GENDER DIFFERENCES ON NEUROMUSCULAR CONTROL OF THE HIP: IMPLICATIONS FOR KNEE JOINT STABILITY AND NON-CONTACT ANTERIOR CRUCIATE LIGAMENT INJURY

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Objective: The purpose of this study was to determine if gender differences existed in hip muscle strength and activation as well as lower extremity kinetics during a functional landing task. **Design and Settings:** A post-test only design was used. The independent variable was gender. Dependent variables were hip muscle strength, electromyographic (EMG), and kinetic variables. All data were collected in a research laboratory. **Subjects:** 42 healthy, NCAA Division I collegiate and club sport male and female athletes (21 males, 21.1 ± 1.7 years, height = 181.2 ± 8.9 cm, mass = 85.3 ± 21.3 kg; and 21 females, 19.7 ± 1.5 years, height = 171.1 ± 8.6 cm, mass = 65.2 ± 7.3 kg) participated in the study. **Measurements:** Isometric strength and strength ratios for the hip extensors, flexors, abductors, adductors, and lateral and medial rotators, preparatory (150ms) and reactive (250ms) EMG area and co-activation area for the gluteus maximus, biceps femoris, gluteus medius, iliopsoas, rectus femoris and adductor longus, and peak vertical ground reaction force, anterior shear force and lower extremity rate of loading were collected on a one-legged standing broad jump-to-vertical jump maneuver. **Results:** Independent t-tests revealed that males had 12% greater isometric hip flexor (t = 2.1, p = .041, males = 5.9 ± 1.3, females = 5.2 ± 1.7 N/kg), and 15% greater lateral rotator (t = 2.5, p = .016, males = 5.4 ± 1.4, females = 4.6 ± 1.6 N/kg) strength. A one-way MANOVA revealed that females had 12% greater gluteus maximus (F = 7.7, p = .008, males = 14.1 ± 1.8, males = 13.0 ± 1.9), rectus femoris (F = .41, p = .050, females = 15.2 ± 1.9, males = 13.5 ± 3.3), and combined co-agonist gluteus maximus and biceps femoris (F = 13.7, p = .001, females = 28.6 ± 2.7, males = 25.7 ± 2.6) EMG reactive area. No other gender differences were statistically significant. **Conclusions:** Based on the lack of gender differences on EMG preparatory muscle activity, females and males prepare for landing with similar muscle activation strategies at the hip driven by feed forward mechanisms of dynamic restraint. However, due to specific muscle weakness of the hip flexors and lateral rotators females require greater reliance on reactive activity of these muscles to attenuate force at ground contact. This may lead to early fatigue and predisposition to increased risk of acute non-contact injury. **Keywords:** ACL, biomechanics, sensorimotor control, hip musculature.