotin in situ nick end-labeling (TUNEL) was used to detect deoxyribonucleic acid (DNA) fragmentation. Light microscope and electron microscope were used to observe histological changes of hippocampus and surrounding the hematoma. *Results:* 1) Under light microscope, typical histological changes of ICH were seen after operation 24h in trial and control groups. After exercise, a lot of new capillary were seen in perimeter of hematoma and hippocampus of rats, in contrast, the control group and sham group had little. 2) Under electronic



microscope, shrunken neuron and glial cell with pre-apoptotic signs of intensely stained cytoplasm and abnormally dense nucleus, swollen mitochondria, blood vessel, Golgi apparatus, rough endoplasmic reticulum were seen in control group rats. In trial group rats, the main alterations are dim premembrane and postmembrane of synapses structure. 3) TUNEL-positive cells appeared in the periphery of the hematoma and hippocampus. The number of TUNEL-positive cells in trial group was less than that in control group. There was a significant difference in two groups ( $p < 0.05$ ) *Conclusion:* Exercise training (cage-running) can suppress the number of apoptotic cells, and increase regeneration of capillary after ICH in rats.

#### PP002-049

### THE EXERCISE EFFECTS ON EXPRESSION OF BCL-2, BAX, CASPASE-3 OF NEURONAL CELLS AFTER ICH IN RATS

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*Objective:* To investigate the effects of exercise on expression of bcl-2, bax, caspase-3 of neuronal cells after ICH in rats. *Methods:* The 120 male SD rats were divided into three groups, trial group (ICH-induction and exercise group,  $n=40$ ), control group (ICH-induction group,  $n=40$ ) and sham operated group (sham-operation,  $n=40$ ). The rats' brains were removed at 7, 14, 21, 28 days after ICH. The activation of bcl-2, bax, caspase-3 was measured by Immunohistochemistry, Western blotting and RT-PCR. *Results:* 1) Bcl-2-positive, bax-positive and caspase-3-positive cells appeared in around the periphery of the hematoma and cortex. The number of bcl-2, bax, and caspase-3-positive cells was nearly zero in the sham-operation group. This number of bcl-2-positive cells was markedly increased, this of bax-positive cells decreased in trial group from 21 to 28 days after ICH, and there was a significant difference compared with control group ( $p < 0.05$ ). Although the expression of caspase-3 had a down-regulation trend, but there was no difference between trial and control group. 2) Western blotting study showed that the protein expression of bcl-2 increased, and the protein expression of bax decreased in trial group than control group ( $p < 0.05$ ), but the protein expression of caspase-3 had no difference in two groups. 3) RT-PCR for bcl-2mRNA showed higher expression, lower expression for baxmRNA in trial group than control group ( $p < 0.05$ ). RT-PCR for caspase-3mRNA had no difference in two groups. *Conclusion:* The results suggested that exercise training (cage-running) can increase the expression of bcl-2 and bcl-2mRNA, decrease the expression of bax and baxmRNA. The was no markedly suppressing on caspase-3 and caspase-3mRNA.

#### PP002-050

### EFFTIVENESS OF FUNCTIONAL ELECTRICAL STIMULATION ON MOTOR RECOVERY OF THE LOWER EXTREMITY IN SUBJECTS WITH FIRST STROKE

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*Objective:* To investigate the efficacy of functional electrical stimulation (FES) in the motor recovery of the lower extrem-

ity of stroke subjects. *Methods:* Forty-four subjects with first stroke were randomly assigned into FES group or control group. Thirty-seven completed the study. All received standard rehabilitation program. Subjects in the FES group ( $n=19$ ) received electrical stimulation. The electrodes were applied on the hemiplegic tibialis anterior, peroneal muscle and peroneus brevis. Parameters were 30Hz with pulse width of 200 m/sec. The intensity was to produce full ankle dorsiflexion. It lasted for 30 min each session, 5 days per week for 3 weeks. Measurements included composite spasticity scale (CSS) for the ankle spasticity, Fugl-Meyer motor assessment (FMA) for the lower extremity, modified Barthel Index (MBI) for activities of daily living. *Result:* No significant differences were found before treatment. However, after 2 and 3 week treatment, the CSS% was significantly lower ( $8.9 \pm 23.2\%$  and  $10.4 \pm 18.3\%$  after 2 and 3 week treatment in the FES group vs  $36.3 \pm 47.3\%$  and  $47.7 \pm 56.4\%$  in the control), the FMA% was significantly higher ( $105.5 \pm 75.7\%$  and  $127.1 \pm 89.4\%$  after 2 and 3 week treatment in the FES group vs  $51.4 \pm 47.3\%$  and  $64.3 \pm 51.8\%$  in the control), and the MBI% was also significantly higher ( $96.1 \pm 58.0\%$  and  $48.2 \pm 25.4\%$  after 2 and 3 week treatment in the FES group vs  $112 \pm 74.2\%$  and  $64.7 \pm 41.3\%$  in the control). *Conclusion:* Three weeks of FES to the affected lower extremity of stroke subjects improved their motor function.

#### PP002-051

### EFFECT OF REHABILITATION ON PROGNOSIS IN PATIENTS WITH TRAUMATIC BRAIN INJURY – CHINESE EXPERIENCE

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*Aim:* To investigate the rehabilitation on prognosis in patients with traumatic brain injury. *Method:* Analysis of the 115 patients with traumatic brain injury during October 2002 to October 2007 was done. The level of cognition, activity of daily living, walking capability, length and cost of hospital stay were recorded. Patients were divided into two categories: patients with active rehabilitation intervention (AR) and patients without rehabilitation intervention (NR). *Results:* There were no difference between groups in age, gender, complications, location and severity of injury as well as capability of daily living and locomotion on admission. The improvement of cognition function by GCS score was much higher in AR ( $3.94 \pm 2.57$ ) than NR ( $2.48 \pm 2.21$ ,  $p < 0.05$ ). Improvement of the modified Barthel scale was also much higher in AR ( $39.5 \pm 26.3$ ) than NR ( $19.5 \pm 18.5$ ,  $p < 0.05$ ). Similar improvement was also found in locomotion ( $p < 0.05$ ). The length of hospital stay was  $51.1 \pm 24.9$  days in AR and  $53.5 \pm 22.3$  days in NR ( $p > 0.05$ ). The cost of hospital stay was 33125 ± 21406 Yuan in AR and 37190 ± 21427 Yuan in NR ( $p > 0.05$ ). *Conclusion:* Rehabilitation intervention may benefit to improvement of cognition, activities of daily living and locomotion in patients with traumatic brain injury without increase the length and cost of hospital stay.



## PP002-052

**EFFECTS OF THREE STAGE REHABILITATION THERAPY ON NEUROLOGICAL DEFICIT SCORES AND ADL IN ISCHEMIC STROKE PATIENTS*****Yu-long Bai<sup>1</sup>, Yong-shan Hu<sup>1</sup>, Wen-hua Chen<sup>2</sup>, Xiaobing Wang<sup>3</sup>, Anlong Cheng<sup>4</sup>, Congyu Jiang<sup>1</sup>, Yi Wu<sup>1</sup>****<sup>1</sup>Department of Rehabilitation Medicine, Huashan Hospital, Fudan University, <sup>2</sup>Department of Rehabilitation Medicine, Shanghai No. 1 People's Hospital, <sup>3</sup>Department of Rehabilitation Medicine, Shanghai Tongji Hospital, <sup>4</sup>Department of Rehabilitation Medicine, Shanghai No. 6 People's Hospital, China*

**Objective:** To explore the effects of standardized three stage rehabilitation treatment on the neurological deficit scores (NDS) and ADL in ischemic stroke patients. **Methods:** 164 ischemic stroke patients were randomly recruited into rehabilitative and control groups. The NDS and Modified Barthel Index (MBI) were evaluated and analyzed at the recruitment, the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month separately after stroke. **Results:** No significant differences were found in the NDS and MBI between the rehabilitative and the control groups at the recruitment. The NDS of the control group descended gradually at the recruitment, the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, but the significant differences were found only at the end of 1<sup>st</sup> month and 3<sup>rd</sup> month comparing with previous assessments. The NDS decrements in rehabilitative group were bigger than that in the control at the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, and significant differences were found between neighboring evaluations in rehabilitative group. The MBI of the control group increased gradually at the recruitment, the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, but the significant differences were found only at the end of 1<sup>st</sup> month and 3<sup>rd</sup> month comparing with previous assessment. The MBI increments in rehabilitative group were bigger than that in the control group at the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, and significant differences were found between neighboring evaluations in rehabilitative group. **Conclusion:** Standardized three stage rehabilitation treatment could decrease NDS and increased ADL in ischemic stroke patients.

## PP002-053

**STUDY OF EFFECTS OF STANDARDIZED THREE STAGE REHABILITATION TREATMENT ON MOTOR FUNCTION IN ISCHEMIC STROKE PATIENTS*****Yu-long Bai<sup>1</sup>, Yong-shan Hu<sup>1</sup>, Wenhua Chen<sup>2</sup>, Xiaobing Wang<sup>3</sup>, Anlong Cheng<sup>4</sup>, Congyu Jiang<sup>1</sup>, Yi Wu<sup>1</sup>****<sup>1</sup>Department of Rehabilitation Medicine, Huashan Hospital, Fudan University, <sup>2</sup>Department of Rehabilitation Medicine, Shanghai No. 1 People's Hospital, <sup>3</sup>Department of Rehabilitation Medicine, Shanghai Tongji Hospital, <sup>4</sup>Department of Rehabilitation Medicine, Shanghai No. 6 People's Hospital, China*

**Objective:** To explore the effects of standardized three stage rehabilitation treatment on the motor function in ischemic stroke patients. **Methods:** One hundred and sixty-four ischemic stroke patients were randomly recruited into rehabilitative and control groups. The Simplified Fugl-Meyer Assessment (FMA) were evaluated and analyzed at the recruitment, the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month separately after stroke. **Results:** No significant differences were found in the total FMA, upper limb FMA and lower limb FMA between the rehabilitative and the control groups. The total FMA of the control group increased gradually at the recruitment, the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, but the significant differences were found only at the end of 1<sup>st</sup> month and 3<sup>rd</sup> month comparing with previous assessments. The total

FMA increments in rehabilitative group were bigger than that in the control at the end of 1<sup>st</sup>, 3<sup>rd</sup> and 6<sup>th</sup> month, and significant differences were found between neighboring evaluations in rehabilitative group. The upper limb FMA of the control group gradually increased, but the significant differences were found only at the end of 3<sup>rd</sup> month comparing with 1<sup>st</sup> month assessment. The increments of upper limb FMA of the rehabilitative group were bigger than that of the control at 3<sup>rd</sup> and 6<sup>th</sup> month, and there were significant differences between the neighboring evaluations in rehabilitative group. The lower limb FMA of the control group gradually increased, but the significant differences were found only at the end of 3<sup>rd</sup> month. The increments of lower limb FMA of the rehabilitative group were bigger than that of the control, and there were significant differences between the neighboring evaluations in rehabilitative group. **Conclusion:** Standardized three stage rehabilitation treatment could increase motor function in ischemic stroke patients.

## PP002-054

**RESEARCH ON EFFECT OF TOPIRAMATE ON REPETITIVE FEBRILE CONVULSION-INDUCED BRAIN DAMAGED ANIMAL*****Juan Li, Zhi Huang, Qiong Chen, Xiaoping Zhang****Childrens Hospital, Chongqing Medical College, Chongqing, China*

**Objective:** To explore whether topiramate has protection or improvement on seizure-induced brain damage by febrile convulsion in animal. **Methods:** Febrile convulsions were induced with hyperthermal bath, then the changes of the hippocampal neurons were observed under the electron and light microscope, and the level of neuron special enolase (NSE) of blood serum were detected. By a water-maze test, capability of study and memory were recorded. **Results:** Topiramate could reduce the damage of hippocampal neurons, and significantly lower the level of NSE of blood serum, and improve the capability of study and memory of rats with repetitive febrile convulsions. **Conclusion:** Topiramate can protect seizure-induced brain damage by febrile convulsion in animal, and improve the functional level.

## PP002-055

**COMMITTED DIFFERENTIATION FROM MESENCHYMAL STEM CELLS OF RAT INTO NEURON-LIKE CELLS INDUCED BY TOTAL SAPONINS OF PANAX GINSENG IN VITRO*****Guo-qing Zheng, Xiao-tong Wang, Wei Wu, Wei Cheng, Qiu-yin Song****Department of Neurology Center, Rehabilitation Center, the Second Affiliated Hospital of Wenzhou Medical College, Wenzhou, China*

**Objective:** To investigate the committed differentiation of mesenchymal stem cells (MSCs) of young rat into neuron-like cells with total saponins of panax ginseng (TSPG) *in vitro*. **Methods:** To isolate the nucleated cells from bone marrow of young rat through adherent screening method, then cultured them and removed the un-adherent cells, then got pure MSCs. The 5<sup>th</sup> passage of MSCs were pre-induced 10  $\mu\text{g}\cdot\text{L}^{-1}$  bFGF for 24 h, then the medium was replaced with the serum-free induction media containing 200  $\mu\text{g}\cdot\text{ml}^{-1}$  TSPG for 5–6 h. The differentiated cells were observed with phase-contrast microscopy and detected the expression of several specific proteins, such as neuron-specific enolase (NSE), microtubule-associated protein-2 (MAP-2) and glial fibrillary acidic protein (GFAP) with immunohistochemi-

cal method. *Results*: MSCs were comprised a single phenotypic population and displayed a fibroblast-like morphology after 5th passage in culture. The induced MSCs gradually turned into the neuron-like cells in the induction groups from the first half an hour to 3 h. The neuron-like cells expressed NSE, MAP-2 and GFAP positive. The percentages of responsive cells positive for NSE, MAP-2 and GFAP were  $76 \pm 4.7\%$ ,  $61 \pm 5.2\%$  and  $10 \pm 2.4\%$ , respectively after 5-6 h of induction. The unresponsive cells in the induction group and those cultured cells in the control were shown negative for all of the former detected markers. *Conclusion*: The MSCs could be differentiated into neuron-like cells in vitro with the induction of TSPG in the free-serum media.

#### PP002-056

### VERAPAMIL AND GABAPENTIN AN NON-OPIOID TREATMENT OPTION FOR ACUTE OPIOID ABSTINENCE SYNDROME

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*Objective*: To compare the efficacy of Verapamil with Gabapentin in treatment of acute opioid Abstinence Syndrome in study patients. *Design*: Single-blind comparative clinical trial. *Patients and Materials*: Forty healthy, opiate-dependent patients were selected randomly, who were seeking inpatient opioid abstinence treatment. All patients were grouped in to group-I received Verapamil 120 mg/day and group-II received Gabapentin 200 mg/day in divided doses. All patients completed the treatment program and stayed in the hospital for 10 days. *Results*: Verapamil and Gabapentin showed a highly significant decline in the subjective symptoms and urine toxicology of opioid withdrawal syndrome. *Conclusion*: Verapamil and Gabapentin proved to be highly effective non-opioid treatment for acute opioid withdrawal syndrome.

#### PP002-057

### EFFICACY OF HYPERBARIC OXYGEN IN TREATMENT OF ISCHEMIC STROKE AMONG YOUNG PATIENTS

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*Objective*: To investigate the efficacy of hyperbaric oxygen in treatment of ischemic stroke among young patients. *Methods*: Eighty-six young in-patients with ischemic stroke were selected from October 2005 to October 2007 and randomly divided into two groups, which were all given routine therapy. The patients in hyperbaric oxygen group were given hyperbaric oxygen therapy, additionally. Nerve function deficit score was observed to assess the efficacy of hyperbaric oxygen therapy. *Results*: Nerve function deficit score was reduced from  $29.15 \pm 8.15$  to  $9.18 \pm 5.31$  and 70% were decreased in hyperbaric oxygen group. In control group, nerve function deficit score was reduced from  $29.48 \pm 6.53$  to  $16.88 \pm 7.00$  and 42.6% were decreased. The effectiveness in hyperbaric oxygen group was 81.4%, while 39.5% in control group. Total progress rate was 93.0% in hyperbaric oxygen group, while 60.5% in control group. There was significantly difference between two groups ( $p < 0.05-0.01$ ). *Conclusions*: Hyperbaric oxygen is effective in treatment of ischemic stroke of youth.

#### PP002-058

### AN ANALYSIS ABOUT THE EFFECTS OF STANDARDIZED COMMUNITY-BASED REHABILITATION (CBR) THERAPY ON ADL FOR PATIENTS AFTER STROKE IN CHINA

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*Objective*: To evaluate the effects of community-based rehabilitation therapy on activity of daily living for stroke patients. *Methods*: In a single-blind, community randomized, controlled multicenter trial, 737 consecutive stroke patients were stratified by two groups of cerebral infarction and hemorrhage. Then they were randomly subdivided by the community into rehabilitation group and control group. The rehabilitation group received an additional standardized community-based rehabilitation therapy. The intervention was applied for 5 months. Patients were evaluated for activity of daily living (Modified Barthel Index) before intervention, follow-up 2 and 5 months, respectively. *Results*: Patients in the rehabilitation group performed better on the Modified Barthel Index than those in the control group after 5 months follow-up, and the differences were significant. Although the rehabilitation group and control group both improved over time, but the rehabilitation group showed a greater improvement in the Modified Barthel Index scores if compared with the control group. After 5 months follow-up, the Modified Barthel Index scores of cerebral infarction rehabilitation group, hemorrhage rehabilitation group and total rehabilitation group improved 26.28, 32.89 and 27.72, respectively. In comparison, The Modified Barthel Index scores of cerebral infarction control group, hemorrhage control group and total control group improved 7.65, 21.70 and 10.85 respectively. This implies a difference in improvement of 18.63 in cerebral infarction group, 11.19 in hemorrhage group, and 16.87 in total group in favor of the rehabilitation group. *Conclusions*: Standardized community-based rehabilitation (CBR) therapy may help the stroke patients to improve their ADL.

#### PP002-059

### EFFECTS OF D-AMPHETAMINE TO APOPTOSIS AND GAP-43 ON FOCAL CEREBRAL ISCHEMIA INJURY OF RAT BRAIN

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*Objective*: This experiment observed the protection of D-amphetamine on focal cerebral ischemia injury of rat brain. *Methods*: The unilateral MCAO models were induced by using Koizumi's method. The terminal deoxynucleotidyl-transferase-mediated dUDP-biotin nick end-labeling (TUNEL) method was applied to detect quantification of apoptosis at weeks 1, 3 and 6 after operation. Using immunohistochemical staining methods and reverse transcriptase-polymerase chain reaction (RT-PCR), the expression of growth-associated protein 43 (GAP-43) and GAP-43 mRNA around ischemia area were observed respectively. *Results*: Apoptosis reduced evidently in the group treated with D-amphetamine, GAP-43 proteins demonstrated statistically significant increases

in immunoreaction product as determined by optical density measurements in D-amphetamine treatment group compared with natural recovery group. Same results appear in RT-PCR product. **Conclusion:** D-amphetamine can reduce apoptosis and promote the expression of GAP-43. This may be one of the mechanism of the protection of D-amphetamine on focal cerebral ischemia injury of rat brain.

#### PP002-060

### THE EFFECTS OF STANDARDIZED THREE STAGES' REHABILITATION PROGRAM IN PROMOTING ACTIVE FUNCTION IN STROKE PATIENTS WITH HEMIPLEGIA

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**Objective:** To explore the effects of standardized three stages of rehabilitation on the active function in stroke patients with hemiplegia. **Method:** 80 cases with acute brain vascular disease were divided randomly into 2 groups: the treatment group and the control group. The treatment group was treated with three grades regular rehabilitation treatment whereas the control received no rehabilitation treatment unless treated with acupuncture or massage by patients themselves. Both groups received routine treatment of internal medicine. Both groups were evaluated with simplified Fugl-Myer (FM) scale at the beginning and the end of the treatment. **Results:** the FM scales of two groups showed no significant difference at the beginning ( $18.18 \pm 16.71$  and  $12.32 \pm 12.12$ ,  $p > 0.05$ ). But the FM scales of the treatment group were significantly higher than those of the control group ( $89.50 \pm 13.06$  and  $44.52 \pm 22.36$ ,  $p < 0.001$ ) and the improvement rate was significantly higher than those of the control group ( $72.13 \pm 17.77$  and  $31.44 \pm 19.05$ ,  $p < 0.001$ ). **Conclusion:** Standardized three stages of rehabilitation can promote stroke patients' active function.

#### PP002-061

### A FMRI STUDY OF ACOUSTIC SENTENCES PROCESSING FOR BROCA'S APHASIAS

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**Objective:** This purpose of the study was designed to assess, using functional magnetic resonance (fMRI), the pattern of brain activity during processing acoustic sentences in three Broca's aphasic patients after stroke, in order to evaluate the modifications of brain function and the corresponding neural networks, which may be related to recovery. **Methods:** The subjects were requested quietly lying in the period of rest, and carefully listening to the language stimuli (incomplete sentences) in the language processing stage, and immediately judged implicitly the stimuli to complete the sentences. The patterns of brain activity of the 3 Broca's aphasic patients in acute and chronic stages with 5 normal controls during covertly processing acoustic sentences with the same functional MRI paradigm were dynamically compared. Functional imaging was alternately collected in the two epochs of processing and rest. **Results:** The Broca's aphasic patients represented mainly the impairment of language expression with the most remarkable activities in right superior and middle temporal gyri in processing acoustic sentences in the acute stage. The aphasic patients improved their

comprehensive and expressive ability of the language with the most remarkable activities in left superior and middle temporal gyri and perilesional brain areas. **Conclusion:** The receptive and expressive language areas are synchronously activated in processing acoustic language. The "disinhibition" of distant blocking effect improves the recovery of language function in relation with right hemisphere in acute stage. The recovery of language function depends on the functional reorganization with more important effect of the dominant hemisphere in chronic stage.

#### PP002-062

### THE EFFECT OF EARLY REHABILITATION ON PATIENTS WITH SEVERE TRAUMATIC BRAIN INJURY

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**Objective:** The study was performed in the aim of evaluation of the effect of early rehabilitation on patients with severe traumatic brain injury (TBI). **Methods:** The clinical information of patients who were managed by early systemic rehabilitation therapy after severe TBI (study group,  $n=75$ ) was retrospectively reviewed, and the outcome was compared with that of control group which was composed of contemporary patients but without an early rehabilitation intervention (control group,  $n=86$ ). **Results:** The neurological function of the patients in the study group was better than that in the control group with statistically significant difference. **Conclusion:** The early rehabilitation would improve neurological outcome in the patients with severe TBI.

#### PP002-063

### VALIDITY AND RELIABILITY OF THE SIMPLIFIED CHINESE VERSION OF MODIFIED BARTHEL INDEX FOR CHINESE STROKE PATIENTS

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**Objective:** To investigate the validity, reliability and sensitivity of the simplified Chinese version of modified Barthel index (MBI) on evaluating activities of daily living (ADL) in Chinese stroke patients. **Methods:** Forty stroke patients participated in the study. They were 26 males and 14 females, aged  $59.65 \pm 11.68$  years,  $21.20 \pm 19.44$  days post-stroke. Modified Barthel Index (MBI) was translated from English version into simplified Chinese version. Original Barthel Index (BI) and the motor component of functional independence measure (M-FIM) were used to compare with MBI for the validity of MBI. Two raters scored same patient at the same time with MBI, BI and M-FIM for the inter-rater reliability and two sessions were conducted within one week for the intra-rater reliability. Intra-class correlation coefficients (ICC) were applied for both inter-rater and intra-rater reliability of MBI. Spearman correlation coefficients were tested between MBI and BI. Sensitivity of MBI was also analyzed with the Wilcoxon signed rank test and paired t-test. **Results:** High correlations were found in each item and total score between MBI and BI ( $r=0.816-1.000$ ,  $p < 0.01$ ), and in total score between MBI and M-FIM ( $r=0.935-0.981$ ,  $p < 0.01$ ). There was high reproducibility in the results of MBI in the same rater and between two raters (ICC=0.866-0.997). Furthermore,



MBI was more sensitive than BI in majorities of its items and its total scores as well. *Conclusion:* Simplified Chinese version of MBI had good validity and reliability as well as sensitivity when it was used to assess ADL of Chinese stroke patients.

#### PP002-064

### EFFECT OF PUSH-UP TRAINING ON LOCOMOTION ABILITY OF PARAPLEGIC PATIENTS

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*Objective:* To explore the effect of push-up training on locomotion ability of paraplegic patients suffering from complete thoracic spinal cord injury. *Method:* Thirty patients (male 20, female 10) suffering from complete thoracic spinal cord injury were selected. Their age ranged from 20 to 45 years (mean 35). According to the injury segment, there were 17 patients of T11, 6 of T10, 1 of T9, 3 of T8 and 3 of T7. Training the patients with Push-up action to increase the locomotion ability, the specific training operation was as follows: sitting, putting their hands aside their body and holding a pusher, respectively, trying to push up the body and swinging the bottom from side to side. Training was done 5 times per week, 15 minutes/times with a total of 8 weeks. Rating locomotion ability of patients with ADL motion scales made by China Rehabilitation Research center (CRRC) before and after training (8 items, total 16). *Results:* Average locomotion ability score before training was  $1.8 \pm 1.9$  and after training was  $10 \pm 3.3$ . There was a significant statistic difference between them. *Conclusion:* Push-up training can obviously increase locomotion ability of paraplegic patients suffering from complete thoracic spinal cord injury.

#### PP002-065

### URINARY RETENTION AFTER STROKE – AN UNDER-DIAGNOSED COMPLICATION

***Cheuk Kwan Tam***

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*Objective:* To determine the prevalence of post-stroke urinary retention through routine screening in an extended care hospital and their characteristics. *Method:* A subgroup analysis of a prospective study on prevalence of raised post-voided residual urine volume (PVR) in consecutive patients transferred to our hospital between September 1 and November 31, 2006 was performed on recent stroke patients. All patients without urinary catheter on transfer were screened for PVR within 24 h using BladderScan immediately or within 15 min post-micturition. Urinary retention is defined as having a PVR  $\geq 300$  ml. *Results:* Among the 84 stroke patients included in the 3-month study period, 6 (7.1%) patients were on urinary catheter on transfer. 9 (10.7%) patients, not on urinary catheter on transfer, were found to have PVR  $\geq 300$  ml. Patients with UR were associated with lower mobility level, lower Norton Score, impaired awareness of toilet need and on diapers for incontinence. It was also associated with longer hospital stay and urinary tract infection. *Conclusion:* Urinary retention occurred in 17.8% stroke patients transferred to our extended care hospital. Less than half were diagnosed in acute hospital. This may be due to patients having mobility difficulties and impaired awareness of toilet needs while overflow incontinence wetting the diapers reducing the alertness for enlarged bladder. Measuring PVR is now a simple screening procedure and is very effective in identifying patients with occult urinary retention before they develop complications of renal damage and recurrent urinary

tract infections. We recommend it as a routine screening procedure for all stroke patients.

#### PP002-066

### PROTECTIVE EFFECTS OF ELECTRO-ACUPUNCTURE AND TREADMILL TRAINING AFTER FOCAL BRAIN ISCHEMIA IN RATS

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*Objective:* Both electro-acupuncture and treadmill training are important rehabilitation measures to improve neurological recovery after brain ischemia. The present study investigated the protective effects of electro-acupuncture and treadmill training and their effects on the Ang1/Tie2 pathway after middle cerebral artery occlusion (MCAO). *Method:* Fifty-six male Sprague–Dawley rats were subjected to 60 min right MCAO. All rats were randomly assigned to one of four groups: EA group, TM training group, control group and sham operation group. Infarct volume was measured morphometrically and the Ang1/Tie2 system and the PI3K/Akt signal transduction pathway were tested by Western blot. The neurological scores were measured to test their neurological recovery. *Results:* Rats in the control group had the largest infarct ratio ( $29.28 \pm 7.0\%$ ) and the lowest neurological score while electro-acupuncture and treadmill training both can reduce the infarct volume ( $16.03 \pm 6.27\%$ ;  $13.23 \pm 4.77\%$ ) and improve neurological recovery after brain ischemia. Early treadmill training was found to have significant effects in increasing Ang1/Tie2 expression, leading to the activation of PI3K/Akt signal transduction pathway. Electro-acupuncture can also increase Ang1/Tie2 expression but failed to activate PI3K/Akt pathway. *Conclusions:* Based on the present findings, both electro-acupuncture and treadmill training can protect the brain from ischemic damage, but the underlying mechanisms maybe different and need further investigation.

#### PP002-067

### THE EFFECT OF AN INTELLIGENT BALANCE EVALUATION AND TRAINING EQUIPMENT ON BALANCE FUNCTION OF STROKE PATIENTS

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*Objective:* To observe the application of intelligent balance training system to assess stroke patients with hemiplegia to balance the effectiveness of training. *Methods:* Stroke subjects were elected from August to December 2007 from Department of Rehabilitation Medicine as inpatient. Patients with serious cognitive dysfunction and who could not be independent standing over 30 sec were excluded. All the remaining patients were assessed with intelligent balance function. There were 20 patients with serious standing balance dysfunction. Conventional rehabilitation treatment on the basis of functional balance training system including training for maintaining focus and transfer with single leg bearing and so on with each training session of 30 min, 2 times a day, five days a week and a total of three weeks. Balancing function was re-evaluated after three weeks of training. *Results:* 19 patients after three weeks of balance training, various parameters such as overall stability, weight distribution showed significant difference before and after treatment ( $p < 0.05$ ). *Conclusion:* Balance function evaluated and treated by an intelligent training system for stroke patients could enhance the function of standing balance.

## PP002-068

**A SIMPLE BEDSIDE WATER TEST TO IDENTIFY DYSPHAGIA IN ACUTE LACUNAR STROKE PATIENTS****Khairiah Mohd Yatim<sup>1</sup>, Saini Freddy Abdullah<sup>2</sup>, Zaliha Omar<sup>2</sup>**<sup>1</sup>Department of Rehabilitation Medicine, Tuanku Ja'afar, Seremban, and <sup>2</sup>Department of Rehabilitation Medicine, University of Malaya, Malaysia

**Objective:** There is no reference of dysphagia in acute lacunar stroke in the standard text book of Neurology and Rehabilitation Medicine. However a study by Sellar C et al suggested that acute lacunar stroke patients do have dysphagia. This study is to find out does dysphagia occur in acute lacunar stroke patients and whether a simple bedside water test is a reliable screening tool in these patients. **Method:** A prospective study was done on acute lacunar stroke patients admitted to University of Malaya Medical Centre from 1<sup>st</sup> of October 2002 until 30<sup>th</sup> of November 2003. 24 patients were assessed clinically for presence or absence of the 6 clinical predictors for risk of aspiration (Dysphonia, Dysarthria, Abnormal gag reflex, Abnormal volitional cough, Cough after swallowing, Voice change after swallowing) and bedside water test. The patients' records were reviewed at 2 months. **Results:** 50% ( $n=12$ ) of patients had moderate to severe risk of aspiration (dysphagia). A simple water test is a reliable screening tool to assess the risk of aspiration (Fisher Exact Test,  $p=0.014$ ). At 2 months post stroke the outcome of patients who were managed according to the result of the bedside water test were good. Five (83.33%) patients who initially failed the bedside water test were back on oral feeding and all the patients who showed no swallowing problem initially continue to be on oral feeding. Only one patient developed aspiration pneumonia. **Conclusion:** Dysphagia is a significant morbidity in acute lacunar stroke patients and water test can be used as a screening tool in these patients.

## PP002-069

**EFFICIENCY OF EARLY REHABILITATION ON PATIENTS WITH SPINAL CORD INJURY****Qing Yin, Hongliang Liu, Qin Wang, Hongjun Yu**

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**Objectives:** To assess the association between early rehabilitation on patients with spinal cord injury and its recovery over time on the one hand, and complications and duration of phases of rehabilitation on the other. **Methods:** Patients with spinal cord injury were assigned randomly into two groups according to started date of rehabilitation, 56 SCI patients were divided into the early rehabilitation group (within two months post-operation) and control group (after three months post-operation) with 56 cases respectively. Activities of daily living (ADL) of all patients were evaluated pre- and after treatment, and also during inpatient rehabilitation. Complications such as urinary tract infection, pulmonary infection, deep venous thrombosis, joint contraction, pressure ulcer, pain, autonomic dysreflexia, urinary stones, epididymitis and heterotopic ossification were registered, and the incidence rates of complications of two groups were compared. **Results:** After 2 months treatment, the incidence of ten common complications occurred after SCI in the early treatment group, such as pulmonary diseases, urinary infection, pressure ulcer, deep venous thrombosis and spasticity in the lower limbs were lower than those in the

control group. Other factors were same between two groups. ADL of the patients in the early rehabilitation group were better than those of patients in the control group ( $p<0.05$ ). **Conclusion:** Early rehabilitation after SCI can significantly decrease the incidence of some complications and improve patient's ADL.

## PP002-070

**ENHANCEMENT OF SURVIVAL, PROLIFERATION AND DIFFERENTIATION INTO NEURONS OF NEURAL PROGENITOR CELLS ISOLATED FROM RATS HIPPOCAMPUS BY BDNF****Li Jiang, Tingsong Li, Hengsheng Chen**

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**Objective:** To explore the effect of brain-derived neurotrophic factor (BDNF) on the neural progenitor cells (NPC) of rat hippocampus. **Methods:** NPC were obtained from Wistar rats at embryonic day 15 to 16 and were immunostained for nestin; NPC were induced to differentiate with 1% fetal calf serum contained medium. The single NPC grew for 3 days in medium containing BDNF at the concentration of 10–200 ng/ml then the number of neurosphere was counted and the diameter was measured. Tunel staining positive cells and the level of lactic acid dehydrogenase (LDH) in medium were used to evaluate the effect of BDNF on the NPC survival. Tubulin II (Tuj-1) immunostaining was used to label the neurons differentiated from NPC, and the percentage of Tuj-1 positive cells among DAPI positive cells in the BDNF and control group were compared. Additionally, the length of neurite in Tuj-1+ cells was measured. **Results:** Nestin-positive NPC exhibited the ability of self-proliferation and could be induced to differentiate into neurons and astrocytes. BDNF at the concentration of 10 to 200 ng/ml enhanced the proliferation of NPC at the cell density of 5–105/ml, while 40 ng/ml BDNF exhibited the strongest proliferation enhancement. Diameter of the neurosphere with 40 ng/ml BDNF was increased obviously while the apoptosis and LDH leakage of 40 ng/ml BDNF group was significantly decreased compared with the control group. In 40 ng/ml BDNF group, more neurons (Tuj-1+ cells) were observed and total neuritic length in Tuj-1+ cells were significantly longer, compared to the control group. **Conclusion:** BDNF has a neuroprotective effect, can promote NPC proliferation and induce them differentiation into neurons.

## PP002-071

**A STUDY ON QUALITY OF LIFE OF STROKE PATIENT IN KUNMING****Lijuan Ao<sup>1</sup>, David Man<sup>3</sup>, Yongmei Li<sup>2</sup>, Wenli Wang<sup>2</sup>, Qiu Luo<sup>2</sup>, Jinhua Qian<sup>2</sup>, Liqing Yao<sup>2</sup>**<sup>1</sup>The Department of Rehabilitation Medicine of the 2<sup>nd</sup> Affiliated Hospital of Kunming Medical College, <sup>2</sup>The Department of Rehabilitation Therapy of Kunming Medical College, China, <sup>3</sup>Hong Kong Polytechnic University, Hong Kong

**Objective:** Stroke is one of the most important causes for chronic disabilities. Studies on Quality of Life (QoL) after stroke have gained substantial attention among social science and medical researchers. However, the instruments specifically designed to assess health-related QoL of persons after stroke is non-existing in China. This study will investigate the QoL among stroke survivors. **Methods:** A cross-sectional study for subjects in Kunming who had survived after stroke. The total of 108 patients (71 men and 37 women, mean age  $66.7 \pm 9.9$  years) were interviewed. QoL was assessed with 36-Item

Short-Form Health Survey (SF-36), Adult Source of Self Esteem Inventory (ASSEI) and another questionnaire for health status, demographic characteristics and self-perception of life experiences. Both qualitative and quantitative analyses will be used to depict QoL and health-related factors; multiple regressions were used to identify mediators of QoL, and MANOVA to test possible difference on QoL domains across different demographics, self-concept and health related factors. *Results:* 1) Mental health received the highest scores ( $20.18 \pm 0.55$ ), while the lowest scores were in area of role limitation-emotional ( $4.28 \pm 0.16$ ). 2) The patients who received household service had higher role limitations-physical composite scores. 3) Five self-concept related factors (physical self, moral self, personal achievement and social self) match the results of content analysis of the subjects' responses to the open-ended questions. *Conclusion:* Family physical health, work and friends were the most important domains in lives of patient after stroke. The self-concept strategies could be used to improve self-concept basis of persons after stroke rehabilitation outcomes.

#### PP002-072

### STUDY OF TREATING MENTAL RETARDED CHILDREN WITH SCALP ACUPUNCTURE

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*Objective:* To investigate the best combination rehabilitation cure of children Mental retarded (MR). *Methods:* We treated 264 cases of children of MR, among who 214 cases were at the age of 3-7 and 50 cases were 7-12. According to the intelligence test, IQ of cases was between 40-65. The key acupoints: Sishengcong and Toubaihui. Five acupoints on the forehead Subordinate acupoints: puncture in 1, 2, 3 language areas if accompanied with logopathy. Puncture 60 times in each course of the treatment: once a day and 15 days of discontinue between every 20 puncturing days. After inserting the acupuncture needle, twist it swiftly and keep twisting and twirling for 5 min. *Results:* Compared with those before treatment, IQ ascended 15; revealed that after one course of the scalp acupuncture treatment, 95/182 cases had effect, after two courses of treatment, 39/53 cases had effect, after three courses of treatment, 24/29 had effect. The total effective rate of 158 cases reached 60%. *Conclusion:* It is regarded in the Chinese traditional medical theory that MR children are nature endowment deficiency of cerebrum hypoplasia. Scalp acupuncture treatment has the special feature of inserting the acupuncture needle deep and strong stimulating. It can stimulate multi channels and multi-points. To acupuncture in Sisbengcong, Beihui, Dumai has the function of regulating and invigorating the flow of vital energy; reinforcing the function of the kidney and invigorating and accelerating the function of the brain. Meanwhile the subordinating acupoint, Shengting, had the function of regulating the two fundamental principles, which is the key of treating MR children with the scalp acupuncture.

#### PP002-073

### THE EFFECTS OF EPHEDRINE ON GFAP OF ASTROCYTES AFTER CEREBRAL ISCHEMIA-REPERFUSION INJURY IN RATS

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*Objectives:* To investigate the effects of ephedrine on glial fibrillary acidic protein (GFAP) expression after cerebral ischemia-reper-

fusion injury in rats. *Methods:* Sixty male SD rats were randomly divided into the sham-operated group, natural recovery group and ephedrine treatment group. The unilateral ischemia-reperfusion models were induced by clue-blocked method. The expressional level of GFAP around ischemic area was examined by immunohistochemical technique at weeks 1, 2, 3 and 4 after operation. *Results:* GFAP expression began to increase at 1w and reached the stabilization at 3w in the ephedrine treatment group and natural recovery group. There was a significant increase of GFAP expression in the ephedrine treatment group compared with the natural recovery group ( $p < 0.05$ ) on first two time points. *Conclusion:* Ephedrine treatment facilitates the activation and proliferation of astrocytes induced by cerebral ischemia-reperfusion injury.

#### PP002-074

### EFFECT OF EPHEDRINE ON MOTOR RECOVERY AFTER BRAIN ISCHEMIA IN RATS AND ITS CELLULAR AND MOLECULAR MECHANISMS

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*Objectives:* To investigate the effect of ephedrine on motor recovery after middle cerebral artery occlusion (MCAO), and explore the molecular and cellular mechanisms of ephedrine in accelerating rehabilitation in rats. *Methods:* Sixty male SD rats were randomly divided into sham-operated group, natural recovery group and ephedrine treatment group. The unilateral MCAO models were induced by using bread occlusion method. Electron microscope was used to observe the tissue damages and newly born synapses around ischemic area at week 1, 2, 3 and 4 after operation. The expression levels of growth-associated protein 43 (GAP-43) and synaptophysin around ischemic area were examined by RT-PCR techniques. *Results:* The ephedrine treatment group was lighter in degree of injury and more in the number of newly born synapses as compared with the natural recovery group. Both GAP-43 and synaptophysin proteins were demonstrated statistically significantly increased in RT-PCR product as determined by optical density measurements in ephedrine treatment group compared with natural recovery group ( $p < 0.01$ ). *Conclusions:* The mechanism of behavioral recovery with ephedrine treatment is associated with the enhanced synaptogenesis and the increased expression of molecules involved in neuronal remodeling around ischemic area.

#### PP002-075

### THE EFFECTS OF INTELLIGENCE LEVEL ON REHABILITATIVE TREATMENT IN CHILDREN WITH CEREBRAL PALSY

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*Objective:* To investigate the effects of intelligence level on rehabilitative treatment and its effectiveness in children with cerebral palsy. *Methods:* Intelligence level was assessed with children developmental central of China (CDCC) in 56 children with cerebral palsy. Patients' motor functions were evaluated with the gross motor function measure (GMFM) before and after rehabilitative treatment and total improvement speed and separated improvement speed were calculated. Correlation between CDCC scores and improvement speed or separated improvement speed



was analyzed. *Results*: Total improvement speed was correlated with CDCC scores ( $r=0.72, p<0.01$ ); separated improvement speed was correlated with CDCC scores, and the order of associativity is area A ( $r=0.85, p<0.01$ ), area C ( $r=0.79, p<0.01$ ), area E ( $r=0.67, p<0.01$ ), area D ( $r=0.65, p<0.01$ ) and area B ( $r=0.62, p<0.01$ ) from high to low. *Conclusions*: There was a significant positive correlation between intelligence level and effectiveness of rehabilitative treatment in children with cerebral palsy.

#### PP002-076

### THE EFFECTS OF EPHEDRINE ON MOTOR RECOVERY IN RATS WITH BRAIN ISCHEMIA AND ITS MOLECULAR MECHANISM

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*Objectives*: To investigate the effects of ephedrine on motor recovery after middle cerebral artery occlusion (MCAO), and explore the molecular mechanism of ephedrine in accelerating rehabilitation in rats. *Methods*: Fifty-six male SD rats weighted 220–250 g were randomly divided into sham-operated group, natural recovery group and ephedrine treatment group. The unilateral MCAO models were induced by using Koizumi's method. Beam walking test was used to evaluate the improvement of motor function at weeks 1, 2, 3 and 4 after operation. The quantity of growth-associated protein 43 (GAP-43) and synaptophysin around ischemia area were examined by immunohistochemical techniques. *Results*: The beam walking test score show the ephedrine treatment group recovered faster than the natural recovery group. Both GAP-43 and synaptophysin proteins demonstrated statistically significant increases in immunoreaction product as determined by optical density measurements in ephedrine treatment group compared with natural recovery group. *Conclusions*: Treatment with ephedrine may facilitate recovery from behavioral dysfunction following brain injury in rats. The mechanisms of behavioral recovery with ephedrine treatment are associated with the enhanced expression of molecules involved in neuronal remodeling.

#### PP002-077

### THE EFFECT OF LANGUAGE THERAPY COMBINED WITH POINT MASSAGE ON COMMUNION DISABILITY IN AUTISM CHILDREN

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*Objective*: To study the effect of language therapy combined with point massage on communion disability in autism children. *Methods*: Totally 30 autism children were randomly divided into test group (16 children) and control group (14 children). The test group children were treated with conventional language therapy and point massage. The language therapy included look at each other, attention, partnership, mouth movement imitation, pronunciation, point massage therapy was kneading and massage the acupuncture points of head and face. The control group children were treated with conventional language therapy only. They were evaluated with CRRC sign-signification relations assessment before treatment and once a month. *Results*: All the 30 children were involved in the result analysis. After treatment the cases of 2 groups were better than before treatment. There was no significant difference at the less-difficult items of operating tasks evaluation between

the 2 groups. At the figure identify, speech imitate, gesture imitate, words understanding and expressions the test group was better than the control group ( $p<0.05$ ). The children's communion attitude of test group were better markedly than control group ( $p<0.001$ ). *Conclusion*: Language therapy combined with point massage is effective for communion disability in autism children.

#### PP002-078

### EXPERIMENTAL STUDY OF THE EARLY BEHAVIOR THERAPY TO REDUCE CEREBRAL PALSY IN THE YOUNG RAT WITH BRAIN DAMAGE

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*Objective*: To study the early behavior therapy to reduce cerebral palsy (CP) of the young rat of brain damage. *Method*: 1) Twenty-seven pregnant rats were consecutively injected with lipopolysaccharide (LPS, 450  $\mu\text{g}/\text{kg}$ ,  $n=21$ ) or saline ( $n=6$ ) on gestation days 18 and 19. Selected randomly neonatal rat saline group B ( $n=30$ ), LPS group A1 ( $n=20$ ) and A2 ( $n=30$ ). 2) Early behavior therapy to group A1 by enriched environment and routine fed to group A2 and B on the second day. 3) The neurobehavior was observed in group A1, A2 and B on day 25. 4) Myelin basic protein (MBP) and S-100 were detected in brain sections on days 1 and 25. *Results*: 1) The expression of MBP was obvious decrease in group A2 compared with group B on day 1 ( $p<0.01$ ); The expression of MBP was increased in group A1 compared with group A2 on day 25 ( $p<0.05$ ), increased in group B compared with group A1 and A2 on day 25 ( $p<0.01$ ); The expression of S-100 was significantly increase in group A2 compared with group B on days 1 and 25 ( $p<0.01$ ); The expression of S-100 was the different level in group A1 compared with group A2 and B on day 25 ( $p<0.01$ ). 2) The neurobehavioral observation indicated that there were 4 CP rats in group A1, 8 in group A2 and 0 in group B. *Conclusion*: 1) MBP and S-100 can be the sign of the extent of brain injury. 2) Early interfere could reduce the ratio of CP.

