Physical activity in MS

Facilitating sustained changes in mobility and exercise participation

7th and 8th June 2013

Hosted jointly by the SIG Mobility, Chairs Anders Romberg and Paul Van Asch

and SIG Education, Chair Dr Christoph Heesen

Local Organiser Dr Susan Coote

University of Limerick, Ireland

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Foreword

"Exercise invigorates and enlivens all the faculties of body and mind... It spreads a gladness and satisfaction over our minds and qualifies us for every sort of business, and every sort of pleasure.” (John Adams, the 2nd president of United States)

While the above words have certainly been true for years in people who are not ill, a number of indications just within recent years suggest that this might be the case also for people with long-term conditions such as MS. In 1996, late Jack H Petajan published the first randomized controlled trial to clearly show the positive impact of regular exercise in MS. This seminal work received well-deserved attention during the first SIG Mobility meeting in Montana, Switzerland, in late 1990s (with far less than 20 participants gathering). Ever since, what a tremendous progress in the field of physical activity and exercise research in MS has occurred! Ever since, what a tremendous progress we have made in our SIG meetings throughout the years!

Based on the current evidence, it is clear that exercise produces versatile benefits on body functions and structures, activities and participation in persons with MS. Nonetheless, a number of important questions remain unsolved within physical activity and exercise research: What are the most feasible exercise components? What would be the most optimal exercise dosage? Are persons with severe MS able to benefit of exercise? What are the barriers to hinder physical activity and exercise participation? What would be the ideal approach(es) to influence physical activity behavior (bearing in mind the disabling nature of MS)? I am pleased to acknowledge that we are now gathered for two days to reflect such questions with MS specialists entering the meeting practically from the entire Europe. I am convinced that you share my expectations of a stimulating and interactive gathering with nice combination of rigorous scientific evidence complemented with inventive clinical experiences.

While enjoying our stay in Ireland, we should not forget the wonderful efforts of the local organizer Susan Coote (& her team) to build a pleasant and a memorable conference. Finally, our mobility group is glad to continue collaboration with other SIG groups, this time with the SIG Education – welcome to join us Chris Heesen & colleagues!

Cheerio!

Anders Romberg, Chair SIG on Mobility
**Friday 7th June**

9.00 – Opening and Welcome – Prof Mary O’Sullivan, Dean Education and Health Sciences Faculty, UL

9.15 – Long term adherence to exercise; current evidence and future research needs – Ulrik Dalgas, Denmark

9.45 – Correlates of physical activity and barriers and facilitators of exercise – Renee Tzschoppe, University of Erlangen, Germany

10.15 – Coffee

10.45 – RIMS SIG mobility joint research projects update

11.45 – Free Paper Session 15 minutes per paper

- Vaney C, Werlen B, Forkel N - Validity and responsiveness of SaGAS 20/10, a revised and simplified version of SaGAS (Short and Graphic Ability Score) in the rehabilitation of patients with neurological diseases.
- Wens I, Grevenonk L, Eijnde B - Impact of exercise therapy on BDNF response in Multiple Sclerosis.
- Gusowski, K - The importance of standardized measurements in physiotherapy fostering evidence based therapy and research projects.

1.15 – Lunch, networking and poster viewing

2.15 - ExIMS: a pragmatic intervention designed to promote sustained exercise behaviour change in people with MS – John Saxton, University of East Anglia, UK

3.00 - Accelerometer use in MS: walking as outcome and treatment - Martin Daumer, Sylvia Lawry Centre for MS Research, Munich, Germany

3.30 - Coffee

4.00 – Workshop – Measuring physical activity

5.00 Close

6.00 Bus departs for dinner at Bunratty Folk Park
9.15 - Long term adherence to exercise; current evidence and future research needs

Ulrik Dalgas

Section of Sport Science, Dep. Public Health, Aarhus University, Denmark

People with Multiple Sclerosis (pwMS) are less physically active than the general population[1] and it is, therefore, not surprising, that the physiological and functional capacity of pwMS generally reflects the effects of inactivity[2]. To counteract the detrimental effects of inactivity, exercise therapy has attracted much attention during the last decade, and today it is known, that exercise therapy is a safe and effective intervention that improves a number of physiological, functional and psychological parameters in pwMS[2].

Despite all the documented beneficial effects (and the very limited level of side effects) of exercise therapy many pwMS are still not exercising regularly[3; 4], or are terminating training after a short period of time[5]. Consequently, the purpose of this presentation is to outline the scientific evidence investigating 1) why many pwMS are not exercising sufficiently, 2) how MS patients participating in studies evaluating structured (supervised) exercise programs manage when they are tested at follow up after the study and 3) factors that may influence long-term adherence to exercise.

PwMS are generally aware of the beneficial effects of exercise but knowing this does not induce sufficient regular exercise. The perceived barriers are changeable and individual, but include aspects related to “physical exertion”[6], “fatigue”[4; 7], “emotional responses”[4], “lack of time”[7] and “impairment”[7]. These barriers do not seem to be influenced by gender[7].

Only few longitudinal exercise studies have evaluated how MS patients behave after an exercise intervention and how effects obtained during the exercise intervention are affected at follow up. Generally, results are inconsistent showing that effects are either maintained or (partially) lost when evaluated at (short-term) follow up.

Future studies should evaluate exercise interventions that can be implemented in the community and that are designed to overcome perceived barriers. Furthermore, follow up testing should be performed in future studies.

References

9.45 - Physical activity and exercise in persons with multiple sclerosis – barriers and facilitators

Tzschoppe R., Tallner A. & Pfeifer K.

Institute of Sport Science and Sport, Friedrich-Alexander University Erlangen-Nürnberg (Germany)

Diverse positive effects of physical activity have been reported for persons with multiple sclerosis (pwMS) but pwMS are even less physically active than healthy persons. To profit from the health effects in the long-term, adherence to regular physical activity is of utmost importance. For the promotion of physical activity it is crucial to understand what hinders and what would facilitate. Therefore, the aim of this review was to identify barriers and facilitators to regular physical activity/exercise adherence of pwMS.

The search strategy compromised a search in Medline (via Pubmed) and Scopus. »Physical activity«, »exercise«, »multiple sclerosis«, »barrier*«, »impediment*«, »facilit*« and »correl*« were used as MESH and free text to identify published literature in English or German language in a timeframe from 1980 to 2012. To identify additional literature the snowball principle was applied.

Various disease-related impairments could be identified as relevant barriers. Just as much important are personal context factors like beliefs, fears, outcome expectations, knowledge, skills plus self-efficacy referring to physical activity. Additionally, motivational as well as familiar, social, and vocational duties are relevant. Material and social environment issues comprise transportation issues, offers for physical activity and exercise, access to facilities, competences of health and fitness service providers as well as social support.

