SWACSM Abstract

Interlimb Comparison of Electromyographic and Mechanomyographic Amplitude Responses of the Vastus Medialis to Submaximal and Maximal Isometric Contractions

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ABSTRACT

Research on interlimb differences in neuromuscular recruitment patterns is limited. If interlimb differences exist, future exercise studies may have to reason for which limb (dominant vs. nondominant) to choose when examining muscle activation and contraction characteristics. **PURPOSE**: To investigate interlimb differences in normalized electromyographic (EMG) and mechanomyographic (MMG) amplitude responses of the vastus medialis muscle during submaximal and maximal isometric leg extension muscle actions. **METHODS**: Fourteen recreationally trained females (mean age ± SD = 22.3 ± 2.0 y) performed isometric leg extension muscle actions at 10-100% (10% increments) of maximal voluntary isometric contraction (MVIC) for their dominant (determined by kicking preference) and nondominant limbs. The muscle actions were performed unilaterally in the seated position of an isokinetic dynamometer. Subjects performed maximal isometric leg extension muscle actions for both limbs to determine each limb's MVIC; then, they performed the submaximal isometric leg extension muscle actions in a random order of intensity. A bipolar surface EMG electrode arrangement and an accelerometer were placed over the vastus medialis muscle to detect EMG and MMG signals, respectively. The amplitudes of the EMG and MMG signals were expressed as root mean square (RMS) and normalized to their highest recorded value (% max). Two separate 2 (limb) × 10 (intensity) repeated measures ANOVAs were conducted to determine interlimb differences in normalized EMG and MMG RMS. **RESULTS**: There were no significant interactions for normalized EMG (p = 0.550) or MMG (p = 0.513) RMS. A main effect for limb was also not significant for normalized EMG (p = 0.653) or MMG (p = 0.490) RMS; however, a significant main effect for intensity was present for normalized EMG (10-90 < 100, 10-80 < 90, 10-60 < 80, 10-50 < 60 & 70, 20-30 < 50, 20 < 30 & 40% MVIC; p < 0.001) and MMG (10-90 < 100, 10-60 < 90, 10-40 < 70 & 80, 20 < 60% MVIC; p < 0.001) RMS. **CONCLUSION**: There were no interlimb differences in EMG or MMG RMS at submaximal and maximal isometric leg extension muscle actions. As they provided comparable information, either limb may be used for examining muscle activation and contraction characteristics in exercise studies using healthy, recreationally trained participants.