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# Gender Comparison of EMG Activity of the Knee Extensors During Three Phases of an Isokinetic Repetition.

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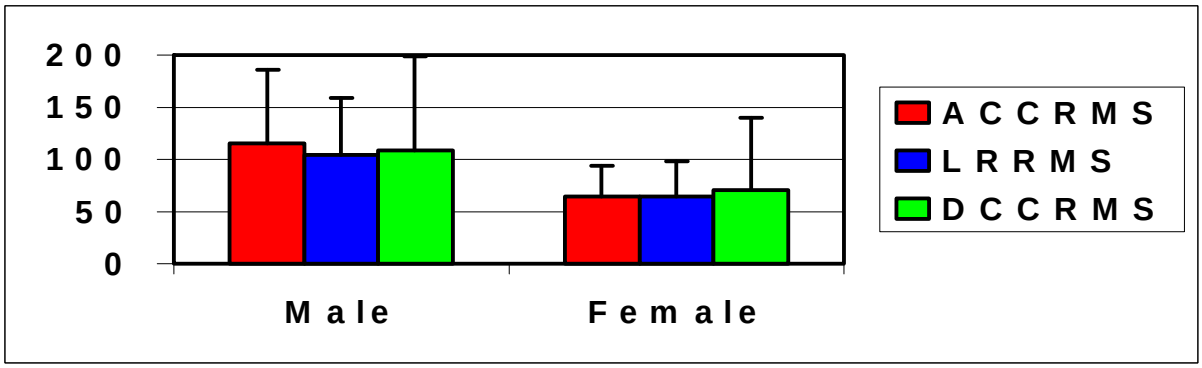
**Introduction:** Females have been reported to be three times more likely to sustain an anterior cruciate ligament (ACL) injury when compared to males competing in the same sport. Recent investigations have focused on factors such as knee recurvatum, peak torque, power, estrogen levels, hamstring/quadricep ratio and muscle activation patterns. Furthermore, there is evidence of a gender biased neuromotoric efficiency difference when performing very fast open kinetic chain accelerative movements. The purpose of this study was to examine the electromyographic (EMG) and phase relationship between genders during an isokinetic repetition. **Methods:** Nineteen subjects (8 male, 11 female, age 27.1±2.5 yrs) volunteered for this study. Subjects performed three maximal concentric knee extension repetitions at 240 degrees per second. A single EMG electrode was placed over the rectus femoris and sampled at 1000 Hz. Each repetition was separated into three EMG and range of motion (ROM) component parts consisting of acceleration (ACC), load range (LR) and deceleration (DCC). EMG data was reduced to root mean square (RMS) values for comparison purposes. **Statistics:** MANOVA was used to analyze each component by phase and gender. **Results:** ACC RMS was significantly different ($p<0.05$) between genders while LR and DCC were not. ROM measurements were significantly different for both ACC and LR but not DCC. Of importance were the temporal differences between genders associated with RMS levels with females displaying later onset of EMG burst. Figure 1 displays these differences between gender. **Discussion:** These results demonstrate that males produce greater knee extension neuromuscular activity than females during an isokinetic repetition and that females EMG activity occurs later in the ROM cycle. Therefore, this EMG latency may support the disparate neuromotoric efficiency between genders as well as temporal contributions to female ACL injury.




**References: 1.** Brown L.E. et al. *J. Orthop. Sports Phys. Ther.* 21(2):107-112, 1995. **2.** Brown L.E. et al. *J. Strength Cond. Res.* 9(3):160-164, 1995. **3.** Brown L.E. et al. *J. Strength Cond. Res.* 12(4):222-225, 1998. **4.** Chen W.L. et al. *J. Orthop. Sports Phys. Ther.* 19(6):324-330, 1994.