WCNR 2012 Review

JUNE 2012

Successful 7th WCNR in Melbourne

This year's 7th World Congress attracted neurorehabilitation clinicians and therapists from 55 countries and was a huge success. A record number of health professionals attended the meeting – over 1800 - in Melbourne's award-winning Congress Centre. There were 650 submitted abstracts, over 300 posters and more than 30 exhibitors and sponsoring companies.

The Congress was held in conjunction with the 35th Annual Brain Impairment Congress for the Australian Society for the Study of Brain Impairment (ASSBI) and the 20th ASM of the Australasian Faculty of Rehabilitation Medicine - RACP.

Over four days the Congress included 12 half-day workshops, 'Meet the Professor', breakfast sessions and a scientific programme covering international research, discovery and innovation in all the major areas of neurorehabilitation including traumatic brain injury, multiple sclerosis, stroke, spasticity management and neuro-oncology. In addition there were 17 **WFNR** Special interest Group meetings taking place concurrently.

Key sponsors of the meeting included Allergan, Epworth Rehabilitation, Ipsen, Medtronic, Mundipharma and St John of God Healthcare. A big thanks to all the sponsors for their support.

Opening ceremony

Professor John Olver, Convenor and Chairman of the Organising Committee and **WFNR** Regional Vice-President for Australia, New Zealand and Oceania welcomed delegates: "We're delighted to welcome you all to Melbourne, a city of diversity and hope you all have a pleasant and productive stay".

A warm and entertaining welcome to the country was given by a Wurundjeri Tribal Elder, followed by a Presidential welcome from the WFNR, AFRM/RACP and ASSBI. Michael Selzer, President of the **WFNR** thanked the Organising Committee including Volker Homberg and colleagues, DC Conferences and Tracey Mole, **WFNR** Executive Director for their expert organisation of the Congress.

The meeting officially opened with The 2nd Michael Barnes Lecture delivered by Professor Randoph Nudo (see page 3). The Lecture was established in recognition of the visionary leadership and dedication of the founding President: "Mike Barnes founded the **WFNR** in 1996 and he remains our leader today, regardless of who is in the President's Chair" said Professor Selzer.

Closing address

In his closing address, Professor Olver congratulated the Congress organisers and said "Thank you all for coming to Melbourne". Professor Stephanie Clarke, the new **WFNR** President, thanked Professor Olver and all his collaborators for a superbly well organised meeting: "Excellent speakers and an incredible breadth of content covering so many aspects of neurorehabilitation".

The meeting closed with a presentation by Professor Anthony Burkitt on the development of the Retinal Implant for the Sight Impaired (see page 3).

Philadelphia wins the bid for the 9th World Congress in 2016

Bids were received for the 9th World Congress from Cape Town, Cancun and Philadelphia, USA. Despite excellent bids from all three, Philadelphia won the vote.

IN THIS ISSUE

News from the Congress

New WFNR President

Professor Selzer handed over the baton to the new **WFNR** President, Professor Stephanie Clarke. Stephanie is Professor and Chef de Service of Neuropsychology and Neurorehabilitation at the University of Lausanne in Switzerland and Director of the Doctoral School of the Faculty of Biology and Medicine at the University.

The new President-Elect is Leonard Li, Director, Rehabilitation Unit, Tung Wah Hospital, Hong Kong. Professor Michael Barnes replaces Professor Klaus von Wild as Treasurer and Professor Volker Homberg was re-elected as Secretary General.

Heart Beat Drumming Group Entertains Participants at Neurological Music Therapy Workshop

There were 12 half-day Pre-Congress Workshops; six running concurrently in the morning and another six in the afternoon on a diverse range of topics from Parkinson's Disease: Promoting Exercise, Physical Activity and Wellbeing to Integrated Management of Spina Bifida and Hydrocephalus.

The first Workshop of the day was Neurological Music Therapy which was followed by a performance by Heart Beat, a hand drumming group from a small rural city in Northeast Victoria called Wangaratta. The aim of Heart Beat is to stimulate neuroplasticy through new learning and rhythm. Students are partnered with the adults and work as mentors, assisting the adults to participate in African drumming activities.

The group is made up of senior drumming students from Wangaratta West Primary School and adults from the region who have a neurological deficit. The music teacher facilitates each session with the therapeutic support of an occupational therapist and a physiotherapist. The programme runs every term of the school year for an hour each week over six weeks.

The Heart Beat programme stimulates the adults on multiple levels including physical, cognitive and psychosocial and the group allows students to develop communication and life skills that could not be fostered in a traditional classroom structure.

