

ORIGINAL RESEARCH

ASSOCIATION OF ISOMETRIC STRENGTH OF HIP AND KNEE MUSCLES WITH INJURY RISK IN HIGH SCHOOL CROSS COUNTRY RUNNERS

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ABSTRACT

Background: High school cross country runners have a high incidence of overuse injuries, particularly to the knee and shin. As lower extremity strength is modifiable, identification of strength attributes that contribute to anterior knee pain (AKP) and shin injuries may influence prevention and management of these injuries.

Purpose: To determine if a relationship existed between isometric hip abductor, knee extensor and flexor strength and the incidence of AKP and shin injury in high school cross country runners.

Materials/Methods: Sixty-eight high school cross country runners (47 girls, 21 boys) participated in the study. Isometric strength tests of hip abductors, knee extensors and flexors were performed with a handheld dynamometer. Runners were prospectively followed during the 2014 interscholastic cross country season for occurrences of AKP and shin injury. Bivariate logistic regression was used to examine risk relationships between strength values and occurrence of AKP and shin injury.

Results: During the season, three (4.4%) runners experienced AKP and 13 (19.1%) runners incurred a shin injury. Runners in the tertiles indicating weakest hip abductor (chi-square = 6.140; p=0.046), knee extensor (chi-square = 6.562; p=0.038), and knee flexor (chi-square = 6.140; p=0.046) muscle strength had a significantly higher incidence of AKP. Hip and knee muscle strength was not significantly associated with shin injury.

Conclusions: High school cross country runners with weaker hip abductor, knee extensor and flexor muscle strength had a higher incidence of AKP. Increasing hip and knee muscle strength may reduce the likelihood of AKP in high school cross country runners.

Level of Evidence: 2b

Keywords: Lower extremity muscle strength, medial tibial stress syndrome, patellofemoral pain syndrome, running

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