#### PP002-079

### EXPERIMENTAL STUDY ON EFFECT ON EXPRESSION LEVELS OF GAP-43 AND MAP-2 IN BRAIN OF NEONATAL RATS BY INTRAUTERINE INFECTION

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*Objective*: To study the effect of intrauterine infection to the brain development in infant rat, through the observation of expression levels of growth associated protein-43 (GAP-43) and microtubule associated protein-2 (MAP-2). *Method*: Thirty pregnant rats were consecutively injected with lipopolysaccharide (LPS, 450  $\mu\text{g}/\text{kg}$ ) on gestation days 18 and 19, to establish a model of intrauterine infection; the same volume of saline was injected to 6 pregnant rats. Selected randomly neonatal rat to LPS group (group I,  $n=22$ ) and saline group (group N,  $n=22$ ). The expression of GAP-43 and MAP-2 levels in brain of neonatal rats of the two groups was explored at 0 h, on days 14 and 28, respectively. *Results*: The immunoreactive positive area ratio (AF) of GAP-43 and MAP-2 in brain (cortex, hippocampus, internal capsule) was smaller in group I compared with group N at 0 h ( $p<0.05$ ); MAP-2 was decreased in group I compared with group N on day 14 ( $p<0.05$ ); GAP-43 was decreased in

internal capsule and cortex ( $p < 0.05$ ), no difference in hippocampus ( $p > 0.05$ ) in group I compared with group N on day 14; GAP-43 was decreased in cortex ( $p < 0.05$ ), no difference in hippocampus and internal capsule ( $p > 0.05$ ) in group I compared with group N on day 28; MAP-2 was decreased in hippocampus and cortex ( $p < 0.05$ ) and no difference in internal capsule ( $p > 0.05$ ) in group I compared with group N on day 28. *Conclusion:* 1) Intrauterine infection inhibits the brain development in neonatal rat. 2) GAP-43 and MAP-2 can be the sign of the extent of brain injury.

#### PP002-080

### EFFECT OF ANKLE-FOOT ORTHOSIS ON POSTURAL CONTROL MECHANISM DURING QUIET STANDING IN CHILDREN WITH SPASTIC DIPLEGIC CEREBRAL PALSY

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*Objectives:* Although ankle-foot orthoses (AFOs) are frequently prescribed to correct skeletal malalignment and improve gait pattern in children with spastic diplegic cerebral palsy (CP), their effect on standing balance abilities has not been documented. This study investigated differences of postural control mechanism during quiet standing related to the presence of AFOs. *Methods:* Fourteen children with spastic diplegic CP and 14 healthy children were enrolled. Pressure data were recorded while subjects with or without AFOs stood on the dual force platform and net body coordinates of center-of-pressure (COP) were calculated. Outcome measurements included net body COP calculations for path length, medio-lateral and antero-posterior displacements, and correlation coefficients between parameters representing ankle, hip and transverse body rotation mechanisms. *Results:* Children with CP showed more path length in trajectory of COP compared to healthy children and there was no difference between with and without AFOs. In condition with AFO, the coordinate of net body COP showed more correlation with ankle mechanism parameters for mediolateral and antero-posterior directions in children with spastic cerebral palsy. *Conclusions:* This study revealed that the ankle control mechanism for antero-posterior and medio-lateral balance control during quiet standing was more used in CP children with AFOs than without AFOs.

#### PP002-081

### PHYSICAL AND MEDICAMENTOUS TREATMENT IN CHILDREN WITH NEUROGENIC BLADDER

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*Objective:* Neurogenic dysfunction of bladder is defined as pathological condition of bladder and sphincter caused by neurological damage. Comparison of results of urodynamic and neurophysiological investigations, it can precisely diagnose whether the lesion is at the level of upper or lower motor neuron or hypoactive or overactive detrusor. *Methods:* At University Children Hospital in Belgrade, during 2004-2007 periods, 37 children with neurogenic bladder were evaluated. First group of 18 children were treated with combination of physical and medication therapy and second group of 19 children were treated with only medication therapy. Due to type and level of neurogenic damage of bladder patients were administered anticholinergic or cholinergic drugs that are dosed by kilogram of body weight. Physical therapy chose was

individually assessed for every patient combining kinezotherapy and electrotherapy. Electrotherapy procedures included: exponential current (EC), interferential current (IC) and transcutaneous electric nervous stimulation (TENS). Kinezotherapy methods included: exercise for strengthening of pelvic floor muscles and abdominal muscles. *Results:* Better results were achieved in patients that were treated with combined therapy (66.67% of patients) compared to group that was treated with medication therapy (36.84% of patients). We evaluated further parameters: bladder capacity, residual urine, detrusor sphincter dysynergia (DSD) and daily and night uncontrolled voiding. *Conclusion:* Physical therapy is painless, safe, easily for application and children are more comfortable in accepting the treatment. This study suggests implementation of physical therapy procedures as additional method in treatment of patients with functional bladder disorders due to its benefit shown.

#### PP002-082

### BELETED DETECTION OF CEREBRAL INJURY USING DIFFUSION TENSOR IMAGING IN A BOY WITH BECKER-TYPE MUSCULAR DYSTROPHY SHOWING ASYMMETRIC INVOLVEMENT

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*Objectives:* Many conventional MRI studies often fail to detect micropathology in patients with neurological deficits. In this study, we report a boy with Becker type muscular dystrophy (BMD) who was diagnosed belatedly with combined spastic hemiplegic cerebral palsy (CP) because of normal findings in conventional MRI. *Methods:* Review of patient's medical record. *Results:* A currently 6 years and 5 months old boy was the second born to Korean parents. He was delivered by a cesarean section at 38 weeks of gestation and there was no perinatal problem. At age 15 months, he visited general hospital due to infrequent use of right hand. But there was no visible lesion in conventional brain MRI. About 1 month later, elevated liver enzyme was incidentally found. The patient and his brother showed the deletion of the dystrophin gene and diagnosed as BMD. At age 6 years, he underwent the orthopedic surgery due to equinovarus deformity of right foot during walking. Mild clumsiness of right hand was also observed. Follow-up conventional brain MRI did not show any visible lesion, but, diffusion tensor imaging (DTI) and fiber tractography (FT) revealed the discontinuity of left corticospinal tract. *Conclusions:* DTI and FT may be a useful modality for investigating focal lesions in spastic hemiplegic CP without visible lesion in conventional MRI and should be recommended for the patients with unexplained weakness. In addition, this is the first report of combined BMD and spastic hemiplegic CP, as far as we know.

#### PP002-083

### THE ANALYSIS OF COGNITION DEVELOPMENT OF INFANT WITH MICROCEPHALY BY GESELL DEVELOPMENTAL SCHEDULES

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*Objectives:* To research the level of cognition and pathogenesis of children with microcephaly, to make preparations for formulating

effective therapeutic measures. *Methods:* Screening 40 clinical cases with head girth less than X-2SD, from 152 atelencephalia children, in pediatric rehabilitation ward in 2007. Cognition level test with Gesell developmental schedules. *Result:* The number of cognition impairment cases is 34, concluding mild maldevelopment 16 cases, moderate maldevelopment 5 cases and severe maldevelopment 13 cases. There is significant difference in the cases first visit at a young age older than two, boy patients, specific causes which influencing brain development and visible abnormal in image, compared to control groups. *Conclusion:* According to the analysis, we found that many factors influence the degree of cognition development. To reduce nosogenesis, to do prenatal care visit, and early detection and treatment help relieve severity of cognition impairment, promoting development of cognitive function. Gesell developmental schedules can be used as an earlier index for screening cognition impairment of children in early childhood.

**PP002-084**

**APPLICATION STUDY OF INTEGRATED CHINESE AND WESTERN MEDICINE HOSPITAL – THE COMMUNITY – FAMILY REHABILITATION IN INFANTILE PARALYSIS REHABILITATION TREATMENT**

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*Objective:* To evaluate the effect of combination of Chinese and Western Medicine: Hospital - the community - family rehabilitation treatment for children with cerebral palsy. *Methods:* To analyze the treatment efficacy of selected 288 cases of children with cerebral palsy with a combination of Chinese and Western Medicine Hospital – the community – family rehabilitation. GMFM assessment DQ: 288 cases of children with cerebral palsy were used in our treatment model. Rehabilitation in hospital included Bobath physical therapy, occupational therapy, and Chinese medicine of massage, scalp acupuncture, body acupuncture and traditional Chinese herb bath. Community rehabilitation treatment was mainly based on Exercise Therapy Training and Chinese massage treatment. The long-term family rehabilitation was guided by the materials produced by our center. *Results:* Two hundred and eighty-eight cases of children with three months treatment, the effective rate in <3-year-old group and the 3 to 8-year-old group was 68.5% and 62.5%, respectively, and the two age groups showed no significant difference ( $p > 0.05$ ). After 6 months treatment, the effective rate in <3-year-old group and the 3 to 8-year-old group was 85.2% and 68.0%, respectively, and there was significant difference between the two age groups ( $p < 0.05$ ). After 3 months treatment, GMFM assessment in the region of A, B, C, D, E had significantly increased ( $p < 0.05$ ). *Conclusions:* Integrated Chinese and Western Medicine Hospital – the community – family rehabilitation model was appropriate to our national condition and could effectively improve movement and intellectual level in cerebral palsy children and reduce burden on the family.

**PP002-085**

**ADVANCE IN THE TREATMENT OF INFANTILE CEREBRAL PALSY BY SCALP ACUPUNCTURE**

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*Objective:* To investigate the advance of Scalp acupuncture in the treatment of infantile cerebral palsy in recent ten years. *Methods:*

To review all of papers in ten years about Scalp acupuncture on infantile cerebral palsy. *Results:* Scalp acupuncture therapy especially Normative Scheme of Chinese Scalp acupuncture has been widely applied to infantile cerebral palsy in recent years. *Conclusion:* Either the selection of Scalp acupuncture scheme or cooperation with other therapies has taken on more research and exploration. Normative Scheme of Chinese Scalp acupuncture has been constituted the mainstream scalp acupuncture system in company with Jiao's, Lin's and Tang's Scalp acupuncture genres; and on the basis of combination with other traditional therapy, synchronized the evaluation and treatment system of modern rehabilitation medicine gradually, abounding greatly basic theory and clinical practice of Scalp acupuncture, making the advancement of scalp acupuncture into scientific and rational direction. Whereas, the strict scientific research designs, the long-term follow-up and interrelated basic research on scalp acupuncture remain to be improved.

**PP002-086**

**AN OBSERVATION OF MEDICINE WITH ULTRA-SHORTWAVE TOGETHER TO IMPROVE CLEARANCE OF SPUTUM AMONG CHILDREN WHO SUFFERED FROM BRONCHITIS OR PNEUMONIA**

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*Objective:* Children's bronchitis and pneumonia were common diseases in Huhhot. Although there were many reports about using medicine with ultra-shortwave together to treat children's bronchitis and pneumonia in China, only a few articles were reported about treatment of using medicine with ultra-shortwave together to improve clearance of sputum among the children who suffered from bronchitis or pneumonia. *Method:* Prospective pre- and post-testing study. The pediatrics department of the first affiliated hospital of Inner Mongolia Medical College. 30 children suffered from bronchitis or pneumonia with fever and inflammation under control, with stable vital signs of 6 months–7 years old having a 5–14 days course of disease. Intervention: drugs and ultra-shortwave (once per day for 3–6 days). Temperature, rale, cough and sputum at baseline and post treatment. *Result:* After 3 days the cure ratio was 60% among the children with bronchitis, 53% among the children with pneumonia. After 6 days, the cure ratio was 100% among the children with bronchitis, 93% among the children with pneumonia and a total cure ratio was 96%. *Conclusion:* Medicine with ultra-shortwave together was an effective method to improve clearance of sputum among the children with bronchitis or pneumonia.

**PP002-087**

**ASSOCIATION STUDY OF CHILDHOOD AUTISM AND GASTRIN-RELEASING PEPTIDE RECEPTOR GENE POLYMORPHISM**

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*Objective:* To investigate the distribution characteristics of single nucleotide polymorphisms (SNP) of the human exon-2 gastrin-releasing peptide receptor gene 1106C/T and 1316C/T in Chinese Han ethnic group children in Xi'an and their association with autism. *Method:* This study included 59 autism children and 82 normal children. Genotypes of 2 SNP loci in all enrolled persons were defined by polymerase chain reaction (PCR) and confirmed by gene sequencing.



The allele's frequencies of SNPs were analyzed with case-control study and transmission disequilibrium test (TDT), linkage of 2 loci and haplotypes composed of the 2 loci were also studied. Results: The sites of 1106 and 1316 in exon-2 GRPR gene was present in all subject. The frequency of each genotype was 68.3% (TT), 17.1% (TC) and 14.6% (CC) in normal Xi'an children, and 67.8% (TT), 16.9% (TC) and 15.3% (CC) in CA ( $X^2=0.010$ ,  $p>0.05$ ). No significant difference was found in distribution of GRPR in 1106 and 1316 according Hardy-Winberg principle statistics in normal group and CA group ( $X^2=3.81$ ,  $4.52$ ,  $p>0.05$ ). There are no significant difference in frequency of each genotype between boys and girls in CA ( $X^2=4.96$ ,  $p>0.05$ ). There is significant difference in frequency of each genotype TT and CT between boys and girls in normal ( $X^2=6.64$ ,  $p<0.05$ ). No significant difference in frequency of each genotype on the scores of ABC scores in CA ( $rs=0.010-0.145$ ,  $p>0.05$ ). **Conclusion:** The sites of 1106 and 1316 in exon-2 GRPR gene was present in all subject. TT genotype was the primary in two groups. There is significant difference in frequency of genotype TT and CT between boys and girls in normal subjects. The genotypes of the exon-2 GRPR gene were no significantly with the score of ABC in CA.

#### PP002-088

### CLINICAL STUDY OF THE LONG ROUND NEEDLE ON OSTEOARTHRITIS OF THE KNEE

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**Objective:** To investigate the effect of Long-round needle therapy on knee osteoarthritis. **Methods:** Forty-two patients with knee osteoarthritis were randomized to two groups: treatment group and control group. Long-round needle therapy was given to the treatment group and general acupuncture treatment was given to the control group. Patients were evaluated with clinical symptoms, signs and ability of daily living (ADL) before intervention and 4 weeks after intervention, respectively. **Results:** After 4 weeks, morning stiffness, joint tenderness, maximum walking distance, went upstairs and downstairs in treatment group were significantly improved. Significant difference was found between treatment group and control group ( $p<0.05$ ). **Conclusion:** Long-round needle therapy could obviously improve the function of patients with osteoarthritis of the knee. The mechanism is mainly according to the theory of muscle regions. Long-round needle could resolve the focus in the muscle regions.

#### PP002-089

### THE EFFECTS OF EARLY REHABILITATION ON QUALITY OF LIFE FOR ELDERLY PATIENTS WITH STROKE

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**Objective:** To investigate the effects of early rehabilitation on the quality of life (QOL) for elderly patients with stroke. **Methods:** Fifty-six elderly post-stroke patients (<4 weeks) were assigned to rehabilitation ( $n=30$ ) and control ( $n=26$ ) groups. Patients in control group received routine clinical treatment, and patients in rehabilitation group received physical therapy and occupational therapy except those treatment. Modified Barthel index (MBI), Fugl-Meyer assessment (FMA), functional comprehensive assessment (FCA) cognitive subscale, and Chinese scale of clinical neurologic deficit were assessed at the time of enrolment (V1) and the end of the third month after enrolment (V3), respectively, and the brief scale

of quality of life (QOL-BREF) was assessed only at V3. **Results:** There were no significant differences in general clinical materials (sex, age, culture, the course of disease, the type of stroke, and the marital status) or in functional assessments (MBI, upper and lower limbs FMA, FCA cognitive subscale, and the Chinese scale of clinical neurologic deficit) between two groups at V1. The scores of all of functional assessments and QOL-BREF in rehabilitation group were higher than those in control group ( $p<0.05$ ) at V3. As shown by stepwise multiple regression analysis, the score of upper limb FMA at V3 and the rehabilitation training were positive predictors for QOL in elderly patients. **Conclusions:** Early rehabilitation is benefit to improve limb motor ability and cognitive ability for elderly patients with stroke, and the improvement of motor ability is useful to increase the QOL for these patients.

#### PP002-090

### STUDY ON THE CONCENTRIC-NEEDLE SINGLE-FIBER ELECTROMYOGRAPHY FOR THE NEUROMUSCULAR FUNCTION ANALYSIS

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**Objective:** To validate whether a disposable concentric needle electrode (CNE) can be used in place of a single-fiber electrode (SFE) for neuromuscular function measurement. **Methods:** We used CNE for neuromuscular jiggle measurement and SFE for neuromuscular jitter measurement in the extensor digitorum communis in 10 normal subjects and 9 patients with MG during voluntary contraction at the same session. The results were statistically analyzed by SPSS 12.0 software. **Results:** 200 potential pairs were obtained from 10 normal subjects by both CNE and SFE. The mean jiggle value of 200 pairs from CNE recordings and the mean jitter value of 200 pairs from SFE recordings were almost identical, which was  $29.35 \pm 8.82\mu s$  and  $29.00 \pm 8.52\mu s$ , respectively ( $p=0.69$ ). The mean jiggle value with CNE and mean jitter value with SFE of 10 normal subjects were  $29.16 \pm 4.64\mu s$  and  $29.00 \pm 4.5\mu s$  ( $p=0.94$ ). 184 potential pairs were obtained from 9 patients with MG by both CNE and SFE. The mean jiggle value of 184 pairs from CNE recordings was  $80.74 \pm 56.62\mu s$ , the mean jitter value of 184 pairs from SFE recordings was  $81.57 \pm 50.80\mu s$  ( $p=0.88$ ). The mean jiggle value of CNE and mean jitter value of SFE of 9 patients with MG were  $81.01 \pm 16.27\mu s$  and  $81.89 \pm 17.81\mu s$  ( $p=0.92$ ). The jiggle values with CNE and jitter values with SFE were highly comparable. **Conclusion:** The jiggle values with CNE and jitter values with SFE are highly comparable. CNE is a justifiable alternative to SFE in neuromuscular transmission function analysis.

#### PP002-091

### THE EFFECTS OF LESIONS FROM BASAL GANGLIA AND FRONTAL LOBE ON ATTENTION FUNCTION AND SHORT-TERM MEMORY

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**Objectives:** We explored the effects of lesions at basal ganglia and frontal lobe on attention function and short-term memory. **Method:** Twenty-eight patients with brain damage contained frontal lobe lesions ( $n=12$ ), left basal ganglia lesions ( $n=8$ ) and right basal ganglia lesions ( $n=8$ ). Ten cases without brain damage were used as control group. Mini-Mental State Examination (MMSE), Wechsler Memory Scale-Revised (WMS-R), Trail Mak-

ing Tests of part A (TMT-A) and part B (TMT-B) were evaluated. *Results:* The scores in calculation and recall of MMSE, attention function and short-term memory of WMS-R, TMT-A and B were significantly lower in patients with frontal lobe lesion than that in control group. The scores in calculation and recall of MMSE, three items about attention function, logical memory and visual paired associates of WMS-R, TMT-A and B were significantly lower in patients with left basal ganglia lesion than that in control group. The scores in recall of MMSE, three items about attention function, logical memory and visual paired associates of WMS-R, TMT-B were remarkably lower in patients with right basal ganglia lesion than that in control group. The scores in digit span of WMS-R in patients with right basal ganglia lesion were remarkably lower than that in control group and were significantly higher than that in patients with frontal lobe lesion or with left basal ganglia lesion, respectively. *Conclusion:* Frontal lobe lesion may bring on more serious and extensive disorders in attention and short-term memory. There are different characters in digit span memory in patients with left and right basal ganglia lesions.

#### PP002-092

### THE CORRELATION OF MOTOR CONTROL TRAINER SCORES WITH BERG BALANCE SCALE AND GAIT PARAMETERS IN HEMIPARETIC PATIENTS

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*Objective:* The purpose of this study is to test validity of Lower Extremity Motor Control Trainer (MCT) scores. *Methods:* 35 hemiparetic patients (25 male, 10 female) who can stand and ambulate more than 10 m without assist on even surface were included in this study. The mean age of patients was  $52.5 \pm 18.6$  years and time since brain lesion was  $6.6 \pm 4.7$  months. We designed MCT to measure the degree of weight shift and knee flexion angle of hemiparetic side, so considering the vertical movement of the center of mass, and to play a game named "Board cleaner" which use these data. We measured game score in these subjects, and evaluated with clinical tests for balance and gait function including Berg Balance Scale (BBS), Timed Up and Go test (TUG), 10 m walking time (10 mWT). We evaluated correlations between MCT scores and clinical parameters with Spearman and Pearson correlations. *Results:* The average degrees of weight shifting to affected side, average angle of maximal affected knee flexion, average game score was  $63.0 \pm 18.3\%$ ,  $48.4 \pm 14.1$ ,  $59.3 \pm 23.4$ , respectively. The BBS, TUG, 10 mWT was  $45.1 \pm 6.2$ ,  $30.5 \pm 22.8$ ,  $28.0 \pm 23.7$ , respectively. Degrees of weight shifting to affected side, angle of maximal affected knee flexion, game score has statistically significant correlations with BBS, TUG, and 10 mWT. *Conclusions:* Scores obtained by Motor Control Trainer may be useful to evaluate motor control capacity of lower extremity of hemiparetic patients.

#### PP002-093

### SPINAL CORD COMPRESSION SECONDARY TO KYPHOTIC DEFORMITY: A CASE REPORT

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*Case Report:* A 14-year-old male with a thoracic sub-arachnoid cyst, underwent laminectomy and excision with re-implantation of the excised vertebrae. Bracing was prescribed but the patient

was not compliant. At 22 years of age, he developed kyphosis, with progressive bilateral lower extremity weakness and bladder and bowel disturbances, warranting posterior instrumentation for correction of the spinal deformity. *Results:* Rehabilitation therapy was initiated post surgery. Neurogenic bladder and bowel resolved and both lower extremity muscles gained functional strength. The patient had some residual weakness of both lower extremities upon discharge.

#### PP002-094

### THE TIME PATTERNS OF CIRCULATING VEGF PROTEIN EXPRESSION IN MYOCARDIAL ISCHEMIA RABBIT ASSOCIATED WITH ISOMETRIC EXERCISE

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*Objective:* To determine the time course of circulating serum VEGF in myocardial ischemia rabbit with isometric exercise. *Methods:* 23 normal adult New Zealand rabbits. The rabbits were subjected to brief occlusion of left ventricle coronary artery branch (LVB). The ischemia procedure was LVB occlusion by the balloon occluder 2 min/h, 2/d, for 4 weeks. After the operation of myocardial models successfully completed, electrode from pulse generator was anchored in apposition to the sciatic nerve of one side hindlimb. The hindlimb underwent 5 min stimulation followed by 5 min rest (8 times/day) pacing at 40Hz, 1.5mA for 4 weeks. The subjects were randomly divided into sham operated group (SO), myocardial ischemia group (IC) and ischemia plus isometric exercise group (IE). Blood was collected at 0 and at 1, 2, 3 and 4 weeks post stimulation from each group. Serum VEGF concentrations were measured using ELISA kit. *Results:* VEGF was increased in IC and IE at 1 and 2 weeks post stimulation. There was a slightly decrease at 3 weeks and ascend at 4 weeks in IC. In IE, after 3 weeks the VEGF was decreased, however, both IC and IE have no significant difference in 2, 3 and 4 weeks ( $p \geq 0.05$ ). The circulating serum VEGF was significantly increased in IC at any time point of post stimulation compare to SO ( $p \leq 0.05$ ). Comparing with IC, VEGF was significantly increased in IE at any time point of post exercise ( $p \leq 0.05$ ). *Conclusions:* There is peak VEGF expression at 2 weeks of post exercise in isometric exercise group in the process of time.

#### PP002-095

### ERGONOMICS IMPACT OF THE FACTORS OF REHABILITATION MEDICINE

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*Objective:* To discuss how theory of ergonomics used in rehabilitation medicine to enhance clinical efficacy and evidence-based medicine, and to promote the standardization within rehabilitation medicine. *Methods:* Through investigation, observation, experiment conducted by the physiological and psychological factors, and other related experimental studies such as using ergonomics design principle reasonable operating postures, auxiliary facilities and equipment, conducting a feasibility analysis for each position, various programs on visual analysis, establishing the optimal operating environment, posturing reaction experimental design, experimental memory breadth, blinking frequency of the test, hearing test reaction, and establishment of

simulation system. *Results:* Based on the ergonomics of rehabilitation, the examples shown can resolve most common problems in clinical rehabilitation work and management. This facilitates an objective, scientific basis for medical rehabilitation to promote standardization. *Conclusion:* Based on the ergonomics, rehabilitation medicine will be more scientific and practically enhancing rehabilitation treatment to be repeatable and facilitating future evidence-based clinical studies resulting far-reaching economic and social significance.

#### PP002-096

##### SIMPLE CLINICAL CYSTOMETRY PATTERN IN REHABILITATION NURSE OF SPINAL CORD INJURY

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*Objective:* Bladder dysfunction is often found in spinal cord injury patients, including urinary incontinence or retention. The dysfunction should play an important role in prognoses of patients. We designed a simple clinical cystometry pattern for supporting strategies on bladder care and management. *Methods:* Twenty-two SCI patients participated in this study, 12 of which were completely injured and others were incompletely injured. The simple cystometry should be processed by using a 1 m rule with a glass tube of same length as a pressure measurer, a rubber catheter with triple connection pipe and 500 ml warmed 0.9% NaCl. The bladder volumes were measured until 40 cmH<sub>2</sub>O. If the volume were less than 300 ml, the patients should take 654–2 10 mg and got cystometry again after 40 min. *Results:* The bladder volume of patients can be classified by three groups: 9 patients 400–500 ml (A group), 3 patients more than 600 ml (B group) and 10 patients less than 300 ml (C group). Seven patients in C group resulted volumes larger than 300 ml (D group). By using different strategies in different group, every patient in each group was supported with individualized bladder management scheme including the pace of intermittent cauterization, oral taking of 654–2 and Crede maneuver. All of participants were self managed and were able to adhere to the rehabilitation treatment. *Conclusions:* Simple clinical cystometry pattern should provide a convenient tool for strategies of individualized bladder management.

#### PP002-097

##### TRANSTIBIAL AMPUTATION IN SYSTEMIC LUPUS ERYTHEMATOSUS: A CASE REPORT

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*Objective:* Systemic lupus erythematosus is a disorder that afflicts mostly female of childbearing age. There is multi-organ involvement but arterial occlusion is a rare manifestation. Arterial occlusion leading to amputation is also unusual. *Case Report:* This is a case of a 41-year-old female, diagnosed with systemic lupus erythematosus with secondary anti-phospholipid syndrome. She was admitted for numbness of the right foot which on examination showed gangrenous lesion on the 2<sup>nd</sup> right toe, violaceous discoloration of the foot, cyanosis of the toenails and absence of dorsalis pedis pulse. She was diagnosed with critical limb ischemia secondary to systemic lupus erythematosus vasculitis. She was started on methylprednisolone pulse therapy

and antibiotics but no improvement was noted. She eventually underwent transtibial amputation on the right leg. Biopsy done on the extremity showed atherosclerotic changes of arteries with complete obstruction of the dorsalis pedis artery. *Results:* Post-operatively, she was admitted at rehabilitation ward for pre-prosthetic training. On 14<sup>th</sup> hospital day, 9<sup>th</sup> post-operative day, the 4<sup>th</sup> and 5<sup>th</sup> left toes were noted to be gangrenous. Left lower extremity pulses were strong. There were no plans for surgical intervention on the left foot. Patient was discharged on the 22<sup>nd</sup> hospital day.

#### PP002-098

##### HISTOPATHOLOGIC CHANGES OF OSTEOARTHRITIS IN RABBITS WITH TRACTION AND FLEXION MANIPULATION

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*Objective:* To observe the patho-morphologic changes of traction and flexion manipulation on osteoarthritis in rabbits. *Methods:* The rabbits were induced osteoarthritis by ligating the right femoral vein. Twenty-four white Japanese male rabbits were randomly divided into 3 groups: normal control group, model control group and traction and flexion manipulation group. The right knee joint of the treatment group rabbits were treated by traction and flexion manipulation once per day. There was no special treatment in normal control and model control group. All animals were sacrificed after 4 weeks' treatment, and articular cartilages of rabbit tibia were made into tissue, sliced paraffin and observed for the pathologic changes by HE stain. *Results:* The joint cartilaginous cell in normal control group was round or oval with fusiform outline, and arranged into four-layer. The cytoplasm and bone matrix was stained gray-blue and red, respectively. Surface of cartilage was coarse and impaired in model control group. Matrix was not symmetrical, and the numbers of cartilaginous cells was decreased significantly. The structure of the cartilage cells of the traction and flexion manipulation group was similar with that of the normal group. *Conclusion:* The damnification of cartilage osteoarthritis in rabbits could be reversed efficiently by traction and flexion manipulation treatment.

#### PP002-099

##### REHABILITATION CHALLENGES OF A TETRAPLEGIC PATIENT WITH BORDERLINE PERSONALITY DISORDER, INTRACTABLE NEUROPATHIC PAIN AND SUBSTANCE ABUSE DISORDER

**Keith K.T. Chan**

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*Objective:* This report presents the challenges faced by our rehabilitation team in our attempts to rehabilitate a patient with tetraplegia and co-morbidities of borderline personality disorder, intractable neuropathic pain and substance abuse disorder. *Methods:* Patients with personality disorders can be challenging to treat in an inpatient hospital setting. They often have difficulty forming therapeutic relationships with healthcare staff, may resist appropriate care, make unrealistic demands and divide members of the treatment team. These behaviours can be particularly disruptive in a rehabilitation setting. This case report describes the negative effects of the patient's behaviours on her



rehabilitation and strategies used by the rehabilitation team to deal with these problems. *Results:* A patient with cervical myelopathy secondary to epidural abscess with significant medical co-morbidities was transferred to our inpatient rehabilitation unit. Discharge plans rapidly fell apart due to lack of a suitable home environment and care-givers. Rehabilitation efforts were hampered by the patient's refusal to work with the rehabilitation team and difficulties in establishing mutually acceptable goals. Pain management was challenging and confounded by borderline personality and substance abuse disorders. Continued difficult patient-staff interactions without a viable discharge option significantly impacted on staff morale and rehabilitation effectiveness. *Conclusions:* This presentation outlines the challenges of attempting to rehabilitate disabled patients with personality disorders and complex medical co-morbidities and discusses strategies that can be used to minimize negative effects and promote good outcomes.

#### PP002-100

##### STUDY FOR ACUPUNCTURE BY STAGES IN COMBINATION WITH REHABILITATION TREATMENT OF THE PATIENTS WITH ACUTE APOPLEXY

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Acupuncture Department, Taihe Hospital of Yunyang Medicine University, China

*Objective:* To investigate the effect of acupuncture in combination with rehabilitation treatment technique for the recovery in patients with acute apoplexy. *Methods:* To divide the patients with new onset of acute apoplexy within two weeks into two groups (the treatment group and the control group), the treatment group received acupuncture stage in combination with promote treatment technique, the control group only received promote treatment technique. Common medications were allowed to be used for all the patients. The patients were assessed by Fugl-Meyer and Barthel Index before the treatment and after 4 weeks and 12 weeks of treatment. *Results:* There was a significantly statistical difference between the two groups with a better effect in the treatment group. *Conclusion:* Acupuncture in combination with rehabilitation treatment is an effective approach for hemiplegia.

#### PP002-101

##### CLINICAL STUDY OF TUINA IN COMBINATION WITH STELLATE GANGLION BLOCK IN TREATING CERVICAL SPONDYLOPATHY OF THE VERTEBRAL ARTERY TYPE

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*Objective:* To study the effect of Tuina in combination with Stellate Ganglion Block on the vertebral artery type of cervical spondylosis. *Methods:* Patients with the appropriate diagnosis were randomly into three groups. One was treated with Tuina; one was treated with Stellate Ganglion Block; one was treated with the Tuina and Stellate Ganglion Block. All the patients were treated for 4 weeks. *Results:* There was significantly different among the three groups ( $p < 0.05$ ), and Tuina in combination with Stellate Ganglion Block group was better than the Tuina group or the Stellate Ganglion Block group. *Conclusion:* Tuina in combination with Stellate Ganglion Block was effective in treating cervical spondylopathy of the vertebral artery type.

#### PP002-102

##### ANATOMIC LOCALIZATION OF MEDIAL AND LATERAL PLANTAR NERVES IN KOREAN CADAVERS

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*Objectives:* To identify the precise anatomic location of the medial and lateral plantar nerves in relation to bony landmarks. *Methods:* We dissected 17 limbs from 9 adult Korean cadavers. Foot length (Y) was defined as the distance from the calcaneal tuberosity to the 2<sup>nd</sup> toe. Foot width was defined in two ways; 1) distance from the navicular tuberosity to the proximal tip of the 5<sup>th</sup> metatarsal bone (X1) and 2) distance from the 1<sup>st</sup> tarsometatarsal joint to the lateral border of the foot on a line parallel to X1 (X2). The measured mean distance from the calcaneal tuberosity to X1 and X2 was expressed in percentage. The location of each plantar nerve was determined by the measured distance from the navicular tuberosity on X1 and from the 1<sup>st</sup> tarsometatarsal joint on X2 and was expressed in percentage. *Results:* The mean foot length (Y) was 22.78 cm  $\pm$  1.47 cm and the mean foot width was 6.72 cm  $\pm$  0.57 cm (X1) and 7.11 cm  $\pm$  0.48 cm (X2), respectively. The mean distances from the calcaneal tuberosity to X1 and X2 were 34.64%  $\pm$  2.93% and 49.58%  $\pm$  5.09%, respectively. The medial and lateral plantar nerves were located at distances of 30.42%  $\pm$  4.07%, 50.53%  $\pm$  5.51% from the navicular tuberosity on X1, and 34.33%  $\pm$  3.32%, 62.97%  $\pm$  4.61% from the 1<sup>st</sup> tarsometatarsal joint on X2, respectively. *Conclusions:* These results will help clinicians find accurate anatomic locations of medial and lateral plantar nerves and minimize technical errors during nerve conduction studies.

#### PP002-103

##### PHARMACOLOGIC MANAGEMENT OF CANCER PAIN

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*Objective:* Cancer remains the second most common cause of death in the United States and China. Pain continues to be the most feared complication of this diagnosis. Purposes of this study are to review the current medical management of cancer pain. *Methods:* Literature review. *Results:* Studies demonstrated that when the World Health Organization treatment guidelines are followed, 90% of patients are pain-free. Nonsteroidal anti-inflammatory medications are the first line therapy for mild to moderate cancer pain with precaution of side effects. Opioids are effective in the treatment of patients with cancer pain. With education of healthcare providers and patients, managing pain with opioids will be more effective. Tailoring doses and rotating opioids are critical to avoid tolerance. Ketamine has been used in some pain conditions that are refractory to high-dose opioids and other conventional therapy. Tricyclic antidepressants have efficacy in treatment of patients with neuropathic pain with/without comorbid depression and sleep disturbances. Anticonvulsants (gabapentin and pregabalin) are efficacious in different neuropathic pain induced by radiotherapy and chemotherapy with a good safety profile. Bisphosphonate calcitonin and ralonuclides have been used for metastatic bone

pain. Other adjuvant medications including corticosteroids and local anesthetics are also reviewed. *Conclusion:* Management of cancer pain caused by tumor and tumor therapies are challenging for patients and clinicians. Fully understanding the pathophysiology of cancer pain will help clinician to manage pain more appropriately. Comprehensive pharmacologic management with opioids and adjuvant can achieve better pain control, decrease side effect and improve patient's quality of life.

#### PP002-104

### SELECTED SPINAL DORSAL RAMUS INJECTIONS FOR LOW BACK PAIN: A RETROSPECTIVE STUDY

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*Objective:* Low back pain is a common problem with many potential pain generators. The purpose of this study is a retrospective study of assessing the efficacy of highly selective spinal dorsal ramus injections to treat low back pain. *Methods:* Forty-one patients: ages from 23 to 84 years, mean duration of pain for 5.9 years; failed conservative treatment, including physical therapy; presented with low back pain without radiation to the lower extremities. Examination revealed a palpable step-off at an interspace between the spinous processes with a deep tenderness at the junction of the lateral facet and proximal transverse process which radiated 2–3 levels distally. Each patient had single level dorsal ramus injection at the painful step-off level under fluoroscopic guidance with one milliliter of mixed 0.25% marcaine and 20 mg of depo-medrol. Patients were followed for 3 to 18 months. *Results:* 79% of patients had  $\geq 50\%$  of pain relief lasting  $>2$  months. Over half of the patients experienced an increase in functional activities and a decrease in oral pain medication dosing. The L1 and L2 vertebral levels were the most common painful sites. *Conclusion:* Segmental spinal dorsal ramus dysfunction may be one of many causes of low back pain. Based on anatomy, physical examination and clinical presentation, the involved spinal ramus can be localized. Our data supports that the single spinal dorsal ramus injection can be used for both diagnostic and treatment of lower back pain.

#### PP002-105

### CERVICAL C1-2, C2-3 SPINAL INJECTIONS AS A DIAGNOSTIC AND THERAPEUTIC TOOL FOR CERVICOGENIC HEADACHE

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*Objective:* The diagnosis and treatment of cervicogenic headache (CeH) is challenging. This study is evaluating the efficacy of C1–C2 and C2–C3 facet joint and dorsal rami injections as a diagnostic and therapeutic treatment in patients with CeH. *Methods:* Thirty consecutive patient charts, with a diagnosis of CeH, were retrospectively reviewed. Thirteen men and 17 women, with a mean age of 42 (18–65) years, had an average disease duration of 6.9 (0.5–20) years. Ten patients had a unilateral headache and twenty patients had a bilateral headache. All patients had failed multiple pharmacological and other treatments prior to the study. All patients had a cervical

spine MRI. Each patient underwent fluoroscopically guided C1–C2, C2–C3 facet joint and dorsal rami injections. Outcome Measures: Numerical pain scale and duration of pain relief (days). *Results:* 27/30 (90%) patients experienced  $>50\%$  headache relief, with an average duration of 26 (2–90) days from the first injection. C1–C2 and C2–C3 injections provided long-duration of pain relief. Twenty-six cervical MRIs demonstrated degenerative disc disease or a herniated disc. *Conclusions:* C1–C2 and C2–C3 facet joint and dorsal rami blocks provided significant and prolonged pain relief in the majority of the patients in this study. The procedure had also a diagnostic value for these patients with CeH. Further studies are needed to compare the efficacy of blocking the facet joint verses the dorsal rami in the treatment of patients with CeH. Additional studies are needed to assess the efficacy of these treatments in a controlled manner.

#### PP002-106

### COMPARISON OF THERAPEUTIC EFFECTS OF TWO TYPES OF COCKUP SPLINT IN PATIENTS SUFFERING FROM CARPAL TUNNEL SYNDROME

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*Objective:* This study was to compare therapeutic effects of long (with MP joint restriction) and short (without MP joint restriction) cockup splint in mild and moderate carpal tunnel syndrome patients confirmed by electrodiagnostic study. *Method:* Patients was evaluated by Semmes-WM-stein monofilaments, two-point discrimination, visual analog scale, pinch & grip strength. In this study 23 patients was treated with long or short cockup splint in two groups. Group A ( $n=12$ ) was treated by long splint and group B ( $n=11$ ) was treated by short splint for 4 weeks. *Results:* Both type of splints appear to be effective in decreasing CTS symptoms but long splint more beneficial than short splint. 1) The results of SWMS, 2PD, pinch & grip strength in group A had higher significant difference than group B ( $p<0.05$ ). 2) Two groups' VAS did not have significant difference in results ( $p>0.05$ – $p=0.55$ ). *Conclusion:* In regard to the results of tests and the effects of both splints in treatment of CTS, The long cockup splint appear to be more effective in decreasing mild & moderate CTS Symptoms. So we suggest that physicians in regard to patients situation choose the proper splint.

#### PP002-107

### EFFECT ON TH1/TH2 CYTOKINES BY ACUPUNCTURE AND MOXIBUSTION IN THE PATIENTS WITH ALLERGIC RHINITIS

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*Objective:* To observe the effects of symptoms, signs, Th1/Th2 cytokines and the imbalance states of Th1 and Th2 cytokines in patients with perennial allergic rhinitis by acupuncture on the points EX-HN8 (Shangyingxiang) and DU23 (Shangxin) and moxibustion on the ST36 (Zusanli), and to study the therapeutic mechanism from the objective evidence for guiding clinical practice. *Methods:* 1) Thirty patients of PAR were treated by acupuncture and moxibustion and 30 healthy people as the control group. 2) Measure the patients' syndromes and nasal mucoma on before and after the first, second course of treatment respectively with one course for 15 days. 3) Tests of the IL-4, IFN- $\gamma$ , GM-CSF in peripheral blood mononuclear cells

(PBMC) both in patients and healthy volunteers. *Results:* 1) Before treatment, the levels of IL-4, GM-CSF were significantly higher than the control group ( $p < 0.01$ ), but the levels of IFN- $\gamma$  in them obviously lower than it. 2) GM-CSF was shown positive correlations with IL-4 ( $p < 0.01$ ), and a negative with IFN- $\gamma$  ( $p < 0.01$ ), respectively. 3) After treatment, the IL-4, GM-CSF level in the treated group was decreased significantly ( $p < 0.01$ ), and the level of IFN- $\gamma$  was increased obviously ( $p < 0.05$ ). *Conclusion:* 1) The result shows that acupuncture combined with moxibustion has the functions in regulating the excretion of the nasal discharge and changing the states of secretion, swelling and of the nasal mucosa. 2) Acupuncture and moxibustion is highly effective in treating PAR by regulating the levels of Th1/Th2 cytokines, correcting the imbalance Th1/Th2 cytokines network.

#### PP002-108

### TREATING HYDROFLUORIC ACID BURN WOUNDS WITH INTRODUCTION OF DIRECT-CURRENT CALCIUM IONS

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*Objective:* Hydrofluoric acid is a highly toxic material which has a strong corrosive effect on human body. Even with a tiny contact area, it can cause a deep burn wound. We observed the curative effect of introducing direct-current calcium ions on hydrofluoric acid burns. *Method:* Eighteen patients suffered from hydrofluoric acid burn were treated. Burn wounds were on face, elbow, forearm, fingers, thighs and toes, respectively. Their burn areas were from 4 cm<sup>2</sup> to 400 cm<sup>2</sup>. Burn wounds were treated with introduction of 10% calcium chloride solution via DL-Z direct current inductive electrotherapy machine produced by Shantou Broadcasting Instrument Factory in Guangzhou. *Result:* All the 18 cases were cured. Deep degree-II burn wounds were healed without scar formation and functional disorder. *Conclusion:* The introduction of direct-current calcium ions has a good therapeutic effect on hydrofluoric acid burns.

#### PP002-109

### MEDIAN NERVE MOBILIZATION EXERCISES AS AN ADJUVANT THERAPY FOR PATIENTS WITH CARPAL TUNNEL SYNDROME: A RANDOMIZED CONTROLLED SINGLE-BLIND STUDY

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*Objective:* The aim of the study was to determine the effectiveness of median nerve mobilization exercise as an adjuvant treatment in alleviating pain and to changes in electrodiagnostic parameters in patients with carpal tunnel syndrome. *Method:* A controlled randomized study was conducted. Twelve patients with a total of 24 hands were enrolled in the study diagnosed with carpal tunnel syndrome according to electrodiagnostic parameters. The 12 patients were randomized into two groups. Six patients were included in the treatment group. Patients in the treatment group were instructed median nerve mobilization exercises. Six patients were included in the control group. Patients in the control group were instructed range of motion exercises of the wrist. All subjects were prescribed custom made neutral volar carpal tunnel splints. All subjects underwent pretest evaluation pain assessment using for visual analog scale (VAS) and for nerve conduction studies. The subjects were then followed up after 4 and 8 weeks for post-test to assess the following outcome parameters: visual analog scale scores and nerve conduction studies. *Results:* Analysis using two

tailed Wilcoxon signed rank test and Mann-Whitney test statistical test analyses were used to show no significant differences between the treatment and control group at 95% confidence level. Z test statistical analyses were performed for the difference of VAS and nerve conduction velocities of the median nerve. *Conclusion:* The author concluded that median nerve mobilization exercises have no significant adjuvant effect in the lowering of the VAS and improvement of electrodiagnostic parameters among patients with carpal tunnel syndrome.

#### PP002-110

### PROPER SHOE SIZES FOR THAI ELDERLY

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*Objective:* To determine proper shoe sizes for Thai elderly. *Methods:* Two hundred and thirteen healthy older people (108 men, 105 women) aged 60–80 years who were independent in walking were recruited from urban Bangkok. Thirteen foot dimensions: foot length, foot width, arch length, toe depth, heel width, upper ball, upper arch, ball girth, waist girth, instep girth, short heel girth, ankle circumference, and ankle height were measured. Correlation between foot length and foot width were analyzed in order to determine shoe sizes for both genders. *Results:* Approximately 84% of older women had foot length between shoes size 22.5 cm to 24.5 cm, and 89% of older men had foot length between shoes size 24 cm to 27 cm. Foot width was correlated with foot length. For women: foot width = 2.396 + (0.299 x foot length),  $r = 0.50$ ,  $p = 0.001$ . For men: foot width = 2.487 + (0.311 x foot length),  $r = 0.56$ ,  $p = 0.002$ . The maximum toe depth which allowed comfort was 2.45 cm for women and 2.78 for men. About 50.0% women and 34.3% men wore too narrow shoe, and 4.8% women and 0.9% men wore too short shoe. Twenty two percent of the subjects (35.5% of women) who used too small footwear reported foot pain. *Conclusion:* These data are important for fitting proper footwear in order to provide foot ergonomics and prevent foot problems in elderly.