The outcome measures are the smiles on all the faces!

Wurundjeri Dancers Welcome Delegates at the Opening Ceremony

The Wurundjeri are a people of the Indigenous Australian nation of the Woiwurrung language group, in the Kulin alliance, who occupy the Birrarung Valley, its tributaries and the present location of Melbourne, Australia. Prior to European settlement, they lived predominantly as hunters and gatherers for tens of thousands of years.

The dancers performed several dances to welcome delegates "from the tops of trees to the roots in the ground".

New dates for 8th World Congress in Istanbul

New dates are announced for the next WCNR Congress in Istanbul, Turkey which now takes place from the 8-12 April 2014 at the Istanbul Convention and Exhibition Centre. The dates have changed due to an unexpected Public Holiday being fixed during the previously agreed dates.

The focus of the Congress will be 'Towards New Horizons in NeuroRehabilitation' with a mixture of presentations on basic neuroscience and clinical science. Planning for the scientific committee is now underway and further information is available at **www.wcnr2014.org** – the website will be active from the end of June.

Early Career Development Awards

Professor Michael Barnes presented the Early Career Development Awards in recognition of the most outstanding oral and poster presentations by a delegate. The Awards, totalling AU$6000, were donated by the Melbourne Convention and Visitors Bureau and the recipients were:

Poster Awards

Louisa Ng (Australia): Use of the international classification of functioning, disability and health to describe patient-reported disability: comparing motor neurone disease, Guillain-Barre Syndrome and Multiple Sclerosis in an Australian cohort.

Corina Schuster (Switzerland): Comparison of embedded and added motor imagery training in patients after stroke: results of a randomised controlled pilot trial.

Oral Presentation Awards

Camila Fiore (Australia): A systematic review of locomotor training as a therapy in animal models of spinal cord injury.

Mayowa Owolabi (Nigeria): Psychometric properties of the HRQOLISP-40: A novel, shortened multiculturally valid holistic stroke measure.

Key Note Lectures

The 2nd Michael P Barnes Lecture Harnessing the Potential of Neuroplasticity to Improve Recovery after Brain Injury

Professor Randolph Nudo

The opening presentation of the 7th World Congress was the 2nd Michael P Barnes Lecture, delivered by Professor Randoph Nudo, Director of the Landon Centre on Aging and Professor in the Department of Molecular and Integrative Physiology at the Kansas University Medical Centre, USA.

Professor Nudo has published over 100 articles on post-injury neuroplasticity and is recognised internationally for his work on the effects of rehabilitative training on functional plasticity after stroke.

Brain connectivity and dysfuntion after injury

Neuroplasticity refers to nervous system's susceptibility to physiological changes, due to changes in behaviour, environment and neural processes. It occurs on a variety of levels, ranging from cellular changes due to learning, to large-scale changes involved in cortical remapping in response to injury. Plasticity provides the scientific basis for the treatment of acquired brain injury with goal-directed therapeutic programmes in the context of rehabilitation.

The adult brain is not 'hard-wired' with fixed neuronal circuits. Cortical and subcortical rewiring of neuronal circuits occurs in response to training and injury; this active, experience-dependent re-organisation of the synaptic networks of the brain involves multiple inter-related structures including the cerebral cortex. Individual connections within the brain are constantly being removed or recreated, largely dependent upon how they are used. If there are two nearby neurons that often produce an impulse simultaneously, their cortical maps may become one. Professor Nudo encapsulated this concept by saying "Neurons that fire together, wire together". This idea also works in the opposite way, i.e. that neurons which do not regularly produce simultaneous impulses will form different maps. The details of how this process occurs at the molecular and ultrastructural levels are topics of active neuroscience research.

Lessons from studies of cortical plasticity in animal models

Enthusiasm for the concept that the brain can adapt to injury has fluctuated, but experiments in monkeys and other animals have rekindled interest in the possibility that the brain is more changeable than was once thought and that the plasticity may help people recover from brain injuries.

Professor Nudo outlined animal studies showing that if a tiny stroke is produced by blocking the blood flow to a small part of a monkey's motor cortex, the part of the body that used to move in response to electrical stimulation of that area of cortex would now move when nearby areas of the brain were stimulated. Understanding the interaction between the damaged and undamaged areas provides a basis for better treatment plans in stroke patients. Functional imaging studies have shown that the brain can change its responses in human stroke patients in ways similar to that found in monkeys. This has also been shown by experiments using transcranial magnetic stimulation of the human cortex. "The challenge is to translate these results to the clinic" said Professor Nudo.

