for 40-min daily using attention/processing speed and working memory modules from BrainHQ. The first 20-min of cognitive training was paired with active or sham tDCS. To allow room for symptom improvement, we only included participants with Beck Depression Inventory, 2nd edition (BDI-II) scores of 5 or greater ("minimal" depression severity). We identified 15 participants who met this cut-off (70.93 ± 5.41 years old, 10 females, 16.4 years ± 2.32 years education, MoCA = 27.27 ± 2.34; 7 active, 8 sham).
Results: tDCS conditions did not significantly differ in age, sex, years of education, MoCA scores, number of completed intervention days, or baseline BDI-II (active: 7.71 ± 2.93, sham: 11.38 ± 6.44). There were no differences in sensation ratings between groups or in confidence ratings for condition received (suggesting successful blinding). Results indicated the combination of active (and not sham) tDCS with cognitive training was associated with reduced depressive symptoms (2.7 vs. 1.4 points, active vs. sham). Including covariates (age, sex, education, MoCA scores, and number of completed intervention days) in the model further strengthened this discrepancy (3.7 vs. 0.51 points, active vs. sham).
Conclusions: While preliminary, these results suggest this intervention combination may be a potential method for improving subthreshold depressive symptoms in older adults via targeting prefrontal neural circuitry and promoting neuroplasticity of the underlying neural network. While baseline BDI-II scores did not significantly differ, the active tDCS group had a lower score than sham, but saw greater improvement in BDI-II scores post-intervention despite having less room for change. Adequate treatment of subthreshold depressive symptoms may prevent or reduce negative outcomes associated with depressive symptoms in at-risk older adults. Larger randomized clinical trials are needed to better understand tDCS plus cognitive training antidepressant effects in this age group.

Categories: Neurostimulation/Neuromodulation
Keyword 1: depression
Keyword 2: neurostimulation
Keyword 3: aging (normal)
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73 Sleep Onset Latency and Duration in rTMS Treatment in Veterans with Treatment-Resistant Major Depressive Disorder

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Objective: This study builds on the work by Rehman et al (2022) who argued that transcranial magnetic stimulation (TMS) treatment not only helps treat depression but also decreases sleep problems such as difficulty falling asleep,staying asleep, and waking too early. The present study further explores differences in sleep onset latency, meaning the time it takes to fall asleep, and duration of sleep per night in the pre and post treatment phases of rTMS. The information regarding major attributes of sleep is critical because recent research shows that about 90% of patients with major depressive disorder (MDD) also struggle with sleep disorders (Li et al., 2022), and sleeping for less than seven hours may eventually lead to sleep deprivation (Hirshkowitz et al., 2015), with increased risk of physical and mental health problems (Sheehan et al, 2019). Sleep onset latency estimates vary from individual to individual but typical sleep latency is considered between 10 to 20 minutes (Jung et al, 2013). As it has been shown that overall

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sleep problems improve with rTMS, we hypothesized that self-reported sleep onset latency will decrease, and sleep duration will increase.
Participants and Methods: All participants met inclusion criteria for MDD diagnosis and completed a full course of TMS treatment (N=470; Mean age=53.45, SD=13.73). The sample was mostly male (81%) and ethnically diverse: 77.7% non-Hispanic White, 13.3% Black Americans, 1.9% Asian, 0.2 % Asian Indian, and 1.9% other ethnicities. Sleep problems were assessed using the following questions at the pre and post treatment stages: the number of minutes it takes to fall asleep and duration of sleep each night.
Results: A Wilcoxon matched-pairs signed-rank test was conducted to determine whether there was a difference in sleep onset latency and hours of sleep per night between pre and post intervention. The results indicated a significant difference in time to fall asleep between pre and post treatment (pre-treatment M = 1.19, SD = 0.99, post-treatment M = 0.93, SD = 0.91; z = -5.01, p < .001. In addition, there was a significant increase in the minutes of sleep per night in pre (M = 6.11, SD = 2.07) compared to the post treatment (M = 6.32, SD = 1.77), z = -2.56, p = .010.
Conclusions: Reduced sleep is known to negatively impact mood, cognitive ability, work performance, and immune function (Besedovsky et al., 2012; Killgore, 2010; Massar et al, 2019; Vandekerckhove & Wang, 2018). Similarly, longer sleep onset latency can cause an individual to enter the first sleep stage later than expected and complete fewer sleep cycles. The results of the present study show the effectiveness of rTMS in decreasing sleep onset latency and increasing the duration of sleep. Given the comorbidity and bidirectionality between sleep disturbances and mood disorders (Fang et al., 2019; Palagini et al., 2019), further researching treatments such as rTMS to improve sleep as a means to also improve mood is crucial. We propose acquiring knowledge about sleep attributes as an essential part of clinicians' work early on in the rTMS treatment in order to monitor an individual's global functioning level in light of improved sleep.

Categories: Neurostimulation/Neuromodulation
Keyword 1: neuromodulation
Keyword 2: sleep
Keyword 3: depression

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74 A Phase I Trial of Accelerated, High-Dose Repetitive Transcranial Magnetic Stimulation to Improve Cognition in Amnestic MCI

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Objective: Repetitive transcranial magnetic stimulation (rTMS), a non-invasive neuromodulation therapy most widely used in depression, has shown evidence of secondary benefits for cognition in both neurologic and neuropsychiatric conditions. The recent development of more efficient stimulation protocols, such as accelerated high-dose intermittent theta burst (iTBS)-rTMS, has substantially reduced treatment burden by shortening the treatment course by >50%. This study aimed to establish the safety, feasibility, acceptability, and preliminary efficacy of iTBS-rTMS as a tool for bolstering cognition in individuals with amnestic mild cognitive impairment (aMCI).
Participants and Methods: Twenty-four patients with aMCI were enrolled in an open-label phase I trial of iTBS-rTMS; 2 withdrew prior to initiating treatment due to personal circumstances. All participants had received a diagnosis of MCI due to possible AD from a healthcare provider (i.e., neurologist or neuropsychologist) and met actuarial neuropsychological criteria for aMCI. This sample of older adults (range: 61.5-85.2 years, M = 74.1, SD = 5.71) was predominantly White/non-Hispanic (n = 23; Black/non-Hispanic: n = 1), roughly half female (n = 13), with a college education (range: 12-20 years, M = 15.9, SD = 2.5). Participants received 24 sessions of iTBS-rTMS to the left dorsolateral prefrontal cortex over 3 days (8 sessions each, lasting roughly 2 hours per day). Participants rated their perceptions and experience of common side effects during and after each treatment session as well as retrospectively at post-treatment and

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