Various barriers arising from disease-related, personal and environmental factors as well as facilitator could be identified and are discussed. These factors constitute an important basis for the further development of adequate interventions for physical activity promotion in pwMS.
Title: Validity and responsiveness of SaGAS 20/10, a revised and simplified version of SaGAS (Short and Graphic Ability Score) in the rehabilitation of patients with neurological diseases.

Authors: C. Vaney, B. Werlen and N. Forkel

Affiliations: Neurologische Rehabilitations und MS-Abteilung, Berner Klinik MontanaCH - 3963 CransMontana

Background: SaGAS 20/10 is an iPhone app developed as an alternative to the MSFC (MS Functional Composite) and as a complement to the EDSS for the moderately disabled MS patients between EDSS 5.0 and 7.0. Assuming that this tool could also be used for other neurological diseases where walking and hand function is impaired, we set out to examine the validity and the responsiveness of SaGAS 20/10 in neurological patients attending a rehabilitation facility.

Method: 311 consecutive patients with different neurological diseases (MS 156, stroke 75, Parkinson 12, neuromuscular disorders 42, trauma 11, others 15) were assessed at the beginning and at the end of their rehabilitation stay using the EDSS (Expanded Disability Status Scale), the FIM (Functional Independence Measure), the RMI (Rivermead Mobility Index), the 2-minute timed walking distance at maximum speed (2MWD) and the 3 measures composing SaGAS 20/10 (the 25 feet timed walk at fast speed with a flying start (T25FW) and the nine-hole peg test (9-HPT) for each hand separately).

Results: For all neurological categories the SaGAS 20/10 scores were highly correlated with the FMI (Spearman r>0.8) and the RMI (Spearman r>0.8) showing the validity of the measure. About 43% of all subjects (MS 34%, stroke 59%) improved by more than 1 point in the SaGAS 20/10 (median 1.7) during their stay. The relationship between the change in score in the SaGAS 20/10 and the RMI was fair (Spearman 0.5) with a 1.0 point change in the SaGAS 20/10 corresponding to a 1.5 point change in the RMI.

Conclusions: These results indicate that SaGAS 20/10 is valid and sensitive to changes over time and that it could be an useful measure not only for patients with MS, but also for patients with other neurological diseases, particularly for stroke patients by showing in which domain the changes occur.
Title: A presentation of an ongoing study at the MS Hospitals in Denmark titled: “specialized rehabilitation for patients with multiple sclerosis. A randomized controlled trial of a personalized, multidisciplinary intervention”

Study protocol is published at http://www.biomedcentral.com/1472-6963/12/306 and 400 MS patients will be included. No preliminary data are available. However, we would like to share our experiences and challenges within the process of completing a study with such complexity.

Authors: Jan Sørensen, Anne Lee, Brita Løvendahl, Michael Nørgaard, Jette Bay, Peter Vestergaard Rasmussen and Finn Boesen

Presenters in Limerick: Anders Skjerbæk and Ellen Jensen, MS Hospital in Ry

Affiliations: MS Hospitals in Ry and Haslev, Denmark

Background: Multiple sclerosis (MS) is a complex, chronic and progressive disease and rehabilitation services can provide important support to patients. Few MS rehabilitation programs have been shown to provide health improvements to patients in a cost-effective manner. The objective of this study is to assess the effects in terms of changes measured by a variety of standardized quality of life, mastery, coping, compliance and individual goal-related endpoints. This combination provides the basis for analysing the complexity of MS and outcomes of a personalized rehabilitation.

Methods/Design: Patients with MS referred to hospital rehabilitation services will be randomized to either early admission (within two months) or usual admission (after an average waiting time of eight months). They will complete a battery of standardized health outcome instruments prior to randomization, and again six and twelve months after randomization, and a battery of goal-related outcome measures at admission and discharge, and again one, six and twelve months after randomization.

Discussion: The results of the study are expected to contribute to further development of MS rehabilitation services and to discussions about the design and content of such services. The results will also provide additional information to health authorities responsible for providing and financing rehabilitation services.

Conclusion: This is an ongoing study (March 2012-December 2014) and therefore no data is available.
Title: Effects of rehabilitation after relapse of disease- a preliminary results

Authors: Nedeljkovic Una, Dackovic Jelena, Dujmovic Basuroski Irena, Drulovic Jelena

Affiliations Clinic for Physical medicine and Rehabilitation, Neurology Clinic, Clinical Center of Serbia

Background: An exacerbation of disease is an unpredictable event and includes worsening or appearance of new symptoms and signs of disease. It is still unclear whether rehabilitation should start immediately after relapse, as well as its potential effects on recovery of patients. The aim of study was to examine effect of rehabilitation started immediately after steroid treatment on fatigue, self-efficacy and physical activity of patients.

Methods: Patients were randomized in experimental (n=10) and control (n=10) group. Experimental group participated in an outpatient rehabilitation program for 3 weeks, 5 days a week, started 1-7 days after the end of steroid treatment. Outcome measures included Fatigue Severity Scale (FSS), Multiple Sclerosis Self Efficacy Scale (MSSE) and Godin Leisure – Time Exercise Questionnaire (GLTEQ). Measures were repeated one and three months after relapse.

Results: There was statistically significant difference between groups in FSS scores after 3 months (p<0.05). Experimental group showed improvement in GLTEQ after 3 months (p<0.05), but there was no statistically significant difference between groups in any time. There was no significant difference in MSSE between groups, although there was trend towards change in time for experimental group.

Conclusions: Early admission to rehabilitation unit after relapse can show benefits in improving some symptoms of disease. Further research is needed in order to give more precise results of the effects of rehabilitation.
**Title**
Impact of exercise therapy on BDNF response in Multiple Sclerosis

**Authors**
Inez Wens, Lotte Grevendonk, Bert O Eijnde

**Affiliations**
REVAL, Rehabilitation Research Center | Biomedical Research Institute (BIOMED)
Faculty of Medicine and Life Sciences, Hasselt University, Belgium

**Background:**
Reduced BDNF production in MS patients can contribute to axonal loss and disease progression\(^{(1)}\). In fact, it is clear that BDNF induces remyelination and functions as a neuroprotective mediator\(^{(2)}\). Recent research showed that exercise can influence BDNF production\(^{(3, 4)}\) in an exercise intensity dependent relation\(^{(5)}\). This, possibly, explains the mechanisms behind the overall therapeutic effects\(^{(3, 6)}\) of exercise therapy in MS.

**Methods:**
- **Baseline measurement:** BDNF profiles of 46 MS patients (EDSS 3.3±0.53) were compared with 49 matched healthy controls (HC).
- **Exercise therapy:** Before (0w) and after 6, 12 and 24 weeks of cardiovascular (1x6 → 3x10min) and strength (1x10 → 4x15reps) training\(^{(7)}\), BDNF concentrations were measured in 28 exercised MS patients (MS\(_{EX}\)) and 16 sedentary MS patients (MS\(_{SED}\)).