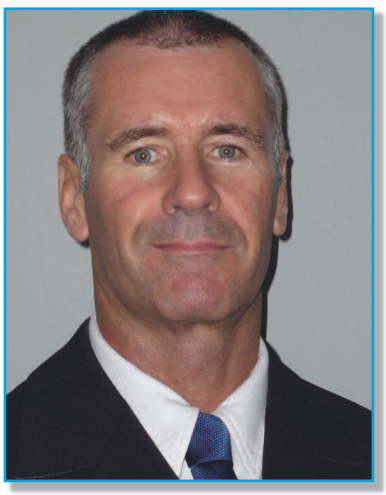
Existing and emerging technologies

Rehabilitatative interventions are being developed based on neuroplasticity principles to improve function, in mild to moderately impaired individuals. Current neuroprosthetic applications include Deep Brain Stimulation in Parkinson's Disease, the Cochlear Implant, Bionic Eye and epidural stimulation post-stroke. These neuroprosthetic tools are increasingly feasible for treating neurological injury.

Neurorehabiliation is embarking on a new period of discovery working towards the goal of rebuilding functional networks in the injured brain. Professor Nudo who is currently collaborating with engineers to develop micro-implantable devices for repairing neural circuits after stroke and traumatic brain injury concluded: "I'm excited to see what the field will look like in another 10 years".

Retinal Implant Development for the Sight Impaired: An Overview of the Bionic Vision Australia Research Programme

Professor Anthony Birkett



Professor Burkitt closed the Congress with a presentation on a neuroprosthetic application for the visually impaired - the so-called 'Bionic Eye' which works by using electrical currents to stimulate nerves at the back of the eye. This Australian technology is targeted at two forms of vision loss; retinosa pigmentosa and age-related macular degeneration.

Professor Burkitt's research into the physiological neural processing mechanisms associated with speech, involving specialised networks within the auditory brainstem, was instrumental to his development of cochlear-implant speech-processing strategies. His research interests extended these concepts from the auditory system to the visual system, in order to develop visual-stimulation paradigms for retinal implants.

Professor Anthony Burkitt is currently the Research Director of Bionic Vision Australia (BVA) and Professor of Engineering at the University of Melbourne. BVA is a partnership of world-leading Australian research institutions collaborating to develop the advanced retinal prosthesis, or Bionic Eye, to restore the sense of vision to people with degenerative or inherited retinal disease. The partners of Bionic Vision Australia are the University of Melbourne, the University of New South Wales, the Bionic Ear Institute, the Centre for Eye Research Australia and NICTA.

The technology for the Bionic Eye consists of a microchip that is inserted into the retina of vision-impaired patients. The microchip is approximately five square millimetres; it receives information, via radio frequency signals, of images captured by a camera mounted on the bridge of a pair of glasses. With 98 precisely-controlled stimulation channels, or wires, the microchip will give patients with severe vision loss the ability to distinguish light and dark shapes. The microchip is implanted at the back of the eye near the retina and the choroid layer. "It's a very stable area to put the electrode and will remain there for the lifetime of the patient'' said Professor Burkitt "and studies are underway with normally-sighted people".

The George Burniston Oration Confounders and Proposed Solutions for Neurorehabilitation Clinical Trials

Professor Bruce Dobkin

Against the exciting developments in neuroplasticity and neuroprosthetic tools, there are frustrations due to the limits imposed by the biology of the brain and the difficulty in doing human experiments that demonstrate the benefits of therapy. It has proved difficult for researchers carrying out rehabilitation trials to determine how much an improvement is due to a particular therapy, how much is placebo and how much is the 'normal' spontaneous partial recovery that follows stroke or brain injury.

Professor Dobkin who is Professor of Neurology and directs the Neurologic Rehabilitation Program at the University of California, Los Angeles, USA introduced his presentation looking at the issues of conducting rehabilitation trials by quoting Einstein "Not everything that can be counted counts and not everything that counts can be counted".

He went on to highlight the shortcomings of neurorehabilitation clinical trials. He illustrated his talk by looking at randomised control trials of body weight-supported treadmill training and robotic-assisted step training which did not produce better outcomes than a comparable dose of progressive over-ground training or exercise in disabled persons with stroke, spinal cord injury , multiple sclerosis, Parkinson's disease and cerebral palsy. Professor Dobkin suggested that the shortcomings require better strategies to assess the conceptual basis, design and outcome measurements for future trials of pharmacological, cortical stimulation, neural repair and other experimental neurorehabilitation interventions.

