DCRM Dutch Congress of Rehabilitation Medicine

5- 7 November 2015 | de Doelen | Rotterdam

Abstract book

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10.20 – 11.00	**KEYNOTE LECTURE: T. Schreuders PhD PT** *Rehabilitation of leprosy patients: Boundaries, challenges and surprises across borders*	**Grote Zaal**
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5b. Mini-symposium: Gait adaptations in unilateral affected individuals. Parallels between stroke survivors and persons with an amputation — **Jurriaanse Zaal**

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5g. Panel Discussion: Spreading knowledge in rehabilitation care: what is the way forward? — **Plate Zaal**

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15.45 – 16.30 **KEYNOTE LECTURE: Prof. G. Kwakkel PhD PT** — **Willem Burger Zaal**
Understanding motor recovery of the upper paretic limb post stroke: Implications for designing trials and measuring outcome

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Therapy development and outcome measures in neuromuscular disorders: issues and challenges

17.30 – 19.00 **General Assembly VRA** — **Jurriaanse Zaal**

20.00 – 00.00 **DINNER** with music entertainment – Steamship De Majesteit

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10.00 – 10.45	**COFFEE BREAK**	
10.45 – 11.00	**Best abstract presentation**	**Willem Burger Zaal**
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11.45 – 12.00	**Plenary poster session 3**	**Willem Burger Zaal**
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13.05 – 13.35	**KEYNOTE: Best PhD Thesis presentation**	**Willem Burger Zaal**
13.35 – 14.20	**KEYNOTE LECTURE: Prof. G. Courtine PhD** *Crossing borders in neuroprosthetic rehabilitation to improve locomotion after neuromotor disorder*	**Willem Burger Zaal**
14.20 – 14.30	**Closing of the DCRM 2015 – including a dance performance**	**Willem Burger Zaal**
14.30 – 17.00	**Meetings Special Interest Groups**	

Keynote Lectures

Thursday 5 November

Friday 6 November

Saturday 7 November

Satish Mishra

Thursday 5 November, 09.40 – 10.20

The WHO Disability Action Plan: *what does it concretely mean for DCRM?*

Biography

Satish Mishra is Technical Officer on Disability and Rehabilitation at the World Health Organization in Tajikistan and is actively involved with the implementation of the Disability Action Plan 2014-2021 at country level.

Ton Schreuders PhD PT

Thursday 5 November, 10.20 – 11.00

Rehabilitation of leprosy patients: *Boundaries, challenges and surprises of rehabilitation across borders*

Summary

André Klukhuhn chemist and philosopher wrote in his last book Across the Borders of Our Thinking: "In other cultures it has been the idea that in the West they have a lot of material things and a lot of knowledge, but also that we are missing something: the experience that we can truly know who we are when we are outside the fence of our own organized society, and enter the jungle outside" (Klukhuhn 2015)

Literally crossing borders makes it obvious that there are many different ideas about how to coop with a disability. In the Western way of thinking being independent is the highest goal of rehabilitation, in many other countries caring for your family member is not a horrifying burden. Participation of people around the disabled person is old school for rehabilitation in developing countries

Limitation of, or imposing Western methods, sometimes extremely expensive methods, can cause problems. In one such experience the Nepalese Medical Director pleaded: don't teach us the most sophisticated methods and leave us to deal with the problems afterwards. In the same way very sophisticated tricycles or lower leg prostheses didn't work in certain parts of Vietnam.

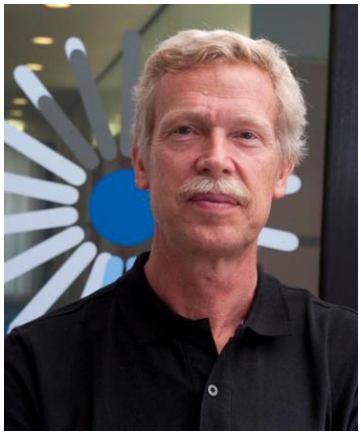
Stigma is present in all societies where the question is often asked "why me?" The parents of a child with a congenital deformity of the hand feels a responsibility and guilt bit in another part of the world, an extra finger can be a sign of a blessing and worth a fortune.

What happens when a leprosy patient is seeking treatment in the Netherlands?

Rehabilitation across borders makes us reflect on the solutions we have for our own society and the rehabilitation of patients.

References: Klukhuhn A. Over de grenzen van de rede. Amsterdam: Prometheus 2015.

Biography



Dr Ton Schreuders studied Physiotherapy at the School for Physiotherapy Utrecht, the Netherlands. He and his wife Hilde joined The Leprosy Mission International (TLMi) to work in Chiangmai, Thailand at the McKean Rehabilitation Center. During this time he also lectured at the school for Physio- and Occupational Therapy, Chiangmai Thailand. After returning to the Netherlands in 1992 he started at the Department of Rehabilitation Medicine of the Erasmus University Medical Center Rotterdam, the Netherlands as a hand therapist. A research project was started in 1999 which cumulated in a PhD at Erasmus University Rotterdam on 24th of November 2004 with the thesis: Strength Measurements of the Hand. His area(s) of professional interest are anatomy, biomechanics of the hand, dynamometry, outcome measurements, leprosy and topic(s) of previous publications related to nerve injuries, dynamometry of the intrinsic, muscles, manual muscle strength testing and tendon transfers and outcome studies related to hand therapy and surgery.
He has had several functions within the Dutch Hand Therapy Association and co-ordinates a hand therapy course at the Erasmus University since 2000. Until 2014 he has been the Chairman of the Permanent Scientific Committee of the European Federation of Societies for Hand Therapy. He is now the owner and director of five hand rehabilitation centres in Holland. He is also a board member of Hands Across Borders and visited Nepal and India. He has (co-)authored approximately 40 articles and has been invited speaker at national and international congresses and course and presented on topics like: Clinical Anatomy of the Hand, Assessment and evaluation of hand function, Hand Therapy after nerve injuries, Brain plasticity and Mirror Therapy, Tendon Transfers and the Volar Plate of the PIP joint.

Prof. Michel Wouters MD PhD

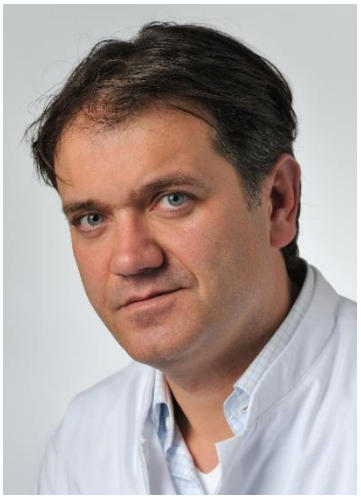
Friday 6 November, 11.15 – 12.00

Clinical Auditing: *pitfalls and potential*

In recent years, national audits have been initiated in several countries in Northern Europe. In the Netherlands the first nationwide quality registry, the Dutch Surgical Colorectal Audit (DSCA) started in 2009, based on a web-based data-collection program that generates continuous and benchmarked feedback to the surgical teams in Dutch hospitals. From 2010 all hospitals participate in this audit in which the whole care process for patients undergoing resection of primary colorectal cancer is measured with a multidisciplinary set of quality indicators. A national committee consisting of multidisciplinary experts in the field of colorectal cancer care, evaluates the results of the audit periodically and updates the indicator-set based on developments in colorectal cancer care and changes in the evidence-based guidelines.

After 5 years of feedback on these process and outcome indicators, colorectal cancer care in the Netherlands has improved significantly, with a 20-30% decrease in morbidity and re-interventions, a reduced length of stay and a remarkable drop in postoperative mortality. Hospital-specific outcome information has become transparent for doctors and their professional organizations, insurers, patient organizations and the public. Analyzing financial data of 30 hospitals in our country, the improvements in quality of the care process and outcome for patients, proved to be accompanied with a substantial decrease in hospital costs. Based on the success of the DSCA, in 2011 the Dutch Institute for Clinical Auditing was founded. Today, this institute facilitates 20 nation-wide clinical audits, including nine cancer types, vascular and bariatric surgery, hip fractures and also chronic diseases like Parkinsons. Recently, remarkable quality improvements have been reported for several of these diagnoses, improving the value of care generated in the Dutch Healthcare system.

Biography



Michel Wouters is a Surgical Oncologist at the Netherlands Cancer Institute and Head of the Scientific Bureau of the Dutch Institute for Clinical Auditing. Since 2007, outcomes research is his main scientific focus. He was one of the authors of the Quality of Cancer Care report of the Dutch Cancer Society, which was published in 2010. This report provided a road map for the concentration of complex cancer treatments, the development of quality standards and hospital specific outcome monitoring (clinical auditing), in the Netherlands. Since 2012, first as President of the Association of Surgical Onologists and currently as President of the Dutch Federation of Oncological Specialties (SONCOS) he is responsible for the publication of multidisciplinary quality standards for cancer treatments in our country. He is co-founder of the Dutch Institute for Clinical Auditing which facilitates 20 nation-wide clinical audits, to measure and improve quality of care and outcome of patients in the Netherlands.

Prof. Gert Kwakkel PhD PT

Friday 6 November, 15.45 – 16.30

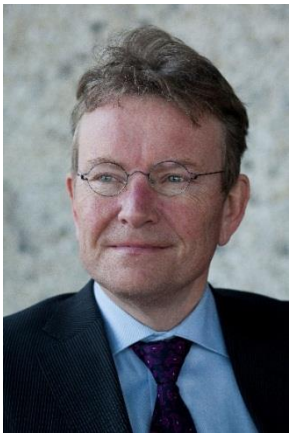
Understanding motor recovery of the upper paretic limb post stroke: *Implications for designing trials and measuring outcome.*

Summary

The time course of stroke recovery as well as the impact of exercise therapy on the pattern of (motor) recovery is poorly understood. This lecture presents the current knowledge about the predictability of the time course of body functions and activities following a stroke.
There is growing evidence that the natural logarithmic pattern of functional recovery can be modified by early started, intensive task-oriented practice. However, the impact of practice on learning-dependent and intrinsic, spontaneous mechanisms of neurological recovery is not well understood. Several, probably interrelated mechanisms, have been identified that affect recovery after stroke. These mechanisms underlying recovery are highly interactive and operate within different, sometimes limited time-windows after stroke. In this key note lecture, a hypothetical phenomenological model for understanding skill reacquisition after stroke will be presented. Subsequently, the need for elucidating the longitudinal association between neurological recovery and regaining meaningful activities will be discussed in order to understand what and how patients learn when they show functional improvement post stroke. This statement will be discussed in light of measuring serial outcomes post stroke at different levels of ICF. There is growing evidence that the effects of neurorehabilitation are rather adaptive (substitution) rather than based on

mechanisms of 'true neurological repair' (restitution). Restitution seems to be restricted to a time window of the first 8 weeks post stroke within which spontaneous neurological recovery occurs. After this critical time window, upper limb recovery is mainly the result of the most efficient optimization of the intact end-effectors to accomplish meaningful tasks.
Future studies should focus on understanding stroke recovery by studying the distinction of restitution of neurological impairments from adaptive mechanisms of motor recovery. To do that, designs are needed based on intensive serial measurements in which the longitudinal relationship between kinematics and neuroplasticity is investigated early post stroke.

Biography



Professor Gert Kwakkel started his career as a physical therapists and movement scientists at the VU University medical Centre in Amsterdam. In 1998, he received his PhD on the thesis entitled: Dynamics in functional recovery after stroke. Professor Kwakkel received a chair 'Neurorehabilitation' at the VU University Medical Centre in Amsterdam in March 2008 and head research of the department neurorehabilitation of rehabilitation centre Reade in Amsterdam. His chair is dedicated to translational research in the field of neurorehabilitation with special interest in Stroke, Parkinsons's Disease and Multiple Sclerosis. Professor Kwakkel published more than 150 papers in leading scientific journals such as The Lancet, The Lancet Neurology, BMJ and Stroke (Hirsch Index 40). Based on a prestigious advanced grant from the European Research Council (ERC), Professor Kwakkel belongs to one of the top researchers of the VU University in Amsterdam. This ERC idea is in collaboration with the Technical University of Delft (Prof. Dr. Frans van der Helm) and focused on investigating the longitudinal relationship between stroke recovery and brain plasticity. Professor Kwakkel is member of the management board of Research Institute Move at the VU University and European Managing Editor of the journal Neurorehabilitation & Neural Repair (NNR). In addition, he is member of the editorial board of Stroke, International Journal of Stroke, Journal Rehabilitation Medicine and Physiotherapy Research International Research. Finally, professor Kwakkel is president of the Dutch Society of NeuroRehabilitation (DSNR; www.neurorehab.nl).

Nathalie Goemans MD PhD

Friday 6 November, 16.30 – 17.15

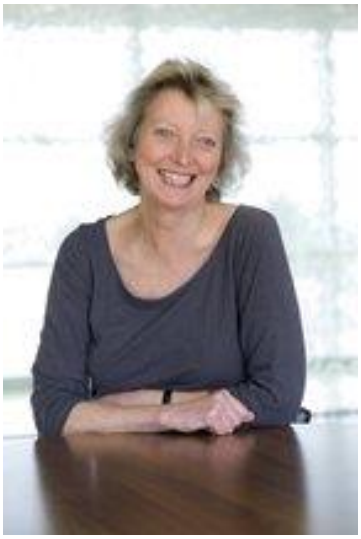
Therapy development and outcome measures in neuromuscular disorders: *issues and challenges*

Summary

Therapy development in neuromuscular disorders is characterized by specific issues inherent to rare diseases. Major challenges imply the limited number of patients that can be included in studies and trials, the issue of defining clinical relevant and suitable outcome measures and the limited data on natural history in contemporaneous subjects to assess therapeutic interventions. Moreover, therapy development and subsequent clinical trials have highlighted the need for harmonized standards of care.

Collaborative international multicentric efforts are currently underway to address these issues, which will be discussed in this presentation.

Biography



Nathalie Goemans, M.D., PhD, is a pediatrician and child neurologist, with certification in rehabilitation medicine , clinical chair of child neurology at the University Hospitals Leuven (Belgium), head of the neuromuscular reference center for children at the UH Leuven and consultant in neuropediatrics at DVC St Jozef Antwerp, Belgium, a rehabilitation centre with residential setting for neuromuscular patients. She is responsible for the traineeship in motor rehabilitation within the department of pediatrics. She is coordinating a multidisciplinary group of experts in the field of paediatric neuromuscular disorders and has experience in clinical research and pharmacological trials in neuromuscular disorders.

She is actively involved in national and international research networks, with a particular interest in the multidisciplinary aspects and the dissemination of standards of care, ethical issues, outcome measures and transition to adulthood, as well as in the design and conduct of clinical trials in neuromuscular disorders.

Prof. Jane Burridge PhD

Saturday 7 November, 11.00 – 11.45

Mobile and web-based technologies for stroke rehabilitation

Summary

This talk is about the use of technologies to support home-based stroke rehabilitation. It will include a report of a study in which patients used Constraint Induced Movement Therapy (CIMT) at home supported by a web-based programme that provided motivation and guidance. It will also present ongoing research using wearable sensors to monitor quality and quantity of movement and provide useful feedback to patients and therapists. The aim of the talk is to present evidence of effectiveness and acceptability and to stimulate ideas and discussion about how technologies should be designed, evaluated and implemented to improve neurological rehabilitation outcomes.

Biography

Jane Burridge is Professor of Restorative Neuroscience at the University of Southampton, where she leads the Rehabilitation and Health Technologies Research Group. Jane's research is about improving recovery of movement following damage to the brain, especially as a result of stroke and spinal cord injury. Fundamental to this is understanding the mechanisms associated with normal, loss and recovery of motor function. Jane's work crosses traditional rehabilitation boundaries, collaborating with engineers, neuroscientists and psychologists.

Jane graduated as a physiotherapist, but later changed career and trained as a musician playing and teaching the flute. Her PhD at the University of Southampton

enabled response to Functional Electrical Stimulation for drop-foot to be better predicted by accurate measurement of muscle dysfunction.

Jane's current research is with non-invasive brain stimulation, rehabilitation robotics, wearable and remote sensors to measure movement and other emerging technologies and the use of the internet to support home-based rehabilitation. She is also interested in understanding how rehabilitation technologies can translate into clinical practice.

Prof. Grégoire Courtine PhD

Saturday 7 November, 13.35 – 14.20

Crossing borders in neuroprosthetic rehabilitation to improve locomotion after neuromotor disorders

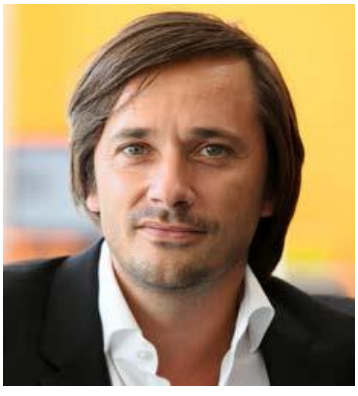
Summary

Over the past decade, my team and I developed a pragmatic therapy that restored supraspinal control over refined leg movements after severe spinal cord injury in rodents. Our therapy acts over two time windows. Immediately, electrical and chemical neuromodulation of spinal circuits mediate motor control of the paralysed legs. In the long term, will-powered training regimens enabled by electrochemical neuromodulation and robotic assistance promote neuroplasticity of residual connections----an extensive rewiring that reestablishes voluntary control of locomotion.

The successful implementation of this locomotor prosthesis required the development of myriad tools, including neural interfaces, computational models, real-time control platforms, robotic systems, and anatomical analyses. Here, I will describe the conceptual framework through which we designed these cutting-edge technologies. I also will reveal some of the mechanisms underlying the immediate and long-term effects of neuroprosthetic rehabilitation on motor control capacities. Finally, I will highlight our current efforts in non-human primates and humans to translate our findings into a locomotor prosthesis to improve motor recovery in paraplegic individuals.

Biography

Grégoire Courtine was trained in Mathematics, Physics, and Neurosciences in France and Italy. After a Postdoc in Los Angeles (UCLA), he established his laboratory at the University of Zurich. In 2012, he was appointed the International Paraplegic Foundation Chair in Spinal Cord Repair at the Center for Neuroprosthetics at EPFL. His research program aims to develop neuroprosthetic treatments to improve recovery after spinal cord injury an endeavor that has been reported in high-profile publications, and has extensively been covered in the media. His startup, G-Therapeutics SA, aims to translate these medical and technological breakthroughs into therapeutic treatments.



Parallel Session 1 – Free Paper Sessions

Thursday, 12.00 – 13.00

Free Paper Session 1

Chair: A. Mert MD PhD

1. Defining an International Standard Set of Patient-Centered Outcome Measures after Stroke

Prof. Ribbers G.M. MD PhD
Rijndam Rehabilitation Centre, the Netherlands

Background: Value-based healthcare delivery is a strategy to align patients, providers, and payers toward improving outcomes while reducing costs. We sought to define an international standard set of patient-centered, stroke health outcomes. **Methods:** We assembled an international expert panel representing patients, advocates, and physician experts in stroke outcomes, stroke registries, global health, epidemiology, and rehabilitation. A modified Delphi process was used to reach consensus recommendations for a Standard Set of outcome measures, baseline risk adjustment variables, and included populations for use in both low and high income countries. **Results:** Patients presenting to a hospital with ischemic stroke or intracerebral hemorrhage evaluated with brain imaging were selected as the required included population, with optional inclusion of transient ischemic attacks. Because of differences in ascertainment and imaging modalities, duration of symptoms and type of imaging are collected to allow for comparisons of homogeneous groups across various countries and practice settings. Basic functional status is assessed at prestroke baseline, index admission, discharge, 90 days, and 1 year thereafter. Co-morbidities and stroke severity are collected for risk adjustment. Symptomatic intracerebral hemorrhage after thrombolysis is the only complication captured, and many measures reflect patient-reported quality of life outcomes and priorities captured in the Patient Reported Outcomes Measurement Information System 10-question short form (PROMIS-10) and elements from existing registries. **Conclusions:** The stroke measure Standard Set is proposed for implementation to permit meaningful comparisons and increase value of stroke care worldwide using a simple, pragmatic strategy

2. Effects of continuous positive airway pressure on cognitive and functional outcome of stroke patients with obstructive sleep apnea

Aaronson J.A. MSc[1], Prof. Van Bennekom C.A.M. MD PhD[1], Hofman W.F. PhD[2], Van Bezeij T. MD MSc [1], Van den Aardweg J.G. MD PhD, Groet E. MSc[1], Kylstra W.A. MSc, Prof. Schmand B.A. PhD [2]
[1]Heliomare Rehabilitation Centre, the Netherlands
[2]University of Amsterdam, the Netherlands

Introduction: Obstructive sleep apnea (OSA) in stroke patients is associated with worse functional and cognitive status during inpatient rehabilitation. The effect of continuous positive airway pressure (CPAP) treatment on stroke recovery however is still unclear. **Objective:** To investigate whether a four-week period of CPAP treatment would improve cognitive and functional outcomes of stroke patients during rehabilitation. **Patients:** 36 stroke patients admitted to a neurorehabilitation unit. **Methods:** Patients were randomized to rehabilitation treatment CPAP treatment (CPAP group) or to treatment as usual (control group). Primary outcomes were cognitive status measured by neuropsychological examination, and functional status measured by two neurological scales and a measure of activities of daily living (ADL). Secondary measures included sleepiness, sleep quality, fatigue and mood. Tests were performed at baseline and after the 4-week intervention period. **Results:** We randomly assigned 20 patients to the CPAP group and 16 patients to the control group. The average CPAP compliance was 2.5 hours per night. Patients in the CPAP group showed significantly greater improvement in the cognitive domains of attention and executive

functioning than the control group. CPAP did not result in measurable improvement on measures of neurological status or ADL, or on any of the secondary measures. **Discussion and conclusions:** CPAP treatment improves the cognitive status, but not the functional status of stroke patients with OSA. **Clinical message:** Recognition and treatment of OSA during stroke rehabilitation is important as adequate treatment can ameliorate the recovery after stroke.

3. Improving gait economy after stroke, effects of holding a handrail

IJmker T. PhD[1,3], Houdijk H. PhD[1,3], Lamoth C.J.C. PhD[2], Rijntjes D. PT[3], Tolsma M. MD[3], Prof. van der Woude L.H.V. PhD[2], Prof. Daffersthofer A. PhD[1], Prof. Beek P.J. PhD[1]

[1]*MOVE Research Institute Amsterdam, Faculty of Behavioral and Movement Sciences, VU University Amsterdam, Amsterdam, the Netherlands*

[2]*University of Groningen, University Medical Center Groningen, Center for Human Movement Sciences, Center for Rehabilitation, Groningen, the Netherlands*

[3]*Heliomare Rehabilitation Centre, the Netherlands*

Introduction: Holding a handrail or cane can substantially improve gait economy in stroke survivors, but it is yet unclear which gait changes, be it spatiotemporal or neuromuscular, mediate this effect. **Objective:** To investigate gait changes (spatiotemporal and neuromuscular) with handrail hold in relation to the effects on energy cost during walking in stroke survivors. **Patients:** Fifteen stroke survivors. **Methods:** Participants walked on a treadmill with or without handrail hold. We recorded oxygen consumption, ground reaction forces, and EMG of eight lower limb muscles. Energy cost (J kg m), spatiotemporal step parameters, and the magnitude, timing constancy, and co-activation of muscle activation were calculated. Condition effects were assessed using repeated measures ANOVA's, and associations between differences in energy cost and step parameters/muscle activity were evaluated using partial least squares regression analysis. **Results:** Handrail hold resulted in a reduction in the energy cost of walking of 12% on average. When holding the handrail subjects took longer steps with improved step length symmetry and smaller step width. EMG analysis showed a global drop in muscle activity, with a more constant activation timing, and decreased co-activation. Changes in stride time, length, step length symmetry, and the global drop in muscle activity were most closely associated with decreased energy cost during handrail hold. **Discussion and conclusions:** Handrail hold resulted in altered step parameters which can be regarded as a normalization of the gait pattern. This was accompanied by a global reduction in muscle activity, without major neuromuscular reorganization. **Clinical message:** Handrail or cane use can be considered to improve gait economy after stroke.

4. Home-based technology-supported training compared to conventional arm and hand exercises after stroke

Nijenhuis S.M. MSc[1], Prange G.B. PhD[2], Wagenaar J. MD[3], Buurke J.H. PhD[2], Prof. Rietman J.S. MD PhD[2]

[1]*Roessingh Research and Development, Enschede, the Netherlands*

[2]*Roessingh Research and Development Department of Biomechanical Engineering, University of Twente, Enschede, the Netherlands*

[3]*Department of rehabilitation medicine, ZGT Hospital, Almelo, the Netherlands*

Introduction: Telerehabilitation allows continuous rehabilitation at home after discharge. Motivational technology-supported arm/hand training at home could enable patients to train independently and ultimately serve as a way to

enhance the dosage of practice. **Objective:** To examine the feasibility and clinical changes of technology-supported arm and hand training compared to conventional arm and hand exercises at home in chronic stroke**. Methods:** Twenty chronic stroke patients received six weeks of arm/hand training at home with either a technology-supported training system (EXP; Figure 1) or conventional home exercises from an exercise book (CON; http://www.cva-vereniging.nl/PDF2013/Oefengids4edruk.pdf). Evaluation of feasibility involved self-reported training duration and perceived motivation examined post-training by the Intrinsic Motivation Inventory (IMI). Arm and hand function was evaluated pre and post-training by the Fugl-Meyer Assessment (FM), Action Research Arm Test (ARAT) and Box and Blocks Test (BBT). **Results:** Mean training duration per week was higher in the CON group than EXP group (212 and 117 minutes, respectively). Both groups reported similar positive motivation (Mean IMI CON = 5.3, EXP = 5.1). FM improved significantly over training (+1.6 points) and ARAT and BBT showed a trend (+1.1 and +1.5 points, respectively). These improvements did not differ between groups. **Discussion and conclusions:** Although technology-supported training showed to be feasible, improvements over training were modest and remarkably, not different between groups, even though the experimental group reported lower training duration. **Clinical message:** Technology-supported home-based arm/hand training can be a promising tool for self-administered practice, especially if the training dose can be increased via motivational strategies.