**Results:**
- **Baseline measurement:** BDNF concentrations in HC and MS patients were not different (p>0.05).
- **Exercise therapy:** As previously indicated\(^{(7)}\) exercise training increased exercise capacity and muscle strength. For BDNF measurements, an overall interaction effect (time x group effect of p=0.06) was achieved. In MS\(_{EX}\) and compared to 0w, BDNF concentrations remained stable after 6 weeks of exercise, where after BDNF concentrations increased with 12% (12w) and 22% (24w), respectively. In MS\(_{SED}\) and compared to 0w, BDNF concentration decreased during 24 weeks (6w: -15%, 12 and 24w: -10%).

**Conclusions:**
Under the conditions of the present study, these data suggest that the applied long term exercise program may improve the BDNF profile of MS patients. This may, in part, explain the therapeutic effects of exercise therapy in MS.
Title: The importance of standardized measurements in physiotherapy fostering evidence based therapy and research projects.

Authors: Gusowski, Klaus

Affiliations: NRZ Quellenhof, D-75323 Bad Wildbad

Abstract Body: The neurological rehabilitation centre “Quellenhof” in Bad Wildbad, Germany, offers inpatient rehabilitation for all neurological diseases, but with a focus on people with multiple sclerosis (MS). The structure of the therapeutic team and their approaches are tailored towards this group of patients. In 2004, we established standardized measurements as a whole (Barthel index, EDSS, MSFC) and in the different therapeutic departments, in particular physiotherapy (2 minute walk, 10 m walk, timed-get-up-and-go, Tinetti score, vital capacity) and occupational therapy (action research arm test). Since then, we have collected these measures in more than 5,000 patients. This set of instruments enabled us to perform retrospective and prospective studies dealing with the effects of conventional physiotherapy in chronic progressive MS on quantitative gait parameters (Gusowski 2006), respiratory function (Kaiser 2006 & 2007), and hippotherapy (Boswell 2008).

Beyond these evaluated interventions many other approaches are available using technical equipment like treadmill, robot assisted gait trainer, fitness devices, balance trainer, arm devices or visual feedback systems like Wii-consoles. They probably support conventional physiotherapy and emphasize an active lifestyle to stabilize the improvements in functioning, but need to be evaluated in a systematic manner. Some of these interventions have already been investigated in other diseases e. g. stroke, but in MS, only pilot studies with small numbers of patients exist. The instruments used in our rehabilitation center may help to set up research projects and collect scientifically sound evidence in large numbers of MS patients.
2.15 - EXIMS: a pragmatic intervention designed to promote sustained exercise behaviour change in people with multiple sclerosis.

John M Saxton,
University of East Anglia, Norwich, UK.

Exercise is a safe, non-pharmacological treatment strategy for people with multiple sclerosis (PwMS) that can bring many health benefits, including improvements in muscle power, physical and psychosocial functioning and quality of life. Regular exercise participation may also have an important role to play in the management of fatigue. A major challenge however, is to develop pragmatic and cost-effective interventions that can safely engage PwMS in their preferred modes of exercise and provide robust evidence of a long-lasting impact on exercise behaviour and important health outcomes. To date, few intervention studies have incorporated strategies for promoting a sustainable increase in exercise behaviour in PwMS. These studies will be briefly reviewed before presenting the results of EXIMS, a pragmatic randomised controlled trial, which incorporated cognitive-behavioural techniques to facilitate sustained exercise behaviour change and improvements in important health outcomes in PwMS. EXIMS comprised a tapered programme of supervised aerobic exercise, strength and balance training, with 2 supervised plus 1 home exercise session during weeks 1-6 and 1 supervised plus 2 home exercise sessions during weeks 7-12. Supervised sessions incorporated cognitive-behavioural techniques (e.g. goal setting, finding social support, understanding the costs/benefits of exercise etc.) to promote long-term participation in exercise. Using the Transtheoretical Model as a guiding framework, this aspect of the intervention was aimed at equipping PwMS with the skills, knowledge and confidence to adopt an active lifestyle. This pragmatic approach increased self-directed physical activity behaviour, improved fatigue symptoms and led to a sustained enhancement of health-related quality of life in PwMS.
3.00 - Accelerometer use in MS: walking as outcome and treatment -

Martin Daumer,
Sylvia Lawry Centre for MS Research e.V. - The Human Motion Institute
& Trium Analysis Online GmbH, Munich, Germany

The loss of walking ability is important both from a patient’s perspective and from a health economic perspective. Physical activity in general and walking in particular can be considered as an additional treatment option. Current measures for assessing walking ability in MS patients have well-known weaknesses (see, e.g., the EMA draft guideline for MS). Mobile accelerometry has been proposed as a potential new gold standard for assessing walking ability in MS and neurologic diseases in general.

We describe our experience with the actibelt technology platform, a 3D accelerometer in a belt buckle, measuring with 100Hz the acceleration of the patient’s centre of mass over an entire week, as a method to both improve, enhance and perhaps at some time partially replace currently used outcome measures for disability. The same platform can be used to prescribe and monitor the adherence to and the effect of "exercise walking" in the context of a motivational package called "move your health", which includes, among other things, modern insights about the molecular basis of the effect of exercise and objective feedback about status and changes in physical activity. Studies in healthy individuals have confirmed the short-term efficacy of "move your health" when the package includes individualized goal setting and the first results with MS patients are promising.

Mobile accelerometry has the potential to change outcome measures in clinical trials - ecologically valid measures for walking ability such as walking speed, number of falls - to enhance clinical assessments of gait and balance (Romberg, 6MWT, 10MWT) and to be used in the context of a prescription of physical activity.
Saturday 8th June

9.00 - Exercise in neurological rehab – competence, orientation and sustainability, Klaus Pfeifer, University of Erlangen, Germany

9.45 – Exercise in Progressive MS – Christoph Heesen, Hamburg

10.30 – Coffee

11.00 – Internet intervention to promote physical activity – Alexander Tallner, University of Erlangen, Germany

11.30 Free paper session 10 minutes per paper
   o Tzschoppe R., Peters S., Tallner, A., Pfeifer, K - Outcomes and Outcome Measures of Physical Activity and Exercise Interventions for Persons with Multiple Sclerosis (20)
   o Rasova K, Rybnickova M, Korinkova M, Tintera J, Ibrahim I, Martinkova P - Evaluating of facilitation physiotherapy using fMRI
   o Jones KØ, Smedal T - WalkAide - Experiences with a multidisciplinary model for testing, adjustment and follow-up
   o Hannes D - Effect of 12 minutes treadmill walking on spatio-temporal gait characteristics in persons with multiple sclerosis

12.30 - Lunch, networking and poster viewing

1.30 – Quality of movement – does it matter and can we change it – Tori Smedal, Norway

2.00 – Promoting exercise and physical activity in the community – Lorna Paul, University of Glasgow

