Dorsolateral prefrontal activity during dual-task walking in patients with Parkinson's Disease

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Context

Patients may have executive deficits even in the early stages of Parkinson's disease (PD) that affect gait and postural adjustments, leading to a higher risk of falls (Fasano et al., 2017)

Among factors that could predict impaired walking in this population, neurophysiological factors such as changes in brain activity during walking have been less studied in patients with PD (Maidan et al., 2015, 2016, 2017; Stuart et al., 2019).

Objective

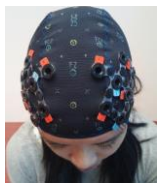
To examine dorsolateral prefrontal cortex activity (DLPFC) during single-task and dual-task walking conditions in PD patients

Methods

Participants

18 patients with PD (68 ± 8 years-old) and 18 healthy older adults (66 ± 7 years-old) matched in terms of age, gender, and level of education

Walking task NIRSport



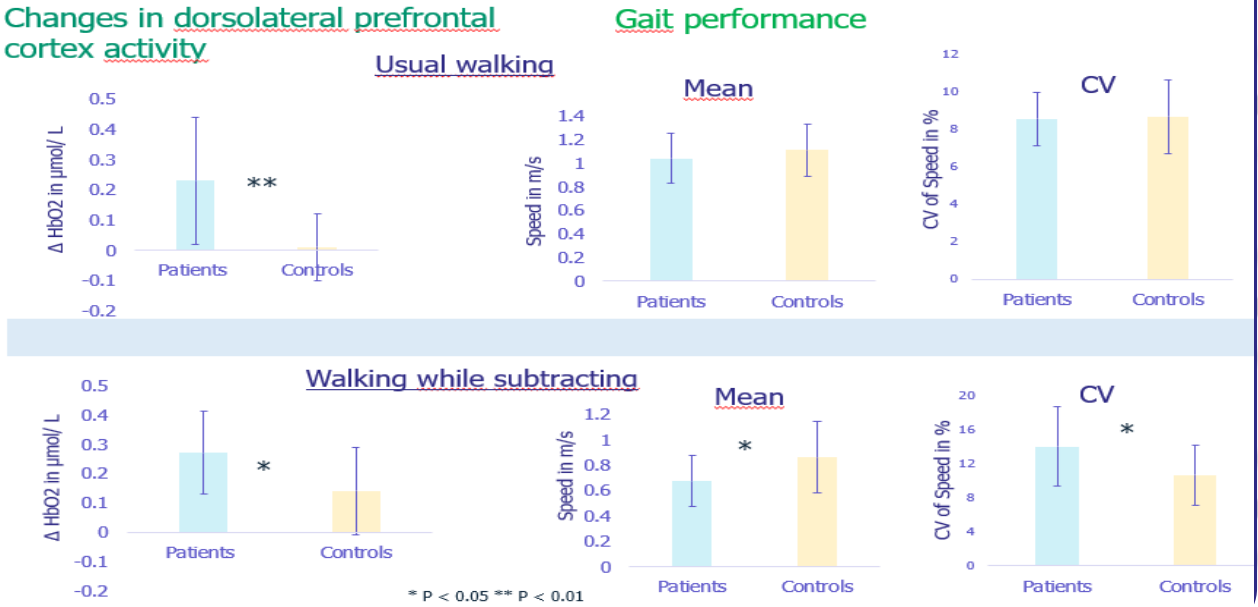
Gait Up system

→ *Standing while subtracting*
→ *Usual walking*
→ *Walking while counting forward*
→ *Walking while subtracting*

Results

Changes in dorsolateral prefrontal cortex activity

Gait performance



Conclusion

The DLPFC plays a major role already during usual walking in patients in relatively early stages of PD → measure of cognitive compensation to perform the usual walking.

Implications for rehabilitation of gait in patients with PD

Another ongoing study will investigate the effect of an exercise-based intervention program (SIROCCO program) on DLPFC activity while walking in the same group of patients with PD.

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