

29. SWACSM Abstract

The Effect of the Short Foot Exercise on the Knee during Landing

JACOB MAYORAL, CONNOR OWEN, DANIEL METRI, ANDY ARANT, DANE JOHNSON, ROBERT DUDLEY, & ANDREA DU BOIS

APU Biomechanics Lab; Department of Kinesiology; Azusa Pacific University; Azusa, CA

Category: Undergraduate

Advisor / Mentor: Du Bois, Andrea (adubois@apu.edu)

ABSTRACT

Intrinsic foot muscles play an important role in the stabilization of the foot and assist with pronation of the foot. Excessive eversion, a component of pronation, may carry up the kinetic chain to impact the knee's frontal plane position, increasing the chance of a knee injury. Runners who go on to sustain injuries have a greater peak knee abduction moment during running than those without injury. Regular short foot exercise (SFE) strengthens the intrinsic foot muscles, which over time could help improve foot posture and mechanics up the kinetic chain. It is unclear if a single bout of SFE can change mechanics or reduce injurious movement patterns. **PURPOSE:** The purpose of this study was to study the effects of acute bouts of the SFE on knee adduction moments during a drop vertical jump (DVJ) landing. **METHODS:** Ten participants (6 male; 24.9±1.19 yr) were asked to do three DVJs (PRE) from an 18-inch box. They then completed the SFE bilaterally for two sets of 30 repetitions, both seated and standing followed by three DVJs (POST). Kinetic data was sampled at 1000 Hz with dual AMTI force platforms (Newton, MA); and the kinematics were sampled at 100 Hz with 14-camera motion capture system (Qualysis, Sweden). External moments were calculated via standard inverse dynamics using Visual 3D software (C-motion Inc, Rockville, MD). Peak external knee abduction moment (KABD) normalized to body mass was used for analysis. **RESULTS:** Paired-t tests showed that there was no effect of SFE on the right KABD (PRE: 0.29 ± 0.13 Nm/kg; POST: 0.28 ± 0.14 Nm/kg; p=0.432; d=0.26); however, there was trend towards a decrease in the left KABD with a moderate effect size (PRE: 0.30 ± 0.17 Nm/kg; POST: 0.25 ± 0.14 Nm/kg; p=0.051; d=0.76). **CONCLUSION:** In a healthy population, the SFE has little to no effect on the KABD. There was a small decrease in the left KABD in these individuals indicating that in a population with poor mechanics, SFE might be an effective intervention.