2.45 – Coffee

3.00 Free paper sessions 20 minutes per paper
   o Heine M, Hoogervorst E, Hacking H, Kwakkel G - Feasibility of cardiopulmonary exercise testing in patients with multiple sclerosis
   o Skjerbæk AG, Næsby M, Lützen K, Møller AB, Jensen E, Lamers I, Stenager E, Dalgas U - Endurance training is feasible in severely disabled patients with progressive multiple sclerosis
   o Feys P, Tytgat K, Gijbels D, de Grootte L, Baert I, Van Asch P - Effects of an 1-day education program on physical functioning, activity and quality of life in community living persons with Multiple Sclerosis

4.00 – Summary and Closing
9.00 - Exercise Therapy – Competence orientation and sustainability

Klaus Pfeifer
Friedrich-Alexander Universität Erlangen-Nürnberg, Institute of Sport Science and Sport

The positive health enhancing effects of exercise therapy, physical activity and sport for the general population as well as for persons with neurological diseases like Multiple Sclerosis, stroke or the Parkinson syndrome are indisputable. High potential lies in integral biopsychosocial physical activity and exercise interventions that target long-term changes of physical activity behavior and thus think beyond short intervention periods with mostly short-term effects on physical functions. Those behavioral interventions are related to the framework of the International Classification of Functioning, Disability and Health (ICF) of the WHO and especially consider –besides the classical target area of restoration of body functions and structures - relevant activities and aspects of participation as well as personal context factors. Relevant contents and methods have to be didactically arranged on three intervention levels to enable the development of movement-related health competence: 1) physical exercise and training, 2) learning/education, 3) experience. Movement-related health competence comprises the three components movement competence, control competence and self-regulation competence. It is regarded as a personal resource for movement and mobility demands in daily life, for autonomous health enhancing physical activity and sport and for coping with or adjustment to health disorders and diseases. Future studies should investigate corresponding intervention concepts and their differential effects as well as dose-response relations.
9.45 Exercise in Progressive MS

Christoph Heesen,

Hamburg
11.00 - Internet intervention to promote physical activity

Alexander Tallner
Friedrich-Alexander Universität Erlangen-Nürnberg, Institute of Sport Science and Sport

Due to its pervasiveness and technical opportunities, the internet has been increasingly used in therapeutic settings as well. In this regard, internet-delivered interventions have proven effective in ameliorating several health behaviors, amongst them physical activity behavior. The different kinds of internet-delivered activities comprise online-counseling, web-based interventions, internet-operated therapeutic software and other online activities like social networks.

Internet-delivered interventions have also shown positive effects on physical activity and physical function in persons with MS. In a randomized and controlled study (internet-based activation to physical exercise, ms-intakt Study Erlangen), we combined an initial face-to-face introductory session with a subsequent online training support for several months. We put the main focus of the intervention on education, strength and endurance training, and an online physical activity diary.

The intervention led to significant increase in muscle force, sports activities and lung function in the intervention group compared to the waitlist control group. Global outcomes like health-related quality of life were not subject to change. An explanation for this might be the social interaction and support that is less in internet-delivered interventions compared to face-to-face group interventions. The integration of social networks seems to be promising in this respect.

A survey among the participants of the ms-intakt study showed high acceptance and satisfaction with the intervention. A striking fact was the training frequency, though, which decreased over time. Decreasing compliance is a major issue in internet-delivered interventions. A possible remedy might be the implementation of game-design elements to increase compliance and long-term adherence to internet-delivered interventions.
**Title:** Multi modal task-oriented training on treadmill: Impact on mobility, equilibrium and participation in persons with multiple sclerosis and stroke.

**Authors:** Johanna Jonsdottir, Elisa Gervasoni, Rita Bertoni, Davide Cattaneo

**Affiliations**
Dr. of Science, Neurorehabilitation, Foundation Don Gnocchi, Milan

**Background:**
Task oriented training is being increasingly recommended for persons with neurological disorders. Training on treadmill has been associated with improvements in walking speed and performance in sit-to-stand (French et al. 2007). High intensity training with dual tasking and balance constructs was implemented on treadmill to assess its impact on mobility and health perception in persons with MS (PwMS) and stroke (PwSt).

8 PwMS and 8 PwSt participated and 8 of them were randomly assigned to treadmill training in addition to usual care. Mean age: PwMS (EDSS 5.5) 46.3, PwSt 57.4 years.

**Methods:**
Training on treadmill: 30 minutes 3X week, 12 sittings. The training included aerobic work, balance and cognitive exercises in a dual tasking paradigm. Mobility, balance and health perception of all subjects were assessed pre and post intervention. Subjects in the treadmill group also underwent gait analysis and Bruce test.

Clinically meaningful improvement in balance scores and velocity was found after treadmill training, see table 1 for changes from pre to post rehabilitation in both groups. Heart rate decreased 15 beats/min at maximum force on Bruce test in the treadmill group.

**Results:**
Table 1

<table>
<thead>
<tr>
<th>Test</th>
<th>Treadmill</th>
<th>Controls</th>
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<tr>
<td></td>
<td>PRE</td>
<td>POST</td>
</tr>
<tr>
<td>Berg Balance scale</td>
<td>45,75</td>
<td>49,25</td>
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<tr>
<td>Dynamic Gait Index</td>
<td>14,75</td>
<td>20</td>
</tr>
<tr>
<td>10MWT (sec)</td>
<td>19,38</td>
<td>12,78</td>
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<tr>
<td>Timed up and Go (sec)</td>
<td>20,4</td>
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</tr>
<tr>
<td>ABC</td>
<td>53,97</td>
<td>58,65</td>
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<tr>
<td>SF-12</td>
<td>27</td>
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</table>

**Conclusions:**
Multimodal treadmill training improved velocity of gait and balance in persons with MS and stroke while perception of balance and health did not change.
Title: Evaluating of facilitation physiotherapy using fMRI

Authors: Rasova K. ¹, Rybnickova M. ¹, Korinkova M. ³, Tintera J. ², Ibrahim I. ², Martinkova P.

Affiliations: ³Department of Rehabilitation, Third Medical Faculty, Charles University in Prague
²MR Unit, Department of Diagnostic and Interventional Radiology, Institute for Clinical and Experimental Medicine, Prague, Czech Republic
³Hospital Beroun
⁴Centre of Biomedical Informatics, Institute of Computer Science, ASCR, Prague, Czech Republic

Background: Understanding of the mechanisms of neuroplasticity induced by physiotherapy may optimize treatments of multiple sclerosis (MS).

Methods: Twelve people with MS participated a two-month physiotherapeutic programme (motor programs activating therapy), for 1 hour, twice per week. Before the beginning and after the end of the therapeutic programme standardized tests evaluating the clinical functions and the monitoring of functional magnetic resonance (motor and cognitive task) was done. The results of functional magnetic resonance were further compared with the results of group of healthy volunteers. The data were analysed by paired and two-sample t tests, p values were adjusted for multiple comparisons using Bonferroni correction.

