The reference treatments are essentially based on psychological and drug treatments, in cases of moderate to severe intensity. However, they are often poorly tolerated and iatrogenic. Neurostimulation treatments such as electroconvulsive therapy are reserved for resistant or very severe forms, with a vital risk (suicidal or somatic).

tDCS is a particularly suitable treatment for the geriatric population because of its excellent tolerance, even at a very advanced age in patients with high multimorbidity, compared with psychotropic drugs. The response rate increases in elderly patients with a higher current intensity (2 mA) and a greater number of tDCS sessions (30 treatments over 6 weeks). Therefore, the application of higher stimulation doses and a greater number of treatments may be important for the efficacy of tDCS in the elderly depressed patient. Thus, these potential antidepressant effects and cognitive improvement and the absence of major side effects make tDCS a promising treatment option for depression in geriatric populations.

The LIMONADE project aims to evaluate the feasibility of using tDCS in patients with depression living in residential care home. Indeed, it is a real strategy of care offer with: diagnosis, deployment of treatment by tDCS at the patient's bed, evaluation/coordination by a psychiatry team and articulation of care with geriatrics.

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EFFECT OF GENOTYPE ON RESPONSE TO tDCS-INDUCED BEHAVIOURAL PLASTICITY

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Introduction: A common single nucleotide polymorphism (Val66Met) in the gene that codes for brain derived neurotrophic factor (BDNF) is associated with reduced motor learning, retention, and plastic response to tDCS. Since one third of Caucasians carry the met allele, this may be a significant source of variability in response to tDCS. We have previously observed that anodal tDCS enhanced retention of prism adaption, a form of motor learning used in stroke therapy, but only in individuals with the dominant val66val allele. Here we aimed to replicate this val/val effect and determine the met allele effect in an adequately powered sample.

Method: Twenty participants were recruited, informed by a power calculation. To avoid the known variability in motor learning and brain chemistry associated with the menstrual cycle, only men were recruited. We used a double-blind, repeated measures design, in which participants performed prism adaptation combined with motor cortex tDCS (anodal versus sham, counterbalanced order). Subsequent retention of the prism after effect was measured 10 minutes and 24 hours later. Participants provided saliva samples for genotyping.

Results: Data collection is currently in progress (n=15 complete to date, 5 more to complete). Results for the full sample will be reported at the conference. Analyses will test the following pre-registered predictions:

- Val/Val homozygotes will show greater retention of the prism adaptation after effect with anodal stimulation versus sham;
- Carriers of the Val66Met polymorphism will show smaller and/or more variable responses to tDCS, resulting in no significant difference in retention between anodal and sham tDCS.

Discussion: Given the prevalence of the Val66Met polymorphism, the implication of previous work is that this should account for significant variability in stimulation response. If confirmed, this would have significant implications for the use of tDCS both in basic research and clinical indications in neurology and psychiatry.

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TRANSCRANIAL DIRECT CURRENT STIMULATION IN THE POSTPARTUM PERIOD: COMPUTATIONAL MODELLING OF ELECTRIC FIELD STRENGTH IN TWO STANDARD MONTAGES FOR DEPRESSION

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Transcranial direct current stimulation (tDCS) has been suggested to treat peripartum depression (PPD) using the F3 (Anode) - F4 (Cathode; 10:10 EEG international system) montage with 2mA electric current. However, the electric field (EF) strength varies with brain morphology and during the perinatal period structural changes seem to take place in brain grey matter, in regions associated with motherhood. To our knowledge, peripartum morphological specificities were never taken into account when choosing tDCS protocols for PPD. Therefore, we aim to contribute to the field by informing about the distinctiveness of the EF strength induced in postpartum brains when using two standard tDCS montages in major depression. T1 weighted scans and clinical assessments of 25 postpartum women (3-months postpartum; 19-33 years [M=26.6, SD=4.0]) from the open-access Postnatal Affective MRI Dataset1 were included. According to the Center for Epidemiologic Studies Depression Scale (CES-D), 12 women presented depressive symptoms (M=20.4). With SimNIBS2 , we simulated EF using the F3-F4, and the F5-F6 montages (10:10 EEG international system; 2mA current intensity). Mean EF strengths were calculated on the Anterior Cingulate Cortex -ACC, the left and right Dorsolateral Prefrontal Cortex -DLPFC, and the Dorsomedial Prefrontal Cortex -DMPFC). We performed two-way mixed ANOVAs to estimate the interaction between montage and presence of depressive symptoms on EF strength across regions. Although the interaction was not significant (Figure 1), we found a main effect of montage, with the F5-F6 montage presenting the peak mean EF strength in the ACC, the right DLPFC and the left DLPFC. The F3-F4 montage presented the peak strength in the DMPFC. Although both montages enable the modulation of the commonly targetted brain areas in PPD using tDCS the clinical decision between the F5-F6 and the F3-F4 should account for the target area of interest when treating PPD.

