GNYACSM Abstract

Relationship Between Ankle Dorsiflexion and Landing Mechanics in Male and Female Division I Student-Athletes

JULIA CATANZANO, STACEY WONG, OFRA POTTORF, CRISTINA LEEK, MICHAEL LEANDROU, ROGER GERLAND, BRIAN DEVEAUX, JAMIE GHIGIARELLI, ADAM GONZALEZ, KATIE SELL

Human Performance Laboratory; Department of Allied Health and Kinesiology; Hofstra University; Hempstead, NY

Category: Undergraduate

Advisor / Mentor: Sell, Katie (Katie.Sell@hofstra.edu)

ABSTRACT

Ankle stability and mobility have been linked to lower limb function and load distribution during weight-bearing activity as joint position may play a role in optimizing landing mechanics and force distribution through the kinetic chain. Ankle stability has also been shown to affect landing mechanics. However, the relationship between ankle function and common evaluations of landing mechanics in athletic populations remains understudied. **PURPOSE:** The purpose of this study was to identify the impact of ankle dorsiflexion (ADF) on landing mechanics in Division I male and female student-athletes. **METHODS:** Landing patterns and ADF were evaluated on 326 Division I athletes during early pre-season following physician clearance. The Landing Error Scoring System (LESS) was used to evaluate landing patterns during a standardized jump-landing task. Student-athletes were then divided into two groups: (1) LESS performance with no errors ($LESS_0$; n = 130, 19.7 ± 1.5 years, 176.3 ± 9.9 cm, 164.7 ± 25.6 lbs) or (2) dysfunctional LESS performance ($LESS_1$; n = 196, 19.9 ± 1.7 y, 174.8 ± 12.2 cm, 163.4 ± 31.5 lbs). ADF was measured with athletes starting in a half-kneeling position from which they were instructed to move the knee forward over the foot without knee deviation while keeping the heel grounded. ADF was recorded using a clinometer app. Data were recorded using mean ± standard deviations, and significant group differences analyzed using independent t-tests. **RESULTS:** The $LESS_0$ group exhibited significantly higher right ADF and left ADF than the $LESS_1$ group (40.8 ± 4.9 vs 38.1 ± 6.4 and 41.3 ± 4.9 vs 38.5 ± 6.5 degrees, respectively). Each comparison showed a moderate effect size was evident for ADF comparisons between $LESS_0$ and $LESS_1$ groups (Cohen's d = 0.47 and 0.48 for the right and left ADF, respectively). **CONCLUSION:** The findings suggest that greater ADF is associated with optimal performance on the LESS test. Athletes with lower ADF may have a higher tendency for compensatory or dysfunctional landing patterns on the LESS test. These results support the importance of maintaining sufficient ADF for reducing injury risk, particularly in sports requiring frequent jumping and bounding tasks.