Association between prefrontal cortex activation and gait parameters during single and dual-task walking in subacute stroke patients

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Résumé

Gait impairments are extensively reported in stroke patients. Despite the growing literature on reduced gait performances and increased prefrontal cortex (PFC) activation in stroke, the relationship between gait and PFC activation is still unclear. To explore this relationship further, we aimed to investigate the relationship between various spatiotemporal gait parameters and PFC activation during single and dual-task (DT) walking in subacute stroke individuals. Thirty-three patients walked 10 m for 30 seconds under two conditions, with and without a cognitive task (n-back test). PFC activation was evaluated with functional near-infrared spectroscopy (fNIRS). We assessed gait speed, double stance time, asymmetry of step length and swing time, and step length variability using an electronic walkway. Of the gait parameters examined, only gait speed in the DT condition appears to be associated with PFC activation (R^2=.220). In the multivariate regression analysis, the association between PFC activation and gait speed was no longer significant, with the Barthel score emerging as the only significant independent predictor (R^2=.383). These findings suggest that PFC activation could serve as a valuable complementary indicator alongside locomotor assessments during DT, but should be considered alongside relevant patients' characteristics. Clinically, this approach may enhance the precision of identifying stroke patient profiles and help explore potential patient subgroups. However, further studies with larger samples are necessary to validate this hypothesis.

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