#### PP002-111

### ARCHITECTURAL DESIGN OF REHABILITATION FACILITIES – RESULTS FROM AN INTER-DISCIPLINARY STUDENT TERM PROJECT

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*Background:* According to the ICF-model environmental factors influence functional health of people with disabilities, including the human-made changes of environment (e150). The architectural design of rehabilitation facilities is of importance for the rehabilitation process. A cooperative project of the department for PRM and the Faculty of Interior Design performed a joint project aiming at “Improving of the design of the rehabilitation centre of Hannover Medical University” teaching the students of Interior Design about the special needs of people with disabilities in the early rehabilitation phase. *Methods:* Fourteen students were given the task to redesign the building of the Department of Rehabilitation Medicine. Initially they were taught in the principles of rehabilitation includ-



ing the ICF-models and the concept of rehabilitation. In seminars and they had to acquire knowledge about norms and standards of architectural design and disabilities. *Results:* In the seminars some special criteria for the concepts were defined, e.g. – barrier-free and clearly structured design – friendly, stimulating and communicative environment – pleasant environment for the staff working – special focus on light, sound and air quality – adaptation to the given structure (re-design). All students developed a written concept and built up a model of their blueprint. *Conclusion:* The knowledge on the special need of people with disabilities is of great importance for future architects and interior designers. The concepts of the students are useful to find an optimized concept for the redesign of the old building of the rehabilitation centre.

#### PP002-112

### REHABILITATION IN NATURAL DISASTER AFFECTED PEOPLE: BANGLADESH EXPERIENCE

#### *Mohd Taslim Uddin*

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*Objective and introduction:* Floods and storms are regular phenomenon in Bangladesh. Every year the country, which is almost the size of the US state Ohio but has a population of 150 million, is visited by floods and storm of varying intensity. Cyclone SIDR hit the south-west coast of Bangladesh on 15<sup>th</sup> November 2007 accompanied by a huge tidal bore. Official death figure stood around 5,000 with hundreds of people still missing in 15 coastal districts. Hundreds of thousands of people became homeless. *Rehab Effort:* The cyclone left its mark of devastations affecting 30,000,000 populations. Bangladesh Association of PMR in general meeting decided to stand beside the affected humanity with their limited resources. We communicated with ISPRM officials at different levels. Thanks to Prof. Andrew Haig, Mark Young and Dr. Eklana Polukhin from USA, Prof. Haim Ring and many others for continuous support. We identified 30 worse affected districts and sent Rehab Team for immediate help. We did not have any previous experience in working such situations. Head injury, cut injury, blunt injury, fracture of bones, skin loss and many other types of injuries have encountered. Thousands of cyclone-affected people haunted by family members killed by deadly cyclone may experience psychiatric disorders as well. We now started second phase of Rehab activity to run long term rehab programs. *Conclusions:* There need to be some Rehab experience to work in special situations like natural disasters; as we find in Hurricane, Earthquake and Cyclones.

#### PP002-113

### ORGANIZATION OF PAIN MANAGEMENT: BANGLADESH PERSPECTIVES

#### *Mohd Taslim Uddin*

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*Objective and introduction:* All medical practitioners used to treat pain, as it is the presenting symptom of most of the disease conditions and mostly musculoskeletal problems. Prof. John Bonica started pain clinic in USA during 1950s. It was so popular that ultimately during 1975 international Association for the study of pain (IASP) was formed. The chronic Pain problem is multifaceted. No single physician has the resources to care comprehensively for the complex psychological, social, legal, medical and psychological problems involved in chronic pain, therefore the multidisciplinary team approach is necessary. *Bangladesh Perspectives:* Pioneers of

Pain Management in Bangladesh include Prof. SN Samad Choudhury, Prof. Quamrul Islam, Prof. KM Iqbal, Dr. Shamsul Alam, Dr. Junaid Shafiq, Dr. Mohd Taslim Uddin. Bangladesh Society for study of pain (BSSP) ([www.bsspb.com](http://www.bsspb.com)) was formed in February 1997. The First Multidisciplinary Pain Clinic involving specialists from Anesthesiology, Psychiatry, PMR, Neurology and Rheumatology in BSM Medical University started during 1994. BSSP organizes bimonthly seminar on different topics of pain regularly. We had first Annual conference during March 1998 and the 10th Congress will be held in April 2008. As a matter of cooperation, bondage and exchange of knowledge South Asian Regional Pain Society was formed (SARPS) and we will have 4<sup>th</sup>. Congress during this April 2008. Our members contributes in the national, regional and international levels. BSSP regularly publishes News letter and its Official Organ Pain Journal. *Conclusion:* Pain Management is a multidisciplinary team approach. Rehab specialist, as a team leader can be one of the best organizer.

#### PP002-114

### LONG-TERM EXERCISE TRAINING PRODUCES ADDITIVE BENEFIT EFFECTS ON THE STANDARD MEDICINE THERAPY FOR PATIENTS WITH CHRONIC HEART FAILURE

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*Objective:* To evaluate the effects of long-term moderate intensity Exercise Training (ET) combined with medicine therapy in patients with heart failure (HF). *Methods:* Thirty patients with HF were randomly assigned to a 1-year exercise-training (ET) group (G1, n=15) and non-exercise training as a control group (G2, n=15). 6-min walking test and echocardiography were measured in all patients before and after ET. *Results:* After one year, left end-ventricular diastolic dimension (LVD) diminished markedly both in ET and control group (G1 from  $71.1 \pm 9.7$  mm to  $61.0 \pm 6.6$  mm and G2 from  $69.1 \pm 9.5$  mm to  $64.8 \pm 8.1$  mm, respectively). Left ventricular ejection fraction (EF) and 6-min walking distance improved significantly both in 2 group (in G1, EF from  $30.8 \pm 9.9\%$  to  $48.0 \pm 10.1\%$ , walking distance from  $378 \pm 81$  m to  $545 \pm 96$  m, in control group (G2), EF from  $29.9 \pm 8.7\%$  to  $40.7 \pm 7.2\%$  and walking distance from  $369 \pm 89$  m to  $463 \pm 101$  m, respectively). Furthermore, LVD decreased markedly and EF, 6-min walking distance increased significantly in ET group when compared to control group ( $p < 0.05$  for each). *Conclusion:* Long-term exercise-training produces additive benefit effects on the heart failure patients with standard medicine therapy.

#### PP002-115

### IN VITRO CULTURE AND PURIFICATION OF ADULT CANINE SKELETAL MYOBLAST

#### *Wenhui Zhu<sup>1</sup>, Yubin Wang<sup>1</sup>, Gufeng Qiu<sup>2</sup>*

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*Objective:* To explore a simple procedure of the culture and purification of the canine skeletal myoblast *in vitro*. *Methods:* The muscle of adult canine rear thigh was obtained, from which myoblasts were isolated and harvested by mechanical decomposition and two-step enzyme digestion. Then the cells were purified by combination of differential velocity adherent method. The growth state of the myoblast was observed and the myoblast growth curves were drawn;

the morphologic properties of myoblasts were observed and myoblasts were identified by immunocytochemistry of desmin. *Results:* Our method had a high possibility of success in obtaining the adult canine myoblasts with high survival rate in vitro and the myoblasts grew very well. More than 90% of the cells were desmin-positive by immunocytochemistry, which indicated the high purification of myoblasts. *Conclusion:* Our method for isolating and purifying myoblasts proved to be convenient and practical with high possibility of success. At the same time, our research laid a foundation for the research of myoblast therapy by animal of canine.

#### PP002-116

### BELOW KNEE PROSTHESIS FOR A PATIENT WITH POLIOMYELITIS, PSORIASIS AND LYMPHEDEMA

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*Objective and background:* We encountered a 55-year-old male patient with history of poliomyelitis affecting his right lower limb. He also has history of psoriasis and lymphedema secondary to elephantiasis nostras verrucosa affecting his lower limbs. He developed right toes gangrene and required below knee amputation on March 2007. *Prosthesis prescription:* The prosthesis needed to accommodate the fragile stump skin and provide good suspension. However the residual limb was weak and the alignment was distorted due to poliomyelitis. It impinged significant difficulty for prosthesis design. After repeated trials of different approaches, finally the socket was a patellar-tendon bearing (PTB) socket made of thermoplastic with strips of carbon fiber reinforcement. Holes were created for ventilation. The suspension system was a combination of supracondylar cuff, similar to patient's old caliper and additional thigh-lace. A drop-lock was added at the knee joint level for knee stabilization. The shank was endoskeletal type and the foot ankle assembly was solid ankle cushion heel (Photos and videos will be shown at the presentation). *Results:* Repeated gait analysis were performed to evaluate his performance with this special prosthesis and to fine adjusting the details of the components. The final gait was slightly wide base with Trendelenberg lurching to right. The right anteroposterior shearing force reduced at late stance phase. However the walking speed reached 0.59 m/s and the peak vertical force was 705N only. *Conclusion:* With tailor-made prosthesis, innovative ideas and testified with a gait analysis, even patient with unstable stump and poor residual limb power can fit with prosthesis and walk with reasonably good quality.

#### PP002-117

### EFFECT OF EXERCISE AT DIFFERENT TIME POINT AFTER DIET ON THE BLOOD GLUCOSE IN THE PATIENTS WITH DIABETES MELLITUS

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*Objective:* To investigate the effect of exercise therapy at different time point after diet on the blood glucose in the patients with diabetes mellitus. *Method:* In the 30 cases of NDDM, the blood glucose was determined after exercises at different time point after diet and that one day before exercises served as control. *Results:* The blood glucose at 90 min after exercise was most significant ( $p < 0.05$ ).

*Conclusion:* Scientific exercise therapy was more beneficial to the rehabilitation of the patients with diabetes mellitus.

#### PP002-118

### THE EFFECTS OF INFRASOUND THERAPY ON RAJI CELLS

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*Objective:* To study infrasound therapy on Raji cells. *Methods:* Infrasound 8TM (USA Chi Corporation) as a treatment factor, Raji cells during logarithm growing period were grouped as infrasound and control groups. Upon the super clean bench, the Raji cells of the infrasound group in the cell culture plates were treated for 15, 30, 60, 90 and 120 min by infrasound 8TM. It was a sham treatment to the control group that the Infrasound 8TM was shut off. All the cells were tested with MTT assay, flow cytometry analysis, and observed with scanning electron microscope (SEM) and transmission electron microscopy (TEM) after 24 h and 48 h. *Results:* MTT assay showed that even OD counts of all infrasound groups seemed less than their control groups; but the differences were no significant ( $p > 0.05$ ). Flow cytometry analysis showed that the rate of necrotic cells and apoptosis cells in all groups was less than 10%; and that the differences in all groups were not obvious ( $p > 0.05$ ). SEM: The cells treated by infrasound exposure then cultivated for 24 h showed that the projections and microvillous on the surface of the cells became shorten and decreased. The surface of the membrane became smooth. TEM: Homogenizing cell nuclear and sprouting off cytoplasm were showed in the cells treated by infrasound exposure then cultivated for 48 h. *Conclusion:* Infrasound (less than 90 dB) treatment in the experiment had no obvious influence on multiplication and apoptosis of Raji cells. But the projections on the Raji cells surface could be changed and the membrane of Raji cells could be affected directly. Furthermore, some Raji cells turned into immature cells possible in order to escape the apoptosis.

#### PP002-119

### COMPARATIVE STUDY ON CLUSTER NEEDLING OF SCALP ACUPUNCTURE CURING ACUTE CEREBRAL INFARCTION

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*Objective:* Discuss a cluster needling of scalp acupuncture curative effect on acute cerebral infarction. *Methods:* Sixty-two patients were divided into 2 sets randomly, the treatment set was treated with cluster needling of scalp acupuncture plus medicine treatment, and the comparison set were treated with medicine treatment. Observe each set Fugl Meyer scale (FMA), the National Institutes of Health Stroke Scale (NIHSS), the improvement Barthel index number (BI), evaluate two sets clinical curative effect. *Results:* 1) Two sets can increase FMA, and cluster needling of scalp acupuncture is better than medicine treatment on motor function. 2) Two sets can increase MBI, and cluster needling of scalp acupuncture is better than medicine treatment on activities of daily living. 3) Two sets can reduce NIHSS, and cluster needling of scalp acupuncture is better than medicine treatment on body structure. *Conclusion:* A cluster needling of scalp acupuncture is an effect method to cure acute cerebral infarction.

## PP002-120

### TRADITIONAL CHINESE MEDICINE REHABILITATION AND EVALUATION OF CHILDREN WITH CEREBRAL PALSY

**Zhenhuan Liu**

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**Objective:** To investigate the mode of cerebral palsy (CP) rehabilitation that would be appropriate to the condition of our country. We implemented modern medicine rehabilitation + tradition medicine rehabilitation + home medicine rehabilitation mode from 1999-2001. **Methods:** Modern rehabilitation included Bobath physiotherapy used, occupation therapist, speech therapist. TCM included matching acupuncture, massage, hydrotherapy, tradition medicine rehabilitation and laquo. Home rehabilitation included Children Cerebral Palsy Home long-term Rehabilitation manual and laquo and Children Cerebral Palsy home Rehabilitation VCD and raquo. 150 CP patients of one to seven years old were randomly divided into two groups for clinical study. **Results:** Effects were observed after a period of three months in treatment group. Measurements with DQ, MQ, GMFE increased significantly compared to that before treatment ( $p < 0.01$ ). Assessment after nine months was similar. The effect rate of treatment group was higher than that of control group ( $t = 6.926, p < 0.01$ ). After treatment, cerebromalacia, encephalomalacia and leukodystrophy on skull CT showed improvement when compared with the control (25.92% vs 2.56%,  $p < 0.01$ ). **Conclusion:** The clinical effectiveness may be due to improvement of nerve-cell function of cerebral injury, alleviating anomaly motion mode and abnormal posture reflex. The implementation of home rehabilitation enables the three-combined-rehabilitation mode and enhances the quality of life of the caregivers as well.

## PP002-121

### EFFECT OF ACUPUNCTURE IN RAISING THE CONTENT OF MONOAMINE NEUROTRANSMITTER IN BRAIN TISSUE OF CEREBRAL PALSY RATS

**Zhenhuan Liu**

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**Objective:** To detect the content of monoamine neurotransmitter in hippocampus, cortex, nucleus basalis of Meynert and brain stem of rats with cerebral palsy and to observe if acupuncture can change the content. To approach the mechanism of action of acupuncture in treating cerebral palsy rats. **Methods:** Through chemicals and hypoxia models, cerebral palsy rats were made. After acupuncture treatment, rats are decapitated to get their brains. Content of monoamine neurotransmitters was detected by spectrophotometer. 85 of 7-day-old rats were selected (11.5-18.4 g,  $12.6 \pm 2.1$  g). All successful models (72 rats) were divided into 3 groups randomly (One with acupuncture I, One with acupuncture II, One without treatment). Besides, another group of sham operation (24 rats) was set up. **First group:** Began the acupuncture 24 h after the operation. **Second group:** Began the acupuncture a week later. **Third group:** Without treatment. **Fourth group:** With sham operation. Outcome measures included 1) death of rats; 2) content of monoamine neurotransmitter in brain tissue. Statistical analysis was made with SPSS 12.0 (Chi square test and ANOVA). **Results:** Compared with the group of sham operation, cerebral palsy rats' content of dopamine (DA) and 5-hydroxytryptamine (5-HT) in nucleus basalis of Meynert, and their content of norepinephrine

(NE) in brain stem were all lower. After acupuncture treatment the above-mentioned monoamine neurotransmitter all increased with significance. **Conclusions:** Increasing the content of monoamine neurotransmitter could be one conceivable mechanism of action of acupuncture in treating cerebral palsy rats.

## PP002-122

### CHALLENGES ENCOUNTERED BY OCCUPATIONAL THERAPISTS IN THE REHABILITATION OF SPINAL CORD INJURY ON THE ASPECT OF SEXUALITY

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**Objectives:** The rehabilitation of spinal cord injury persons requires holistic approach. Objective of the paper will be to report the finding of the study that focus on the challenges faced by therapists in addressing issues regarding sexuality for spinal cord injury in Tanzania. The paper will also discuss the patients' feelings regarding who is best to discuss or address the sexuality issues of patients. The paper will also put forward the recommendation for future betterment. **Methods:** The study was a qualitative study. The structured interview and Focused Group Discussion was the methods employed to gather information from the patients and therapist. **Result:** The results of study will be reported based on the objectives of the study. Some of information since the study was more of qualitative will be narrated. **Conclusions:** The study finds out that the components of sexuality for SCI Clients was very much neglected by majority of therapists. In addressing the issues of sexuality requires confidence and it should be culturally accepted. The paper will outline why the therapist were neglecting that component.

## PP002-123

### CONTEXTUAL FACTORS BASED ON ICF AS BARRIERS FOR PROSTHESIS USE IN DOUBLE AMPUTEE. CASE REVIEWS OF MALAYSIAN EXPERIENCE

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**Objective:** This paper aimed to illustrate contextual factors based on the international classification of functioning, disability and health (ICF) domains influencing the functional outcome of double amputee patients. Based on the biopsychosocial model of the ICF framework, contextual factors also influence disease and patients' outcome. Contextual factors include environmental and personal factors. Factors determining the level of function for prosthetic restoration in amputee are quite established. These include patients' medical condition, amputation level, stump condition, premorbid function and psychological status. However, contextual factors are not well described yet. How do contextual factors influence prosthetic restoration in double amputee patient? **Methods:** Six double amputee patients seen in University Malaya Medical Centre in 2007 were prospectively followed up. Contextual factors that affect prosthetic restoration are listed in order of importance for each patient using the ICF based clinical sheet and the ICF coding is given except for personal factors. **Results:** The amputations were caused by common conditions eg complications of diabetes mellitus, peripheral vascular disease, and trauma. Patient group include three male and three female.



The age group range between 28 to 69 years old. Different ethnic groups were included (2 Indian, 2 Chinese and 1 Malay) to reflect cultural factors. The common contextual factors identified are: Product and technology for personal use in daily living (e115), support and relationship immediate family (e310) and health (e580), general social support (e575), social security (e570) and transportation (e540) service, system and policies. *Conclusion:* Environmental factors can serve as barriers or facilitators because of its presence or absence. Identifying these can provide a more comprehensive approach in patient care by adopting ICF classification as clinical tools especially for double amputee of which the impairment are more complex.

#### PP002-124

##### THE EFFECTS OF EXERCISE TRAINING ON THE IMPAIRED GLUCOSE REGULATION IN PATIENTS' GLUCOLIPID METABOLISM AND INSULIN RESISTANCE

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*Objective:* To investigate the effects of exercise training on the impaired glucose regulation (IGR) in patients' glucolipid metabolism and insulin resistance. *Methods:* 46 patients with IGR were divided into experiment group (EG) and control group (CG) randomly. The EG took exercise training according to the exercises prescription of quantified caloric consumes, 3 times a week at least and last for 6 months, while the control group did not receive any treatment. The body measurement index, glucolipid metabolism index, level of insulin and status of IGR were observed before and after 6 months in both groups. *Results:* After 6 months, the TC, TG, LDL-c, FPG, 2h PG, FINS, 2hINS and HOMA-IR declined significantly in the EG compared to the CG. And there was no one in EG transformed to DM while there were 3 in CC. *Conclusion:* The exercise training has the effects of adjusting the level of lipids and blood glucose with decreasing the insulin resistance and improving prognosis of IGR.

#### PP002-125

##### PAIN LEVEL EXPERIENCED DURING SEXUAL INTERCOURSE MAY BE INFLUENCED BY BFB-ASSISTED ELECTROSTIMULATION OF PELVIC FLOOR MUSCLES – A PILOT STUDY

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*Objective:* Pelvic floor function is fairly well understood and pelvic floor exercises are part of rehabilitation for incontinence. Some of these patients indicate pain as a reason for withdrawal in sexual activities. *Method:* Female patients ( $n=10$ ) with urinary stress incontinence due to descensus perinei who stated a constraint in sexual activities due to pain were accepted for the investigation. These patients underwent already a base therapy with 4 times pelvic floor exercise (PFE) group sessions and a home exercise program. They were provided with a biofeedback basis diagnosis before an after PFE program and had stated on a visual analogue scale their pain level. None of these patients showed a hypertonus of the pelvic floor in the BFB assessment.

The pain level was unchanged after PFE alone. They received then BFB-assisted electrostimulation (Stiwell Med 4) for ten times twice a week. Afterwards VAS and a BFB diagnostic procedure were repeated. *Results:* All patients showed a reduction of pain on the VAS. The level of pelvic floor coordination force, evaluated with a 10 second duration test and the measured maximal force in the BFB diagnostic procedure were higher compared to PFE sessions alone. The BFB-assisted electrostimulation showed a significant increase of the pelvic floor muscle coordination force in the diagnostic procedure compared with the results before and after PFE alone. *Conclusion:* The increase of pelvic floor coordination force seems to influence the pain level experienced. BFB-assisted electrostimulation showed an increment of pelvic floor muscle force compared with the results of pelvic floor exercise alone.

#### PP002-126

##### THE BLOOD LEAD LEVEL & IL-2R NK CELLS EXPRESSION

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*Objectives:* To assess the effect of blood lead level on IL-2R, NK cell of children, and the association of IL-2R, NK cell with threshold limit value of blood lead level. *Methods:* Blood lead level and expression of IL-2R, NK cell were measured with graphite furnace atomic absorption spectroscopy and immunofluorescence methods respectively. Student *t*-test was used in data analysis, and linear correlation analysis was used to assess the correlation between blood lead level and expression of IL-2R, NK cell. *Results:* Data from all 120 children were used for data analysis. Expression of IL-2R NK cells were increased in Group 1 (lead level  $\geq 0.48 \mu\text{mol/l}$ ) than Group 3 (lead level  $\geq 0.24 \mu\text{mol/l}$ ) ( $t=3.18, 3.09, p<0.01$ ). When the blood lead level was  $\geq 0.48 \mu\text{mol/l}$ , the blood lead level showed had significant positive correlation between IL-2R NK cells expression and blood lead level. *Conclusions:* A blood lead level  $\geq 0.48 \mu\text{mol/l}$ , is shown to significantly increase in the expression of IL-2R NK cells in peripheral blood, which may impair the children's immunological function.

#### PP002-127

##### THE BLOOD LEAD LEVEL AND FRESH BLOOD QUICK NATIVE IMMUNE REACTION

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*Objective:* The aim of the study is evaluating the significance of blood level, as an indicator for environmental lead and fresh blood quick native immune reaction on cancer cells as an effect indicator, to determinate the correlation between the content of blood lead and quick native immune reaction on cancer. *Methods:* Blood lead level and fresh blood quick native immune reaction on cancer cells expression were measured with graphite furnace atomic absorption spectroscopy and using cancer cells adding in fresh anti-coagulate blood to incubation at 37°C for 30 min, respectively. Student *t*-test was used in data analysis used to assess the correlation between blood lead level and expression of cancer cells adding in fresh anti-coagulate. *Results:* Data from all 60 children was used for data analysis. Expression of TRR and TLR were lower in Group 1 (lead level  $\geq 0.48 \mu\text{mol/l}$ ) than Group 3 (lead level  $0.24 \mu\text{mol/l}$ )

( $t=3.48, 2.32, P$ ). When the blood lead level was  $\geq 0.48 \mu\text{mol/l}$ , the blood lead level showed significant inverse correlation with TRR and TLR ( $r=-0.703, -0.606 p<0.01$ ). The result revealed the level of fresh blood quick native immune reaction on cancer cells was a significant difference between groups of high and low blood lead levels. *Conclusions*: The result suggested that the high blood lead level may be regarded as an adverse effect on children's immune function especially on TRR and TLR percentage when exposed environmental lead.

**PP002-128**  
**REHABILITATION ISSUES IN MONGOLIA**

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*Objective and Introduction*: Institute of Post-Graduate Training at Health Sciences University of Mongolia (HSUM) HSUM organises residential doctors specialty training in 23 different fields of medicine, and rehabilitation medicine is one of them. Rehabilitation Medicine is the newest and worst developed field if compared with other medical fields in Mongolia. Before 2000, we did not have residential training and we used to prepare our Rehabilitation doctors by 3–6 months course. *Results*: After 2000, Rehabilitation medicine residential training programmes were started and standards had been thoroughly renewed, and the duration of training became 1 year. Now each year approximately 6–10 medical doctors are trained into rehabilitation doctors in Mongolia. The quality of residency training is not good because of the lack of rehabilitation centre and services throughout Mongolia. After post-board on job training they should collect 30 credit hours during 5 years to re-new the board certificate. Due to increases in various kinds of accidents, morbidity along with growth in social development, and stresses brings down the overall quality of life which results to rapid increase in number of disabled people year by year in Mongolia in past few years. But unfortunately in addition to underdevelopment stage of PRM in our country, which is the main factor to solve above mentioned incidence, we also do not have any modern equipped centre such as electro diagnostic and gait analysis laboratory and lack of high specialized physiatrists and PT and OT also ST at the moment. *Conclulsion*: We need to work on all rehabilitation components including enhancing awareness of the public and trainings of more junior doctors as there is a great deficiency of certified rehabilitation doctors in Mongolia. We also need international cooperation and support to develop RM in our country.

**PP002-129**  
**EXPERIENCE OF OCCUPATIONAL THERAPY – A CASE OF BURN**

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*Objective*: After hands burned, contracture of the scar, muscles, tendons and joint stiffness is thought to cause loss of motion at joints, and also induce manual functional handicap and deformity. What is more, it affects activities of daily living and ability of working. And it also brings about extremely pain in psychology and physiology. *Case Report*: Now, reporting some experiences with one case of after burning occupational therapy. The goal of after burning is not to cure wound, but to try our best to recover

manual function. It is good for preventing or diminishing the complications and improving the manual practical function, including exercise function, sensory function, ADL, the ability of working and so on. *Conclusion*: Pressure therapy plays the most important role for the burns in the occupational therapy.

**PP002-130**  
**EFFICACY AND SAFETY OF LEUKOTRINE RECEPTOR ANTAGONIST MONTELUKAST, VERSUS HERBAL OPTION N.SATIVA IN THE TREATMENT OF SEASONAL ALLERGIC RHINITIS**

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*Objective*: To compare the efficacy of the Montelukast with N.Sativa seeds in management of seasonal allergic rhinitis. *Methods*: Comparative uncontrolled clinical trial. Forty untreated adult patients, suffering from seasonal allergic rhinitis, seeking outpatient treatment were selected from different primary care clinics. They were enrolled and randomized in a single-blind manner to receive Montelukast, 10 mg/day, group I ( $n=20$ ) and 250 mg/day of N.Sativa, group II ( $n=20$ ) orally for 14 days. All patients had completed the treatment program. *Results*: Both Montelukast and N.Sativa were equally effective at relieving the symptoms of seasonal allergic rhinitis; however, Montelukast was shown to be more likely to cause adverse effects. *Conclusion*: It would appear that N.Sativa is totally devoid of risk of adverse effects. So it is a safe treatment option for the patients of seasonal allergic rhinitis.

**PP002-131**  
**THE EFFECTS OF DIFFERENT METHODS OF LOAD CARRYING ON RESPIRATORY VOLUME**

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*Objective*: There are extensive studies about the effects of backpack carrying on the posture and musculoskeletal system but a few studies about this effect on lung function. The aim of this study was to compare the effects of different methods of backpack carrying with 15% of body weight on the respiratory volumes. *Methods*: Seventy healthy subjects (aged 18 to 24 years, mean  $20.47 \pm 1.55$ ) participated in this study. At first respiratory volumes (FEV1, FVC, FEV1/FVC) were measured without carrying a backpack. Respiratory volumes were measured while the subjects were carrying backpack in different methods (single strap, double strap, cross chest). Oxycon spirometer was used to measure the respiratory volumes. Paired t-test was used for statistical analysis of the data. *Results*: The comparison between FEV1, FVC, FEV1/FVC in no backpack condition with those of different methods of backpack carrying (single strap, double strap, cross chest) showed no significant differences. Also differences in respiratory variables among the three methods of carrying were not statistically significant. *Conclusion*: Carrying a backpack with 15% of body weight did not cause significant differences in respiratory volumes and there were no significant differences between the three methods of carrying. Therefore it seems that backpack carrying with 15% of body weight has probably no effect on respiratory system.

PP002-132

**WORKERS COMPENSATION AND RETURN-TO-WORK AFTER ORTHOPEDIC INJURIES OF EXTREMITIES****Wen-Hsuan Hou<sup>1</sup>, Huey-Wen Liang<sup>3</sup>, Jau-Yih Tsauo<sup>2</sup>, Ching-Hua Lin<sup>4</sup>, Chung-Li Du<sup>4</sup>***<sup>1</sup>Department of Physical Medicine and Rehabilitation, E-Da Hospital and I-Shou University, Kaohsiung, <sup>2</sup>School & Graduate Institute of Physical Therapy, College of Medicine, <sup>3</sup>Institute of Occupational Medicine and Industrial Hygiene, <sup>4</sup>Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Taipei, Chinese Taipei*

**Objective:** To explore the influence of workers' compensation coverage on injury patterns and return-to-work (RTW) outcome in orthopedic injuries of extremities. **Methods:** Prospective and follow-up study. One hundred and fifty-four subjects were recruited and 37.7% of the injuries were covered by workers' compensation (WC). The baseline data was obtained by questionnaire and chart review. Main outcome variable was time of first return to work (RTW) and subjects were followed up at 1, 3 and 6 months after initial interview. Cox proportional hazards model was used to analyze associations between potential predictors and RTW. **Results:** The WC group was more likely to be males employed in labor occupations and was more likely to sustain crushing injuries or injuries from being struck by objects. The 6-month RTW rates for WC group and non-WC group were 69.0% and 71.9%. Early RTW was associated with more years of higher education, and increased self-efficacy in both groups. Moreover, age older than 45 years and hospitalization less than 14 days were associated with early RTW in the non-WC group. **Conclusions:** The injury patterns of WC and non-WC groups differed but the likelihood of RTW at 6-month follow-up was similar. More years of education and self-efficacy were positive predictors of RTW.

PP002-133

**INTRATHECAL BACLOFEN INFUSION FOR SPASTICITY AND PAIN****Dhafir Al Khudhairi<sup>1</sup>, Abdulrahman Shug'a Aldin<sup>2</sup>, Abdullah Rababah<sup>2</sup>, Bassam Al Zaidat<sup>2</sup>, Jiri Pazdirek<sup>2</sup>, Jalal Abdulsalam<sup>2</sup>***<sup>1</sup>Pain Management, Riyadh Military Hospital, Riyadh, <sup>2</sup>Sultan Bin Abdulaziz Humanitarian City, Riyadh, Saudi Arabia*

**Objective:** Spasticity is a disorder of muscle function that causes muscle tightness or spasm. This may result from traumatic or pathological causes of the brain or spinal cord. Baclofen has been widely used for spasm since 1967 but has side effects which could result from oral doses due to central depressant properties including sedation, ataxia, weakness and fatigue. Intrathecal Baclofen is an alternative therapy when oral Baclofen is ineffective or with side effects. **Methods:** Twenty-six patients were selected to have intrathecal Baclofen pump implantation after positive effects of intrathecal Baclofen diagnostic test. Baclofen diagnostic test 50–70 µg given as a bolus intrathecally and the effect is monitored for the next 20 h and when Ashworth scale of spasm improved by 2 scales, and then it will be eligible for pump implantation. **Results:** All patients had a good to excellent results and spasticity was reduced significantly. The doses of continues intrathecal Baclofen was between 50–840 µg/day. There were only 2 complications, one was catheter problem that needs changing and the other was repositioning of the pump subcutaneously. **Conclusion:** For spasticity and pain, Baclofen intrathecally is an excellent alternative when oral Baclofen is ineffective or cannot be tolerated, although

it is expensive due to the high cost of equipment but could be cost effective in the long term.

PP002-134

**REHABILITATION PROGRAM FOR PATIENTS UNDER PALLIATIVE CARE****Mei Ling Tsang***Department of Rehabilitation and Extended Care, Wong Tai Sin Hospital, Hong Kong SAR*

**Objectives:** Rehabilitation for patients under palliative care aims to maximize physical, social, psychological, and vocational function within the limits imposed by disease and its treatment. The program focused on the patients and their needs. **Methods:** Palliative rehabilitation program was set up in our hospital for patients with non-curative cancer & end stage organ failure. The program was care-path driven, goals orientated. **Results:** The program was reviewed from Oct 2006 to September 2007. 174 patients were recruited. 138 patients (79%) were cancer patients and 36 patients (21%) were patients with end-stage organ failure. Among end-stage organ failure patients, majority 78% (28 patients) are patients with stage 5 Chronic Kidney Disease; 14% (5 patients) with chronic heart failure and 8% (3 patients) with liver cirrhosis. 103 (59%) patients completed the program with average length of stays of 19.1 days. 71 (41%) patients died or dropped out of the program because of changing health condition. The functional outcomes (PPS – Palliative Performance Scale; BI – Barthel Index (100); EMS – elderly Mobility Scale) were measured on admission and discharge with average of scores and (change in score) as follows: PPS: 54.8 and 62.5 (+7.7); BI: 63.5 and 69.6 (+6.1); EMS: 8.8 and 11.0 (+2.2); Pain (0–10): 1.8 and 0.4 (–1.4). There were 378 goals set and 74% of these set goals were achieved within the period of rehabilitation. **Conclusion:** The pilot program gives us a vision for further development of target specific, goal orientated rehabilitation program for patient under palliative care to maximize their quality of life at the final phase of the life journey.

PP002-135

**THE TREATMENT EFFECT OF ACUPUNCTURE OF THE YANGMING MERIDIAN IN DISUSE SYNDROME****Kai Wang, Jingwei Guo, Yuxiao Xie***Physical Medicine and Rehabilitation, China-Japan Friendship Hospital, Beijing, China*

**Objective:** To study the clinical efficacy of acupuncture of the meridians Yangming on myasthenia gravis or disuse atrophy after stroke. **Method:** Seventy-two cases of myasthenia gravis or post-stroke patients with disuse atrophy were randomised into two groups: 1) experimental group with 36 patients received the method of acupuncture of the Yangming meridians plus conventional rehabilitation training. 2) control group with 36 patients only received conventional rehabilitation training. Both groups were treated for 30 times. All the patients were assessed by Evaluation Table of ShangTianmin and Barthel index before and after treatment. **Results:** It showed a good efficacy for the myasthenia gravis and disuse atrophy after stroke by the acupuncture of the meridians Yangming, but it should be incorporated with other therapy for a long illness deformity. After treatment, muscle bulk increased in both groups, but the experimental group increased significantly better than the controlled group. **Conclusion:** The meridians Yangming effectively affect the supplies of qi and blood. It can dredge the meridians which conditions qi and blood. It will be then assisting resumption of function after the



Disuse syndrome. In addition, the acupoint SANYINJIAO (SP6) can strengthen bones and tendons from its role on strengthening the spleen for resolving phlegm, invigoration the liver and kidney. At the same time strengthen the active and passive physical functional training can promote the rehabilitation of the myasthenia gravis and disuse atrophy after stroke.

#### PP002-136

### COMPARE THE EFFICACY OF IBUPROFEN WITH NIGELLA SATIVA IN THE MANAGEMENT OF PAIN AFTER TOOTH EXTRACTION

*Anila Kazi*

*Institute of Dentistry, Liaquat University of Medical & Health Sciences, Jamshoro, Sind, Pakistan*

**Objective:** To compare the efficacy and safety of non-steroidal anti-inflammatory Ibuprofen with herbal option Nigella sativa seeds in the management of pain after tooth extraction. **Methods:** Fifty adult patients, suffering from acute pain after tooth extraction, were selected from different dental clinics and enrolled and were in a randomized single-blinded trial to receive Ibuprofen, 400 mg/day, group I ( $n=25$ ) or 250 mg/day of N.sativa, group II ( $n=25$ ) orally for 4 days. All patients had completed the treatment program. Efficacy of two groups was assessed by severity of pain on the basis of clinical ground and graded by visual analogue scale. While safety was assessed by the incidence of side effects in two drug group. **Results:** Both study groups were equally effective at relieving acute pain after extraction of tooth; however, the Ibuprofen group has been shown to be more likely to cause gastric and other adverse effects. **Conclusion:** It would appear that N.sativa is totally devoid of risk of adverse effects. So it is a safe herbal treatment option for acute pain after tooth extraction.

#### PP002-137

### THE CHARACTERISTIC ANALYSIS OF CLINICAL MANIFESTATION AND REHABILITATION OF THE CHRONIC HEART FAILURE OF THE AGED MEN

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**Objective:** Clinical symptoms and signs of heart failure in the aged are mostly not typical or specific. It is important to identify chronic heart failure in the aged as early as possible. We have to grasp the characteristic of it and to treat it in time with treatments including rehabilitation therapy. For this purpose, we evaluate the clinical characteristics and examinations and treatments of chronic heart failure of the aged men. **Method:** There were 100 cases of the chronic heart failure with 50 above 65-year-old as the aged group and other 50 of below 65-year-old as the comparative group. Clinical symptoms, signs and investigations such as tiredness, anorexia, and cough at night, X-ray examination of chest, medicine and rehabilitation and so on were documented. **Results:** 1) Clinical symptoms and sign of the aged group in early phase of heart failure were mild whilst those on the comparative group were severe. 2) The chest X-ray was the most sensitive to diagnose. 3) No inducements of heart failure in the aged group were obvious. 4) The incidence and severity of heart failure in the elderly increased with age. 5) The heart failure in the aged was present for a long time. 6) The aged group was still suitable for rehabilitation, which could be effective. **Conclusion:** It is useful to

look for tiredness as the symptom of heart failure in the aged and sometimes comes as faint feeling. Chest X-ray should be checked. The rehabilitation would be useful.

#### PP002-138

### LASER IRRADIATION; BPD-MA; BLADDER CANCER; APOPTOSIS; PTP, MMP

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**Objective:** The study aims to investigate the apoptotic mechanism of photodynamic therapy with Laser-activated BPD-MA. **Method:** BPD-MA was activated by laser with red light delivered at 10 mw/cm<sup>2</sup> to give a total dose of 2.4 J/cm<sup>2</sup>. The mitochondria membrane potential (MMP) and opening of permeability transition pore (PTP) were analyzed by flow cytometry with labeling of Rhodamine123. **Results:** The distribution peak of forward light scatter transferred from low channel to high channel, fluorescent distribution peak from high channel to low channel and distribution peak of 90 light scatter from low channel and high channel, showing swelling of mitochondria, fall of MMP, alteration of particle properties in mitochondria and the fluorescent intensity of Rhodamines123 after laser-activated BPD-MA obviously lower than that of the controls ( $p<0.05$ ). **Conclusion:** Laser-activated BPD-MA can make PTP open and decrease MMP, suggesting that Laser-activated BPD-MA might trigger cell apoptosis through mitochondria-initiated apoptosis pathway.

#### PP002-139

### BESIDES OF GENDER, SLEEPING DISORDERED BREATHING AFFECTING PLASMA TRIGLYCERIDE, URIC ACID LEVELS AND BLOOD PRESSURE

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**Objectives:** Obstructive sleeping disorders have been proved to associate with systemic inflammation response and result in plasma uric acid elevation. Obstructive sleeping disorders are also the risk factor of cardiovascular and cerebral vascular disease and have close association with metabolic syndrome. The prevalence of sleep apnea in male appears to be greater than female. Female has greater metabolic and cardiovascular condition, but the advantages decrease and even no longer exist after menopause. We make a hypothesis that no matter before or after menopause, the advantages mentioned above in female compare to that in male decrease and even no longer exist under the same age, BMI and RDI. **Methods:** We collected 717 patients visiting our sleep center with varies sleep disorders from Oct.17, 2002 to June.23, 2006. We exclude the patients with cerebral vascular accident, seizure, fatty liver, hematoma, emphysema, cardiopulmonary disease, DM, cancer, spinal cord injury, smoking, alcoholism, the medicine history of hypertension and hyperlipidemia. Then we subsume the remained patients with BMI greater than 18 kg/m<sup>2</sup> and with the age between 20 to 70 years. The remained 371 patients are separated into 2 groups by the age of 50 years. The two groups are matched by age (10 years old), BMI (2 kg/m<sup>2</sup>) and RDI (5 times/h). **Results:** After menopause, female has similar metabolic condition and blood pressure under the same RDI. Our study shows that gender indeed affects blood pressure, plasma triglyceride and uric acid even under the match factor of RDI, but the fact only exists before the age of menopause. **Conclusions:** Besides sex, age and BMI, the obstructive sleeping disorders should be brought into the consideration of metabolic associated factors.

PP002-140

### A RESEARCH ON THE IMPROVED PERCUTANEOUS LASER DISC DECOMPRESSION IN TREATING LUMBAR DISC HERNIATION

**Huaping Pan, Jian Wang, Baoguo Zhang, Hui Feng**

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**Objective:** Observe the effect of improved Percutaneous Laser Disc Decompression (PLDD) in treating Lumbar Disc Herniation (LDH). **Methods:** Forty sufferers were treated by improved PLDD and followed up for observation. **Results:** Forty sufferers had several visits in six months: on the first day, the first week, the first month, the third month, and the sixth month after their operations. The effective rates in terms of clinical improvement were 100%, 100%, 97.5%, 97.5% and 97.5%, respectively, during the follow-up time frame. The improvement was significant. **Conclusion:** Improved PLDD has not only the advantages of regular surgical operations, but also its own decompression effect which could avoid the nerve from being harmed by heat.

PP002-141

### A NOVEL METHOD OF ESTABLISHING THE HYPERTROPHIC SCAR MODEL

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**Objective:** The survivors of burn are often suffered from hypertrophic scarring (HS). But our knowledge about the HS is poor. One important reason is the lack of an animal model for a pristine and long-term observation. **Methods:** Twenty nude mice were divided into two groups. The mice in group one underwent transplantation of full thickness human skin grafts into the subcutaneous parts of the back skin and burns were made to the grafts 7 days after the transplantation. The full-thickness human skin grafts were transplanted onto the backs of nude mice in group two. The status of local grafts was observed and histological examination of the grafts was performed after transplantation. **Results:** All the mice in group one survived and developed obvious and persistent HS after burns, which were hard, and elevated out of the surrounding skin. Histological examinations revealed abundant collagen deposition and inflammatory infiltration in these scars. Eight nude mice survived in group two, but only five developed HS after transplantation. **Conclusion:** The HS model can be established by burning human skin grafts in the subcutaneous parts of nude mice. The similarity repeatability, certainty, and survival rate of this model is superior to those ever reported. It is a better tool for studying HS.

PP002-142

### THE SEMANTIC AND EPISODIC MEMORY INVOLVED IN RETRIEVAL FACE AND RELATING INFORMATION WITH ERP

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**Objective:** The study was to investigate the temporal and spatial characteristics of the semantic and episodic memory involved in

retrieval face and name recall and their corresponding mechanisms on ERPs. **Methods:** Identity matching (episodic memory to previously learned unfamiliar faces) and discriminating (retrieval of semantic information to famous faces) tasks were adopted. The subject's task in test stage was to press '1' button to a face presented in study stage, '2' an unfamiliar face, '3' a seen famous face without name recall, and '4' a famous face with name recall. ERPs and behavior performances were synchronously recorded in response to the photographs of the four kinds of faces. **Results:** The P600 was affected by stimulus category, showing the mean amplitudes of the famous named faces biggest, in turn the repeated priming unfamiliar faces, the famous faces without being named, the last new faces. The difference waves respectively between the ERPs of the preceding three items and new face were obtained. The dynamic topographies of this difference waves showed that the P600 of the repetition primed unfamiliar faces was more positive in left centroparietal and prefrontal sites, known famous faces without retrieval of their names more positive at right centrofrontal regions, and known famous faces with retrieval of their names more positive at right centroparietal and prefrontal regions. **Conclusion:** Recognition of face typically involves multiple processes, such as semantic retrieval, name recall or episodic retrieval, dependent on the characteristic of the recognized faces and tasks.

PP002-143

### EFFECT OF POSTPARTUM EXERCISE ON HUMAN BREAST-MILK

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**Objective:** To explore the effect of postpartum exercise on human breast-milk. **Methods:** English articles about the effect of postpartum exercise on human breast-milk from PubMed were reviewed. **Results:** Moderate exercise postpartum (exercising aerobically at least 30 min/day for 3 days/week, RPE=12) did not increase lactic acid (LA) level [1] or affect levels of sIgA, lactoferrin, or lysozyme in breast-milk. Women consuming adequate amounts of Long-chain polyunsaturated fatty acids (LC-PUFA) could exercise moderately without decreasing LC-PUFA in milk [2]. Overweight lactating women did aerobic exercise to promote a weight loss of 0.5 kg/week and restricted their energy intake by 500 kcal/day by decreasing consumption of foods high in fat and simple sugars and increasing intakes of foods high in calcium and vitamin D without affecting milk quality or infant growth. Maximal or submaximal exercise did not affect Ph [3], urea [3], ammonium [3], volume, or concentration of lipid [3], phosphorus, calcium, magnesium, sodium and potassium in breast-milk. However, LA increased between 105% and 650% immediately after maximal exercise to exhaustion and was elevated (by 36%) 10 min after a "typical" submaximal workout [4]. Accumulated LA could "sour" the taste of milk and caused infants to reject it. However, infant acceptance of expressed breast milk was the same 1h before and 1h after maternal exercise at both moderate and maximal intensities was reported recently [5]. Even the volume and energy of milk was increased after mother's exercise. **Conclusion:** Maternal moderate exercise with restricting energy intake did not affect milk quality or quantity for weight control. Moderate or even high-intensity exercise had no adverse effect on human breast milk volume and macronutrient composition.