He concluded: "Too many of our outcome measurements are statistically significant but not clinically important and we must continue to figure out what counts".

Knowledge to Action in Stroke Rehabilitation. Clinical Implementation of Best Evidence

Professor Robert Teasell

Professor Robert Teasell is Chair-Chief of the Department of Physical Medicine and Rehabilitation, University of Western Ontario, Parkwood Hospital, St Joseph's Health Care London and a clinical scientist at the Lawson Health Research Institute.

Professor Teasell opened his presentation by stating that despite all the evidence available, clinical care for stroke patients is not generally delivered in accordance with established guidelines and this may negate the benefits of specialised organised interdisciplinary care.

Strokes are increasing and 'it's a disease of older people' – this was the recurring message throughout the Congress and Professor Teasell emphasised "the demographic crunch that is coming". Primary prevention is expensive and difficult and treatment with tissue plasminogen activator or tPA is effective in 10% of strokes and benefits about 1 in 5 patients.

The three key principles for stroke rehabilitation are a) organised stroke care, b) the earlier the better and c) intensity of therapy. Evidence is growing that rehabilitation has a significant impact on functional outcomes following stroke with improvements in discharge disposition and community reintegration. There are approximately 1000 randomised controlled trials focusing on stroke rehabilitation and clinical care provided in accordance with evidence-based guidelines and associated with improved outcomes. If the rehabilitation team adhere to guidelines the outcomes are better.

Areas where guidelines are not being implemented consistently include intensity of therapy, screening, assessment and treatment of post-stroke depression, screening and assessment of cognitive disorders, assessment and treatment of urinary incontinence and outpatient therapies.

"You can discover all you want but if you don't transfer it to the patient then it doesn't matter" said Professor Teasell, "the simple existence of research evidence doesn't automatically result in alterations in policy or clinical decisions". He concluded "We need to standardise care and be more systematic in how we apply it".

Key Note Lectures

The Norington Lecture Self-regulation Concepts in Brain Injury Rehabilitation

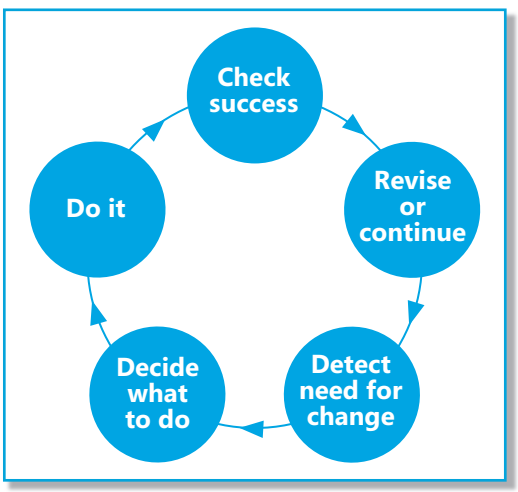
Dr Tessa Hart

The Norington Lecture is named in memory of Bradney Norington, the first President of the Australian College of Rehabilitation Medicine. It is presented by an Allied Health professional. Dr Tessa Hart is an Institute Scientist at the Moss Rehabilitation Research Institute in Philadelphia, Pennsylvannia, where she directs the Traumatic Brain Injury Clinical Research Laboratory and the Moss Traumatic Brain Injury Model System, one of 16 centres of excellence for traumatic brain injury care in the USA. She is a clinical neuropsychologist by training and has focussed her research on the cognitive and psychosocial effects of traumatic brain injury, including attention executive function, emotional regulation and self-management.

Dr Hart discussed how self-regulation concepts have been successfully applied to brain injury rehabilitation. Self-regulation is defined as adjusting one's thoughts, emotions and behaviours to attain personally meaningful goals. This construct overlaps with those of executive function and cognitive control, and all of these terms describe the phenomena of central importance to understanding and treating the long-term effects of TBI and other acquired brain injuries.

Self-regulation can be viewed as a cycle in real time and incorporates behavioural operations such as goal setting, action planning, evaluation of results etc. We all use this cycle, regardless of age and culture and this can facilitate communication amongst the rehabilitation team and between therapist and patient.

Figure 1: Self-regulation cycle



The cycle places the patient at the centre in control as opposed to being controlled by others. It helps to emphasise capabilities not deficits, and shifts the responsibility of the therapist to that of teaching, supporting and facilitating the maximum self-regulation that the patient is capable of. Within this framework patients can be encouraged to learn self-regulation principles that enable positive changes to continue after formal rehabilitation has ended.

