SEX DIFFERENCES IN FORCE VARIABLES: COMPARING MEN AND WOMEN COLLEGIATE ATHLETES

INTRODUCTORY STATEMENT: Performance in sports often depends on the ability to generate force quickly and efficiently. Force variables, such as reactive strength index (RSI), rate of force development (RFD), relative peak power, and concentric impulse, are critical for success in high-intensity activities like jumping, sprinting, and dynamic changes in direction. Sex-specific variations in biomechanics, including differences in joint angles, muscle activation patterns, and movement mechanics, significantly contribute to the disparities observed in these variables between men and women.
PURPOSE: This study aims to compare sex-based differences in relative force variables during countermovement jumps among collegiate athletes, focusing on relative peak power, concentric jumps among collegiate athletes, focusing on relative peak power, concentric impulse, RSI, RFD, and jump height.
METHODOLOGICAL APPROACH:
Twenty-two collegial athletes (females: n = 11, age = 21.0 ± 1.1 years, height = 175.5 ± 5.4 cm, body mass = 72.1 ± 9.8 kg; males: n = 13, age = 21.3 ± 1.6 years, height = 194.7 ± 8.4 cm, body mass = 95.1 ± 15.9 kg) performed two sets of the countermovement jump on a ForceDecks platform (VALD, CA, USA). An independent samples T-test was run to discern disparities in force variables between men and women collegial athletes.
FINDINGS: The analysis revealed statistically significant differences ($p = <.001$) in relative peak power between men (M + SD: 57.3 W/kg ± 7.5 W/kg) and women (45.5 W/kg ± 5.4 W/kg) athletes. Significant differences ($p = <.001$) were also seen between peak concentric impulse between men (258.8 kg · m/s ± 30.4 kg · m/s) and women (171.6 kg · m/s ± 17.4 kg · m/s) athletes. Relative peak jump height, peak velocity, peak RSI, and peak RFD showed no statistical differences.
CONTRIBUTION TO DISCIPLINE: Strength and conditioning professional can use these findings to design training programs that address sex-specific performance. Targeted interventions to improve relative peak power and concentric impulse in female athletes may enhance performance. Understanding these differences provide deeper insight into training strategies and focus for both men and women.