## PP002-144

**RELIABILITY, VALIDITY AND RESPONSIVENESS OF THE REDUCED WOMAC****Yan Qi, Dongliang Shi, Ninghua Wang***School of Graduate, Institute of Sports Medicine, Tianjin University of Sport, Tianjin City, China*

**Objectives:** To evaluate reliability, validity and responsiveness of the reduced WOMAC. **Methods:** Articles from PubMed are reviewed. **Results:** WOMAC including pain (five items), function (17 items) and stiffness (two items) generally satisfies requirements of Rasch item response theory and is a self-assessed, disease-specific measure for patients with osteoarthritis of knee. WOMAC function short form included items 2, 3, 6, 7, 8, 9, 10 and 14 of the long form. This short form has good responsiveness, test-retest reliability and good construct validity for some sample, but these parameters should be validated in an independent sample of subjects from the target population. After 12-month follow-up data, this reduced WOMAC has been successfully derived and validated for use as a summarised and more practical version of the full WOMAC scale. The reduced and full scales have comparable, moderate correlations with high Cronbach's alpha ( $>0.85$ ) confirming reliability and other measures of function confirming convergent validity. The short form does not differ substantially from the long form in responsiveness (standardised response mean of  $0.84$  v  $0.80$ ). And responsiveness may be greater for the reduced scale (full= $1.4$ , reduced= $1.6$ ). The reduced scale may even be better at detecting change than the full scale. This reduced version of WOMAC function scale provides a practical, valid, reliable and responsive alternative to the full function scale for use after total joint replacement. And clinical relevance and applicability of WOMAC function subscale short form require further evaluation. **Conclusions:** The reduced WOMAC has good reliability, validity, and better responsiveness.

## PP002-145

**RELIABILITY OF WOMAC****Dongliang Shi, Ninghua Wang, Yan Qi***School of Graduate, Institute of Sports Medicine, Tianjin University of Sport, Tianjin City, China*

**Objective:** To choose a proper questionnaire for the measurement of pain and function of knee osteoarthritis. **Methods:** Articles from PubMed were reviewed. **Results:** The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) including pain (five items), function (17 items) and stiffness (two items) generally satisfies requirements of Rasch item response theory and is a self-assessed, disease-specific measure for patients with osteoarthritis of knee. Good reliability has been found for pain and function scales (both ICC $>0.80$ ), stiffness scale has showed moderate reliability (ICC  $0.69$ ). WOMAC scores on walking, climbing stairs, chair-rise and ROM of affected joints in knee OA are significantly correlated with performance. WOMAC with high response and completion rates (range  $88.1$ – $100\%$ ) has advantages over other health status instruments when measuring pain and difficulty with physical function related to the knee, and is able to quantify the burden of self-reported knee pain and related disability. It has been shown that associations previously demonstrated for radiographic OA further distinguish those with severe knee pain and disability from those with lower severity of pain and disability related to the knee. A formula has been derived from the WOMAC index (almost  $40\%$  of the variation in HUI3 utility scores) to estimate overall utility scores based on HUI3 for studies of patients with OA. Unidimensionality of Dutch WOMAC, remitting valid international Dutch-English comparisons after correction for differential item functioning, has

been confirmed by principal component and Rasch analysis (good fit for 20/22 items). The computer format of WOMAC 3.1 is a reliable assessment tool. Telephone interview for WOMAC LK3.0 Index is a valid method for future OA clinical trials. **Conclusions:** WOMAC has good reliability for the measurement of pain and function of knee osteoarthritis, which is not affected by different response pattern or version in other language.

## PP002-146

**COMPARE WOMAC WITH LEQUESNE, DOYLE, SF-36, HSS, KSS, QUOL****DongLiang Shi, Ninghua Wang, Yan Qi***School of Graduate, Institute of Sports Medicine, Tianjin University of Sport, Tianjin City, China*

**Objective:** To choose a proper questionnaire for the measurement of pain and function of knee osteoarthritis. **Methods:** Articles from PubMed were reviewed. **Results:** Test-retest and inter-observer reliability were satisfactory for all. The relative efficiency of WOMAC was similar to that of the Lequesne and Doyle indices. WOMAC had a high level of internal consistency (Cronbach's alpha  $0.61$  to  $0.95$ ), consistent effect sizes (range  $0.73$  to  $2.43$ ) and significant correlation with HSS and KSS items (correlation range  $0.58$  to  $0.86$ ), which performed poorly in validity compared to WOMAC. For SF-36 and QUOL, the standardised effect sizes were similar sizes (SF36  $0.01$  to  $0.70$  and QUOL  $0.06$  to  $0.65$ ) but not as great as for HSS, KSS and WOMAC. For WOMAC and SF-36, the pain scales were more responsive than the function scales. And the responsiveness of pain scale of both instruments was comparable. In the measurement of function, WOMAC was significantly more responsive than SF-36 (SRMs, end of rehabilitation:  $0.628$  v  $0.249$ ; three month follow-up:  $0.235$  v  $-0.001$ ). So functional improvement can be detected better by WOMAC than by SF-36. All the other scales of both instruments were more weakly responsive. However, both captured improvement in pain in patients undergoing comprehensive inpatient rehabilitation intervention. **Conclusions:** Reliability was satisfactory for all. WOMAC had higher or equal validity than the others. The responsiveness of pain scale of both WOMAC and SF-36 was comparable. But in function, WOMAC was significantly more responsive than SF-36. Thus, WOMAC was proper for knee osteoarthritis.

## PP002-147

**DIPOLE-MODELING OF THE AUDITORY EVOKED P300 AND ITS SUBCOMPONENTS****Wen Wu<sup>1</sup>, Zongyao Wu<sup>2</sup>, Yuejia Luo<sup>3</sup>***<sup>1</sup>Department of Rehabilitation, Zhujiang Hospital, Guangzhou City, <sup>2</sup>Center of Rehabilitation, Southwest Hospital, Chongqing City, <sup>3</sup>Institute of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing City, China*

**Objective:** The aim of the present study was to identify the sources of these scalp recorded auditory P300 and its subcomponents. **Methods:** We collected auditory event-related potentials (ERPs) from 15 normal subjects using an "oddball" paradigm. Subjects were required to discriminate and count mentally the occurrences of rare 2000 Hz target tones (15%) from frequent 1000 Hz non-target tones. ERPs were recorded from 64 electrodes distributed over the scalp. A multiple spatio-temporal equivalent dipole (ED) model was used to fit the P300 potential and its subcomponents (P3a and P3b). A latency window to analyze the P300 and its subcomponents were determined using the global field power (GFP) statistic. **Results:** The ERPs elicited in the context of auditory target detection tasks include the N1 and P2 as well as N2 and P300 com-



ponents, in which 30% P300 potentials were bifurcated as P3a and P3b subcomponents. The source of P300 could be accounted for 2 to 4 EDs, which were consistently located in anterior cingulate gyrus (ACG) for the earlier parts (240–310 ms) of P300 or the P3a of bifurcated (double peaks) P300 and were usually located near medial temporal regions including the hippocampal formations, the parahippocampal gyurs, the amygdala, the thalamus or cingulated gyrus for the later parts (310–420 ms) of P300 or the P3b. The single peak P300 is also usually consisted of at least two parts, showing similar sources respectively corresponding to P3a and P3b. Residual variances (RV) of individual models ranged from 5.19% to 11.3%, showing good quality of fitness. *Conclusion:* The P3a or earlier parts of P300 should root in anterior cingulate gyrus and the P3b in medial temporal regions.

#### PP002-148

### THE PREVALENCE, INTENSITY AND INTER-FERENCE OF CHRONIC PAIN AMONGST LOWER LIMB AMPUTEES

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*Objective:* Chronic pain which is common amongst lower limb amputees can negatively affect the rehabilitation process. This study aims to examine the prevalence of stump pain, phantom pain and phantom sensation and also determine the intensity and interference caused by each in patients with major lower limb amputations. *Method:* A cross-sectional survey on patients with major lower limb amputations of 6 or more months in duration, attending the amputee rehabilitation medicine clinic at a tertiary medical centre. 121 amputees were evaluated using a self-designed questionnaire that incorporated the Chronic Pain Grade. *Results:* It was found that 26% experienced stump pain, 31% phantom pain and 56% phantom sensations. Average intensity of stump pain, phantom pain and phantom sensation was 4.3, 4.4 and 4.5, respectively. Phantom sensation caused significantly less interference compared to stump pain and phantom pain. Most patients with stump pain (75%) and phantom pain (95%) fell into the two low disability categories (pain related disability). Demographic factors associated with stump pain, phantom pain or phantom sensation included age, race, marital status, education and occupation, whereas associated amputation factors were a transtibial amputation and diabetes mellitus as a co-morbidity. *Conclusion:* This study found that the prevalence of stump pain, phantom pain and phantom sensation was lower than what had been reported in the recent international studies. There was no significant difference in the intensity of average pain among the three groups; however, stump pain was found to be more disabling to a significant number of participants.

#### PP002-149

### VALIDATION OF COMPREHENSIVE ICF CORE SET FOR BREAST CANCER IN MALAYSIAN PERSPECTIVE

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The Comprehensive ICF Core Set for Breast Cancer (BC) describes the typical spectrum of problems in functioning among

patients with breast cancer and is now undergoing worldwide testing and validation. *Objectives:* To study the content validity of the Comprehensive ICF Core Set for BC from the Malaysian perspective in view of frequency of problem in ICF Core set and missing categories. *Method:* Breast cancer survivors in University Malaya Medical Centre (UMMC) who fulfilled the inclusion criteria were recruited. The ICF-based data were collected by Rehabilitation Physician using the core set. The self-administered forms of the SF-36 and the Comorbidity Questionnaire (SCQ) were filled in by the patients. Analysis with descriptive statistics were used to examine the frequency in the ICF categories and describe the health status of the SF-36. *Result:* One hundred and ten patients were included in the study with only one male. Patients were between 32 and 72 years. Majority had 1–2 surgery for the condition and mastectomy being the commonest. For ICF categories the highest frequency for impairment of body functions was pain in body part (b2801) energy and drive (b130); for body structure was breast and nipple (s6302); for activity limitation was: lifting and carrying object (d430). Highest facilitator for Environmental factors was Product or substance for personal use (e110) and Asset (e165). In the SF-36, the lowest health status was mental health and the highest was of physical functioning. *Conclusion:* The content validity of the Comprehensive ICF Core Set for BC could be largely supported from the Malaysian perspective based on the results of this study.

#### PP002-150

### A STUDY ON THE INFLUENCING FACTORS OF ISOMETRIC CONTRACTION OF MUSCLE STRENGTH ON TRUNK FLEXORS AND EXTENSORS IN COLLEGE STUDENTS

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*Objective:* To study the effects of sex difference, sport and body composition (B.C) on isometric contraction of trunk muscle strength, which may provide a theoretical foundation on preventing low back pain. *Methods:* Forty college students from sport and non-sport major were recruited. Using a testing system for isometric contraction of trunk muscle strength, parameters of muscle strength on trunk flexors and extensors were obtained in sitting posture, during which the subjects acted to flex and extend trunk 3 times, respectively, lasting 5 sec for each time. B.C analysis was performed by using B.C analyzer. Tested parameters include: peak torque (PT), peak torque/body weight (PT/BW), peak torque/lean body mass (PT/LBM), peak torque of flexion/extension (F/E), body's fat % (BT%), lean body mass (LBM), waist to hip ratio (WHR). SPSS13.0 was used for data analysis with one-way analysis of variance and Spearson correlation. *Results:* 1) Compared with that of female, the parameters (PT,PT/BW,PT/LBW) of male significantly increased ( $p<0.01$ ) in flexion. There was no significant difference in PT/BW and PT/LBM of extensors between male and female. All parameters except F/E in no-sports major was significantly less as compared with sports major ( $p<0.05$ ). 2) Significant negative correlation was shown between BT% and every parameters of trunk muscle strength, as well as WHR and PT, while LBM was positive correlation with every parameters of trunk muscle strength except with PT/LBM in extension. *Conclusions:* While trunk muscle quality influenced flexors strength, its quantity influenced extensors strength. Physical exercise might enforce trunk muscle strength in college students. Controlling quantity of BT for keeping trunk muscle strength is very important.

## PP003-001

**THE EFFECT OF INFRARED RAYS AND QINGPENG PASTE ON SCAPULOHUMERAL PERIARTHRITIS****Peng Cheng, Wenmin Shi, Jia He, Haitao Lang***Department of Rehabilitation, Changhai Hospital, Shanghai, China*

**Objective:** To study the effect of infrared rays and Qingpeng paste therapy on scapulohumeral periartthritis. **Methods:** Seventy cases of scapulohumeral periartthritis from Changhai Hospital and Shidong Hospital since 10/2006 to 01/2007 were divided freely into treatment and control group. An infrared ray was given to the control group and Qingpeng paste therapy was added the control treatment for the treatment group. Visual analogue scale (VAS) and Range of motion (ROM) were used to observe their results. Side effect was observed at the same time. **Results:** After one week treatment, both groups were improved with no significant difference. After treatment for two weeks, VAS of the treatment group improved more than that of the control group, but the ROM was similar to the control group. There were no side effects for the treatment group. **Conclusion:** Using Qingpeng paste with infrared rays could reduce the symptom of scapulohumeral periartthritis.

## PP003-002

**THE CLINICAL EFFECT STUDY OF VARIABLE VELOCITY AND RESISTANCE MUSCLE STRENGTH TRAINING EXERCISE ON PATIENTS WITH KNEE JOINT DYSFUNCTION****Hong Wu, Chun-Feng Ran, Wen-Bin Yuan, Min Wang, Sheng-hai Gaoi, Bing Hao, Ying Wu***Department of Rehabilitation Medicine, The Longgang Centre Hospital of Shenzhen, Shenzhen, Guangdong, China*

**Objective:** To observe the effects on training with variable velocity and resistance (VVR) muscle strengthening exercise in the treatment of postoperative knee dysfunction after fracture of lower limb. **Methods:** Sixty patients with postoperative dysfunction of knee joint caused by fracture were divided into two groups: a therapeutic group and a control group. The therapeutic group was treated with muscle strengthening exercise of VVR and comprehensive rehabilitation therapy such as exercise therapy, automatic compression system. The control group was treated only with exercise therapy and automatic compression system. **Results:** The ROM of the knee joint, peak torque on quadriceps femoris and biceps femoris and Lysholm knee score improved in both groups after treatment ( $p < 0.05$ ), but the therapeutic group was significantly better than the control group ( $p < 0.05$ ). **Conclusion:** VVR muscle strengthening exercise with comprehensive rehabilitation treatment is effective for postoperative dysfunction of knee joint caused by fracture of lower limb. Applying training with VVR muscle strengthening exercise to postoperative knee dysfunction is a reformative training exercise system.

## PP003-003

**EFFECTS OF REHABILITATION TRAINING ON RECOVERY OF SHOULDER JOINT FUNCTION AFTER ARTHROSCOPIC ASSISTED SPORT ROTATOR CUFF INJURY REPAIR****Fang Cui<sup>1</sup>, Hui-fang Wang<sup>2</sup>, Yu-bing Wang<sup>1</sup>, Wen-lin Sun<sup>1</sup>, Zhen-hua Li<sup>1</sup>, Li Cui<sup>1</sup>, Hui-juan Pan<sup>1</sup>***Departments of <sup>1</sup>Rehabilitation and <sup>2</sup>Sports Medicine, East Hospital, Tongji University, Shanghai, China*

**Objective:** To study the effects of exercise training on recovery of shoulder joint function after small incision approach of sport

rotator cuff injury repair. **Methods:** In the present study, 64 cases of sport rotator cuff injury after Arthroscopic assisted sport rotator cuff injury repair were divided into rehabilitation training group ( $n=34$ ) and control ( $n=30$ ) in a random manner. According to rehabilitation program, patients of rehabilitation training group were started rehabilitation training 1 day after Arthroscopic assisted sport rotator cuff injury repair. UCLA (University of California at Los Angeles shoulder scores) score and the SST (Simple Shoulder Test) questionnaire were adopted for evaluation at after surgery and in 2, 4, 8, 12 and 16 weeks. **Results:** The results showed that rehabilitation training for patients with sport rotator cuff injury after Arthroscopic assisted rotator cuff repair at 8, 12 and 16 weeks were satisfied with the good function of the shoulder joints and pain relief. UCLA score of rehabilitation training group compared with control was significantly different ( $p < 0.05$  or  $p < 0.01$ ). **Conclusion:** The study indicated that rehabilitation training could significantly improve shoulder joint function after Arthroscopic assisted sport rotator cuff injury repair.

## PP003-004

**THE CORRELATION BETWEEN THE ARCH OF FOOT AND LUMBAR LORDOSIS ON NORMAL SUBJECTS****Mohammad Reza Farazdaghi, Tahereh Motiallah, Amin Rezaee***Rehabilitation School of Shiraz Medical Sciences University, Shiraz, Fars, Iran*

**Objective:** The musculoskeletal system is a complex structure that any malfunction in each part can lead to failure of the other parts through the time. The spine which is the axis of the trunk links the upper and lower extremities, so in this study the relationship between the lumbar lordosis and the foot arch was investigated. The effects of other factors such as body mass index were also analyzed. The literatures were studied these parameters separately or on people with low back pain. None of the articles considered these factors on normal subjects. **Methods:** This is a descriptive analytic study which was done on 113 male students aged 18-30 years (mean 21,  $80 \pm 2.30$ ) were selected by simple sampling. Personal data were collected by questionnaire & foot arch were measured by stump (padescopy), and the lumbar arch was measured by flexible ruler. None parametric correlation, Chi-square and Pearson tests were used for analysis of data. **Results:** There was no correlation between the foot arches and lumbar lordosis, but there was a reverse correlation between BMI and the left foot arches. **Conclusion:** The results of this study showed that there was no significant correlation between the foot arches and lumbar lordosis but a reverse correlation was detected between BMI and the left foot arches. Although there was a trend toward the correlation of right foot arches and BMI but more subjects are recommended for further studies.

## PP003-005

**THE EVALUATION OF CHINESE CHARACTER 米 SHAPE EXERCISE ON PREVENTING NECK MUSCLE FIBROSIS OF NASOPHARYNGEAL CARCINOMA PATIENTS AFTER RADIOTHERAPY****Qin Dai***Zhejiang Cancer Hospital, Hangzhou, Zhejiang Province, China*

**Objective:** To prevent neck muscle fibrosis of nasopharyngeal carcinoma patients after radiotherapy the Chinese character "米" shape exercise was conducted in the patients. **Methods:** One hun-

dred inpatients with nasopharyngeal carcinoma who would be discharged were randomly divided into 2 groups including control group and study group. Neck rotation exercise was trained in study group, which takes head as a pen, moving in following steps just like Chinese character "米" shape: 1) moving from up left to down right; 2) moving from up right to down left; 3) moving from left to right or right to left level; 4) moving from up to down or down to up vertically; 5) moving from right to down left; 6) moving from left to down right. *Results:* According to patient's subjective feeling of neck rotation, 28 cases can rotate the neck freely in study group, meanwhile 15 cases in control group. 9 cases feel slightly tight in study group, meanwhile 18 cases in control group. 13 cases feel very tight in study group, meanwhile 17 cases in control group. The statistics analysis was done ( $x=8.244$   $p<0.05$ ). *Conclusion:* The Chinese character "米" shape neck rotation exercise can help to prevent neck soft tissue fibrosis for the patients with nasopharyngeal carcinoma after radiotherapy.

#### PP003-006

### PATHOLOGICAL CHANGES OF ARTICULAR CARTILAGE IN OVARIECTOMIED RATS

*Yufeng Song, Xiaochun Wei, Ping Qiu*

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*Objective:* To investigate the effect of osteoporosis on tibia articular cartilage of SD rats, the relationship between estrogen and the degeneration of articular cartilage. *Methods:* Forty-eight eight-month-old female SD rats were divided into two groups randomly, one was experiment group, underwent bilateral ovariectomy, another was control group, underwent sham operation. Three month later, we got the osteoporosis model successfully. Then the rats were sacrificed at 2<sup>th</sup>, 4<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup> week. The gross pathology and the immunohistochemistry of collagen I, II, III and sox9 were measured. *Results:* HE, toluidine blue, safranin-O and alcian blue stain show that the number of chondrocytes and cartilage thickness were similar in experiment and control group at 2<sup>th</sup>, 4<sup>th</sup> week. Meanwhile joint surface were smooth and tide lines were integrated. Compared with control group, cartilage thickness of experiment group became thinner, and the joint surface was locally destroyed in experiment group at 8<sup>th</sup> week. Also, tide lines are integrated and the numbers of chondrocytes were similar. At 12<sup>th</sup> week, cartilage thickness were distinctly thinner in experiment group, the number chondrocytes increased remarkably, joint surface became rough and denudations appeared, tide lines were not integrated in experiment group. Immunohistochemistry stain show the expression of collagen II decreased sharply at 8<sup>th</sup> and 12<sup>th</sup> week, the expression of sox9 have no obvious change. Compared with experiment group, Mankin's grade scale of control group was significantly decreased at 8<sup>th</sup>, 12<sup>th</sup> week. *Conclusion:* Osteoporosis can affect the articular cartilage structurally; the decrease of estrogen can lead to degeneration of articular cartilage in rats.

#### PP003-007

### PATHOLOGICAL CHANGES OF ARTICULAR CARTILAGE IN OVARIECTOMIED RATS

*Yufeng Song, Xiaochun Wei, Ping Qiu*

*Rehabilitation Department, 2<sup>nd</sup> Hospital of Shanxi Medical University, Taiyuan city, Shanxi state, China*

*Objective:* To investigate the effect of osteoporosis on tibia articular cartilage of SD rats, the relationship between estrogen and the de-

generation of articular cartilage. *Methods:* Forty-eight eight-month old female SD rats were divided into two groups randomly, one was experiment group, underwent bilateral ovariectomy, another was control group, underwent sham operation. Three month later, we got the osteoporosis model successfully. Then the rats were sacrificed at 2<sup>th</sup>, 4<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup> week and the articular cartilages of tibia underwent formalin fixation, paraffin imbedding, The gross pathology and the immunohistochemistry of collagen I, II, III and sox9 were measured. *Results:* HE, toluidine blue, safranin-O and alcian blue stain show that the number of chondrocytes and cartilage thickness were similar in experiment and control group at 2<sup>th</sup>, 4<sup>th</sup> week. Meanwhile joint surface were smooth and tide lines were integrated. Compared with control group, cartilage thickness of experiment group became thinner ( $p<0.05$ ), and the joint surface were locally destroyed in experiment group at 8<sup>th</sup> week. Also, tide lines are integrated and the number of chondrocytes were similar. At 12<sup>th</sup> week, cartilage thickness were distinctly thinner in experiment group ( $p<0.05$ ), the number chondrocytes increased remarkably, joint surface became rough and denudations appeared, tide lines were not integrated in experiment group. Immunohistochemistry stain show the expression of collagen II decreased sharply at 8<sup>th</sup> and 12<sup>th</sup> week, the expression of sox9 have no obvious change. Compared with experiment group, Mankin's grade scale of control group was significantly decreased ( $p<0.05$ ) at 8<sup>th</sup> and 12<sup>th</sup> week. *Conclusion:* Osteoporosis can affect the articular cartilage structurally, the decrease of estrogen can lead to degeneration of articular cartilage in rats.

#### PP003-008

### THE USEFULNESS OF AQUATIC EXERCISE IN RATS WITH DIABETIC NEUROPATHY

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*Objective:* It is reported that most of patients with diabetes (DM) have subclinical diabetic neuropathy at diagnosis. Therefore, it is possible that exercise can induce musculoskeletal injury in patients with DM due to decreased sensory function. The possibility of harmfulness of exercise was suggested from the results of inflammatory infiltrate in muscles after exercise in rats with DM. Aquatic exercise could decrease the injury of musculoskeletal system by reducing the weight load so that it can be a good starting point in exercise for patients with DM. We designed this study to investigate the effect of aquatic exercise compared to on-land exercise using rats with DM. *Method:* DM was induced by injecting streptozotocin into peritoneal cavity in Sprague-Dawley rats. Insulin capsule was implanted to maintain the appropriate blood glucose level (180–270 mg/dl) after a week of injection. DM neuropathy was identified by prolonged latency in thermal plantar test. Rats were subjected to each group which were control ( $n=4$ ), treadmill ( $n=6$ ) and aquatic exercise ( $n=6$ ) group. Rats in exercise group were exercised for 12 weeks. Gastrocnemius muscle (GCM), sural and sciatic nerve were harvested and analyzed by TUNEL assay and Western blot. *Results:* TUNEL positive cells ratio (TUNEL(+) ratio) in GCM was higher in treadmill and aquatic exercise group than control group. TUNEL (+) ratio in sural nerve was also higher in exercise group than control group and it was higher in treadmill group than aquatic exercise group. In Western blot analysis of sural nerve, the Bax level was higher in treadmill group than aquatic exercise group. *Conclusion:* We should consider the risk of musculoskeletal injury by exercise. Aquatic exercise could be a better starting point in the view of potential musculoskeletal injury in patient with DM, although the clinical significance of increased apoptosis by exercise in musculoskeletal system is unclear.



## PP003-009

**RECOVERY OF INJURY IN FREESTYLE SKIING ATHLETES**Xiaofeng Pang*Shenyang Sport College, Shenyang, Liaoning Province, China*

**Objective:** Freestyle's skiing air technique is a technique sport item that goes forward in a line in snow. Injury rate is high, resulting in interruption of exercise and training, even after the injury was healed. To be engaged in training of less intensive activities after injury, to return to normal training after recover to work when at the top of physiological status and mentally prepared would be important. **Method:** The author with past experience to put forward some discussions on this challenging issue. **Results:** How does the athlete recover? Which trainings should be carried on during the convalescent period? Which trainings should be started after conalescent? Whether the sport injury was due to the biomechanics problems of some techniques and how to rectify the mistakes? The harm of endless convalescent period causes a depressive mood and the athlete fears about the seriousness of the injury and doubtfulness of oneself's ability to return to the sport. All these problems need the instructions and help of the professionals to develop the athlete's self-confident for competition. **Conclusion:** Medical personnel and the coach member are the key persons in assisting these athletes, with closed communicate and readiness to revise training programme at any time could attain a purpose of promoting the instauration.

## PP003-010

**ASSOCIATION STUDY OF SPHINGOMYELIN PHOSPHODIESTERASE 2 (SMPD2) GENE POLYMORPHISM IN KOREAN FEMALE PATIENTS WITH RHEUMATOID ARTHRITIS**Dong Hwan Yun, Hee-Sang Kim, Jong Ha Lee, Seung Don Yoo, Dong Hwan Kim, Chun Ho Baik*Department of Physical Medicine & Rehabilitation, KyungHee University Medical College, KyungHee University Medical Center, Seoul, Korea*

**Objective:** The purpose of this study was to assess possible relationship between SMPD2 gene and rheumatoid arthritis (RA) prevalence, disease severity and clinical findings. **Methods:** Three single nucleotide polymorphism (SNP)s of SMPD2 gene by Illumina 100K chip were selected in screening of twenty-four Korean female patients with RA arthritis and thirty-five Korean female controls. For association studies, 114 female patients and controls are recruited from Kyung Hee University Medical Center. The genomic DNA is obtained from blood samples and pertinent region is amplified with polymerase chain reaction, each SNPs (rs9386806, rs1476386, rs1476387) were analyzed with sequencing. Statistical differences in genotype and allele frequencies between RA patients and control subjects were evaluated and according to clinical findings [erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), bone erosion] RA patients were grouped and analyzed. **Results:** Association studies of three SNPs from SMPD2 gene showed no significant association in prevalence. Among three SNPs of SMPD2 gene, rs1476387 SNP showed significant association with ESR [Genotype,  $X^2=23.538$   $p<.0001$ ; Allele frequency, odds ratio 0.311 (95% CI, 0.154-0.625;  $X^2=11.402$ ,  $p=0.001$ )] and rs9380806 SNP is revealed association with bone erosion [Genotype,  $X^2=4.532$ ,  $p=0.033$ ; Allele frequency, odds ratio 1.0541 (95% CI, 1.0010-1.1099;  $X^2=4.417$ ,  $p=0.036$ )]. Three SNPs of SMPD2 gene showed no significant associations with CRP in Korean female patients with RA. **Conclusions:** This

result suggested that SNPs (rs1476387, rs9380806) of SMPD2 gene were associated with inflammation and bone erosion of RA, respectively.

## PP003-011

**WHOLE BODY VIBRATION INCREASING BONE DENSITY IN THE OSTEOPOROTIC RATS BY TAIL SUSPENSION**Chia-Hsin Chen<sup>1</sup>, Gwo-Jaw Wang<sup>2</sup>, Mei-Ling Ho<sup>3</sup>, Yan-Hsiung Wang<sup>4</sup>, Mao-Hsiung Huang<sup>1</sup>, Chin Hsu<sup>3</sup>*Departments of <sup>1</sup>Physical Medicine and Rehabilitation, <sup>2</sup>Orthopaedics, School of Medicine, <sup>3</sup>Physiology and <sup>4</sup>Orthopaedic Research Center, Kaohsiung Medical University, Kaohsiung, Chinese Taipei*

**Objective:** Osteoporosis is a skeletal pathology characterized by low bone density. High frequency, extremely low-level mechanical signals can be anabolic to bone formation using whole body vibration (WBV). In this study we evaluated the influence of WBV on the bone mineral density (BMD) in osteoporotic rats by hindlimb unload (HU). **Methods:** Twelve adult male disuse rats ( $n=12$ ) were done with HU for 28 days by tail suspension and 12 non-disuse rats were not. All the rats were divided into four groups with 6 in each: control, control with WBV, HU, and HU with WBV. Rats received WBV stimulation at 40 Hz with a 1.2 g. Each received vibration for 30 min/day, 5 days/week for 5 weeks. BMD measurements were performed using DEXA. Four different regions of interest (ROI's) were analyzed: ROI 1 the femoral condyles area, ROI 2 the whole femoral bone, ROI 3 the proximal metaphyseal tibial area and ROI 4 the proximal epiphyseal and metaphyseal tibial area. **Results:** Rat weights did not significantly change in the HU groups, but increased in the control groups compared to their initial weight. BMD in the HU groups decreased after 4 and 9 weeks compared to that in the control groups. In the HU groups, BDMs increased in ROI3 and ROI4 after the rats received the WBV, but they had no significant change in ROI1 and ROI2. Four ROI's in the control groups, however, did not change. **Conclusions:** WBV stimulation could increase osteoporotic rats' BMDs in the proximal tibial metaphysic and epiphysis area. However, distal femoral epiphysis did not respond. Thus, the distance from the source of vibration may influence the response to WBV.

## PP003-012

**ULTRASONOGRAPHY GUIDED GLENOHUMERAL INJECTION USING AN ANTERIOR APPROACH: A CADAVERIC STUDY**Min Wook Kim<sup>1</sup>, Joon-Sung Kim<sup>2</sup>, Jae Min Kim<sup>1</sup>, Jong Soo Yoon<sup>1</sup>, Young Jin Ko<sup>3</sup>, Won Il Lee<sup>3</sup>*<sup>1</sup>Rehabilitation, The Catholic University, Our Lady of Mercy Hospital, Incheon, <sup>2</sup>Rehabilitation, The Catholic University, St. Vincent Hospital, Suwon, <sup>3</sup>Rehabilitation, The Catholic University, St. Mary Hospital, Seoul, South Korea*

**Objective:** The success of injections in the glenohumeral joint using an anterior approach was studied. This study assessed the accuracy and confidence of the glenohumeral joint injection in cadavers. **Method:** Eight shoulders from six cadavers were placed supine with arm abduction and external rotation. A single examiner performed all of ultrasonography guided injection using an anterior approach. A twenty-one gauge needle was placed into shoulder, and then the anatomic sections were analyzed. **Result:** Seven of 8 (87.5%) were judged to be accurately placed by the anatomic section. In one of eight cases, the needle tip was placed in

supraglenoid space and in one of seven cases the needle traversed the long head tendon of biceps muscle. Confidence of injection was 87.5%. *Conclusion:* Ultrasonography guided glenohumeral injection using an anterior approach had efficacy and safety. This procedure will be required in a clinical setting.

#### PP003-013

### THE RESEARCH ON REHABILITATION TRAINING METHOD FOR THE KNEE CROSS-CRUCIATES LIGAMENT AFTER SURGERY

**Baoxin Zhang, An Wen, Xiaoni Yan**

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*Objective:* How can we find a reasonable and scientific method on rehabilitation training after knee surgery? This paper provides several safe, good and feasible training methods by taking the Rehabilitation Training Scheme, the Clinical Observation and the joint ROM amplitude variation and many other aspects studies for patients with the knee Cross-cruciates ligament damage, who were treated after surgery at the Sports Medicine and Rehabilitation Centre in the author's college. *Methods:* The rehabilitation exercises were taken by all subjects in the College Rehabilitation Centre. They all received arthroscopic or the surgical ligament reconstruction. The earliest one started training from the 7<sup>th</sup> day after surgery and the latest one was from 1 month after. 12 samples patients were treated through CPM machine, swimming, ascending the power bicycle, the HUR Knee-functional exerciser, Static-dynamic balance exercises. These various rehabilitation methods improve unsteady symptom of knee joint effectively. The results were compared with health knee joint including ROM, the stock four muscles encircles, the Lysholm knee joint ligament grades, the standard and the myo- strength test after rehabilitation exercises. *Results:* According to the Lysholm knee joint ligament Score standards, 7 samples patients scores above 85 points after 4 month-long rehabilitation exercises, ROM of knee joint achieved from 0 to 120° and the myo-strength approached 70%. while these patients only reached to the average of 65 points before rehabilitation exercises. *Conclusions:* Rehabilitation exercise improved the function of knees after cruciate ligament surgery.

#### PP003-014

### THE CHANGE OF PLANTAR FASCIA IN HEMIPLEGIC PATIENTS

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*Objective:* To investigate the change of plantar fascia thickness in hemiplegic and non-hemiplegic feet in stroke patients using the ultrasonographic evaluation. *Methods:* Sixteen hemiplegic and non-hemiplegic feet from 16 hemiplegic patients (patient group) and 16 feet from 8 healthy subjects (control group) were evaluated with ultrasonography. Sagittal sonograms were obtained in the prone position, and the plantar fascia thickness was measured at its insertion into the calcaneus. *Results:* Mean plantar fascia thickness was measured  $4.5 \pm 0.8$  mm in hemiplegic feet of patient group,  $3.4 \pm 1.0$  mm for contralateral non-hemiplegic feet and  $2.8 \pm 0.3$  mm for control group. There was a statistically significant difference between hemiplegic feet, contralateral non-hemiplegic feet, and control group ( $p=0.000$  and  $p=0.046$ , respectively). There was no significant difference in plantar fascia thickness of patient group according to the Brunnström stage and Spasticity. *Conclusions:* These results demonstrated that plantar fascia is overloaded in

hemiplegic and non-hemiplegic feet of patients with stroke. A therapeutic approach should be considered for these patients.

#### PP003-015

### USEFULNESS OF ASSESSMENT BY ULTRASONIC METHOD OF BONE SUBSTANCE OF DISTAL END OF RADIUS

**Kenji Kagechika<sup>1</sup>, Yasutaka Takagi<sup>2</sup>, Kiyotaka Yagi<sup>1</sup>, Hiroshi Yamada<sup>2</sup>, Yoshimitsu Kanazawa<sup>2</sup>, Wataru Nasu<sup>2</sup>, Katsuhiko Tachino<sup>3</sup>**

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*Objective:* To establish the method for evaluation of bone quality at forearm in osteoporosis by supersonic wave similar to that of measurement by dual energy X-ray absorptiometry (DXA) in the vertebrae lumbales. *Methods:* The relationship of the conduction velocity of the supersonic wave of center frequency 1MHz transmitted in the distal end of radius and the bone mineral density of the distal end of radius, vertebrae lumbales, and femoral neck by QDR-4500 was examined. The subjects were seven women with a fracture of distal radius (56–83, mean age  $71.4 \pm 8.9$  years old), and 24 healthy female without the anamnestic of fracture (25–58, mean age  $43.5 \pm 8.6$  years old). *Results:* Correlation coefficient of supersonic wave conduction velocity and the DXA of distal end of radius was 0.54. The supersonic wave conduction velocity in the distal end of radius was slower than that of calcaneus, which had achieved the correlation with DXA value of the vertebrae lumbales and femoral neck. *Conclusion:* The shape of the distal end of radius is simple and few to change by age and the possibility that distortion by positioning is minimal. Ultrasonic method has some problems of difference between measurements, with the possibility relating to the bone substance. Because of the difference in the proportion of the cancellous and cortical bone at the distal end of radius, it is important to evaluate a potentially big difference caused at this position.

#### PP003-016

### THE REHABILITATION THERAPY AFTER REVISION TOTAL HIP ARTHROPLASTY

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*Objectives:* To explore the effectiveness of an individualized rehabilitation therapy after revision of total hip arthroplasty (RTHA). *Methods:* Twenty-four cases with revision of total hip replacement from Feb 2004 to Mar 2007 were treated with an individualized rehabilitation therapy. The group was evaluated by Harris Hip score in the 1<sup>st</sup> and 3<sup>rd</sup> month after surgery. Statistical analysis with t-test was used. *Results:* The patients' functional ability, ROM of hip, walking and ADL were better than those before surgery when assessed on the 1<sup>st</sup> and 3<sup>rd</sup> month. *Conclusions:* The early rehabilitation therapy program is important to recover the functional ability of hip. For the complexity of RTHA, the rehabilitation therapy after surgery should evaluate from three aspects: the integrity of hip's bone (osteoporosis, defective bone), the relative stability of implant (the appropriate types of total hip replacement prostheses) and the condition of soft tissue around hip joint. The rehabilitation therapy of RTHA after surgery must follow the principle of individuation, progressiveness and comprehensiveness. The key is the muscle strength exercises, particularly in the strength of hip abductors.

## PP003-017

**ELECTROMYOGRAPHIC ANALYSIS OF THE LEFT LOWER EXTREMITY DURING GOLF SWING IN PROFESSIONAL AND AMATEUR GOLFERS*****Seong Ho Jang, Mi Jung Kim, Si Bog Park****Department of Physical Medicine and Rehabilitation, College of Medicine, Hanyang University, Seoul, Korea*

**Objective:** There were some studies about muscle activity during the golf swing, but most studies were conducted on highly skilled golfers and very few research comparing expert and novice differences. The purpose of this study was to analyze the muscle activity of left lower extremity during golf swing between professional and amateur golfers. **Methods:** Five professional golfers and five amateur golfers (handicap <13) volunteered. The EMG signal was recorded through surface electrodes in left Gluteus maximus, Gluteus medius, Biceps femoris, Gastrocnemius, Rectus femoris, Peroneus longus and Tibialis anterior muscles. The swing motion was divided into 4 phases: take away, back swing, down swing and follow through. Root mean square value of each muscle in each phase was calculated and repeated measures analysis of variance was done between two groups. **Results:** Two golfers showed very different muscle activity patterns in all examined muscles. In left peroneus longus muscle of professional golfers, muscle activities increased steadily until impact and maintain its activities, in amateur golfers, muscle activities increased during backswing and showed no change during downswing and after impact suddenly increased. In another muscles in left lower extremity of professional golfers, muscle activities increased until downswing or impact phase and maintain its activities after that, in amateur golfers, muscle activities decreased during downswing rather than increase or continuance. This result shows the importance of left side wall. During downswing and impact, professional golfers contracted his knee extensor, flexor, ankle dorsiflexor, plantar-flexor and evertor muscles much stronger than amateur golfers. **Conclusions:** Professional golfers used left lower extremity more powerfully than amateur golfers, especially during downswing and impact phase. This data allow effective training program to build more accurate and skillful golf swing.

## PP003-018

**ELECTROMYOGRAPHIC ANALYSIS OF THE TRUNK MUSCLES DURING GOLF SWING IN PROFESSIONAL, AMATEUR AND NOVICE GOLFERS*****Seong Ho Jang, Tai Kon Kim, Seung Hoon Han****Department of Physical Medicine and Rehabilitation, College of Medicine, Hanyang University, Seoul, Korea*

**Objectives:** There were some studies about muscle activity during the golf swing, but most studies were conducted on highly skilled golfers and very few research comparing expert and novice differences. The purpose of this study was to analyze the muscle activity of trunk during golf swing between skill levels. **Methods:** Five professional golfers, five amateur golfers (handicap <13) and five novice golfers (handicap >18) volunteered. The EMG signal was recorded through surface electrodes in bilateral Rectus Abdominis, Obliquus Abdominis, and Erector Spinae. The swing motion was divided into 4 phases: take away, back swing, down swing, follow through. Root mean square value of each muscle in each phase was calculated and repeated measures analysis of variance was done between three groups. **Results:** Novice golfers showed different

muscle activity patterns in right obliquus abdominis and erector spinae muscles. EMG activities of the two muscles went on after ball impact, whereas that of another two groups decreased after impact. Our results indicated that novice golfers devote strength in right side rather than build left side wall, consequently can not achieve natural and smooth swing plane. **Conclusions:** Novice golfers use muscles of right trunk after impact phase more than the amateur and professional golfers. This data allow effective training program to build more accurate and skillful golf swing.

## PP003-019

**THE INITIAL EFFECTS OF KINESIO TAPING IN LATERAL EPICONDYLITIS – A RADIOMISED CONTROLLED TRIAL*****Bye-Then Chen<sup>1</sup>, Chung-Liang Lai<sup>1</sup>, Jung-Jui Chao<sup>2</sup>****<sup>1</sup>Department of Physical Medicine and Rehabilitation, Tai-Chung Hospital, <sup>2</sup>National Taiwan University of Physical Education, Taichung, Chinese Taipei*

**Objective:** The purpose of this study was to investigate the initial effects of a kinesio taping combined with ultrasound and TENS in individuals with lateral epicondylitis. **Methods:** Twenty-one women and five men participated in this study. There were 2 groups of 13 that were assigned 1 of 2 treatments. Both groups randomly selected: group A being treated with kinesio taping, ultrasound and TENS, and group B with ultrasound and TENS. The outcomes of group A and B were measured through elbow pain, range of motion and strength of pain-free grip. These were assessed before the treatment and immediately, 24hs and 48hs after the completed treatment. **Result:** The group A had significant findings of decreased elbow pain, and improved range of motion in forearm, 48 h after completed treatment. ( $p < 0.05$ ). But there was not a significant change in group A's strength of pain-free grips after the completed treatment ( $p > 0.05$ ). **Conclusion:** The study initially demonstrated positive effects of kinesio taping combined with ultrasound and TENS for lateral epicondylitis and suggest that kinesio taping should be considered as effective method for treatment.

## PP003-020

**CLINICAL OBSERVATION OF LOW FREQUENCY PULSE ELECTROMAGNETIC FIELD ON TREATMENT OF OSTEOPOROSIS*****Yin Qin<sup>1</sup>, Ling Li<sup>2</sup>, Yuanju Zhang<sup>1</sup>****<sup>1</sup>Department of Physiotherapy, Fuzhou General Hospital, Fujian, and <sup>2</sup>Department of Rehabilitative Physiotherapy, First hospital Affiliated to General Hospital of Chinese PLA, Beijing, China*

**Objective:** To observe the therapeutic effect of low frequency pulsed electromagnetic fields (PEMFs) on primary osteoporosis. **Methods:** Forty-eight patients with primary osteoporosis received PEMFs therapy for 43 min/day, five times a week for 24 weeks, and then the effectiveness was evaluated. **Results:** After therapy, the pain vanished or disappeared in 43 cases among the 48 patients with pain ( $p < 0.05$ ), the total effective rate was 89.6%. The serum osteocalcin was increased by 5.8% ( $p < 0.05$ ). The re-measurement of BMD after six months later showed that the average BMD was increase by 0.56% in lumbar spine (L2–4) ( $p < 0.05$ ), 1.3% in femur neck ( $p < 0.05$ ) and 1.2% in wards triangle region ( $p < 0.05$ ) of the hip, respectively. Blood routine tests: hepatorenal function, blood calcium and phosphate were all in normal range before and after treatment. **Conclusion:** Low frequency pulsed electromagnetic fields can ameliorate pain and stimulate osteogenesis which increases bone mineral densities in patients with primary osteoporosis.



## PP003-021

**CLINICAL ANALYSIS IN 110 PATIENTS WITH SPINAL CORD INJURY****Rongqiu Mao, Ying Chen, Zhang Li***Department of Rehabilitation, The First Affiliated Hospital Guangxi Medical University, Guangxi, China*

**Objective:** The occurrence of spinal cord injury (SCI) has profound social sequelae and closely related to factors that vary in countries, regions and people. There were relationship among different injured causes, regions, degree of injury, symptoms, physical signs, functional dysfunction and recovery. **Methods:** From Sep 2001 to Jul 2006, a retrospective review was performed on 110 patients who suffered from SCI. Factors including gender, age, occupation, etiological factors, region, dysfunction, operation, rehabilitation comprehensive treatment were analysed and correlated. The motor and sensation scores were collected and compared at the level of pre- and post-rehabilitation treatment. **Results:** Among the patients, 110 cases with SCI with cervical region 57, thoracic region 28 and lumbar region 25 cases). 94 were males and 16 were females, the age ranged from 12 to 73 years but mostly were young. Fall were the most cause of injuries (35%), followed by traffic accidents (32%). The clinical types were as follows: paraplegia (41%), tetraplegia (47%) and paresthesia (88%). The main damaged regions of spinal cord were C1-2, C6-7, and T12-L1. The more serious was the injuries, the poorer was the outcome. **Conclusion:** There are many different causes for the SCI in our hospital. The commonest SCI cause was falling from height, for which prevention measures should be taken. The percentage of SCI patients could receive systemic medical rehabilitation was low.