Results: Concerning clinic tests, the results of patients have improved after the therapy. In functional magnetic resonance statistics the earlier start and change of a curve progress of brain activation during cognitive task was discovered, which portrays improving speed of processing information at multiple sclerosis disordered. During motor task, we found the decrease of the strength of effective connectivity after therapy on fMRI.

Conclusion: Motor programs activating therapy had significant effect on several clinical functions. These changes were accompanied by changes on fMRI during both cognitive and motor task. However, the interpretation of fMRI changes is very difficult.
Title: WalkAide - Experiences with a multidisciplinary model for testing, adjustment and follow-up

Authors: Jones KØ¹, Smedal T¹,²

Affiliations: ¹Department of physiotherapy, Haukeland University Hospital, ²Norwegian Multiple Sclerosis Competence Centre, Department of Neurology, Haukeland University Hospital

Background: WalkAide (WA) is an electrical device designed to improve walking for people with drop-foot caused by central nervous lesions e.g multiple sclerosis (MS). There was a need for a structured model and a systematic way to evaluate whether WA seemed applicable for our patients.

Methods: Patients considered relevant for WA were referred by a neurologist (2010-2012) for two short day-hospital stays. During the first stay a physiotherapist (PT) and an orthotist (CPO) cooperated to ensure best combination of walking analysis and knowledge in technical opportunities. PT evaluated gait, motor, sensory and cognitive functions, and a decision was made together with the patient. Eligible patients returned after one month for a second stay to get and adjust WA together with the PT and CPO. Timed Up and Go (TUG), 10-metre timed walk (10MTW) and 2-min walk test (2MWT) were recorded without and with WA. Patient Global Impression of Change (PGIC) after using WA was reported. The patients were followed up by the CPO at one and 3 months, and thereafter every 6 month. PT was contacted when necessary.

Results: 29 out of 44 were considered relevant for WA. Testing results without and with WA: TUG (n=23): 12.07 and 11.27 sec. respectively (p=0.028). 2MWT (n=21): 123 and 132m respectively (p=0.010). 10MTW (n=23): 11.27 and 10.16 sec. respectively (p=0.020). PGIC (n=25): 6 reported minimal-, 18 much- and 1 very much improved.

Conclusions: We find this model appropriate. Patients, who received WA, seemed to benefit. We aim to include a three-month PT follow-up.
Title: Outcomes and Outcome Measures of Physical Activity and Exercise Interventions for Persons with Multiple Sclerosis

Authors: Tzschoppe R., Peters S., Tallner, A., Pfeifer, K.

Affiliations: Institute of Sport Science and Sport, Friedrich-Alexander University Erlangen-Nürnberg (Germany)

Background/Objective: Diverse positive effects of physical activity have been reported for persons with multiple sclerosis (pwMS) but current secondary analysis report heterogenic study characteristics to draw definite conclusions about specific effects, exercise recommendations etc. The goal of this study is to analyse outcomes and the homogeneity of outcome measures plus characteristics of physical activity/exercise interventions for pwMS.

Methods: The search strategy comprised a systematic search in Medline (via Pubmed), Scopus and the Cochrane Library to identify published literature in English or German language from 1980 to 2012. The snowball principle was applied to identify additional articles.

Results: Walking, muscle functions and fatigue are the most common outcomes but up to 50% of all outcomes lack a clear prioritization. Overall, outcomes regarding body functions and structures are the most examined outcomes. Furthermore, the applied outcome measures show a high heterogeneity, e.g. for balance 15 different outcome measures are recorded. Most frequent interventions are resistance and endurance training or a combination of both which cover a time span of 2 to 26 weeks (most frequently 4 to 12 weeks). Mostly persons with relapsing remitting MS were investigated, although in 50% of all analysed studies the disease type was not specified. Most studies included pwMS with an EDSS range from 2 to 5.

Conclusions: This work gives an overview of the existing physical activity/exercise interventions for pwMS and builds a quantitative basis for the development of future research activities. There is a need for a common language regarding outcomes, an extension to relevant activity/participation outcomes, a critical analysis of applied outcome measures. Further, the reporting quality regarding population, intervention and outcome characteristics hast to be improved to enhance comparability between studies and advance translation of results into clinical practice.

Key words: multiple sclerosis, physical activity, exercise, outcome, outcome measure
Title: Effect of 12 minutes treadmill walking on spatio-temporal gait characteristics in persons with multiple sclerosis.

Authors: Hannes D., De Rijck J., Feys P., Severijns D.

Affiliations: REVAL - Rehabilitation Research Center, U Hasselt, Belgium
Rehabilitation and MS Centre Overpelt, Belgium

Introduction: The gait pattern is altered in persons with multiple sclerosis (PwMS). Sacco et al (2011) found a decrease in gait speed, step and stride length and cadance, which has been confirmed by several other researchers. Another frequent symptom in MS is fatigue, which can relate to both the cognitive and physical/motor domain. It is clear that motor fatigue can have an impact on gait characteristics in MS (Phan-Ba 2011, Feys et al 2013). With our investigation we would like to point out: 1) the influence of a (sub) maximal 12 minute walking test on a treadmill on the spatial and temporal gait characteristics in MS, 2) if these changes occur gradually, or is there rather a sudden change in gait.

Methodology: Thirteen ambulatory persons with MS with FAC above 1.5 and HAI below 6 were included in the Rehabilitation and MS Centre of Overpelt. During the first test day, participants had an habituation session on the c-mill. Comfortable speed was set during this session. On the second test day, participants had to walk for 12 minutes on the c-mill, at 120% of their comfortable speed. Every 2 minutes, mean spatiotemporal data were collected as well as instant heart rate and BORG score. Spatiotemporal data were: step length, contact time, step width, step frequency and percentages of sway-, support and double support phase. Pre- and post we documented overground similar gait parameters using the GAITRite Walkway System as well as muscle strength and spasticity for lower extremities.

Data are currently being processed.
1.30 - Quality of movement – does it matter and can we change it?

Tori Smedal

Haukeland University Hospital, Norway

The presentation raises a discussion regarding quality of movement, compensatory strategies, skilled training/specificity, and training/exercises. The presentation will be based on the ICF model, knowledge of neuroplasticity and multidisciplinary rehabilitation.

Neuroplasticity is the basis for learning, and learning is an essential component of brain adaptation to brain damage: “You learn what you do”. I claim that how movement is performed is an issue. One behavioral consequence of brain damage is that individuals develop compensatory behavioral strategies to perform daily activities in the presence of loss of function. Such spontaneous and self-taught behavioral changes can be adaptive and major contributors to functional outcome. However, they can also be maladaptive, and interfering with improvements in function that could be obtained using rehabilitative training. We do not know which rehabilitative training leads to the best result. Kleim and Jones (2008) discuss that rehabilitative training should among others, focus on skilled training and specificity, in addition to repetition and intensity. In the presentation, the physiotherapist’s role will be discussed, as part of the multidisciplinary team, emphasizing the physiotherapist’s contribution of understanding movement analysis and motor control. Especially the rationale for focusing on trunk control and core stability as basis for all voluntary motor skills are discussed and exemplified with results from different studies. If we say that the importance of quality of movement has not been sufficiently documented, and that quality of movement therefore doesn’t matter, I am afraid that we are in the risk of “Throwing the baby out with the bath water”.
2.00 - Promoting Exercise and Physical Activity in the Community

Lorna Paul,
University of Glasgow

This presentation will provide an overview of a series of studies undertaken to evaluate the effects of exercise programmes for people moderately to severely affected by MS.