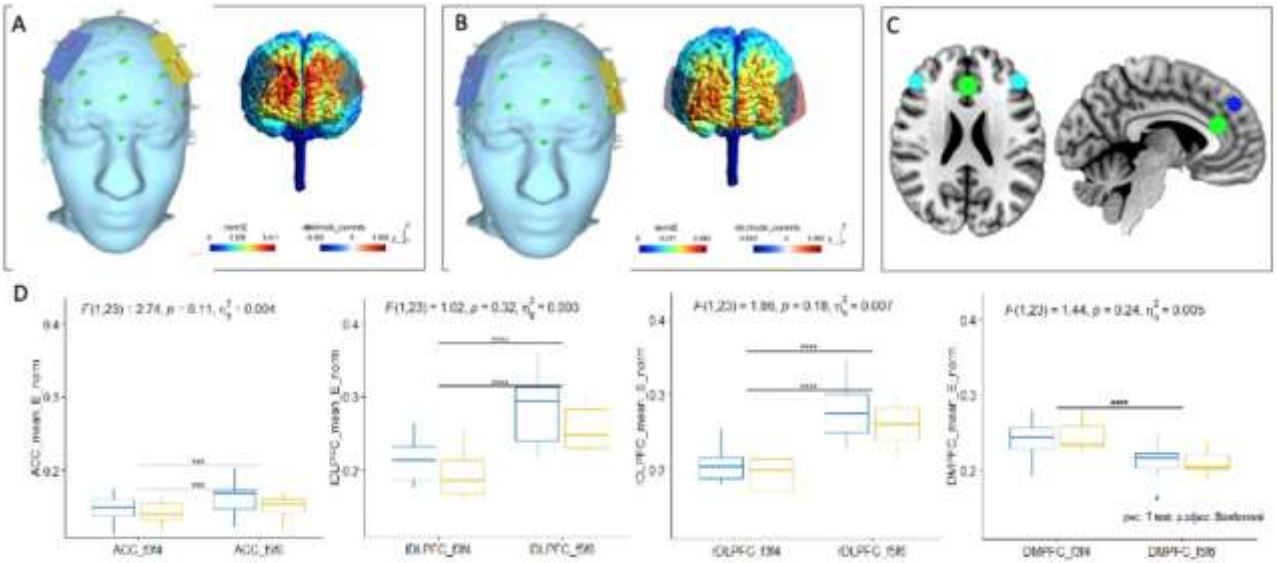

Figure 1. tDCS simulation montages, regions of interest (ROIs) and ANOVAs results. A. Left: tDCS montage F3 (Anode) - F4 (Cathode); 10:10 EEG International System. Right: Electric field (EF) simulation on gray matter (electrode current: 2mA, peak EF strength [normE]: 0.411 V/m). B. Left: tDCS montage F5 (Anode) - F6 (Cathode); Right: EF simulation on gray matter (electrode current: 2mA, peak EF strength [normE]: 0.483 V/m). C. Spherical ROIs over MNI template: anterior cingulate cortex (ACC; green), left and right dorsolateral prefrontal cortex (l and rDLPFC, light blue), dorsomedial prefrontal cortex (DMPFC, dark blue). D. ANOVA results: two-way mixed ANOVAs. Montage as within-group factor (F3-F4 vs. F5-F6) and presence of depressive symptoms (according to CES-D) as between-group factor. Left to right: results for mean EF strength in ACC, lDLPFC, rDLPFC, and DMPFC

References:

1. *Laurent H, Finnegan MK, Haigler K. Postnatal Affective MRI Dataset [Internet]. Openneuro; 2020 [citado 28 de Janeiro de 2022]. Available at: https://openneuro.org/datasets/ds003136/versions/1.0.0*