## PP003-022

**EFFECTS OF CONTINUOUS EPIDURAL ELECTRICAL STIMULATION ON SYNAPTOGENESIS AND NEURONAL PROLIFERATION IN STROKE RAT MODEL****Chung-Yong Yang<sup>1</sup>, Jin-Hoon Lee<sup>1</sup>, Min-Cheol Joo<sup>1</sup>, Suk-Bong Yun<sup>2</sup>, Yong-II Shin<sup>1</sup>***<sup>1</sup>Department of Physical Medicine and Rehabilitation, Wonkwang University School of Medicine, Iksan <sup>2</sup>Department of Physical Medicine and Rehabilitation, Presbyterian Medical Centre, Korea*

**Objective:** To evaluate the effects of continuous epidural electrical stimulation (ES) on the behavioral recovery, and molecular markers of synaptogenesis and neural cell proliferation in rats with photothrombotic stroke. **Methods:** The male Sprague-Dawley rats ( $n=23$ ) were pretrained on a single pellet reaching task (SPRT), and then received the photothrombotic infarction on dominant sensorimotor cortex (SMC) and implantation of electrode over the peri-lesion SMC surface. All rats were randomly assigned to one of two groups: anodal ES on infarcted SMC (ES group) and no ES on infarcted SMC (control group). Rats received daily SPRT and neurological examinations for 14 days. After the rats were killed, brain sections were immunostained for evaluation of the structural remodeling markers (MAP2, synaptophysin and GFAP) and neuronal cell differentiation markers (BrdU, NeuN and DCX), and quantification of infarct volumes. **Results:** The functional improvement of SPRT was significantly increased in the ES group compared to control group. There were no significant group differences in the infarct volumes, neurological examinations, structural remodeling markers and neuronal cell differentiation markers except significantly increased DCX in corpus callosum of ES group ( $p<0.05$ ). But, in ES group, MAP2, synaptophysin and NeuN staining in affected peri-infarct

area, DCX in affected striatum, BrdU in corpus callosum tended to increase compared to control group. In infarct hemisphere of ES group, many structural remodeling markers and NeuN tended to increase compared with unaffected hemisphere. Especially, the staining of synaptophysin and GFAP in peri-infarct area had a significant increase more than unaffected hemisphere in ES group and control group, respectively ( $p<0.05$ ). **Conclusions:** The ES greatly improved the behavioral motor function after SMC infarction and induced the significant synaptogenesis with the widespread neuronal proliferation in peri-infarct area. Postischemic astrogliosis was not remarkable in ES group.

## PP003-023

**A CLINICAL RESEARCH OF COMBINED REHABILITATION THERAPY PROTOCOL FOR SPINAL CORD INJURY****Lijuan Ao<sup>1</sup>, Jinghua Qian<sup>2</sup>, Wenli Wang<sup>2</sup>, Mei Tang<sup>2</sup>, Lin Zheng<sup>2</sup>, Wangxiang Li<sup>2</sup>, Lifen Zhang<sup>2</sup>***<sup>1</sup>The Department of Rehabilitation Medicine of the 2nd Affiliated Hospital of Kunming Medical College, <sup>2</sup>The Department of Rehabilitation Therapy of Kunming Medical College, China*

**Objective:** To explore the effects of combined rehabilitation therapy protocol on the prognosis of spinal cord injury (SCI) and prevention of related complications. **Methods:** The research subjects included 88 SCI patients (65 males and 23 females), averaging  $37.44 \pm 15.08$  years old (range 3-79 years) and among the subjects, 32 were with cervical cord injury, 39 with thoracic cord injury, 15 with conus medullaris injury and 2 with cauda equina injury. After hospitalization, all of them were treated according to the combined rehabilitation therapy protocol for SCI patients. In initial, intermediate and end stages of treatment, the assessment items included ASIA classification and neurogenic bladder typing. The follow-up period was 1 year. **Results:** 1) Neurological levels decent 1-3 segments in 29 cases (32.95%). 2) The ASIA scales in 6 cases (6.82%) were improved from grade A to B; 3 (8.19%) from A to C; 7 (46.60%) from B to C; 3 (20.00%) from B to D; 15 (65.20%) from C to D. 3) Three cases (3.41%) were improved from quadriplegia-type (Q-type) to paraplegia-type (P-type); 3 (3.41%) from Q to detrusor-external sphincter synergia-type (S-type); 6 (27.30%) from Q to tractus cerebrospinalis remnant-type (C-type); 1 (2.30%) from P to S-type. **Conclusion:** The combined rehabilitation therapy protocol is helpful to improve the neurological status in SCI patients and effectively prevent and reduce the occurrence of complications after SCI.

## PP003-024

**USE OF ACUPUNCTURE-TENS IN TREATING POST-STROKE RETENTION OF URINE – A PILOT STUDY****Kwok-pui Leung<sup>1</sup>, Elaine F. M. So<sup>2</sup>, Tze-kin Kwok<sup>1</sup>, Leonard S. W. Li<sup>1</sup>***<sup>1</sup>Division of Rehabilitation Medicine, University Department of Medicine, and <sup>2</sup>Department of Physiotherapy, Tung Wah Hospital, Hong Kong SAR*

**Objective:** About 21% to 29% of stroke patients remained bothered by urinary retention at 3 weeks post-stroke. Effective treatment for post-stroke retention of urine (ROU) is scanty. We explore the usefulness and practicability of using acupuncture-TENS to treat this common post-stroke complication. **Methods:** Nine consecutive stroke patients with ROU at 3 weeks post stroke

between January 2007 and April 2007 were recruited. ROU is defined as having persistent high post-void residue urine (PVRU) volume greater than 250 ml. Transcutaneous Electrical Nerve Stimulation (TENS) current with frequency of 2 Hz, pulse width 200  $\mu$ sec was applied to two groups of acu-points selected based on the meridian principle of Traditional Chinese Medicine for 30 mins using non-invasive surface electrodes. Patients were treated 5 times per week for a maximum of 4 weeks. *Results:* Five female and 4 male patients were recruited with a mean age of 71 (range: 51–84). The average pre-treatment PVRU volume was 399 ml (range: 250–600 ml). Three of them required urinary catheter insertion because of marked retention. The average post-treatment PVRU volume was 108 ml (0–146 ml) which was significantly improved ( $p=0.0002$ ). Eight of 9 patients (89%) were regarded as cure based on the usual criterion that PVRU should be less than 150 ml. Two of the 3 catheterized patients were able to wean off from catheters. One of 9 patients (11%) was regarded as failure and required long-term Foley catheter. For those who responded favourably, treatment effect was seen after a median 7 sessions of Acu-TENS (range: 2 to 17). The only patient who did not respond was confirmed by uro-dynamic study to have benign prostatic hypertrophy. Diabetes Mellitus (DM) was not conducive to poor outcome as 6 of the 8 responders had DM. All treated patients rated the Acu-TENS procedures as highly acceptable and no adverse effect was reported. *Conclusion:* Our pilot concluded that Acu-TENS is a useful and acceptable treatment for post-stroke ROU provided that there is no significant out-flow tract obstruction.

#### PP003-025

### APPLICATION OF FUNCTIONAL MAGNETIC RESONANCE IMAGING TECHNIQUE IN SPINAL CORD INJURY

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*Objective:* To review the application of functional magnetic resonance imaging (fMRI) as a noninvasive imaging clinical technique in the direct evaluation of spinal cord injury (SCI) so as to supply objective evidence for resonant neurological function and reparative plasticity assessments, prognostic decision and novel treatment development. *Method:* In PubMed database, entering “spinal cord injury AND fMRI” as a docuterm and setting Title/Abstract in Tag term of limits, 13 related articles were obtained. In CMB database, entering “spinal cord injury AND MR” as a docuterm and “fMRI”, the result of searching was only 1 related article was got from 1979–2007. Meanwhile, other related information was also collected by scanning notable journals, including Spinal Cord Journal, PNAS, Chinese Rehabilitation Theory Practice Journal, etc. *Results:* Recently, some overseas researchers had studied SCI by fMRI. In clinical research, fMRI was mainly used in the assessments of resonant neurological function and reparative plasticity after acute or chronic SCI. In animal experiments, fMRI was mainly used in comparison of mild and moderate SCIs and studying cortical reorganization with drug treatment in animal model of SCI. In SCI patients, fMRI was used to assess changes after receiving rehabilitation training. *Conclusion:* fMRI may provide a noninvasive assessment of an injured spinal cord that does not depend on a patient’s perception to stimulus and help us observe cortical reorganization after SCI.

#### PP003-026

### EFFECT OF TRANSCUTANEOUS AND PERCUTANEOUS ELECTRICAL STIMULATION TO ACUPUNCTURE POINTS OF THE HEALTHY YOUNG SUBJECTS ON THE SOMATOSENSORY EVOKED POTENTIALS

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*Objective:* To investigate the effects of transcutaneous and percutaneous electrical stimulation to acupuncture points of the healthy young subjects on the somatosensory evoked potentials (SEPs). *Method:* Ten healthy young subjects with 5 male and 5 female of 18–22 years old were recruited. Each was treated separately with transcutaneous electrical stimulation and percutaneous electrical stimulation on the acupuncture points (Jiangu, Binao, Quchi, Shousanli, Waiguan, Hegu) of the right upper extremity within one week. Stimulation lasted for 30 min and was 1.4Hz, 200 $\mu$ s for percutaneous acupuncture and 20 Hz, 200 $\mu$ s for transcutaneous stimulation, respectively. SEPs were examined before and after stimulation with the average of repetition 150 x 2 at each session. The amplitude and latency of N9 and N20 of the upper limb were recorded. The interclass correlation coefficient (ICC) was used to analyze the reproducibility of SEPs and the difference before and after 30 min stimulation and between two different stimulations. *Results:* The SEPs was highly reproducible and ICCs were between 0.991–0.999. There were significantly increase in the amplitude of N9 and N20 at either stimulation after treatment. The significant increase of amplitude was also found between right and left side. However, no significant difference was found in the latency after either stimulation when compared with baseline recording. *Conclusions:* The SEP is a reliable way to examine the effects of electrical stimulation on the acupuncture points. There are similar effects of transcutaneous and percutaneous electrical stimulation on the SEPs when they are applied to the acupuncture points of the healthy young subjects.

#### PP003-027

### THE RELIABILITY OF FUNCTIONAL ELECTRICAL STIMULATION ON SOMATOSENSORY EVOKED POTENTIALS OF STROKE PATIENTS

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*Objectives:* To investigate the reliability of functional electrical stimulation (FES) on somatosensory evoked potentials(SEP) of subjects with stroke. *Methods:* Nine subjects were randomly divided into two groups, the upper limb group (group 1) and the lower limb group (group 2). They were 7 male and 2 female of 60.3  $\pm$  11.8 years old and 1.2  $\pm$  0.5 months post stroke. Subjects in group 1 received FES treatment on the affected upper limb for 30 min. The parameters were 30 Hz, the pulse width 0.2 ms, on/off at 5s/5s, ramp at 1s/1s. Subjects in group 2 received FES treatment on the affected lower limb as the same as group 1. SEP were examined before and after treatment with the average of repetition 150 x 2 at the each session. We recorded the amplitude and latency of N9 and N20 of upper limb for group1, while N9 and P40 of lower limb for group 2. The interclass correlation coefficient (ICC) was used to analyze the reproducibility of SEP, the difference between 2 sessions before and after treatment was also analyzed within group. *Results:* The SEP

for both sessions was highly reproducible and ICCs were between 0.899–1.000 in group 1 while between 0.193–1.000 in group 2. There were significant changes in amplitude and latency of N9 and N20 in group 1 after treatment, but no significant change was found in the latency of the N9 and P40 in group 2. *Conclusion:* The SEP is reliable to observe the effects of FES on subject with stroke and the reliability in group 1 was better than that in group 2.

#### PP003-028

### THE EFFECT OF VALPROIC ACID ON BALANCE FUNCTION IN ISCHEMIC STROKE PATIENTS

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*Objectives:* Ataxia and dizziness are the most common adverse events associated with antiepileptic medications interfering with functional recovery in stroke patients. The aim of this study was to investigate the effect of valproic acid for antiepileptic medications on balance function in ischemic stroke patients. *Methods:* Twenty-two functional ambulatory patients with cerebral infarction on the middle cerebral artery territory were included. The patient group (age  $52.7 \pm 12.5$  years; men 5, women 6; duration  $11.1 \pm 6.9$  months; target drug monitoring level  $72.2 \pm 9.7$   $\mu\text{g/ml}$ ) was taking the valproic acid per oral to prevent poststroke seizure. The control group (age  $58.0 \pm 14.0$  years; men 5, women 6; duration  $10.3 \pm 9.4$  months) was not taking the valproic acid. The exclusion criteria were visuospatial neglect, visual impairment, vestibular impairment, neurodegenerative disorder, depression disorder, peripheral polyneuropathy, lumbosacral radiculopathy, and less than grade 4 on Criteria for rating eight stages of functional ability. We measured Functional Independence Measure (FIM), Brunnström stage of lower extremity (BS), Mini-Mental Status Examination (MMSE), and the balance function by Berg Balance Scale (BBS) and balance test of Tinetti Performance Oriented Mobility Assessment (POMA) in both groups. *Results:* The BBS score and Balance test score of POMA of patient group were significantly lower than those of control group ( $p=0.048, 0.049$ ). There were no significant differences in the FIM, BS, and MMSE scores between two groups ( $p>0.05$ ). *Conclusions:* We think that the valproic acid decrease the balance function in ischemic stroke patients.

#### PP003-029

### THE DISTRIBUTION OF PLANTAR PRESSURE IN DIABETIC NEUROPATHY PATIENTS WITHOUT FOOT ULCER

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*Objective:* The aim of this study is to investigate the plantar pressure distribution (PPD) in diabetic neuropathy patients without foot ulcer. *Methods:* Forty diabetic patients of normal lower limb alignment without foot ulcer were included for this study. Peripheral polyneuropathy (PN) was diagnosed by means of Diabetic Neuropathy Staging and classified patients into two groups; the experimental group, diabetics with PN (DPN), are 26 patients (men 16, women 10; age  $57.0 \pm 6.2$  years; duration,  $6.6 \pm 8$  years; BMI  $24.9 \pm 0.9$   $\text{kg/m}^2$ ; serum HbA1c  $8.9 \pm 0.2\%$ ), the control group,

diabetics without PN (NDPN), are 14 patients (men 4, women 10; age  $58.0 \pm 5.7$  years; duration,  $8.6 \pm 6$  years; BMI  $23.3 \pm 0.8$   $\text{kg/m}^2$ ; serum HbA1c  $7.7 \pm 0.4\%$ ). Both groups are evaluated with the static and dynamic test by the plantar pressure analyzer, Gait view (alFOOTS' Korea). The static test was performed to evaluate PPD ratio from the front to the rear and deviation of center of gravity (COG). The dynamic test was performed to evaluate the path of plantar pressure. *Results:* In static test, the PPD ratio of DPN were significantly increased than NDPN ( $p<0.05$ ). The deviation of COG of DPN were significantly larger than NDPN ( $p<0.05$ ), and BMI and serum HbA1c show a significant correlation with the deviation of COG ( $r=0.321, 0.218, p<0.05$ ). In dynamic test, the DPN were significantly increased the supination and pronation of foot than NDPN ( $p<0.05$ ). *Conclusions:* The PPD analysis would be useful to predict diabetic complications and to understand the gait pattern in diabetic neuropathy patients.

#### PP003-030

### CHARACTERISTICS OF MOTOR EVOKED POTENTIAL RECORDING FROM SWALLOWING MUSCLES OBTAINED BY TRANSCRANIAL MAGNETIC STIMULATION IN HEALTHY SUBJECTS

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*Objective:* To evaluate the characteristics of the motor evoked potentials and the cortical topography of swallowing muscles in healthy subjects. *Methods:* Fourteen healthy subjects were enrolled. Their mean age was 31 years. Transcranial magnetic stimulation was applied to left and right motor cortices in turn and contralateral electromyographic recordings were made from orbicularis oris, masseter, submental and infrahyoid muscles during resting. The scalp sites of maximal response with the lowest stimulus output, which elicited motor evoked potential (MEP) of these muscles, were recorded. The Onset latency and peak-to-peak amplitude of MEP were measured for each muscles. *Results:* Most of the maximal MEPs of swallowing muscles were evoked within 9–17 cm lateral and 1–5 cm anterior from Cz and they showed interhemispheric symmetry. In submental and infrahyoid muscles, the threshold of right cortical excitability was significantly lower than that of left cortical excitability. The latency of the left submental MEP was statistically shorter than that of right submental MEP. *Conclusion:* These results demonstrated that the cortical representation of swallowing muscles displays interhemispheric symmetry. We suggest that submental and infrahyoid muscles have right cortical dominant tendency.

#### PP003-031

### CHARACTERISTICS OF CORTICOSPINAL INNERVATION OF TRUNK MUSCLES STUDIED WITH TRANSCRANIAL MAGNETIC STIMULATION IN HEALTHY MALE

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*Objective:* To evaluate the characteristics of motor innervation and the degree of ipsilateral innervation of trunk muscles. *Methods:* Fourteen healthy male subjects were enrolled. Their mean age was 28 years. Transcranial magnetic stimulation (TMS) was applied to left and right motor cortices in turn and bilateral electromyographic



recordings were made from deltoid, rectus abdominis, external oblique, upper thoracic erector spinae, and lower thoracic erector spinae muscles during resting. Onset latency and peak-to-peak amplitude of motor evoked potential (MEP) were measured for each muscle on both sides. *Results:* Incidence of ipsilateral MEPs was 75% in rectus abdominis, 60% in external oblique, 71% in upper thoracic erector spinae, and 64% in lower thoracic erector spinae muscles. Mean ipsilateral MEP latencies were longer than contralateral MEP latencies ( $p<0.01$ ). *Conclusion:* These results demonstrated that trunk muscles receive a variable degree of motor innervation ipsilaterally and contralaterally.

#### PP003-032

### LONG-TERM FUNCTIONAL OUTCOME FOR LEVAMISOLE-INDUCED MULTIFOCAL INFLAMMATORY LEUKOENCEPHALOPATHY: A CASE REPORT

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*Objective:* Levamisole (LEV) has been used as an immunomodulating medication in patients with recurrent aphthous ulceration and as an adjuvant agent for chemotherapy. LEV can induce multifocal inflammatory leukoencephalopathy (MIL). We sought to delineate the long-term functional outcome of MIL and the role of rehabilitation. *Methods:* A 26-year-old woman underwent LEV therapy for oral ulcers. One week later, she had acute onset of confusion, unsteady gait, right-sided hemiparesis. MIL was diagnosed on the basis of brain magnetic resonance images. *Results:* Her clinical symptoms and neuroimaging findings improved after plasmapheresis. We administered physical therapy and occupational therapy, focusing on strengthening, endurance, ambulation training and skill in performing activities of daily living. At the time of discharge, she was able to ambulate 100 m independently and was independent in most of activities of daily living. Nevertheless, at 3-year follow-up after initial presentation, the patient still had cognitive difficulties with memory problems and could not return to work. *Conclusion:* Patients with LEV-induced MIL can benefit from rehabilitation intervention. Motor impairment tends to recover faster than cognitive function does, whereas residual cognitive function may be the main determinant of long-term outcomes.

#### PP003-033

### EFFECTS OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION ON UPPER EXTREMITY MOTOR FUNCTION IN SEVERE POST-STROKE PATIENTS

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*Objective:* Repetitive transcranial magnetic stimulation (rTMS) is known to improve the motor function through modulation of the excitability in the cerebral cortex. However, most studies with rTMS are limited to mild stroke patients. Therefore, this blind randomized case-control study was designed to investigate the effects of rTMS on the paretic upper extremity function in severe stroke patients. *Methods:* Sixty severe stroke patients participated in this study. The subjects were divided into three different groups of 20 patients. 40 patients received subthreshold rTMS during two weeks, among which 20 received low frequency rTMS (1Hz) on the unaffected pri-

mary motor cortex (Group 1) and 20 received high-frequency rTMS (20Hz) on the affected primary motor cortex (Group 2). 20 patients in control group received the sham stimulation during two weeks. The stimulation was delivered on the hot spot evoking the highest motor evoked potential. Fugl-Meyer assessment was performed before and after the two weeks of rTMS. The results were compared between the three groups by repeated ANOVA. *Results:* The Fugl-Meyer assessment score were significantly more improved in both rTMS groups than that in control group ( $p<0.05$ ). The shoulder part score of Fugl-Meyer scale in both rTMS groups was significantly more improved than that in control group ( $p<0.05$ ) but the wrist and hand part score did not. We did not show any significant differences between both rTMS groups. *Conclusion:* rTMS may be helpful to improve the paretic upper extremity motor function in severe post-stroke patients regardless of the stimulation site.

#### PP003-034

### THE EFFECT OF FUNCTIONAL ELECTRICAL STIMULATION ON UPPER EXTREMITY FUNCTION IN STROKE PATIENTS WITH HEMIPLEGIA

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*Objective:* This study was designed to evaluate the effect of FES (functional electrical stimulation) on upper extremity function in stroke with hemiplegia. *Methods:* Forty hemiplegic patients were divided into two group of 20 subjects. FES was applied to 20 stroke patients with hemiplegia on the flexor and extensor of elbow & wrist muscles for 20 min and then, the patients tried to make the movement for 4 weeks. Both groups were under the NDT (neurodevelopment treatment). Upper extremity function was evaluated by comparison of pre-treatment and post-treatment in FES group and control group. *Results:* There were significant improvement of shoulder, elbow, wrist and hand of MMT (manual muscle test), WMFT (Wolf motor function test), Fugl-Meyer, hand grip, pinch, FIM, MBI (Modified Bathel Index), shoulder PROM (flexion) in FES group after treatment. And control group had significant improvement of MMT of each joints, WMFT, Fugl-Meyer, FIM, MBI, shoulder PROM (flexion) ( $p<0.05$ ). But it had a better effect in FES group compared to control group at the WMFT, Fugl-Meyer, hand grip, pinch, FIM, MBI, shoulder PROM (flexion) ( $p<0.05$ ). *Conclusions:* The results of this study showed that the FES will be useful treatment to improve upper extremity function of stroke patients with hemiplegia.

#### PP003-035

### ULTRASONOGRAPHIC FINDINGS OF BOTH KNEE JOINTS IN CHRONIC AMBULATORY HEMIPLEGIC STROKE PATIENTS

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*Objective:* The aim of this study was to investigate the ultrasonographic findings of both knee joints in chronic ambulatory hemiplegic stroke patients. *Methods:* Thirteen chronic ambulatory hemiplegic stroke patients (8 men, 5 women; age,  $60.8 \pm 1.7$  years; duration of disease,  $22.0 \pm 22.9$  months) without previous history of osteoarthritis of both knee joints were recruited. We examined

both knee joints using Sonoace 9900 (MEDISON, Korea) with 7.5 MHz linear probe and measured the cross sectional area of vastus medialis muscle at distal of femur. We evaluated the existence of each extra-articular and intra-articular lesion. Body mass index (BMI) and Brunnström stage were assessed. *Results:* 1) Disease duration, BMI, and Brunnstrom stage were not correlated with the existence of each extra-articular and intra-articular lesion in the affected side, respectively ( $p>0.05$ ). 2) 'Patellar tendinitis' as extra-articular lesions ( $p=0.018$ ) and 'blurred cartilage border' and 'irregularity of cartilage-bone border' ( $p=0.027, 0.001$ ) as intra-articular lesions were more frequent in the unaffected side. 3) The cross sectional areas of vastus medialis muscle were  $6.83 \pm 1.02$  in the affected side and  $7.62 \pm 1.41$  in the unaffected side. 4) The difference of cross sectional areas of both vastus medialis muscles was significantly correlated with intra-articular lesions in the unaffected side ( $p=0.047, r=0.558$ ). *Conclusions:* Considering that both intra-articular and extra-articular lesions were more observed in the unaffected knee joint of chronic ambulatory hemiplegic stroke patients, uneven weight-bearing exercise should be taken into account for the possible overload injury of the unaffected knee joint.

#### PP003-036

### A STUDY TO EVALUATE THE DETECTION RATE FOR DEPRESSION BY PHYSICIAN ASSESSMENT ALONE IN PATIENTS UNDERGOING POST STROKE REHABILITATION

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*Objective:* Post Stroke Depression (PSD) has a high prevalence rate and adversely affects rehabilitation outcomes and mortality. This study evaluates the diagnostic rate of PSD by physician's assessment alone. The risk factors for post stroke Depressive Symptoms (DS) will be examined. *Method:* Thirty-five patients undergoing stroke rehabilitation in an extended hospital in Hong Kong were recruited. Patient were administered the 15 items Geriatric depression scale (GDS-15) if they were not suspected of having PSD by the attending physician. (GDS-15 scoring 7 or more suggests presence of DS.) The prevalence of DS, its relation with demographic and clinical data will be examined. *Results:* In this cohort, five (14.3%) patients were eventually diagnosed with PSD, 3 (8.6%) by physician assessment alone and 2 patients (5.7%) in the subgroup not initially suspected of PSD, after further clinical assessment. The prevalence of DS was 48.6%. Barthel index (BI) on admission and discharge and length of stay in rehabilitation unit were associated with post stroke depressive symptoms ( $p=0.005, p=0.02; p=0.015$ , respectively) *Conclusion:* The prevalence of DS is 48.6%, comparable to other published local data. Diagnosis by physician assessment alone had missed 40% of PSD. BI on admission and discharge, were found to be risk factors associated with DS. Given the high prevalence of PSD, a screening tool increased the diagnostic rate.

#### PP003-037

### EXPRESSION OF PSA-NCAM ON RAT SACRAL MOTONEURONS FOLLOWING SPINAL CORD INJURY WITH SPASTICITY

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*Objective:* To investigate the relationship of spasticity with polysialylated neural cell adhesion molecule (PSA-NCAM) in adult

rats tail motoneurons following spinal cord injury (SCI). *Methods:* In this double blind, crossover study 16 male adult SD rats were divided randomly into three groups: SCI model (group A), SCI with administration (group B), sham operation (group C). The rats in the group A and B were performed S2 spinal transection. The other was only performed totally laminectomy. The rats in the group A and B were tested behaviorally for the progression of spasticity in the tail musculature using spasticity score and the maximum flexion angle. The group A was postoperative administered NCAM glycosylated inhibitor castanospermine (CAST) from d0 to d14 at 100 mg/kg/day for 15 days, the other groups did not treat with administration. The expression of PSA-NCAM on sacral spinal cord tissue was observed with immunohistochemistry at 15<sup>th</sup> day post-operation, the number of positive cells as observation index. *Results:* Of the 16 rats, 12 were established SCI models. Expression of PSA-NCAM appeared at 15<sup>th</sup> day in the group A, few positive cells appeared in the group B, no positive cells appeared in the group C. Compared with the group A, both spastic behavior and the number of PSA-NCAM-positive cells were significantly decreased ( $p<0.05$ ) in the group B. *Conclusion:* SCI-induced spasticity, in the tail musculature, appears to involve the increase in PSA-NCAM to sacrocaudal motoneurons.

#### PP003-038

### AUTONOMIC NERVE FOLLOWING SUBTHRESHOLD REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION OF THE PRIMARY MOTOR CORTEX

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*Objective:* To explore the effect of subthreshold repetitive transcranial magnetic stimulation (rTMS) over the primary motor cortex on autonomic nerve. *Method:* We evaluated the autonomic nerve in 10 healthy subjects and prior to, 1 min, 30 min, after rTMS over the primary motor cortex. The stimulation parameters were a frequency of 10 Hz and a field intensity of 90% of the resting motor thresholds. Stimuli were provided in trains of 100 pulses, followed by a 50 s rest period, 10 trains were applied in the session, resulting in 1,000 pulses in total. As for the change of autonomic nerve, the function of sympathetic nerve was evaluated by measuring blood pressure change on standing and continuous fist-clenching. And that of parasympathetic nerve was evaluated by using an electrodiagnosis machine and measuring posture change, respiration and R-R interval variability (RRIV) during valsalva maneuver. *Result:* There was no change in blood pressure on standing but there was elevation of diastolic blood pressure on clenching a fist. The RRIV showed a temporary tachycardia when standing up. As well, it was appeared that the R-R interval became shorter at inhalation when breathing deeply while it became longer at expiration. Statistically there was not significant decrease or increase in RRIV during valsalva maneuver, at either prior to and 1 min or 30 min after rTMS stimulation. *Conclusion:* Subthreshold rTMS over the hand motor cortex does not seem to change the autonomic nerve.

#### PP003-039

### CAUDA EQUINA SYNDROME DEVELOPED AFTER CAUDAL BLOCK

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*Objective:* Cauda equina syndrome is a disease caused by infectious or inflammatory condition, nerve root compression and

characterized by the symptoms of lower extremity pain, changes of the reflexes, decrease muscle power and sensations. *Case report:* A 45-year-old man visited hospital for lower extremity weakness and defecation difficulty. One day prior to the symptoms, he received caudal block for low back pain control. His motor grade was decreased. At the hip and knee joint, right side was P grade; left side was F-grade. At the ankle joint, right side was P-grade, left side was P grade. Sensation was decreased below L2 level. Knee jerk was hypoactive at both side and the defecation sense was lost. Laboratory test and L-spine MRI showed normal findings. 17 days after symptom, needle EMG showed decreased interference pattern and no abnormal spontaneous activities in the right lower extremity and paravertebral muscles. A tibial SEP finding was prolonged latency bilaterally. After three weeks, needle EMG findings showed abnormal spontaneous activities in the right lower extremity and paravertebral muscles. Residual urine volume after self voiding was 250cc. Urodynamic study findings showed impaired detrusor contraction. After the rehabilitation therapy for three months, lower extremity muscle power was F+ on the right side, G+ on the left side, and he could walk and void independently but still required some medications for defecation. *Conclusion:* This report is a case of Cauda equina syndrome after a caudal block.

#### PP003-040

##### EFFECT OF EARLY INTERVENTION BY REHABILITATION FOR PEDIATRIC PATIENTS WITH SEVERE BRAIN INJURY

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*Objective:* To investigate the effectiveness on conscious disturbance and motor function with combined methods of median nerve electrical stimulation and rehabilitation for pediatric patients with severe brain injury, starting when their vital signs became stable. *Methods:* A total of 86 pediatric patients with severe brain injury were divided into 2 groups. 43 patients who had the vital signs stable were assigned as treatment group while other 43 patients who preferred to have routine medical treatment were used as control group. On the basis of medical treatment, they were carried out convalescent care. Glasgow conscious disturbance score scale and GMFM were used to evaluate the level of consciousness and motor function respectively before and after treatment. *Results:* The outcomes measured by Glasgow score ( $p < 0.01$ ) and GMFE ( $p < 0.01$ ) showed significant difference between the treatment and control groups with a superior therapeutic result in using median nerve electrical stimulation and rehabilitation. *Conclusion:* The rehabilitation intervention study with the method of combining median nerve electrical stimulation and rehabilitation care should be applied to pediatric patients with severe brain injury once their vital signs became stable.

#### PP003-041

##### THE DESIGN OF ASSESSMENT TABLE FOR REHABILITATION NURSE IN CARING OF SPINAL CORD INJURY (SCI) PATIENT AND HIS DEPENDENTS

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*Objective:* To establish a concise, accurate, objective and comprehensive assessment table (chart) for rehabilitation nurse working in SCI in order to comprehensively master the rehabilitation progress of SCI patients and to carry out the systematic rehabilitation nurs-

ing program from early till end of inpatient rehabilitation of SCI patients. *Method and Results:* Contents include assessment items with regular periodic assessment. The assessment items consist the common data, special data (injury place, excreta, etc), the routine nursing information such as independence of living abilities (feeding, washing, bathing and grooming, dressing, hygiene, rolling in bed, transfers, arise, ambulation, clear up and defecate being the examples), the timing for assessment (on admission, 2<sup>nd</sup>, 4<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup> week and discharge) and the persons to be assessed (patient and relatives). *Conclusions:* The assessment table for rehabilitation nurse in SCI unit can comprehensively observe and assess the ability of body, mentality, social interaction and activities of daily living of SCI patients. Probably, the patient and his/her relatives can directly participate and design the program of rehabilitation nursing with the aim to facilitate efficiency of the process of rehabilitation.

#### PP003-042

##### EFFECT OF REHABILITATIVE TRAINING ON FUNCTION RECOVERY AND ULTRASTRUCTURE OF NERVE CELLS

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*Objective:* To study the effect of rehabilitative training on function recovery and ultra-structure of nerve cells of cortical infarct marginal zone after cerebral infarction in rats. *Method:* The mode of left middle cerebral artery occlusion (MCAO) was established by Sprague-Dawley rats. Rats were randomly divided into three groups: rehabilitative training group ( $n=20$ ), which were given bar rotating, balancing and rolling exercises everyday; sham surgery group ( $n=8$ ) and control group ( $n=20$ ), which were fed in cages with no any special training exercises. Post-MCAO, their motor functions were measured at 3, 7, 21, and 35 days. Changes of nerve cells in the cortical infarct marginal zone were observed by microscope and transmission electron microscope methods. *Result:* The scores of motor functions in the rehabilitative training group were significantly better than the control group at 7, 21, and 35 days ( $p < 0.05$ ). The microscope and transmission electron microscope showed that the nerve cells of cortical infarct marginal zone have more integrity nuclear membranes, less agglutinative chromatin, clearer structures of mitochondria and more plentiful ribosomes on rough endoplasmic reticulum compared to the control group. *Conclusion:* Rehabilitative training may promote the motor function recovery as well as the nerve cells of cortical infarct marginal zone after cerebral infarction in rats.

#### PP003-043

##### CLINICAL APPLICATION OF IMPROVED INTERMITTENT CLEAN URETHRAL CATHETERIZATION FOR SPINAL CORD INJURY PATIENTS

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*Objectives:* To explore the best method of urethral catheterization for spinal cord injury patients with bladder dysfunction. *Methods:* 30 patients with spinal cord injury were divided randomly into 2 groups. The control group was trained to use intermittent clean urethral catheterization and the experimental group was trained to use improved intermittent clean urethral catheterization. Both groups were done by bladder training. *Results:* The number of practical



training was 3 to 7 times (average 3.5) in the control group, while the number of practical training was 1 to 5 times (average 2.5) in the experimental group. The difference in number of practice was significant ( $p < 0.05$ ). The incidence of urinary tract infection was not significantly difference in two groups ( $p > 0.05$ ). Both groups had no complication reported. *Conclusions:* The technique of improved intermittent clean urethral catheterization is simple and straight forward. Patients and family members can easily master. The technique should be conveniently promoted.

#### PP003-044

### EFFICIENCY OF USING VISUAL FEEDBACK PROGRAMS FOR BALANCE CORRECTION IN NEUROREHABILITATION OF PATIENTS WITH CENTRAL HEMIPARESIS SYNDROME

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*Objective:* To prove expediency of the use of visual biofeedback programs for balance correction in neurorehabilitation of the patients with the central hemiparesis syndrome. *Methods:* Seventeen patients with the central hemiparesis syndrome post stroke took part in the training. The balance and gait stereotypes are being changed by the central hemiparesis syndrome and actually the greater body's mass loads on the healthy extremity. Thus the center of gravity is significantly displaced in the frontal plane and this factor causes difficulties for independent motion of the patient. We proposed to conduct the rehabilitation training in accordance with visual biofeedback programs aimed at the balance correction and as a result to bring the actual center of gravity nearer to "the ideal" in the frontal plane and therefore to provide more even body mass distribution on the lower extremities. The patients received a neurological examination, FIM Scale and Berg Balance Scale assessment. Stabilometry was performed with application of the complex "Biomechanics", the Sensory Organization Test - with the complex "Smart Equitest Balance Manager". We used a complex program for balance correction in all patients that included 15 sessions of training with half an hour's duration at each complex within 3 weeks. In the research we determined that the gradual displacement of the center of gravity towards the hemiparesis body's side is the most effective. *Results:* After the trainings we can observe the progressive displacement of the center of body mass towards the hemiparesis side and approaching the actual center of gravity towards "the ideal". *Conclusion:* The proposed method to restore the balance impairments in patients with the central hemiparesis syndrome can improve stabilometric indices of body's balance and enhance functional independence and balance capabilities.

#### PP003-045

### IMPARTIAL ASSESSMENT OF PHYSIOLOGICAL AND PATHOLOGICAL FINGER TREMOR BY ACCELEROMETRY

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*Objective:* Studying indices of physiological finger tremor and tremor caused by the nervous system pathologies: Parkinson's

disease, essential tremor, autonomic dysfunction. *Methods:* Our subjects are 20 patients with autonomic dysfunction; 10 patients with essential tremor; 6 patients with Parkinson's disease. The control group consisted of 10 clinically healthy persons. We employed neurological examination, the spiral drawing test, special questionnaires and tables to record impartial autonomic indices and finger tremor registration by means of accelerometry. We designed a tiny non-inertia accelerometric sensor fixed on the distal finger phalanges. The spectral analysis of amplitude-frequency responses was performed with the use of Power Graph Professional software. *Results:* We determined amplitude-frequency responses of different kinds of tremor. Physiological tremor was characterized with the wide-band spectrum at 5–30Hz without predominant frequencies; the amplitude of resting tremor is 5–10 mV and postural tremor – 10–23 mV in the range of 10–20Hz. We observed the wide spectrum of oscillations at 5–30Hz with the resting tremor and postural tremor amplitudes up to 25 mV and 100 mV, respectively in the patients with autonomic dysfunction syndrome. The narrow-band oscillations with the frequency at 6–8Hz and high postural tremor amplitudes (150–250 mV) are distinguishing features of essential tremor. The very high resting tremor amplitudes up to 1200 mV with frequency at 4–6Hz are characteristic for Parkinson's disease. *Conclusion:* The proposed method allows distinguishing among different kinds of tremor, assessing its indices impartially and also registering the tremor dynamics in the treatment and rehabilitation.

#### PP003-046

### PHYSICAL THERAPY EFFECTS ON FIVE PARAPLEGIA PATIENTS CAUSED BY INTRATHECAL INJECTION OF VINCRISTINE IMPURITY IN METHOTREXATE AND CYTARABINE

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*Objectives:* To observe the effect of comprehensive physical therapy on the five spinal cord injury patients. *Methods:* To treat patients with techniques of muscle strength training in the upper limbs and trunk muscles, turning over on bed, long sitting, transition between bed and wheel-chair, ADL training of upper limbs, use of wheel-chair, use of orthosis, standing platform, multifunctional nerve-muscular instrument and gait training. *Results:* Barthel index improves in all the five patients. *Conclusions:* Comprehensive physical therapy is necessary in improving the function and Barthel index in spinal cord injury patients.

#### PP003-047

### EXPERIMENTAL RESEARCHES ON THE PROMOTION OF THE INJURED SPINAL CORD RECONSTRUCTION

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*Objectives:* To investigate the effect of the electric fields of millimeter wave on the injured spinal cord. *Methods:* To treat rat's injured spinal cord with the millimeter wave in various parameter (4.9 mm–7 mW/cm<sup>2</sup>, 7.1 mm–7 mW/cm<sup>2</sup>, 8.9 mm–7 mW/cm<sup>2</sup>) and study the changes in histology and CSEP. *Results:* The pathologic changes were slighter and CSEP latencies were shorter in 7.1 mm–7 mW/cm<sup>2</sup> group than that in the trauma group. *Conclusion:* Millimeter wave in some parameters could promote injured spinal cord reconstruction.

## PP003-048

### THE EFFECT ON CEREBRAL CORTEX STIMULATION BY LINGUAL STIMULATION USING SIGHT AND HEARING

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**Objectives:** This research was carried out to find out the effect on cerebral cortex stimulation by lingual stimulation using sight and hearing. **Methods:** Selected subjects were 15 right-handed male and female showing no abnormalities in physical examination. Visual stimulation involved showing the phrase "abduct your right thumb" for 30 seconds and auditory stimulation involved playing 10 repetitions of the above phrase for 30 seconds with the eyes covered. Volitional movement of the right thumb was limited during the experiment. Cerebral cortex activity was measured by motor evoked potential from magnetic stimulation with 8-figure coil at motor cortex area and C7 position and the recording electrode was attached at abductor pollicis brevis (APB) of right thumb. Stimulation intensity was set to 120% of resting intensity and latency and amplitude of each motor induced stimulation during visual and auditory stimulation was measured 5 times. **Results:** Motor evoked potential, from transcranial magnetic stimulation during visual and auditory lingual stimulation, in comparison to pre-stimulation showed reduction in latency and increment in amplitude. Latency reduction and amplitude increment changed with more statistical significance in auditory rather than visual stimulation ( $p < 0.05$ ). However, latency and amplitude of motor induced potential stimulated from C7 showed no significant change. **Conclusions:** We were able to conclude that lingual stimulation using sight and hearing increased cerebral cortex stimulation and especially through auditory stimulation. This implies that exercise accompanied by lingual stimulation using sight and hearing rather than simple exercise can be used for rehabilitation treatment in acceleration of brain function.

## PP003-049

### NEURO-ELECTROPHYSIOLOGICAL RESEARCHES ON THE EVALUATION OF THE INJURED SPINAL CORD

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**Objective:** To investigate the evaluation of the injured spinal cord with cortical somatosensory evoked potential (CSEP) and motor evoked potential (MEP). **Methods:** To induce spinal cord injury in rats with either 50 gcf (gram-cm.force) or 80 gcf and then study the CSEP and MEP changes. **Results:** The latencies of CSEP and MEP in 80 gcf group were longer than that in 50 gcf group. The latencies in both injury groups were longer than that in control. **Conclusion:** The degree of spinal cord injury could be evaluated with CSEP and MEP.

## PP003-050

### EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON VERBAL WORKING MEMORY IN PATIENTS WITH STROKE

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**Objectives:** To investigate the effect of anodal transcranial direct current stimulation (tDCS) over the left dorsolateral prefrontal cortex (DLPFC) on working memory performance in patients with stroke. **Methods:** Ten patients with stroke (3 women, age  $50.2 \pm 10.6$  years) participated to this crossover sham and site controlled study. Each subject performed three experimental sessions with 48 h of washout period between each session. For real stimulation, anode was placed over F3 and cathode was placed at the right supraorbital area. Constant current of 2mA was applied for 30 min. For sham stimulation, electrode placement was identical to real stimulation and the current of 2 mA lasted only for 10 sec. For site control stimulation, both electrodes were placed on the midline and 2 cm above theinion. The current intensity and duration were identical to real stimulation. Cognitive paradigm consisted of two-back verbal working memory task using pseudo-random set of Korean letters. Accuracy (No. of correct response/total targets), error rate (No. of false response/total foils), and response time was recorded before and after 25 min of tDCS. **Results:** Accuracy was enhanced only after anodal stimulation. Error rate and reaction time were not changed after anodal or sham stimulation. Error rate was decreased in the site control group. **Conclusion:** This study shows that anodal tDCS over the left DLPFC at 2mA has a positive impact on the working memory in patients with stroke.

## PP003-051

### RESEARCHES ON THE GAP-43MRNA EXPRESSIONS IN THE INJURED SPINAL CORD

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**Objective:** To investigate the effect of the electric fields of millimeter wave on the GAP-43mRNA expressions in the injured spinal cord. **Methods:** To treat rat's injured spinal cord with the millimeter wave in some parameters (7.1 mm-7 mW/cm<sup>2</sup>, 7.1 mm-20 mW/cm<sup>2</sup>), and then study the changes of GAP-43mRNA expressions. **Results:** The GAP-43mRNA expression is stronger in the treatment group than that in the control. **Conclusion:** The mm wave could enhance the GAP-43mRNA expressions so as to promote injured spinal cord reconstruction.

## PP003-052

### DIFFERENT POSTURAL CONTROL ABILITIES IN STROKE PATIENTS ACCORDING TO LESION LOCATION

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**Objective:** The purpose of this study was to explore the differences in postural control capabilities in stroke patients according to lesion location. **Methods:** Stroke location was categorized into two particular groups: supratentorial and infratentorial according to the CT and/or MRI results. Seventeen among the subjects

had supratentorial lesions and the other seventeen subjects had infratentorial lesions. All of the subjects were capable of standing independently, i.e., without any external aid. The posturographic examinations were carried out by the Tetra-ataxiometric posturography (Tetra Sunlight Medical Ltd.), which utilizes two paired forceplates measuring vertical pressure fluctuations over both the heels and the forefeet. We assessed 1) an index of general stability. Not only was it to measure the amount of sway over the four plates but it was also an indicator of the subject's overall steadiness; 2) the weight distribution index, computed by squaring the deviations of weight distributions from an expected mean of 25%; 3) the fall index, representative of the risk of falling. **Results:** Patients with infratentorial lesions appeared to be significantly less stable than the patients with supratentorial lesions ( $p < 0.05$ ). Significant amount of discrepancy in weight distribution patterns were observed in patients with infratentorial lesions ( $p < 0.05$ ). Both groups indicated a high risk of falling, however, patients with infratentorial lesions were significantly higher than patients with supratentorial lesions ( $p < 0.05$ ). **Conclusions:** These findings suggest that patients with infratentorial lesions have more deficits in postural control than patients with supratentorial lesions.