Free Paper Session 2

Chair: J.M. Stolwijk-Swüste MD PhD

5. A behavioral intervention promoting an active lifestyle is effective in persons with subacute spinal cord injury: a randomized controlled trial

Van den Berg-Emons H.J.G. PhD[1], Nooijen C.F.J. MSc[1], Prof. Stam H.J. MD PhD[1], Prof. Bergen M.P. MD[2], Prof. Research group Act-Active
[1]*Department of Rehabilitation Medicine, Erasmus MC University Medical Center, the Netherlands*
[2]*Rijndam Rehabilitation Institute, the Netherlands*

Introduction: After discharge from inpatient rehabilitation, physical activity levels in persons with spinal cord injury (SCI) are known to decline**. Objective:** To evaluate the added value of a behavioral intervention promoting an active lifestyle after discharge**. Patients:** Thirty-nine persons with subacute SCI (33% tetraplegia, 62% motor-complete, 150±74 days post injury), dependent on a manual wheelchair. **Methods:** The intervention and control group both received regular rehabilitation and a handcycle training program. Only the intervention group received a behavioral intervention, involving 13 individual sessions beginning two months before and ending six months after discharge, delivered by a coach trained in motivational interviewing. Outcome measures were objectively measured physical activity, health-related outcomes, participation and quality of life. Measurements were performed at baseline, discharge, six months and one year after discharge from inpatient rehabilitation. **Results:** An overall intervention effect was found for objectively measured physical activity (B=0.35 hours, p<0.01). Compared to the control group, the intervention group was 0.47 hours per 24-hour period (p<0.01) more physically active six months after discharge and maintained this higher level till one year after discharge (B=0.42 hours, p=0.06). Significant favorable intervention effects one year after discharge were found for total cholesterol (B=-0.89 mmol/L, p=0.01), LDL (low density lipoprotein cholesterol; B=-0.63 mmol/L, p=0.05), and participation (B=9.91, p<0.01). **Discussion and Conclusions:** The behavioral intervention was effective in eliciting a behavioral change toward a more active lifestyle and had favorable effects on health and participation in persons with subacute SCI. **Clinical message**: We advise to implement this intervention in regular rehabilitation.

6. Experienced fatigue, pain and instability during sitting in persons with chronic SCI

Valent L.J.M. PhD[1], Nachtegaal J. PhD[1], De Groot S. PhD[3], Faber W.X.M. MD[1], Smit C.A.J. MD[2], Kaandorp E. OT[1], Adriaansen J.J. MD[4], Prof. Post M.W.M. PhD[3]
[1]*Heliomare Rehabilitation Centre, the Netherlands*
[2] *Amsterdam Rehabiliation Research Centre, Reade, Amsterdam, the Netherlands*
[3]*University Medical Centre Groningen, the Netherlands*
[4]*De Hoogstraat Rehabilitation / University Medical Center Utrecht, the Netherlands*

Introduction: For persons with a spinal cord injury (SCI), the ability to sit comfortable and stable in the wheelchair is an important prerequisite for optimal daily functioning**. Objective:** To describe experienced fatigue, pain and instability during sitting and satisfaction with sitting posture**. Patients:** Persons ≥10 years after SCI who use a wheelchair for daily mobility (N=265). **Methods:** A cross-sectional study using a self-report questionnaire. **Results:** Of all subjects, 84.5% reported sitting to be fatiguing (sometimes: 51.1%; regularly - always: 33.3%) and 70.5% indicated having pain while sitting (sometimes: 42.4%; regularly - always: 28.1%). Most reported pain locations were the lower back, back at shoulder height, neck, and ischial tuberosity. Sitting stable, reasonably stable, and instable in the

wheelchair is reported by 55.1%, 36.6%, and 8.3% respectively. During an activity (e.g. reaching for a bottle or cup) 29% experienced instability (falling aside and/or to the front). The majority (58.1%) was satisfied with their sitting posture, another 27.5% were reasonably satisfied. Although only 14.4% were dissatisfied with their sitting posture, 57.9% of all subjects indicated that their sitting posture could be improved**. Discussion and conclusions:** Persons with SCI frequently report fatigue, pain and instability during sitting. Although these problems might be caused by more factors than sitting alone, a vast majority believes their sitting posture can be improved. An optimal sitting posture probably means more comfort (less pain and fatigue) and stability. **Clinical message:** Persons with SCI should be advised to have their sitting posture regularly checked, preferably by SCI-specialized seating therapists.

7. A description of urological surveillance and urologic ultrasonography outcomes in a cohort of individuals with long-term spinal cord injury

Adriaansen J.J.E. MD[1], Van Asbeck F.W.A. MD PhD[2], Bongers-Janssen H.M.H. MD, Spijkerman D. MD[4], Prof. Visser-Meily J.M.A. MD PhD[1], De Kort L.M.O. MD PhD[5], Prof. Post M.W.M. PhD[1]

[1]*De Hoogstraat Rehabilitation / University Medical Center Utrecht, the Netherlands*

[2]*Center of Excellence in Rehabilitation Medicine Utrecht, the Netherlands*

[3]*Adelante Rehabilitation Centre;* [4]*Rijndam Rehabilitation Centre, the Netherlands*

[5]*Department of Urology, University Medical Center Utrecht, the Netherlands*

Introduction: Persons with spinal cord injury (SCI) have an increased risk of developing urological complications. Long-term routine urological surveillance is therefore recommended**. Objectives:** To evaluate urological surveillance in individuals with long-term SCI and to determine factors associated with urologic ultrasonography (UU) outcome. Patients: Wheelchair dependent persons with (non)-traumatic SCI for ≥ 10 years and age at injury 18-35 years. **Methods:** Multicentre cross-sectional study in which The International Lower Urinary Tract Function Basic SCI Data Set was used during a medical assessment. We studied urological surveillance: whether participants had routine urological checkups (including UU) and when latest urodynamic study was performed. Latest UU (performed <1 year ago) was retrieved or, when lacking, yet performed**. Results:** Median time since injury (TSI) was 22.0 years (IQR: 16.8-30.3). Overall, 39% of 282 participants did not have routine urological checkups and 33% never had an urodynamic study performed. Available UU data (N=243) revealed dilatation of the upper urinary tract (UUT) in 4.5% of the participants and urinary stones in 5.7%. Abnormal UU outcome was associated with increasing TSI, having a non-traumatic SCI and previous surgical bladder or UUT stone removal. UU outcome was not associated with routine urological checkups or bladder emptying method. **Discussion and conclusions:** Contrary to (inter)national guidelines over one-third of Dutch individuals with long-term SCI did not receive routine urological surveillance. However, UU outcome was not associated with routine urological checkups or bladder emptying method. **Clinical message:** The low frequency of abnormal UU outcomes advocates further research concerning risk factors for urinary tract deterioration.

8. Practice variation in the structure of vocational rehabilitation after acquired brain injury in Dutch rehabilitation centres

Van Velzen J.M. PhD[1, 2], Prof. Van Bennekom C.A.M. MD PhD[1, 2]

[1]*Heliomare Research & Development, Wijk aan Zee, the Netherlands*

[2]*Coronel Institute of Occupational Health, Academic Medical Centre, University of Amsterdam, Amsterdam, the Netherlands*

Introduction: Recently, a module focusing on work has been implemented in Dutch rehabilitation centres. Implementation of the module assumes a similar vocational rehabilitation (VR) intervention in all centres.

Objective: To describe the practice variation in the structure of VR interventions used in patients with acquired brain injury (ABI) in Dutch rehabilitation centres. **Patients:** Not applicable. **Methods:** A questionnaire consisting questions about the structure of VR interventions has been designed. Questions can be divided into eight domains: availability of intervention, timing, criteria, coordination, disciplines involved, work training, external partners involved, transfer of information to external partners, and funding. The questionnaire is sent to 18 rehabilitation centers. Availability and content of the domains in the interventions is scored. **Results:** A reply is received from 12 rehabilitation centers. In all centres a VR intervention is provided. The employer and the occupational physician are involved as external partners in all interventions. For all other domains of the questionnaire, differences between the interventions are found. **Discussion and conclusions:** VR interventions are already used in all rehabilitation centres that participated in the study. However, a lot of practice variation is found. In order to decrease the amount of variation and to come to a similar VR intervention in all centres, the differences between the existing interventions should be compared and discussed. The current overview of the practice variation can be helpful during that process. **Clinical message:** To come to a similar VR intervention in all rehabilitation centres as practical implementation of the recently developed work module, tuning between the centres is necessary.

Free Paper Session 3

Chair: I.J.M. de Groot MD PhD

9. Maximum swallowing speed is a sensitive test to detect bulbar involvement in patients with amyotrophic lateral sclerosis (ALS)

Weikamp J.G. MSc[1], Kalf J.G. PhD[1], De Swart B.J.M. PhD[1], Raaphorst J. MD PhD[2], Voermans N.C. MD PhD[2], Prof. Geurts A.C.H. MD PhD[3]

[1]Radboud University Medical Centre, Radboud Institute for Health Sciences, Department of Rehabilitation / Speech-language pathology, the Netherlands

[2]Radboud University Medical Centre, Donders Institute for Brain, Cognition and Behaviour, Centre for Neuroscience, Department of Neurology, the Netherlands

[3]Radboud University Medical Centre, Radboud Institute for Health Sciences, Department of Rehabilitation, the Netherlands

Introduction: Currently, no quantitative bulbar measurements exist for early detection of bulbar involvement in patients with ALS. **Objective:** To identify a quantitative maximum performance test sensitive to detect bulbar involvement in ALS Patients Twenty-eight patients with established ALS. **Methods:** Patients were assessed three times at intervals of 12 weeks. Each time patients completed the revised Amyotrophic Lateral Sclerosis Functional Rating Scale and had a bulbar neurological examination (by a neurologist). Both tests together were used as a reference for bulbar involvement. In addition, a speech-language pathologist assessed bulbar function with quantitative performance tests: maximum tongue strength, maximum speech rate, maximum phonation time, maximum swallowing speed, and maximum swallowing volume. For each test, we compared maximum performance scores between patients with and without bulbar involvement, and we analyzed area under the ROC curve (AUC), negative and positive predictive values. Change in bulbar function over time was analyzed using wilcoxon signed rank test. **Results**: Nineteen patients were classified with 'bulbar involvement' versus nine patients without. All performances tests were worse in the bulbar involvement group. Maximum swallowing speed (cut-off score 25 ml/s) showed the highest AUC (0.83) with a positive predictive value of 93.8%. It also showed the strongest decrease in bulbar function over time ($p = 0.17$). **Discussion and conclusion:** Maximum swallowing speed appears to be a promising test to detect bulbar involvement in patients with ALS, showing both discriminative strength and sensitivity to disease progression. **Clinical message**: Reduced swallowing speed seems to be discriminative and sensitive to identify bulbar involvement in ALS.

10. The effect of static versus dynamic depictions of actions in verb and sentence production in aphasia

Damen I.J. MSc[1], Blankestijn-Wilmsen J.T.R. MSc[2], Voorbraak-Timmerman V. MSc[1], Brouwer de Koning J. MSc, Pross A.W.L. MSc[3], Hurkmans J.J.S. MSc [2], Jonkers R. PhD[3]

[1]Rehabiliationcentre Roessingh, Enschede, the Netherlands

[2]Rehabiliationcentre Revalidatie Friesland, Beetsterzwaag, the Netherlands

[3]University of Groningen, the Netherlands

Introduction: In clinical practice we experience a lack of materials for the treatment of verb and sentence production problems in aphasic speakers. In therapy, we often use pictures or photographs depicting actions, although the meaning of certain verbs clearly involve movement. **Objective**: In the current study, we tested the hypothesis that aphasic speakers are more accurate in retrieving verbs in isolation and in sentence context in a dynamic condition rather than in a static condition. **Patients:** Thirty-one aphasic speakers were included in this study.

All participants were native speakers of Dutch and suffered from a left-hemispheric stroke. **Method:** Two tasks, an action naming task and a sentence production task, were administered in both a static and a dynamic condition. The dynamic tasks included 20 video clips which were soundless and filmed in a natural context. The static tasks included 20 photographs which were stills cut from the video clips depicting the peak moment of the action. The tasks were administered in two separate sessions with a time lag of approximately a week. **Results:** Aphasic speakers were able to produce significantly more correct reactions in both the action naming task (p=0.021) and the sentence production task (p=0.023) in the dynamic condition as compared to the static condition. **Conclusion and clinical message:** Aphasic speakers profit from the dynamic depiction of actions. We therefore recommend to use video materials in aphasia therapy for verb and sentence production problems.

11. Verbal communicative ability of aphasic stroke patients after inpatient rehabilitation: development of a prediction model

Blom-Smink R.M.A. MSc ST[1], Van de Sandt-Koenderman W.M.E. PHD[1], Kruitwagen C.L.J.J. MSc[2], El Hachioui H. PhD[1], Visch-Brink E.G. PhD[3], Prof. Ribbers G.M. MD PhD[1]
[1]*Rijndam revalidatie, Rotterdam, the Netherlands*
[2]*Department of Biostatistics and Research Support, UMC Utrecht, the Netherlands*
[3]*Department of Neurology, Erasmus MC, Rotterdam, the Netherlands*

Not published.

12. Long-term fatigue after perimesencephalic subarachnoid hemorrhage in relation to cognitive functioning and mood

Boerboom W. MSc[1], Van Zandvoort M.J.E. PhD[2, 3, 4, 5], Van Kooten F. MD PhD[6], Kahjeh L. MD[6], Prof. Visser-Meily J.M.A. MD PhD[7, 5], Prof. Ribbers G.M. MD PhD[1], Heijenbrok-Kal M.H. PhD[1]
[1]*Rijndam Rehabilitation Centre, the Netherlands*
[2]*Department of Neurology*
[3]*Utrecht Stroke Center*
[4]*Brain Center Rudolf Magnus*
[5]*University Medical Center Utrecht, the Netherlands*
[6]*Erasmus University Medical Center Rotterdam, department of neurology, the Netherlands*
[7]*Rudolf Magnus Institute of Neuroscience and Centre of Excellence for Rehabilitation Medicine, the Netherlands*

Introduction: In previous research we found that patients with perimesencephalic subarachnoid hemorrhage (PM-SAH) experienced problems in executive functioning and fatigue in the short term. **Objective:** To study relationships between objective and subjective cognitive functioning, mood and fatigue in the long term after perimesencephalic subarachnoid hemorrhage. **Patients:** Forty-six patients, mean age 50.4 (SD=9.4), mean time after PM-SAH 4.7 (SD=1.6) years. **Methods:** Fatigue was measured with the Fatigue Severity Scale, Mood with the Hospital Anxiety and Depression Scale, Subjective Cognitive Functioning with the Cognitive Failure Questionnaire and Objective Cognitive Functioning with: Trail Making Test; Symbol Search Test; D2; Verbal and Semantic Fluency; Digit span; 15-Words-Test; Rey Complex Figure. **Results:** Patients with fatigue (33%) had significantly lower scores than patients without fatigue on most objective cognitive functioning tests (p<0.05). Significant correlations were found between fatigue and objective cognitive functioning, but not between subjective and objective cognitive functioning. Mood was associated with fatigue, subjective cognitive functioning, and objective cognitive functioning in the domains of attention and memory, but not with information processing speed and executive functioning.

Discussion and conclusions: This study supports our previous findings that a third of patients with PM-SAH experience fatigue and problems of cognitive functioning, also in the long term. After adjustment for mood, fatigue remains associated with most domains of objective cognitive functioning. Future research should investigate whether these patients will benefit from long-term follow-up and/or cognitive rehabilitation programs. **Clinical Message:** Clinicians should anticipate problems of fatigue and cognitive functioning in the long term after PM-SAH.

Free Paper Session 4

Chair: M.E. Roebroeck PhD

13. Spring-like Ankle-Foot Orthoses improve knee kine(ma)tics, while preserving push-off power in children with cerebral palsy

Kerkum Y.L. MSc[1, 2, 3], Brehm M.A. PhD[1, 2, 3], Van den Noort J.C. PhD[1, 2, 3], Prof. Becher J.G. MD PhD[1, 2, 3], Prof. Harlaar J. PhD[1, 2, 3], Buizer A.I. MD PhD[1, 2, 3]
[1]*Department of Rehabilitation Medicine*
[2]*MOVE Research Institute Amsterdam, the Netherlands*
[3]*VU University Medical Center, the Netherlands*

Introduction: Gait of children with cerebral palsy (CP) is often hampered by excessive knee flexion, which may lead to an increased walking energy cost (EC). To counteract knee flexion, rigid ankle-foot orthoses (AFOs) are often prescribed. However, these impede ankle range of motion and push-off power. A spring-like AFO may enhance push-off, and improve the EC. **Objective:** To evaluate the effects of rigid and spring-like AFOs on gait. **Patients:** 15 children with spastic CP (10±2 years, GMFCS levels I-III) walking with excessive knee flexion. **Methods:** Participants were prescribed a spring-hinged AFO. The hinge was set into a rigid configuration, and in two spring-like configurations (stiff and flexible). 3D-gait analysis and a walking EC test at comfortable speed were performed at baseline (shoes-only) and for the three AFO configurations. Effects of the different configurations on knee and ankle kine(ma)tics, speed and net EC were analyzed using a Generalized Estimation Equation**. Results:** All AFO configurations similarly improved knee kine(ma)tics compared to shoes-only. Peak push-off power was reduced in the rigid configuration compared to shoes only, while it was preserved in the spring-like configurations. Net EC comparably improved for all AFO configurations with comparable speed (Table1). **Conclusion:** Spring-like AFOs could improve knee kine(ma)tics similarly to a rigid AFO, while preserving ankle push-off power in children with CP walking with excessive knee flexion. **Clinical message:** Applying spring-like AFOs shows favorable effects on push-off power compared to a rigid AFO, in children with CP walking with excessive knee flexion.

14. Candidacy for conversation partner training. Findings from a Dutch implementation study

Wielaert S.M.[1], Sage K.[2], Heijenbrok-Kal M.H. PhD[1], Van de Sandt-Koenderman W.M.E. PhD[1]
[1]*Rijndam rehabilitation Centre, the Netherlands*
[2]*Frenchay Hospital*

Introduction: Family members should be integral to rehabilitation. To support partners of people with aphasia (PWA) in communication, the 'Partners of Aphasic clients Conversation Training (PACT)' was introduced in Dutch rehabilitation. **Objectives:** Describe partner experience of PACT and candidacy in terms of psychosocial characteristics (partner), behavioural characteristics (PWA) and biographical data (both). **Methods:** Cohort study, pre and post treatment design. Partner experience was assessed with the Intrinsic Motivation Inventory (IMI, Deci et al.,1994) and a satisfaction rating scale (1-10). Pre and post characteristics measures were analysed using correlational and inferential statistics. Biographical data were analysed using descriptive statistics. **Results:** Partners of people with severe aphasia (ANELT median 19.5, range 10-48) engaged in the training at mean 11.5 MPO (SD 16.2). Partners were satisfied (mean 7.7, SD 0.85) and enjoyed the practical, individually tailored training. IMI scores were high, eg IMI-Enjoy mean 6.15 (SD 0.99) Partners improved significantly on coping skills and risk for depression lowered significantly whilst caregiver

burden remained stable. Caregiver esteem predicted IMI-Enjoy (B.69 (CI -.001, 1.380) and partner age negatively predicted IMI-Enjoy (B -.03(CI -.062, -.002). The ANELT negatively predicted IMI-Effort (B -.32(CI -.052, -.002). **Discussion and conclusions:** Especially partners of people with severe aphasia, with high caregiving-esteem, engaged with PACT. Caregiver commitment and capacity (Young et al., 2014) should be taken into account when selecting candidates. **Clinical message:** People with aphasia and their partners should be offered conversation training to prepare them for the conse quences of aphasia in their conversations and relationship in the longer term.

15. The effects of resistance and interval training on physical fitness and fatigue in patients treated with autologous stem cell transplantation: results from the EXIST study

Persoon S. MSc[1], Prof. Chinapaw M.J.M. PhD[2], Buffart L.M. PhD[3], Prof. Nollet F. MD PhD.[4], Prof. Kersten M.J. PhD[5]

[1]Department of Rehabilitation, Academic Medical Center, University of Amsterdam, the Netherlands
[2]VU University Medical Center, Department of Public and Occupational Health and the EMGO+ Institute for Health and Care Research, the Netherlands
[3]VU University Medical Center, Department of Epidemiology and Biostatistics and the EMGO+ Institute for Health and Care Research, the Netherlands
[4]Department of Rehabilitation, Academic Medical Center, University of Amsterdam, the Netherlands
[5]Department of Hematology, Academic Medical Center, University of Amsterdam, the Netherlands

Not published

16. The cycle of homelessness and traumatic brain injury: are we looking at the right information

Bushnik T. PhD, Im B. MD, McDermott H. BSc, Glubo H. PhD
Rusk Rehabilitation, NYU Langone School of Medicine, United States of America

It has been estimated that over half of the homeless population has experienced a traumatic brain injury (TBI). Homeless individuals are at increased risk for TBI due to frequent contact with common causes of injury: substance abuse related accidents, including falls, and victimization to violence. Residual symptoms following TBI increase risk for economic and housing instability and homelessness itself increases risk for poor health outcomes. Seventy percent of homeless individuals with a history of TBI reportedly suffered their first TBI before they became homeless. Thus, not only does homelessness increase the risk of TBI, but TBI can contribute to the causes of homelessness. However, homelessness is only part of a larger pattern of housing instability--defined by periods of housed and homelessness--associated with poorer access to health care and outcomes. The relationship between TBI and homelessness demands closer scrutiny.

Currently the TBI Model Systems (TBIMS) database in the United States captures at-the-moment domiciled status at the time of injury and at the time of the follow-up annual interviews. Concerns about under-identification of the housing unstable and the associated risks they face will be discussed and data will be presented on lifetime history of housing instability in comparison to at-the-moment homelessness status collected by the TBIMS. Housing instability, rather than current homelessness, may prove to be a more nuanced variable in understanding the role of social class in health disparities and providing effective interventions for this population.

Free Paper Session 5

Chair: A. Buizer MD PhD

17. ULFC of working patients with primary osteoarthritis of the hands; a case control study

Vansteenkiste S. MD MSc[1], Prof. Van der Sluis C.K. MD PhD[1], Prof. Reneman M.F. MD PhD[1], Prof. Dijkstra P.U. PhD[2], Van der Eerden P.J.M. MD[3], Soer R. PhD[1]

[1]*University of Groningen, University Medical Center Groningen, Department of Rehabilitation Medicine, Groningen, the Netherlands*

[2] *University of Groningen, University Medical Center Groningen, Department of Rehabilitation Medicine, Department of Oral and Maxillofacial Surgery, Groningen, the Netherlands*

[3] *University of Groningen, University Medical Center Groningen, Department of Radiology, Groningen, the Netherlands*

Introduction: Osteoarthritis of the hands (OAH) has an important impact on quality of life, but little is known about the effects of OAH on hand function and work participation. **Objectives:** The aim was to assess the ULFC (Upper Limb Functional Capacity) of working patients with primary OAH**. Patients:** Working patients with primary OAH were recruited from the Department of Rehabilitation Medicine of the University Medical Centre of Groningen, the Netherlands. **Methods:** Primary OAH was diagnosed according to the Kellgren and Lawrence rating using a predetermined protocol. The recruited patients were interviewed and underwent an ULFC Evaluation (ULFCE). The ULFCE comprised as primary outcome variable the hand Grip Strength and as secondary outcome variables the finger strength, Purdue pegboard, Complete Minnesota dexterity test, overhead lifting, overhead working, and repetitive side reaching. An independent t-test was used for normally distributed variables and the Mann-Whitney U test was used for non-normally distributed variables**. Results:** 41 patients were included. Every patient was matched with 2 healthy controls. The handgrip strength was more than 7 kg lower in patients compared to controls. There was also a significant difference for all the secondary outcome variables**. Discussion and conclusions:** A reason for this difference in ULFC might be joint deformation or limited range of motion, diminished strength because of disuse, pain or anxiety. Further research into the cause for the loss of strength and function in OAH is necessary**. Clinical Message:** Working patients with primary OAH perform significantly worse on the ULFCE compared to healthy workers.