"Self-regulation concepts have already been successfully applied to brain injury rehabilitation and the effects highlight the promise and feasibility of an apparent paradox, that of teaching self-regulation to people with self-regulation deficits" concluded Dr Hart.

Mobility in MS – In Spite of Fatigue and Spasticity

Professor Jurg Kesselring

Professor Jurg Kesselring is Head of the Department of Neurology at the Rehabilitation Centre in Valens, Switzerland. He is also a Lecturer in Clinical Neuroscience at the Universities of Berne and Zurich and President of the Swiss MS Society after having been Chair of its Medical Advisory Board for 20 years.

The progressive nature of Multiple Sclerosis (MS) can have a significant impact on the patients' quality of life, in particular impaired mobility. Monitoring low level limitations of activities during the early stages of MS is important as it can indicate advancing neurological damage. Although studies have demonstrated the negative effect of reduced mobility, there is a substantial need for greater recognition of the presence and effects of disabilities including reduced mobility, fatigue, pain, depression and spasticity and the need for targeted treatments for specific impairments.

The origin of fatigue in MS is still not completely understood. Fatigue symptoms include physical or mental dimensions and it is unlikely that a single pharmacotherapy will successfully treat all aspects of fatigue. Professor Kesselring suggested that early, continuous and consistent assessment of MS patients is required because of the variability in speed of progression and prognosis with early mobility loss. "More specific tests of walking ability will be more widely used as a key part of MS diagnosis and to more precisely monitor disease progression and assess patient needs" said Professor Kesselring.

Spasticity, Functioning and Control of Voluntary Movements

Dr Klemens Fheodoroff

Dr Klemens Fheodoroff is the first assistant medical director in the Department of Neurorehabilitation, Gailtal-Klinik in Austria. He is a full member of the Scientific Advisory Board of the Austrian Society for Neurological Rehabilitation and a lecturer at Danube University Krems-Neurorehabilitation and ICF. Dr Fheodoroff's Special Interest Groups include ICF and Robotics.

Spasticity may give rise to disability and is a major challenge in many stroke survivors. Dr Fheodoroff discussed the many definitions of spasticity and highlighted that they do not bridge the gap between the impairment of spasticity and functioning. Spasticity is found to be in the level of 'body functions' in the WHO model of functioning, disability and health (ICF) as one possible dysfunction of musculoskeletal and movement related functions. The others are muscle power and

endurance, motor reflex and involuntary movement reaction functions, gait pattern functions and the control of voluntary movements (CVM) functions.

To carry out the routine tasks of caring for oneself, moving around, handling objects and interacting with others at different levels, assistance or devices may be needed. The amount of assistance required may be used to describe the level of activity limitation.

In many patients the voluntary control of movement goes unrecognised and is masked by spasticity. Different rehabilitation techniques, such as a combination of chemodenervation interventions, dynamic forearm orthoses, robotic devices and constraint induced movement therapy aim at enhancing patients' knowledge and the use of individual control of voluntary movement. Future research may be aimed at designing environmental control systems to utilise the residual CVM in daily activity and tasks.

Dr Fheodoroff concluded that: "Setting up therapeutic strategies to enhance functioning and assess CVM patterns may be a better guide for choosing appropriate exercises to overcome the motor recovery plateaux and to link with daily task performance".

Spontaneous Brain Activity: A Key for Understanding the Mind and the Pathophysiology of Brain Diseases

Dr Maurizio Corbetta

Dr Maurizio Corbetta is the Norman J Stupp Professor of Neurology and Professor of Radiology and Anatomy and Neurobiology at the Washington University School of Medicine in Saint Louise, USA. He is also the Chief of the Division of Neurorehabilitation at the Rehabilitation Institute of Saint Louis. Dr Corbetta focuses on the neural bases of cognitive functions in the healthy brain and the mechanisms underlying plasticity and recovery of function after focal injuries.

The spontaneous activity occurring in the brain is the key to understanding the pathophysiology of brain diseases. Dr Corbetta discussed the topography and functional organisation of Resting State Networks (RSN) in the human brain, their neurophysiological basis and their potential functional significance. He illustrated the importance of RSNs for clinical neurology as a bioassay of brain function in stroke where abnormality of interhemispheric communication can be seen, even in the absence of structural damage and this seems to correlate with behavioural deficits of movement and attention.

Expert Views on Future Direction of Neurorehabilitation

At the closing ceremony Professors Michael Barnes, Bruce Dobkin, Stephanie Clarke, Maurizio Corbetta, Julie Bernhardt and Michael Nilsson were asked for their views on the future of neurorehabilitation.