The first study was an evaluation of eight weeks of home based physiotherapy for people moderately to severely affected by MS (EDSS 6.5-8.0). The results showed that, compared to the control group, the intervention group has some improvements in MSIS-29, MS Symptom Checklist and muscle strength. The control group showed some deterioration in function (10m walk). However the physiotherapist travelled 3540 km to deliver the programme to 15 patients.

The second study was an evaluation of an MS specific exercise class (EDSS 5.0-6.5). The class consisted of aerobic, resistance and balance exercises and was delivered in local leisure centres. The intervention group (n=15) showed improvement in physical activity, balance and strength with no detrimental effect on fatigue compared to the control group (n=15). However a number of people were unable to access the class for a variety of reasons and so we developed the third study which was an evaluation of 12 weeks of individualised web based physiotherapy. Each exercise page consists of a video of the exercise, text and exercise diary. The physiotherapist can remotely view progress and alter the programme. Result showed improvements in MSIS-29, MS Symptom Checklist, TUG and balance. Patients liked the flexibility offered by the web based system.

Overall these studies show physiotherapy led exercise has benefits in MS regardless of the model of delivery. Deterioration over time in the control groups suggests that exercise programmes may ‘maintain’ the physical ability of people with MS.


Title: Feasibility of cardiopulmonary exercise testing in patients with multiple sclerosis

Authors: Martin Heine¹, Erwin LJ Hoogervorst², Hub GA Hacking² and Gert Kwakkel¹,³

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2) Multiple Sclerosis Center, St. Antonius Hospital, PO Box 2500, 3430 EM Nieuwegein, The Netherlands
3) Department of Rehabilitation Medicine, MOVE Research Institute Amsterdam, VU University Medical Center, De Boelelaan 1117, 1081 HV Amsterdam, The Netherlands

Background: Cardiopulmonary exercise testing (CPET) can be considered the gold standard for the assessment of physical fitness. CPET is rarely used in MS, as non-disease- and disease-related factors may limit its feasibility in MS.

Objective: To determine the feasibility of CPET in patients with MS and identify factors that predict the ability to match predicted peak oxygen uptake (pVO₂peak).

Methods: CPET was conducted and outcome predicted in 45 patients with MS. Logistic regression analyses were used to identify factors predicting the ability to match pVO₂peak.

Results: Age, neurological disability (Expanded Disability Status Scale (EDSS)), pyramidal function, rating of perceived exertion (RPE) and ambulation were significant bivariate predictors of the ability to match pVO₂peak. RPE, EDSS and pyramidal function were included in the multivariate logistic regression model. A score of 1.0 on the pyramidal function subscale of the EDSS was established as the cut-off value to differentiate between patients who are or are not able to match pVO₂peak.

Conclusion: The present findings suggest that using CPET as measure of physical fitness is feasible in MS patients with absent or low degree of pyramidal dysfunction.
Endurance training is feasible in severely disabled patients with progressive multiple sclerosis

Skjerbæk AG, Næsby M, Lützen K, Møller AB, Jensen E, Lamers I, Stenager E and Dalgas U

The MS-Hospitals in Ry and Haslev, Denmark. Department of Public Health, Section of Sport Science, Aarhus University, Denmark. Department of Neurology, Soenderborg Hospital, Denmark. Institute of Regional Health Services, University of Southern Denmark. Biomedical Research Institute, University of Hasselt, Belgium.

Background: Research on the effects of exercise therapy in severely disabled (EDSS >6.0) patients with progressive multiple sclerosis (PMS) is deficient.

Objective: The purpose of the present pilot study was to evaluate whether upper body endurance training (ET) is 1) safe and tolerable and 2) can be executed at a sufficient volume and intensity to expectedly induce cardio-vascular adaptations over time.

Methods: Eleven PMS patients (6.5≤EDSS≤8.0) were randomized with respect to gender to either a control group (n=5, 4F/1M, 55.2±8.2y, 169.0±10.3cm, 84.5±20.5kg, 3SP/2PP, EDSS: 7.3±0.6) or to an intervention group (n=6, 4F/2M, 62.0±5.8y, 172.3±8.7cm, 71.9±6.3kg, 5SP/1PP, EDSS: 7.0±0.4). Both groups received a four week inpatient programme with individualized MS rehabilitation and within same period the intervention group also completed 10 sessions of upper body ET, consisting of six 3 minute intervals at a heart rate corresponding to 65-75% of VO2-peak. All ET sessions were performed using fitness equipment designed for persons with reduced leg function (sitting crosstrainer, Monark arm ergometry and arm/leg ergometry).

The primary outcome measures of this feasibility study were tolerance to ET (in terms of drop out rate, adherence and adverse events) and training quality (in terms of exercise intensity and volume). Before and after the four week intervention period all patients completed VO2-peak testing (incremental arm exercise test performed on a Monark Ergomedic 834E bicycle ergometer), tests of physical function (9 hole peg test, hand grip strength, Box and Block test and 6 minute wheelchair test) and fulfilled questionnaires on depression, disease impact and fatigue (MDI, MSIS-29, FSMC).

Results: One patient from the EXE group was excluded from the analysis, because the patient had to be hospitalized during the intervention due to a throat infection unrelated to the ET intervention, giving a drop-out rate of 1/6~17%. No adverse events were recorded during the EXE intervention. Participants in the EXE group completed on average 9.3±0.8 sessions of the planned 10 sessions (~96.0±5%).

An average heart rate of 93.9±9.3 beats*min^-1 were sustained during the ET sessions corresponding to 91.6±6.8% of the maximal pre-intervention heart rate. An average Borg score of 14.6±1.7 were registered during the exercise sessions.

Four of five participants in the EXE group showed improved VO2-max, while none of the participants in the CON group showed improvements. Comparison of the changes (EXE: 308±312ml O2/min vs. CON: 2±30ml O2/min) in VO2-max showed that the two groups differed (p=0.046). When changes in all other measures of physical function and questionnaires were compared no significant group differences were found.

Conclusion: ET is feasible and safe in severely disabled patients with MS and ET can be performed at sufficient intensity to induce increases in VO2-max.
Title: Effects of an 1-day education program on physical functioning, activity and quality of life in community living persons with Multiple Sclerosis

Authors: Peter Feys (1), Katrien Tytgat (2), Domien Gijbels (1), Luc de Grootte (2), Ilse Baert (1), Paul Van Asch (3)

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2 MS Society Flanders  
3 Fit Up, fitness and physiotherapy center Kontich, Belgium

Background: Persons with MS (pwMS) in the community show reduced physical activity while studies demonstrated beneficial effects of exercise therapy in supervised settings.