18. Can the effect of walking speed on foot and ankle joint kinematics provide insights in rheumatoid arthritic gait?

Dubbeldam R. PhD[1, 2], Buurke J.H. PhD[3, 4], Nene A.V. MD PhD[1, 4], Baan H. MD PhD, Prof. Van der Laar M.A.F.J. MD PhD[5], Prof. Hermens H. PhD[3]

[1]*Roessingh Research and Development, Enschede, the Netherlands*

[2]*Fysio Holland Twente, the Netherlands*

[3]*University of Twente, the Netherlands*

[4]*Roessingh Rehabilitation Centre, Enschede, the Netherlands*

[5]*Ziekenhuis Groep Twente, the Netherlands*

Introduction: Rheumatoid arthritis (RA) manifests itself in the feet and ankles of RA patients and may result in abnormal foot and ankle gait kinematics. However, the factors that lead to these differences are not yet fully understood**. Objective:** The aim of this study was to analyse the effect of walking speed and RA on foot and ankle joint kinematics. **Patients:** Gait recordings of 21 RA subjects with moderate to severe disease activity and progression and 14 age-matched healthy subjects were performed. **Methods:** RA subjects walked at their comfortable walking

speed. Healthy subjects walked at 100%, 75% and 50% of their comfortable waking speed. Stance phase kinematics were analysed and compared. Differences between the stance-phase kinematics of the two groups caused by the factors walking speed and the RA disease process were analysed using a multi-linear model. **Results:** The ankle dorsi-flexion, medial-arch motion and hallux abduction were significantly influenced by walking speed alone. Hallux flexion, mid-foot supination and leg rotation were influenced by both walking speed and the disease process. Hind-foot eversion was solely influenced by the disease process. **Discussion:** In addition to the effects of lower walking speed, other RA factors such as pain and joint damage result in abnormal joint function compared to healthy subjects, and consequently may influence joint kinematics too. **Clinical message:** The slower walking of RA subjects cannot explain all differences in foot and ankle kinematics between RA and healthy subjects. However, not all observed differences in RA joint kinematics compared to healthy subjects are pathological.

19. Cognitive problems after out-of-hospital cardiac arrest in patients following a rehabilitation program

Boyce L.W. MSc[3], Volker G. BSc, Prof. Vliet Vlieland T.P.M. PhD[1], Van den Heuvel D.M.J. PhD[2], Van Exel H. MD[3], Goossens P.H. MD PhD[3]

[1]*Leids University Medical Centre, the Netherlands*

[2]*Leiden University, Faculty of Social and Behavioural, the Netherlands*

[3]*Rijnlands Rehabilitation Centre, the Netherlands*

Introduction: In The Netherlands, approximately 23% of patients survive out-of-hospital cardiac arrest (OHCA). To deliver appropriate rehabilitation care, it is important to have insight into the prevalence of cognitive problems at start of the rehabilitation. Currently, no standardised set of assessments for cognitive complaints after OHCA is available. **Objective:** To describe the results of 3 cognitive tests in OHCA-survivors referred for rehabilitation and their correlation with quality of life (QoL). **Patients:** Consecutive OHCA patients referred for cardiac rehabilitation were included between 1 February 2011 and 31 May 2013. **Methods:** The Mini-Mental State Examination (MMSE), Cognitive Failures Questionnaire (CFQ) and Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) were administered four weeks after OHCA. Cognitive problems were defined if MMSE<28, CFQ>32 and/or IQCODE>3.6. Quality of life was measured with the SF-36. Correlations between cognitive problems and quality of life were calculated. **Results:** Sixty-three of 77 patients were male (82%), median age 59 years (range 15-84). MMSE 28.8 (SD 1.6), CFQ 20.9 (SD 9.4) and IQCODE 3.1 (SD 0.2). Eighteen patients (23%) showed cognitive problems. MMSE was significantly associated with SF-36 subscale social functioning (r=0.32), CFQ with the SF-36 subscales bodily pain (r=-0.37), vitality (r=-0.25), mental health (r=-0.35) and role emotional (r=-0.40) and the IQCODE to the SF-36 subscales vitality (r=-0.33) and social functioning (r=-0.41). **Conclusion:** Twenty-three percent of the OHCA patients referred for cardiac rehabilitation showed cognitive problems. Associations between cognitive problems and QoL were found. **Clinical Message:** A standardised cognitive screening in OHCA patients is warranted.

20. Out-of-hospital cardiac arrest survivors with cognitive problems have lower exercise capacity than patients without cognitive problems

Reinders C. MD[1], Boyce L.W. MSc[2], Van Exel H. MD[2], Volker G. BSc[2], Prof. Vliet Vlieland T.P.M. PhD[3], Los-van Mechelen E. MD[1], Goossens P.H. MD PhD[2]

[1]*Sophia Rehabilitation Centre, the Netherlands*

[2]*Rijnlands Rehabilitation Centre, the Netherlands*

[3]*Leiden University Medical Centre, the Netherlands*

Introduction: Survival after out-of-hospital cardiac arrest (OHCA) is approximately 23% in the Netherlands. Hypoxic brain injury is described in 40% of survivors. It is unknown if exercise capacity of patients with cognitive problems differs from other OHCA survivors**. Objective:** To determine exercise capacity in OHCA survivors with and without cognitive problems. **Patients:** This prospective study included 53 patients with myocardial infarction (MI) as cause of OHCA. **Methods:** Cognitive problems were measured with Mini-Mental State Examination (MMSE; cut-off <28), Cognitive Failures Questionnaire (CFQ; cut-off >32) and the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE; cut-off >3.6). Cardiopulmonary exercise tests (CPET) on a bicycle ergometer were performed at start of rehabilitation. Exercise capacity (VO2 max) and work load (Watts) were measured at maximum exercise, heart rate (bpm) and blood pressure (mmHg) at rest and at maximum exercise. Metabolic equivalents (MET) were calculated. **Results:** Cognitive problems were reported in 9 of 53 patients (17%). Significant differences ($p<0.05$) were found between patients with and without cognitive problems for VO2max (19.7 vs 14.5 ml/kg/min), work load (124 vs 86W) and MET's (5.6 vs 4.1). No significant differences for heart rate or blood pressure were found. **Discussion and conclusions**: Cognitive problems after OHCA are associated with lower exercise capacity. **Clinical Message:** Patients with cognitive problems after OHCA caused by MI may have lower exercise capacities than OHCA survivors without cognitive problems.

Mini-symposia and workshops - index

Thursday 5 November

Friday 6 November

Saturday 7 November

Parallel Session 2 – Mini-symposia and workshops

Thursday 5 November, 14.15-15.45

2a. Mini-symposium: Multidisciplinary care for children with mitochondrial disorders

In this mini-symposium the multidisciplinary care setup for children with mitochondrial disorders will be presented. The child is screened for several medical issues by means of consultations of pediatrician, pediatric neurologist and pediatric rehabilitation physician, and screened by the psychologist, pediatric physiotherapist, speech therapist, occupational therapist, and dietician. A social worker consults the parents. This is done in a clinical setting, the so called mito-route. The aim of this program is to improve care, and also to get more insight in the problems children with mitochondrial disorders encounter.
Several measurement instruments are used and evaluated on their applicability and sensitivity. The new insights and knowledge achieved after one year working with the mito-route gives new insights on several fields, which will be presented and discussed in the mini-symposium.

Programme
Chair: I.J.M. de Groot MD PhD, associate professor
Speakers: M. Hermans nurse, A. Janssen PhD PT, M. van Gerven SLT, C. Verhaak PhD psychologist

- Introduction: what are mitochondrial disorders in childhood
- Mito-route: the program
- Experience and insight by pediatric physiotherapist: to give insight in the screening of children with mitochondrial disorders in an academic setting
- Experience and insight by pediatric speech therapist: to give insight in the increasing knowledge on this group of children
- Experience and insight by pediatric psychologist: to discuss the transfer of knowledge into rehabilitation programs

2b. Mini-symposium: Post Intensive Care Syndrome (PICS) - a new clinical syndrome in rehabilitation medicine

Survival of critically ill patients has dramatically improved, but is frequently associated with significant impairments, resulting in restrictions in daily functioning, participation problems (employment) and decreased quality of life. Recently, the term 'post–intensive care syndrome' (PICS) was agreed on as the term to denominate new or worsening impairments in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization.
Previous research has shown that PICS remains frequently unrecognised and, even when identified, may not be appropriately assessed and managed.
Recent research shows that early rehabilitation in the ICU is safe and effective, and improves functional status at hospital discharge. Beyond this stage, there are no standardized rehabilitation pathways for survivors of critical illness. However, in patients with comparable impairments it has been shown that organised coordinated multidisciplinary rehabilitation care improves long-term patient outcomes.
The aim of this mini symposium is to present the current evidence and the patient perspective on:

- The impact of PICS on daily functioning of ICU survivors and their families,
- The impairments in physical, mental and cognitive functions in patients with critical illness.
- Interdisciplinary rehabilitation interventions in the ICU and after hospital discharge.

Programme
Chair: B. Hemmen MD PhD and M. van der Schaaf PhD PT
Speakers: M. van der Schaaf PhD PT, B. Hemmen MD PhD, M. Brackel-Welten MD , M. van der Steen

- *1.Welcome and introduction - Marike van der Schaaf PhD PT*
- *2.Post Intensive Care Syndrome - Marijke van der Steen, Intensivist*
- *3.Rehabilitation for critically ill patients; the patient's perspective - Marianne Brackel -Welten, Ex-ICU-patient*
- *4.Early rehabilitation in the ICU - Bea Hemmen MD PhD, Consultant Rehabilitation Medicne*
- *5.Acute and Post hospital rehabilitation - Marike van der Schaaf PhD PT*
- *6.Discussion - Marike van der Schaaf PhD PT and Bea Hemmen MD PhD*

2c. Workshop: Physical and Rehabilitation Medicine and Elite Sport: Where are the Crossing Borders?

Language: Dutch

Athletes in elite sports train and strain their bodies and minds maximally to enable them to deliver a top performance. If they want to be superior to their opponents their training needs to be both intensive and effective. Our patients face similar challenges. Like top athletes, they need and want to make the most of their bodies in order to actively reach independence in functioning relatively fast. Therefore, effective training is essential for our patients too. Are we able to apply the knowledge of the elite sport and athletes' training to our rehabilitation programs? What can we learn from athletes and their training methods? What are similarities and differences between athlete training and daily rehabilitation practice?

Chair: P.C.Th. van Aanholt MD
Moderator: M. Boogers
Speakers: N. de Vries (Exercise Physiologist of the KNVB), A.J. Helmantel (Trainer and Exercise Physiologist of Tom Dumoulin)
Discussion with panel members: Prof H.J. Stam MD PhD, C.F. van Koppenhagen MD PhD, R. Dekker MD PhD, H. Kneepkens MD

2d. Mini-symposium: Designing and applying robotic devices for support of arm/hand function: Moving towards the home (in short: Upper limb robotics at home)

Limitations in arm and hand movements due to stroke and/or ageing can have profound negative effects on the ability to move the arm and to grasp and manipulate objects, impairing performance of and independence in activities of daily living (ADL).

Robotic rehabilitation for the upper limb has gained interest over the last years to enable intensive, active, task-specific treatment. Recently, the growing potential to enable self-administered training moves towards application of robotics at home, with the incentive to enhance dose of practice. Moreover, robotic devices are becoming increasingly suitable to provide prolonged support during functional activities at home, beyond application as a training tool. This development can serve even more people suffering from arm/hand problems in daily life.
This symposium will share the latest findings about robotic rehabilitation and assistance at home from clinical, technological and research perspectives. The audience will find out whether stroke patients can practice independently with a robotic device at their own home. But which aspects need to be considered when designing and applying assistive robotic devices for support of ADL at home, from the technological and user perspectives? Will people actually want to use such a device? And if so, will they benefit from it?

Programme
Chair: Prof. J.S. Rietman MD PhD
Speakers: S.M. Nijenhuis MSc, G. Prange-Lasonder PhD, B. Radder MSc

- Introduction symposium 'Upper limb robotics at home'
- Arm/hand training at home using a robotic device after stroke
- Development of assistive robotic devices for support of ADL after stroke
- User perspective on use of a robotic glove supporting ADL at home
- 'Clinical outlook on upper limb robotics at home' by Hans Rietman, including questions and discussion from the audience

2e. Mini-symposium: Guideline-based prescription practice for lower limb orthotics in neuromuscular disorders

In 2012, a Dutch multidisciplinary guideline was published on the prescription of leg orthoses in neuromuscular disorders. In this mini-symposium, we will share clinical experiences and scientific evidences

to boost implementation in the field by showing how the guideline can support clinical decision-making in this area, in order to apply orthotic treatment more effectively.
In patients with neuromuscular diseases, gait is frequently hampered by lower extremity muscle weakness. This limits the patient's ability to walk, as characterized by instability, falls and fatigue due to an increased walking effort. The mainstay of treatment for lower extremity muscle weakness is orthotic management. The application of (custom-made) leg orthoses is therefore among the core areas of multidisciplinary rehabilitation expertise. However, few studies in neuromuscular disorders exist on the effectiveness of these devices. As such, there is little guidance to support clinical decision making in this area. In 2012, the Academic Medical Center Amsterdam, in collaboration with a multidisciplinary platform of experts, published a Dutch national guideline on the prescription of leg orthoses in neuromuscular disorders, following the Process description for Medical devices (CVZ 2006). This orthotic guideline supports clinicians and other healthcare professionals in applying treatment more effectively, which is important for improving quality of care.

Programme
Chair: Prof. F. Nollet MD PhD
Speakers: M.A. Brehm PhD, Prof. J. Harlaar ir. PhD, Prof. F. Nollet MD PhD, T. Gort

- Process description for leg orthoses: focus on the patient - *Dr. M.A. Brehm PhD, senior researcher AMC Amsterdam*
- The role of clinical gait analysis technology in prescribing leg orthoses - *Prof. Dr. J. Harlaar PhD, biomedical engineer VUmc Amsterdam*
- Identifying the care need: informed orthosis prescription - *Prof. Dr. F. Nollet MD PhD, rehabilitation physician AMC Amsterdam*
- Creating the care plan: state-of-the-art in lower limb orthotics. - *T. Gort, senior orthotist at OIM Noppe*

2f. Mini-symposium: Mindfulness and acceptance based interventions in the rehabilitation of patients with multiple sclerosis: feel it and believe it?!

There is growing evidence that patients with multiple sclerosis (MS) could benefit from cognitive behavioral therapy (CBT). Recently, a new generation of CBT, including mindfulness and acceptance based interventions has been developed. In the present mini-symposium, participants will learn what the scientific evidence is for Mindfulness Based Interventions and Acceptance and Commitment Therapy (ACT) in neurological diseases, including MS.
Second, participants can experience themselves what mindfulness is by doing an exercise. Also the experience of a MS patient who followed an 8-week training of Mindfulness-Based Cognitive Therapy (MBCT) will be presented. Third, we will present the results of a waiting list controlled study focusing on the feasibility and effectiveness of MBCT in severely fatigued MS patients (MindMS). Fourth, we will present a study protocol and the first results of a single case multiple baseline experimental study (ACTinMS). In this study the focus is on ACT as an intervention to improve quality of life and participation in patients with multiple sclerosis. Finally, we will discuss if and how Mindfulness and Acceptance based interventions are beneficial for MS patients during their rehabilitation program, especially because it is a population that is often severely fatigued and cognitively impaired.

Programme
Chair: Prof. C. van Heugten PhD
Speakers: Y. Bol PhD, A.E.W. Hoogerwerf MSc, I. de Marez Oyens MSc

- Mindfulness Based interventions and Acceptance and Commitment Therapy in neurological diseases and multiple sclerosis: the state of the art
- See and feel what mindfulness can do: exercise with the audience and an interview with a MS patient (video)
- Is Mindfulness-Based Cognitive Therapy feasible and effective in severely fatigued patients with Multiple Sclerosis? A waiting list controlled study (MindMS)
- Acceptance and Commitment Therapy as an intervention to improve quality of life and participation in patients with multiple sclerosis. A single case multiple baseline experimental study (ACTinMS).
- Concluding remarks

2g. Workshop: Rehabilitation; it's all about learning

What does somebody who is confronted with new physical capacity need from the care system to be able to keep participating? And what prompts this from you as a professional and from the organization you work in?
This workshop will challenge all participants to exchange their "care-view" for a "learning-view" and find answers to the above. In this workshop the principles on which the way people learn are based, have been translated to the rehabilitation setting. These learning principles offer a new perspective and practical tools to focus on the learning

process of the rehabilitation patient. The outcome can be a person who has learned how to keep participating in society on his own means. Besides that, the workshop offers on how to organize rehabilitation from this perspective. After a thorough introduction in learning-principles and the influence of professionals in learning processes, the participants can join in. The speakers will actively involve participants in lively discussions based on short videos of practical day-to-day rehabilitation settings. For example: "How to create a meaningful context?"
This workshop is suitable for both physiatrists, therapists, psychologists and other health care professionals.

Programme
Chair: J.M. Stolwijk-Swüste MD PhD
Speakers: J.M. Stolwijk-Swüste MD PhD, I. Vuijk Ba PT, C. Vuijk

- Introduction 'Rehabilitation as a learning process'. A brief historical and cultural introduction - *Janneke Stolwijk-Swüste MD PhD*
- Learning principles and educators skills in rehabilitation - *Inge Vuijk, PT*
- From "grasping to gripping". A practical example learning principle - *Coen Vuijk*
- How to create a meaningful context? Arranging contexts as a learning tool - *Coen Vuijk*
- Summary/Discussion

2h. Workshop: Rehabilitation medicine: a challenge for medical students?

Crossing borders: a challenge to look around in rehabilitation medicine.
What do you know about it?
In this workshop we show you about everyday practice in rehabilitation medicine. The work in hospital and rehabilitation centre and all other places were you meet the consultant in rehabilitation medicine.
We inform you about topics of the conference of interest for medical students. What is there to see and hear?
Fellow students present their research in rehabilitation medicine and discuss the outcomes.
We have a special poster walk for you included in the programme. What do we learn from it and why is it of interest for rehabilitation medicine? You are the jury for selecting the prize-winning poster.
Interested? You want to know more about this medical specialty?
Come and join us in the conference and cross the border!

Programme
Chair: G.M. Rommers MD PhD
Speakers: G.M. Rommers MD PhD, W. G.M. Janssen MD PhD, L. Hasket BSc

- Introduction of the workshop
- Introduce yourselves: what are your ideas about rehab medicine: where do you study and why interest in rehabilitation medicine.
- What you expect from a conference?
- What about rehabilitation medicine: G.M. Rommers and W.G.M. Janssen and registrars: examples and why we train(ed) as rehabilitation doctors
- Student research presentation: presentation and discussion with the students
- Poster walk with 4-5 preselected posters; presentation of posters by poster presenter: 5 minutes with discussion in the group
- Poster reward by the students
- Final remarks, take home message and close

2i. Mini-symposium: Crossing borders within the ICF: added value of objective measurement of physical behaviour in Rehabilitation Medicine

Disorders treated by rehabilitation specialists have consequences in several (ICF) domains of functioning. One of those domains is "performance", which includes a patient's physical behaviour (PB), i.e. the body postures, movements and activities people perform in their daily life environment. Literature shows that this PB is a unique part of functioning. So far, this domain received relatively little attention, probably due to the lack of methodologically sound and practically usable devices. However, technological progress allows the use of innovative, objective and feasible instruments to measure PB. Application in rehabilitation medicine includes monitoring the course of disease or recovery, and evaluation of treatment, but objective assessment can also be used to provide feedback to patients as part of their treatment. In this symposium a general overview will be provided of the relevance and possibilities of measuring PB in rehabilitation medicine. Examples from Dutch and UK clinical studies and applications will be presented, and current and future developments in this area will be discussed.

Programme

Chair: J.B.J. Bussmann PhD

Speakers: Prof. M.H.G. Granat PhD, H.J.G. van den Berg-Emons PhD, E. van Wegen PhD, J.H.J. Bussmann PhD, I. Huijnen PhD, J. Huijser MSc

- General introduction: physical behaviour within the ICF and rehabilitation medicine - *Hans Bussmann*
- Objective measurement of physical behaviour in various patient groups: examples from clinical studies - *Rita van den Berg*
- Chronic pain: avoiders & persisters; different patterns of physical behaviour? - *Ivan Huijnen*
- Physical behaviour feedback : first clinical experiences in Rijndam Rehabilitation Institute - *Joris Huijser*
- Activity monitoring as part of tele-rehabilitation and e-health after stroke: the care4stroke program - *Erwin van Wegen*
- Current and future developments in the area of measuring physical behaviour - *Malcolm Granat*

Parallel Session 3 – Mini-symposia and workshops

Thursday 5 November, 16.30-18.00

3a. Workshop: Clinical exercise testing in pediatric and adult rehabilitation

Clinical exercise testing is increasingly acknowledged as an important method to improve diagnostics and treatment of patients with limitations in mobility. Common complaints in these patients include reduced walking distance and early fatigue during daily life activities. These complaints may be associated with low fitness due to low activity levels. In addition, low walking economy can contribute to the development of walking problems. Appropriate assessment of these outcomes are therefore essential for clinical decision making. This workshop provides a background in the principles of exercise testing and training that is required to understand and interpret test results and apply training programs in pediatric and adult rehabilitation. Results and experiences with exercise testing and training from three Dutch rehabilitation departments (VUmc, Heliomare, UMCG-Beatrixoord) are presented and discussed with the audience. Clinical case examples concerning children with cerebral palsy, and adults with neurological disorders and adults following amputation are presented. Each 30-min presentation consists of diagnosis specific principles of exercise testing, testing procedures, interpretation of test results and exercise prescription and discussion of clinical cases.

Programme

Chair: A.I. Buizer MD PhD
Speakers: A.J. Dallmeijer PhD, A.I. Buizer MD PhD, R. Dekker MD PhD, F. van Dijk MSc, H. Houdijk PhD, F. Groot MD

- Exercise testing in children with cerebral palsy - *VUmc: Annet Dallmeijer, Annemieke Buizer*
- Exercise testing in adults with neurological disorders - *UMCG-Beatrixoord: Frank van Dijk, Rienk Dekker*
- Exercise testing and training program in adult rehabilitation - *Heliomare Rehabilitation: Han Houdijk, Floor Groot*
- General discussion about exercise testing in rehabilitation

3b. Mini-symposium: Robotics and brain computer interfaces in spinal cord injury

Spinal cord injury (SCI) is a condition which is rare and for which there are currently no restoration possibilities. However, there are encouraging signs a revolution in technology may speed the process of regaining mobility. New generations of robotic training devices and exoskeletons for training and regaining functional activities are being developed. Researchers have bypassed the spinal cord and are able to restore fine motor control to paralyzed limbs using brain-computer interfaces.

Programme

Chair: M.Vos MD PhD

Speakers: Prof. M. Post PhD, W.X.M. Faber MD, T.W.J. Janssen PhD, E. van Asseldonk PhD, Prof. N. Ramsey MD PhD

- Brain computer interfaces in locked in syndrome - *Prof N. Ramsey MD PhD*
- State of the art: development of exoskeletons and electrostimulation for walking after SCI - *E. v Asseldonk PhD*
- Locomotor training in SCI: is it effective and useful? - *Prof T. Janssen PhD*
- Practical use of the exoskeleton in SCI- a clinical illustration - *W. Faber MD*

3c. Mini-symposium: Trauma Rehabilitation anno 2020

In this mini symposium, you will hear about new treatments and insights, along with recently completed research and/or implementation of research, in the field of trauma rehabilitation and from a European perspective. In the first lecture, details of the 'Supported Fast Track Trauma Rehabilitation Service' program and the results of its implementation in the rehabilitation trauma care system of two Dutch trauma regions will be presented, along with the clinical implications. Next, four leading international experts in the field will share their experiences and will look into the future to give their ideas about developments in trauma rehabilitation. Implications for daily clinical practice that can be learned from working within the Greater Manchester Trauma Network, United Kingdom, will be presented in the third lecture. This will be followed by results of recently completed research about the difference in outcome between patients with "non-fast-track-Rehabilitation" compared to those treated as early as possible after accident in different rehabilitation departments in Hamburg, Germany. Finally, insights in the daily clinical practice of trauma rehabilitation, especially of the upper extremity, in East-Flanders, Belgium, will be given in the fourth lecture.

Programme

Chair: B. Hemmen, MD PhD

Speakers: J.J. Glaesener MD PhD, K. Walton MD, B. Hemmen MD PhD, S. Geers MD PhD, H.R. Holtslag MD PhD

- Supported Fast track trauma rehabilitation: introduction and results of implementation - Bea Hemmen
- Fracture rehabilitation, what's in a name? - Herman Holtslag
- Major Trauma Networks in England & the rehabilitation pathways: present and future - Krystyna Walton (UK)
- Acute and post-acute rehabilitation of trauma patients: procedures and results of an outcome study - Jean-Jacques Glaesener (Germany)
- Trauma and amputation rehabilitation: state of the art. - Sybille Geers (Belgium)

3d. Mini-symposium: McARM: the development of an intuitive dynamic arm support

Not being able to eat or drink independently are common problems for people who suffer from Duchenne muscular dystrophy, multiple sclerosis, or the consequences of a stroke. For individuals with an affected arm/hand function a dynamic arm support can be an important technical aid in the everyday ability to manipulate objects in the environment. Existing dynamic arm supports, however are mainly passive or need to be actively controlled in the vertical direction. Use of these devices require a moderate amount of strength, strength people with a severely decreased arm function might not have. The McArm project aimed to develop an innovative arm support which can be controlled through intuitive force exertion. Two versions were foreseen: one to support in daily life activities and one to facilitate training of arm/hand function involving serious gaming. Development of such an innovative dynamic arm support requires close cooperation between developers, end-users, health care professionals and researchers. The consortium managed to develop a working prototype that is not far from market introduction. This symposium guides you along the development of the McARM. From the current state of the art, until the actual development, and implications of the recent developments for the field and the end-user.

