

**New insights on sensory-motor integration in Parkinson-related fatigue**

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*Background:* Fatigue is an extremely distressing symptom in Parkinson's disease (PD) that affects up to 50% of patients [1]. Imaging studies have linked fatigue to a disruption in connectivity of areas involved in motor preparation [2] and lack of pre-movement facilitation (PMF), [i.e. the increase of motor evoked potential (MEP) amplitude before movement onset] has been seen in fatigued patients with other neurological diseases [3].

*Aim:* We studied PMF in PD patients and tested the hypothesis that PD-related fatigue was related to reduced PMF.

*Methods:* We enrolled 15 patients with fatigue (PD-F), 16 patients without (PD-NF) and 16 Healthy controls (HC). Presence and severity of fatigue was measured with the Fatigue Severity Scale (FSS, cut-off $\geq$ 4). We assessed PMF during a simple reaction time (RT) motor task using transcranial magnetic stimulation (TMS) and TMS was delivered within RT at 150, 100 and 50 ms before the estimated movement onset.

*Results:* The rate of increase in MEP amplitude at three different intervals during movement preparation compared to MEP at rest (MEPPMF/MEPREST) disclosed separate effects for 'and 'group' and post hoc analyses disclosed a statistically significant difference at 50 ms in all. HC group resulted statistically significant different from PD-F (p= 0.004\*\*) and PD-NF (p = 0.014\*), but PD-F and PD-NF did not differ from each other (p> 0.05).

*Conclusions:* These results provide preliminary evidence PMF is abnormally reduced in PD patients compared to HC, but independently from fatigue. Abnormally reduced pre-movement facilitation could represent a neurophysiological hallmark of PD patients but it is not a biomarker of fatigue in PD. Future studies are necessary to understand the mechanisms of fatigue and to verify the meaning of reduced PMF in PD patients, its meaning in clinical and research context.

**References:**

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