Professor Dobkin
"We have a lot of angst interpreting the present let alone interpreting the future. However I think there will be decreased money available for rehabilitation – that is inevitable. Over the next 5-10 years we will see pharmacological intervention, cellular bridging intervention for spinal injury and sprouting, cosmetic exoskeletal devices and internet-based rehabilitation. But we need more randomised clinical trials".

Professor Nilsson
"We've heard about the implication of best practice which is an enormous challenge. We need to maximise brain plasticity especially in the first 6-12 months post-stroke - there are a lot of lost opportunities in chronic stroke survivors who would benefit from personalised strategies. We need to learn how to evaluate multi-model approaches; the future is bright but there are many challenges ahead".

Professor Corbetta
"Humans are bad at predicting the future! Brain organisation needs to be more fully understood and target intervention applied in a holistic approach so we can restore/rebalance the abnormal. Data needs to be collated in a smart way so that predictions can be made more accurately".

Professor Clarke
"The WFNR needs to position itself to address the challenges of acute to community rehabilitation so we can do the best possible rehabilitation for our patients. Covering the broad span of rehabilitation needs synergies with the many patients organisations. We need to ensure that the standard of rehabilitation is consistent even if it takes different forms. The WFNR should strengthen its teaching initiatives and awareness raising is key amongst politicians and the public".

Professor Barnes
"In 15 years we have come a long way but we don't want to be complacent and we need to keep moving forwards. The WFNR's 32 National Societies cover half the world's population but there are 400 million people who are not getting any rehabilitation at all and we need to focus on them. We can address this through education and training and we need to do more. There is reasonable evidence to suggest that low tech aids can provide some rehabilitation to the masses and we should work on the concept that something is better than nothing".

Professor Bernhardt
"We have a critical mass of people interested in the field which we didn't have 20 years ago. We're not just clinicians, we have a multi-disciplinary team involved in rehabilitation and that's hugely beneficial. In the future we need to build better connections with countries; we need more international clinical trials, we must stop working in silos and work more as groups, with maximum cooperation. We must also get some of the fundamentals right – for example we don't know how much exercise to prescribe, for how long and it really is a simple treatment. Outcome measures must be re-evaluated and knowledge shared across the different neurological conditions to create a better platform to move forwards".

New Developments in Rehabilitation 'Tools'

Robotic Developments

The field of rehabilitation robotics has grown steadily over the past decade with significant clinical contributions. Studies have demonstrated both the efficacy and advantages of robotics for assessing and treating motor impairment and recent guidelines were issued at the end of 2010 supporting the use of rehabilitation robotics for upper limb post-stroke care.

This symposium provided a concise introduction to key topics in rehabilitation robotics. Dr Hermano Igo Krebs is at the Massachusetts Institute of Technology (MIT), Cambridge, USA where he is a pioneer in the design, development, and testing of robots used to administer rehabilitation therapy to patients with stroke, multiple sclerosis, Parkinson's Disease, and acquired brain injury for the improvement of upper and lower extremity function. Over the past few years, MIT engineers have successfully tested robotic devices to help stroke patients learn to control their arms and legs. They are now building on that work to help children with brain injuries and disorders such as cerebral palsy. All the devices are based on the same principle: it is possible to help rebuild brain connections using robotic devices that gently guide the limb as a patient tries to make a specific movement. The team's suite of robots for shoulder-and-elbow, wrist, hand and ankle have been in clinical trials for more than 15 years with more than 400 stroke patients. Dr Krebs presented The Department of Veterans Affairs large-scale, randomised, multi-site clinical study with these devices showing that robot-assisted therapy was superior and cheaper than Intensive Comparison Therapy.

Professor Saitoh from Fujita Health University, Aichi in Japan discussed the range of robotic devices being developed in Japan, some in conjunction with companies such as Toyota to help people with CNS disorders including paraplegics. Dr Gary Thickbroom from the Australian Neuro-Muscular Research Institute in Nedlands, Western Australia discussed the possibilities for enhancing the results of therapeutic robotics by measuring plasticity using non-invasive brain stimulation.

Innovative Rehabilitation Treadmill

An innovative Rehabilitation Treadmill was discussed at the Congress in a session about Gait Disorders. The C-Mill treadmill incorporates online detection and feedback of gait events and characteristics (e.g. heel-strike and step length) and a projection system that presents meaningful visual contexts eg. obstacles or stepping targets on the treadmill belt's surface.

A key aspect of walking is the ability to adjust gait according to the environment; most falls are due to a misplaced step. The ability to modify gait is also important for regaining independent mobility and confidence. Avoiding obstacles, changing speed and making visually-guided steps are all essential for safe movement.

