The drop-jump screening test: difference in lower limb control by gender and effect of neuromuscular training in female athletes


Abstract: BACKGROUND: A valgus lower limb alignment has been noted during noncontact anterior cruciate ligament injuries. A video drop-jump test can indicate an athlete's ability to control lower limb axial alignment in the coronal plane. HYPOTHESES: Female athletes have decreased knee separation distances on landing and acceleration; male athletes have a neutrally aligned lower limb position. A neuromuscular training program will significantly increase knee separation distance in female athletes. STUDY DESIGN: Cohort study; Level of evidence, 2. METHODS: The authors tested 325 female and 130 male athletes aged 11 to 19 years. The distance between the hips, knees, and ankles was measured during a drop-jump test. The separation distance between the knees and ankles was normalized by the hip separation distance. A neuromuscular training program (Sportsmetrics) was completed by 62 female athletes, and their jump-landing characteristics were reexamined. RESULTS: A marked decrease in knee separation distance was found on takeoff in 80% of female athletes and in 72% of male athletes. There was no difference between male and female athletes in the normalized knee and ankle separation distance during the landing and takeoff phases. The knee separation distance on landing was 23 +/- 9 cm in the female athletes and 22 +/- 8 cm in the male athletes. The normalized knee separation distance was 51% +/- 19% in the female athletes and 51% +/- 15% in the male athletes. After training, statistically significant increases were found in the female athletes in the knee separation distance on landing (29 +/- 8 cm, P < .0001) and in the normalized knee separation distance (68% +/- 18%, P < .0001). The trained female athletes had significantly greater knee separation distance and normalized knee separation distance than did the males (P < .0001). CONCLUSIONS: The majority of untrained female and male athletes demonstrated a valgus alignment appearance on the video test. After neuromuscular training, female athletes had improved knee separation distances and a more neutral lower limb alignment on landing and takeoff.