Programme
Chair: K. Meijer PhD
Speakers: D.J. van der Pijl MSc OT, L.A. van der Heide MSc, A. Bergsma MSc, H. Essers MSc, B. van Ninhuijs MSc

- Classifications of dynamic arm supports: from a technological and intended user perspective - *Dick van der Pijl*
- The use of dynamic arm supports in daily life - *Loek van der Heide*
- Assessment of arm function in muscular diseases: from muscle function to participation in activities of daily living - *Arjen Bergsma*
- Influence of arm support on muscle-skeletal loading and coordination - *Hans Essers*
- Technical aspects of a motion controlled arm support system: From specifications to design - *Bob van Ninhuijs*

3e. Workshop: Cancer Rehabilitation: Benefits and pitfalls from 3 perspectives

Cancer Rehabilitation focuses on the functional, physical, psychological , spiritual and social problems associated with cancer, including aftercare and rehabilitation. It concerns advice and, where needed, guidance in dealing with the disease (coping), recovery, prevention of deterioration and improving physical condition. Cancer rehabilitation needs to focus on the entire process of diagnosis, treatment, and- aftercare for all patients.
In 2011 the Dutch guideline for Cancer Rehabilitation was established and was implemented in 2012-2014 in 6 pilot centers. Recently the guideline was revised based on feedback from cancer patients and health care professionals working with patients with cancer.

Programme
Chair: J.P. van den Berg MD PhD
Speakers: J. van den Berg MD PhD, M. Velthuis PhD, B. van de Weg MD, Prof. E. Boven MD PhD, P. Versteegh

This workshop focuses on 3 perspectives: the oncologist will inform us about short and long term effects of cancer treatment, a cancer patient will share her personal experience with a rehabilitation program and the consultant in rehabilitation medicine will present the key points of the cancer rehabilitation guideline (2015).

3f. Workshop: PEPT and GEXP for CRPS-1; without pain no gain

Pain Exposure Physical Therapy
We will present the general principles about pain (acute nociceptive versus chronic neuropathic pain) and diagnostic criteria according to Bruehl. Furthermore, we will present data from a retrospective study of patients who were offered a PEPT treatment in the Sint Maartenskliniek at Nijmegen in the years 2013-2014. We used Standardised Questionnaires and Performance tests which are described in the 'Nederlandse Data Pijnset' (NDP) which is a digital data set. We will explain how we treat the patients and our analysis of the pain with the S.C.E.G.S (Somatic; Cognition; Emotion; Behavior; Social). A focus of discussion will be the inclusion criteria for PEPT; our experience is that more patients benefit from PEPT than just CRPS type 1 patients.

Graded Exposure in Vivo
GEXP in CRPS-I specifically aims at a restoration of functional abilities by reducing pain-related fear. We will present the results of an RCT, that was conducted to compare the effectiveness of GEXP with pain-contingent physical therapy on disability, pain-catastrophizing and perceived harmfulness of physical activity, pain-intensity, and health-related quality of life in CRPS-I patients with at least moderate levels of pain-related fear.

Programme

Chair: S. Groeneweg

Speakers: Prof. R.J.E.M. Smeets, MD PHD, M.L. den Hollander MSc, R.T. van Dongen, MD PHD, G. Gilbers PT, R. Kersten PT, S. Groeneweg

- Changing concepts (crypto – Cartesian (Bio medical)versus Neo Aristotelian (Bio-Psycho-Social)
- Results of the retrospective study
- How we do the PEPT (video)
- Discussion

3g. Mini-symposium: Rehabilitation Medicine across European borders, a view from European Organisations

Several European organisations are involved concerning Rehabilitation Medicine in Europe. Despite different historical and organizational backgrounds they are involved in the developments in Europe, which also are reflected in the Netherland. Wim Janssen will provide an introduction into the system of accreditations provided by the Board of Physical and Rehabilitation Medicine of the UEMS. The Board is involved in the Board certification by examination which takes places yearly. Xanthi Michail has been involved as president of the European Society of PRM, which is to be the leading scientific European Society

for physicians in the field of PRM. 21 National Societies are involved. Dr Michail will expand on scientific developments and facilitation of exchange. The ESPRM organizes a biannual European Congress of PRM. Nicolas Christoudoulou chairs the Section and the Board of Physical and Rehabilitation Medicine which represent specialists in Physical and Rehabilitation Medicine within the European Union of Medical Specialists (UEMS). Activities of the section are organized concerning professional practice and clinical affair. Currently effort is put into the renewal of the directive of the European Parliament and council dating 2005. This directive is directly linked to the individualisation of vocational training in the Netherlands.

Programme

Chair: D. Wever MD

Speakers: D. Wever MD, W. Janssen MD PhD, Prof. X. Michail MD PhD, Prof. N. Christoudoulou MD PhD

- Introduction; aim and outlines workshop - *Daniel Wever, MD*
- Introduction to accreditation procedures Board UEMS PRM - *Wim Janssen, MD PhD*
- Introduction to activities of ESPRM - *Xanthi Michail, MD PhD*
- Introduction to activities of the UEMS Section - *Nicolas Christoudoulou, MD PhD*
- Panel discussion with representatives and floor in an interactive approach discussing current European and Dutch topics related to European developments. What are current relevant developments in Europe and the Netherlands, what is our sphere of influence
- Summary and closure

3h. Mini-symposium: Aphasia rehabilitation: timing of treatment after stroke

Aphasia due to stroke affects communication and consequently quality of life. Most stroke survivors with aphasia receive speech and language therapy in the months following stroke onset. Two important clinical issues in providing speech and language treatment for stroke survivors are intensity and timing of treatment. Whereas there is general consensus that high treatment intensity is crucial for its effect, evidence for benefits of an early start in aphasia rehabilitation is frail. Nevertheless, clinicians often adhere to statements such as “the earlier, the better”.

Aphasia treatment is provided in the sub-acute and chronic stage of stroke. In clinical practice treatment approaches differ across stages; impairment based treatment is often preferred in the sub-acute stage and in the chronic stage focus shifts towards compensational treatment.
This mini-symposium not only presents the results from recent RCTs in different stages after stroke, studying efficacy of different treatment approaches, but also provides an overview of current knowledge of the relationship between timing and efficacy of treatment. Lastly a novel treatment targeting not only the patient, but also their communicative environment is presented. Timing of this intervention will be discussed.

Programme

Chair: W.M.E. van de Sandt-Koenderman PhD
Speakers: L. de Lau MD PhD, F. Nouwens MSc ST, S.M. Wielaert Mphil, I.A.C. van der Meulen PhD

- Optimal timing of speech and language therapy for aphasia after stroke; more evidence needed - *Lonneke de Lau*
- The RATS-3 study; The effect of early intensive aphasia therapy after stroke - *Femke Nouwens*
- The MIT study; The effect of Melodic Intonation Therapy in the subacute and in the chronic stage - *Ineke van der Meulen*
- ImPACT: Implementing participation oriented training for partners of people with aphasia - *Sandra Wielaert*

Parallel Session 4 – Mini-symposia and workshops

Friday 6 November, 09.00-10.30

4a. Mini-symposium: Future directions in upper and lower limb strength measurement in children with CP

Muscle strengthening programs receive a lot of attention in the development of new treatment approaches for children with cerebral palsy (CP). Several studies have shown that muscle strength in children with CP classified with GMFCS levels I and II is reduced by 30-50% compared to typical developing children.1,2,3 At the moment promising effects of strengthening interventions are stated.2,3 Besides spasticity, the level of strength of the upper limb seems to be an important factor for performing activities in daily life.3 Therefore, muscle strength has become increasingly important in the assessment process in both clinical and research settings to quantify the effects of strengthening interventions. 1,2,3 At the moment, several instruments are used without appropriate information about clinimetric properties for children with CP.4 To help clinicians and researchers to select an appropriate measure and protocol, a careful evaluation of clinimetric properties of already existing instruments is necessary. Additionally, we need a careful consideration of the question; "What is the optimal goal of our measurement for that specific child with its own specific health questions and what is the best way to perform it?" 5,6,7 In this perspective functional approach of measuring strength seems promising, next to the strength of specific muscles.

Programme

Chair: C. Bastiaenen PhD
Speakers: E. Rameckers PhD PT, K. Dekkers PT, A.N. Mulder-Brouwer PT, W.F.M. Aertsen-Verhoef PhD, E. Smulders PhD.

- Principles of strength measurements
- Relevance of measuring strength in interventions
- Translation Dutch Guideline CP
- Isometric strength measurements
- Functional strength measurements; Isometric
- Functional strength measurements; Dynamic

4b. Mini-symposium: Cerebral visual impairment in childhood

Cerebral visual impairment (CVI) is a major cause of visual impairment in childhood and refers to a wide range of visual impairments resulting from brain dysfunctions. Although clinicians have become increasingly aware of CVI over the past decade, diagnostic criteria of CVI are still subject of debate. In today's practice, assessment and interventions are typically a multidisciplinary venture. This symposium presents state of the art clinical procedures as well as new insights from scientific studies by:
1. An introduction to visual impairment, referral criteria for visual rehabilitation and open questions where it comes to CVI in (ophthalmic) medical practice,
Followed by recent findings from scientific studies into:
2. A function-based (research) diagnosis of CVI in very preterm born children, including repercussions of CVI on motor, intellectual, and behavioural functioning,
3. Practical value of eye tracking to characterize the development of visual sensory and visual perceptive functioning in children with CVI,
4. Adaptations of the PEDI-NL and GMFM-88 to evaluate daily-life activities for self-care, mobility, social functioning, and gross motor functioning in children with cerebral palsy (CP) and CVI,
And concludes with:
5. An integrative vision on CVI including signs and symptoms that can serve as referral criteria.

Programme
Chair: C.J.A. Geldof MSc
Speakers: M.J. de Vries MSc, C.J.A. Geldof MSc, M.J.G. Kooiker MSc, A.Q. Salavati PT, S. Zuidhoek PhD

- CVI: the ophthalmologist's view - *Meindert de Vries*
- Utility of a function-based CVI diagnosis in very preterm born children - *Christiaan Geldof*
- Eye tracking as a tool to characterize the development of visual sensory and visual perceptive functioning in children with CVI - *Marlou Kooiker*
- Reliability of the modified Paediatric Evaluation of Disability Inventory, Dutch version (PEDI-NL) and Gross Motor Function Measure-88 (GMFM-88) for children with Cerebral Palsy and Cerebral Visual Impairment - *Masoud Salavati*
- Understanding and identifying CVI: integrative model and referral criteria - *Sander Zuidhoek*

4c. Mini-symposium: Crossing borders in spinal cord injury education and research

Spinal cord injury (SCI) is a relatively rare condition. Therefore there is a need for international collaboration in research and clinical practice. This mini-symposium will highlight international projects that have moved this field forward to share knowledge on international collaboration and to be inspirational for similar initiatives in other diagnostic groups.
The European Multicenter study about SCI (EMSCI) started in 2002 as a prospective cohort study on neurological and functional recovery and has grown into a collaboration of 19 SCI centers and is a basis for the European Clinical Trial Network. Recently the SCI-POEM study started on prognostic factors and therapeutic effects of surgical treatment for spinal column trauma.
The International SCI Data Sets project started in 2002 as an international effort to harmonize data collection on SCI in clinical practice. Since then international consensus has been reached on 20 Data Sets to describe e.g. bowel management, non-traumatic etiology and quality of life.
The E-learning project started in 2010 and the website elearnSCI.org was launched in 2012. Its goal is to educate health professionals on SCI worldwide. This was accomplished through contributions of more than 300 experts from 36 countries coordinated by the education committee of the International SCI society.

Programme

Chair: M. Vos MD PhD and Prof. M. Post PhD
Speakers: Prof. M. Post PhD, H. van de Meent MD PhD, S. Muldoon, M.Vos MD PhD

- European Multicenter Study about SCI (EMSCI) and SCI-POEM: The European Multicenter study about SCI (EMSCI) started in 2002 as a prospective cohort study on neurological and functional recovery and has grown into a collaboration of 19 SCI centers and is a basis for the European Clinical Trial Network. Recently the SCI-POEM study started on prognostic factors and therapeutic effects of surgical treatment for spinal column trauma - *Henk van de Meent MD,PhD, Sint Maartenskliniek Nijmegen, the Netherlands*
- International Spinal Cord Injury Data Sets: The International SCI Data Sets project started in 2002 as an international effort to harmonize data collection on SCI in clinical practice. Since then international consensus has been reached on 20 Data Sets to describe e.g. bowel management, non-traumatic etiology and quality of life – Prof. *Marcel Post PhD, University Medical Center Groningen and Center of Excellence in Rehabilitation Medicine Utrecht, the Netherlands*
- E-Learning Spinal Cord Injury: The E-learning project started in 2010 and the website elearnSCI.org was launched in 2012. Its goal is to educate health professionals on SCI worldwide. This was accomplished through contributions of more than 300 experts from 36 countries coordinated by the education committee of the International SCI society - *Steven Muldoon (to be confirmed), Livability, Enniskillen, Ireland*

4d. Workshop: The experience sampling method (ESM) in rehabilitation medicine: a promising new tool to improve treatment

Acquired brain injury is an increasing burden as it is the largest cause of disability in physical, behavioural and psychological functioning for the affected individual and his or her environment. In the first months of rehabilitation, the focus is mainly on physical and cognitive impairments. Problems on emotional and behavioural level mostly arise after discharge from the clinic. Emotional and behavioural problems are strongly intertwined with the context in which they occur. This interaction between emotions/behaviour and context is difficult to objectify. The experience sampling method (ESM) is an ecologically valid, time-sampling method providing to study the dynamics of person-environment interactions by means of an electronic diary or app on a smartphone. ESM makes it possible to gain insight in both negative and positive affect in interaction with daily life experiences, which is not captured with traditional clinical diagnostic methods. The rehabilitation therapist can use this information to strengthen patients' strategies to cope with daily challenges. In this workshop, the background of ESM and first result of its application in brain injury patients will be presented. Moreover, possible applications in other patient populations in rehabilitation will be discussed (e.g. pain patients).

Programme

Chair: Prof. R.W.H.M. Ponds PhD
Speakers: Prof. R.W.H.M. Ponds PhD, S. Rasquin PhD, Prof. M. van Heugten PhD

- Introduction and background of the ESM methodology - *Rudolf Ponds*
- Application of the ESM in brain injury patients: first results - *Sascha Rasquin*
- Possible application of het ESM in other rehabilitation patient groups - *Caroline van Heugten*
- General discussion

4e. Mini-symposium: Crossing borders in vocational training

The quality of healthcare is directly linked to the quality of medical training provided to the healthcare professionals. The expansion of globalization, as manifested by cross-border education and information, exchange of medical students, and migration of medical doctors causes a strong focus on the need of standards in medical education. To

produce physiatrists who can work across European healthcare systems the PMR section of the Union of European Medical Specialists (UEMS) aims to improve and harmonize the content and eventually the standard of training across the European Communities.
Despite the commitment of the PMR section, differences in healthcare systems and medical training within the European countries still exist. If we could approach these variations in terms of chances and opportunities instead of threats and limitations, this might give us an excellent opportunity to learn from each other and still improve quality of medical training.

As such, the main aim of this workshop is to recognize these variations, exchanging opinions, and sharing best practices of vocational training within the European countries; what can we learn from each other within the EU.

Programme
Chair: A.A. van Kuijk MD PhD
Speakers: E. Drossaer MD, M. Nayar MD, B. Fard MD

- Introduction; aim & outlines workshop
- Short structured presentation of the key features of postgraduate training by representatives of the attending countries:
- Organization of training
- Contents of training: the basic elements of the postgraduate training programme
- Research & scientific communication
- Pearls and diamonds of training (excellent features of the training programme that should be shared with other countries)
- Panel discussion in an interactive atmosphere between representatives and floor. Main aim: recognizing variations within vocational training within European countries, exchanging opinions, and sharing best practices of vocational training; what can we learn from each other?
- Summary and closing

4f. Mini-symposium: Sustainable top-quality user-friendly measurement. Why and how?

In this mini-symposium the why and how of sustainable top-quality user-friendly measurement in daily clinical practice will be addressed.
First, for sustainable measurement, it is important to understand the different perspectives of the stakeholders involved in the measurement process including clinicians, researchers, managers and health insurers. To managers and health insurers, routine outcome monitoring and benchmarking are important issues.
For top-quality measurement, on the other hand, it is important that instruments meet certain psychometric criteria, and the COSMIN initiative (www.cosmin.nl) has summarized these criteria. An update of these criteria is forthcoming.
Furthermore, for user-friendly measurement, it is important for patients to complete instruments consisting of small number of relevant questions only. In recent years instruments have been developed using item response theory. This theory enables item banking and computerized adaptive testing (CAT), which helps combine both top-quality and user-friendly measurements.
The Patient Reported Outcomes Measurement Information System (PROMIS®) initiative (www.nihpromis.org) has developed a large number of item banks and CATs. These are highly reliable, valid, flexible, precise, and responsive assessment tools that measure patient–reported health status. Dutch-Flemish translations of the PROMIS item banks (www.dutchflemishpromis.nl) are now available for rehabilitation practice in the Netherlands and Belgium.

Programme
Chair: L.D. Roorda MD PhD
Speakers: L.D. Roorda MD PhD, E. de Beurs PhD, C. Terwee PhD, M. Crins MSc

- Opening - *Joost Dekker, PhD*
- Measurement: integrating perspectives of different stakeholders - *Leo D. Roorda, MD, PT, PhD*
- Benchmarking in Mental Health Care - *Edwin de Beurs, PhD*
- The updated COSMIN guidelines - *Caroline B. Terwee, PhD*
- The Patient Reported Outcomes Measurement Information System (PROMIS®) initiative - *Caroline B. Terwee, PhD*
- Validation of Dutch-Flemish PROMIS® item banks in rehabilitation medicine - *Martine Crins, MSc*
- Discussion - *Joost Dekker, PhD*

4g. Mini-symposium: Assessing sarcopenia: why and how?

What is sarcopenia? How can it be assessed? What are the clinical implications of sarcopenia? Why is it important in rehabilitation? Which interventions are successful? These questions will be answered during this multidisciplinary mini-symposium on this exciting and clinically important subject. Sarcopenia, i.e. low muscle mass and hence low muscle force has a detrimental effect on daily activity at older age. Sarcopenia relates to increased mortality and morbidity, loss of mobility and ADL activity and impaired internal processes like glucose regulation. Sarcopenia is largely unnoticed in daily practice, as decreased muscle mass is replaced by fatty tissue and hence body weight is unchanged or even increases. Body mass index is therefore no valid measure for sarcopenia.
Early detection and proper intervention are of key importance to slow down and stop the detrimental effects of sarcopenia. This requires a multidisciplinary approach. Awareness of the clinical importance of sarcopenia is important in reaching an integrated approach to assist our patients in being independent as long as possible.

Programme
Chair: C.G.M. Meskers MD PhD and Prof A.B. Maier MD PhD
Speakers: Prof. A.B.Maier MD PhD, E.M.Reijnierse MSc, M. Dovers PT, C.G.M. Meskers MD PhD

- General introduction - *A.B. Maier*
- Definitions of sarcopenia - *E.M. Reijnierse*
- Sarcopenia and nutrition - *M.A.E. de van der Schueren*
- Sarcopenia: physical therapy - *M. Doves*
- Sarcopenia: implications for rehabilitation - *C.G.M. Meskers*

4h. Mini-symposium: Ankle-foot orthoses in adult neurological diseases: evidence and practical implications

Ankle-foot orthoses (AFOs) are often used to improve balance and walking ability during rehabilitation after stroke. Despite this, many important aspects, such as the optimal AFO design, timing of provision or long term effects have scarcely been studied. The goal of this symposium is to summarize the scientific evidence regarding the effects of AFOs on balance and walking after stroke and implications of this evidence for daily clinical practice. This will include the biomechanical effects and material properties of different AFO-designs and how these can be optimized in clinical practice using clinical gait analysis. Latest results of a recent randomized controlled trial to consider timing of providing AFOs after stroke will complete this update of the evidence.

Programme

Chair: J.H. Buurke PhD PT
Speakers: Prof. J. Harlaar PhD, C. Nikamp MSc

- Short introduction - *Jaap Buurke PhD PT*
- Presentation 1: What is the evidence for ankle-foot orthoses after stroke? The results of two recent, definitive systematic reviews with meta-analysis of the effect of an ankle-foot orthosis on gait biomechanics and activity (walking, balance and mobility) after stroke will be presented - *Jaap Buurke PhD PT*
- Presentation 2: How AFO mechanical characteristics affect walking performance and how to optimize it. Various designs of ankle-foot orthosis will perform differently in a mechanical sense, and consequently, affect walking in a different way. We will summarize what is known on this relation, incorporating our own studies on the effects of AFO stiffness and alignment. We will elaborate on how specific deviations of the walking pattern in adult neurological patients require a specific type of AFO, and how to tune it towards optimal performance for the patient - *Prof. Jaap Harlaar PhD*
- Presentation 3: Timing of providing ankle-foot orthoses in acute and sub-acute stroke patients. Results of a recent randomized controlled trial studying the effects of timing of provision of AFOs in the rehabilitation after stroke will be presented. The study compared 2 groups of (sub)acute stroke patients with different randomized moments of AFO-provision after stroke. The presented results will include short-term and long-term effects of different moments of AFO-provision on functional outcome measures, falls and 3D gait kinematics - *Corien Nikamp MSc*
- General discussion and questions

Parallel Session 5- Mini-symposia and workshops

Friday 6 November, 13.30-15.00

5a. Mini-symposium: Puzzle pieces to support lifelong health-related fitness and activity among individuals with Cerebral Palsy: The importance of knowledge sharing across borders

Despite a paucity of evidence, health-related physical fitness and activity are thought to have a positive effect on health and quality of life in individuals with cerebral palsy (CP). This symposium will integrate information based on research and ongoing clinical practice from the Stay-FIT Research Program in Canada, work pertaining to secondary health complications of chronic inactivity from the U.S.A., and the MoveFit Research Program in The Netherlands. Chronic disease burden in CP through the lifespan will be a central focus of this symposium, and specific attention will be given to outlining viable interventions that may lessen the health burden of ageing with CP. Health-related fitness impairments and intervention options will be discussed in the context for individuals with CP, but also with respect to other motor and developmental disabilities.

Programme

Chair: W.M.A. van der Slot MD PhD
Speakers: W.M.A. van der Slot MD PhD, M. Peterson PhD, J.W. Gorter MD PhD, R. van den Berg-Emons PhD

- Block 1: Background chronic disease burden
- Presentation 1: The issue (a): Health-related fitness impairments and chronic conditions in individuals with CP - *M. Peterson*
- Presentation 2: The issue (b): Physical activity and sedentary behavior patterns in CP from young adulthood onwards - *R. van den Berg-Emons*
- Presentation 3: The consequences: Vascular health in CP and the effect of aging - *J.W. Gorter*
- Q&A time
- Block 2: Treatment options
- Presentation 4: Improving physical fitness and activity in CP over the lifespan - *W. van der Slot*
- Discussion with attendee participation: Exchange experiences and discuss strategies to promote health-related fitness and physical activity in individuals with CP from adolescence onwards. Discuss future directions in both research and public health efforts in the context of population surveillance and chronic disease prevention.

5b. Mini-symposium: Gait adaptations in unilateral affected individuals. Parallels between stroke survivors and persons with an amputation

Goal of this symposium: to discuss gait adaptations of stroke survivors and unilateral amputees. It is known that the majority of the gait adaptations seen in these individuals take place in the intact leg. This leads to distinct gait asymmetry, as the intact leg seems to overcompensate for the affected leg. In both clinical practice and research, the effect of for instance different prosthetic knees is still expressed in terms of symmetry indices. We believe that striving towards gait symmetry with the underlying assumption that more symmetry means better functionality is flawed. The presentations of this symposium will show results that, in our opinion, support this statement.

Programme

Chair: M.J. Nederhand MD PhD
Speakers: M.J. Nederhand MD PhD, J. Buurke PhD, E. Prinsen MSc PT, H. Houdijk PhD

- Similarities in dynamic control of static balance between both stroke survivors and persons with an amputation - *MJ Nederhand*
- Gait adaptation of stroke survivors and the increasing reliance on the intact side with increasing demands of a task of daily life - *JH Buurke*
- Potential mechanical and energetic benefits of an asymmetric strep pattern in people with a transtibial prosthesis - *JHP Houdijk*
- Gait adaptions of persons with a knee disarticulation or transfemoral amputation and the effects of a user-adaptive prosthetic knee on these gait adaptations - *EC Prinsen*

5c. Workshop: Existential global meaning and rehabilitation: a cross-disciplinary perspective

A traumatic life event, such as spinal cord injury or brain injury, constitutes a major threat to the meaning people give to their lives. In the rehabilitation process, people are trained to deal with the physical, psychological, and social consequences of life. 'Existential global meaning' may be a source of direction and continuity in this process of adaptation and rehabilitation. Existential global meaning refers to global beliefs (e.g. core values, worldview) and global goals (e.g. having meaningful relationships), guiding people in living their live.
In this interactive workshop, the results will be presented of a recent study on the impact of existential global meaning on the process and outcome of rehabilitation in people with spinal cord injury or brain injury. Psychological aspects of the rehabilitation process will be reviewed: similarities, differences and added value of existential global meaning will be discussed. Two rehabilitation physicians will reflect on the pros and cons of integration of existential global meaning into the rehabilitation process. This session will be concluded with group work and a plenary discussion. The speakers will give short presentations and they will involve the workshop participants in lively discussions on the role of existential global meaning in rehabilitation.

