Stroke

Oral communications

**CO01-001-e** Positive effects of tDCS cortical stimulation on the walking performance of chronic hemiplegic patients
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**Objective** To evaluate the effect of a single session of stimulation of the primary motor cortex (M1) with tDCS versus placebo (SHAM) on the walking performance of hemiplegic patients at a chronic stage.

**Patients and methods** Randomized, cross-over, double-blind study. Eighteen patients (6 women, 12 men, mean age: 60 years) were included. They suffered an initially complete hemiplegia due to a single stroke older than 6 months (min: 14 months, max: 11 years). Each patient participated in a single anodal stimulation session (2 mA, 20 minutes) of the area of the lower limb ipsilesional M1 (STIM condition) and a pseudo-stimulation session (SHAM condition). The order of the two sessions was randomly assigned, with an 11-day interval between the two sessions. The anododal electrode was positioned on the hotspot previously identified with TMS. The cathode was placed above the contralateral orbit. The walking performances were evaluated with the Wade Test and the 6-Minute Walking Test (6MWT). These tests were performed during the stimulation and after 1 h, and 2 days before and 10 days after each session.

**Results** The Wade Test and 6MWT showed a linear progression from the first pre-stimulation evaluation until the last evaluation (Wade average + 20% + 21% average 6MWT). To overcome this progression, comparisons were based on the linearly corrected data of each patient. The comparison between the 6MWT under STIM versus SHAM conditions demonstrated a significant positive effect of the stimulation by 11% during stimulation (Wilcoxon matched pairs, \( P = 0.019 \)) and 6% 1 hour after stimulation (Wilcoxon matched pairs, \( P = 0.025 \)). There is no significant difference regarding the Wade Test.

**Discussion** These results show a significant positive effect of a single session of anodal tDCS of the M1 ipsilesional area of the lower limb in chronic hemiplegic patients. This improvement affects the endurance (6MWT) but not the walking speed (Wade Test). This proof of principle study supports a follow-up study assessing the training of walking under iterative tDCS stimulation.

**CO01-002-e** Ipsilateral M1 transcranial direct current stimulation increases excitability of the contralateral M1 during an active motor task: Implications for stroke rehabilitation
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**Objective** Anodal transcranial direct current stimulation (a-tDCS) of the primary motor cortex (M1) elicits an increase in cortical excitability that outlasts the period of stimulation. However, little is known about effects of a-tDCS on the contralateral M1 during and after ipsilateral M1 stimulation. Therefore, we investigated the changes in corticospinal excitability and inhibition of the left M1 during and after 20 min of a-tDCS to the right M1.

**Material and methods** Eight healthy participants received real (2 mA) and SHAM a-tDCS to the right M1 randomized across 2 testing sessions. Single- and paired-pulse transcranial magnetic stimulation (TMS) was applied to the left M1 to measure changes in motor-evoked potential (MEP) amplitude from the right extensor carpi radialis (ECR) at 130% of resting and active motor threshold, cortical silent period (CSP) and short-interval cortical inhibition (SICI). Active motor threshold was measured during a wrist extension contraction that was less than 5% of maximal electromyographic activation of the ECR. TMS measurements were recorded at baseline, every 5 min for 20 min during and 10 min after a-tDCS.

**Results** The results showed a significant \( (P < 0.05) \) increase in left M1 MEP amplitude and reduction in CSP duration during (10 and 15 min) and after (immediately and 10 min post) a-tDCS to the right M1, only during the active motor task. A significant reduction \( (P < 0.05) \) in SICI during the active task was also found immediately and 10 min post a-tDCS. No significant changes in MEP amplitude, CSP and SICI were observed in the resting or active task during SHAM tDCS.