

Keywords: TMS, Movement neuroscience, Perception, Primary motor cortex

P2.012

CRANIAL ELECTROTHERAPY STIMULATION AFTER TRANSCRANIAL MAGNETIC STIMULATION FOR MAINTENANCE OF IMPROVEMENT IN TREATMENT-RESISTANT DEPRESSION: A PILOT STUDY

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Abstract

Background: Transcranial Magnetic Stimulation (TMS) can significantly improve depression acutely in those with treatment-resistant depression (TRD). However, relapse is not uncommon, with 20% relapsing in 6 months and nearly 40% relapsing within a year. Cranial electrotherapy stimulation (CES) is FDA-cleared for depressive symptoms, but has not been assessed after TMS to improve maintenance in TRD.

Objective: To assess the tolerability of home-based CES in TRD after treatment with TMS, and to assess whether the benefits of TMS can be extended with CES over 8 weeks.

Design: This was a prospective open label study over 8 weeks with 10 patients. Patients with response to TMS as defined by at least a 50% improvement on the PHQ9 were offered CES for 8 weeks at home. Their PHQ9 scores at the end of 8 weeks were compared to their PHQ9 scores at the end of TMS treatment.

Results: Before TMS, the mean PHQ9 score was 19.89, and the mean score after TMS was 4.67. The mean score after CES was 5.33 (5.0 with intent to treat, LOCF). Using the t-test for 2 dependent means, $t = 0.65$ and $p = 0.53$, indicating no significant difference between mean PHQ9 score at the end of TMS treatment and mean PHQ9 score at the end of CES treatment. 7/9 (78%) of patients who achieved response and 3/4 (75%) of patients who achieved remission at the end of TMS were able to maintain their status with CES. 1 patient dropped out due to intolerability (1/10, 10%).

Conclusion: CES was tolerable in TRD after TMS for most patients. Further, patients on average were able to maintain benefits of their TMS treatment with at-home CES for 8 weeks. Future studies should use a randomized controlled design with a sham arm to build upon this pilot study data.

Keywords: Neuroplasticity, Maintenance, Treatment-Resistant Depression, Cranial Electrotherapy Stimulation (CES)

P2.013

REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION PROMOTES RAPID PSYCHIATRIC STABILIZATION IN ACUTELY SUICIDAL MILITARY SERVICE MEMBERS

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Abstract

Objective: Suicide remains an intransigent problem for which there are limited abortive treatments available. This study presents data for using accelerated TMS as an intervention for suicidal crisis that may be abortive or preventative for those who are currently at-high-risk.

Methods: This prospective, single-site, randomized, double-blind trial enrolled active duty military participants with suicidal crisis (SC) to receive either active TMS ($n=59$) or sham TMS ($n=61$) three times per day for three consecutive days. Our primary outcome the Beck Scale for Suicidal Ideation-current (SSI-C) was measured after each session of TMS. Secondary outcomes measured both the SSI-C and the Beck Scale for Suicidal Ideation-total (SSI-T) daily for the 3 intervention days as well as at 1, 3 and 6 months follow up.

Results: In the modified intent to treat analysis (mITT) of SSI-C changes over treatment sessions, the TMS active group had accelerated decline in suicidal ideation as compared to sham: Beta for interaction = 0.12 points

greater SSI-C decline per session ($SE = 0.06$) in TMS versus sham; $p = 0.04$. In both the mITT and per protocol (PP) active TMS groups the mean final SSI-C scores were below 3. These scores remained below 3 for the entire 6 month follow up period.

Conclusions: In this military trial of suicidal patients we found that both active and sham accelerated TMS rapidly reduces SC over the course of the three day treatment cycle. Moreover, in the mITT analysis, there was a statistically significant anti-suicidal benefit of active TMS versus sham TMS in the primary outcome. Both the mITT and PP groups moved from higher to ~7 times lower suicide risk strata and remained there for the duration of the study. Further studies are warranted to understand accelerated TMS full potential as a treatment for SC.

Keywords: Accelerated TMS, Suicide, Military

P2.014

THE EFFECT OF SINGLE-SESSION TRANSCRANIAL DIRECT CURRENT STIMULATION (tDCS) ON THE THREE CORE COMPONENTS OF PHYSICAL FITNESS: MUSCLE STRENGTH, MUSCLE ENDURANCE AND CARDIOPULMONARY ENDURANCE, A SYSTEMATIC REVIEW

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Abstract

Physical fitness, entailing muscle strength (MS), muscle endurance (ME), and cardiopulmonary endurance (CPE) amongst others, is of indisputable importance for both sport performance and health. Various studies suggest that the brain is a key determinant of physical performance, making transcranial direct current stimulation (tDCS) a promising ergogenic tool. Previous reviews mainly focused on one component of physical fitness. Furthermore, the effect of various stimulation parameters remains insufficiently addressed, which is understandable due to the heterogeneous stimulation protocols. In order to increase between-study comparability, parameters such as current and charge density will be derived from the existing studies. In this systematic review, Pubmed and Web of Science were searched for randomized sham-controlled trials. In total, 35 studies were included. The impact of tDCS on MS was investigated by 16 studies. Six studies (37.5%), all using anodal tDCS, reported a significant increase in MS. Protocols consisting of cathodal tDCS ($n=4$) reported no significant effect of stimulation or a negative effect. The impact of tDCS on ME was investigated by 16 studies. A positive impact of tDCS on at least one key ME outcome measure was reported in 11 studies (68.8%). All but one tDCS protocol leading to positive results used anodal tDCS. High current densities seemed to yield greater effects on ME. Thirteen studies investigated the impact of tDCS on CPE. All protocols applied tDCS offline. Seven studies (53.8%) reported a positive effect of tDCS in at least one CPE key outcome measure. All seven studies used anodal tDCS. Stimulation duration, timing and charge density did not seem to affect tDCS effectiveness. Although the heterogeneity of the included study designs warrants cautious interpretation, currently it seems that anodal tDCS yields the best results in the context of physical fitness. In addition, ME appears to be most susceptible to tDCS-induced improvements.

Keywords: Transcranial direct current stimulation, tDCS, Physical fitness, Systematic review

P2.015

EFFECTIVENESS OF UNILATERAL VS. BILATERAL RTMS TREATMENT ON SUICIDAL IDEATION IN PATIENTS WITH DEPRESSION AND COMORBID ANXIETY

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Abstract

Background: This study assessed suicidal ideation (SI) severity in 1001 patients ($n_{males} = 321$, $M_{age} = 44.82$ years, $SD_{age} = 15.93$ years) primarily diagnosed with major depressive disorder (MDD) with a secondary diagnosis of generalized anxiety disorder (GAD) using CHRT risk subscale