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Perceptual Sensitivity to Changes in Self-Paced Maximal Walking Speed During the Six-Minute Walk Test in Individuals With Multiple Sclerosis and Healthy Controls: Preliminary Results

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Introduction: People with multiple sclerosis (PwMS) walk slower than their healthy peers and report more negative experiences associated with walking. Perception of walking performance integrates sensory inputs about performance and body-homeostasis, but is inferential: prior beliefs are confronted with sensory inputs to compute precision-weighted updates and lower prediction errors over time. In PwMS, imprecise inputs may lower perceptive sensitivity during motor tasks with the risk of maladaptive behaviors such as slow walking speed and dysfunctional gait patterns. Tests like the 6-minute walking test (6MWT) assess motor capacity, and objective parameters such as gait speed variability may reflect movement quality. In addition, task-specific perceptual abilities that could help inform rehabilitation strategies remain unknown.
Objectives/Aims: The aim of the study was to examine perceptive sensitivity for performance variations in PwMS and healthy controls (HC), with a focus on the perception of gait speed during the 6MWT.
Methods: Eight mildly-disabled PwMS (median age: 39 IQR: 34-44,5 ; median EDSS: 3) and 8 HC (median age: 31 IQR: 28-31) were included. They performed an instrumented (6 wearable inertial measurement units) 6MWT at maximal speed in silence, carrying a handheld sensor to save perceptive reports. They were all instructed to squeeze it when perceiving gait speed variations in the straight parts of a 30-meter track, regardless of them being perceived accelerations or decelerations. Detection rates were calculated as the ratio between report quantity and speed variability (CV), and compared with subjective confidence ratings about the accuracy of their given reports (Visual analog scale, expressed in %).
Results: Lower walking speed was measured in PwMS compared to HC's [median: 1,529 m/s Vs 1,891 m/s). Despite similar walking speed variability [median: 0,029 vs 0,030], detection rates were higher in HC [median:4,67 IQR: 3,01-8,35] than in PwMS [median: 1,19 IQR: 0,30-1,76]. In contrast, controls reported lower subjective confidence ratings [median: 62,5% IQR: 60-75%] than PwMS [median: 80% IQR: 62,5-92,5%].
Conclusion: These findings may indicate a reduced sensitivity in PwMS to perceive ongoing variations in their walking performance. This could be related to overconfidence in their perceptual abilities or underlying perceptual impairments

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