#### PP003-053

##### A CASE OF COMBINED COMPRESSIVE AND VITAMIN B12 DEFICIENT MYELOPATHY

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**Objective:** Vitamin B12 deficient myelopathy showed weakness and decreased proprioception because it primarily involves the lateral and dorsal spinal columns. When compressive myelopathy is combined with vitamin B12 deficient myelopathy, these symptoms could be masked and surgical decompression would not be effective. We report a rare case of patient with myelopathy due to cervical cord compression and vitamin B12 deficiency, whose symptoms were improved after vitamin B12 administration. **Method:** A single case report. **Results:** Forty-one-year-old male patient suffered from gait disturbance with weakness and decreased proprioception. His MRI showed typical compressive myelopathy by centrally herniated C5-6 intervertebral disk and he was treated with surgical decompression. After surgery, his symptoms did not improve and gait disturbance persisted. One month later, his laboratory studies showed pernicious anemia with decreased serum vitamin B12 level. Retrograde review of his MRI revealed that high signal intensity involving the dorsal and lateral column at whole spine levels. He was treated with administration of vitamin B12 and his weakness was rapidly recovered. However, proprioception was slowly and partially increased. Serial follow-up of C-spine MRI showed decreased signal intensity on the lateral and dorsal column, especially cervical area. After regular administration of vitamin B12 for six months, his gait disturbance and weakness successfully resolved. **Conclusion:** We report a case of successful treatment of a patient with vitamin B12 deficient myelopathy whose symptoms were masked by cervical compressive myelopathy. In the serial study of MRI, surgical decompression resolved local signal intensity, while supplement of vitamin B12 improved the whole signal intensity of spinal cord.

#### PP003-054

##### THE ULTRASOUND IMAGING OF PERIPHERAL NERVE OF PATIENTS WITH HEMIPLEGIA

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**Objectives:** To investigate the ultrasound imaging of peripheral nerve of patients with hemiplegia after brain injury. **Methods:** Twenty patients with hemiplegia secondary to lesion of central nervous system were recruited. Eight of them had loss of muscle strength (zero in MMT) and muscular atrophy on the affected side. Six healthy individuals were allocated as control group. Measurement of the diameter, reflected signals in the ultrasonic detection of tibial nerve, common peroneal nerve, median nerve, radial nerve and cubital nerve in both sides was performed. **Results:** Peripheral nerves had a hypoechoic (dark structures) or hyperechoic (bright structures) sonographic appearance, depending on the size of the nerve and the angle of the ultrasound beam. The nerves appeared as multiple round or oval hypoechoic areas encircled by a relatively hyperechoic horizon on transverse scans. In a longitudinal view, each nerve appeared as a relatively hyperechoic band characterized by multiple discontinuous hypoechoic stripes separated by hyperechoic lines. There was no difference between nerve diameters in both sides ( $p > 0.01$ ). The signals of multiple round hypoechoic areas and hyperechoic horizon of affected side nerves decreased. Hyper echo was disseminated, which was especially obvious in completely paralysed limbs. It was hard to localize margin of nerve in several patients. Nerve stimulator was helpful to localize nerve. Puncture needle showed hyper echo. The needle tip and the margin of nerve could be clearly located. Muscle contracted when neural stimulator approached to the nerve within 1 mm. We also found that while stimulator closed to a major nerve and stimulated it, the muscles innervated by this nerve would incompletely contract. Only when the needle was inserted into nerve, the muscle would come to the maximal contraction. **Conclusion:** Ultrasound imaging may be a method to evaluate prognosis of nerve function. The technique of using ultrasound-guided neural stimulator nerve puncture is safe and effective, and would make it possible to develop varied micro-invasive rehabilitation therapies.

#### PP003-055

##### IPSILATERAL MOTOR PATHWAY CONFIRMED BY MULTIMODAL BRAIN MAPPING TECHNIQUE IN A PATIENT WITH SCHIZENCEPHALY: A CASE REPORT

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**Objectives:** We report the ipsilateral motor pathway in a left hemiparetic patient with schizencephaly confirmed by using combined functional MRI (fMRI), diffusion tensor tractography (DTT), and motor evoked potential (MEP) study. **Methods:** A 49-year-old male with left hemiparesis since his birth was evaluated. He has weakness on his left arm and leg with muscle strength of MRC grade 4. Brain MRI showed a cleft along the right central sulcus. fMRI were obtained by gradient EPI at 3T Philips Achieva scanner. Hand grasp-release and ankle dorsiflexion-plantar flexion movements were performed during fMRI scanning. The fMRI data were analyzed using SPM5 software. With diffusion



tensor images obtained at 45 directions, corticospinal tract (CST) was reconstructed using PRID's software with pre-set termination criteria of  $FA < 0.2$ . MEPs were obtained from both 1<sup>st</sup> dorsal interossei (DI) and rectus femoris (RF) muscles using BiStim stimulator. **Results:** On fMRI, the unaffected cortex was found to be activated during the affected and unaffected hand and ankle movements. MEP was not evoked by stimulating the affected hemisphere, but was obtained from the bilateral 1<sup>st</sup> DI and RF by stimulating the unaffected hemisphere. Corticospinal tract of the unaffected hemisphere was intact whereas that of the affected hemisphere was not observed. **Conclusion:** Using the multimodality brain mapping technique, we could delineate the functional relevance of the ipsilateral CST extended from the unaffected motor cortex to the affected hand and leg in a patient with congenital schizencephaly.

#### PP003-056

### EFFECTS OF ROBOT-ASSISTED GAIT THERAPY ON LOCOMOTOR RECOVERY IN STROKE PATIENTS

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**Objective:** Body weight-supported treadmill training using robot-driven gait orthosis can enhance locomotor function in stroke patients. This randomized controlled study investigated the effects of robot-assisted gait therapy on locomotor recovery in hemiparetic patients after stroke. **Methods:** Twenty-five stroke patients were randomly divided into 2 groups. Robotic training group received 30 min of robot-assisted gait therapy, 3 times a week for 4 weeks, while control group received equal time and sessions of conventional gait training. Outcome were measured using Motricity Index, Fugl-Meyer Assessment, Function Ambulation Category, Modified Motor Assessment Scale, 10-m gait speed, isometric torque, Ashworth Scale, gait analysis, body tissue composition, and Beck's depression inventory. **Results:** Robotic training group showed significant improvement in motor functions measured by Motricity Index, Fugl-Meyer Assessment, 10-m gait speed, isometric torque of hip compared with the baseline and with those of control group. Ashworth Scale of hip, Beck's depression inventory, and muscle mass showed significant improvement in robotic training group than control group. In gait analysis, stride length of unaffected leg demonstrated significant improvement in robotic training group ( $p < 0.05$ ). **Conclusions:** The robot-assisted gait therapy with body weight-support is considered to facilitate locomotor recovery of the hemiparetic stroke patient.

#### PP003-057

### PROSPECTIVE MEMORY FUNCTION IN STROKE PATIENTS

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**Objectives:** Prospective memory (PM), the ability to plan future actions and execute them successfully, is a central part of daily living. PM function has not been studied well in stroke, despite

the high prevalence of stroke in the adult population. This study investigated PM function in stroke survivors. **Methods:** Twelve stroke patients and twelve controls, matched for age and education, were included. Background neuropsychological measures included MMSE, Trails A and B, Verbal Fluency phonemic (FAS) and semantic categories, Sustained Attention to Response Task (SART), Revised Strategy Application Test (R-SAT), Verbal Paired Associates I, II (Verbal PA), and California Verbal Learning Test (CVLT). PM was assessed by: Memory for Intentions task (MIT), the Virtual Week (VW), Remembering a Belonging subtest from the Rivermead Behavioural Memory Test, and Prospective and Retrospective Memory Questionnaire. **Results:** Patients performed worse than controls in FAS, SART commission error, and CVLT T-Score ( $p < 0.05$ ). MIT provided three measures: PM and RM components for the intentions and an associative recall performance. Patients did not differ from controls on RM component but did worse than controls on PM component ( $p < 0.001$ ). Associative recall performance showed patients performing worse than controls ( $p = 0.014$ ) but ANCOVA analysis showed that pathology has an additional effect after differences in associative memory were accounted for. For VW, patients performed worse on the time-check task; proportions of correct responses and misses ( $p < 0.01$ ). **Conclusions:** These results suggest that stroke patients show deficits in PM performance.

#### PP003-058

### EFFECT OF REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION (RTMS) OF THE IPSILESIONAL PREMOTOR CORTEX ON MOTOR LEARNING IN SUBCORTICAL STROKE PATIENTS

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**Objective:** The premotor cortex is attracting as a possible brain region for noninvasive stimulation. The aim of this study was to observe whether ipsilesional premotor cortex rTMS improves visuospatial motor learning in subcortical stroke patients. **Methods:** Nine patients with hemiparesis following basal ganglia hemorrhage were included in this study. The experiment was designed as a crossover randomized sham-controlled study. The visuospatial motor function was assessed such that the subjects were instructed to press the designated number when a cross displayed randomly in one of four quadrants, while response time and accuracy were measured. After localizing the premotor cortex, 600 pulses of subthreshold (90%) stimulation were applied at the frequency of 10 Hz in each session. Subjects were subdivided into two groups by calculating the relative value of mean fractional anisotropy (FA) and Apparent Diffusion Coefficient (ADC) of their affected corticospinal tract in diffusion tensor tractography. **Results:** Excitability of the primary motor cortex has been changed significantly after stimulating the premotor cortex. rTMS on the premotor cortex was effective for simple motor learning but not for the visuospatial learning. However, the subgroup who had low ADC value of their CST showed rTMS effect on visuospatial learning as well. **Conclusion:** High frequency rTMS on the premotor cortex was effective for simple motor and visuospatial learning in patients who had integrity of CST in subcortical stroke patients.

## PP003-059

**THE QUANTITATIVE ASSESSMENT OF MOTOR IMPAIRMENT AND INFARCT VOLUME AFTER TRANSIENT MIDDLE CEREBRAL ARTERY OCCLUSION IN RATS*****Hye Won Kim, Seong Hoon Lim, Jung Soo Lee, Jong In Lee, Young Jin Ko, Won Ihl Rhee, Sun Im, Myung Eun Chung****Department of Rehabilitation Medicine, Catholic University of Korea, Kangnam St Mary's Hospital, Seoul, South Korea*

**Objective:** The purpose of this study was to quantitatively assess the motor function and infarct volume in transient ischemic stroke rat. **Method:** Male Sprague-Dawley rats (11 weeks old,  $n=42$ ) were randomly divided into 4 separate groups; sham operation group, 60-min, 120-min and 180-min MCA occlusion groups. The weight bearing pressure in bilateral hind limb was measured every day for 7 days starting from the day before ischemia. The fifty percent withdrawal threshold values in forepaw and hindpaw were measured using von-Frey hair. All data were statistically analyzed. **Results:** 1) The Proportion of paretic hind limb pressure to total hind limb pressure measured on the all days after ischemia were reduced significantly in the three transient ischemic stroke groups than the sham group ( $p<0.05$ ). 2) After cerebral ischemia, the fifty percent withdrawal threshold values in the paretic forepaw and hindpaw that were measured everyday were not significantly different in all groups ( $p>0.05$ ). 3) The infarct volume of three ischemic groups were significantly different and were increased in relation to ischemic time ( $p<0.05$ ). The proportion of paretic hind limb pressure in three transient stroke groups were correlated with their infarct volume ( $p<0.05$ ). **Conclusion:** Transient ischemic stroke in rats result in reduction of weight bearing pressure at the paretic hind limb. The proportion of paretic hind limb pressure to total pressure was shown to be correlated with infarct volume.

## PP003-060

**EFFECTIVENESS OF ULTRASOUND-GUIDED PERIPHERAL NEUROLYTIC BLOCKS IN PATIENTS WITH SEVERE SPASTICITY*****Dan Yu****Rehabilitation Center, Hangzhou Military Police Hospital, Hangzhou, Zhejiang Province, China*

**Objective:** To evaluate the clinical effectiveness of ultrasound guided peripheral nerve blocks for the treatment of severe spasticity in individuals and explore the potential value of this method on locating the peripheral nerves. **Methods:** Fifteen patients with severe spasticity secondary to cerebrovascular accidents, traumatic brain injuries and anoxic encephalopathy, whose walking and standing were limited and the muscle spasm had no obviously relief by movement and physical therapy. Nerve blocks were performed via a approach using ultrasonography to identify the peripheral nerve trunk and were performed by injection of  $\geq 99.7\%$  ethanol or 1% lidocaine. Fifteen patients include 2 cases of elbow flexor spasticity, 11 cases of ankle spasticity and 2 cases of knee flexor spasticity. musculocutaneous nerve, tibial nerve and sciatic nerve were located respectively by ultrasound. The severity of spasticity was assessed using the Modified Ashworth Scale (MAS) score. **Results:** Ultrasonography can clearly detect the peripheral nerve. The display value of the ultrasonography was 100% (15/15). Ultrasound can display the needle tip when it near the target nerve and proved to be accurate. The accurate value of ultrasound guided is 100% (15/15). The minimum stimulus intensity is 0.2–0.4 mA in sciatic nerve, 0.2–0.6 mA in tibial nerve and 0–0.4 mA in mus-

culocutaneous nerve respectively. The MAS score was reduced in 5 patients injected by 1% lidocaine during the 30-min follow-up ( $3.4\pm 0.89$  versus  $2.1\pm 0.89$ ) and 10 patients injected by  $\geq 99.7\%$  ethanol during the 4-week follow-up ( $3.2\pm 0.42$  versus  $1.8\pm 0.75$ ). Compared with scores measured before and after the block, MAS scores were significantly improved ( $p<0.05$ ). **Conclusion:** The treatment of severe spasticity with ultrasound guided peripheral nerve blocks proved to be an accurate, safe, simple and highly successful and reproducible approach, which represents a new technique and is worth to used widely in clinic practice.

## PP003-061

**QUALITY OF LIVING IS THE REHABILITATION GOAL*****Shengyong Deng, Zhi Xiang Huang, Jun Liu****Department of Physical Therapy, Ruihaibo Medical Rehabilitation Center, Nanjing, Jiangsu Province, China*

**Objective:** To observe the effect of rehabilitation outcome of a severely disabled person suffering from brain hypoxia. **Methods:** It is a single case study of a severely disabled young male. The client had been bed-ridden for more than two years after suffering from a brain hypoxia. Simple goals to enable him to lift up his head voluntarily when sitting up, and sitting in a wheelchair safely for around two hours were aimed. Various modalities were used to reduce his muscle tone including phenol and Botulinum toxin injection for selective muscle groups and innovative use of the Swiss exercise ball. **Results:** After nearly 3 months' therapy, client's drooping of saliva had almost disappeared; his swallowing function was significantly improved; he began to show interest in his surrounding environment, and responded with uttering sounds to other's talk; he was capable of independently raising his head upright when asked to do so. He started to have his bowel opening sitting in a commode chair, and his meals sitting in the wheelchair. His muscle tone had reduced, and much easier to get it relatively relaxed by the therapist for treatments. **Conclusion:** This unfortunate young client is most unlikely to become independent again for any of his daily self care activities. But the change from a totally bed bound person to one capable of sitting for more than two hours to consume his meals, elimination, and outdoor walk in a wheelchair is a most meaningful outcome, as it would help him achieving and maintaining an acceptable quality of life. The process had addressed his specific needs, and promoting adaptation and adjustment of himself and his family to adapted life. 'Quality of Living' is the rehabilitation goal for him, not functional regain.

## PP003-062

**ENHANCEMENT OF ATTENTION SPAN TO FACILITATE LEARNING SELF-CARE ACTIVITIES*****Dan Qin, Mei Xia Yu, Shaoqin Gu****Department of Physical Therapy, Ruihaibo Medical Rehabilitation Center, Nanjing, Jiangsu Province, China*

**Objective:** To observe the outcome of applying a multi-mode therapeutic approach in communication therapy to enhance the client's overall attention span, and to improve participation in self care functional training. **Methods:** A single case study is used as a preliminary observation. A young male client in his 30s suffering from brain injury after a road traffic accident admitted with very poor communication ability was chosen to apply a progressive step-up therapeutic approach using modalities based on the client's pre-morbid interest and hobbies informed from the family members. The program was designed for 3 weeks starting with various forms of stimulations gradually stepped up to combined

verbal and hand movements in the 3<sup>rd</sup> week. *Results:* The client responded to treatment with gradually having eye contacts in the first week; able to duplicate simple tasks and recall some names and improved in swallowing after the 2<sup>nd</sup> week; and in the later part of 3<sup>rd</sup> week, capable of following two steps instructions. The continuing attention span was also improved to 30 to 50 min during the therapeutic exercises for self care functional tasks. *Conclusions:* Difficulties in communication accompanied by various degrees of swallowing and cognitive impairments are not uncommon problems after severe head injuries. These will significantly affect the client's proactive participation in self care functional training, as the client is not able to pay any attention to instructions. Using approaches in speech therapy and applying modalities based on client's pre-morbid interests and hobbies can greatly enhance the improvement of client's communication process and behavior which will in turn help the client's training in self care tasks. Therapeutic communication by speech therapist should be taken as an important modality in the comprehensive rehabilitative management of severe brain injuries.

#### PP003-063

##### A CLINICAL STUDY ON THE TREATMENT OF ABDUCENT PARALYSIS BY ACUPUNCTURE

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*Objective:* To observe the curative effect of acupuncture for abducent paralysis (AP). *Methods:* Forty cases of AP were treated by acupuncture, and the scope of eyeball movement was detected before and after treatment. *Results:* Acupuncture was markedly effective for AP, especially traumatic type, and was helpful to restore the function of paralyzed nerve and muscle. *Conclusion:* Acupoint acupuncture is one of the effective measures for AP. Its mechanism may be stimulation of abducent nerve and its branches or of the muscle spindle and tendon, and excitation of nerve-muscle contraction couple so as to promote the restoration of nerve and muscle function.

#### PP003-064

##### QUALITY OF LIVING FOR SCI CLIENTS – RUIHAIBO'S EXPERIENCE

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*Objective:* To evaluate that quality of living of SCI clients could be improved despite having delay or improper earlier management. *Methods:* Clients with 1) complete lesions, and 2) not achieving expected functional outcome with their respective neurological level after more than one year from the onset of SCI were selected for this study. 21 SCI clients were qualified. Among them 11 clients had received rehabilitation in other hospitals, and 10 had never undergone any rehabilitation process. The average post-injury duration of these clients was 27.4 months. After a detailed assessment of their impairments and potential functional outcome, tailored individual rehabilitation programs were implemented accordingly. *Results:* After an average of 11 weeks of rehabilitation therapies, all the 21 clients attained the expected functions in self care activities corresponding to their neurological levels. *Conclusions:* To maximize functions in self care activities is the key requirement in comprehensive management of SCI clients. To achieve this goal, correct rehabilitation diagnosis and com-

prehensive management planning is required to be worked out by related rehabilitation professionals. Our present study reflected the deficiency in the awareness of rehabilitation need among the physicians treating the clients in their acute stage, thus delaying the 10 clients' functional improvement, and insufficient professional judgments made when dealing with the 11 clients' rehabilitation process. Such phenomenon is not uncommon to be found in many places of our locality. The outcomes we have achieved for these clients could serve as an example to show that SCI clients' 'quality of living' can be improved with proper rehabilitative management planning, despite having a delay or previous inadequate management. Educating the physicians in acute care and upgrading our rehabilitation professional's skill is recommended.

#### PP003-065

##### CORRELATION BETWEEN ACUPUNCTURE AND LEFT-HANDED PATIENTS AFTER ACUTE STROKE

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*Objective:* About 36% of acute stroke patients remain disabled at discharge despite rehabilitation with standard treatment modalities. Acupuncture is available as one of the alternative treatments in Traditional Chinese Medicine. The goal of this study was to compare the effects of acupuncture and no acupuncture in the acute stroke with respect to ability in ADL in left-handed patients suffered from right hemiplegia or left hemiplegia. *Methods:* Forty consecutive left-handed patients with motor function impairment were included at days 3 to 7 after acute stroke. They were stratified into the left-handed right hemiplegic patients or left handed left hemiplegic patients before randomization into the control group receiving standard modalities of treatment, which included speech therapy, physiotherapy, and skilled medical and nursing care, and the acupuncture group received additional manual acupuncture. The acupuncture treatment was performed over a 4-week period with a mean of 18 sessions on 10 main acupoints. Outcome measures were performed by blinded assessors and estimated by the neurological score and the Barthel and Sunnaas ADL index scores, respectively, at weeks 0, 2, and 4. Patients in each group were comparable in all important prognostic characteristics. *Results:* No differences were seen between the groups ( $p > 0.05$ ) for any of the outcome measures at any time. *Conclusions:* Acupuncture treatment does not have additional beneficial effect on acute stroke in left-handed patients.

#### PP003-066

##### EFFECTS OF ELECTRICAL STIMULATION AND THE KINESIOTHERAPY ON RESTORATION OF MOVEMENT FUNCTIONS IN PATIENTS WITH ACUTE STROKE

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*Objective:* To study the effects of transcutaneous electrical nerve stimulation (TENS) and the kinesiotherapy on restoration of movement functions in patients with acute stroke. *Methods:* One hundred and nineteen stroke patients of 10 days onset were divided into the electric stimulation group (29), the kinesiotherapy group (30), the complex therapy group (30) and control group



(30). The control group was treated conventionally in neurology department. The complex treatment group received TENS with kinesiotherapy treatment added. Assessments included Fugl-Meyer (FMA) (and the Barthel index (BI) used for evaluation. *Results:* Each treatment group showed significant changes in FMA and BI before and after treatment ( $p < 0.05$ ). Each treatment group showed FMA and BI scores better than that of control group. The complex therapy group improved more than the sole treatment groups ( $p < 0.05$ ). *Conclusion:* To provide electrical stimulation and kinesiotherapy treatment as soon as possible to the stroke patient may improve movement function significantly with better clinical outcomes.

#### PP003-067

### REGULATION OF NPY ON THE LEVELS OF IL-4, IFN- $\gamma$ OF EXPERIMENTAL ALLERGIC ENCEPHALOMYELITIS IN GUINEA PIG

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*Objective:* To investigate the effect of neuropeptide Y on the delitescence, the maximal disease score and the levels of cytokines IL-4 and IFN- $\gamma$  in blood serum of EAE, and to investigate the protective effect and immune regulation of NPY on EAE. *Method:* Thirty guinea pigs were included and were assigned randomly to three groups: the normal groups, the EAE control group and the NPY intervention group. The levels of cytokines IL-4 and IFN- $\gamma$  in blood serum were detected and the delitescence and maximal disease score of each group were compared. *Results:* There was no incidence of EAE in the normal group. The symptom of EAE was significant. Comparing to the EAE control group, The delitescence of the NPY interference group was significantly longer ( $p < 0.001$ ), the maximal disease score was significantly lower ( $p < 0.001$ ), the death rate of the NPY interference group was obviously decreased ( $< 0.05$ ), the levels of IFN- $\gamma$  in the blood serum of the NPY interference group were significantly higher ( $p < 0.01$ ), while the level of IL-4 in blood serum of the NPY interference group was significantly lower ( $p < 0.05$ ). The levels of IFN- $\gamma$  in blood serum were negatively correlated with the delitescence of guinea pigs, and were positively correlated with the maximal disease scores. The levels of IL-4 in blood serum were positively correlated with the delitescence of guinea pigs, and were negatively correlated with the maximal disease scores. *Conclusion:* It is proved that injection NPY into lateral ventricle can protected EAE. The protected effect of NPY on EAE may be carried out through the increased level of IL-4 and the decreased level of IFN- $\gamma$ .

#### PP003-068

### COMPARATIVE RESEARCH OF BRAIN IMAGING MECHANISM BETWEEN NORMAL MEN'S FINGER ACTIVITY AND FUNCTIONAL TRAINING ON STROKE PATIENTS

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*Objective:* To evaluate the mechanism of recovery after functional training following central nervous damage. *Method:* Using imaging techniques to do comprehensive evaluation: by fMRI method

to evaluate 3 kinds of finger activities on 10 normal men's and by PET-CT to evaluate 8 patients with basal ganglion infarction or intracerebral hemorrhage on rehabilitation training. *Results and Conclusion:* Signals changed in functional imaging were the least when the predominant hand in normal men was receiving training. Skilled activities, casual activities and thinking activities were needed for recruiting central nervous system to join in hand activities. In the early stage of stroke, compensation is the most important changes in the health hemisphere with related motor area in cortical reorganization were activated most. Functional training was beneficial to cortical functional reorganization. It seemed that the area of cortical activation was transferred to the damaged cerebral hemisphere.

#### PP003-069

### CLINICAL AND NEUROPHYSIOLOGICAL PROFILE OF LAUNDRYWOMEN WITH AND WITHOUT SELF-PERCEIVED PASMA: A CROSS-SECTIONAL SURVEY

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*Objective:* Pasma, a common complaint of Filipinos, is a vaguely defined syndrome indigenous to the country. To describe the clinical and neurophysiological characteristics of those with self-perceived pasma. *Methods:* Thirty-three female laundrywomen 24–59 years old were recruited from eight community health centers in Pasay City. Exclusion criteria included diagnosed autonomic, peripheral nerve disorders, diabetes mellitus, and thyroid dysfunction. Those with self-perceived pasma (WSPP) were compared to those without self-perceived pasma (WOSPP). Seventeen out of the 33 volunteers were WSPP at the time of the tests. Patients answered a guided questionnaire, underwent blood extraction and neurophysiological tests. Signs, symptoms, Fasting Blood Sugar (FBS), TSH, Neurological Exam (NE), Nerve Conduction Velocity (NCV) and Autonomic Nervous System (ANS) Tests, Orthostatic Test (OT), Hand Grip Test (HGT), and Cold Pressor Test (CPT). *Results:* Participants WSPP were not significantly different from those WOSPP with regard to age, BMI, onset of menopause, systolic blood pressure (SBP), smoking history, educational attainment, total years work, and hours spent ironing in a week. However, they had significantly higher mean diastolic BP (DBP) ( $p = 0.024$ ) and spent more hours doing laundry ( $p = 0.027$ ). Predominant symptoms included numbness (52%), pain (45%), hyperhidrosis (33%), and lack of muscle control (27%). Pasma was attributed to temperature changes (61%) and preexisting medical conditions (33%). There was no significant difference between groups. Median NCV was decreased in both groups. The groups were not significantly different except for the OT, which showed a significantly higher SBP ( $p = 0.011$ ) in the WSPP participants. *Conclusion:* Participants WSPP had more laundry hours per week, had higher resting DBP and increase in SBP in the OT test. Incidental findings show significant difference in baseline BP for succeeding ANS tests between groups ( $p = 0.003$  [SBP] and  $0.024$  [DBP]) suggesting cumulative effects of ANS tests and poor ANS adaptation of those WSPP.

## PP003-070

**EFFECT OF CONDUCTIVE EDUCATION COMBINED WITH SALVIN MILTIORRBIZA AND CEREBROLYSIN ON THE DEVELOPMENTAL QUOTIENT OF INFANT WITH CEREBRAL PALSY**

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**Objectives:** To use conductive education (CE) and drug for nourishing brain cells and removing blood stasis to treat infants with cerebral palsy in order to improve the rehabilitative effect. **Methods:** From January 2002 to January 2004, 74 and 79 infants with cerebral palsy who were less than three years old received the treatment of CE and CE+Cerebrolysin+Salvin Miltiorrbiza, respectively, in the Departments of Pediatric and Rehabilitation Medicine, the First Affiliated Hospital of Anhui Medical University. One-year follow-up was conducted in all the infants. **Results:** The total effective rate was 68.92% for the single CE group and 87.34% for the combination group. There was a significant difference between the two groups ( $p < 0.01$ ). After one year treatment, the mean developmental quotients (DQ) were  $58.36 \pm 16.34$  in the single CE group and  $69.38 \pm 17.32$  in the combination group. There was a significant difference between the two groups ( $F = 12.38, p < 0.01$ ). **Conclusion:** CE is effective to treat infants with cerebral palsy. CE combined with drugs for nourishing brain cells and removing blood stasis is more effective and has greater effect on the DQ of infants with cerebral palsy.

## PP003-071

**A CLINICAL ANALYSIS OF CHEIRAPSI BINDING FUNCTION TRAINING ON HEAD CONTROL CAPABILITY ON 56 CHILDREN WITH CEREBRAL PALSY**

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**Objectives:** To investigate the effects of cheirapsis binding function training on head control capability in children with cerebral palsy (CP). **Methods:** 56 children with CP (average age  $3.3 \pm 1.3$  years) were recruited from Rehabilitation Department of Nanjing Children's Hospital. All of them had a poor control capability of their head. Kneading massage, tap and pinching massage were applied to specific acupoint in cervical part and back, and Bobath approach such as head turning and head raising exercise were integrated in this process. The effect was evaluated by the physician with rating scale after 2 months of treatment. **Results:** Within this group, 46 cases showed excellent improvement (82%), 8 cases showed some effect (14%) and 2 cases showed no effect at all (4%). The total effective rate was 96%. **Conclusions:** Cheirapsis could promote blood circulation and thereby enhance muscular energy, resulting in restrain of abnormal movement. Cheirapsis binding function training could facilitate the establishment of head control.

## PP003-072

**EFFECT OF POSTURAL CONTROL ON REDUCTION OF PAIN IN CHILDREN WITH SPASTIC CEREBRAL PALSY DURING VENIPUNCTURE**

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**Objective:** The purpose of this study was to determine the effectiveness of using postural control (a rehabilitation way) to reduce procedural pain for children with spastic cerebral palsy during venipuncture. **Methods:** Spastic cerebral palsy children 1 to 10 years of age were randomly assigned to two groups, one as intervention group and another is control group. In the intervention group children received postural control training by their physiotherapist before venipuncture. Non-communicating of Pain Checklist-Revised, the time taken to complete the sample, and the number of skin punctures were compared between the two groups. **Results:** One-hundred and fifty-eight subjects completed the study. There was a statistically significant and clinically meaningful reduction in pain scores and shortened time for successful sampling for children with spastic cerebral palsy in the intervention group. **Conclusions:** Using postural control appears to be more effective in decreasing distress and shortened the time for successful sampling than standard care for children with spastic cerebral palsy. This new method may be applied not only to children with spastic cerebral palsy, but also to some other patients with other diseases.

## PP003-073

**INITIAL RESEARCH ON CEREBRAL PALSY CHILDREN'S REHABILITATION BY USING CONDUCTIVE EDUCATION COMBINED WITH PHYSICAL THERAPY**

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**Objective:** To study the way of providing comprehensive treatment to children with cerebral palsy by applying conductive education combined with physical therapy so as to promote the children's overall ability to the maximum. **Methods:** Treating 12 cases of children with CP, aging from 3-16 years for 12 months. Before conductive education, subjects also received physical therapy. Subjects were assessed before and after treatment with "Assessment of practical skill for Children with Cerebral Palsy" published by the Spastic Society of Hong Kong. **Results:** Through combined treatment of conductive education and physical therapy, all 12 cases have achieved progress in different degree in gross and fine motor, ADL, communication, social and cognitive areas. **Conclusion:** Conductive education turns the children from the passive receivers of therapy into active participants of the process and facilitates them to experience success. When they have got self-confidence, they became more active and initiatives in exploring the environment. It is necessary to apply passive training or training with aids. In such a situation, physical therapy can be precluded to conductive education, both are supplement to each other in the therapy process, or more exactly, conductive education can not only cover the shortage of physical therapy, but help increase the effectiveness of physical therapy, enabling the children to get training and learn in an easy and pleasant atmosphere, which may help them to develop in all-round way as a human being.

PP003-074

### THE EFFECT OF HIPPOThERAPY ON CHILDREN WITH SPASTIC DIPLEGIC CEREBRAL PALSY

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**Objectives:** The aim of this study was to investigate whether hippotherapy could improve functional performance and postural control of children with spastic cerebral palsy (CP). **Methods:** Nineteen children with spastic diplegic CP were included. The thirty-minute hippotherapy was conducted twice a week for 8 consecutive weeks. Gross Motor Function Measure (GMFM) and sitting balance were evaluated before and after hippotherapy. Sitting balance was assessed using specially designed device that consisted of unstable platform, force plate, frame, safety harness, monitor and computer. Force plate on unstable platform enabled to monitor the center of pressure (COP) of subject. COP sway (time to maintain COP on circle at center of monitor and distance away from central location), COP maintaining time (time to maintain COP on desired target) and COP moving time (time to move COP to desired target away from central location) were recorded before and after hippotherapy. **Results:** There was a significant improvement in gross motor function of children with CP after hippotherapy. Dimension B (sitting) and E (walking, running, jumping) scores of GMFM were especially increased significantly. In COP sway, the time maintaining at center was significantly increased. COP moving time to all directions were significantly decreased and COP maintaining time to all directions were significantly increased ( $p < 0.05$ ). **Conclusions:** Hippotherapy could improve functional performance and sitting balance without adverse effect, therefore, it can be considered as an additional therapeutic method for rehabilitation of children with spastic diplegic CP. Long-term effect of hippotherapy with randomized controlled design needs to be investigated in future.

PP003-075

### THE STUDY ON THE HERITABILITY OF CHILDREN'S IQ, BODY HEIGHT, BODY WEIGHT, HEAD CIRCUMFERENCE

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**Objective:** In order to inquire into heritability of children's IQ, Body Height (BH), Body Weight (BW), Head Circumference (HC) in our country. **Methods:** We used Holzinger's improved method (h2) and Vogel's three methods of heritability estimation (h12, h22, h32) to estimate the heritability of Intelligence Quotient (IQ), Body Height (BH), Body Weight (BW), Head Circumference (HC) for 30 pairs of monozygotic twins (MZ), 30 pairs of dizygotic twins (DZ) and 60 pairs of mass control group, with the same conditions (CP) in Hefei. **Results:** The results showed the heritability of children's IQ was: by Holzinger's method calculation: 0.643; by Vogel's three method (h12, h22, h32) calculation: 0.645; 0.812; 0.397. The average of them was

0.618. The heritability of children's BH was: by Holzinger's method calculation: 0.712; by Vogel's three method (h12, h22, h32) calculation: 0.710; 0.729; 0.676. The average of them was 0.705. The heritability of children's BW was: by Holzinger's method calculation: 0.548; by Vogel's three method (h12, h22, h32) calculation: 0.549; 0.625; 0.311. The average of them was 0.494. The heritability of children's HC was: by Holzinger's method calculation: 0.605; by Vogel's three method (h12, h22, h32) calculation: 0.589; 0.677; 0.401. The average of them was 0.555. **Conclusion:** Heritability of IQ, BH in preschool children group were both higher than those of school children group. Heritability of HC in school children group was a little higher than that of preschool children group. But heritability of BW in preschool children group and school children group were not obviously different. We also found using Vogel's three methods to estimate the same batch of sample could avoid systematic error; the result would be more accurate.

PP003-076

### DEPTH AND THICKNESS OF GASTROCNEMIUS, SEMITENDINOSUS AND BICEPS FEMORIS MUSCLES IN CHILDREN WITH SPASTIC CEREBRAL PALSY

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**Objective:** To identify the depth and thickness of gastrocnemius, semitendinosus and biceps femoris muscles in children with spastic cerebral palsy using ultrasonography to help increasing the accuracy of intramuscular injection of botulinum toxin A. **Method:** Twenty children with spastic cerebral palsy who did not have fixed contractures and operation history (mean age 3.65 years, mean height 96.03 cm, mean weight 13.71 kg, mean BMI 14.77 kg/m) were involved in this study. Children were lying prone and one examiner measured the depth and thickness of medial and lateral gastrocnemius, semitendinosus and biceps femoris muscles using ultrasonography with and without compressing the probe. At the thickest parts of each muscle, the depth and thickness were measured, and circumference of calf and thigh were measured. **Results:** Medial gastrocnemius muscles were thicker than lateral gastrocnemius muscles and the depth and thickness were decreased with compressing the probe. With compression, the depths of medial and lateral gastrocnemius, semitendinosus and biceps femoris muscles were  $57.60 \pm 0.92$  mm,  $52.18 \pm 0.60$  mm,  $109.08 \pm 0.02$  mm,  $91.43 \pm 0.60$  mm. Without compression, the depths of muscles were  $78.30 \pm 0.85$  mm,  $69.83 \pm 0.06$  mm,  $144.65 \pm 0.14$  mm,  $122.85 \pm 1.08$  mm and those of subcutaneous layers were  $44.25 \pm 0.25$  mm,  $60.93 \pm 0.14$  mm,  $54.70 \pm 0.71$  mm,  $65.30 \pm 0.65$  mm. The calf circumference and the thickness of gastrocnemius muscle showed positive correlations and the thigh circumference and the thickness of subcutaneous layer over semitendinosus and biceps femoris muscles showed positive correlations. With age, circumference of calf and thigh, and depth of medial gastrocnemius muscle were increased. **Conclusion:** In children with spastic cerebral palsy, the identification of the Depth and Thickness of gastrocnemius, semitendinosus and biceps femoris muscles will help to increase the accuracy of intramuscular injection of botulinum toxin A. But, further controlled study including larger group is needed.



## PP003-077

**REHABILITATIVE EFFECT FOR 8 OSTEOGENESIS IMPERFECTA PATIENTS****Dalin Fu, Yue Zhang, Jian Tang***Department of Rehabilitation Medicine, Nanjing Children's Hospital, Nanjing, Jiangsu Province, China*

**Objective:** To study the rehabilitative effect for patients with osteogenesis imperfecta. **Method:** Retrospective analysis of the outcome of 8 patients with osteogenesis imperfecta after rehabilitative treatment. **Result:** The patients receiving simple orthopedic treatment could not reduce the incidence of bone fracture but ambulation completely depends on wheelchair. Patients receiving rehabilitative treatment could reduce the incidence of bone fracture and ambulation of long distance depends on wheelchair. **Conclusion:** Rehabilitative treatment could reduce incidence of bone fracture, elevate capacity in locomotion and improve quality of life.

## PP003-078

**NAIL-PATELLA SYNDROME CASE****Sun-hong Hwang, Bong-Ok Kim, Sook-ja Kim***Physical Medicine and Rehabilitation, ChungNam National University Hospital, Dae-Jeon, Korea*

**Objective:** Nail-Patella Syndrome was firstly described by Chatelain in 1820 and it has been known that the four characteristics of the syndrome are fingernail dysplasia, hypoplastic or absent patella, radial head hypoplasia, abnormal bilateral iliac horn. Apart from this, this syndrome can cause glaucoma, cataracts, glomerulonephritis and end-stage renal disease by renal involvement. It is reported that genetic pattern is autosomal dominant and is related to LMXIB gene. We hereby report what we experienced from the case of patient suffered from the Nail-Patella Syndrome. **Case Report:** Two years ago, a five-year-old girl visited a hospital due to left pes varus while absent patella was discovered during progress observation. Physically she had quite healthy appearance but fingernail dysplasia was observed in both hands when she visited dermatology department four years ago. Fingernail dysplasia in thumb was the most severe, which had characteristics as follows: It was very thin compared to the normal, had a very small base, gradually reduced at a central part, and many lines split into longitudinal pattern were seen. In both knees, patella was not palpable, and this was also proved in radiological finding. Radial head hypoplasia in elbow and bilateral iliac horn caused by hip dysplasia was not noted. The result of laboratory tests and urine analysis was normal. Constant observation will be required because there is a possibility that glomerulonephritis and end-stage renal disease by renal involvement will occur in the future. In a gene study, LMXIB gene mutation was identified. **Conclusion:** This is to report what we learned from the case of a patient suffering from Nail Patella Syndrome.

## PP003-079

**THE EFFECT OF TAIJIQUAN ON FLEXIBILITY OF MIDDLE-AGED AND AGED PEOPLE****Xiangjiang Rong<sup>1</sup>, Dandan Liang<sup>2</sup>, Xiaomen Shu<sup>1</sup>***<sup>1</sup>Section of Rehabilitation in Capital College of Physical Education, and <sup>2</sup>Physical Education Department in Yan Zhou University, China*

**Objective:** To discuss the effect of Taijiquan on flexibility of middle-aged and aged people, and provide the evidence for Taijiquan to be a middle-underload way to improve flexibility. **Methods:**

In Beijing Chongwen district, we chose 421 middle-aged persons and divided them into two groups. One group persisted in doing Taijiquan exercises as exercise group and the other group was common healthy middle-aged people who did not do exercises frequently as being the control group. Each group was also divided into male and female groups, who were further subdivided into 2 age-groups of age 46-55 and age above 56. We assessed body anteflexion in sitting position in them. **Results:** 1) In generally, the results of anteflexion in exercise group were better than that in the control group. 2) In male exercisers, the results were better than those of control in both age subgroups. 3) In female exercisers, the results were similar to the female control. **Conclusion:** As age growing, the flexibility of elderly people tends to be weakened, and Taijiquan could obviously improve the flexibility of elderly people.

## PP003-080

**VALUE OF BRAINSTEM AUDITORY EVOKED POTENTIAL IN DIAGNOSING CEREBRAL PALSY****Jiulai Tang, De Wu, Xiaoyan Xu, Xiaosong Xiao, Huizhi Huang, Ling Zhang, Li Yang***Department of Pediatrics, the First Affiliated Hospital of Anhui Medical University, Hefei, China*

**Objective:** To study the handicap of hearing and brain stem function in cerebral palsy children through determining their brainstem auditory evoked potential (BAEP). **Method:** BAEP were analyzed in 75 cases of children with cerebral palsy by using MYTO type evoked potential equipment (made in Italy). **Results:** The data showed that the abnormal BAEP rate was 72% (54/72). Abnormalities manifested as differentiation of brainstem waves in diverse level. The latencies of wave I, the inter peak latencies of wave I-III, III-V of BAEP in children with cerebral palsy were prolonged and the ratio of V/I wave amplitude was abnormal. **Conclusion:** BAEP can be used to find out the changes of hearing handicap and brainstem function in children with cerebral palsy.

## PP003-081

**ASSOCIATION OF THE SINGLE NUCLEOTIDE POLYMORPHISM OF REELIN GENE WITH CHINESE HAN CHILDREN WITH AUTISM****Zhimei Jiang<sup>1</sup>, Zhaoming Sheng<sup>1</sup>, Lihua Zhang<sup>2</sup>, Zhihai Lv<sup>1</sup>***<sup>1</sup>Department of Development and Behavior Pediatrics, The Third Affiliated Hospital of Jiamusi University, Jiamusi City, China, <sup>2</sup>Child Neurological Rehabilitation Laboratory of Jiamusi University, Jiamusi City, China*

**Objective:** To investigate the association between two single nucleotide polymorphisms (SNP) at Exon 6 and Exon 50 of Reelin gene and Chinese Han children with autism. **Methods:** Polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP) were used to determine the frequency of allele and genotypes of two SNPs of Reelin gene in 30 Chinese Han autism children and 30 Chinese Han normal children. **Results:** There were significant differences in genotype distribution and the frequency of allele at Exon 6 SNP between two groups, both the distribution of genotype GG and the frequency of allele G at Exon 6 SNP in autistic children were higher than the control ( $X^2=6.371, p=0.041$ ;  $X^2=5.635, p=0.018$ ). There was no significant difference in genotype distribution and the frequency of allele at Exon 50 SNP between two groups ( $X^2=0.863, p=0.65$ ;  $X^2=0.037, p=0.847$ ). There were significant differences in Autism Behavior

Checklist (ABC) score and Communication Factor score among different genotypes at Exon 6 SNP ( $F=5.900$ ,  $p=0.007$ ;  $F=5.709$ ,  $p=0.009$ ). *Conclusions:* The GG genotype and G allele at Exon 6 SNP of RELN gene were probably the risk factor of autism. The GG genotype at Exon 6 SNP of RELN gene was correlated significantly with the social communication symptoms of childhood autism.

#### PP003-082

### THE CHANGES OF NEUROFIBRILLARY AND MICROTUBULE-ASSOCIATED PROTEIN TAU IN NEONATAL RATS WITH HYPOXIC-ISCHEMIC BRAIN DAMAGE

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*Objective:* To explore the changes of neurofibrillary and the expression of microtubule-associated protein Tau in the cerebral tissue of neonatal rats with hypoxic-ischemic brain damage. *Methods:* A rat model of hypoxic-ischemic brain damage was established by clipping left cephalic artery; then put in oxygen deficiency surroundings (8% oxygen and 92% nitrogen fumes) for 2 h. The sham operation group (control group) only cut the center skin of cervical part, segregate but not clip left cephalic artery. All the rats were divided into 5 groups randomly, based on the time after hypoxia and ischemia (3 h group, 6 h group, 12 h group, 24 h group and 48 h group), then to observe the pathological changes of neuron and neurofibrillary in the cerebral tissues of the neonatal rats after hematoxylin and eosin staining and silver staining, and to measure the expression of Tau by immunohistochemical method and analyze its negral photodensity. *Results:* There were neurofibrillary tangles in the neurons in cortex, hippo campus and inner of neonatal rats with hypoxia-ischemia. The expression of microtubule-associated protein Tau in different experimental groups was decreased with prolongation of ischemia. There was a significant difference in the expression of microtubule-associated protein Tau between 12 h group, 24 h group, 48 h groups of hypoxia-ischemia and the control group ( $p<0.05$ ). *Conclusion:* The expression of Tau in the cerebral tissues of neonatal rats with hypoxic-ischemic brain damage decreased and neurofibrillary tangles were present.

#### PP003-083

### THE ETIOLOGY RESEARCH ON THE RELATIONSHIP BETWEEN FAMILY VIOLENCE AND CEREBRAL PALSY

**Duxiong Mai, Jiu Lai**

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*Objective:* To research the etiology of cerebral palsy (CP) and study the relationship between family violence and the invasion of cerebral palsy. *Methods:* A total of 186 children with CP were randomly selected. The entire social factors such as nutritional state, drug or dope abuse, and family violence were investigated from the parents of the CP children. *Results:* Multiple stepwise regression analyses showed that social factors especially family violence had significant effect on the invasion of cerebral palsy ( $p<0.05$ ). *Conclusion:* It is very important to improve society

circumstance factors. This will promote children's animation quality and reduce the invasion of cerebral palsy.

