

ARE THERE DIFFERENCES IN POWER AND VELOCITY OUTPUT BETWEEN SKILL AND BIG SKILL AMERICAN FOOTBALL PLAYERS WHEN PERFORMING COUNTERMOVEMENT JUMPS?

Eric C. Conchola, Tatum D. Robertson, Abbey M. Wahl, Regan M. Walker and Mikayla I. Navarro
University of Central Oklahoma



INTRODUCTION

Countermovement Jumps (CMJ) have allowed health care professionals and coaches the ability to see power and velocity producing capacities with athletes. While positional groups (line, skill, big skill) in American football may produce different CMJ metrics, assessing one's CMJ could be beneficial for assessing athletic talent, and physiological differences by position, status (starter vs. non-starter) and other variables. Thus, the purpose of this study was to see if there are differences in CMJ performance between skill and big skill Division II male football players.

METHODS

During the initial phase of the off-season (first 3 weeks) eight big skill (age = 21.00 ± 2.14 years, mass = 100.44 ± 8.80 kg, height = 186.10 ± 4.34 cm) and twelve skill (age = 20.00 ± 1.76 years, mass = 80.33 ± 6.67 kg, and height = 181.78 ± 4.92 cm) division II collegiate football athletes volunteered for the study. Any upper or lower extremity injuries resulted in exclusion from the study. A wireless uniaxial dual force plate system (Hawkin Dynamics) was used to measure countermovement performance, (vertical jump height (VJH), average power (AP), peak power (PP), average velocity (AV), peak velocity (PV), takeoff velocity (TV), average relative power (ARP) and peak relative power (PRP)). Each participant performed three countermovement jumps and fifteen-thirty seconds of rest were allowed in-between attempts. The best jump was included per participants for analysis. A Mann-Whitney U test was used to assess differences between positions for all jumping metrics, and an alpha of 0.05 was used for level of significance

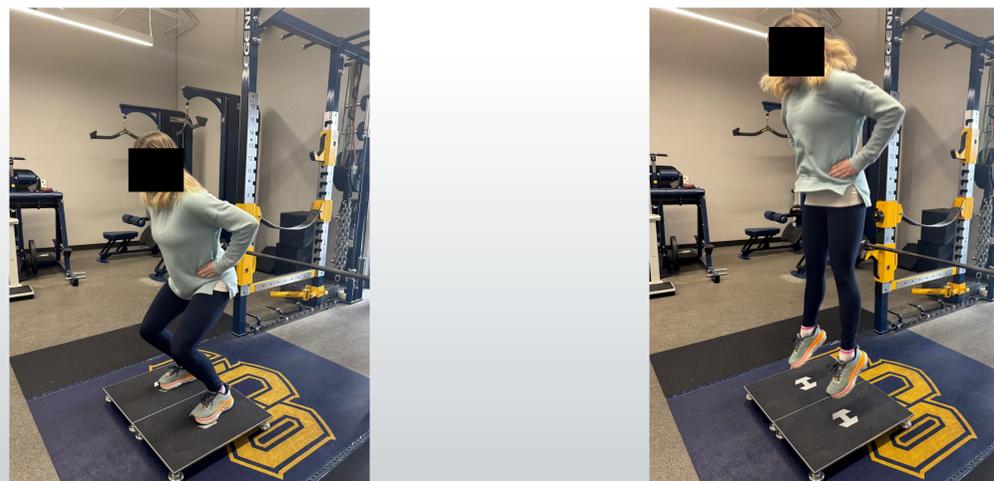


Figure 1. Includes pictures of the countermovement jump (CMJ) during the lowering (braking) and jumping (propulsive) phases. Participants were instructed to keep hands on their hips the whole time and were asked to jump as high as they could.

Table 1. Mean (standard deviation) values for age, body mass, height by player grouping

Position	Age (yr)	Body Mass (kg)	Height (cm)
Skill	20.00 (1.76)	80.33 (6.67)	181.78
Big Skill	21.00 (2.14)	100.44 (8.80)	186.10 (4.34)

Table 2. Average (SD) values for countermovement jump metrics for skill and big skill American football positional groupings

Metrics	Skill	Big Skill	P-value
Jump Height (cm)	49.24 (6.19)	47.10 (10.37)	p = 0.343
Average Propulsive Power (W)	3102.10 (613.80)	3523.96 (468.54)	p = 0.098
Peak Propulsive Power (W)	5363.68 (901.85)	6324.68 (658.64)*	p = 0.007
Average Propulsive Velocity (m·s ⁻¹)	1.85 (0.15)	1.77 (0.19)	p = 0.270
Peak Propulsive Velocity (m·s ⁻¹)	3.19 (0.19)	3.12 (0.32)	p = 0.384
Takeoff Velocity (m·s ⁻¹)	3.10 (0.20)	3.02 (0.33)	p = 0.343
Average Relative Propulsive Power (W · kg ⁻¹)	38.26 (5.43)	35.32 (5.39)	p = 0.270
Peak Relative Propulsive Power (W · kg ⁻¹)	66.25 (7.16)	63.52 (8.89)	p = 0.521

*Denotes significant difference between player groupings ($P \leq 0.05$)

RESULTS

The present findings observed significant differences for PP ($p = 0.007$), while no differences were observed for JH, AP, AV, PV, TV, ARP, or PRP ($p = 0.098-0.384$).

CONCLUSIONS

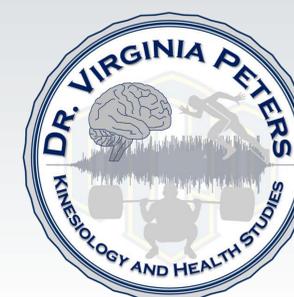
Interestingly, the present study only observed one significant difference (PP), all other power, and velocity-based metrics were non-significant when comparing skill and big skill positions in division II male football players. Although there were large differences in mass for big skill vs. skill players (100.44 vs. 80.33 kg), when related to average power and all velocity metrics, similar outputs were seen between positions

PRACTICAL APPLICATIONS

Position specific profiles (skill vs. big skill) may be observed when a CMJ is assessed via force plates. While the present study found small differences (PP) with power and velocity, coaches, strength and conditioning staff, and sport scientists may want to measure these metrics across training seasons (Off, Pre, In, Post) to see if differences persist, and if they do, do they remain constant, or do they fluctuate across seasons, training weeks, and or games.

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