Physical Exercise & Brain Stimulation: A Novel Treatment Combination for Depression?
Exploring the Theoretical Framework, Rational & Acceptability
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Theoretical Framework

Standard Treatments for Depression
- Based on the cognitive neuropsychological model, improvements in mood following standard treatments are attributed to changes in affective processes (Godlewska, 2019)

Targeting affective processes is not sufficient ...
- 1/3 of patients will not respond to at least 2 standard treatment trials, i.e. treatment resistance (Rush et al., 2006)
- Patients who remit following 1 or 2 treatment attempts have high risk of relapse, 40% & 55% respectively. (Rush et al., 2006)

Cognitive Impairment in Depression
- Neurocognitive deficits persist despite remission of mood symptoms (Semkovska et al., 2019) & predict poor treatment response and prognosis (Bortolato et al., 2016)

Rational for Exercise & rTMS

Efficacy for Treatment Resistance
- Patients with treatment-resistance are 5x more likely to achieve remission with rTMS compared to placebo (Gaynes et al., 2014), with 46.3% sustaining remission after 1 year (Senova et al., 2018)
- Exercise improved remission by 30% in patients with inadequate response to medication (Trivedi et al., 2011)

Benefits on Neurocognitive Deficits
- Exercise → improvements in behavioural and neurophysiological measures of working memory and cognitive control (Greer et al., 2015; Olson et al., 2017)
- rTMS over the dlPFC → psychomotor speed, attention, verbal fluency, cognitive control and working memory (Serafini et al., 2015)

Acceptability Study Findings

Purpose
- To assess the acceptability of a combined exercise and rTMS intervention for patients with depression
- We aimed to collaborate with patient partners as a first step in designing a clinical trial

Methods
- A cross-sectional survey was used to examine the acceptability of adding a hypothetical exercise intervention for patients currently receiving rTMS treatment
- Three patient partners from the NINET laboratory attended monthly meetings with researchers (for 6 months) to discuss ideas and provide feedback on the ongoing study

Results
- 44 patients (70% F, 47±14.7 yrs) with major depressive disorder completed the survey
- 75% of patients were interested in undergoing a combined exercise and rTMS intervention
- 85% of patients found the following hypothetical exercise program to be acceptable: 30-min of moderate-intensity exercise on a treadmill or bike 3 times per week prior to rTMS sessions for 6 weeks

Study Highlights:
- This is the first patient-oriented study to propose the combination of exercise and rTMS as an acceptable treatment for depression
- Patients undergoing rTMS found moderate-intensity exercise to be an acceptable addition to their current treatment regime
- An innovative aspect of this study was our collaboration with patient partners based on the strategy for patient-oriented research (SPOR) patient engagement framework

References
- Greer, T. L., et al., 2015. Dose-dependent changes in cognitive function with exercise augmentation for major depression: Results from the TREAD study. European Neuropsychopharmacology, 25(2), 248-256

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