

Identifying specific artificial turf footwear to minimize abnormal biomechanical movements and maximize lower extremity alignment in female college athletes to reduce anterior cruciate ligament (ACL) injuries.

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Abstract

As of late, knee joint injuries - specifically anterior cruciate ligament (ACL) injuries - have become more common, especially in the female athlete population. Understanding the causes of said injury is crucial in preventing future injuries. The purpose of this experiment was to compare the effects of high top, low top, and turf cleats on the biomechanical movement and lower extremity alignment of knee valgus and flexion at foot strike in female athletes. It was hypothesized that valgus angles would steadily increase from turf to low top to high top conditions and that flexion angles would steadily decrease from turf to low top to high top conditions. Fifteen NCAA female college athletes were divided into three groups based on their preferred cleat type. Participants completed sprinting, cutting/pivoting, and jump landing tasks wearing both sneakers and cleats, as knee valgus and knee flexion angles were recorded. No significant results were found, although, on average high top cleats altered knee valgus by $6.4 \pm 9.5^\circ$ and knee flexion by $5.0 \pm 5.6^\circ$. All changes in knee valgus and knee flexion should be driven by neuromuscular training and purposeful injury prevention techniques instilled by the athlete. Cleat type should not drive differences in knee valgus and knee flexion, as was seen in this study. Thus, it was concluded that high top cleats should not be worn when knee joint injury is of concern because said cleats alter biomechanical tendencies more so than turf and low top cleats, though results were insignificant.