Various patient groups including stroke and cerebral palsy with different levels of walking ability successfully completed C-Mill therapy interventions, including visually-guided stepping, speeding up and slowing down, obstacle negotiation and gait adaptability games. C-Mill was shown to be a safe, functional and therapy-friendly rehabilitation device for high-intensity, repetitive and task-specific gait adaptability training with integral feedback on performance.

Paediatric Lokomat Improves Walking Capability

A paediatric lokomat was presented as the first driven gait orthesis for children taller than 100cm with a range of neurological conditions. Based on the concept that activities of daily living may be trained and improved through numerous repetitions, 190 children of different diagnosis including stroke, incomplete spinal cord injury, ICP and neuromuscular disorders were treated three times a week with the paediatric lokomat. The average age of the children was 8.4 years and they also received physiotherapy and occupational therapy. On average the new method was used 13 times for each patient. Video documentation was completed for all children.

A clear improvement of walking function was observed in all the children based on an outcome measure of the reduction of utilities used to help the children walk.

GAS-eous Tool for Evaluating Outcome in Upper Limb Spasticity

Goal attainment scaling (GAS) is increasingly used as an outcome measure for measuring focal interventions for upper limb spasticity. However, clinicians frequently report that recording GAS can be too time consuming.

The GAS-eous tool was therefore developed as a new standardised framework for goal setting and evaluation of treatment for upper limb spasticity. It is based on this framework with sub-categories labelled with ICF codes and prompts for the construction of clearly defined goals. Verbal rating of goal attainment, based on a limited number of standard measures, translates automatically to a standard 5-point rating scale and a combined T-score. This tool is now undergoing further validation.

Satellite Symposia

Ensuring Quality Care and Support After Stroke – A Call to Action

In middle and high-income countries, stroke is the second leading cause of death, after ischaemic heart disease and there has been a 100% increase in stroke incidence in low- to middle-income countries. According to the Riks-Stroke Swedish Registry and other studies, approximately one-third of stroke survivors are not receiving the quality care and support that they require. Growing evidence supports the positive impact of early and long-term interventions on post-stroke outcomes.

In an Allergan-sponsored satellite speakers discussed the strategies that may ensure the successful implementations of rehabilitation programmes for stroke survivors, as well as

an effective use of available therapeutic interventions aimed at reducing patient disabilities such as spasticity. There was a 'Call to Action' for improved health systems to ensure the long-term rehabilitation of stroke survivors who are motivated and able to make continued improvement.

In order to help the stroke survivor discuss their ongoing needs, a simple, post-stroke checklist has been developed for the patient to go through with their primary care team. The checklist is being piloted in the UK and other countries.

New Perspectives for Spasticity Management with Botulinum Toxin

This Ipsen-sponsored satellite looked at the impact that post-stroke motor impairment has on the patient and what this means for continued services. Around half of all patients suffering from stroke will have persisting motor deficits and spasticity of the upper limb is one of the most common complications. A new classification of posture post-stroke upper limb spasticity was discussed which has been validated using an international database. The results were presented from an international, prospective cohort study investigating goal attainment following treatment with botulinum toxin using the 'GAS-light' approach which has been designed to be timely and practical for use in a busy clinic.

Neurorehabilitation in Developing Countries

This year's Congress highlighted the contrast between the countries where rehabilitation is well-established and those where it does not even exist. This session looked at the situation in developing countries.

India

India's economy is booming; the country is poised to become the world's most populated country and the second largest economy overtaking China and the USA. However, of its 1.8 billion population, 70% live in rural areas and 30% are below the poverty line, with limited access to modern healthcare amenities. The majority of the urban population has access to private medical services, those living in rural areas are served by public institutions. Modern traditional and alternative medicine are working together, albeit with a relatively small number of health professionals compared to the overall population.

"Mumbai was India's first public hospital to introduce a multidisciplinary rehabilitation clinic 10 years ago; rehabilitation is recognised as essential for the masses but there are only a handful of modern rehabilitation centres" said Dr Nirmal Surya, WFNR Regional Vice-President. Consequently, trained therapists play an important role bridging the gap between rehabilitation services in rural and urban areas.

"The gap between the need and the supply of rehabilitation services is astoundingly large" said Dr Surya.

Latin America

Rehabilitation began in the 1940s and 1950s with the poliomyelitis epidemic when rehabilitation services were founded in most Latin American countries. However, there is an imbalance in service provision between highly specialised institutions and small primary care centres, mainly in rural areas. Community-based rehabilitation experiences are still not integrated in rehabilitation health programmes.