#### PP003-084

### EFFECT OF LIGHT-ACTIVATED BPD-MA ON THE SURVIVAL RATE OF HUMAN BLADDER CANCER CELLS

**Dingqun Bai<sup>1</sup>, Lehua Yu<sup>1</sup>, Chuanshan Xu<sup>1</sup>, Xinshu Xia<sup>2</sup>, Shiming Wu<sup>3</sup>, Yong He<sup>1</sup>, Yong Tan<sup>1</sup>**

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*Objective:* The study aims to investigate the effect of light-activated photosensitizer BPD-MA on the survival rate of human bladder cancer cells. *Method:* Human bladder cancer cell lines BIU-87 cells were seeded into 96-well dish and grown for 24 h in RPMI1640 medium with 10% FCS. The cells were cultivated with BPD-MA and radiated by red light. 24 h after light radiation, the survival rate of BIU-87 cells after treated by BPD-MA alone, Laser irradiation alone and BPD-MA in combination with Laser radiation on BIU-87 was measured by trypan blue exclusion assay, respectively. All procedures were carried out in subdued light conditions. *Results:* The survival rate of BIU-87 cells in BPD-MA-PDT group significantly decreased, but BPD-MA alone or laser radiation alone had no notable effect on BIU-87 cells. *Conclusions:* Light-activated BPD-MA could effectively kill human bladder cancer cells, suggesting that light-activated BPD-MA might be a promising approach to treat human bladder cancer.

#### PP003-085

### THE EFFECT AND MECHANISM OF AEROBIC EXERCISE ON PATIENTS WITH METABOLIC SYNDROME

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*Objective:* To explore the effect of aerobic exercise on serum leptin, interleukin-18 (IL-18), soluble intercellular adhesion molecule-1 (sICAM-1), C reaction protein (CRP) concentration and Homeostasis model assessment insulin resistance (HOMA-IR) of patients with metabolic syndrome (MS), and to explore the mechanism of aerobic exercise on MS. *Method:* Forty sedentary patients with MS were randomly divided into exercise group and fenofibrate group. Patients in exercise group were trained at anaerobic threshold intensity (30 min/times) for 12 weeks (5 times/week). Patients in fenofibrate group were treated with fenofibrate 200 mg every night. Serum leptin, IL-18, CRP and sICAM-1 concentration were measured by enzyme linked immunosorbent assay. 20 healthy subjects were selected as the control group. *Results:* Serum concentration of leptin ( $26.04 \pm 9.07$  vs.  $8.32 \pm 2.94$ ,  $p<0.01$ ), IL-18 ( $308.27 \pm 50.39$  vs.  $230.60 \pm 29.15$ ,  $p<0.01$ ), CRP ( $2.65 \pm 0.57$  vs.  $1.26 \pm 0.23$ ,  $p<0.01$ ), sICAM-1 ( $331.89 \pm 60.08$  vs.  $246.43 \pm 39.32$ ,  $p<0.01$ ) and HOMA-IR ( $4.38 \pm 2.06$  vs.  $2.12 \pm 0.50$ ) of patients with MS were significantly increased compared to those of control. Serum concentration of leptin ( $26.38 \pm 10.85$  vs.  $19.63 \pm 6.27$ ,  $p<0.05$ ), IL-18 ( $309.40 \pm 49.77$  vs.  $291.80 \pm 39.21$ ,  $p<0.05$ ), CRP

( $2.73 \pm 0.72$  vs.  $2.28 \pm 0.38$ ,  $p < 0.01$ ), sICAM-1 ( $333.85 \pm 55.97$  vs.  $306.24 \pm 50.55$ ,  $p < 0.01$ ) and HOMA-IR ( $4.53 \pm 2.39$  vs.  $2.89 \pm 0.69$ ,  $p < 0.01$ ) were significantly decreased after training for 12 weeks. **Conclusion:** Aerobic exercise is one of the effective treatments of patients with MS. Its underlying mechanism may be associated with reduction of serum inflammatory adipokines concentration and improvement of vascular endothelial function and insulin resistance.

#### PP003-086

### NEUROPATHIC PAIN FOLLOWING ACUTE SPINAL CORD INJURY

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**Objective:** Neuropathic pain (NP) following spinal cord injury (SCI) is still an unsolved problem. **Method:** In a prospective study on 494 cases of acute spinal cord injury patients were evaluated as per guidelines of American Spinal Cord Association. Daily counseling for pain was done. All cases of NP were recorded. **Results:** The incidence of NP was 13.76% with higher incidence among 21 to 30 years age group and dorsolumbar cases are affected more. 48% of cases developed NP in 2<sup>nd</sup> and 3<sup>rd</sup> week. Discomfort was more during night in below the knee area and dorsum of foot. Most of the cases described hot burning type of sensation, relieved by ROM Exercise and tepid sponging. Drug trial revealed that Pregabalin, Oxcarbamazepine, Amitriptyline and Gabapentine helps in reducing the discomfort but at different duration of time. **Conclusion:** None of these drugs are superior to placebo.

#### PP003-087

### PREVENTION OF VENOUS THROMBOEMBOLISM IN GERIATRIC HIP FRACTURE PATIENTS BY COMPRESSION STOCKING

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**Objectives:** 1) To investigate venous thromboembolism (VTE) prevention in geriatric hip fracture patients by compression stocking. 2) To assess the complication and compliance of the compression stocking. **Methods:** From 1<sup>st</sup> February 2006, geriatric hip fracture patients admitted were given compression stocking to his/her affecting leg. Data from 1<sup>st</sup> February 2006 to 31<sup>st</sup> January 2007, wearing compression stocking (stocking group) was compared with data from 1<sup>st</sup> February 2005 to 31<sup>st</sup> January 2006, without compression stocking (control group). Demographic (patient characteristics, fracture and surgical characteristics) and outcomes data (thromboembolic events, length of hospital stay (LOS), in-hospital complication) were compared. Also, complication and compliance rates of stocking wearing were recorded. **Results:** A total of 202 patients were investigated, 93 control and 109 stocking group. Demographic data including age, sex, pre-morbid functional status, accommodation, number of medical diagnosis and thromboembolic risk factors, fracture type and side, surgical type and anesthetic use were all comparable between the two groups. Three patients in the control group had VTE and no case of VTE was noted in the stocking group during the

in-patient period. LOS was significantly shorter in the stocking group (24.3 days vs 29.8 days,  $p = 0.001$ ). Number of in-patient complication was also significantly lower in the stocking group (1.06 vs 1.48,  $p = 0.013$ ). 37.6% of cases had complication with compression stocking usage and most were mild skin redness. Compliance to compression stocking was good (80.7%). **Conclusions:** Compression stocking reduces VTE in geriatric hip fracture patients in the in-patient period. Skin surveillance is needed with compression stocking usage and the compliance to the stocking is good.

#### PP003-088

### STUDY OF THE EFFECT TO BLOOD OXYGEN SATURATION OF PEOPLE'S FIRST ARRIVAL AT HIGH ALTITUDE WITH LASER EXTRAVASCULAR IRRADIATION

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**Objective:** To study the effect of extra vascular semiconductor laser irradiation on the blood oxygen saturation for people who first arrived at high altitude plateau. **Method:** One hundred and twenty newly enlisted soldiers were recruited. 60 of them were enrolled randomly as therapeutic and control groups. The therapeutic group subjects received extra vascular irradiated with low level semiconductor laser (650 nm, 20 mW). Both the treated and control groups were tested at Chengdu (sea level) airport on the day flied to Lhasa (3658 m above sea level) and daily in successive 10 days after they arrival. The test index included blood oxygen saturation, morphology of erythrocyte under light microscope and anoxic symptoms. **Results:** After arrival at Lhasa, the oxygen saturation decreased in all subjects, from 98% at Chengdu airport to around 80% at the evening of the day after arrival. The saturation automatically increased from the second day gradually in both groups but the group with laser extra vascular irradiation increased significantly more than the control ( $p < 0.01$ ) 48 h after arrival. At the end of observation, the oxygen saturation restored to 93% around in the treated group, and to 90% around in the control group ( $p < 0.01$ ). **Conclusions:** The treatment with low level semiconductor laser extra vascular irradiation can increase anoxia-resisting capability of the people who first arrived at high altitude, which was particular worked by increasing the erythrocyte activity.

#### PP003-089

### THE RESEARCH OF THE OPPORTUNE MOMENT FOR AN INJURED ATHLETE FOR RETURN TO COMPETITION

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**Objective:** To build a standard for reference to know the injury of athletes and help the athletes to regain training or competition at opportune time. **Methods:** Reviewed the literature, interviewed and discussed on injured athletes from injury to return to competition, the specialists and scholars analyzed the recovery laws and identified various factors relating to the opportune time for athletes to go back for competition. **Results:** 1) The factors affecting the injured involving athletes to go back to competition are body injured (23.3%), fitness affected by injury (21.4%), special technique lost by the pause of training (15%), athlete's psychological response to the injury (11%) and the public concern



for the injured athletes (9%). 2) To set up criteria for choosing the opportune time is beneficial to the quality of injury recovery and special ability that athletes regained. 3) The criteria for the opportune time are various for type and degree of injuries and kind of sports. **Conclusion:** 1) It is very important to evaluate the athlete's injury with objective criteria for the opportune moment to return to training or competition. The criteria must be different between the athletic item, type and degree of injury. 2) The athletes should be told the criteria to cultivate their confidence to return to training and competition, focus their attention to recovery, and accelerate the process of recovery. 3) The coach is important in helping athletes to regain training and competition.

#### PP003-090

### COMPARISON BETWEEN ULTRASOUND PLUS ELECTRICAL STIMULATOR-GUIDED AND ELECTRICAL STIMULATOR-DIRECTED BTX-A INJECTION IN PATIENTS WITH SPASTICITY AFTER STROKE

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**Objective:** To compare between ultrasound plus electrical stimulator-guided and electrical stimulator-directed to locate sites for BTX-A injection in patients with spasticity after stroke. **Methods:** 40 patients with spastic hemiplegia after stroke were involved with 12 at score 2, 20 at score 3 and 8 at score 4, according to Modified Ashworth Scale. All patients were separated in two groups randomly: Group A for ultrasound plus ES guidance ( $n=20$ ); Group B for ES only for direction ( $n=20$ ). Muscle triceps surae and tibialis posterior of patients in each group were injected by different location approach. VAS scale on each patient was assessed as soon as BTX-A injection finished and Muscle tone was evaluated with Modified Ashworth Scale after two weeks. Data were analysed by *t*-test. **Results:** The Ashworth scores were  $0.8 \pm 0.69585$  for group A and  $1.4 \pm 0.94032$  for group B ( $p < 0.05$ ). The VAS scores was  $5.705 \pm 1.044$  for group A and  $6.660 \pm 1.320$  for group B ( $p < 0.05$ ). There was significant difference between the two groups. **Conclusion:** BTX injection located by ultrasound plus ES is better than by ES only in relieving spasticity after stroke. It also induces less pain and less bleeding during injection procedure, especially of benefit for children and deeper muscle BTX injection.

#### PP003-091

### EXPERIMENT STUDY ON HE-NE LASER IRRADIATION TO INHIBIT SCAR FIBROBLAST GROWTH IN CULTURE

**Bin Shu<sup>1</sup>, Xiaohua Tu<sup>2</sup>, Xiang Li<sup>2</sup>, Xiangqin Fang<sup>2</sup>, Zhijin Yang<sup>2</sup>, Wanlin Jiang<sup>2</sup>**

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**Objective:** To explore the inhibitory effect of He-Ne laser irradiation on growth of fibroblasts of hypertrophic scars (HS) in culture. **Methods:** The cultured fibroblasts in HS were irradiated with He-Ne laser (Wavelength 632.8 nm, power density of 50 mW/cm<sup>2</sup>), various energy densities such as 3J/cm<sup>2</sup>, 30 J/cm<sup>2</sup>, 90 J/cm<sup>2</sup> and 180 J/cm<sup>2</sup> were respectively adopted once a day. After 1, 3 and 5 times of He-Ne laser with each dose irradiation separately, the cell count and cell circle analysis were counted and examined by

trypan blue staining and flow cytometry. **Results:** After 3 and 5 times of 180 J/cm<sup>2</sup> laser irradiation, the amount of cells was markedly less than the controls ( $p < 0.05$ ), the cells in S-phase were reduced from 51% to 20% and 14%, respectively; the cells in G0/G1 phase were raised from 28% to 55% and 60%. The percent of Sub-G1 was 6.7% and 9.8%. **Conclusions:** The study suggests that He-Ne laser with 180 J/cm<sup>2</sup> irradiation can inhibit the growth of cultured fibroblasts in HS. The cause is probably due to the stagnation and apoptosis of G0/G1 cells induced by He-Ne laser.

#### PP003-092

### EFFECT OF HE-NE LASER REPEATED IRRADIATION ON EXPRESSION OF GENE-ASSOCIATED WITH APOPTOSIS IN SCAR FIBROBLASTS IN VITRO

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**Objective:** In order to explore the mechanism of He-Ne laser inducing apoptosis of fibroblasts of cultured hypertrophic scars (HS) at protein level. **Methods:** The cultured fibroblasts in HS were irradiated with He-Ne laser (Wavelength 632.8 nm, power density 100 mW/cm<sup>2</sup>) daily for 30 min. After 3 times of He-Ne laser irradiation, the expression of these genes such as bcl-2, Bax, Fas, ICE, p53 and c-myc were respectively studied by Confocal Laser scanning microscopy and Flow Cytometry. **Results:** Several proteins such as Bcl-2, Fas, ICE, p53 and c-myc proteins were present in scar fibroblasts in culture. The amount of Fas and ICE proteins increased, and Bcl-2 protein reduced, while the amount of Bax, p53 and c-myc proteins remained constant, after repeated He-Ne laser irradiation. **Conclusions:** He-Ne laser inducing apoptosis of scar fibroblasts were associated with these proteins of Fas, ICE and Bcl-2.

#### PP003-093

### LOCALIZATION OF THE TERMINAL INTRAMUSCULAR BRANCHES OF THE MUSCULOCUTANEOUS NERVE TO THE BICEPS AND BRACHIALIS MUSCLE

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**Objective:** To determine the location of the terminal intramuscular endings of the biceps and brachialis muscle and to determine if these locations varied according to the different branching patterns. **Methods:** Fifty-six upper limbs from fresh cadavers were dissected deep to the point where intramuscular endings were located. The point where the musculocutaneous nerve first pierced the muscle belly was defined as the motor point (MP). The intramuscular branches located most proximally and distally were defined as proximal (PL) and distal limit (DL) points, respectively. **Results:** We found three branching patterns for biceps brachii which consisted of 1) one branch (57.1%) 2) two branches, one for each biceps head (39.2%) and 3) two branches, one for the biceps head and one for the common belly (3.5%). We found two branching patterns for the brachialis muscle which consisted of 1) one branch (55.3%) and 2) two branches (44.6%). The MP, PL

and DL were located around a similar region in all the dissected muscles for all branching patterns. The MP, PL and DL of the three branching patterns for the biceps were located at a mean distance (SD) of 44.12 (0.009)%, 49.10 (0.003)% and 75.21 (0.01)% of the reference line. The MP, PL and DL of the two branching patterns of the brachialis were located at a mean distance (SD) of 60.69 (0.001)%, 63.73 (0.02)% and 86.17 (0.02)% of the reference line. *Conclusion:* Application of these points may help in localizing the ideal injection points for the neuromuscular blockade of the biceps and brachialis muscles. Block performed at the ideal point may help to increase the efficacy of botulinum toxin in patients with flexed elbow.

#### PP003-094

### A KINETIC MODEL OF THE EFFECTOR CELL RESPONSE TO CANCER

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*Objective:* The aim of this paper is to get a mathematical description on T-cell-mediated cytotoxicity which we consider to be the dominant contributor of tumor regression, by studying a kinetic model of the effector cell response to cancer, which has been provided by R. P. Garay and R. Lefever. *Method:* The methods employed are mathematical methods: differential analysis, Liapunov's method of stability, Hopf bifurcations, and linear systems theory. For the simplicity of the model, we consider the quantity of effector cells per unit to be constant and go one step further to assume that  $\beta$ , namely the ratio of binding rate and growth rate multiplied by the constant  $E_1$ , is greater than 1, bespeaking the "work efficiency" of effector cells is higher than that of cancer cells. *Results:* We show that tumor recuperation and tumor dormancy can be obtained when value of  $b$ , i.e. the ratio of the binding rate of cancer cells and effector cells and the rate of lysis, satisfies a specific condition respectively. *Conclusion:* The study indicates that tumor can be suppressed once cellular immune response is properly triggered, in which the former condition we set is most likely to be met.

#### PP003-095

### CLINICAL EFFECTS OF DECIMETER MICROWAVE IRRADIATION ON RHEUMATOID ARTHRITIS KNEE

***Zhou Hui***

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*Objective:* To observe the effects of decimeter microwave irradiation on knees with rheumatoid arthritis. *Method:* Sixty-five patients with rheumatoid arthritic knees, mean age of 51 years and average disease duration of 10.6 years including 10 male and 55 female, were recruited from Sep 2005 to Aug 2007. They were randomly assigned to the intervention or control group with age, sex and disease duration matched. Participants in both groups were directed to a set of knee mobilization home exercises. No medication was given regularly. A 915 MHz power hyperthermia apparatus was used for intervention group. The radiator directed to the knee with patients' feeling of warm locally. Treatment lasted 60 min every two days with 4 weeks in total. Before and 2 months after the treatment, both intervention and control groups were evaluated. *Results:* Participants in both groups got some improvement at the last evaluation. VAS score for the treated

and control groups decreased 1.5 and 0.6 ( $p < 0.01$ ). Average daily total activity time for household and leisure activities increased 1.5 and 0.5 h, respectively, comparing to that before treatment. Average 6-min walk distances improved about 20% and 8% for intervention and control groups respectively, but the circulation and range of motion of knee changed little ( $p > 0.05$ ) for both groups. No adverse reaction could be observed. *Conclusion:* Decimeter microwave irradiation is effective and safe for treatment of rheumatoid arthritic knee.

#### PP003-096

### THE DIVERSIFICATION TEACHING: TOUCH APPROACH IN THE TEACHING OF APPLICATION OF REHABILITATION TREATMENT

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*Objective:* In recent years, with fast development of rehabilitation medicine in China, exalting the level of teaching in rehabilitation medicine has been an urgent issue. My University from 1999 onward has started to recruit to rehabilitation professionals, continuously tried various teaching methods: pass tradition teaching method, diversification teaching mode of comparison, detection leading type, inspire type of diversification teaching mode and ratio tradition teaching mode to develop students' interest, exertive subjective ability without sex difference, exalting comprehensive abilities and etc. All seem to have some effects. *Methods:* Matched control study to compare tradition teaching method with experiment setting with leading and inspired type of diversification teaching method. *Results:* The effect of the experiment setting of teaching was obviously better than the matched control. *Conclusions:* Rehabilitation Medicine, particularly rehabilitation treatment requires application of academic knowledge. It requires strong commitment in addition to the request of mastering basic clinical and professional knowledge from the students. Traditional spoon-feeding and doctrines-teaching type of education only provide verbal information resulting in unclear expression, even with the aids of multimedia teaching. Student without personal practical experience cannot provide appropriate treatment to the patients after graduation.

#### PP003-097

### OPTIMIZE OCCASIONAL: TREATMENT OF DYSPHAGIA BY DIRECT TRAINING

***Hongying Li***

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*Objective:* Dysphagia is simply defined as any difficulty with swallowing. Generally, treatment methods of dysphagia can be classified into operation, rehabilitation training, acupuncture and etc. *Method:* However, all methods used must have direct training. It requires appropriate method to be used early, such as when signs of coughing during or after swallowing or developed a wet or hoarse voice. These indicated that patients were at risk of aspiration pneumonia. *Results:* Optimize occasional is important to be used as direct training. If the treatment used at later stage, the patients' rehabilitation would be delayed. *Conclusion:* Researchers should look into choosing optimize occasional in managing dysphagia. Until now, we found that swallowing action could be elicited in needling throat muscles.

PP003-098

### COMPARE THE COMBINATION THERAPY WITH ONLY DRAWING THERAPY IN THE TREATMENT OF LUMBAR INTERVERTEBRAL DISC PROLAPSE

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**Objectives:** To evaluate an effective method in the treatment of the lumbar intervertebral disc prolapse. **Methods:** Three hundred and ten cases were randomly divided into 2 groups. The treatment group ( $n=155$ ) were treated by traction combined with massage, and the control group ( $n=155$ ) were only treated by traction. **Results:** There was significant difference between the two groups in term of therapeutic effect ( $p<0.01$ ). **Conclusions:** Combination of traction with massage has better clinical therapeutic effect than the simple traction treatment on lumbar prolapse intervertebral disc.

PP003-099

### EFFECT OF PULSED ELECTROMAGNETIC FIELDS OF DIFFERENT MAGNETIC INTENSITY ON BIOMECHANICAL PROPERTIES OF FEMUR IN OVARIECTOMIZED RATS

**Chengqi He, Deng Xiao, Wei Wang**

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**Objective:** The purpose of this study was to observe the effect of PEMFs of different intensity on biomechanical properties of femur in ovariectomized rats, so as to find out the intensity for the best therapeutic efficacy. **Methods:** Fifty female SD rats were randomly divided into five groups: 1) sham-operated control (no PEMFs treatment), 2) ovariectomized control (no PEMFs treatment), 3) ovariectomized I (PEMFs treatment at 8HZ frequency with 0.77 mT intensity, 40 min daily for 30 days), 4) ovariectomized II (PEMFs treatment at 8HZ frequency with 3.82 mT intensity, 40 min daily 30 days), and 5) ovariectomized III (PEMFs treatment at 8HZ frequency with 9.87 mT intensity, 40 min daily 30 days). Except for 10 rats of the sham-operated control group, a standardized ovariectomy was used in every rats. Estradiol (E2) of serum and biomechanical properties (peak load, maximum displacement, maximum energy absorption, maximum stress, maximum strain and modulus of elasticity) of femur were assessed at 30 days after PEMFs treatment. **Conclusion:** Three pulsating electromagnetic field of different intensities improve biomechanical properties of femur in ovariectomized rats significantly (including max load, max displacement, max energy) and material index (including max stress, max strain, elastic modulus), 3.82 mT PEMFs group exceed 0.77 mT and 9.87 mT groups.

PP003-100

### COMPARISON ON THE CT/MRI, EMG/NCV AND OPERATION FINDINGS OF LUMBAR DISC HERNIATION

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**Objective:** To research the relationship between CT/MRI, EMG/NCV and surgical findings of lumbar disc hernia. **Method:** One hundred and fifty-one patients with lumbar disk hernia dissection in Jan 2006 to June 2007 were analyzed. They are 100 male and 51 female aged 44.3

(21–72) years, disease duration with 10 days to 20 years. Surgical and EMG/NCV findings were compared with CT/MRI appearance. **Results:** Among 3 cases with L3–L4 disc hernia on CT/MRI, operation found pressure on L4 in 3 and L5 in 1. EMG/NCV found L4 abnormal in 2 and L5 in 1. Among 71 cases with L4–L5 disc hernia on CT/MRI, operation found pressure on L4 in 7, L5 in 68. EMG/NCV found abnormal with L4 in 16, L5 in 71, S1 in 6. Among 61 cases with disc hernia of L5–S1 on CT/MRI, operation found pressure on L5 in 18, S1 in 45. EMG/NCV found abnormal with L4 in 13, L5 in 53, S1 in 26. 16 cases with disc hernia of L4–L5 and L5–S1 on CT/MRI, operation found pressure on L4 in 2, L5 in 15, S1 in 14. EMG/NCV found abnormal with L4 in 10, L5 in 16, S1 in 5. **Conclusion:** L3–L4 and L4–L5 lumbar disc hernia always presses on L4 and L5 root, respectively. It is proved by surgery and EMG/NCV examination. One segment higher or lower may be pressed in seldom cases. EMG/NCV may find more abnormalities than operation does because it is more sensitive. But for L5–S1 lumbar disc hernia, it involves the upper segment L5 more often.

PP003-101

### VALIDATION OF 2-MINUTE WALK TEST AS A MEASURE OF EXERCISE TOLERANCE AND PHYSICAL PERFORMANCE IN PATIENTS WITH CGVHD

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**Objectives:** To determine the validity of the 2MWT as a measure of exercise tolerance and physical performance in patients with chronic graft-versus-host disease (cGVHD). **Methods:** Patients with cGVHD evaluated in a prospective, cross-sectional natural history protocol. Measures included: 1) distance walked in 2 and 6 min; 2) the SF-36 physical functioning subscale (PFS) and vitality subscale (VS); 3) maximal activity score (MAS) and adjusted activity score (AAS) of the Human Activity Profile (HAP); 4) severity assessment of cGVHD/Composite Assessment Scale (CAS); 5) Lee cGVHD symptom score (SS). Correlations calculated using Pearson Correlation Coefficients. **Results:** Fifty-one subjects had complete data. 2MWT showed strong correlation with 6MWT ( $r=0.951$ ,  $p<0.001$ ), PFS ( $r=0.696$ ,  $p<0.001$ ), and MAS/AAS ( $r=0.608$  and  $0.639$ ,  $p<0.001$ ); negative/moderate correlation with CAS ( $r=-0.480$ ,  $p<0.001$ ), and negative/weak correlation with SS ( $r=-0.296$ ,  $p<0.05$ ). 6MWT showed strong correlation with PFS ( $r=0.712$ ,  $p<0.001$ ) and MAS/AAS ( $r=0.606$  and  $0.680$ ,  $p<0.001$ ); negative/moderate correlation with CAS ( $r=-0.433$ ,  $p<0.001$ ) and SS ( $r=-0.360$ ,  $p<0.01$ ). Correlations between 2- and 6-MWTs and VS were weak ( $r=0.295$  and  $0.313$ ,  $p<0.05$  and  $<0.01$ ). **Conclusion:** 2- and 6MWTs can be used interchangeably, and the strong correlations between SF36, HAP and both 2- and 6-MWTs suggest that they provide valid assessment of exercise tolerance and function, in this population.

PP003-102

### COMPARISON OF EDUCATION IN HONG KONG AND MAINLAND CHINA

**Jingwen Li**

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**Objective:** To compare different education system. More and more mainland students are keen to study in Hong Kong nowadays



which makes us start to wonder whether it worth so much money and effort or not. *Method:* Personal experience suggested having both pros and cons. From a student's (who is now studying Occupational Therapy in Hong Kong) perspective, it really depends some factors. *Results:* On the one hand, in the field of education, Hong Kong absolutely has its merits among which, the most obvious one is the notion of education. Under the influence of Western culture, almost all the universities in Hong Kong aim at training their students to be smart learners rather than good knowledge masters. Therefore, every student spends a large proportion of their college life in learning and practicing various kinds of learning kills, such as how to search appropriate reading materials for their assignments. In contrast, most mainland universities only focus on teaching knowledge which may become out-of-date very soon while ignoring studying skills. Consequently, university graduates usually find themselves less competitive in self promotion, compared with students who graduate from universities in Hong Kong and Western countries. Concerning this advantage of Hong Kong, it is really an excellent opportunity for us to study here. On the other hand, it is relatively easy for a young adult to lose himself in Hong Kong than in mainland China. Facing so many attractions, it is no wonder that a student indulges in entertainment rather than studying, especially in such free atmosphere. *Conclusion:* So for those students, who can not fully control themselves, please look before leap.

#### PP003-103

##### ASSESSMENT OF SENSORY NERVE ROOT IN S1 RADICULOPATHY BY MAGNETIC STIMULATION AND F WAVE

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*Objective:* To explore the electrophysiological examination of the sensory nerve root function in patients with S1 radiculopathy. *Methods:* In 20 normal subjects and 20 patients with unilateral S1 radiculopathy, we recorded bilateral H reflex and M response latency from soleus through magnetic stimulation of S1 nerve roots, combined with F wave and M response latency by electrically stimulating tibial nerve on popliteal fossa. Sensory root conduction time (SRCT) in two groups was then calculated and compared. *Results:* The data obtained established  $2.93 \pm 0.65$  ms and  $0.41 \pm 0.35$  ms as the normal value for SRCT and the interval between two sides respectively in healthy subjects. In patients with S1 radiculopathy, H reflex elapsed in 4 patients, the SRCT of affected side significantly prolonged ( $4.08 \pm 0.75$  ms) in other patients, and the mean difference between sides apparently increased ( $1.18 \pm 0.73$  ms). *Conclusion:* SRCT can be used to estimate the sensory nerve root function, probably indicating a way to non-invasive electrodiagnosis of S1 radiculopathy.

#### PP003-104

##### EFFECTS OF TRADITIONAL CHINESE MEDICAL EXERCISE ON QUALITY OF LIFE IN PATIENTS WITH COPD

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*Objective:* To investigate the effects of traditional Chinese medical exercise on the quality of life of COPD patients suffering from anxiety and depression in stable stage. *Methods:* Fifty-six cases

with moderate COPD patients (FEV1/FVC <70% and 30% <FEV1/predictive FEV1 <80%) were assigned to control group (CG) and traditional Chinese Medicine group (TG). The TG groups took part in two months of intensive training course. *Results:* 6MWD in TG group increased from  $309.82 \pm 55.67$  to  $357.11 \pm 57.38$  while the Borg scales dropped from  $2.93 \pm 1.25$  to  $1.86 \pm 0.76$ . SAS scores in TG group declined from  $35.29 \pm 7.37$  to  $31.29 \pm 5.03$  while SDS scores dropped from  $32.07 \pm 6.83$  to  $27.93 \pm 3.67$ . SF-36 scores in TG group increased from  $97.63 \pm 19.02$  to  $102.26 \pm 17.72$ . SGRQ scores also showed statistical significant difference. All these evaluations showed us some favorable efficiency in TG group compared to the CG group except for the results of SF-36. *Conclusion:* Traditional Chinese medical exercise can improve the exercise tolerance and decrease dyspnea in COPD patients in stable stage. It also can relieve the anxiety and depression, hence improving the quality of life.

#### PP003-105

##### RELIABILITY RESEARCH OF CLINICAL MEASUREMENTS OBTAINED WITH THE MODIFIED ASHWORTH SCALE IN PEOPLE WITH HYPERTONICITY

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*Objective:* To analyze the reliability of clinical measurements obtained with the Modified Ashworth Scale (Chinese version) in people with hypertonicity. *Methods:* Twenty-three patients with increased muscle tone were involved, including 16 patients with hemiplegia, 5 patients with paraplegia and 2 with tetraplegia. Two doctors assessed the muscle tone of the elbow flexor, wrist flexor, quadriceps femoris, gastrocnemius and soleus using the Modified Ashworth Scale in hemiplegic and tetraplegic patients. While we only assessed the muscles of the lower extremities in paraplegic patients, the inter-rater and intra-rater reliability of the scales were evaluated. *Results:* Interrater and intrarater reliabilities of the elbow flexor, wrist flexor and were good with Kendall's tau-b correlations from 0.621 to 0.862, but for gastrocnemius and soleus, they were poor with Kendall's tau-b correlations from 0.095–0.486. *Conclusion:* The Modified Ashworth Scale is valuable for clinical measurements in China, but when applied for gastrocnemius and soleus, it is not reliable.

#### PP003-106

##### A CHRONIC EXPERIMENTAL MODEL OF CONTROLLABLE MYOCARDIAL ISCHEMIA

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*Objective:* To develop a chronic animal model of controllable myocardial ischemia in mini swine. *Methods:* Thoracotomy and pericardiectomy were performed in 10 mini swine. A homemade hydraulic occluder was then implanted around the oblique marginal artery. Selective coronary angiography, pressure-EKG test, Coronary collateral blood flow (CCBF), pathological examination of HE staining and transmission electron microscope (TEM) were performed after surgery to evaluate the degree of stenosis. *Results:* Pressure induced EKG change of ischemia could be found in all subjects. Selective coronary angiography

demonstrated a significant reduction in myocardial blood flow in the oblique marginal artery after hydraulic occluder was inflated. The controllable myocardial ischemia animal model is stable for 8 weeks. Simultaneously, CCBF of the hazardous zone was obviously decreased ( $p < 0.05$ ). There was no evidence of myocardial infarction in HE staining and TEM. *Conclusions:* The home-made hydraulic occluder is applicable to make a chronic animal model of controllable myocardial ischemia. It may create an important approach in research of cardiac rehabilitation.

#### PP003-107

### APOPTOSIS OF HUMAN OVARIAN CARCINOMA INDUCED BY LED-ACTIVATED MPPA

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*Objective:* This study aims to investigate that lighting emitting diode (LED)-activated MPPa induced the apoptosis of human ovarian carcinoma. *Methods:* A special LED equipment and human ovarian carcinoma cell line COC1/DDP was employed to investigate the photodynamic effect of MPPa, in which the drug concentration was 2 mol/l and energy density of LED 1 J/cm<sup>2</sup>. Apoptosis was determined 4 h after LED-activated MPPa using fluorescent staining with Hoechst 33258. *Results:* In the control groups, the nuclei were stained a less bright blue and the color was homogeneous. After being irradiated by LED with MPPa for 4h, the blue emission light in apoptotic cells was much brighter than the control cells. Condensation of chromatin and nuclear fragmentations could also be found in many treated cells and some of them formed the structure of apoptotic bodies, which is one of the classic characteristics of apoptotic cells. *Conclusion:* LED-activated MPPa could effectively induce apoptosis of human ovarian carcinoma cells and LED will become an alternative light source for photodynamic therapy.

#### PP003-108

### SONODYNAMIC THERAPY WITH HEMATOPORPHYRIN MONOMETHYL ETHER ON TUMOR CARNEUS UMR-106 CELLS

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*Objective:* The present study aims to investigate sonodynamic therapy (SDT) with hematoporphyrin monomethyl ether (HMME) on tumor carneus. *Methods:* Tumor carneus UMR-106 cells were pretreated with HMME and radiated by ultrasound. 6 h post SDT treatment, the inhibition rate, apoptosis rate and ultrastructural changes of UMR-106 cells were investigated in SDT group, ultrasound alone group, HMME alone group and control group using MTT assay, flow cytometry and transmission electron microscopy respectively. *Results:* SDT with HMME could significantly inhibit the growth of UMR-106 cells and induce it into apoptosis, while HMME group showed no significant difference compared with the control. Transmission electron microscope showed that the cells in SDT group displayed morphological features of apoptosis or necrosis. *Conclusion:* SDT with HMME could significantly kill UMR-106 cells and induce

apoptosis of the tumor cells in vitro. It could be developed for treating tumor carneus.

#### PP003-109

### THE EFFECT OF AIR PRESSURE CHAMBER TREATMENT ON SAO<sub>2</sub> AND ARTERIAL PO<sub>2</sub> OF PEOPLE FIRST ARRIVAL AT HIGH ALTITUDE PLATEAU

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*Objective:* To study the effect of air pressure chamber treatment on blood oxygen saturation and arterial blood gas of people first arrival at high altitude plateau. *Methods:* One hundred and thirty new enlisted soldiers were recruited. 65 of them were enrolled as therapeutic group and the others as control randomly. The therapeutic group subjects were treated with air pressure chamber (0.1–0.12 Mpa, 40–50 min, once a day) after their arrival at the plateau. The test index included blood oxygen saturation, arterial blood gas analysis, morphology of erythrocyte under the light microscope and anoxic symptom. *Results:* After arrival at Lhasa, some subjects suffered from anoxic symptoms, which faded away after treatment with air pressure chamber. The oxygen saturation (SaO<sub>2</sub>) decreased in all subjects, from 98% at Chengdu airport to 80% (SaO<sub>2</sub>), PO<sub>2</sub> decreased to around 50.3 mmHg at the evening of the day after arrival. The saturation automatically increased from the second day gradually. But the group with air pressure chamber were significantly faster than the control ( $p < 0.01$ ). At the end of observation, the SaO<sub>2</sub> restored to around 97% in the treatment group, and to around 90% in the control group ( $p < 0.01$ ). The PO<sub>2</sub> restored to around 83.6 mmHg in the treatment group, and to around 50.3 mmHg in the control group ( $p < 0.01$ ). *Conclusions:* The treatment of air pressure chamber can increase anoxia-resisting capability of the people first arrived at high altitude, by increasing the SaO<sub>2</sub> and PO<sub>2</sub>.

#### PP003-110

### INFLUENCE ON THE BALANCE CONTROL OF THE HUMAN BODY BY ULEMF APPARATUS

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*Objective:* To discuss the features of motion on the upper limbs' encircling motion and feedback (ULEMF) apparatus with different body markers. *Method:* Eleven healthy young men aged from twenty to twenty-seven finished the motion. The motion data of the neck, shoulder, thorax and pars sacralis were collected by the motion analysis system. Through the Motion Analysis System we observed changes of the mean sway amplitude (MSA) at these parts. MSA expressed the degree of human balance control. *Results:* The mean sway amplitude MSA on the anterior-posterior direction was significantly bigger than the left-right direction and vertical direction. The MSA of neck, shoulder and thorax were much bigger than the MSA of the pars sacralis. We found significant differences between the MSA of the left and right shoulder ( $p = 0.029$ ), and significant difference between the right shoulder and thorax ( $p = 0.012$ ) on the left-right direction. On the vertical direction, we only found a difference between the left shoulder and the pars sacralis ( $p = 0.019$ ). The sequence of the motion started

from the sacral two to the thorax eight, then the shoulder and the neck. *Conclusion:* The apparatus can drive a multiple segment movement and balance control, in which the movement of body segment was from bottom to top. The upper limbs' encircling motion is an integrated, systemic motion, which can be used in balance training.

#### PP003-111

##### PRELIMINARY STUDY ON EFFECT OF NANO-DRUG FOR APOPTOSIS OF CHONDROCYTES WITH TRAUMATIC ARTHRITIS

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*Objective:* To study the effect of nano-drug for the apoptosis of chondrocytes with traumatic arthritis. *Methods:* We fabricated a kind of micro-particles which have a uniform diameter as drug carrier from oligochitosan and TPP. The oligochitosan-TPP micro-particles (OCTMPs) displayed a good biocompatibility and stability in the 7 days test of fibroblasts cell culture. In the study fluoresceinisothiocyanate (FITC) loaded OCTMPs fluorescence imaging was used to test the attachment of OCTMPs and fibroblasts. *Results:* The observing showed that OCTMPs can attach onto the surface of the cells stably. *Conclusions:* The OCTMPs can be used as a potential carrier of the medication for traumatic arthritis.

#### PP003-112

##### CLINICAL OBSERVATION OF THE REHABILITATIVE EFFECT OF THE INTEGRATED TRADITIONAL CHINESE AND WESTERN MEDICINE TO UNSTABLE ANGINA

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*Objective:* To observe the rehabilitative effect of the integrated traditional Chinese and Western Medicine to unstable angina. *Methods:* Seventy patients were randomized into two groups. 33 patients in the control group were treated by common Western Medicine and 37 patients in the treatment group were treated with combined Chinese Medicine named Shuxintang in addition to the treatment of control group received for two weeks. *Results:* The total efficacy rate of the treat group was 91.89%, whilst that of the control group was 75.76%. The difference was significant in two groups statistically ( $p < 0.05$ ). *Conclusions:* Shuxintang in combination with Western Medicine has significant therapeutic effect to the unstable angina.

#### PP003-113

##### EFFECT OF ACUTE EXERCISE ON THE EXPRESSION OF GLUT4 IN THE SKELETAL MUSCLE OF TYPE 2 DIABETES

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*Objectives:* To observe the effect of acute exercise on GLUT4 protein expression in normal and type 2 diabetic rats. *Methods:*

10 OLETF and 10 age-matched LETO rats were taken as type 2 diabetic group and control group. Then the type 2 diabetic group and the control group were each randomly allocated into two subgroups. One subgroup underwent a bout of swimming and the other one was control, and each subgroup contained five rats. The blood glucose and blood insulin of the rats in exercise groups were measured before and after 3-h-termed swimming. Then GLUT4 protein in soleus and extensor digitorum longus were measured by Western blots. *Results:* The blood glucose was decreased in LETO rats with 30.1% ( $p < 0.05$ ) and OLETF rats with 31.3% ( $p < 0.05$ ) after 3-h swimming than before. There is no statistical difference in insulin concentration between before and after swimming, although there is a decreasing tendency. There is no difference in GLUT4 protein expression in soleus and extensor digitorum longus between exercise group and control group. *Conclusion:* Exercise can decrease the blood concentration of glucose and insulin in type 2 diabetic rats. The protein expression of GLUT4 was not increased after exercise. The increasing in translocation and activation of GLUT4 may account for it, which needs further research to prove.

#### PP003-114

##### SELF-REPORTED USE OF TRADITIONAL CHINESE MEDICINE AND OTHER COMPLEMENTARY AND ALTERNATIVE MEDICINE AMONG REHABILITATION OUTPATIENTS WITH MUSCULOSKELETAL COMPLAINTS IN TAIWAN

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*Objective:* This research seeks to discover whether rehabilitation outpatients with musculoskeletal complaints used traditional Chinese medicine (TCM) and other used complementary and alternative medicine (CAM) for the same complaints, and to examine factors that predict use among this population in Taiwan. *Methods:* This is a cross-sectional survey examining patterns of use of complementary and alternative therapies in the musculoskeletal rehabilitation outpatients. A sample of 302 musculoskeletal patients was interviewed at four hospital-based rehabilitation clinics in central Taiwan. We investigate self-reported use of CAM from the time that patients suffered from the current care-seeking diagnosis. *Results:* Sixty percent of patients with musculoskeletal conditions in this study said that they combined mainstream medical treatment and complementary medicine to help them cope their symptoms. Of those who reported using CAM, 70% said they also used at least one type of TCM treatments. Besides using Chinese medicine, 53% of respondents said they used dietary supplements. Patients likely to use any kind of CAM reported poor or fair perceived health, were non-smokers, and said they sought out health information frequently. *Conclusions:* The predictors of self-reported CAM use for rehabilitation outpatients with musculoskeletal complaints were similar to those identified in other studies identified here. Being alert to health information and perceived health status are important predictors for use of any CAM, TCM and non-TCM CAM.



PP003-115

### BILATERAL SUBTHALAMIC STIMULATION IMPROVES ACTIVITIES OF DAILY LIVING AND DECREASES AXIAL SYMPTOMS IN PATIENTS WITH PARKINSON'S DISEASE

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**Objective:** To investigate the relationship between the improvement of activities of daily living (ADL) and motor function of patients with Parkinson's disease (PD) undertaken deep brain stimulation on bilateral subthalamic nuclei (DBS-STN). **Methods:** From February 2002 to February 2006, fifty-eight consecutive patients with PD who received bilateral DBS-STN were rated by the Unified Parkinson's Disease Rating Scale (UPDRS) in the conditions of medication-off and -on preoperatively. UPDRS was also evaluated in the conditions of DBS "ON" and "OFF" when the patient was off from levodopa after surgery. UPDRS ADL, part III (motor function) and axial score (sum of items 18, 27, 28, 29 and 30) were extracted for pre- and post-DBS outcome comparisons. **Results:** In patients undertaken stimulation, the scores of ADL and UPDRS III were reduced significantly ( $p < 0.0001$ ). Whereas, in patients without stimulation, UPDRS III, tremor and rigidity had significant sustained effect ( $p < 0.05$ ), but ADL and axial symptoms did not show such effect ( $p = 0.17$  and  $0.76$ , respectively). Although the correlation between improvement of ADL and motor function such as tremor was significant, ADL scores were much better correlated with axial symptoms than other motor subscores. **Conclusions:** After bilateral DBS-STN, the improvement in ADL and axial symptoms of PD patients was closely related.

PP003-116

### CLASSIFICATION OF GAIT PATTERN IN HEMIPLEGIC PATIENTS

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**Objective:** This study is designed to classify the gait patterns of hemiplegic patients using kinematic data of the knee joint and investigate the differences of clinical, kinematic, and kinetic parameters and energy consumption data in each group. **Methods:** 169 affected hemiplegic knee joints and 24 controls were recruited. Non-hierarchical cluster analysis was used to classify the gait patterns based on the kinematic parameters of the affected knee joint. The temporo-spatial, kinematic, and kinetic parameters and energy consumption data were analyzed between groups. **Results:** We classified the hemiplegic patients into four groups according to their gait patterns using kinematic data of the knee. Four groups of patients were: 1) the mildly flexed group, 2) the genu recurvatum group, 3) the stiff-knee group and 4) the extension thrust group. In the stiff-knee group and the extension

thrust group, the knee flexion was more smaller than in other groups, walking speed was significantly slower, and asymmetry of gait & O<sub>2</sub> cost were significantly higher. Also, differences in clinical, kinematic and kinetic parameters during walking were identified between groups. **Conclusion:** The hemiplegic patients were classified into four different groups through the kinematic analysis of knee. Each group showed a relatively homogeneous level of function. This classification will provide basic understanding of the hemiplegic gait and can be utilized for better treatment for hemiplegic patients in the future.

PP003-117

### EFFECTS OF 10 HZ HIGH FREQUENCY REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION IN ACUTE HUMAN MUSCLE PAIN MODEL

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**Objective:** There are a number of studies about repetitive transcranial magnetic stimulation (rTMS) on neuropathic pain after thalamic or brain stem infarctions, trigeminal neuralgia and brachial plexus injury. but there are few study about muscle pain. This study was designed to assess the effects of high frequency rTMS in acute human muscle pain model and the changes of motor evoked potential. **Methods:** Twenty musculoskeletal pain free, informed consented normal volunteer (8 male and 12 female) were evaluated. 5% hypertonic saline were injected in the left extensor carpi radialis using computer-controlled infusion pump (CURE-MATE, Chung-Sang Tech. Ltd., Korea). The changes of subject's pain scores (visual analogue scale) and motor evoked potential were measured at regular interval. The sham study was done about 3 week after the real 10Hz high frequency rTMS. **Results:** rTMS showed the rapid relief of acute pain compared to sham stimulation and continued the therapeutic effect. The amplitude of motor evoked potential was more increased on the rTMS than the sham stimulation. The amplitude of motor evoked potential was decreased after a injection of hypertonic saline. **Conclusions:** The high frequency rTMS has a pain relieving effect on acute muscle pain. The rTMS can increase an amplitude of the motor evoked potential that was decreased by acute muscle pain. These results suggest that there may be a connection between pain reducing effect of the rTMS and the facilitation of a corticospinal tract.