Objective: This study investigated, in pwMS living in the community, the effects of a 1-day education program about exercises and sports, on physical activity behavior and related outcome measures as self-efficacy, perceived walking ability, fatigue, perceived impact of MS and quality of life.

Methods: PwMS attended an education day with theoretical and practical sessions that was organized by the Flemish MS Society and professional exercise experts. Forty-two participants immediately completed questionnaires as well as after three and six months. Overall disability and physical activity level were measured using PDSS (patient determined disease steps) and PASIPD (Physical Activity Scale for Individuals with Physical Disabilities) respectively. Other outcomes were the ESES, MSWS-12, MFIS, MSIS-29 and SF-36. Analyses of variance were performed in groups distinguished by self-reported disability level (PDDS ≤1; n=24 and PDDS >1; n=18).

Results: Groups differed significantly for perceived walking ability (PDDS, MSWS-12) and physical related-domains of MSIS-29 and SF-36, but not PASIPD. A trend towards significant group*time interaction effect was found for the PASIPD indicating, at 3 and 6 months, increased physical activity in the subgroup PDDS ≤1. For the MSIS-29, a significant time effect was found with reduced impact being largest for the more disabled group at 6 months. No changes were found in other outcome measures.

Conclusion: An one-day education program had, depending on perceived disability level, some long-standing effects on physical activity and perceived impact of MS.

Work will be published in ‘Neurorehabilitation’ (2014)
Poster presentations

Title: Changes in walking, spasticity and muscle strength during relapse and after recovery in patients with multiple sclerosis - preliminary study

Authors: Siiro M, Taalfeld K, Maamägi H, Toots M, Kannel K, Reitsnik A, Sorro U, Gross-Paju K.

Affiliations: MS Centre, West Tallinn Central Hospital, Estonia

Reduced walking speed, muscle weakness and spasticity are common features Multiple Sclerosis (MS).

Goals: To measure changes in walking ability, muscle weakness and spasticity in patients experiencing MS relapses.

Methods: 120 patients with relapsing-remitting MS were recruited from April 2010. 6 minute walk test (6MWT), muscle strength using Manual Muscle Testing and spasticity measured by Modified Ashworth Scale. All relapses were treated with 5g of methylprednisolone. All parameters were recorded during relapse, after the first IVMP drip, after the 5th drip, 1 month and 3 months after the relapse.

Results: There was statistically significant improvement in 6MWT during relapse compared to other measured drip times (p=0.0001).

Statistically significantly spasticity was reduced during relapse compared to first drip of plantarflexors in both legs (p<0.05) and knee extensors of left leg (p<0.05). Spasticity was statistically significantly reduced in plantarflexors on left leg (p<0.0001) and right leg (p<0.001) and knee extensors on left leg (p<0.05) after 5th drip. After 1 and 3 months spasticity was statistically significantly reduced in plantarflexors (p<0.05).

Muscle strength improved statistically significantly as compared with relapse and after first drip, 5th drip and 1 month in hip flexion and dorsiflexion on both legs (p<0.0001). Statistically significant improvement was after 3 months in dorsiflexion (p<0.001) and hip flexion on right leg (p<0.0001) and on left leg (p<0.001).

Conclusions:

1. Statistically significant improvement was seen with 6MWT already after the 1st IVMP and was sustained at the same level on 3 months visit.
2. Spasticity reduced comparing relapse and other measured drip times on the calf muscles in both legs.
3. Muscle strength improved comparing relapse and after first IVMP, 5th drip and 1 month in both movements and both legs.
Title: Evaluation of the rehabilitation technique ‘Abdo-MG’ (Luc Guillarme) as part of the bowel management in the treatment of constipation and evacuation problems in Persons with MS.

Authors: Oosterlinck.C; Vermeulen. C; Janssens. A; Gebara. B

Affiliations: NMSC, Melsbroek, Belgium

Abstract Body: The main goal of the study is to make a preliminary assessment of the effectiveness of the ABDO-MG® in the treatment of constipation and stool evacuation problems in PwMS.

The ABDO-MG® is a specific abdominal method, using expiration, rehabilitation of the abdominal girdle and pelvic floor awareness in service of functional rehabilitation.

Thereby, the Winnerflow®, a small, non-invasive instrument is used to train and control the expiration. A combined external stimulation device gives stimulation of the abdominal muscles and feedback of the quality of breathing.

Our intent is a controlled trial study, with a treatment and control group.

We would focus on the treatment group (the method ABDO-MG® requires a specific training program), while other centers could focus on the control group who are given tips and advice.

We provide a standardized information brochure and the informed consent form. The patients are followed and tested during 3 weeks. All patients are tested before and after these 3 weeks on abdominal muscle strength and expiratory force, together with the Constipation Score system and a VAS on their QoL regarding the influence of bowel and bladder problems on their life. The patients need to fill in a diary during these 3 weeks. This diary contains 9 items that need to be filled in every day, during these 3 weeks.

We would be gather and process all data.

As first results of this method seem promising, we do hope that we can work together.
Title
SPATIO-TEMPORAL GAIT PARAMETERS CHANGE DIFFERENTLY ACCORDING SPEED INSTRUCTIONS AND WALKING HISTORY IN MS PATIENTS WITH DIFFERENT AMBULATORY DYSFUNCTION

Authors
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² Rehabilitation and MS Center Overpelt, Belgium

Background:
Different walking capacity test formats are applied, but their impact on the gait pattern in persons with MS (pwMS) has not yet been investigated according to baseline velocity performance.

Objective:
To assess, in pwMS with different ambulation dysfunction, the impact of speed instructions and previous walking tests (2 and 6 minute walking test; 2MWT and 6MWT) on spatiotemporal gait parameters.

Methods:
27 participants, divided in three groups based on usual gait speed (Most Limited Community Walkers; MLCW<0,82m/s, CW>1,14m/s, LCW show intermediate values), completed the 2MWT and 6MWT. Before and after each test, they walked on the GAITRite walkway system at both usual and fastest speed. Spatio-temporal gait parameters were measured and analyzed with ANOVA.

Results:
All gait parameters in the MLCW were significant different from other groups. In contrast to the MLCW, the LCW and CW subgroup showed greater velocity in the fastest compared to usual speed condition, associated with a significant increase in cadence and step length. After the 6MWT, small changes in cadence at usual speed and step time at fastest speed were observed in the MLCW subgroup only. No impact of the 2MWT on gait parameters was found in any group.

Conclusions:
The ability to accelerate was dependent on the severity of ambulatory dysfunction. Prolonged walking during the 6MWT has, in contrast to the 2MWT, some impact on gait parameters in the most disabled group only.

