

Combining Non-Invasive Brain Stimulation (NIBS) with speech therapy for the treatment of neurogenic dysphagia: neurophysiological outcome in Parkinson's disease (PD)

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Introduction: Neurogenic dysphagia (ND) is a swallowing impairment which can cause upper airway obstruction, malnutrition, aspiration pneumonia and, ultimately, increased mortality [2], common in Parkinson's disease (PD) [1]. Lately, therapeutic approaches have targeted sensory-motor integration processes and neuroplasticity as promising strategy for recovery [3], and transcranial direct current stimulation (tDCS) has been proposed as adjunctive treatment [4].

Objectives: To evaluate the neurophysiological effect of speech therapy plus tDCS in patients with ND in PD or atypical parkinsonism, as measured by changes in motor evoked potentials (MEPs) recorded from the transverse muscle of tongue.

Methods: Six dysphagic patients (mean age: 68.5 ± 8.36 years, 4 women) with PD and multiple system atrophy underwent anodal tDCS (anode over the vertex, reference over the right deltoid - 2 mA for 20 min) plus speech therapy (45min after tDCS, once a day, 5 days, 2 consecutive weeks), and speech therapy alone (once a day, 5 days, 4 consecutive weeks). We stimulated motor cortex to record MEPS from the transverse muscle of tongue before (T0) and after combined treatment (T1), after speech therapy alone (T2) and 6 weeks after speech therapy alone (T3) the intervention. MEPs amplitude (mV) and Total Motor Conduction Time (TMCT - ms) were considered as outcomes. The Bayesian statistic approach, which provides the level of the evidence for the effect of the treatment, was used.

Results: The model comparison via repeated-measures ANOVA revealed weak evidence for the treatment in amplitude and TMCT changes between each timepoints (always $BF_{10} > 0.33$). However, we found a tendency to increase the values of amplitude (mV, median \pm IQR– T0: 2.7 ± 1.67 ; T1: 3.7 ± 0) and TMCT (ms, median \pm IQR – T0: 7.24 ± 0.24 ; T1: 8.7 ± 0).

Conclusions: Our findings suggest the promising insight that combining tDCS and speech therapy could modulate lingual MEPs.

References:

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