

## Press release

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### Basic information

Name: Jacob Callesen      Email: [jlcl@ph.au.dk](mailto:jlcl@ph.au.dk) Phone: 28700093

Department of: Public Health

Main supervisor: Associate Professor, Ulrik Dalgas

Title of dissertation: The impact of muscle strength and balance on gait performance in multiple sclerosis – effects of functional balance or progressive resistance training

Date for defence: 25/10 2019 at (time of day): 12.00 Place: Auditorium 11.05, VIA University College, Hedeager 2, 8200 Aarhus N

Press release (Danish)

Betydning af muskelstyrke og balance for gangfunktion hos personer med multiple sklerose.

Nedsat gangfunktion angives som en af de mest betydningsfulde gener som følge af multiple sklerose. Det er kendt at både muskelstyrke og balance har betydning for gangfunktionen. Derfor anvendes både styrketræning og balancetræning i rehabiliteringen hvor det for begge interventioner er et mål at bevare eller forbedre gangfunktionen. Den relative betydning af muskelstyrke og balance er kun sparsomt undersøgt. Endvidere er styrketræning og balancetræning, trods fælles mål på mange områder, modsatrettede. Hvor styrketræning inducerer en stor belastning på muskler og nerver med en samtidig begrænset belastning af den kognitive aktivitet relateret til koordination, er det modsatte gældende for balancetræning. Undersøgelsens primære formål var derfor at undersøge betydningen af henholdsvis styrke- og balancetræning for gangfunktion hos en population med multiple sklerose. Metoden inkluderede ti ugers træning af enten muskelstyrke eller balance. Resultaterne bekræftede at muskelstyrke og balance har betydning for gangfunktion men også at forbedring af balance og koordination synes at have en større indflydelse på gangfunktionsniveau sammenlignet med forbedring af muskelstyrken. Dette var både gældende for ganghastighed ved normal gang og i mere komplekse mønstre og understreger betydningen af specificitet og et heraf følgende funktionelt fokus i rehabiliteringen af denne patientgruppe.

Ph.d.-projektet er gennemført ved Aarhus Universitet, Health af Jacob Callesen, der forsvare det d. 25/10

Forsvaret af ph.d.-projektet er offentligt og finder sted den 25/10 kl. 12.00 i 11.05 auditorium, VIA University College, Hedeager 2, 8200 Aarhus N. Titlen på projektet er "Betydning af muskelstyrke og balance for gangfunktion hos personer med multiple sklerose.". Yderligere oplysninger: Ph.d.-studerende Jacob Callesen, [jlcl@ph.au.dk](mailto:jlcl@ph.au.dk), tlf. 87552330.

Bedømmelsesudvalg:

Professor, Claus Vinther Nielsen, PhD - chairman of the committee and moderator of the defence  
Section of Clinical Social Medicine and Rehabilitation, Department of Public Health, Aarhus, Denmark

Associate Professor, Ylva Nilsagård, PhD

Health Care Management, Faculty of Medicine and Health, Örebro University, Sweden

Docent, Uffe Laessoe, PhD

Department of physiotherapy/Research and Development  
University College of Northern Denmark, Aalborg, Denmark

Press release (English)

## The impact of muscle strength and balance on gait performance in multiple sclerosis

Gait impairment is one of the main complaints in persons with multiple. It is recognized that both muscle strength and balance affect gait function. Consequently, strength training and balance training are frequently applied in rehabilitation for the shared aim of preserving and improving gait function. The relative contribution of muscle strength and balance to gait performance has only been sparsely studied. Furthermore, resistance training and balance training are despite the shared aim highly divergent in their approach to training. Where resistance training induces a heavy load on muscles and motor neurons with a same time limited load on the cognitive processing related to coordination, the opposite applies for balance training. The primary aim of the present dissertation was therefore to investigate the impact of strength training and functional balance training on gait function in a population with multiple sclerosis. The method included ten weeks of either resistance training or functional balance training. The results confirmed that strength and balance are associated with gait performance, but also that improvement of balance and coordination seems to have a greater impact on functional performance compared to improvement in muscle strength. This applies for both gait speed in forward walking and walking in patterns that are more complex and underlines the importance of specificity and subsequently a functional approach in rehabilitation. The project was carried out by Jacob Callesen, who is defending his dissertation on 25/10.

The defence is public and takes place on 25/10 at 12.00 in 11.05 auditorium, VIA University College, Hedeager 2, 8200 Aarhus N. The title of the project is The Impact of Muscle Strength and Balance on Gait Performance in Multiple Sclerosis . For more information, please contact PhD student Jacob Callesen, email: jlcl@ph.au.dk, Phone +45 2870 0093.

Assessment committee:

Professor, Claus Vinther Nielsen, PhD - chairman of the committee and moderator of the defence  
Section of Clinical Social Medicine and Rehabilitation, Department of Public Health, Aarhus, Denmark

Associate Professor, Ylva Nilsagård, PhD  
Health Care Management, Faculty of Medicine and Health, Örebro University, Sweden

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