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Original Research

Thigh Muscle Activity, Knee Motion, and Impact Force During Side-Step Pivoting in Agility-Trained Female Basketball Players

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Abstract

Context: Improving neuromuscular control of hamstrings muscles might have implications for decreasing anterior cruciate ligament injuries in females.

Objective: To examine the effects of a 6-week agility training program on quadriceps and hamstrings muscle activation, knee flexion angles, and peak vertical ground reaction force.

Design: Prospective, randomized clinical research trial.

Setting: Sports medicine research laboratory.

Patients or Other Participants: Thirty female intramural basketball players with no history of knee injury (age = 21.07 ± 2.82 years, height = 171.27 ± 4.66 cm, mass = 66.36 ± 7.41 kg).

Intervention(s): Participants were assigned to an agility training group or a control group that did not participate in agility training. Participants in the agility training group trained 4 times per week for 6 weeks.

Main Outcome Measure(s): We used surface electromyography to assess muscle activation for the rectus femoris, vastus medialis oblique, medial hamstrings, and lateral hamstrings for 50 milliseconds before initial ground contact and while the foot was in contact with the ground during a side-step pivot maneuver. Knee flexion angles (at initial ground contact, maximum knee flexion, knee flexion displacement) and peak vertical ground reaction force also were assessed during this maneuver.

Results: Participants in the training group increased medial hamstrings activation during ground contact after the 6-week agility training program. Both groups decreased their vastus medialis oblique muscle activation during ground contact.

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Knee flexion angles and peak vertical ground reaction force did not change for either group.

Conclusions: Agility training improved medial hamstrings activity in female intramural basketball players during a side-step pivot maneuver. Agility training that improves hamstrings activity might have implications for reducing anterior cruciate ligament sprain injury associated with side-step pivots.

Keywords: [anterior cruciate ligament](#), [injury prevention](#), [knee sprains](#)

Danielle R. Wilderman, MA, ATC; Scott E. Ross, PhD, ATC; and Darin A. Padua, PhD, ATC, contributed to conception and design; acquisition and analysis and interpretation of the data; and drafting, critical revision, and final approval of the article.

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