

## Is fatigue a disorder of movement preparation? A neurophysiological study

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**Background:** Fatigue is a common symptom of Parkinson's disease (PD), poorly recognized and not adequately treated [1]. In MRI studies, it has been linked to motor planning impairment [2] and in other diseases like Multiple Sclerosis, it has been linked to reduced pre-movement facilitation (PMF) [4]. Our aim was to understand whether PMF is abnormal in PD and it is related to fatigue.

**Methods:** Presence and the severity of fatigue were defined based on the 9-item Fatigue Severity Scale (FSS). We enrolled 15 patients with fatigue (PD-F), 16 without (PD-NF) and 16 Healthy Controls (HC). We assessed PMF with transcranial magnetic stimulation (TMS) during a simple reaction time (RT) motor task and TMS was delivered at 50 ms, 100ms and 150ms before movement onset.

**Results:** The rmANOVA corrected for age did not show significant interactions group x side x time ( $F = 0.26$ ,  $p = 0.9$ ) of amplitude of MEP and at three different intervals during PMF ( $MEP_{PMF}$ ) compared to  $MEP_{REST}$ . However, when computing the rate of MEP increase during PMF ( $MEP_{PMF}/MEP_{REST}$ ), all groups had a significantly higher rate of PMF at 50 ms ( $F = 4.3$ ,  $p = 0.014^*$ ), but HC significantly differ from patients ( $F = 4.6$ ,  $p = 0.01^*$ ) and PD-F and PD-NF did not differ from each other ( $p > 0.05$ ).

**Discussion:** These results provide preliminary evidence PMF is abnormally reduced in PD patients compared to HC and independent from fatigue.

**Conclusions:** Abnormally reduced pre-movement facilitation could represent a neurophysiological hallmark of PD patients but it is not linked to fatigue in PD. Future works are necessary to disentangle 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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