Increased muscle power generation and absorption improves walking speed in persons early post stroke
– A pilot study

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Introduction
• Stroke patients have decreased walking capability and walking speed compared to healthy controls
• Gait kinematics and kinetics are decreased in both limb compared to healthy controls
• Descriptive studies have reported highly positive correlations between power variables in sagittal plane (Hip: H1-S, H3-S; Knee: K3-S; Ankle: A2-S) and in frontal plane (Hip: H3-F) and in walking speed. This is reported both in the non-impaired side (NS) and in the impaired side (IS)
• Few intervention studies have shown an increase in H1-S on both sides and A2-S on IS chronic stroke patients (> 6 month) together with an increase in walking speed
• No causal relationship between the presented power variables and walking speed has been evaluated in subacute stroke patients

Hypothesis
• Muscle power generation and absorption peak during gait (H1-S, H3-S, K3-S, A2-S and H3-F) increase in both limb when walking speed increases in subacute stroke patients

Materials and Method
• Inclusion: Subacute stroke patients (< 3 month; middle cerebral artery) With a walking speed less than 0.5 m/s with or without support by a stick
• Intervention: Three weeks of gait training in a body weight supported treadmill assisted by a robotic orthosis followed by three weeks of conventional gait rehabilitation
• Power variables were collected in a 3D gait analysis lab (Vicon Motion lab, V612) at inclusion and after six weeks
• Changes in variables were visually examined at graphs for differences at baseline and after intervention

Results
• A median improvement of 0.39 m/s (range: 0.34–0.76 m/s) in walking speed was seen after gait training
• Power variables increased with improvement in walking speed
• Power graphs of one participant are shown in figure 1-8

Conclusion
• Muscle power generation and absorption at specific phases of gait cycle might corresponded to walking speed in stroke patients
• Results indicate a need to test this study’s hypothesis in a larger study population