Work will be published in ‘Multiple Sclerosis and Related Disorders’ (2013)
Case study- Does physiotherapy intervention have the potential to lead to improvements in self-efficacy, balance, functional walking capacity, mobility, perceived walking ability and perceived impact of disease in People with Multiple sclerosis?

Authors: E. Ross

Affiliations: St. James's Hospital, Dublin 8

Background: A 52 year Irish male (JM) with a 15 year history Relapse-Remitting Multiple Sclerosis (MS) was referred for a physiotherapy consultation. Prior to this referral, JM had refused previous physiotherapy appointments. JM undertook an initial physiotherapy assessment. Various impairments relating to body structures were identified resulting in significant difficulties with JM's abilities and participation levels. Baseline berg balance scale and MS impact scale-29 scores were also recorded. Multidisciplinary team discussions were held with JM, around formalizing treatment goals and plans. JM undertook a 4-week period of outpatient physiotherapy (Intervention 1(I1)). Re-evaluation of treatment goals and outcome measures were completed post I1. Following on from I1, JM undertook a different treatment approach (Intervention 2(I2)) and completed a battery of other outcome measures pre and post I2 (MS walking scale (MSWS-12); Balance evaluation systems test (BESTest); MS self-efficacy scale (MSSES); Six minute walking test (6MWT); Modified Fatigue impact scale (MFIS)). I2 consisted of an eight week MS exercise classes incorporating aerobic, strengthening, balance and the Nintendo WII fit®. I2 also included techniques promoting self-efficacy. Formal improvements in JM's self-efficacy, balance, functional walking capacity, mobility, perceived walking ability and perceived impact of disease were demonstrated post I2. JM also reported being independent with his home exercise program after initial intervention and at 1 year follow up.

Physiotherapy intervention may have the potential to lead to improvements in self-efficacy, balance, functional walking capacity, mobility, perceived walking ability and perceived impact of disease in people with MS.
Title: A study of the correlates of Physical Activity in Multiple Sclerosis: an investigation into the relationship between both objective and patient reported measures with physical activity.

Authors: John Allen, Dr. Susan Coote

Affiliations: University of Limerick, Ireland

Background: Although there are many benefits for physical activity (PA) in the Multiple Sclerosis (MS) population, overall levels of PA remain low. Many studies like this one aim to identify the possible reasons for such low levels. The aim of this study was to investigate possible correlations between levels of PA and objective outcome measures; The Berg Balance Scale (BBS), The 6 Minute Walking Test (6MWT), as well as patient reported outcome measure; Exercise Self-Efficacy Scale (EXSE), Modified Fatigue Impact Scale (MFIS), Hospital Anxiety and Depression Scale, Multiple Sclerosis Impact Scale (MSIS), Guy’s Neurological Disease Scale (GNDS) and the Illness Perception Scale (IPQ-R).

Method: This cross-sectional study had 19 participants complete the above outcome measures over two days. Levels of PA were measured using SenseWear Armbands (SWA), which each participant wore for the seven days between testing. SWA data were examined for measures of PA (step count and energy expenditure) which was used for correlation analysis with the above outcome measures.

Results: There was a strong correlation between energy expenditure and depression (r=.5, p=0.029) and IPQ-R’s Timeline (r=0.540, p=0.017). A strong correlation existed between step count and 6MWT (r=.553, p=0.014), a strong, negative correlation with MSIS’s physical aspect (r=-0.513, sig=.025), while the strongest correlation was with BBS (r=.544, p=0.014).

Conclusions: Although strong correlations were detected, unusual direction of relationship between depression and PA was found, as well as weak correlations between PA and measures like EXSE, MFIS and GNDS. Results to be interpreted with caution as limitations existed within this study.

Multiple Sclerosis; Physical Activity; Correlates
Title: The Impact Bladder Dysfunction has on Participation in a Meaningful Life for People with Multiple Sclerosis.

Authors: Emma-Louise O’ Regan, Dr. Maria Garrett

Affiliations: University of Limerick, Ireland

Background: Prevalence of bladder dysfunction in multiple sclerosis (MS) is frequently cited at approximately 75% (Fowler et al 2009). The impact of urinary symptoms on daily life can be distressing. Studies have shown increased psychosocial burden and the impact on quality of life. However no study has looked specifically at the impact on participation, in an Irish population of people with MS (pwMS). To understand the impact of bladder symptoms on participation in pwMS and explore compensatory strategies used to participate in meaningful activities.

Method: Participants had at least one bladder symptom and a definite diagnosis of MS. Six semi-structured interviews were audio-recorded, transcribed verbatim, coded using NVivo and subject to thematic analysis.

Results: Analysis revealed two themes; ‘Barriers to Participation’ and ‘Facilitators to Participation’. Barriers were expressed at impairment and personal level. Under impairment, triggers and intensity of bladder symptoms restricted participation in meaningful activities. At a personal level, embarrassment was expressed. Facilitators involved an environmental facilitator; intermittent self-catheterisation and personal facilitators; family, attitude, self-management and normalising symptoms.

Conclusions: Findings suggest bladder symptoms restrict participation in activities outside of home and pwMS use strategies to overcome this. Future research should explore if findings are applicable in a broader population. Research is needed on the role of healthcare professionals (HCPs) in reducing the impact of bladder symptoms on participation in meaningful activities. HCPs need awareness of the impact on participation; therefore must routinely ask pwMS about bladder symptoms, so they can assist with management strategies and ensure appropriate intervention.
Title: The Current Management of Bladder Dysfunction in Multiple Sclerosis: The Patient’s Perspective.

Authors: Bláthín Casey, Dr. Maria Garrett.

Affiliations: University of Limerick, Ireland

Background: The treatment and management of bladder dysfunction in Multiple Sclerosis (MS) remains an unmet need for the estimated 80% of people with MS (PwMS) with bladder dysfunction (Nakipoglu et al. 2009), despite recent advances in recommended guidelines (Fowler et al. 2009). The aim of this study was to gain an insight into the current management of bladder dysfunction in MS from the patient’s perspective in an Irish community.

Method: Seven individual semi-structured interviews were conducted with PwMS with known bladder problems. Interviews were audio-recorded, transcribed verbatim and thematic analysis was performed using a qualitative software package, NVIVO 10.

Results: Two themes emerged from the data which illustrated the current management of bladder dysfunction in MS in an Irish community. Theme 1, ‘Self-management’, represents the ideal of people who rely mainly on self-management strategies, whether these are ineffective or effective. Theme 2, ‘Seeking Help’, focuses on the role of the healthcare professional (HCP) in managing bladder dysfunction in MS. The main question answered is whether or not participants are reporting symptoms to a HCP and thus seeking help. Results suggest the dominance of a self-management approach with only two participants in this study reporting symptoms to a HCP.

Conclusions: There is an evident gap between the recommended guidelines for the management of bladder dysfunction in MS and how these guidelines are implemented. There is a need for guidelines that allow effective implementation. Future research should aim to observe the current management form the HCP’s perspective and further generalise the results of this study.