TACSM Abstract

Test Re-Test Reliability of Motor Unit Action Potential Relationships During Isokinetic Knee Extension

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ABSTRACT

Decomposition electromyography (EMG) is now capable of examining relationships between motor unit (MU) firing behaviors during dynamic movements. However, reliability across testing sessions has yet to be established within the quadriceps group during controlled isokinetic contractions. **PURPOSE:** To examine test re-test reliability of MU identification and firing behaviors of the knee extensor muscles during isokinetic contractions. **METHODS:** Nine (22.67 ± 1.17 yrs., 172.47 ± 5.43 cm, 77.75 ± 10.72 kg) recreationally active individuals randomly performed ten continuous knee extension contractions at 60°/s and 180°/s on two separate visits. Surface EMG was used to record activation in the vastus medialis (VM), rectus femoris (RF), and vastus lateralis (VL) between visits. Locations were marked for accurate replacement of the sensors between visits. Signals from each location during each visit were decomposed and validated for statistical analysis. Interclass correlation coefficients (ICC, 2,1) were used to assess the reliability of linear coefficients from the MFR vs MUAP relationships for the validated MUs between visits. **RESULTS:** Test re-test reliability of the MFR vs MUAP slopes for the VM at 60°/s and 180°/s displayed moderate reliability (ICC = 0.681 - 0.727). For the VL, MFR vs MUAP slopes and y-intercepts during both velocities showed poor to moderate reliability (ICC = 0.098 – 0.452). Slope and y-intercepts for the RF at 60°/s displayed poor reliability (ICC = 0.407, 0.492, respectively), but good and moderate reliability at 180°/s (ICC = 0.920, 0.647, respectively) **DISCUSSION:** These findings suggest that the velocity of the contraction may elicit variations in MU identification, decomposition, and relationships in the knee extensor muscles activation during isokinetic contractions. Many of the moderate to poor reliability classifications may have been due to the chosen velocities and repetitions performed. Future investigations will consider these to best identify future recommendations in decomposition EMG during dynamic movements.