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### Fatigue Index is Affected by Repetitive Transcranial Magnetic Stimulation Target but not Protocol

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Repetitive transcranial magnetic stimulation (rTMS) has been used in clinical populations to improve motor function by modulating corticospinal excitability (CSE). Two methods of rTMS, continuous theta burst stimulation (cTBS) and intermittent theta burst stimulation (iTBS), can decrease (cTBS) or increase (iTBS) CSE, thus impairing or improving motor performance. Nevertheless, the impact of these rTMS procedures on a healthy population is unclear.

**PURPOSE:** To examine differences between cTBS and iTBS over the pre-supplementary motor area (preSMA) and leg representation of the motor cortex (M1<sub>LEG</sub>) on anaerobic performance measures. **METHODS:** 54 participants (21 women, age: 26.9±6.2y, BMI: 24.1±3.4kg/m<sup>2</sup>) either received cTBS (N=26) or iTBS (N=28) over the preSMA or M1<sub>LEG</sub>. rTMS was delivered as 600 pulses at 50Hz either continuously (cTBS) or with 8s breaks every 30 pulses (iTBS). Stimulation intensities for the preSMA and M1<sub>LEG</sub> were selected as 80% of active motor threshold (defined as the minimum single pulse TMS intensity needed to produce a motor evoked potential in a target muscle) for the rectus abdominis and vastus lateralis, respectively. 20min after the rTMS intervention, participants performed one Wingate Anaerobic Test on a cycle ergometer. A 2min self-paced warm-up and a 15s lead-in at 100RPM/125W was given prior to the test. Mean and peak RPM, anaerobic capacity and power, and fatigue index were assessed using a 2 (group: cTBS, iTBS) by 2 (target: preSMA, M1<sub>LEG</sub>) mixed-method ANOVA. **RESULTS:** Fatigue index (range=5.2-27.7W/s) was higher for M1<sub>LEG</sub> than preSMA (M1<sub>LEG</sub>=13.3±5.1W/s, preSMA=12.5±4.9W/s,  $F_{1,52}=4.6$ ,  $p=0.04$ ), but there was no difference between groups ( $F_{1,52}=0.2$ ,  $p=0.7$ ). Mean RPM (range=62-149RPM), peak RPM (range=105-186RPM), anaerobic capacity (range=4.6-10.9W/kg), and anaerobic power (range=7.7-13.7W/kg) did not differ by group ( $F$  range=0.1-0.2,  $p$  range=0.7-0.8) or target ( $F$  range=1.2-3.9,  $p$  range=0.1-0.3). **CONCLUSION:** Fatigue index increased (participants experienced more fatigue) after rTMS over the M1<sub>LEG</sub> compared to the preSMA, but stimulation protocol (cTBS vs iTBS) did not have an impact, nor were other measures affected by rTMS protocol or target. Future research could assess the influence of other protocols, such as suprathreshold rTMS, on anaerobic performance.

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