Programme

Chair: Prof. J. Dekker PhD
Speakers: E. Littooij MSc, Prof. M. Post PhD, J.M. Stolwijk-Swüste MD PhD, J. Vloothuis MD

- Impact of existential global meaning on the process and outcome of rehabilitation – a qualitative study - *Elsbeth Littooij, MSc*
- Psychological aspects of adaptation after sudden onset of disability - *Prof. Marcel Post*
- Plenary discussion: Psychological approaches and existential global meaning: similarities, differences and added value - *Prof. Joost Dekker*
- Integration of existential global meaning into the rehabilitation process: opportunities and barriers - *Janneke Stolwijk-Swüste, MD, PhD and Judith Vloothuis, MD*
- Group work

- Plenary discussion - *Prof. Joost Dekker*

5d. Mini-symposium: Awareness in Deficits of Awareness

Disturbed awareness of deficits is one of the most disabling problems after acquired brain injury (ABI). Due to lack of awareness, patients do not feel the need of rehabilitation and hence show non-cooperative behaviour. This problem crosses all rehabilitation borders and asks for interdisciplinary treatment. Up until now we face the challenges of diagnosis and treatment of awareness deficits. Awareness is a complex concept which often results from different causes. These are brain injury, lack of information and denial or a combination). The current assessment-procedures are insufficient and we do not know precisely how to treat lack of awareness. In this symposium experts in this field give an overview about the state of art and how to overcome some of the difficulties. Results will be presented about (new) instruments and treatment of awareness, based on systematic reviews of existing questionnaires and treatment approaches and new research data (instruments, treatment)

Programme
Chair: S.M.C. Rasquin PhD, prof C.M. van Heugten PhD, Prof. R. Ponds PhD
Speakers: S.M.C. Rasquin PhD, I. Winkens PhD, A.C. Schrijnemaekers MSc, Prof. C.M. van Heugten PhD, R. Ponds PhD

- Introduction - *S. Rasquin*
- Diagnosing Awareness - *C. van Heugten*
- Validity of Awareness Questionnaires - *I. winkens*
- Treatment of Awareness - *AC Schrijnemaekers*
- Discussion - *R. Ponds*

5e. Mini-symposium: Customized weight-bearing protocol after orthopaedic trauma

Although techniques for osteosyntheses have taken a flight in the 20th century, studies focusing on optimizing post-surgical care facilitating optimal bone healing and function restoration remain sparse. It is well recognized that mechanical stimulation regulates bone healing and therefore weight bearing is an important aspect of postsurgical care. However, little is known about the relation between the amount of bony consolidation and load bearing capacity. As a result therapy is often cautious and guided by existing

dogmas. Clinical experience in our rehabilitation facility has led to the development of a new protocol, aimed at early load bearing guided by subjective experience of patient and therapist and objective parameters. Furthermore, complications, progression in load bearing activities, treatment means and dosage are recorded in the protocol database. The protocol will provide data to define the relationship between patient and fracture characteristics on the one hand and the rehabilitation process on the other; eventually resulting in an evidence based guideline for fracture aftercare. In retrospect over a 10 year period practicing this method it seems that the first results indicate no more complications that could be ascribed to early weight bearing compared to the number and kind of complications in literature occurred.

Programme
Chair: G.J.C.M. Maas MSc PT
Speakers: P.H.S. Kalmet, M. van de Vusse MD, G.H.H. Meys PT, Y.Y. van Horn MD

5f. Mini-symposium: Patients crossing borders in rehabilitation research: From research subjects to research partners

The pivotal role of patients in the optimization of health care, research and the education of professionals is more and more acknowledged. With respect to research, active collaboration between patients and researchers ensures an appropriate representation of the patients' needs, and helps preventing a potential mismatch between their preferences and the scientific focus. Other potential benefits include more patient oriented health research agendas, gaining trust and access to patient organisations and other institutions, raising funds for research, and creating support for implementation. Since 2013 patient research partners have been active at the Rijnlands Rehabilitation Center in Leiden (RRC). Persons who received rehabilitation treatment in the RRC after stroke operate as active research team members on an equal basis with professional researchers, adding the benefit of their experiential knowledge to any phase of the 'Stroke Cohort Outcome REhabilitation (SCORE-)' study.
In this session the background and benefits of patient participation in research will be highlighted and practical recommendations are presented. The session will provide various examples of collaboration between research partners and researchers in rehabilitation, musculoskeletal and rheumatic diseases and cardiovascular conditions

Programme
Chair: I.F. Groeneveld PhD
Speakers: Prof. T.P.M. Vliet Vlieland PhD, D. Bloemkolk MSc, P. Goossens MD PhD, I.F. Groeneveld PhD

- Patient participation in research: An international perspective - *Thea Vliet Vlieland (LUMC, RRC, Sophia)*
- Patient engagement in cardiovascular research - *Daphne Bloemkolk (De Hart&Vaatgroep)*
- Patient partners in applied rehabilitation research. A quick-start guide - *Paulien Goossens (RRC, LUMC, Sophia)*
- Panel discussion with research partners from RRC and De Hart&Vaatgroep - *Iris Groeneveld, chair of the panel discussion (RRC, Sophia)*

5g. Paneldiscussion: Spreading knowledge in rehabilitation care: what is the way forward?

Language: Dutch

Chair: M.E. Leupen
Panel: M. Ketelaar PhD, Prof. V. de Groot MD PhD, M. Klem MSc (BOSK), L. Rompen MSc, J. Haanstra

Spreading knowledge from academic medical centers to general hospitals, local therapists and general practitioners is a big challenge in health care in the Netherlands these days. Evidence based practice is promoted widely, but how do you spread and implement the academically acquired knowledge effectively to health care professionals working across the Netherlands? This is one of the challenges to improve quality of care for patients with disabilities. In this debate three examples of networks of health care professionals in our field will introduce the highlights of their approach and other panel members represent the patients' perspective and professionals perspectives.

ParkinsonNet is a national network for health care professionals specialized in treating people with Parkinson's disease. Over 2700 therapists (neurologists, physiotherapists, occupational therapists, speech therapists and nurses) join this network. The network is an open network with a restricted number of paying members per region. Goal of the network is to provide the best possible care in the Netherlands for people with Parkinson's disease. The network provides obligatory education and registers for educated therapists. Patients can search for an educated therapist in their neighbourhood.

CP-Net is a collaborating network of health care providers, researchers and persons with cerebral palsy (CP). Aim of the network is to facilitate that all children and adults with CP in the Netherlands are treated according to the latest

insights by healthcare providers in their vicinity. CP-Net works with knowledge brokers who share their knowledge at CP-Net meetings and fora, and actively translate it to changes in clinical practice (from knowing to doing). Medio 2015 there are 28 sites of rehabilitation care participating in CP-Net; the sites financially contribute to the costs of the network coordination.

Knowledge Network Stroke Netherlands (KNSN) is a national network for healthcare professionals specialized in treating stroke patients. KNSN foundation was set up in 2006 with the aim of improving stroke care. The Netherlands is divided into 72 stroke services: regional networks of health care institutions, together providing care and treatment for stroke patients. The professionals work in hospitals, rehabilitation centers and geriatric nursing homes and home care. 2.500 professionals (neurologists, rehabilitation physicians, physiotherapists, nurses and hospital managers) have joined the network. Every stroke service pays a yearly fee to KNSN. KNSN provides obligatory education, instructive meetings, conferences and a yearly report containing their benchmark data in comparison with national averages.

Programme

1. Introduction
2. What is the added value of knowledge networks in communicating and applying knowledge in a rehabilitation center, hospital or primary care?
3. Which choices have knowledge networks made in order to optimize the functioning of the network?
4. How do you evaluate the functioning of the network?
5. Conclusion: How can you work together in knowledge networks in order to optimize health care for people with disabilities?

Parallel Session 6 – Mini-symposia and workshops

Saturday 7 November, 08.30-10.00

6a. Mini-symposium: Think and Act beyond Borders: Promoting self-management and autonomy in emerging adults with a childhood onset disability

Youth with childhood onset disabilities often experience poor healthcare and a delayed transition to adulthood in several life areas. A key element for young people with a disability is to learn how to self-manage their health and their life before, during and after their transition from pediatric to adult settings. In this mini-symposium we will discuss self-management principles including results of studies among individuals with cerebral palsy. We will present interventions from Canadian (CanChild) and Dutch transition programs (TransitieNet) aimed at supporting young people to improve their self-management of life and autonomy. We will demonstrate a new scale to measure self-management skills in adolescents with chronic health conditions (Transition-Q) developed in Canada and present the development, implementation and evaluation of a tool to promote self-management in youth with disabilities: the Youth KIT.
In the contribution from The Netherlands we will share experiences with promoting self-management and autonomy in a Young Adult Rehabilitation Clinic. We will show the intervention 'Manage Your Life', which provides training of self-management skills in young adults with disabilities, in collaboration with MEE.
We will provide practical information, and promote an interactive discussion with participants to think about and act on the implementation of self-management interventions.

Programme
Chair: W.M.A. van der Slot MD PhD
Speakers: W.M.A. van der Slot MD PhD, J. Gorter MD PhD, T. Hulst, E. Salomons

- Presentation 1: Introduction: Self-management principles in childhood onset disability - *W. van der Slot*
- Presentation 2: Teen-transition Clinic, Canada: Let's make transition better for youth with disabilities by using a measure of self-management skills in adolescents with chronic health conditions (Transition-Q) and the use of the Youth KIT - *J.W. Gorter*
- Q&A time
- Presentation 3: Young Adult Clinic, The Netherlands
  Promoting self-management and autonomy in young adults with disabilities - *W. van der Slot*
  Intervention: 'Manage Your Life': design, experiences and practical exercise - *T. Hulst/E. Salomons*
- Discussion: Ample time for questions and debate on clinical significance and ways to implement and develop self-management interventions.

6b. Mini-symposium: The adaptation process after acquired brain injury and the influence of psychological factors

Acquired brain injury can have many different consequences which affect societal participation and quality of life. It is not clear why some patients adapt well to their changed life while others experience many psychosocial problems. The last few years more attention has been paid to the influence of personal factors on the outcome after brain injury and in particular psychological factors such as coping style and self-efficacy. Coping styles are ways in which people deal with stressful situations; typically problem-focused and emotion-focused styles are distinguished. Self-efficacy is the extent or strength of one's belief in one's own ability to complete tasks and reach goals. In this mini-symposium we will present results of several large scale longitudinal cohort studies into the influence of psychological factors on brain injury outcome. Special emphasis is placed on coping styles and self-efficacy. The mini-symposium will finish with a translation of these results to clinical rehabilitation practice: how should we assess these personal factors and can these factors be influenced in order to improve adaptation following brain injury?

Programme
Chair: Prof. C. van Heugten PhD
Speakers: Prof. C. Heugten Heugten, Prof. J.M.A. Visser-Meily MD PhD, M. van Mierlo MSc, I. Brands PhD

- Restore4stroke cohort study: the influence of psychological factors on stroke outcome two years post injury - *Marloes van Mierlo*
- Adaptive and maladaptive coping styles after brain injury - *Caroline van Heugten*
- The influence of self-efficacy on the adaptation process following brain injury - *Ingrid Brands*
- How can psychological factors be incorporated in rehabilitation treatment after brain injury? - *Anne Visser-Meily*
- Discussion

6c. Workshop: How to make your lecture interactive and interesting?

The renewed VRA education program induced teachers to prepare a lecture for small groups (less than 8-15), larger groups (around 40) or all participants (100-150). But how to make such a lecture interactive? What makes a lecture interesting for the residents? How to change your lecture from a 'Never miss a dull moment' to a 'Must have seen moment'?

Programme
Chair: M. Tepper MD
Speakers: R. Dahmen MD, M. Verhulsdonck MD, L. de Ruijter MD, H. Veldt MD, M. van Beugen MD, B. Roelofsen MD

Rotating workshops with all participants and in small groups. Tips and Tricks will be discussed concerning:

- What makes a lecture interesting for residents?
- How to increase the interaction?
- What is an interactive presentation?

Participants: Course coordinator, lecturers (rehab physicians, therapists) and residents.

6d. Mini-symposium: Understanding motor recvery of the upper paretic limb post stroke: implications for designing trials and measuring outcome

More than 50% of the stroke patients who are admitted to a rehabilitation centre have no or minor upper limb function. It is important to be able to predict the functional recovery of the upper limb, since it helps in clinical decision making and in achieving realistic treatment goals. Knowledge about the prognostic factors early post stroke, the time course of upper limb recovery, the clinical properties of used outcome measures as well as patients' goals are important to make appropriate clinical decisions with respect to intensity and type of treatment. By using accepted criteria for specific care pathways, the rehabilitation process will be more (cost-)effective.
The current mini-symposium aims to address the following topics: early prediction and time course of upper limb function after stroke (G. Kwakkel), selecting effective upper limb treatment (A. Geurts), and an organisation structure for upper limb rehabilitation (H. Franck). In addition, new developments in upper limb rehabilitation are presented: transcranial Direct Current Stimulation (R. Selles) and exercising by using a mobile application (M. Willems). Finally, a first attempt will be made to create an algorithm for upper limb treatment to be used in clinical decision making, based on the latest scientific results.

Programme

Chair: J.F.M. Fleuren MD PhD
Speakers: Prof. G. Kwakkel PhD PT, Prof. A.C.H. Geurts MD PhD, H. Franck MSc, R. Selles PhD, M. Willems MSc

- Introduction - *J. Fleuren*
- Early prediction of the upper limb recovery after stroke - *G. Kwakkel*
- Selecting effective upper limb treatment - *A. Geurts*
- Organisation structure for upper limb rehabilitation - *H. Franck*
- Transcranial Direct Current Stimulation - *R. Selles*
- Exercising by using a mobile application - *M. Willems*
- Conclusion - *J. Fleuren*

6e. Workshop: Taking the Virtual out of Virtual Reality

High-end motion based platform for use in clinical practice have become increasingly common in the Netherlands. As of 2015 a total of three academic centres and four regular rehabilitation centres have acquired similar systems high-end platforms. The systems are complex and require specialised therapists to operate them. Scientific research and cooperation between the centres is of utmost importance to create enough leverage to validate the use of the systems in rehabilitation. The workshop will focus on the process of validation, the requires data-set compared to regular care and the pitfalls when implementing these systems in care paths.

Programme

Chair: I. van de Port, PhD
Speakers: E. Hoogendoorn, M. Prins MSc, M. vd Krogt MSc, A. Mert MD PhD, J. Hijmans PhD, R. van Ee MD PhD, Prof. J. Harlaar PhD Ir

1. Eight years of experience using virtual reality and serious gaming in rehabilitation care – *M. Prins.*
2. Gait analyses and the role of the treadmill – *Marjolein vd Krogt.*
3. Pitfalls and good practice implementing complex systems in regular care (panel discussion)- *Agali Mert, Juha Hijmans, René van Ee.*
4. Cooperation: keeping the frogs on the database wagon - *Jaap Harlaar.*
5. Clinical validation of a virtual reality based clinical tool. Cooperation, understanding and success - *Evert Hoogendoorn.*

6f. Mini-symposium: Foot and ankle impairments - Biomechanical insights and interdisciplinary therapeutic interventions explained in the rheumatoid arthritis foot

A wide range of patients suffers from foot and ankle pathologies. These pathologies result in more or less severe gait impairments, which significantly influence the quality of life. In terms of therapy, several conservative and surgical interventions are frequently applied. However, chosen interventions are performed on basis of the experience of the physician or surgeon and require better scientific support: Among others, the relations between pathologies and related consequences for foot function are not yet well understood and knowledge on the effects of both conservative and surgical therapies are limited.
This mini-symposium aims to provide insight into the function of the foot and ankle and insight into the possible conservative and surgical therapeutic options. The topics will be related to the rheumatoid arthritis foot, which presents a range of common foot and ankle pathologies.
We start with an overview of foot and ankle pathologies and impairments. Second, we provide insight into foot and ankle biomechanics during gait and the relations between foot function and structural pathologies. Third, we present the opportunities of conservative foot and ankle (physical) therapy, which may be experienced by the audience themselves. As last, we present and discuss the possibilities of state-of-the-art surgical interventions.

Programme
Chair: Prof. J.S. Rietman MD PhD
Speakers: A.V. Nene MD PhD, A.V.C.M. Zeegers MD PhD, R. Dubbeldam PhD PT, J. Wippert PhD PT

- Foot and ankle problems of the rheumatoid foot - *Anand Nene, rehabilitation physician*
- Foot and ankle biomechanics "The foot as a 3-dimensional structure" - *Rosemary Dubbeldam, physical therapist, scientist*
- Conservative solutions for foot and ankle problems: theory and praxis - *Jens Wippert, physical therapist*
- Invasive solutions for foot and ankle problems - *Elgun Zeegers, orthopaedic surgeon*

6g. The Dutch Neurotraumatology Quality Registry (Net-QuRe): a multi-institutional cohort study

Moderate and severe traumatic brain injury (TBI) leads to a wide array of disturbances in the normal functioning of the brain. TBI is one of the major causes of death among people under the age of 45. In addition, over 50% of hospitalized TBI survivors experience long-term disability due to physical, cognitive or psychological deficits. The gravity of the condition stands in sharp contrast to the scientific evidence on the most optimal care strategies in TBI. Despite many fundamental studies and several randomized clinical trials, the most effective interventions remain to be determined. As a result, the current care for TBI patients may vary widely between institutions, both hospitals and rehabilitation centers. This project, named Neurotraumatology Quality Registry (Net-QuRe), will entail the development of a high quality database on the total chain of care for neurotrauma patients. The goal of this project is to describe and compare the care strategies and enable fast identification of the most effective interventions. The first step in this project is to define a standard set of TBI outcomes by means of Delphi rounds. The development of the Net-QuRe study and the results of the Delphi procedure will be presented.

Programme
Chair: M.H. Heijenbrok-Kal PhD
Speakers: Prof. G.M. Ribbers MD PhD, H.F. Lingsma PhD, T.A. van Essen MD, L. Peppel Msc
1. Routine outcome measurement: dilemmas, challenges, and current activities - *Prof. Gerard Ribbers MD PhD*
2. Comparative effectiveness research within the Net-QuRe study - *Hester Lingsma PhD*
3. Neurosurgical decision making in traumatic acute subdural hematoma and intracerebral hematoma. - *Thomas van Essen MD*
4. Defining a standard set for TBI outcomes in the Net-QuRe study: results from a Delphi procedure. - *Lianne Peppel, MSc*

6h. PhD Thesis Session

Jury: Prof. J. Verbunt MD PhD, J.H. de Groot PhD, J. van Meeteren MD PhD, A. Mert MD PhD

During this session, the best PhD theses in the field of rehabilitation medicine in the academic year 2014-2015 in the Netherlands are presented. These dissertations are nominated by professors in rehabilitation medicine. A selection of the theses was made by the PhD Award jury. During the session the jury will select the winner from the nominees of the PhD Award 2015. The nominees are:

Dr. Joke Geytenbeek - *Comprehension of spoken language in non-speaking children with severe cerebral palsy*

Children with severe cerebral palsy (CP) , i.e. non-speaking children with severely limited mobility, are restricted in many domains involved in the acquisition of language. This thesis describes the development and application of a specifically developed 'Computer-Based instrument for Low motor Language Testing' (C-BiLLT), to assess spoken language comprehension in non-speaking children with severe cerebral palsy (CP). The C-BiLLT showed good validity and reliability results. With its different access methods, the C-BiLLT enables reliable assessments in children with severe CP and provides valuable information to optimize the child's language environment in daily activities and participation. Using the C-BiLLT, the relation between spoken language comprehension and motor type of CP, MRI pattern and severity of brain lesions in children with severe CP was investigated. The results of the different studies investigating these relations will be presented and the different access methods of the C-BiLLT will be illustrated with video material.

Dr. Jorrit Slaman - *Promoting a healthy lifestyle*

Physical activity serves as primary and secondary prevention against several chronic diseases and is associated with a reduced risk of premature death. Nevertheless, it is known that persons with cerebral palsy (CP) have low levels of daily physical activity and physical fitness. At the Erasmus MC, a lifestyle intervention was initiated that aims to improve physical fitness and increase physical activity among youth with chronic conditions. The LEARN2MOVE 16-24 study evaluated this lifestyle intervention among youth with CP on both the short and long term. The results of this study will be presented during the PhD Thesis Session (parallel session 6H). This includes results on fatigue, several components of physical fitness, and both self-reported and objectively measured physical activity. Moreover, the surprising results of the cost-utility study will be presented.

Dr. Eric Voorn - *Aerobic exercise capacity in post-polio syndrom*

The aim was to expand the body of knowledge on the diminished aerobic capacity of individuals with post-polio syndrome (PPS). The studies described in this thesis were based on the assumption that, besides a reduced muscle mass, deconditioning contributes to the diminished aerobic capacity found in many individuals. Deconditioning may result from two factors; the disease process itself and a sedentary lifestyle. While the disease process itself is irreversible, deconditioning as the consequence of a sedentary lifestyle may be reversed by increasing physical activity in daily life or by following exercise programs. The efficacy of a high intensity home-based aerobic exercise program was evaluated. The results showed that the program was not effective in improving the aerobic capacity or reducing fatigue in severely fatigued individuals with PPS. A process evaluation exploring the reasons for the lack of efficacy revealed that, despite high attendance rates, participants were unable to adhere to the designated high intensities. Although participants still trained around the anaerobic threshold most of the period, the program did not result in an improved aerobic capacity as muscle function nor cardiorespiratory fitness increased. It was also shown that fatigue resistance of the knee extensor muscles in individuals with PPS did not differ from healthy subjects. Together with the lack of efficacy of the training program on muscle function our findings argue against the assumption of deconditioning of lower extremity muscles in PPS.

Plenary Poster Sessions - index

Plenary Poster Sessions

Poster Session 1

Thursday 5 November, 11.00 – 11.15

1. Effect of inspiratory muscle training on functional capacity parameters in patients with chronic heart failure

Abdelhameed A. PhD
University of Sharjah, United Arab Emirates

Background: Most patients with chronic heart failure (CHF) are limited in their physical activity by fatigue and dyspnea, and it has been suggested that respiratory muscle weakness and deconditioning may be involved in the increased work of breathing during activities. **Purpose:** The aim of this study was to investigate the effect of inspiratory muscle training on parameters of functional capacity(VO_{2max} and AT) in Chronic heart failure and to clarify other possible effects including; reduction of sympathetic over activity and improvement of the parameters of ventilatory function tests and gas exchanges during exercise. **Methods**: Forty male patients with chronic heart failure (≥ 1 year), recruited for the study. Their ages ranges from 50-65 years old with left ventricular ejection friction ≤40% in NYHA class II and III and in stable condition. The patients were randomly divided into two equal groups: IMT, and control group. IMT group participated in inspiratoray muscle training program using inspiratoray muscle trainer and breathing calisthenics, three times a week for three months, whereas the patients in the control group were under medical treatment, and were asked to be on their normal activities. **Results:** The results showed a significant increase in the of VO_{2max}, anaerobic threshold, and maximum oxygen pulse with significant reduction in VE during exercise testing in the IMT group, over the control. While the parameters, peak work load, and maximum heart rate, were not significantly altered in both groups. Concerning the parameters of HRV, The results showed a significant increase in HF in the IMT group, with significant reduction of LF/HF where as there was no significant changes in LF. **Conclusion:** inspiratory muscle training result in marked improvement of inspiratory muscle strength and functional capacity indices, which may be attributed to improved ventilatory response to exercise secondary to the specific inspiratory training program. **Clinical message:** IMT may be considered as part of cardiac rehabilitation program for heart failure patients with marked limitation of activity daily living due to inspiratory muscle fatigues.

2. Prevalence of hypertension and associated risk factors in persons with long-term spinal cord injury living in the Netherlands

Adriaansen J.J.E. MD [1], Van Asbeck F.W.A. MD PhD[2], Van Koppenhagen C.F. MD PhD [1], Prof. Visser-Meily J.M.A. MD PhD[1], Prof. Post M.W.M. PhD [1]
[1]*De Hoogstraat Rehabilitation / University Medical Center Utrecht, the Netherlands;*
[2]*Center of Excellence in Rehabilitation Medicine Utrecht, the Netherlands*

Introduction: Hypertension is an important modifiable risk factor for cardiovascular disease, one of the leading causes of mortality in persons with spinal cord injury (SCI). **Objective:** To describe the prevalence of the diagnosis of hypertension and associated risk factors in persons with long-term SCI. Furthermore, to compare the prevalence of single measured hypertension with the prevalence in the Dutch general population. **Patients:** Wheelchair dependent

persons with (non)-traumatic SCI for ≥ 10 years and age at injury between 18-35 years. **Methods**: Multicentre cross-sectional study. Hypertension was defined as SBP of ≥ 140 mmHg and/or DBP of ≥ 90 mmHg and/or the use of antihypertensive drugs. Diagnosis of hypertension was defined as previously established hypertension or newly diagnosed hypertension after ≥2 blood pressure measurements during ≥2 doctor visits. **Results:** Among 282 participants the prevalence of the diagnosis of hypertension was 21.5%. Significant predictors were: lesion level below C8 (T1-T6 lesion: OR=5.8, lesion below T6: OR=9.3), history of diagnosed hypercholesterolemia (OR=4.6), increased time since injury (OR=1.1), increased age (OR=1.1). The prevalence of single measured hypertension was higher for spinal cord injured men (35.2%) and women (30.0%) compared to Dutch able-bodied men (30.6%) and women (17.9%). **Discussion and conclusion:** The risk for the diagnosis of hypertension is higher in some subgroups of persons with SCI. The prevalence of single measured hypertension was higher for persons with SCI than for the Dutch general population. **Clinical message**: Screening for hypertension during annual check-ups is needed in persons with SCI, especially in those with a lesion below T1.

