



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 5th - 6th, 2021
Conference Proceedings
International Journal of Exercise Science, Issue 9, Volume 10



Little Variability in Active Motor Thresholds of Trunk and Leg Muscles Across Days

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Transcranial magnetic stimulation (TMS) is a non-invasive technique that is used to assess the functional properties of the corticospinal system. TMS assessments often target the intrinsic hand muscles because of their large corticomotor representations and low motor thresholds. Given their roles in activities of daily living and susceptibility to various neurological disorders, there is growing interest in the assessment of postural and lower extremity corticospinal circuits. Nevertheless, less is known about the reliability, consistency, and variability of corticospinal excitability estimates from axial and lower extremity muscles. **PURPOSE:** To determine the reliability, consistency, and variability of active motor thresholds (AMT) in the rectus abdominis (RA) and vastus lateralis (VL). **METHODS:** 25 right-handed and -footed participants (8W, age: 26.5 ± 5.5 yr, height: 174.2 ± 9.2 cm, weight: 72.7 ± 13.0 kg) completed AMT testing for the RA and VL on four visits separated by 9.2 ± 8.4 d. Biphasic single pulse TMS was delivered with a 96mm curved coil and individualized structural neuronavigation. Hotspots for each muscle were determined as the scalp location that consistently produced the largest peak-to-peak motor evoked potential (MEP) from 15-65ms post-stimulus. Next, participants performed isometric contractions of the RA or VL at 15% of maximum voluntary isometric contraction force. During contractions, TMS was delivered to the respective hotspot at 0.1-0.2Hz and the AMT was determined with parameter estimation by sequential testing. For each muscle, AMT consistency and reliability were determined based on intraclass correlation coefficient (ICC), coefficient of variation (CV), and standard error of measurement (SEM) across days. Absolute agreement was evaluated via Bland-Altman plots. **RESULTS:** For the RA and VL, consistency and reliability were excellent (RA: ICC=1.0 CV=4%, SEM=1.3%, AMT range=37-73; VL: ICC=1.0, CV=3%, SEM=1.1%, AMT range=36-75). Absolute disagreement across days was less than one percent for either muscle (RA: mean bias=0.83%; VL: mean bias=0.19%). **CONCLUSION:** Trunk and leg muscle AMTs are consistent and reliable across four days; future studies can explore corticospinal excitability in these muscles.

Supported by the Department of Defense W81XWH1810452