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### Repetitive Brain Stimulation Does Not Influence Perceived Exertion During Maximal Cycle Ergometer Protocol

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Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive brain stimulation technique that has been used to improve exercise performance by modulating activity in homotopic areas of the primary motor cortex (M1). However, the optimal stimulation parameters and targets have yet to be determined. Additionally, objective measures of physical exertion are consistent with subjective measures (e.g., perceived exertion) but it is unknown if rTMS can influence perceived exertion when applied to M1. **PURPOSE:** To examine the effects of two rTMS protocols and three stimulation targets on perceived exertion after maximal anaerobic lower extremity exercise. **METHODS:** On three separate visits, 22 participants (6W, age:  $26.3 \pm 5.3$  yr, wt:  $80.4 \pm 35.2$  kg, ht:  $173.3 \pm 9.3$  cm) were randomized to receive continuous theta burst stimulation (N=10) or intermittent theta burst stimulation (N=12) over the SMA, M1 trunk (M1<sub>RA</sub>) or leg (M1<sub>LEG</sub>). Following 600 pulses of TBS at 80% of motor threshold, participants performed two 30s maximal sprints on a cycle ergometer while pedaling against 7.5% of their body weight with two min of rest between sprints. Participants were provided with a 2min warmup, followed by a 15s standardized lead-in at 125W and 100RPM. Perceived exertion was assessed immediately after each sprint using the Borg Ratings of Perceived Exertion scale (RPE). Mean Difference (MD) RPE were compared among targets and stimulation protocols using a mixed-model ANOVA. **RESULTS:** RPE increased from sprint one to two (S1 RPE average=  $16.4 \pm 0.4$ , S2 RPE Average=  $18.1 \pm 0.3$ , Grand Average=  $17.3 \pm 0.35$ , MD:  $1.7 \pm 0.3$ ,  $F_{1,20} = 49.3$ ,  $p < 0.01$ ,  $\eta^2 p = 0.71$ ). However, RPE did not differ between stimulation protocols (MD:  $0.1 \pm 0.7$  F=0.6;  $p=0.5$ ) nor stimulation target (MD: M1<sub>RA</sub> to M1<sub>LEG</sub>:  $0.2 \pm 0.2$ ;  $p > 0.05$ , M1<sub>RA</sub> to SMA:  $0.4 \pm 0.2$ ;  $p=0.6$ , M1<sub>LEG</sub> to SMA:  $0.4 \pm 0.2$ ;  $p=0.6$ , F=1.4;  $p=0.3$ ). **CONCLUSION:** Neither protocol nor target altered perceptual responses to this fatiguing exercise protocol. As expected, perceived exertion increased from the first to second Wingate in response to physical fatigue. Future studies should examine other cognitive brain and exercise program variables to determine if rTMS can be used to modulate perceptual responses to exercise.

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