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Sustained attention during prolonged walking in persons with multiple sclerosis

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Introduction: Walking is a cognitively demanding activity, as has been shown in long-distance assessments. It is known that there is often a decrease in walking speed during long-distance walking in persons with multiple sclerosis (pwMS) which could be related to reduced sustained attention while performing simultaneously performing a prolonged motor task (i.e., long distance walking task).

Objective: This study investigated sustained attention during prolonged walking in pwMS with different levels of disability and compared it with healthy controls (HC).

Methods: Thirty pwMS with mild disability (EDSS < 4.0), 16 pwMS with moderate to severe disability (EDSS 4.0-6.5), and 27 age-gender matched HC performed the 6-Minute Walk Test (6MWT) with an auditory vigilance task. Participants were auditory provided a letter every 2.5s through a headphone and were instructed to say "yes" as fast as possible when they heard one of two selected letters (L and R) and asked to not respond on other letters to assess vigilance. The number of errors and average reaction time in the vigilance task, and distance walked per minute were measured. Distance Walked Index (DWI; change in walking distance between min 1 and min 6) was calculated to determine walking fatigability. Repeated measures ANOVAs (RMANOVAs) were conducted on each outcome variable with post-hoc corrections.

Results: Significant group*time interaction effects were found for reaction times. Reaction times significantly increased in persons with mild disability and moderate to severe disability groups, with greater increase in pwMS with moderate to severe disability (13.22%). There was no change in reaction time between min 1 to min 6 in HCs. Significant time effects were found for walking distance and number of errors, but there was no group*time interaction. The DWI was not different between mildly disabled pwMS and HC (-10.22% vs. -6.54%), but those with moderate to severe disability showed a significantly greater change (-20.59%) than mildly disabled pwMS.

Conclusion: Our findings showed that attention and walking speed deteriorated over time during the six minutes of walking, especially in pwMS with higher disabilities. Change in sustained attention may explain the decrease in walking speed, and it should be further examined.

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RIMS - (Tele)Rehabilitation (physical, neuropsychological and psycho-social approaches)

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Sleep quality and fatigue is independent phenomena and show different treatment response to multidisciplinary rehabilitation - The Danish MS Hospitals Rehabilitation Study

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Introduction: Sleep disturbances and fatigue are highly prevalent symptoms in patients with multiple sclerosis (MS) known to have detrimental effects on overall functioning and health-related quality of life. However, the multifactorial relationship between these phenomena is not fully understood and effective treatment strategies counteracting the disabling consequences are warranted.

Objectives: To investigate the relationship between sleep quality and fatigue and the treatment response to multidisciplinary rehabilitation (MDR) in an appropriate sample of patients with MS.

Aims: To optimise treatment of some of the most prevalent and disabling MS symptoms.

Methods: As part of The Danish MS Hospitals Rehabilitation Study 405 patients with MS were included in a randomized controlled partial crossover design. Patients were randomly assigned to 4 weeks of inpatient MDR or a waitlist group. Following the 6-month follow-up, the waitlist group received the 4 weeks of inpatient MDR, and all patients were followed up at month 12. Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI) and fatigue impact by the Modified Fatigue Impact Scale (MFIS). Principal Component Analysis (PCA) were conducted to investigate component loadings and repeated measurement linear mixed effects models were applied to get estimates of difference-in-difference at 6- and 12-month follow-up (MFU).

Results: PCA loadings revealed two separate components of sleep issues and fatigue with limited overlap, suggesting that sleep quality and fatigue are independent phenomena. 4-weeks of inpatient MDR decreased the perception of fatigue-impact when compared to control (6 MFU mean (95 % CI): -2.3 (-0.4;-4.1), $p=0.02$, and 12 MFU mean (95 % CI): -2.3 (-4.7;-0.1), $p=0.04$), while a pattern of improvement was observed for sleep quality (6MFU mean (95 % CI): -0.49 (-1.0;0.02), $p=0.06$, and 12MFU mean (95 % CI): -0.44 (-1.07;0.17), $p=0.15$). The latter was however driven by the one sub-component of the PSQI that loaded into the fatigue principal component, suggesting that sleep quality may not be specifically improved by the MDR.

Conclusions: Sleep quality and fatigue seem to be independent phenomena with different treatment responses to a pragmatic inpatient MDR intervention, suggesting that specificity is important in order to optimise treatment of these disabling MS symptoms.