SWACSM Abstract

Motor Evoked Torque Differences Between ACLR Patient and Control

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ABSTRACT

Anterior cruciate ligament reconstructed (ACLR) patients with quadriceps deficits demonstrate greater motor evoked potential (MEP), indicating altered corticospinal excitability. Recent study has suggested that evoked torque responses to transcranial magnetic stimulation (TMS) is an alternative method to determine motor cortical excitability. However, no study has evaluated the evoked torque in ACLR patients compared to healthy controls. **PURPOSE**: To evaluate percentage changes in evoked torque values in response to TMS between an ACLR patient (ACLR) and a healthy control (CONT). **METHODS**: One ACLR (female, 21yrs, 180cm, 77.1kg) and one CONT (female, 39yrs, 160cm, 61.2kg) were seated on HUMAC dynamometer to perform an isometric knee extension at 90° of knee flexion on the reconstructed and matched knee at 10% of their maximum voluntary isometric contraction (MVIC), respectively. Motor evoked torques elicited by 30 trials of TMS over the primary motor cortex at 120% and 140% of active motor threshold (AMT) were measured during the submaximal isometric contraction of the quadriceps. Five resting twitch torques (RTT) directly evoked by TMS over the quadriceps muscle were measured while both subjects were completely relaxed. The percentage change of averaged evoked torque relative to RTT was calculated for MET at both AMT120% and AMT140%. **RESULTS**: The ACLR showed greater increases in MET at both AMT120% (ACLR: 79.37%, CONT: 63.84%) and AMT140% (ACLR: 141.15%, CONT: 104.73%), when compared to the CONT. **CONCLUSION**: Our preliminary results may imply that TMS induced greater torque production in the ACLR patient compared to the control, possibly indicating altered corticospinal excitability of the quadriceps muscles after ACLR, with greater alteration at AMT140%. Such excessive involuntary quadriceps contraction in the ACLR patient may indicate recruiting more motor neurons than needed, leading to improper regulation of the quadriceps as well as re-tear of the ACLR. Future studies should examine the direct relationships between the corticospinal excitability and knee function outcomes.