3. The validity of the Michigan Hand Outcomes Questionnaire in stroke patients

Arwert H.J. MD, Keizer S. MSc, Kromme C.H. MSc, Prof. Vliet Vlieland T.P.M. PhD, Meesters J.J.L. PhD
Leiden University, dept of orthopedics, rehabilitation and physical therapy, the Netherlands

Introduction: There is a need for an easily administered, reliable assessment of hand function after stroke, covering relevant ICF components. **Objective:** To investigate the properties of the Michigan Hand Outcomes Questionnaire (MHQ) Dutch language version in stroke patients. **Patients:** Consecutive stroke patients**. Methods:** During regular outpatient rehabilitation patients completed the MHQ (57 items on function/structure, activities and participation), the Short Form (SF-36) QoL questionnaire, the Barthel Index and performance tests for hand function (Action Research Arm Test, Nine Hole Peg Test, Frenchay Arm Test, Motricity Index). Associations between the MHQ and other outcome measures were determined by Spearman correlation coefficients (r). Furthermore, the internal consistency (Cronbach's alpha), floor/ceiling effects and test-retest reliability (ICC) were established. **Results:** 51 Patients participated, 31% female, mean age 60 years (SD11). The mean MHQ total score was 70.0 (SD22.4). The MHQ total score correlated significantly with the physical component summary of the SF-36 (r=0.49), the Barthel Index (r=0.41) and all hand function performance tests (r=0.45 – 0.64, p<0.01). Cronbach's α was 0.97. The MHQ total score showed no floor or ceiling effects, contrary to the hand function performance tests. The ICC (test-retest) was 0.97. **Discussion and conclusions:** The MHQ is an internally consistent, valid and reliable hand function questionnaire. Moreover it is easy to administer compared to conventional hand function tests. The MHQ contains relevant items of the ICF (function/structure, activities and participation). **Clinical message:** The MHQ is validated as a patient reported outcome measure for handfunction after stroke that covers ICF components.

4. How do parents of children with physical disabilities search for information; a qualitative study

Ausems-de Wijn F.S. BSc[1], Alsem M.W. MD[1, 2, 3], Ketelaar M. PhD[1, 2, 3]
[1]University Medical Center Utrecht, the Netherlands
[2]Brain Center Rudolf Magnus and Center of Excellence for Rehabilitation Medicine, the Netherlands
[3]De Hoogstraat Rehabilitation Centre, Utrecht, the Netherlands

Introduction: Evidence suggests that parents of children with disabilities feel that not all information needs are currently being met, but it is not yet clear how parents try to fill these information gaps. **Objective:** In this study we examine the way parents search and value information from different sources. **Participants**: Parents of children with a

primarily physical disability (1.5-21 years). **Methods:** Qualitative semi-structured interviews were held to explore the strategies of participating parents concerning information needs. A thematic analysis approach was performed to analyse the interviews. **Results:** Twelve interviews were conducted. The search for information for most parents is triggered by unmet information needs. Search strategies are adjusted depending on the type of information needed. The most important resources were healthcare professionals, peers, and institutions, such as hospitals and government authorities. Parents search for objective information at healthcare professionals, and institutions. Peers were the preferred resource for experience-based knowledge and support. Sources are contacted in person or online. Internet is a widely-used medium to search information and get into contact with different sources. There was a general preference for closed internet communities for peer contact. Information evaluation is commonly done by comparing multiple resources. Needs remain despite their search strategies. **Discussion and conclusions:** Parents search for different information needs at different sources. Information is valued through comparison of resources. **Clinical message:** Health care professionals should realize the importance of additional information resources and guide parents in their search for objective information and experience-based knowledge from peers.

5. Quality of Life in out-of-hospital cardiac arrest survivors attending a rehabilitation program

Boyce L.W. MSc, Prof. ***Vliet Vlieland T.P.M. PhD*** [1]***, Van Exel H. MD*** [2]***, Goossens P.H. PhD MD*** [2]
[1]*Leids University Medical Center, the Netherlands;*
[2]*Rijnlands Rehabilitation Centre, the Netherlands*

Introduction/Objective: With a survival rate of 23% in the Netherlands after out-of-hospital cardiac arrest (OHCA) it is important to determine quality of life (QoL**)**. **Patients:** Included were all consecutive survivors of OHCA referred for an outdoor rehabilitation program to the Rijnlands Rehabilitation Centre in Leiden between February 2011 and February 2015. **Methods:** QoL was measured with the SF-36 Health Survey (SF-36) 4 weeks after OHCA and compared with normative data of age-matched Dutch population (56-65 years) using the Unpaired two-sample T tests. **Results:** Of the 140 patients 84% were male, mean age 57.,9 years (SD 13.0). There were significant differences between OHCA survivors and the general population ($p<0.01$) regarding the SF-36 subscales physical functioning (mean 71.7 (SD 21.9) versus 76.8 (SD 22.6)); social functioning 72.8 (SD 25.1) versus 82.7 (SD 22.5); role physical 29.4 (SD 30.8) versus 70.8 (SD 39.1); and vitality 63.2 (SD 20.3) versus 69.0 (SD 18.9), respectively. No significant differences were found for bodily pain, general health, role emotional and mental health. **Discussion and conclusion:** QoL in patients 4 weeks after OHCA admitted to a rehabilitation program was significantly worse on physical functioning, social functioning, role physical as compared with Dutch population. Most striking are differences in physical role. The prognosis of this reduced QoL on the long-term should be studied. **Clinical message:** The finding that QoL is significantly impaired after OHCA needs more attention in care and research.

6. Attention for Neglect: a protocol

Molenkamp E. ST, Smal S. OT, Börger F. MSc, Vloothuis J. MD PhD, Broeder S. PT, Marijne B.C. BSc
Amsterdam Rehabilitation Research Centre, Reade, Amsterdam, the Netherlands

Introduction: Neglect is a common result of a stroke. Neglect negatively influences functional abilities in activities of daily living for these patients. There are various treatments for neglect. But a clearly defined evidence based treatment protocol is lacking**. Objective:** The objective of this project was to clearly describe an evidence based treatment protocol for stroke patients with neglect. Rehabilitation doctors, therapists and nurses are educated to apply the protocol. The ultimate aim of this study is to evaluate the feasibility and applicability of the protocol.

Participants: Twelve stroke patients with neglect are included, admitted in Reade. Also 100 colleagues are involved working in Reade. **Methods:** Initially a review, to search for evidence for the treatment of neglect was conducted. The results of the review are included in the neglectprotocol. This protocol is then implemented in Reade. Before and after the implementation a written survey and a file search were conducted. They included questions about the treatment process, covering the experiences, opinions and behaviours of the doctors, therapists and nurses. **Results:** The results of the review show Visual Scanning Training (VST) is most effective at improving the performance of activities of daily living of stroke patients with neglect. The neglectprotocol is based on the principle VST. The feasibility and applicability of the protocol have been evaluated by a survey and a file search with good results. **Conclusion:** The neglectprotocol provides a more streamlined treatment of a stroke patient with neglect. In addition, through this protocol these patients can be approached in a more consistent manner.

7. First Upper Limb Osseointegration procedure in the Netherlands

Brouwers M.A.H.MSc
De Hoogstraat Rehabilitation Centre, Utrecht, the Netherlands

The osseointegration procedure is increasingly used for both upper limb as lower limb amputees. To date, there are two accepted implant and operation protocols: the OPRA protocol from the Swedish group and the ILP protocol from the German-Dutch-Australian group. The surgical care for osseointegration amputees in the Netherlands is currently organised in two centres: the Radboudumc (Nijmegen) and LUMC (Leiden). Regarding the rehabilitation care for the upper limb amputees both centers agreed to organise the rehabilitation treatment in De Hoogstraat Rehabilitation centre in Utrecht with the scientific support and evalution of the UMCGroningen. **Clinical report:** In 2014, a 54 year old male with a traumatic transhumeral amputation received the first transhumeral osseintegration prosthesis according to the ILP protocol in the Radboudumc Nijmegen. Subsequently, rehabilitation treatment in De Hoogstraat Rehabilitation centre Utrecht was started. In this case study we will focus on surgical techniques, rehabilitation protocol and the patient's functional results. Difficulties and pitfalls encountered during the entire process will be discussed. Special technical requirements, the importance of patient motivation and soft tissue problems with the stump will be explained. Furthermore, a broader literature overview of functional results of upper limb osseointegration will be presented. **Clinical message:** The introduction of osseointegration prosthetics into rehabilitation care is a new phenomenon and needs individualized solutions and collaboration of several institutions. The preliminary functional results of osseointegration seem to be promising and counterbalance the investment in time and efforts.

8. Traumatic brain injury and incarceration, recidivism, and intersectionality

Bushnik T. PhD, Im B. MD, Hada E. BSc, Smith M. MSc, McDermott H. BSc, Bertisch H. PhD
Rusk Rehabilitation, NYU Langone School of Medicine, United States of America

Since 1980, U.S. incarceration rates have more than tripled with past studies reporting 25% to 87% of inmates having a history of traumatic brain injury (TBI), in contrast to the general U.S. TBI-prevalence rate of 10% to 38%. Within five years post-injury, nearly one-third of individuals with TBI report some involvement with the criminal justice system. "Intersectionality" (defined as multiple marginalized group membership which creates distinct experiences of structural inequity) places individuals at higher risk in ways beyond the risks of their individual group membership, as well as having quantifiable effects on health and psychosocial outcomes. **Design:** Data was collected through medical record abstraction and patient self-report, composing a sample of 37 participants from both a private and public TBI Model Systems (TBIMS) center. Data collected included history of incarceration/imprisonment, and membership in the following marginalized groups: racial-ethnic minority status, history of substance abuse, over 65 years old, psychiatric

history, medical co-morbidities, non-English speaking, homeless, and history of institutionalization. **Participants:** Participants were predominantly male (59.5%) and White (29.7%) or Hispanic (24.3%) with a mean age of 46.4 years (SD = 16.6). Most of the participants were unemployed, educated at most a HS level (46.7%), and were in at least one of the marginalized identities of interest (83.8%). **Results:** Chi-squares, t-tests, and correlational analyses will demonstrate that (1) the expanded incarceration questionnaire serves to better capture the criminal history of patients in the TBIMS, (2) rates of recidivism are significantly higher for those with TBI than they are in the general population, (3) repeat offenders and increased membership in vulnerable groups leads to increased risk for TBI.

9. CARE4Carer: personalized caregiver support in rehabilitation for patients with acquired brain injury

Cox V.C.M. MSc[1], Prof. Visser-Meily J.M.A. MD PhD[2], Schepers V.P.M. PhD[1], Prof. Van Heugten C.M. PhD[3]
[1]UMC Utrecht, the Netherlands
[2] De Hoogstraat Rehabilitation / University Medical Center Utrecht, the Netherlands
[3]Maastricht University, the Netherlands

Not published.

10. Validation of the Dutch-Flemish PROMIS Pain Behavior and Pain Interference Item Banks in Patients with Rheumatoid Arthritis.

Crins H.P. MSc[1], Terwee C.B. PhD[2], Prof. Westhovens R. MD PhD[3], Van Schaardenburg D. MD PhD[1], Smits N. PhD[2], Joly J. MSc[3], Prof. Verschueren P. MD PhD[3], Van der Elst K. MSc[3], Prof. Cella D. PhD[4], Cook K.F. PhD[4], Prof. Dekker J. PhD[2], Prof. Boers M. MD PhD[2], Roorda L.D. MD PhD[1]
[1]Amsterdam Rehabilitation Research Centre, Reade, Amsterdam, the Netherlands
[2]VU University Medical Center, the Netherlands
[3]KU Leuven; [4]Northwestern University Feinberg School of Medicine, United States of America

Introduction: The Patient-Reported Outcomes Measurement Information System (PROMIS) contains item banks for measuring pain behavior and pain interference, which are important in the assessment of patients with rheumatoid arthritis (RA). **Objective:** The aim was to validate the Dutch-Flemish translation of the PROMIS Pain Behavior (DF-PROMIS-PB) and Pain Interference (DF-PROMIS-PI) item banks in Dutch and Flemish RA patients. **Patients:** 826 Dutch and 618 Flemish RA-patients completed the DF-PROMIS-PB (39 items) and DF-PROMIS-PI (40 items). **Methods:** One-factor confirmatory factor analysis assessed unidimensionality. Item response theory (IRT) models evaluated the item characteristics, to facilitate development of computer adaptive tests (CAT). A graded item response model (GRM) was fitted and construct validity was studied. Ordinal regression models evaluated Differential Item Functioning (DIF) for e.g. language (Dutch-Flemish vs. English and Dutch vs. Flemish), to analyse cross-cultural validity. **Results:** Current analyses support unidimensionality of the DF-PROMIS-PB and DF-PROMIS-PI (CFI=0.975;0.997 respectively and TLI=0.974;0.997 respectively). The first factor accounted for 49% (DF-PROMIS-PB) respectively 81% (DF-PROMIS-PI) of the questionnaire variance. The data of the two item banks fit the GRM. Further analyses of the DF-PROMIS-PB and the DF-PROMIS-PI are in progress and will be presented at the conference. **Discussion:** The first results indicate that the items of the DF-PROMIS-PB and the DF-PROMIS-PI fit a GRM and demonstrate good coverage across the range of the pain behavior and pain interference domain. **Clinical message:** The DF-PROMIS-PB and DF-PROMIS-PI can be used to develop a CAT for measuring pain behavior and pain interference in Dutch and Flemish RA-patients.

11. Improved step quality after perturbation based balance training in people in the chronic phase after stroke

Van Duijnhoven H.J.R. MD [1, 2], Roelofs J.M.B. MSc [1, 2], Den Boer J. PhD [1, 2], Van Bon G. MSc [1, 2], Prof. Geurts A.C.H. MD PhD [1, 2], Weerdesteyn V. PhD [1, 2]
[1] *Radboud University Medical Centre, the Netherlands*
[2] *Donders Centre for Neuroscience, Department of Rehabilitation*

People after stroke often have an impaired stepping quality. This study aimed to investigate whether perturbation-based balance training improves step quality in the chronic phase after stroke. Twenty persons with chronic stroke were randomized to either an intervention (n=10) or waiting-list control group (n=10). All participants received a 5-week perturbation-based training. Step quality was assessed during backward (bwLaR) and forward (fwLaR) lean-and-release tasks pre intervention, post intervention and six weeks after intervention (retention). In the control group, an additional baseline assessment was conducted six weeks prior to training. Leg angles at foot contact, a strong indicator of step quality, were calculated and compared between pre intervention, post intervention and retention for the study population at large (repeated measures ANOVA). For the control group, we also compared leg angles between baseline and pre intervention. A main effect of time was found for both bwLaR ($p=0.013$) and fwLaR ($p<0.01$). For bwLaR, the leg angle (1.6±3.9° pre intervention) significantly improved following training ($\Delta=4.0\pm5.0°$, $p=0.019$), which was retained after six weeks ($\Delta=4.0\pm3.6°$, $p=0.003$). The same pattern was seen for fwLaR (pre 22.3±3.4°; post $\Delta=3.0\pm3.2°$, $p=0.003$; retention $\Delta=3.1\pm2.6°$, $p=0.001$). For the control group, leg angles did not differ between baseline and pre intervention assessments (bwLaR: $\Delta=0.75\pm4.0°$, $p=0.667$; fwLaR: $\Delta=-0.13\pm4.4°$, $p=0.404$), which demonstrated the absence of learning effects on the lean-and-release task. It is concluded that the 5-week perturbation-based training program improved step quality immediately and six weeks after training in the chronic phase after stroke.

12. The power of music – using music to improve verbal fluency

Fraser K.R. ST
Frenchay Brain Injury Rehabilitation Centre, Bristol, United Kingdom

Introduction: A 38 year old female was admitted to an acute, inpatient rehabilitation facility following a resection of a brain abscess in her left temporal lobe. She presented with severe non-fluent Aphasia. Her verbal output was impaired across modalities; naming, reading aloud and repetition, indicating a Phonological Assembly deficit. The aim was to explore whether music could improve the verbal output of a person with non-fluent Aphasia. **Clinical report:** Daily Speech and Language Therapy sessions utilised music and singing to stimulate the preserved functions of the right hemisphere to support the damaged language functions of the left. This included targeting functional phrases and category specific vocabulary. She would sing them repeatedly in a set melody with the therapist, gaining independence through backward chaining. Simultaneous facilitation to rhythmically tap the syllables of the words and phrases with her left hand took place. This set the pace for syllable production and stimulated right-sided sensorimotor network that controls both hand and mouth movements. Outcomes were measured before and after the intervention using the Palpa 53 Picture Naming Assessment and an expression self-rating scale. Post intervention both outcome measures showed a significant improvement**. Discussion and conclusion:** This suggests that the music perception strengths of the right hemisphere can aid access to fluent singing output. This singing ability can be used to relearn functional language, which can improve overall fluency for people experiencing non-fluent Aphasia. **Clinical message:** Clinicians should consider utilising music in their therapy for people with non-fluent Aphasia.

13. Intermittent claudication affects gait during treadmill walking

Gommans L.G. MD[1], Smid A.T. MD[1], Meijer K. PhD [2], Verhofstad N. PhD[1], Scheltinga M.R.M. PhD[3], Prof. Teijink J.A.W. PhD[1]
[1]*Department of Surgery, Catharina Hospital, Eindhoven, the Netherlands*
[2]*Department of Human Movement Sciences, Maastricht University Medical Center, the Nederlands*
[3]*Department of Surgery, Máxima Medical Center, Veldhoven, the Netherlands*

Background: IC is the most common symptom of peripheral arterial disease and presents as exercise induced muscle pain of the lower limb(s), that resolves in rest. SET, mainly performed on a treadmill, is the first-choice treatment for IC and improves walking performance. Appropriate gait analysis during treadmill walking in patients with IC has not been investigated before. **Methods:** IC patients and age-matched controls walked on a treadmill at a self-selected pace. Spatio-temporal gait parameters (e.g. step length and foot settlement) were obtained using the validated Optogait® photoelectric system. Patients performed bot a pain-free and a painful trial, whereas controls completed only one session. Parameters were compared between groups and within patients. **Results:** 11 patients and 15 controls were examined. IC patients walked 0.8 km/h slower than controls (p=0.031), and their step length was significantly shorter in both trials. Within the patient group, a 1.2% shorter contact phase (p=0.006) and a 3% increased foot flat phase (p=0.022) was noted during painful walking. Also, patients appeared to spend more time in double support phase (Δ4%, p=0.041). **Conclusion:** IC patients walk slower and take shorter steps than healthy controls, even in pain-free walking. During painful walking disturbances in foot settlement appear, as IC patients drop their foot faster, resulting in an increased foot flat time and double support phase. Results can be used to improve SET, although, the effect of gait-specific training should be further investigated.

14. Identification of tissue stiffness, reflex activity and optimal muscle length in stroke patients

De Gooijer-van de Groep K.L. MSc[1], De Vlugt E. PhD[1], Van der Krogt J.M. MD[1], Helgadóttir A. MSc[2], Prof. Arendzen J.H. MD PhD[1], Meskers C.G.M. MD PhD[1], De Groot J.H. PhD[1]
[1]*Leiden University Medical Center, the Netherlands*
[2]*Delft University of Technology, the Netherlands*

Introduction: About half of all chronic stroke patients experience loss of arm function (1) commonly seen as a flexed wrist and due to a change in neural and/or structural tissue properties. **Objective:** Goal of this study was to quantify the neural and structural properties contributing to wrist joint resistance and to compare these properties between healthy subjects and stroke patients. **Patients:** Stroke patients (n=32) and healthy volunteers (n=14) who participated in the EXPLICIT study (2,3). **Methods**: Ramp-and-hold rotations were imposed by a haptic analyser to the wrist over the range of motion (RoM) in one second. Wrist angle, torque and surface EMG of flexor and extensor carpi radialis muscles (FCR, ECR) were recorded. Subjects were asked to relax during the experiment. A neuromuscular model was applied to calculate the wrist joint torque from the imposed motion and measured EMG. Neural (reflexive torque) and structural (connective tissue stiffness, optimal muscle length and slack length of connective tissue) parameters were estimated. **Results:** Stroke patients with modified Ashworth score (MAS) ≥ 1 significantly differed from healthy controls by increased tissue stiffness, increased reflexive torque, decreased optimal muscle length and decreased slack length of connective tissue of FCR. **Discussion and conclusion:** Non-invasive quantitative analysis helps to identify neural and structural changes in chronic patients. These changes coincide with smaller RoM (3). Monitoring these changes in time is important to understand the recovery process and to eventually optimize treatment. **Clinical message:** The quantitative method can be successfully applied for selecting patients and follow-up on specific therapy for impaired

wrist joint function.

1) Broeks et al., 1999 Disabil Rehabil. 21,8 2) Kwakkel et al., 2008, BMC.Neurol. 8,49 3) Van der Krogt et al., 2015, JNER 12,28

15. Brain activity during passive and active walking in robot-assisted gait training in stroke patients and healthy controls

Keijsers N.L.W. PhD
Department Research, Sint Maartenskliniek

Introduction: Robot-assisted walking devices have been used during rehabilitation of patients with neurological disorders like stroke, Parkinson's disease and spinal cord injury, for regaining and improving walking ability. Previous studies showed the advantage of brain computer interface (BCI) based robot-assisted training combined with physical therapy in the rehabilitation of the upper limb after stroke. Therefore, BCI robot-assisted gait training devices, might have important applications in the rehabilitation of the gait in patients with neurological disorders. In order to develop such BCI, it is necessary to evaluate the feasibility to decode walking intention from cortical patterns during robot-assisted gait training. **Methods:** We investigated the spectral patterns in the electroencephalogram (EEG) related to robot-assisted active and passive walking in healthy participants (10) and in 3 stroke patients during robot-assisted walking. A logistic regression algorithm was used to classify the differences between active and passive walking and standing still. **Results:** A significant decrease of power in the beta rhythm was found during walking in comparison to standing still. Mean classification accuracies of 94.0% (SD 5.4) and 93.1% (7.9) were reached when active and passive walking were compared against standing. The classification performance between passive and active walking was 83.4% (7.4). The stroke patients showed a classification accuracy of 88.3% (5.4) between walking and standing. Furthermore, modulation of gamma activity in central midline areas was found to be associated with the gait cycle phases. **Conclusion:** Our results support the feasibility of developing a BCI based robotic-assisted treadmill for the rehabilitation of gait.

16. PPP-Arm: the implementation of a national Prosthesis Prescription Protocol

Wijdenes P.W. OT[1], Brouwers M.A.H. MD[2], Prof. Van der Sluis C.K. MD PhD[1]
[1]University of Groningen, Universital Medical Center Groningen, Department of Rehabilitation Medicine, Groningen, the Netherlands
[2] Rehabilitation center De Hoogstraat, Utrecht, The Netherlands

Introduction: Patients with an acquired or congenital upper limb defect need highly specialized care from multidisciplinary teams. In the Netherlands, various rehabilitation centers had their own method of treatment. Standardized care for these patients was necessary, especially when prescribing prostheses. Aim To create and implement a national digital protocol, which should be used when prescribing upper limb prostheses. **Method:** The Prosthesis Prescription Protocol of the upper limb (PPP-Arm) has been developed in the previous 4 years and is a tool to structure, underpin and evaluate the prescription of upper limb prostheses. The protocol is based on WHO's criteria of the International Classification of Functioning (ICF). The protocol consists of the following layers: 1) Establishing patient's demands 2) Establishing device requirements 3) Preparation of treatment requirements 4) Selection, try-out and final decision 5) Delivery of the device 6). Instructions and training 7) Evaluation, results of implementation. The protocol has been created through the collaboration of several patients, rehabilitation teams, orthopedic workshops and insurance companies, collaborating in the working group PPP-Arm. Implementation started in four rehabilitation teams in the Netherlands. After one year another six rehabilitation teams started using the protocol. In each team a knowledge broker was appointed, who was responsible for the implementation within his own center. A national

project coordinator maintained contact with all parties involved, collected questions and problems when using the protocol, organized activities and meetings to develop the protocol further and to stimulate using the protocol. Advantages of the protocol are: - complete and structured - user-friendly - using the same ICF terminology and the same treatment guidelines by all users - applied nationally - digital reporting - workplace independent login possibilities for all team members - prescription reports are generated for insurance companies - patients gain more insight in their own treatment process - the protocol contributes to building a national database for research. Disadvantages of the protocol are: - time investment is needed to learn using the protocol - a computer with internet access is required at the work spot. **Conclusion:** The nationwide implementation project PPP-Arm was successful, since all participating centers use the protocol. By developing PPP-Arm we have managed to create a national uniform and structured method to advise and evaluate the prescription of upper limb prostheses, which might be interesting for other countries as well.

Poster session 2

Friday 6 November, 12.00 – 12.15

17. Family focus on future: design of a multicenter trial

Hillebregt C.F. MSc, Scholten E.W.M. MSc, Ketelaar M. PhD, Prof. Post M.W.M. PhD, Prof. Visser-Meily J.M.A. MD PhD
Rehabilitation center Medicine, University Medical Utrecht, the Netherlands

Introduction: Support from family members is often pivotal to maintain participation and quality of life of rehabilitation patients. Due to upcoming changes and budget cuts in community care, more pressure will be put on the family to provide care. However, many spouses and children of persons with disabilities experience high levels of burden of care. **Objective:** To enhance empowerment and participation of persons with newly acquired disabilities and their significant others by developing, evaluating and implementing a structured multidisciplinary Family Focus Conference (FFC) in rehabilitation teams in multiple rehabilitation centers and diagnostic groups. **Patients:** A total of 240 patients and their significant others will be included in 6 intervention teams (brain injury, spinal cord injury, amputation) and 6 control teams. **Methods:** Multicenter controlled trial with test occasions before and after the FFC, and at 3 and 6 months follow-up. The intervention consists of: 1. Development of an assessment battery to detect risk factors for long-term adjustment problems. 2. Evaluate and implement a FFC for families at risk of long-term adjustment problems. In an FFC families, social work (community case managers if applicable) discuss possible impacts of the condition and the actions to be taken to increase participation in daily activities. **Results:** Data collection will start early 2016. **Discussion and conclusions:** This research is expected to provide insight into psychosocial risk factors and the value of FFC's to increase family-centeredness of clinical rehabilitation. **Clinical message:** Non applicable.

