BI-FRONTAL tDCS CAN IMPROVE FACIAL EMOTION RECOGNITION IN MAJOR DEPRESSIVE DISORDER: AN EXPLORATORY PILOT STUDY

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The dorsolateral prefrontal cortex (DLPFC) plays a pivotal role in both depressive symptoms and emotional processing. Recently, transcranial Direct Current Stimulation (tDCS) applied over the DLPFC hold promises to alleviate clinical symptoms in patients with MDD. However, only a few studies investigated the effect of tDCS on emotional processing whereas antidepressant drugs are known to improve such deficits in patients with MDD. Here, we investigated the effect of DLPFC-tDCS a facial emotion recognition task (FER) in patients with MDD.

In a randomized sham-controlled study, 40 patients with treatment-resistant MDD received a single session (30 min) of either active (2 mA, n=18) or sham tDCS (n=17). The anode was placed over the left and the cathode over the right DLPFC, respectively. FER was assessed before and after the stimulation session.

After active tDCS, we observed an overall improvement in FER performance as compared with sham tDCS. The beneficial effect seemed mainly drive by an improved recognition of Sad faces. No significant effect of the sham stimulation was observed. The session was well tolerated.

Although exploratory, these results suggest that a single session of tDCS may improve social cognition in patients with MDD. Further studies are needed to replicate these results and investigate whether this acute improvement of FER in response to tDCS could translate into clinical benefits as observed with antidepressant drugs.

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REAL WORLD TRANSCRANIAL MAGNETIC STIMULATION FOR MAJOR DEPRESSION IN FRANCE: A MULTISITE, NATURALISTIC, RETROSPECTIVE STUDY

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Background: Repetitive Transcranial Magnetic Stimulation (TMS) was approved in 2008 by the US FDA. Meta-analyses of randomized controlled trials have confirmed its efficacy in the treatment of depression. However, real-world outcomes of rTMS remain understudied. We aimed to study how TMS therapy used to treat depression is delivered in routine clinical practice in France, and to measure its effectiveness and potential moderators of this effectiveness.

Methods: Five French centers provided data on patients treated with TMS for resistant depression between January 2015 and December 2020. We included patients who were assessed by a hetero-questionnaire and had a baseline and immediate posttreatment assessment. We performed univariate analyses to investigate which factors were significantly associated with the efficacy of TMS. Next, we included age, sex, and significant factors in a multivariate model.

Results: 435 patients were included; 66% of individuals with depression were female and 26% had bipolar depression. Stimulation was delivered with four different stimulation parameters: 1Hz (7% of individuals), 10Hz (43%), 50Hz (38%), and 20Hz (12%). TMS resulted in a significant decrease in MADRS (Delta=9.47 (8.73, MW Stat. 150319.5, p<0.001) with a large effect size (CLES=0.79). The mean improvement was 33% (SD=31%). Response and remission rates were 31% and 23%, respectively. In multivariate analysis, improvement in depressive symptoms was associated with higher baseline symptoms.

Conclusion: TMS is effective in routine clinical practice. Response prediction and personalized targeting could improve its effectiveness.

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BRAIN PERFUSION ALTERATIONS INDUCED BY STANDALONE AND COMBINED TRANSCRANIAL STIMULATION OVER THE PREFRONTAL CORTEX: A RANDOMIZED, PLACEBO-CONTROLLED STUDY, USING 99mTc SPECT

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Background: Non-invasive brain stimulation (NIBS) approaches have been increasingly used to target the prefrontal cortex (PFC), with mixed results in the fields of cognitive and behavioral neuroscience. Recent studies suggest that the combination of distinct NIBS techniques may maximize required changes in brain activity. However, it is unclear whether NIBS combinations could also enhance prefrontal cortical activity and its neurocircuitry.

To evaluate the application of standalone and combined protocols of transcranial direct current stimulation (tDCS) and intermittent theta-burst stimulation (iTBS) over the left dorsolateral PFC (DLPFC) of healthy volunteers through Single Photon Emission Computed Tomography (SPECT) neuroimaging.

Methods: A randomized, double-blind, sham-controlled, full-factorial design was conducted. Participants received four different stimulation protocols (tDCS, iTBS, Combined Interventions and Placebo), one per week, over the DLPFC located by structural neuronavigation. TDCS was applied with a current of 2mA for 20 minutes and iTBS with 1620 pulses for 9 minutes. A radiopharmaceutical (99mTc-ECD) was administered immediately after the start of the iTBS protocol. An adverse effects scale was applied after the end of the neurostimulation session and the SPECT was collected afterwards.

Results: Twenty-five adults with a mean age of 28.6 years (standard deviation (SD) = 7) were included. Of those, 23 underwent 4 sessions while 2 underwent only the first neurostimulation session. The first findings of the neuroimaging data analyses show that the combined intervention significantly modulated deeper regions from the PFC, such as the left anterior (*p=0.03*) and the right posterior cingulate cortex (*p=0.02*), while the tDCS protocol increased the blood flow of the orbitofrontal right (*p=0.04*) and left (*p=0.02*) cortices in comparison with the placebo protocol. iTBS alone did not show significant results compared to placebo. However, those are preliminary findings and will be further explored to be presented at the conference. Finally, all active protocols were similarly tolerable.

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