"The main issues are determining epidemiological aspects, sharing experiences in the patient treatment, establishing evaluation and management guidelines and promoting education and research activities" said Dr Jorge Hernandez, WFNR Regional Vice-President.

Sub-Saharan Africa

Sub-Saharan Africa (SSA) comprises 47 countries and over 800 million people. It is the poorest region of the world. Neurological disorders are a leading cause of disability and there is an average of one neurologist to one million people; in 11 SSA countries there is no neurologist at all.

Dr Mayowa Owolabi, WFNR Regional Vice-President discussed the WFNR-supported multi-disciplinary neurorehabilitation centre in Ibadan, Nigeria, featured in previous issues of WFNR Update, which serves East, West and Central Africa.

"We may not have all the equipment we need but we can help to heal the patients by motivating them" said Dr Owolabi.

South East Asia

In South East Asia. neurorehabilitation has not received as much interest as other specialities because of limited resources and facilities, restricted accessibility, paucity of medical personnel and specialists. Awareness of rehabilitation is increasing, but has to compete with other remedies such as Thai traditional massage, acupuncture and spiritual treatment.

Dr Witsanu Kumthornthip, WFNR Regional Vice-President, outlined the need to improve services through education and training, international experts, financial support, greater government support and increased awareness.

Northern Africa and the Middle East

North Africa and the Middle East include 20 countries. "It's the past and the present" said Dr A El Etribi as this huge geographical area differs in wealth and standards of medical services. At present neurorehabilitation varies not only from one country to another, but from hospital to hospital and also from therapist to therapist within the same hospital.

Egypt, Tunisia, Lebanon and Saudi Arabia are the leading countries in the area of medical services whereas Libya, Palestine and the Yemen have poor facilities and there are none in the Sudan.

New WFNR Special Interest Group launched – Developing World Forum

Dr Nirmal Surya launched a new SIG at WCNR 2012. The Developing World Forum SIG will address the issues arising in the developing countries and the initial feedback was extremely positive.

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Young Neurologists Special Interest Group

There were over 20 Special Interest Groups (SIGs) meeting throughout the Congress and a list of all WFNR SIGs is available on its website **www.wfnr.co.uk**. This report comes from just one of those that met in Melbourne.

The Asia Pacific Association of Young Neurologists and Trainees (APAYNET) chaired the Young Neurologists SIG at the WCNR 2012. APAYNET hosted this successful SIG workshop in Melbourne on post-stroke spasticity, attended by 22 young, enthusiastic neurologists and trainees.

Acting SIG Chair, Tissa Wijeratne (Manuel Murie is the Chair) began an interactive discussion and lecture on stroke, post-stroke spasticity and botulinum toxin. Senior neurophysiotherapist Liz Judd continued with a detailed discussion on the clinical assessment of spasticity. Dr Andrew Hughes, Senior Neurologist and Neurorehabilitationist bought nearly three decades of practical experience of managing post-stroke spasticity at Melbourne's Austin Hospital and discussed the practicalities of setting up a post-stroke spasticity clinic.

Congress Social Events

The Congress had its social side with a Welcome Reception in the Convention Cente which was a chance for delegates and sponsors to mingle with friends and colleagues. The Gala Dinner was held in the Great Hall at the National Gallery of Victoria. The Gallery is one of Australia's most revered public art museums and the dinner was held in the museum's magnificent Great Hall, famous for Leonard French's stunning stained glass ceiling.

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Diary Dates

2012

2-3 JULY 2012
9th Conference of the Neuropsychological Rehabilitation Special Interest Group of the WFNR
Bergen, Norway
www.mers,vpweb.com.au

29-31 AUGUST 2012
Stroke 2012
Sydney, Australia
www.stroke2012.com.au

2013

3-6 FEBRUARY 2013
Australian Neuroscience Society 33rd Annual Meeting
Melbourne, Australia
www.ans2013.org

6-8 FEBRUARY 2013
International Stroke Conference
Honolulu,Hawaii
www.strokeconference.org

17-20 MARCH 2013
2013 Australian Pain Society 33rd Annual Scientific Meeting
Canberra, Australia
www.dcconferences,com.au/aps2013

2-4 MAY 2013
36th Annual Brain Impairment Conference
Tasmania, Australia
www.assbi.com.au

2014

19-23 MARCH 2014
Tenth World Congress on Brain Injury
San Francisco, USA
www.internationalbrain.org

8-12 APRIL 2014
8th World Congress for Neurorehabilitation
Istanbul, Turkey