18. The nationwide implementation of a sports and physical activity stimulation program in 18 rehabilitation centers and hospitals across The Netherlands

Hoekstra F. MSc [1, 2], Alingh R.A. MSc [1, 2], Hettinga F.J. PhD [3], Prof. Van der Schans C.P. PhD [2, 4], Dekker R. MD [2, 4], Duijf M. MSc [6], Prof. Van der Woude L.H.V. PhD [1, 2]
[1] *University of Groningen, University Medical Centre Groningen, Centre for Human Movement Sciences, Groningen, the Netherlands*
[2] *University of Groningen, University Medical Centre Groningen, Groningen, Centre for Rehabilitation, Department of Rehabilitation Medicine, the Netherlands*
[3] *University of Essex, School of Biological Sciences, Centre of Sport and Exercise Science, Colchester, United Kingdom*
[4] *Hanze University of Applied Sciences, Research and Innovation Group in Health Care and Nursing, Groningen, the Netherlands*
[5] *University of Groningen, University Medical Centre Groningen, Centre for Sports Medicine, Groningen, the Netherlands*
[6] *Stichting Onbeperkt Sportief, Bunnik, the Netherlands*

Introduction: The evidence-based program Rehabilitation, Sports and Exercise (RSE) is developed to stimulate an active lifestyle in patients with physical disabilities and/or chronic diseases during and after rehabilitation. Setting up a Sports Counselling Centre (SCC), in which standardized counselling and information are offered via motivational interviewing, is a key component of the program. **Objective:** To evaluate the implementation process of the RSE

program in 12 Dutch rehabilitation centers and 6 hospitals. **Methods:** During the program period (2013–2015), rehabilitation professionals (n=±70) filled out questionnaires on the implementation of the RSE program within their organization yearly. In addition, online data were collected on the number of patients that received tailored advice via the SCC. **Results:** All organizations (n=18) integrated sports and exercise activities into rehabilitation treatment. A total of 23 SCC's were set up across The Netherlands. Most professionals (T1: 63%,n=65) reported that awareness of the SCC within the organization was (very) good. More than 4500 patients received tailored advice on active lifestyle at home via a SCC. In general, professionals' experiences with the RSE program were positive. **Conclusion:** The RSE program is successfully implemented in 18 participating organizations illustrated by 23 active SCC's. **Clinical message:** The implementation of the RSE program can realize a more structural integration of sports and exercise activities in rehabilitation care. Moreover, the connection between rehabilitation and sports and exercise activities in the community was strengthened. Both elements can contribute to a physically active lifestyle in patients with disabilities and/or chronic diseases after rehabilitation.

19. Botulinum Toxin A normalized the ankle neutral angle and dorsiflexion in stroke patients with increased ankle joint stiffness

Hofman C. MD[1, 2], De Gooijer-van de Groep K.L. MSc[1], Meskers C.G.M. MD PhD[1, 3], Steenbeek D. MD PhD[1], De Groot J.H. PhD[1]

[1]*Department of Rehabilitation Medicine, Leiden University Medical Center, Leiden, the Netherlands*

[2]*Rijnlands Rehabilitation Centre, Leiden, the Netherlands*

[3]*Department of Rehabilitation Medicine, VU University Medical Center, Amsterdam, the Netherlands*

Introduction: Botulinum neurotoxin (BoNT) infiltration in calf muscles is applied to reduce increased ankle joint stiffness in stroke patients, of which relevance has been proven regarding walking ability. However, little is known about the relationship between spasticity and increased ankle joint stiffness originating from muscle activation. Joint stiffness is assumed to increase plantarflexion at rest and reduction of passive dorsiflexion (PROMDF). We hypothesized that the ankle angle at rest (neutral angle, NA) will normalize and PROMDF will increase after BoNT-treatment of calf muscles. **Objective:** The present study's objective was to investigate the effect of BoNT on NA and PROMDF of the ankle. **Patients:** Thirteen patients (8 male, 54.8y), 20-280 months post-stroke, mAS ankle 1-4; BoNT-injections in m.soleus (11), m.gastrocnemius (8), m.tibialis posterior (5). Methods NA and PROMDF were objectively measured applying 0Nm and 15Nm torque using an electrically powered single axis footplate (Achilles©), with knee flexed in 20 o and 70 o. Patients were measured pre- and 6-8 weeks post-treatment. **Results:** With knee flexed in 20 o and 70 o, NA changed 4.7o (p=0.191) respectively 5.1o (p=0.035) towards dorsiflexion. PROMDF increased 4.0o (p=0.173) respectively 4.7o (p=0.028). **Discussion and conclusions:** Treatment with BoNT shifted both the neutral and dorsiflexion ankle angles towards dorsiflexion.This confirms our hypothesis. Additional research is recommended to identify the clinical relevance and longer term outcome. **Clinical message:** Spasticity reduction coincides with the normalization of the ankle rest angle in stroke patients. This mechanism could explain enhanced orthosis fitting.

20. Patients with Neonatal Brachial Plexus Palsy who take part in cross-sectional research; do they differ from non-responders?

Van der Holst M. PT[1,2], Prof. Vliet Vlieland T.P.M. MD PhD[1], Prof. Nelissen R.G.H.H. MD PhD[1], Steenbeek D. MD PhD[1], Pondaag W. MD PhD[1]

[1]*Leiden University Medical Center, the Netherlands*

[2]*Rijnlands Rehabilitation Centre, the Netherlands*

Introduction: Research in patients with Neonatal Brachial Plexus Palsy (NBPP) often concerns studies with relatively small sample sizes, with the generalizability of the results being limited by response bias. **Objective:** To investigate whether participants in a cross-sectional study on activities and participation in daily life after NBPP differ from non-responders. **Patients:** Patients with NBPP (n=1142) who had visited a specialized NBPP clinic of a university hospital. **Methods:** A (electronic) questionnaire was sent to all eligible patients and/or their parents. Differences between participants and non-responders in regard to age, gender, lesion-extent, affected side, treatment history and discharged from follow-up yes/no were investigated by means of Mann-Whitney-U or Chi-Square tests**. Results:** 507 patients participated (44%). The participants were different from non-responders with respect to age (mean age 9.8 versus 10.6 years), affected side (right side: 49% vs 54%) and history of nerve surgery (52% vs 43%) (all $p<0.04$), whereas gender, lesion-extent and being currently under treatment did not differ between the two groups. **Discussion and conclusion:** Patients with NBPP participating in a cross-sectional study were younger, more often had involvement of the right side and more often had undergone nerve surgery than non-responders. **Clinical message:** With the interpretation of the results of studies in patients with NBPP, response bias needs to be taken into account.

21. The use and effect of passive vertical body oscillations on desensitisation of symptoms in patients with chronic peripheral vestibular dysfunction: a pilot study

Hondebrink M.S. BSc[1, 2], Van de Lint R. BSc [1], Van der Wurff P. PhD[1], Mert A. MD PhD[1]
[1] *Research & Development Military Rehabilitation Centre (MRC) Aardenburg, Doorn, the Netherlands*
[2] *University of Groningen, the Netherlands*

Introduction: Peripheral vestibular dysfunction and the related symptoms like dizziness can severely affect quality of life, when traditional interventions such as medication or vestibular exercises/rehabilitation offer limited improvement for patients. We investigated whether the Motion-based Equilibrium Reprocessing Therapy (MERT), a novel desensitization program for vestibular complaints, could alleviate symptoms in patients with chronic peripheral vestibular dysfunction. **Methods:** a nonrandomized pilot study. In this observational study the data were collected with a retrospective chart review. MERT consisted of whole body passive vertical oscillations of increasing intensity. Sessions were 3 to 5 a week, during a period of 4 weeks for a maximum of 20 minutes per session and were conducted at the Computer Assisted Rehabilitation Environment (CAREN) in the Military Rehabilitation Centre (MRC) Aardenburg in Doorn. Treatment effectiveness was measured using the Dizziness Handicap Inventory (DHI), a validated symptom inventory, at the start of treatment, immediately after treatment and 2-6 months after treatment. **Results:** The 15 subjects had a median age of 55 years old, with symptoms lasting with a median of 13 months. Significant decrease in DHI scores from the start of treatment ($P<.001$) were observed after completion of treatment protocol ($P=.004$), and at the 2-6 months follow-up ($P=.001$). **Conclusions:** This study showed that MERT is beneficial in patients with chronic dizziness. A randomized control trial that examines the efficacy of MERT in patients with dizziness is warranted, as MERT may be a reasonable treatment for chronic peripheral vestibular dysfunction and the chronic complaints like dizziness associated with it.

22. Quality of life in children with obstetrical brachial plexus palsy from children's and parents perspective using TACQOL questionnaires

Van Dorp-Koebrugge B. MD, Van Wijlen-Hempel M.S. PhD, Steenbeek D. MD PhD, Pondaag W. PhD, Prof. Nelissen R.G.H.H. PhD

Introduction: Obstetrical Brachial Plexus Palsy(OBPP) is a nerve injury occurring in approximately 1-2/1000 live births in the Netherlands. Functional deficits are proportional to injury severity. Besides the effect on an child's functional

status, a disease like OBPP probably affects quality of life(QOL). Limited research has been performed on QOL of children with OBPP, which often describes QOL based on parent-questionnaires. **Objective:** To assess QOL in children with OBPP from both children's and parents perspective and describe child-parent agreement. **Patients:** 25 children(C5/C6 n=17, C5/C6/C7/C8/T1 n=8) with unilateral OBPP. Median age was 8 years. Methods: QOL was measured using the TACQOL child and parent questionnaires, containing seven 8-item scales. We compared OBPP QOL domain scores to Dutch reference values and obtained child-parent agreement. **Results:** OBPP children reported significantly higher physical complaints scores(i.e. pain) and lower positive(i.e. happiness) and negative emotion scores(i.e. sadness) compared to healthy peers. There were no statistically significant differences concerning motor functioning, autonomy, cognition and social functioning. A comparison made between children and their parents showed that parents scored significantly higher on physical complaints, negative and positive emotions. **Discussion and conclusions:** Children with OBPP score higher on physical complaints than their healthy peers and lower on positive and negative emotions. We found child-parent disagreement regarding those domains. **Clinical message:** Children with OBPP have a normal QOL compared to healthy peers except for physical complaints. Despite physical complaints, motor functioning was age-adequate. There is a marked difference between the child and parents view on the child's QOL: parents seem to overestimate positive and negative emotions and physical complaints .

23. Validity and feasibility of the Impact of Spasticity Evaluation Tool (I-SET)

Jägers D.C. MD, Fleuren J.F. MD PhD, Snoek G.J. MD PhD

Introduction: The Spinal Cord Injury Evaluation Tool (SCI-SET) is a reliable self-assessment questionnaire designed to measure the impact of spasticity on daily life. However, the SCI-SET is not available in the Dutch language yet. **Objective:** To assess the construct validity and feasibility of the Dutch version of the SCI-SET, called the Impact of Spasticity Evaluation Tool (I-SET). **Patients:** 26 participants with spinal cord injury. **Methods:** The SCI-SET was translated using forward and backward translation. Participants completed the I-SET,the Spasm frequency scale, the Spinal Cord Independence Measure(III), the 36-item Short Form Health Survey and a Visual Analogue Scale (VAS) for severity of spasticity and impact of spasticity during three activities (making a transfer, during ADL activities, changing position).Spearman's rank correlations were used to assess the correlation between the I-SET and the other parameters. For the assessment of the feasibility, two experienced occupational therapists completed a semi-structured interview. **Results:** Statistically significant moderate correlations were found between the I-SET and the VASseverity and the VASimpact during the three measured activities (resp. -0.569, -0.597, -0.547 and -0.603). No statistically significant correlation was found with other measures. Occupational therapists indicated that the added value of the I-SET could be the quantification of interference of spasticity during different daily activities**. Discussion and conclusion:** The I-SET and the other instruments measure slightly overlapping but different constructs. Thus, they can be used complementary. **Clinical message:** The I-SET is a useful instrument because it seems to measure a different construct, providing a more detailed profile of impeded activities.

24. Attentional focus instructions and feedback during gait rehabilitation after stroke

Kal E.C. MSc [1], Van den Brink H. MSc[1], Houdijk H. PhD [1], Van der Kamp J. PhD [2], Goossens P. MD [3], Prof. Scherder E. PhD [2], Prof. Van Bennekom C. MD PhD [1,4]

[1]*Heliomare Rehabilitation Centre, the Netherlands*

[2]*VU University Amsterdam, the Netherlands*

[3]*Rijnlands Rehabilitation Centre, the Netherlands;* [4]*Coronel Institute of Occupational Health, the Netherlands*

Introduction: Accumulating evidence shows that motor learning is superior when healthy adults focus their attention on the outcome of their movements (an external focus) rather than on movement execution itself (an internal focus). Such an external focus might also enhance motor recovery post-stroke. Literature suggests that physical therapists predominantly use internally focussed feedback and instructions during rehabilitation therapy of inpatient stroke patients. In this study we determined which focus of attention predominates in Dutch neurorehabilitation settings. **Objective**: To investigate physical therapists' use of external and internal focus instructions and feedback when retraining gait with stroke patients. **Patients:** 22 inpatient stroke patients and 22 physical therapists, included in 6 rehabilitation centers in the Netherlands. **Methods:** For each therapist-patient dyad, one physical therapy session was videotaped. Instructions and feedback provided by the physical therapists were transcribed verbatim. Of main interest was the relative proportion of instructions and feedback, and of internal and external focus statements. **Results:** Preliminary analyses show that therapists provided more feedback (56%) than instructions (44%). Instructions were more externally focused (37% internal, 63% external), whereas feedback was more internally focused (59% internal, 41% external). **Discussion and conclusions:** Physical therapists' instructions and feedback were mixed in terms of attentional focus content. This challenges the popular belief that therapists predominantly provide internally focused instructions and feedback. **Clinical message:** This study provides insight into the current use of attentional focus strategies during motor rehabilitation post-stroke. Future studies will further determine the potential of external focus learning to enhance motor recovery after stroke.

25. Shoe sole flexibility affects roll off and spatiotemporal gait parameters

Keijsers N.L.W. PhD [1], Hofstad C.J. MSc, Van Halen S. BSc, Kanters J. BSc, Tijssen T. BSc, Stolwijk N. PhD, Van Ee R. MD

[1]*Department Research, Sint Maartenskliniek Nijmegen, The Netherlands*

Introduction: In gait analysis, subjects are usually tested barefoot. However, patients, such as lower limb amputees, are unable to walk without shoes. Therefore, the aim of the study was to compare spatiotemporal gait parameters and roll off between barefoot walking and walking with shoes. Furthermore, the effect of the flexibility of the sole of shoes was investigated. **Methods:** Plantar pressure measurements during gait were performed in 31 healthy participants. They walked in three conditions: barefoot and with two types of shoes, which had flexible sole (sneaker) and a rigid less flexible sole (standard). An RSscan footscan® pressure plate on top of a force plate was used to obtain plantar pressure pattern, foot progression angle and gait parameters such as contact time, heel-off, foot-flat. In addition, the (velocity of) Center of pressure was analysed in five phases of the stance phase (Perry et al., 2010) **Results:** Contact time, foot flat, and heel off increased significantly from barefoot, sneaker to standard. Foot progression angle decreased significantly from barefoot to standard. Center of pressure was significantly different between the three conditions for most of the phases. Shoes had a more medial center of pressure during the loading response and push off phase. The velocity of the center of pressure was also significantly different between the conditions. **Conclusions:** Walking with shoes affect the gait parameters and roll off compared to walking barefoot. Furthermore, the less flexible a shoe, the larger effect it has on the gait parameters and roll off compared to barefoot walking.

26. Cognitive gaming after stroke

De Kloet A.J. PhD [1,2], Wentink M. MSc, Berger M.A.M. PhD, Meesters J.J.L. PhD [1], Band G.P.H. PhD, Wolterbeek R. MSc, Goossens P.H. MD PhD[1], Prof. Vliet Vlieland T.P.M. MD PhD[3], De Kloet A.J. PhD [1]

[1]*Sophia Rehabilitation Center, the Netherlands*

[2]*The Hague University of Applied Sciences, the Netherlands*

[3]*Leiden University Medical Centre, the Netherlands*

Introduction: Evidence on effectiveness of cognitive computer-based gaming after stroke is scarce. Objective To determine the effect of a computer-based cognitive rehabilitation (CBCR) brain training program on cognitive functioning, quality of life (QoL) and self-efficacy compared to only information provision on brain and cognition in stroke patients. **Patients:** Patients aged 45-75 years , 12-36 months after a first stroke, with self-perceived cognitive impairments. **Methods:** Randomised comparison of an 8-week computer-based game training program (Lumosity Inc.®) to be used ≥5 days per week for 15-20 minutes with the provision of general information about the brain weekly. Assessments (0, 8 and 16 weeks) consisted of neuropsychological tests (Trail Making Test, Block and Digit Span, Eriksen Flanker Task and Raven Standard Progressive Matrices) and the Cognitive Failure Questionnaire, Stroke Specific Quality of Life Scale and General Self-Efficacy Scale. **Results:** 53 patients were randomized to the intervention and 57 to the control group. Significantly better results in favour of the intervention were seen for working memory (Block Span, items correct forward, mean difference 0.7, 95% CI 0.25,1.10), speed (Eriksen Flanker, reaction time incongruent, mean difference -63, 95% CI -118.9,-7.4) and self-efficacy (GSES, mean difference 1.0 , 95% CI 0.31;2.23) at 8 weeks. Between 8 and 16 weeks no changes within or differences between groups were seen. **Conclusions:** The effect of the computer-based gaming program on some aspects of memory and self-efficacy warrants the need for further research into the value of CBCR to improve cognitive functioning in patients after stroke.

27. Living with a short arm: which problems do young adults experience in transition to adulthood?

Lankhorst I.M.F. MSc[1], Baars E.C.T. MD[1], Van Wijk I. MD PhD[2]; Janssen W.G.M. MD PhD[3], Poelma M.J. MD[4], Prof. Van der Sluis C.K. MD PhD[5]

[1]*Rehabilitation Center Vogellanden, the Netherlands*

[2]*Department of Rehabilitation Medicine, De Hoogstraat Rehabilitation Centre, Utrecht, the Netherlands*

[3]*Department of Rehabilitation Medicine, Erasmus MC, the Netherlands*

[4]*Rehabilitation Center De Sint Maartenskliniek;* [5]*University of Groningen, University Medical Center Groningen, the Netherlands*

Introduction: During growing up from childhood to adulthood young adults with disabilities are at risk of experiencing limitations due to changing physical and social requirements. Transitional problems in transversal upper limb reduction deficiency (tULRD) have not been studied yet. **Objective:** To evaluate whether young adults with tULRD experience limitations in different domains of participation during transition to adulthood and how they deal with these limitations. **Patients**: 15 patients (mean age 21.4 years) with tULRD. **Methods:** A qualitative study was performed using a semi-structured interview to identify experienced problems on participation domains described in the Rotterdam Transition Profile. **Results**: Transition from elementary to secondary school did not cause many problems. However, almost all participants experienced difficulties in finding a suitable study or job. Most of the patients were convinced they were able to perform these studies or jobs. However, others, such as employers or teachers, judged they were not. This sometimes influenced their self-confidence or financial situation. On the domains leisure activities, intimate relationships/sexuality, housing/housekeeping and transportation only a few difficulties were described. Participants preferred to find their own strategy in dealing with limitations. Aids, adaptations or prostheses were sometimes used for specific activities, like car driving or household chores. Rehabilitation teams were infrequently involved in solving transitional problems. **Discussion and conclusion**: Young adults with tULRD experience mainly limitations in choosing and finding a suitable study or job. Clinical message Rehabilitation teams could possibly play a more extensive role in supporting transitional problems, especially in study or job selection.

28. Factors related to fatigue after pediatric Acquired Brain Injury (ABI)

Van Markus-Doornbosch F. MD [1], De Kloet A.J. PhD [1]; Hilberink S.R. PhD [2], Roebroeck M.E. PhD [1,2], Catsman-Berrevoets C.E. PhD [2], Peeters E.A.J. MD [3], Prof. Vliet Vlieland T.P.M. PhD [1,4], Lambregts S.A.M. MD [5]

[1]*Sophia Rehabilitation Center; the Netherlands*

Erasmus MC-University Medical Centre, the Netherlands
[3]Medical Center Haaglanden, the Netherlands
[4]Leiden University Medical Center, the Netherlands
[5]Revant Rehabilitation Center Breda, the Netherlands

Introduction: One of the most common symptoms after ABI in the acute and chronic phase is fatigue. **Objective:** To assess the degree of fatigue after pediatric traumatic and non-traumatic brain injury (TBI and NTBI) and its associations with family functioning, participation and quality of life (QoL). **Patients:** Children with a hospital-based diagnosis of ABI, aged 4-20 years and their parents, 24-30 months after diagnosis. **Methods**: Parents (and children if applicable) completed the Pediatric Quality of Life Inventory™Multidimensional Fatigue Scale (PedsQL™MFS), score 0-100; higher scores indicating less fatigue. Additional assessments included measures of family functioning, participation, QoL and sociodemographics/disease characteristics. **Results**: Eighty-eight parents and 49 children (56%) completed the PedsQL™MFS. The median age was 11 years (range 5-22). Sixty-nine patients had TBI (10 (16%) moderate/severe) and 19 NTBI (3 (16%) moderate/severe). The mean parent and child-reported PedsQL™MFS Total Fatigue scores were 76.5 (SD 16.4) (n=88) and 78.5 (SD 12.9) (n=49), respectively (Spearman r=0.45, p=0.001; n=49). In a multivariable linear regression analysis more parent-reported fatigue was associated with higher age and single parent household. **Discussion and conclusions:** Two years after onset of ABI, parent-reported fatigue is higher in older patients and single parent households. **Clinical message:** Fatigue is significant symptom after ABI and should be addressed in rehabilitation programs. This study was financially supported by the Revalidatiefonds, Johanna Kinder Fonds and Kinderrevalidatie Fonds Adriaan.

29. Implementation of the CoMoSS program – a condensed client-centered modular spinal cord injury rehabilitation service

Bouwsema H. PhD [1,2], Spooren A.I.F. PhD [1,2], Van Mastrigt G. PhD [3,4], Bongers H.M.H. MD [2], Prof. Smeets R.J.E.M. MD PhD [1,2], Seelen H.A.M. PhD [1,2]
[1]Centre of Expertise in Rehabilitation and Audiology, the Netherlands
[2]Adelante Rehabilitation Centre, the Netherlands
[3]Department of Health Services Research, the Netherlands
[4]Maastricht University, the Netherlands

Introduction: The typical rehabilitation of persons with a Spinal Cord Injury (SCI) consists of a long general period of rehabilitation, resulting in long inpatient stay and high costs. Inpatient stay and costs might be reduced when patients are offered a program with a condensed client-centered approach. **Objective:** To implement a condensed modular client-centered SCI rehabilitation service, consisting of 3 phases: a) short clinical rehabilitation; b) home phase to let patients experience what skills they want to improve on additionally; and c) client-centered modules focussing on individual goals. **Methods:** Outcome measures are length of stay, functional status (FIM, SCIM), quality of life (SF-36, well-being, self-efficacy, satisfaction with care), and cost-effectiveness. These measures are assessed at: start of rehabilitation, end of the clinical phase, during the home phase, end of rehabilitation, and 1 year follow-up. **Results:** CoMoSS is currently being provided to 39 patients with a SCI (26 male, 13 female; mean (SD) age: 56.42 (15.04); mean (SD) duration of stay: 155 (105) days). Preliminary results of the patients who have passed T4 (n=26) show an improvement in functional status (FIM: $F(1.4,34.8) = 19.61$, $p = .00$; SCIM: $F(1.4,36.9) = 30.79$, $p = .00$) and quality of life (SF-36-physical-functioning: $F(1.9,50.9) = 9.5$, $p = .00$; SF-36-physical-role-functioning: $F(1.9,50.9) = 11.9$, $p = .00$; SF-36-bodily-pain: $F(2.1,56.1) = 10.5$, $p = .00$; well-being: $F(3,84) = 7.9$, $p = .00$). **Conclusion:** According to the preliminary results, CoMoSS seems effective. Cost-effectiveness and comparison with a control group who received standard rehabilitation are currently assessed.

