Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

P3.001

COGNITIVE FUNCTIONING IN MULTIPLE SCLEROSIS (MS) IMPROVES WITH AT-HOME ONLINE TRAINING PAIRED WITH TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS): RESULTS FROM A SHAM-CONTROLLED RANDOMIZED CLINICAL TRIAL

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Abstract
Background: Cognitive impairment is a common symptom in MS. tDCS paired with a cognitive training intervention may improve clinical outcomes.
Objectives: To evaluate the cognitive outcomes in an RCT of active vs. sham tDCS paired with online adaptive cognitive training (aCT) in people with MS delivered as an at-home intervention.
Methods: The study enrolled people with MS and fatigue without depression or severe cognitive impairment. Participants were randomized to either active (2.0 mA) or sham left anodal dorsolateral prefrontal cortex (DLPFC) tDCS paired with aCT (Posit Science's BrainHQ) for 30 x 20-minute daily sessions over six weeks. Randomization was stratified by high or low neurologic disability. Sessions were completed at home and remotely supervised. The Brief International Cognitive Assessment in MS (BICAMS) was administered at baseline and end of intervention, with scores converted to demographics-adjusted z scores and averaged for composite score.
Results: Participants were n=106 of total study sample of n=116 with cognitive assessments completed at both timepoints. Participants were aged 20 to 72 years, 81% female, with 63% relapsing subtype. There was a high treatment fidelity, with n=103 (99%) completing >25/30 tDCS+aCT sessions. Pre- to post-intervention change in BICAMS was greater and improved in the active (n=55) vs. sham (n=51) group (mean change in BICAMS z score=0.05 ± 0.54 vs. -0.17± 0.46, respectively, p=0.027). While the active tDCS benefit was observed in both high and low EDSS strata, there was a greater and significant change in BICAMS in the active vs. sham comparison for those with higher EDSS (n=23: 0.03 ± 0.56 vs. n=21: -0.41± 034, p=0.004) vs. lower EDSS (n=32: 0.07 ± 0.53 vs. n=30: 0.00 ± 0.47, p=0.595).
Conclusions: Active vs. sham tDCS resulted in significantly better cognitive outcomes. The cognitive benefit was observed to be greater in those with higher vs. lower levels of baseline neurological disability.

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P3.002

AT-HOME TELEHEALTH TRANSCRANIAL DIRECT CURRENT STIMULATION FOR TREATMENT RESISTANT DEPRESSION

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Abstract
Background: tDCS delivered to the left dorsolateral prefrontal cortex (DLPFC) in repeated daily or near-daily applications can be an effective treatment for depression. tDCS devices can be portable with the option for self-administered applications in the home setting.
Objective: To evaluate an at-home intervention of tDCS paired with mindfulness meditation for treatment resistant major depression.
Method: We participated in Soterix Medical's open-label observational trial (ClinicalTrials.gov: NCT04781127) enrolled through our NYU Langone Health tDCS program that provides contactless at-home tDCS through virtual visits. Treatment-seeking potential participants were eligible if they met criteria for moderate or severe major depression that has been treatment resistant (failing at least two prior medication trials). Participants were enrolled in the clinical virtual health tDCS service for standard of care defined by 28 days of tDCS (M-F x 6 weeks) followed by a 4 week once-weekly taper phase. All treatment and study procedures were delivered remotely to the participant at home. Anodal tDCS was administered over the DLPFC (2 mA x 30 minutes) using a 1x1 mini-CT tDCS device (Soterix Medical). The tDCS period was paired with mindfulness meditation audiotracks (10 Minute Mind). The primary outcome was the MADRS from baseline to week six (day 28). Clinical response to treatment (≥ 50% improvement in MADRS score from baseline to week 6) and remission (MADRS score ≤ 10 at week 6) were calculated.
Results: A total of n=18 participants received 28 daily sessions (5 days per week x 6 weeks) of left anodal DLPFC tDCS (2.0 mA x 30 mins.) MADRS scores significantly improved from baseline to week 6 with a 61% response rate and 56% remission rate by treatment end.
Conclusions: Home-based tDCS delivered through telehealth is feasible as a remote contactless treatment option for patients with treatment resistant depression.

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P3.003

COMBINATION OF TMS MAPPING AND E-FIELD MODELING REVEALS DISSOCIATION OF LANGUAGE FUNCTIONS WITHIN THE TEMPORAL GYRUS

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Abstract
The cortical distribution of brain regions related to different categories of language errors have been previously investigated using rTMS bursts. As standard TMS mapping approaches typically lack the accuracy of direct cortical stimulation, we herein adopt an optimized procedure bringing together TMS and electric field (E-field) modeling in an in-house developed high-precision neuronavigation software suite for precise coil positioning and improved estimation of the cortical distribution of language and speech errors.
18 healthy, right-handed participants were included in this study. The individual fMRI data acquired at 3T was used to define a language 'hotspot' within the superior temporal gyrus (STG). Neuronavigated TMS-bursts of 10 Hz were applied to nodes of a target grid centered around this hotspot three times during an object naming task. TMS pulses were triggered using a tailored in-house developed precision software suite. Video recordings of the procedure were evaluated based on qualitative criteria for speech impairments: speech arrest, anomia, phonological and semantic