PP003-118

### THE EFFECT OF ACUPUNCTURE ON SIMPLE OBESITY

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**Objective:** To observe the effect of acupuncture on simple obesity. **Methods:** Sixty-eight cases of simple obesity were divided into an acupuncture group and a control group randomly. Changes in obesity and subhealth condition indexes were observed. **Results:** There was a significant difference on weight and subhealth condition indexes between acupuncture group and control group. **Conclusion:** Acupuncture treatment has a reducing effect on simple obesity. The ameliorative effect of acupuncture on subhealth condition indexes was superior to simply on a diet.

## PP003-119

**CLINICAL OBSERVATIONS ON COMBINED TREATMENT OF KNEE JOINT PAIN****Yiping Yang***Department of Rehabilitation, Guizhou Provincial People's Hospital, Guiyang City, Guizhou, China*

**Objective:** To alleviate knee joint pain, remit the symptoms, delay the aggravation of the disease, and protect joint functions. **Methods:** Two hundred and nine cases of knee joint pain were randomly divided into two groups: Treatment Group (108 cases) were treated by linear polarized infrared light radiation (the apparatus made in Japan), ultrashort wave therapy and computerized medium-frequency electrotherapy; Control Group (101 cases) was treated by medication. The therapeutic effects of the two groups were compared. **Results:** Through three course of treatment, there was significant difference in cured rate between treatment group and control group based on statistical data analysis with a total cured rate reaching 92.6% in the treatment group. **Conclusion:** Osteoarthritis is a common disease among middle-age people induced by focal articular cartilage degeneration, bone resorption and osteophyte development. The gender difference is male to female of 1:1.5 and the incidence increases with age. Knee joint pain is the main clinical symptom of osteoarthritis and it would influence patients' daily life and work and even quality of life. The combined treatment of knee joint pain by linear polarized infrared light radiation, ultrashort wave therapy and computerized medium-frequency electrotherapy is a safe, painless and effective therapeutic approach with insignificant side effects. It could improve local blood circulation, reduce swelling, and enhance pain threshold, and eventually achieve satisfactory therapeutic effects.

## PP003-120

**EFFECTS OF ANGLES AND DURATION OF WRIST SPLINTING ON NERVE CONDUCTION****Chia-Ling Lee<sup>1</sup>, Jiu-Jen Hsu<sup>1</sup>, Mao-Hsiung Huang<sup>1</sup>, Yu-Sheng Yang<sup>2</sup>***<sup>1</sup>Department of Rehabilitation Medicine, and <sup>2</sup>Department of Occupational Therapy, College of Health Science, Kaohsiung Medical University, Kaohsiung City, Chinese Taipei*

**Objective:** Splinting has been commonly used in rehabilitation clinics. Some studies previously investigated the effect of wrist splinting angle on carpal tunnel pressure and median nerve morphology. The purpose of this study was to identify the effects of the angles and duration of wrist splinting on nerve conduction. **Methods:** Forty healthy volunteers were equally classified into four groups and splinted with different angles, including 0, 15, 30 and 45° of extension. Nerve conduction studies were performed before splinting and repeated after splinting for 2, 4 and 6 h, respectively. The velocity, amplitude and distal latency of compound motor action potential (CMAP) and sensory nerve action potential (SNAP) of median and ulnar nerves were recorded. **Results:** After continuous splinting for six hours, the differences of all the parameters of nerve conduction studies were not significant among different wrist angle groups. The differences of those parameters were also not significant in different time points in the group of 45°-extension. **Conclusions:** In healthy subjects, the changes of the nerve conduction after 6-h splinting with angles less than 45° were not significant. Therefore, there was no significant effect on nerve conduction after splinting with angles less than 45° and for less than 6 h.

## PP003-121

**QUALITY OF LIFE IN PATIENTS WITH DIABETIC FOOT PROBLEMS****Mazlina Mazlan, Saini Freddy***Department of Rehabilitation Medicine, Hospital Kuala Lumpur, Kuala Lumpur, Wilayah Persekutuan, Malaysia*

**Objectives:** The burden of illness experienced by patients with diabetes is greatly associated with diabetes complications including foot complications. Diabetic foot can lead to reduced physical function, mobility, vitality and mental health. The main aim of this study is to assess the impact of foot complications on health-related quality of life (HRQoL) in patients with diabetes attending outpatient clinics. **Methods:** This is a case-control study to compare the HRQoL of diabetic patients with and without foot complications (case and control group respectively) attending outpatient clinics in University Malaya Medical Center. The instrument used to assess the patients' HRQoL was Medical Outcomes Study Short-Form 36 (SF-36), a generic HRQoL questionnaire using two languages, English and Bahasa Melayu. **Results:** Patients with diabetic foot problems scored substantially lower for all SF-36 domains when compared to the control group ( $p < 0.05$ ). Diabetic foot problems have a greater impact on the patients' physical health and lesser impact on mental health. This is evidenced by the larger difference found for the role physical (case: 68.75 vs control: 93.75) and physical functioning domains (case: 55.00 vs control: 80.00) compared to the mental health domain (case: 65.00 vs control: 77.50). Profiles such as female gender, younger age group (age 35-44 years), unemployed, obesity and diabetes duration of more than ten years were significantly associated with a lower score in certain SF-36 domains (all  $p < 0.05$ ). After controlling for the confounders, only gender and diabetes duration were found to be significantly associated with HRQoL. **Conclusion:** Diabetic foot complications negatively affect HRQoL. Patients with diabetic foot problems had a statistically significant lower HRQoL in the physical and mental health when compared to diabetic control. Both gender and duration of diabetes influence the HRQoL perceived in patients with foot complications.

## PP003-122

**A DEVICE SUBSTITUTING GLOTTIC FUNCTION FOR AIR STACKING EXERCISE IN BULBAR DOMINANT AMYOTROPHIC LATERAL SCLEROSIS****Seong-Woong Kang<sup>1</sup>, Sang-chul Lee<sup>2</sup>, DongHyun Kim<sup>1</sup>, HoHyun Ryu<sup>1</sup>, JongHoon Baek<sup>1</sup>***<sup>1</sup>Department of RM and Rehabilitation Institute of Muscular Disease, Yonsei University College of Medicine, Seoul, <sup>2</sup>Department of Rehabilitation Medicine, Myongji Hospital, Kwandong University College of Medicine, Korea*

**Objective:** Patients with neuromuscular disease can have severe inspiratory and expiratory muscle weakness that diminishes vital capacity and lung compliance. Atelectasis and the inability to effectively cough out airway secretions are the main cause of respiratory failure and mortality. Therefore, air-stacking exercise which insufflates the lung to its maximal capacity is mandatory to maintain pulmonary compliance. However, amyotrophic lateral sclerosis (ALS) with bulbar muscle weakness or indwelling tracheostomy cannot induce glottic opening and closure. For these patients, we developed a device which replaces dysfunctional glottis, and enables maximal insufflation through air-stacking. **Methods:** 1) Participants: 26 ALS patients with bulbar muscle

weakness or indwelling tracheostomy. 2) Device: T-shaped device is mainly composed of connection and control part. One-way valve is installed to the connection part to provide extra volume of air via a manual resuscitator bag, which also prevents air leakage. The control part is designed to artificially modulate glottic opening and closure. 3) Outcome measure: Vital capacity (VC), maximum insufflation capacity (MIC), and maximum insufflation capacity with a device (MIC-device) were measured. *Results:* For the 19 patients, MIC was unobtainable with conventional methods. However, with help of the device which enables air stacking, MIC was successfully measured for all patients. Mean VC and MIC-device were  $914.1 \pm 504.5$  ml,  $1540.4 \pm 718.8$  ml, respectively. 7 other patients were able to produce MIC without the device, and mean MIC and MIC-device were  $914.6 \pm 196.6$  ml,  $1649.1 \pm 252.2$  ml, respectively. MIC-device of the patients was significantly higher than MIC alone. *Conclusions:* The new device enables air stacking, which is mandatory for lung expansion. It also makes it possible to maintain or even improve pulmonary compliance, which eventually prevents lethal pulmonary complications.

#### PP003-123

### CURRENT DEVELOPMENT OF DEPARTMENTS OF REHABILITATION MEDICINE IN THE GENERAL HOSPITALS IN JIANGXI PROVINCE

#### Feng Zhen

*Department of Rehabilitation, First Affiliated Hospital of Nanchang University, China*

*Objective:* To understand the current development of Rehabilitation Medicine in the General Hospitals of Jiangxi Province. *Methods:* Twenty-nine General Hospitals were surveyed on the number of hospital beds, the characteristics of profession, the composition of professional and technical personnel through means including questionnaire and personal investigation. *Results:* The existing problems are mainly as follows: Confusion about the names used for the rehabilitation department, irregularity of installing as a specialty in the Department of Rehabilitation Medicine, lacking characteristic and professional and technical personnel, unable for Rehabilitation Medicine to take part in clinics as first line assessing patients. *Conclusion:* Efforts should be continued in standardization of the name for rehabilitation department and promotion of Rehabilitation Medicine for further development of the Specialty in Jiangxi Province.

#### PP003-124

### CASE REPORT ON THE TREATMENT OF ACUTE INFLAMMATION DUE TO CUPPING (NEGATIVE PRESSURE)

#### Jun Wang, Zhen Feng, Bopin Yang

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*Objectives:* To explore the correct treatment of acute inflammation due to cupping, which is a type of Traditional Chinese Medicine. *Case Report:* A patient received cupping treatment, which was complicated with acute and diffuse inflammation. He was then treated with ultrashort wave and ultraviolet radiation. *Results:* The acute inflammation subsided on combined treatment with ultrashort wave and ultraviolet radiation. *Conclusion:* Prevention of acute inflammation must master the indication of cupping accurately. Combining ultrashort wave with ultraviolet radiation was effective in healing the acute inflammation induced by cupping in this case study.

#### PP003-125

### BRACHIAL PLEXOPATHY AFTER CARDIAC MRI – AN UNCOMMON CAUSE OF BRACHIAL PLEXUS INJURY

#### Kin Keung Yip, Sheung Wai Li

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*Case Report:* We report a case of brachial plexopathy that occurred during positioning of upper limbs for routine magnetic resonance imaging (MRI) of the heart. A 58-year-old man with a history of ischemic heart disease and cervical spinal fixation for spinal injury resulting in reduced spinal movement was scheduled for MRI of the heart for assessment of myocardial ischemia. He developed an acute onset of left upper limb pain and numbness during the MRI procedure. Physical examination revealed weakness of the left upper limb with power of 1/5 in shoulder abductors, 4/5 in elbow flexors, 3/5 in elbow extensors, 2/5 in wrist extensors and 4/5 in finger flexors and extensors. The lateral flexion of the neck was zero degree by clinical measurement. Nerve conduction study and electromyography revealed findings consistent with a diagnosis of left supraclavicular brachial plexopathy. Radiography of the thoracic inlet and MRI of the left brachial plexus did not reveal any accountable structural abnormalities. *Discussion:* The brachial plexus is occasionally susceptible to compression injury during improper positioning. We postulated that in the presence of a markedly reduced range of movement of the cervical spine after spinal fixation surgery, an excessive focal pressure can be exerted on the supraclavicular brachial plexus when the shoulder is held in an abducted position inside the MRI cabinet. *Conclusion:* We recommend extreme caution during positioning the upper limbs for MRI procedure in any patients with reduced cervical spinal movement to avoid brachial plexus injury.

#### PP003-126

### SARCOPENIC OBESITY: AN UNRECOGNIZED CAUSE OF DISABILITY IN THE ELDERLY

#### Robin Sekerak

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Sarcopenic Obesity is a nosogenic term that is becoming identified with disability in the elderly. With the rapid aging of society, maintaining function in the elderly is a priority at all societal levels. Along with current trends of inactivity and obesity, we face the possibility of overwhelming disability in this group. Most societies are ill-equipped for this potential burden of care. If not recognized the impact of sarcopenic obesity, on financial, medical, and human resources, is likely to become profound. *Objectives:* Define the term Sarcopenic obesity. Discuss the usefulness of this terminology as opposed to the component parts. Discuss the physiology. Describe how it relates to frailty and function. Discuss prevention, interventions, and treatments. Discuss how this may affect rehabilitation potential and length of stay. Discuss the need for prevention and early intervention. Discuss the Rehabilitation Physician's role in education, intervention, and treatment. *Methods:* Extensive literature review. *Results:* Sarcopenic Obesity is useful as a working terminology. It is highly correlated with frailty and loss of function. Some conflicting study results are based on different methodologies and outcomes measures. Although obesity and sarcopenia each relate to decreased mobility and function independently, the two are interrelated and act synergistically to cause disability. The relationship between muscle lipid, strength,



and disability has been recognized. *Conclusions:* Sarcopenic Obesity threatens to create an epidemic of disability in developed and developing countries that we can ill afford. This will affect Rehabilitation Physicians worldwide. We as Rehabilitation Physicians have a unique role, in our function-based medicine, to recognize this condition, to intervene early, and educate others, to avoid an epidemic of disabled elderly.

#### PP003-127

### THE EFFECT OF REHABILITATION EXERCISE ON SPORT ENDURANCE OF ELDER PATIENTS WITH CORONARY ARTERY DISEASE AFTER PTCA

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*Objective:* To evaluate the effects of rehabilitation exercise on sport endurance of elder patients with coronary artery disease after PTCA. *Methods:* Two hundred and forty-two elderly CHD patients with coronary artery disease after PTCA were divided into two groups, 121 patients were included in rehabilitation group and control group, respectively. Rehabilitation group participate in rehabilitation exercise for 3 months. Two groups were measured in six min walking test with COSMED K4b2 to observe the change of  $VO_2$ max, HRmax, METsmax, maximal walking distance and  $VO_2$ /HR at the beginning and the end of the test. *Results:* The  $VO_2$ max, METs and maximal walking distance were significantly increased in rehabilitation group after 3 months rehabilitation, compared with the control group ( $p < 0.01$ ), and peak HRs were lowered significantly ( $p < 0.05$ ). The metabolic indexes in patients of rehabilitation group were also improved significantly ( $p < 0.01$ ) after rehabilitation exercise. *Conclusions:* Rehabilitation exercise was beneficial to improve heart function and sport endurance of elder patients with coronary artery disease after PTCA.

#### PP003-128

### CLINICAL CONTROLLED OBSERVATION OF TRADITIONAL LYSIS FOR SHOULDER JOINT SYNARTHROPHYSIS UNDER BRACHIOPLEXUS NERVE BLOCK FOR SHOULDER PERIARTHRITIS

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*Objective:* The aim is to search the clinic effective means of treating shoulder arthritis through observing different treatments, which are traditional lysis for shoulder joint synarthrophysis under brachio-plexus nerve block and joint mobilization. *Methods:* Eighty patients were separated into treatment group and control group randomly. In the treatment group, we supplied the traditional lysis for the shoulder joint synarthrophysis under the brachio-plexus nerve block. In the control group, we supplied the joint mobilization. For both groups, we used the functional exercise and physical therapy. After finishing the treatment courses, we made the statistics analysis to compare the pain evaluation and movement function. Comprehensive evaluation including effective rate was performed before and after treatment for the two groups. *Result:* From the effect statistics, the cure rate of the treatment group was 77.5% and effective rate was 97.5% when compared that with the control group. *Conclusion:* The effect of the traditional lysis for the shoulder joint synarthrophysis under the brachio-plexus nerve block is significant.

#### PP003-129

### LONG TIME POSTURE KEEPING OF TAIJIQUAN IN THE THERAPY OF SPASTICITY INDUCED BY ANOXIC ENCEPHALOPATHY

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*Objectives:* To observe the effect of long-time posture keeping of TaiJiQuan in therapy of spasticity induced by anoxic encephalopathy. *Methods:* A 27-year-old hospitalized patient, suffering from anoxic encephalopathy for 2 years, with quadriplegia, spasticity, nystagmus, dysarthria and autonomic nervous dysfunction, already received physical therapy 3 h a day for 18 months. No progress in the recent 6 months with Fugel-Meyer scale, Berg Balance Scale and Modified Barthel Index. *Methods:* Training method is posture keeping of TaiJiQuan 30 min each, one or two times a day. Follow-up assessment include Berg Balance Scale, Modified Barthel Index, 10-m Walking, and Simple Test for Evaluating Hand Function weekly for 10 months with detailed video recording. *Results:* In 10 months, Berg Balance Scale increases from 30 to 50, Modified Barthel Index from 7 to 19, STEF from 52 to 74, 10 m walking speed from 0.48 to 0.99 m/s. The patient even became able to walk outdoor and enjoy his meal with chopsticks. The most great progress was made when he stayed at home for 40 days, no physical therapy, but posture keeping of TaiJiQuan 1 h each, two or three times a day. The instant effect lasts for about half an hour can be observed easily by the patient himself. *Conclusions:* Long-time posture keeping of TaiJiQuan as a self-training method in therapy of spasticity may be of special effect.

#### PP003-130

### INTERPERSONAL MANNER AND TECHNICAL QUALITY-FACTORS IN PATIENT SATISFACTION: DEVELOPING A PATIENT SATISFACTION TOOL

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*Objective:* We developed a patient satisfaction tool assessing the quality of care at the Rehabilitation Medicine Outpatient Clinic by key informant interviews, focus group discussion, committee review, pre-testing and determined its reliability and validity. We described the over-all level of satisfaction and determined the relationship of patient and provider characteristics with patient satisfaction. *Method:* Six hundred patients at the said clinic participated in the study. We determined internal consistency using Cronbach alpha. A panel of content experts assessed content validity. We evaluated convergent validity by testing a priori hypotheses. We assessed construct validity with factor analysis. We performed univariate and multivariate analyses to determine associations of socio-demographic, clinical, and provider characteristics with patient satisfaction. We used descriptive statistics to describe the overall satisfaction. The Patient Satisfaction tool has a 7-component structure (Interpersonal Manner, Technical Quality, Accessibility/Convenience, physical environment, availability of providers/facilities, continuity of care, and efficacy) with 12 items, an over-all satisfaction rating (faces scale) and an open-ended question for comments and suggestions. *Result:* It has been shown to have some reliability and validity for assessing patient satisfaction with the rehabilitation medicine outpatient clinic. Internal consistency was shown to be good to excellent in all the scales except the accessibility/convenience subscale. In general, the items are related to the domains of the scale and are adequate in

reflecting the objectives of the tool implying content validity. The summed scores of each domain specified in questionnaire correlate with measures of global satisfaction reflecting convergent validity. Positive ratings are manifested in the domains on interpersonal manner, technical quality, and physical environment. Low ratings are persistent in the continuity of care and accessibility (waiting period) components. *Conclusion:* Greater satisfaction is associated with being young, being a recurring/continuous patient, being attended to by a trainee, and with the patient being the respondent himself.

**PP003-131**

**THE CLINICAL STUDY ON CHILDREN WITH CEREBRAL PALSY AND GENU RECURVATUM**

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*Objective:* To obtain the statistics of morbidity, age and clinical subtypes of children with cerebral palsy (CP) marked with genu recurvatum and to explore the causes of this disease. *Methods:* With clinical observations and statistical analyses of 300 untreated children with the diagnosis of CP or ZKS. *Results:* The incidence of genu recurvatum in children with CP was 21.5% and the ages focus on between 1–3 years old. Spastic subtype or spasm of mixed subtype is mostly seen in clinic, accounting for 72.5%. *Conclusion:* It has high morbidity in genu recurvatum among children with CP and it is an important factor to consider for rehabilitation of CP. Abnormal standing or walking and muscle tension are the key factors which result in genu recurvatum.

**PP003-132**

**APPLICATION OF TREATMENT OF TRADITIONAL CHINESE MEDICINE IN REHABILITATION OF CHILDREN WITH CEREBRAL PALSY**

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*Objective:* To summarize the situation of traditional Chinese medicine (TCM) treatment in rehabilitation of children with cerebral palsy (CP) and introduce its features and advantages. *Methods:* We described the therapeutic methods of TCM rehabilitation in our rehabilitation centre including Tuina, acupuncture, Chinese medicines for internal and external use, TCM in combination with modern physical therapy, and the progress in the present studies of Chinese medical therapy. *Results and conclusion:* TCM treatment in CP children has conspicuous efficacy in reducing muscle tension, increasing muscle strength and correcting posture, promoting development and improving the health statue. However, there is deficiency in pure TCM treatment, and the best therapeutic effect can be obtained by combination of TCM rehabilitation methods with modern rehabilitation technologies.

**PP003-133**

**THE EFFECT OF HIGH FREQUENCY RTMS ON SPINAL CORD EXCITABILITY AND SPASTICITY TREATMENT FOR STROKE PATIENTS**

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*Objective:* Repetitive transcranial magnetic stimulation (rTMS) is reported to be helpful in spasticity treatment by inhibiting

spinal cord excitability on normal people. This research is aimed at finding out the effect of rTMS on spinal cord excitability and spasticity treatment. *Method:* Subjects were 10 stroke induced hemiplegic inpatients of Rehabilitation Medicine, Chung Nam National University Hospital. Test method involved measuring H-reflex from active electrode on ampulla of plegic flexor carpi radialis muscle with the motor evoked potentials (MEPs) being fired from the scalp, where maximal response of plegic flexor carpi radialis muscle could be induced, with figure 8 resembling coil and the magnetic stimulation strength set at 120% of threshold. rTMS was carried out 10 times at frequency of 10Hz with 10 se stimulation followed by 20 sec rest, totaling to 1000 stimulations to the affected brain's primary motor area. rTMS was carried out at 120% of threshold and MEP and H-reflex were measured at pre, post, 15 and 30 min post stimulation. After 2 weeks of triweekly sessions of high frequency rTMS, MAS scores were compared with a non-treated group. *Results:* High frequency rTMS increased the amplitude of MEP but H-reflex amplitude and H/M ratio decreased. High frequency rTMS effect on H-reflex persisted for 30 min. Spasticity reduced with statistical significance in high frequency rTMS group. *Conclusion:* High frequency rTMS, by reducing spinal cord excitability in stroke induced hemiplegic patients, could be clinically useful in spasticity treatment in stroke patients.

**PP003-134**

**THE INFLUENCE OF NASOGASTRIC TUBE ON SWALLOWING FUNCTION IN DYSPHAGIC PATIENTS**

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*Objectives:* To investigate the influence of nasogastric (NG) tube on swallowing function in patients with dysphagia. *Methods:* Data collected from a videofluoroscopic swallowing study (VFSS) using protocol modified from Logemann's study. Forty-six patients recently fed via NG tube were recruited for this study. All patients underwent VFSS study twice with (tube-in) and without NG (tube-out) tube in random order. Clinical dysphagia scale (CDS) was calculated based on history and physical examination regarding swallowing function. Aspiration rate, bolus transit time, pharyngeal residue and functional dysphagia scale (FDS) were measured from the result of VFSS. *Results:* The aspiration rate of tested food including fluid, pudding, and curd type yogurt was significantly higher in tube-in state than in tube-out state. The amount of pharyngeal residue of fluid was also significantly increased in tube-in state, but bolus transit time was not significantly changed in all type of tested food. Among 46 patients, 29 patients demonstrated higher aspiration rate in tube-in state than in tube-out state (aggravated group), but the others did not show change in aspiration rate after tube-out (not-aggravated group). Sex, age, type of underlying cause, CDS and FDS did not differ between aggravated and not-aggravated group. However time interval from onset to evaluation day was significantly longer in aggravated group. *Conclusions:* The presence of NG tube had a significant impact on swallowing function in patients who were fed via NG tube. More aspiration occurred in the presence of NG tube, and time interval from onset to evaluation day was significantly correlated with additional aspiration with NG tube. These results suggest that more attention should be paid on oral feeding in the presence NG tube.

## PP003-135

**CERVICAL AND THORACIC EPIDURAL BLOCKADES****Igor Martuliak, Pavel Schvarcz, Karol Kralinsky***Pain Department, F.D. Roosevelt University Hospital, Banska Bystrica, Slovak Republic*

**Objective:** To show the place of epidural blockades in cervical and thoracic level in the pain treatment. Authors describe their opinion and experience with this method in group of 102 patients. **Methods:** From 1994 to 2007, 5,500 epidural blockades were applied in our Algesiology Department, out of which 102 patients were in cervical and thoracic level. Of this group, 27 were treated for acute pain and 75 were for chronic pain. Indications were Cervicobrachial sy. (18 pts), Myofascial sy. (8 pts), Intercostal neuralgia (3 pts), N. ulnaris damage (1 pt), Post-mastectomy Pain (1 pt), and Painful pancreatitis (1 pt). The level of catheter tip or solution application in the group was C4-Th3: 62 pts., Th4-Th8: 31 pts. and Th9-Th12: 9 pts. Frequency of application were: single in 30 pts., twice a day in 4 pts., three times a day in 61 pts. and continuously (perfusor) in 7 pts. Types of blockade were single application in 30 pts., catheter in 70 pts. and port in 2 pts.. Applied remedy were lidocain 0.5% alone or with betamethason, ketamin, morphine, clonidine or its combination. **Results:** The required state of analgesia (no pain and significant improvement) was reached in 80.4% pts. Observed adverse effects resulted from applied morphine in 4 patients (vomiting + pruritus, urine retention, nausea, de-orientation), from epidural blockade in 4 pts. (Painful application, blocked or cranked catheter, nosocomial inflammation with subcutaneous suppuration in catheter tunneling region treated by antibiotics and surgery). **Conclusion:** Epidural blockades in cervical and thoracic level are a very useful and safe method in the pain treatment. It needs to master the technique and pharmacology for their appropriate application in pain management.

## PP003-136

**CHINESE MEDICINE REHABILITATIVE TREATMENT OF ANKYLOSING SPONDYLITIS-INDUCED PAIN****Xiao-yan Liu***School of Preclinical Medicine, Beijing University of Chinese Medicine, Beijing, China*

**Objective:** To discuss the measures that might be taken in Chinese medicine (CM) to relieve Pain induced by Ankylosing Spondylitis in the process of rehabilitation. **Methods:** Literature of the recent 15 years concerned about the CM treatment of the Ankylosing Spondylitis induced pain in the process of rehabilitation was reviewed. Civilian therapy treatment of the Ankylosing Spondylitis induced pain was also summed up and classified. **Results:** Several kinds of treatment were taken by CM to manage the Pain induced by Ankylosing Spondylitis. They were Chinese herbs taken orally, acupuncture, massage, Qi-gong and Dao-yin, herb bath, and bee venom. Chinese herbs took a primary role in the process of rehabilitative treatment. It was proved by a number of clinic reports that oral Chinese herbs demonstrated a particular advantage in reliving and even getting rid of the pain induced by Ankylosing Spondylitis. As an assistant rehabilitative treatment, herbs acupuncture and massage could relieve and eliminate the pain of the waist and sacro-iliac joint caused by muscular tension induced by arthropathy at the waist and back. Qi-gong Dao-yin, such as Yi-jin-jin, could improve the painful stiffness of joints through extending the muscles and inflamed joints by oneself.

Herb bath could ease the pain effectively by means of Chinese herbal water or steam through skin. Bee venom is a biological mean of rehabilitative treatment. It could eliminate the pain while bee stinging the points on the back. **Conclusions:** CM is of distinct predominance in the process of rehabilitation treatment of Ankylosing Spondylitis induced pain with abundant means, which have distinguished relieving effect. So the use of CM as measures to relieve the pain in AS should be promoted and applied in routine practice.

## PP003-137

**PHYSICAL ACTIVITY AND VASCULAR DILATION FUNCTION IN MID-AGED PEOPLE****Qi Liang<sup>1</sup>, Hong Ma<sup>2</sup>, Yuling Wang<sup>1</sup>, Bing Sun<sup>2</sup>, Donghong Liu<sup>2</sup>***<sup>1</sup>Department of Rehabilitation Medicine, <sup>2</sup>Department of Cardiology, First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China*

**Objective:** Physical activity is associated with lower risk of cardiovascular disease, but the mechanisms are uncertain. Endothelial dysfunction has been linked with risk of cardiovascular disease. We therefore examined the relationship between physical activity and vascular endothelial-dependent dilation function. **Methods:** We recruited 91 healthy, mid-aged people to complete a self-report 7-day physical activity recall questionnaire and an examination of brachial artery flow-mediated dilation (FMD) and Nitroglycerin-mediated dilation (NMD) detected by ultrasonography. The relations between physical activity level (PAL) and FMD and NMD were analyzed. **Results:** Physical activity showed a significant and positive relationship with FMD, even after adjustment for possible confounders ( $r=0.281$ ,  $p=0.007$ ). The group of high physical activity level has the highest FMD and NMD. FMD (%) in low, moderate and high PAL were respectively  $8.68 \pm 3.93$ ,  $9.01 \pm 3.23$  and  $12.38 \pm 5.67$  with significant difference ( $p=0.006$ ). Similarly, NMD (%) is  $24.62 \pm 7.43$ ,  $24.38 \pm 5.44$  and  $29.50 \pm 7.25$  respectively ( $p=0.023$ ) but there is no difference between low and moderate PAL. There was no positive relation between PAL and FMD in women before menopausal but positively related in men and postmenopausal women. Although the group of high PAL had the best FMD, the moderate PAL can also retard FMD decrease with ageing. **Conclusions:** These data suggest that the benefit of physical activity on cardiovascular disease may be at least partly a result of effects on endothelial-dependent dilation function.

## PP003-138

**THE EFFECT OF CERVICAL MUSCLES ON NECK PAIN AND THE REHABILITATION EVALUATION OF TUINA THERAPY****Shunyun Jiang<sup>1</sup>, Juantao Yan<sup>1</sup>, Min Fang<sup>1</sup>, Shuizong Hong<sup>2</sup>***<sup>1</sup>Tuina Department, Yue Yang Hospital of Traditional Chinese & Western Medicine, Shanghai University of TCM, <sup>2</sup>Biomechanics Research Room, Engineering Mechanics Department, Shanghai, China*

**Objective:** The purpose of this study is to investigate the role of cervical muscles, to evaluate the rehabilitation outcomes of Tuina and traction therapies in patients with neck pain. **Methods:** Randomized, comparative clinical trial. 93 subjects with and without neck pain were enrolled in this study. The patients with neck pain were divided into two groups randomly, one group was treated with Tuina manipulation and the other group was managed with traction with 30 normal people as control group. All



the subjects were asked to accomplish neck pain test with Visual Analogue Score (VAS), the characteristics of cervical muscle with Peak Torque (PT), Average Power (AP), AGON/ANTAG RATIO (F/E), and Neck Disability Index (NDI), then analyze the relationships among VAS, NDI, PT, AP and F/E. *Results:* There are significant differences between patients and normal people in VAS, NDI, PT, AP and F/E. Both groups treated either with Tuina or traction therapies improved in neck pain. The characteristics of cervical muscles differed significantly. *Conclusion:* There is high relationship among the results of VAS, NDI, PT, AP and F/E. Characteristic of cervical muscles is the most essential factor related to the prevalence of neck pain. Both Tuina manipulation and traction therapies are effective methods in reduction of neck pain. VAS, NDI, PT, AP and F/E are the alternative methods for evaluation of cervical spondylosis rehabilitation.

#### PP003-139

##### STUDY ON THERAPEUTIC EFFECT OF ACUPUNCTURE ON DYSPHAGIA AFTER STROKE

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*Objective:* To study the therapeutic effect of acupuncture on dysphagia after stroke. *Methods:* Sixty cases were divided randomly into acupuncture group ( $n=30$ ) and control group ( $n=30$ ). In acupuncture group, lianquan, yamen, tianzhu was selected as main acupoints. The control group were treated with VitalStim Therapy (Chattanooga Group, USA). Taking the change of dysphagia (water swallow test) as the main parameter, the curative effect before and after treatment was observed and the statistical analysis was performed. *Result:* The total effective rate of treatment group was 90.0% and that of control group was 76.7%. There was an obvious difference between the two groups ( $p<0.05$ ). *Conclusion:* The acupuncture therapy has obvious therapeutic effect on dysphagia after stroke.

#### PP003-140

##### EFFECT OF PULSED ELECTROMAGNETIC FIELDS OF DIFFERENT MAGNETIC INTENSITY ON BONE MINERAL DENSITY OF FEMUR IN OVARIETOMIZED RATS

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*Objective:* The purpose of this study was to observe the effect of PEMFs of different intensity on bone mineral density of femur in ovariectomized rats, so as to find out the intensity for the best therapeutic efficacy. *Methods:* Fifty female SD rats were randomly divided into five groups: 1) sham-operated control (no PEMFs treatment), 2) ovariectomized control (no PEMFs treatment), 3) ovariectomized I (PEMFs treatment at 8HZ frequency with 0.77mT intensity, 40 min daily for 30 days), 4) ovariectomized II (PEMFs treatment at 8HZ frequency with 3.82mT intensity, 40 min daily 30 days), and 5) ovariectomized III (PEMFs treatment at 8HZ frequency with 9.87mT intensity, 40 min daily 30 days). Except for 10 rats of the sham-operated control group, a standardized ovariectomy was used in every rat. Estradiol (E2) of serum, bone mineral density (BMD), bone calcium contents and biomechanical properties (peak load, maximum displacement, maximum energy absorption, maximum stress, maximum strain and modulus of elasticity) of femur were assessed at 30 days after PEMFs treatment. *Conclusion:* Overall,

pulsed electromagnetic fields can prevent the loss of bone mass and the decline of BMD in ovariectomized rats. Under certain field frequency (8Hz) and time (40 min/day $\times$ 30days), PEMFs by the three different magnetic intensity can significantly improve BMD and bone calcium contents of femur to exceed or approach the normal level in ovariectomized rats, but among the three groups, there was no significant difference. It showed that 3.82 mT PEMFs had better calcium contents of femur than the 0.77 and 9.87mT PEMFs in ovariectomized rats.

#### PP003-141

##### A RETROSPECTIVE STUDY OF NUTRITIONAL STATE CHANGE IN STROKE PATIENTS IN KOREA

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*Objectives:* To compare the nutritional state of stroke patients in acute stage with those in chronic stage and to evaluate factors that may affect the patient's nutritional state in South Korea. *Methods:* A retrospective study. Medical records of stroke patients, who were hospitalized at acute stage in our hospital from January 2005 to February 2007, were reviewed. They were follow-up regularly as outpatients for at least 6 months. Measurement scales applied were body mass index (BMI, nutritional information of anthropometric measurement) and biochemical findings such as albumin, total lymphocyte count (TLC) and hemoglobin. Considerable factors that might affect the patient's nutritional state include patient's mobility, mode of feeding, type of medical insurance as a socioeconomic status, diabetes mellitus, dysphagia, and medication for depression. In our study, 34 males and 27 females were studied and mean age of patients was 60.13 years old. Mean follow up duration was 456.64 days. *Results:* BMI was decreased from 23.85 to 23.16 kg/m<sup>2</sup> ( $p=0.049$ ), albumin was decreased from 4.09 to 3.88 g/dl ( $p=0.012$ ) and TLC was decreased from 2056.64 to 1772.26/l ( $p=0.034$ ) in chronic state. Significantly, nutritional imbalance was severe in chronic patients with tube feeding or poor mobility or dysphagia or taking a medication for depression. *Conclusions:* Control of patients' nutritional state is crucial for better outcome not only at acute stage but also at chronic stage in stroke patients. Therefore, medical institutes should care for nutritional state in stroke patients.

#### PP003-142

##### THE EFFECT OF DOUBLE APPLICATION OF FUNCTIONAL ELECTRICAL STIMULATION IN PATIENTS WITH DYSPHAGIA AFTER STROKE

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*Objectives:* The objective of this study was to investigate the outcomes of functional electrical stimulation (FES) which was applied twice a day in patients with dysphagia after stroke. *Methods:* Eleven patients with dysphagia after stroke were participated. The electrical stimulator with two channels was employed for 40 min daily or 40 min twice a day for 15 days. Participants were divided into two groups by random method. The FES was performed twice a day for Twice-FES group ( $n=6$ ), and once a day for Standard-FES group ( $n=5$ ). For evaluation of dysphagia, the functional dysphagia scale by videofluoroscopic swallowing study, and swallow function scoring system by six clinical swallowing stage were

assessed at pre- and post-treatment. *Results:* In both groups, there was a significant decrease of total functional dysphagia scales after FES treatment ( $p < 0.05$ ) and the results mainly affected the pharyngeal phase of deglutition. There was no significant difference between the two groups in total functional dysphagia scales, but the Twice-FES group had a decreased residue in oral cavity compared to the standard FES group. In both groups, there were significant improvements in swallow function scoring system ( $p < 0.05$ ). The twice-FES group had more high clinical swallowing stages. *Conclusions:* The results demonstrated that FES is a clinically effective intervention in treatment of stroke patients with dysphagia. Moreover, the treatment applied twice a day had relatively positive effects on the reduction of oral cavity residue and the improvement of clinical swallowing stage.

#### PP003-143

##### RESEARCH ON RECRUITMENT AND THE RECRUITMENT CURVE OF VASTUS MEDIALIS

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*Objective:* To explore and evaluate on the mode of motor unit recruitment and the influencing factors of recruitment by using SEMG, to lay reliable foundation for extending clinical application of SEMG. *Method:* Four healthy young males performed isometric ramp contractions in knee extension with the force gradually. SEMG signals were recorded respectively from their bilateral vastus medialis. The experimental data's analysis of curve estimation, nonlinear regression and otherwiseness was made. *Results:* The estimative curve optimum of each parameter with MVC% is all cubic. *Conclusions:* Cubic is the curve of recruitment.

#### PP003-144

##### STUDY ON THE RELATIONSHIP OF LUMBAR DISC HERNIATION AND MANIFESTATION ON RADIOLOGICAL EXAMINATION

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*Objective:* To explore the relationship to the clinical diagnosis and the radiologic examination about lumbar disc herniation and their clinical significance. *Methods:* One hundred and forty-five cases with clinical diagnosis as lumbar disc herniation (L3-4, L4-5, L5-S) were scanned by CT. According to the degree of protrusion of the disc, they were divided in to two groups 1)  $< 0.5$  cm and groups 2)  $> 0.5$  cm. To assess relation to the degree of the pain by VAS, accounting for the tenderness points on lumbar and lower extremity and the change of image. *Results:* All of 145 patients showed changes on radiological examination. 9 cases of them only showed the degeneration. Herniated lumbar disc of L4-5 could be observed in 56 cases, that of L5/S1 in 67 cases, that of L4-5.L5/S1 in 11 cases and that of L3-4.L4-5.L5/S1 in 2 cases, respectively. Herniated disc with slipped vertebra body were of 14 cases, and with degeneration were of 89 cases. There was no difference between herniated disc  $< 0.5$  cm and  $> 0.5$  cm on analyses by VAS ( $p > 0.05$ ), and total number of tenderness points was not related to the degree of herniated disc ( $p > 0.05$ ). *Conclusion:* To the lumbar disc herniation, the clinical diagnosis was not in complete agreement with the exhibition of the image. Only when the positive result of the radiologic examination corresponds with the clinical diagnosis, it has the considerable diagnostic value.

#### PP003-145

##### CLINICAL EFFECT OF BIOMEDICAL FOOT ORTHOSIS FOR PELVIC MALALIGNMENT SYNDROME

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*Objective:* Pelvic malalignment syndrome is one of the frequent causes of scoliosis in young population. Biomechanical Foot Orthosis (BFO) is applied as functional foot orthosis in the extra-depth shoe to correct malalignment of the pelvis. This is to evaluate the effectiveness of BFO in the correction of the lumbar scoliosis associated with pelvic malalignment syndrome. *Methods:* The angle of the lumbar scoliosis and pelvic level were measured in the fifty patients with lumbar scoliosis associated with pelvic malalignment syndrome pre- and 2 years after the application of BFO. They were encouraged to use BFO as long as possible in the daily lives. As Korean usually take off their shoes at home, a special indoor shoe was also developed to fit BFO and the mean wearing time was measured. The resting calcaneal angle at standing position (RCSP) was also measured to understand the conditions of subtalar joint. Statistical analysis was done to evaluate the significance of the changes after the use of BFO. *Results:* Statistically significant improvement was noted in the lumbar scoliosis, the pelvic heights and RCSP with BFO in the shoes of the patients with lumbar scoliosis associated with pelvic malalignment syndrome. *Conclusions:* BFO is a powerful tool in the management of the lumbar scoliosis associated with pelvic malalignment syndrome.

#### PP003-146

##### ASSESSMENT OF PLANTAR FOOT PRESSURE IN NEUROPATHIC DIABETES MELLITUS

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*Objective:* Diabetic patients who had neuropathy are at risk of foot pressure ulcers because of the lack of pain sensation in their feet. In this study we assessed the plantar foot pressure in neuropathic diabetic patients and compare their values with normal subjects to find points with higher pressures which are at risk of pressure ulcers. Choosing the best orthotic treatment in these patients should be after this assessment. *Methods:* In this cross sectional study, 20 subjects participated. Subjects put in two groups of diabetic (5 men and 5 women) with mean age of 57 years and normal (5 men and 5 women) with mean age of 60 years. We used 2D foot scanner system to assess the foot plantar pressures in 10 different zones under the foot. We asked patients to walk at their normal speed a defined 5 m pace. *Results:* There was significant difference in foot plantar pressure in six zones in comparison between two groups which are Toe 1, Toe 2-5, Meta 1, Meta 4, Meta 5 and Midfoot. In both groups the mean foot plantar pressure was higher in forefoot. The higher foot plantar pressure under heads of metatarsals 3 and 4 and the overall higher foot plantar pressure under the foot of diabetic patients in comparison to normal population is in accordance with similar studies. *Conclusion:* Diabetic patients had higher pressures in their forefoot and are more vulnerable to injuries in forefoot. So in orthotic treatment of these patients should choose appropriate materials in forefoot.

PP003-147

### EFFECTS OF TRANCUTANEOUS ELECTRICAL NERVE STIMULATION ON SOMATOSENSORY EVOKED POTENTIAL (SEP) OF STROKE

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**Objective:** This study investigated whether there was significant difference in SEP between both upper limbs stimulation and affected upper limb stimulation after three weeks treatment. **Methods:** Twenty-eight subjects with stroke were recruited and randomly divided into 2 groups. The first was with both upper limbs stimulation. The second was only with affected upper limb stimulation. The model TM-21SSP machine was used. The acicular electrodes with vacuum were applied to the acupuncture points (LI15, LI11, TE5 and L14) on both upper limbs. SSP was administered with 0.5 micro; Sec width, bidirectional and symmetrical wave at 4Hz in the constant mode. The treatment lasted for three weeks. Recording SEP was at before the first treatment and after three weeks treatment. Data of N9, N20 was analyzed with SPSS 13.0. The difference in SEP results between after and before SSP treatment and all the data on rate-of-change between two groups was compared. Significant level was set at  $p < 0.05$ . **Results:** Both groups showed positive changes of amplitude and latency on N9 and N20 after treatment. However, changes in the first group were greater in latency than that in the second group. Furthermore, the percentage of changes in the first group was much larger than that in the second group and there was significant different between 2 groups ( $p < 0.01$ ). **Conclusions:** Three weeks of PPS treatment improved SEP of stroke subjects. Recording from stimulating on both upper limbs was more sensitive to detect the significant changes than affected upper limbs.

PP003-148

### GAITRAINER FOR GAIT TRAINING IN A CHILD WITH SPASTIC CEREBRAL PALSY

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**Objective:** Partial weight bearing with body weight suspension has been popular in gait training in patients with spastic cerebral palsy. Less complicated but more functional body weight suspension device, GAITRAINER was developed and applied to a child

with spastic diplegic cerebral palsy. This paper is to introduce this simple inexpensive device in the daily care of the needy population. **Methods:** A 10-year-old girl with spastic diplegic cerebral palsy was trained to walk with GAITRAINER. Thirty min training twice a week was given to her for 12 weeks. The scores of Gross Motor Function Measure (GMFM), her motivation to participate in the treatment and activities of daily living were measured pre- and post- training with GAITRAINER. **Results:** Significant improvement of her functions in all measured areas was noted after the scheduled gait training with the GAITRAINER. **Conclusions:** This is a case report of 10-year-old girl with spastic diplegic cerebral palsy after gait training with GAITRAINER.

PP003-149

### THE VALIDITY AND RELIABILITY ANALYSIS OF ACTIVITIES OF DAILY LIVING MEASURE SCALE

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**Objective:** To analyze the validity and reliability of Activity of daily living measure scale (AMS). **Method:** Activity of daily living measure scale (AMS) was established to suit the cultural and custom of Chinese. It contains movement (AM), cognition (AC) and total (AT) scores. 30 cases with spinal cord injury were recruited. AMS, Barthel index (BI), Functional independence measure (FIM) was taken and Pearson relationship were analyzed with SPSS12.0. **Results:** 1) Inter-group reliability: The AMS scores of two times measured by the identical scorer within a week-long was analysis. The Pearson correlation coefficient between AM1 and AM2, AM1 and AT2, AC1 and AC2, AT1 and the AM2 are 0.982–0.999, respectively. 2) Between-groups reliability: The Pearson correlation coefficients between the results by surveyor (A) and surveyor (B) are more than 0.964–0.999. 3) Face validity: Expert's appraisal believed the AMS has the good face validity. 4) Criteria validity: The correlation analysis AMS and FIM and BI was carried on pre and post treatment by Pearson relation. The Pearson correlation coefficient of AM1 and FM1, AM1 and FT1, AM1 and BI1, AT1 and FM1, AT1 and FT1, AT1 and BI1 are between 0.788–0.924. 5) Sensitivity: The AMS scores of post treatment is significant improved comparing with pre treatment ( $t=12.36$ ,  $p=0.000$ ). **Conclusions:** The validity and reliability of AMS is good. It can be widely clinical applied to evaluate the movement function and ADL ability of patients with spinal cord injury.



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