30. Prognostic factors for outcome after a multidisciplinary rehabilitation program for chronic tendinopathy

Van Orsouw M.A.P. MD MSc, Meijer R.S. MD MSc, Hendricks H.T. MD PhD
RMC Grootklimmendaal, the Netherlands

Introduction: Tendinopathy often is a self-limiting disease. However, a minority of patients develop severe disabling chronic complaints. It is not clear whom of these patients benefit most from an integrated multidisciplinary team approach. **Objective:** To determine which factors predict outcome after rehabilitation treatment in patients with chronic tendinopathy. **Patients:** All consecutive patients from march 2011 to march 2014 with chronic tendinopathy of the elbow lateral or medial epicondyle, the Achilles tendon or the plantar fascii, who followed our rehabilitation program. **Methods:** Retrospective cohort study of all patients who completed the program. Outcome was dichotomized in good versus poor, based on pain scores and recovery of activities. **Results:** 221 patients completed the rehabilitation program; 81 had lateral epicondylitis(LE), 11 medial epicondylitis(ME), 65 Achilles tendinopathy(AT) and 64 fasciitis plantaris(FP); 97 were treated successfully, 124 patients held invalidating complaints. There was no significant difference in gender (p=0.132) or duration of complaints (p=0.684). However the patients who responded successfully had significantly less pain (VAS 52.1 vs VAS 42.3; p= 0.003) at presentation and they were slightly older (51.9 yrs vs 48.6 yrs; p=0.008). **Discussion and conclusion**: Conform some studies we found that a lower pain intensity at presentation is a positive outcome predictor. However we couldn't subscribe the reported predictor ´duration of complaints'. The slightly older age hasn't been reported so far and is mainly seen in the AT subgroup. **Clinical message:** The pain score at presentation is a prognostic factor for a successful conservative rehabilitation program.

Poster session 3

Saturday 7 November, 11.45 – 12.00

31. Quantitative muscle ultrasound in stroke

Berenpas F. MSc, Martens A. MSc, Prof. Geurts A.C.H MD PhD, Van Alfen N. PhD
Radboud University Medical Centre, the Netherlands

Introduction: Muscle architecture is known to change as a consequence of stroke. These adaptations are often attributed to disuse but might also be related to degeneration of lower motor neurons. Quantitative Muscle Ultrasound (QMUS) has successfully revealed architectural changes in muscles in various neuromuscular disorders. Whether stroke causes similar muscle changes is currently unknown. **Objective:** To explore changes in muscle architecture in chronic stroke patients using QMUS. **Patients:** n=29. **Methods:** QMUS was obtained bilaterally for 2 arm and 4 leg muscles. Echogenicity grey values (EG) and muscle thickness were corrected for age, sex and weight and expressed as z-scores relative to reference values. The correlation of echogenicity in lower limb muscles with activity (step count), physical functioning (walking speed) and neurophysiological function (EMG) was explored. **Results:** Increased echogenicity and decreased muscle thickness were found in the majority of muscles on the paretic and non-paretic side (hemiparetic > non-paretic). Only the EG of the paretic tibialis anterior showed a significant correlation, with walking speed. **Discussion and conclusions**: Increased echogenicity was found bilaterally. In this cross-sectional design we did not find clear relations with either physical activity or neurophysiological function. Future studies should focus on the longitudinal relationship of muscle characteristics, stroke severity, lower motor neuron degeneration and activity in both acute and chronic stroke patients. **Clinical message:** QMUS is a non-invasive, patient-friendly method to show changes in muscle architecture after stroke and might be used for detection of these changes and a way to monitor recovery and effects of therapy.

32. Energy expenditure and muscle activity in a patient with spinal cord injury while walking with and without an exoskeleton

Nachtegaal J. PhD , Fickert R. BSc, Van der Mijll Dekker M. PT, Gobets D. MD, Faber W.X.M. MD, Houdijk J.H.P. PhD
Heliomare Rehabiliation Centre, the Netherlands

Introduction: An innovative therapy in the rehabilitation of patients with spinal cord injury (SCI) is the use of exoskeletons. Exoskeleton training is used to improve walking ability and may counteract some of the systemic impacts of immobility and diminished weight bearing. Apart from limited evidence on the effectiveness of exoskeleton training, knowledge on energy expenditure and on muscle activation during walking in an exoskeleton is limited as well. **Objective:** To describe energy expenditure and muscle activity for walking with and without Ekso robotic exoskeleton. **Patient:** A patient with motor incomplete SCI (C2, ASIA D) **Methods:** The patient performed three trials: 1) Ekso walking with full support; 2) Ekso walking with partial support; 3) walking without Ekso using a cane. Oxygen uptake ($\dot{V}O_2$) and hart rate (HR) were monitored to determine energy expenditure. Muscle activity was measured using surface electromyography. **Results:** Energy expenditure was highest during Ekso walking with partial support (HF: 89 ; $\dot{V}O_2$: 14,6 ml/min/kg), followed by full support (HF: 80 ; $\dot{V}O_2$: 12,5 ml/min/kg) and without Ekso (HF: 75; $\dot{V}O_2$: 12,2 ml/min/kg). Muscle activity of the calf muscles was lower during walking in Ekso, whereas the hamstrings and rectus femoris showed higher activity compared to walking without Ekso especially during terminal stance. **Discussion & conclusion:** In this patient, energy expenditure during Ekso walking was higher than during non-Ekso walking and increased with decreasing support. Walking in Ekso required different muscle activation, both amplitude

and timing, compared to non-Ekso walking. **Clinical message:** Ekso walking induces high physical strain and a different coordination pattern compared to non-Ekso walking.

33. Study protocol: Effect of a Platelet Rich Plasma (PRP) injection on the outcome of chronic lateral epicondylitis A double blinded randomized controlled clinical trial

Van Orsouw M.A.P. MD [1], Meijer R.S. MD [1], Van Helden W.H. MD [2], Hendricks H.T. MD PhD [1]
[1] *RMC Grootklimmendaal, the Netherlands*
[2] *Hospital Gelderse Vallei, the Netherlands*

Introduction: Lateral Epicondylitis (LE) is in most cases a self limiting disease. The chronic variant may lead to disabilities in daily living, work and sports. Local injections with Platelet Rich Plasma (PRP) may improve the outcome in these chronic patients. PRP contains an increase in platelets and grow factors compared to whole blood, and may enhance tissue regeneration and healing. However, studies show conflicting results. **Objective:** To examine if a PRP injection results in a better functional outcome and pain relief compared to a saline injection. **Patients:** Patients with epicondylar pain increasing with pressure and with resisted wrist extension for more than 6 months and resistant to a well-structured 5 week rehabilitation program (age 18 – 70 years) with ultrasound findings indicating lateral epicondylitis. **Methods:** Randomized controlled trial, in which patients receive an injection with three millilitre (ml) PRP or an injection with three ml saline. **Outcome measurements:** The main study parameter is the difference in improvement expressed in the Patient Rated Tennis Elbow Evaluation (PRTEE) score at six months between the PRP group and the control group. Secondary outcome parameters are the Visual Analog Score (VAS) (pain), the Disability of Arm Shoulder and Hand (DASH) questionnaire and the pain-free grip strength and maximum grip strength measured with a dynamometer, among others. At six months an ultrasound will be made, which will be compared to the ultrasound at the time of the injection. **Message**: If you have a patient who lives up to the inclusion criteria, please refer to us M van Orsouw MD, R. Meijer MD, H. van Helden MD and H. Hendricks MD PhD RMC Grootklimmendaal, Ziekenhuis Gelderse Vallei.

34. The effect of virtual reality training on balance and gait ability in patients recovering from stroke: a systematic review

Van de Port I.G.L. PhD [1], De Rooij J.M. MSc [2]
[1] *Revant Rehabilitation Center Breda, the Netherlands*
[2] *Human Movement Sciences, Maastricht University, the Netherlands*

Objective: The aim of this study was to conduct a systematic literature review to investigate whether virtual reality (VR) balance or gait training is more effective than conventional balance or gait training in stroke survivors. Search strategy Literature search was carried out on the PubMed and Medline databases up to 13 April, 2015. Selection of articles Randomized controlled trials that compared the effect of conventional balance or gait training with the effect of VR balance or gait training on balance and gait ability in stroke survivors were included. Gait ability is expressed as spatiotemporal and functional outcome measures. VR had to consist of a screen or a head-mounted device (HMD). The stroke survivors had to perform gait or balance exercises on the ground, a balance board or a treadmill while looking at the VR scenes. **Evaluation of articles and results:** Twelve studies between 2004 and 2015 were included. The studies demonstrated a positive effect of VR on dynamic balance and gait recovery in stroke survivors. Dynamic balance improved more in the VR training group in eight out of nine studies, whereas static balance showed significant greater increase in just one study. Regarding gait ability, all eight studies found significant greater improvements in the VR group for different spatiotemporal or functional parameters of gait ability they investigated. **Conclusion:** The

results suggest that VR training is more effective than conventional balance or gait training to improve dynamic balance ability and some gait ability outcomes in stroke survivors. However, more research is needed, specifically focusing on the dose response relationship and the effect of adding VR to conventional therapy or solely implementing VR during rehabilitation. Also the long term effect of VR and the effect of VR on other outcomes needs more research.

35. The effect of inpatient pain rehabilitation treatment in patients with severe pain related disabilities and high level of psychosocial distress

Swaan L. MD, Fonseca de Oliveira Souto H. MD , Slaman J. PhD
University Hospital Ghent, Belgium

Introduction: In a previous study (2013, Swaan et al) we examined the characteristics of the inpatient population with chronic musculoskeletal pain (CMP) in comparison with the outpatient population, which confirmed that the first mentioned has a worse condition regarding to pain related disability and psychosocial distress**. Objective:** The aim of this study is to evaluate the effectiveness of inpatient multidisciplinary rehabilitation treatment in this highly disabled group. **Patients:** A total of 86 patients were evaluated. 24 patients were included who filled the evaluation forms both at intake and at the end of the 12-weeks rehabilitation program. Medical diagnosis was mainly chronic low back pain (40%) and generalised pain (33%). Most patients were female (85%). Mean age was 36y (18-65). **Methods:** Paired sample t-tests were used for statistical analysis of changes in PDI, RAND-36 and NRS scores before and after inpatient treatment. **Results:** Our results show that there is a significant decrease in PDI scores (mean difference score= 17.9) and NRS scores (mean difference score= 1.16) before and after treatment ($p<0.001$) and a significant improvement in some dimensions of the RAND-36. **Discussion and conclusions**: The significant effectiveness of inpatient multidisciplinary pain rehabilitation in Rijndam is showed in this study. De mean difference score on the PDI is far beyond the minimum clinical relevance. We conclude that Rijndam's inpatient multidisciplinary rehabilitation program results in significant improvement of pain disability and quality of life in patients with severely disabling CMP. **Clinical message:** Patients with severely disabling CMP can benefit from inpatient rehabilitation treatment.

36. Effect study of an intervention to promote psychosexual development in adolescents and young adults with a physical disability or chronic disease

Troe Y.T.A. MSc [1], Haga N. MD [1], Hilberink S.R. PhD [2], Polet J.C. MSc [3]
[1]*Libra Revalidatie & Audiologie, Leijpark, Tilburg, the Netherlands*
[2]*Department of Rehabilitation Medicine, Erasmus MC Rotterdam, the Netherlands*
[3]*Hogeschool Utrecht, the Netherlands*

Introduction: Multiple studies show that adolescents and young adults with a physical disability have delay in their sexual development. It seems necessary to develop and implement strategies to stimulate the psychosexual development of these youngsters. The aim of this research is to gain more evidence about the effectiveness of a group training to promote psychosexual development. **Method**: In this research participated 21 young adults with a physical disability or chronic disease aged 14 to 25 years old, with no serious learning disabilities. Evaluation was done pre- (T0) and post training (T1) and three months after finishing the group training (T2). The outcome was measured with The Physical Disability Sexual and Body Esteem Scale, Questionnaire Sexuality and Intimate Relationships and the Dutch Adaptation of the general Self-efficacy Scale. **Results:** Comparison between the groups shows significant less information needs in the control group (p=0,045) at T0. At T1 no changes were measured in both the intervention group and the control group. At T2 the information needs significantly decreased in the intervention group (Cohen's

d= 0,5 p=0,02). On sexual esteem (Cohen's d= 0,52 p=0,12), body esteem (Cohen's d=0,31 p=0,5), attractiveness (Cohen's d=0,26, p=0,47) and courtship (Cohen's d=0,43 p=0,55) a small to average effect size developed. **Discussion/conclusion:** Despite of some limitations it can be concluded that the group training shows a small, but positive effect in outcome on information needs, sexual esteem, attractiveness, body esteem and courtship. It is recommended performing further research with more participants and a longer follow-up to gain more evidence of the effect of this group training.

37. Differences in hand function, patient satisfaction and patient preference between two orthoses for thumb carpometacarpal osteoarthritis: a multicenter crossover randomised controlled trial

Van der Vegt A.E. MD [1], Grond R. MD [2], Grüschke J.S. MD [1, 3], Prof. Dijkstra P.U. PT PhD [1], Emmelot C.H. MD PhD [2], Boomsma M.F. MD PhD [4]; Prof. Van der Sluis C.K. MD PhD [1]

[1] *University of Groningen, University Medical Center Groningen, Department of Rehabilitation Medicine, Groningen, the Netherlands*

[2] *Isala, Department of Rehabilitation Medicine, Zwolle, The Netherlands*

[3] *Medical Centre Leeuwarden, Department of Rehabilitation Medicine, Leeuwarden, the Netherlands*

[4] *Isala, Department of Radiology, Zwolle, the Netherlands.*

Introduction: Thumb carpometacarpal osteoarthritis results in pain and loss of function and is often treated using orthoses. Objective: To analyse differences in hand function and patient preferences between the Push Ortho Thumb Brace (Push brace,PB), a new off-the-shelf orthosis which only immobilises the carpometacarpal-1 joint, and a custommade orthosis (CM) immobilising the carpometacarpal-1 and metacarpophalangeal-1 joints. **Patients:** Patients with primary osteoarthritis of the carpometacarpal-1 joint. **Methods:** A multicenter crossover randomised controlled trial was performed. Patients used both orthoses for two weeks, with a two-week washout period. Hand function was assessed including Jebsen Taylor test, Nine hole peg test, Key grip, Pinch grip and the FIHOA questionnaire. Patient preference was assessed using D-Quest. **Results**: We found significant differences between the measurements after two weeks wearing of the orthoses for keygrip ((Mean(SD) PB/CM:6.0(2.7)/5.3(2.3),p=<0.001), Jebsen Taylor ((Mean(SD) PB/CM:56.6(12.8)/60.4(14.6),p=0.005) and D-QUEST ((Mean(SD) PB/CM:30.6(3.9)/26.8(4.9),p=<0.001). Insufficient wash out was present for Nine hole peg test and Jebsen Taylor. No differences were found in the other outcome variables. **Discussion and conclusions:** For hand function keygrip and Jebsen Taylor are significantly different in favour of the Push Brace. The preference for the Push Brace is higher. Insufficient washout was probably related to learning effects. Differences were clinically small. **Clinical message:** In prescribing an orthosis, the small Push brace seems to be a good choice, because patient preference is higher and hand function is partially better compared to the custommade orthosis. This result may be explained by better preservation of the mobility of the thumb in the Push brace.

38. Problem Solving Therapy during outpatient rehabilitation for stroke: long-term results of a randomized controlled trial

Visser M.M. MSc [1], Heijenbrok-Kal M.H. PhD [1], Van 't Spijker A. PhD [2], Prof. Busschbach J.J.V. PhD [2], Prof. Ribbers G.M. MD PhD [1]

[1] *Rijndam Rehabilitation Centre, the Netherlands*

[2] *Erasmus University Medical Center, the Netherlands*

Introduction: Stroke patients use insufficient active problem-oriented coping strategies, and experience a relatively low health-related quality of life (HR-QoL). **Objective:** To investigate whether Problem Solving Therapy (PST) is an

effective group intervention for improving coping strategy and HR-QoL in stroke patients. **Patients:** 166 stroke patients, mean age 53.06 years (SD 10.19), 53% men, median time post-stroke 7.29 months (IQR 4.90-10.61). **Methods:** Randomized controlled trial with 12 months follow-up. The intervention group received PST in addition to outpatient rehabilitation treatment, the control group received outpatient rehabilitation only. Data were analyzed using paired and independent samples t-tests. **Results:** Over the intervention period, only within-group effects were present. Six months after PST, the intervention group showed significant improvements compared to the control group in task-oriented coping (p=.004), avoidant coping (p=.034), and the utility value for general HR-QoL (p=.020). Twelve months after the intervention, the effect on task-oriented coping remained significant (p=.044). **Discussion and conclusions:** On the short-term, effects of PST did not reach statistical significance compared to standard care. At six months post intervention task-oriented and avoidant coping strategies and general HR-QoL improved more if PST was added to standard care. Twelve months post intervention, the improvement in task-oriented coping was maintained. The improvement in HR-QoL stabilized over time, but the control group catched up after one year. **Clinical message:** PST during outpatient stroke rehabilitation improves task-oriented coping on the long term and accelerates a stable HR-QoL.

39. Caregiver-mediated exercises for improving outcomes after stroke: a systematic review

Vloothuis J.D.M. MSc MD [1], Mulder M. MSc [2], Veerbeek J.M. PT PhD [2], Konijnenbelt M. MSc MD [1], Prof. Visser-Meily J.M.A. MD PhD [3, 4], Prof. Kwakkel G. PT PhD [2], Van Wegen E.E.H. PhD [2]

[1] *Amsterdam Rehabilitation Research Centre, Reade, Amsterdam, the Netherlands*

[2] *MOVE Research Institute Amsterdam, VU University Medical Center, Amsterdam, the Netherlands*

[3] *Brain Center Rudolf Magnus, University Medical Center Utrecht, the Netherlands*

[4] *De Hoogstraat Rehabilitation / University Medical Center Utrecht, the Netherlands*

Objective: To determine the effects of caregiver-mediated exercises (CME) on activities of daily living (ADL), caregiver burden and functional outcome in patients with stroke. Search strategy: A systematic search of The Cochrane Stroke Group Trials Register, electronic databases (a.o. CENTRAL, MEDLINE, EMBASE, SPORTDiscus) and trial registers (April 2014) was performed. **Selection of articles:** Two researchers independently performed study selection and data extraction. Randomized clinical trials, comparing CME to either usual care, no intervention or a control intervention, were included. **Evaluation of articles and results:** Systematic review and meta-analysis was performed. Cochrane Collaboration methods, resources and software, were used. Post-intervention scores were used to calculate (standardized) mean differences ((S)MD). Six trials involving 216 participants were included. Three trials were executed in the first six months and three in the chronic phase post stroke. Regarding the primary outcomes, post intervention basic ADL improved (SMD 0.51, 95% CI: 0.17 to 0.85; P = 0.003) and caregiver burden did not increase. (SMD -0.04, 95% CI: -0.45 to 0.37; P = 0.86) Regarding the secondary outcomes, CME significantly improved balance and Quality of Life post intervention. At follow up a significant MD in favor of CME was found for the six minute walking test and Reintegration to Normal Living Index. **Conclusion:** CME can be a valuable intervention to augment the pallet of therapeutic options for rehabilitation after stroke towards independent living at home. Future research should determine whether CME is cost-effective and whether cross-cultural differences affect implementation and effectiveness of CME.

40. Nurse practitioners and physician assistants in rehabilitation medicine: reallocation of tasks

Van Vught J.A.H. PhD , Laurant M.H. PhD

Faculty of Health and Social Studies, HAN University of Applied Sciences, the Netherlands

Introduction: Nurse Practitioners (NPs) and physician assistants (PAs) are mid-level providers, who are licensed to diagnose and treat patients independently. In the Netherlands, we see in the last few years an increased number of mid-level providers performing medical tasks in rehabilitation medicine. **Objective:** A multi-site case study aimed to get insight into the motives, the tasks and consequences of the employment of mid-level providers in rehabilitation medicine. **Methods**: Semi-structured in-depth interviews were held with mid-level providers, rehabilitation specialists and paramedics. Two scientists coded the interviews with respect to the outcomes of interest. **Results:** Five PAs, two NPs, six rehabilitation specialists and six paramedics from six rehabilitation centers were interviewed. Primary motives for employing mid-level providers were: relieving the specialist's workload and increasing continuity of healthcare. The mid-level providers performed a broad spectrum of tasks with different responsibilities, which largely depended on the vision of the specialists, the collaboration of mid-level providers with rehabilitation specialists, and work experience of the mid-level providers. Experienced outcomes were increased continuity of care, efficiency and easily accessible communication. Besides, some rehabilitation specialists experienced mid-level providers as a threat to their position. **Discussion and conclusion:** The tasks and autonomy of mid-level providers seem related to the shared vision of the specialists. The challenge ahead is to position and embed the mid-level providers in rehabilitation medicine. **Clinical message:** Mid-level providers are able to perform a broad spectrum of tasks in co-partnership with the specialist and contribute to reduction of the specialist's workload and increase continuity of care.

41. Peer support in rehabilitation for acquired brain injury: what is the client's need?

Wobma R. MSc, Nijland R. PhD [1], Prof. Kwakkel G. PT PhD [1, 2]
[1]Amsterdam Rehabilitation Research Center, Reade, Amsterdam, the Netherlands
[2]Department of Rehabilitation Medicine VU Medical Center, the Netherlands

Introduction: Nowadays, more rehabilitation settings are interested in deploying peer supporters to improve their health care. Peer support can be defined as social emotional support offered by persons with experiential knowledge and characteristics similar to the person it is given to. To customize and improve peer support programs it is essential to know the characteristics of patients who may benefit from this kind of support and determinants that influence a positive outcome. **Main objective:** To get a better understanding of factors related to the need for peer support and to a positive experience of peer support. **Methods:** A prospective cohort study of a peer support program during inpatient rehabilitation for acquired brain injury (ABI). Peer supporters with ABI were selected, employed and trained by the rehabilitation centre. 120 patients with ABI (age ≥ 18 years) will be included and logistic regression will be applied to identify factors related to the need for, and positive experience of peer support, according to patients and peer supporters. Independent variables for the analysis include a) demographic factors and disease related characteristics, b) subjects of conversation and c) number of contacts. **Preliminary results:** Currently, 117 patients are included of which 73% perceive a need for peer support. Of all discharged respondents 78% value their contact as meaningful. The final results of the relating factors for need and meaningful contact are expected in June 2015. **Concluding statement:** Results will be used to improve the existing program and support future research into the effect of peer support.

42. Ankle joint moment assessment using a pressure plate only

Keijsers N.L.W. PhD [1], Pellen L. MSc [1], Vos M. MD PhD[2]
[1]Department Research, Sint Maartenskliniek Nijmegen, the Netherlands

[2]Department of Rehabilitation, Sint Maartenskliniek Nijmegen, the Netherlands

Introduction: The ankle moment is an important parameter in assessing gait. It is most commonly measured using a 3D-gait analysis system, which is time consuming and demanding for patients. The pressure plate can be an alternative because it measures the vertical ground reaction force and the center of pressure relative to the pressure pattern of the foot. This study investigates whether the ankle joint moment can be calculated using a pressure plate only. **Methods:** Fifteen healthy subjects were recorded during barefoot walking with a 3D motion capture system (Vicon) and a pressure plate. The optimal ankle joint axis location on the plantar pressure pattern was defined as the axis that resulted in the smallest moment error compared to the Vicon moment. The flexion/extension and inversion/eversion moments calculated with the pressure plate were compared to the Vicon moments using correlation coefficients and root mean squared errors (RMS). **Results:** The optimal ankle axis for the flexion/extension moment was located at 20% of normalized foot length and 47% of the normalized foot width. Correlation coefficients between Vicon and pressure plate moment were above 0.99 for flexion/extension and around 0.8 for inversion/eversion. The RMS values were small for flexion/extension and high for inversion/eversion compared to the magnitude of the moment. **Conclusion:** This study showed that the pressure plate is able to accurately assess the flexion/extension moment without the use of a 3D motion capture system. Further research should determine which axis location and orientation is best to calculate the inversion/eversion moment.

43. Plasticity, motor learning and functional recovery after task-oriented training of the upper extremity in tetraplegia –multiple single case study

Bouwsema H. PhD [1,2], Spooren A.I.F. PhD [1,2], Kaas A.L. PhD [3,4], Bongers H.M.H. MD[2], Prof. Smeets R.J.E.M. MD PhD [1,2], Seelen H.A.M. PhD [1,2]

[1]Centre of Expertise in Rehabilitation and Audiology
[2]Adelante Rehabilitation Centre;
[3]Department of Cognitive Neuroscience
[4]Faculty of Psychology and Neuroscience

Introduction: While task-oriented training is often provided during rehabilitation of persons with a spinal cord injury (C-SCI), the underlying mechanisms are unknown. **Objective:** This pilot study aimed to study motor learning processes and neural plasticity by A) investigate which basic neural mechanisms of motor learning underlie functional recovery of arm-hand skilled performance during task-oriented training of the upper limb; and B) investigate the contribution of the structure of training, i.e., constant versus variable practice. **Methods:** Multiple single case design (A-B-C design). After therapy as usual (baseline, A), participants trained for 6 weeks on two individually chosen goals (3 weeks intervention B: variable practice, 3 weeks intervention C: constant practice), 5 days/week, 2x/day, 30'/training. VLT-SF, SCIM (self-care), UEMS, hand-held dynamometry, Semmes-Weinstein Monofilaments, surface EMG, and neuroimaging (fMRI) in a sub-group of patients were assessed at baseline and at the end of each intervention. **Results:** Presently, 5 participants with a C-SCI have completed the training. Initial results of one participant (male, 69) with a non-traumatic C-SCI (C6) indicate improvements in VLT-SF (A:72.45, B:76.87, C:87), SCIM (A:10, B:15, C:16), strength (pinch A:13.9, B:16.7, C17.6; grip A:37.2, B:49.9, C:60.3) and sensibility. Preliminary fMRI results show that functional reorganization resulting from the SCI may be present. EMG data and the data of the other participants will be analyzed. **Conclusions:** This pilot experiment shows it is feasible to use the set of functional, kinematic, and fMRI data to track changes on arm-hand skilled performance, motor control, and neural plasticity during task-oriented training by people with a C-SCI.