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Effect of Two Bouts of Eccentric Exercise on Knee Flexors Changes in Muscle-Tendon Lengths

Authors : Shang-Hen Wu, Yung-Chen Lin, Wei-Song Chang, Ming-Ju Lin

Abstract : This study investigated whether the repeated bout effect (RBE) of knee flexors (KF) eccentric exercise would be changed in muscle-tendon lengths. Eight healthy university male students used their KF of non-dominant leg and performed a bout of 60 maximal isokinetic (30°/s) eccentric contractions (MaxECC1). A week after MaxECC1, all subjects used the same KF to perform a subsequent bout of MaxECC2. Changes in maximal isokinetic voluntary contraction torque (MVC-CON), muscle soreness (SOR), relaxed knee joint angle (RANG), leg circumference (CIR), and ultrasound images (UI; muscle-tendon length and muscle angle) were measured before, immediately after, 1-5 days after each bout. Two-way ANOVA was used to analyze all the dependent variables. After MaxECC1, all the dependent variables (e.g. MVC-CON: ↓30%, muscle-tendon length: ↑24%, muscle angle: ↑15%) showed significantly change. Following MaxECC2, all the above dependent variables (e.g. MVC-CON□↓21%, tendon length: ↑16%, muscle angle: ↑6%) were significantly smaller than those of MaxECC1. These results of this study found that protective effect conferred by MaxECC1 against MaxECC2, and changes in muscle damage indicators, muscle-tendon length and muscle angle following MaxECC2 were smaller than MaxECC1. Thus, the amount of shift of muscle-tendon length and muscle angle was related to the RBE.

Keywords : eccentric exercise, maximal isokinetic voluntary contraction torque, repeated bout effect, ultrasound
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