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### Sensorimotor Cortical Thickness Moderates Corticospinal Excitability

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Transcranial magnetic stimulation (TMS) is commonly used to examine corticospinal excitability (CSE) and related behaviors. Individual differences in brain morphology may influence responses to TMS, but clarification is needed. **PURPOSE:** To explore the relationship between cortical thickness and CSE when targeted to the lower extremity corticomotor representation. **METHODS:** Twenty women ( $20.4 \pm 1.8$ yr) completed 3T T1-weighted MRI scans to determine the thickness of cortical regions of interest including the precentral gyrus (PrG), postcentral gyrus (PoG) and paracentral lobule (PCL). Corticospinal excitability (CSE) was assessed during an isometric squat performed at 15% of maximal force. Five single pulses were delivered at 40-90% stimulator output (SO) in randomized 10% increments using a figure-of-eight coil targeting the primary motor cortex vastus lateralis (VL) representation. CSE was measured in the VL as the peak-to-peak amplitude of the electromyographic response from 15-65ms post-TMS. The largest MEP at each SO was selected, averaged and retained for analysis. Pearson correlations were used to examine the relationship between CSE, PCL, PrG and PoG thickness. **RESULTS:** CSE exhibited a moderate inverse relationship to PCL thickness ( $r = -0.43$ ,  $p < 0.01$ ), but was not correlated with PrG ( $r = 0.01$ ,  $p = 0.95$ ) or PoG ( $r = 0.03$ ,  $p = 0.84$ ) thickness. **CONCLUSION:** Corticospinal responses are sensitive to differences in sensorimotor cortical morphology. In contrast to PrG and PoG, PCL thickness was associated with CSE, which supports the contention that corticomotor contributions to CSE are topographically specific. Cortical thickness should be further explored as a moderating factor for TMS.

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