COMPARISON OF DROP JUMP PERFORMANCE IN MALE VERSUS FEMALE COLLEGIATE TRACK ATHLETES

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INTRODUCTION

- In collegiate athletics, both male and female teams undergo similar training within the same sport.
- However, male athletes typically outperform female athletes in strength, jump, and sprint absolute performances, or in maximum muscle power.
- The drop jump (DJ) is an effective measure of plyometric ability, which is important for track athletes.
- Yet, the difference in absolute and relative DJ performance between male and female athletes has not been fully explored.

PURPOSE

- To compare DJ performance variables between male and female track athletes with or without accounting for body weight.

METHODS

- Twenty-two NCAA Division I track athletes (n = 10 males, n = 12 females) participated in this study.
- Each athlete underwent a series of three DJ trials during their indoor pre-season testing session from a 45.72 cm platform onto two force platforms sampling at 1000Hz.
- The best trial was subsequently used for analysis.
- DJ variables compared were drop jump height, reactive strength index (RSI), stiffness, as well as absolute and relative measures of peak breaking force, peak propulsive force, eccentric impulse, and concentric impulse.
- Independent samples t-test were used to compare the differences between the drop jump variables of male and female athletes with effect size determined by a Cohen's d.
- Significance was set at $p < 0.05$ for all analysis.

Table 1: Mean and Standard Deviation & Pairwise Analysis

	Males	Females	T - Test Analysis		
	Mean ± SD	Mean ± SD	t value	p value	Cohen's d
Jump Height (cm)	39.68 ± 9.29	34.43 ± 5.14	-1.68	0.11	-0.72
RSI	1.88 ± 0.50	1.79 ± 0.34	-0.49	0.63	-0.21
Absolute Peak Breaking Force	5432.68 ± 1410.69	4632.60 ± 1203.31	1.44	0.17	-0.62
Stiffness	46.88 ± 27.85	40.08 ± 18.12	-0.69	0.5	-0.3
Absolute Peak Propulsive Force	4256.33 ± 897.23	3343.08 ± 761.63	-2.58	0.018	-1.11
Absolute Eccentric Impulse	295.98 ± 52.30	211.76 ± 15.87	-5.32	<0.001	-2.28
Absolute Concentric Impulse	322.46 ± 53.63	235.74 ± 25.13	-4.99	<0.001	-2.14
Relative Peak Breaking Force	68.38 ± 17.90	72.91 ± 12.75	0.69	0.49	0.29
Relative Peak Propulsive Force	53.50 ± 10.91	52.95 ± 9.90	-0.12	0.9	-0.05
Relative Eccentric Impulse	3.70 ± 0.48	3.39 ± 0.30	-1.83	0.08	-0.78
Relative Concentric Impulse	4.03 ± 0.47	3.76 ± 0.29	-1.61	0.12	-0.69

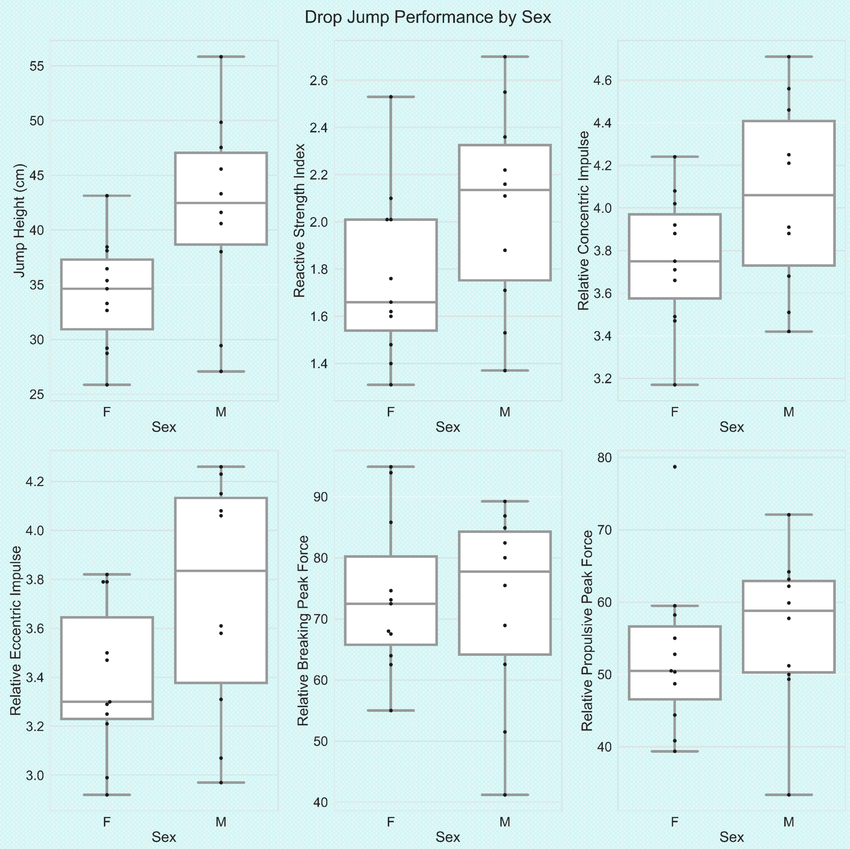

Figure 1: Illustrates the comparison of drop jump variables by sex.

RESULTS

- There was no statistically significant difference between jump height (cm) ($t = -1.68$, $p = 0.11$, $d = -0.72$), RSI ($t = -0.49$, $p = 0.63$, $d = -0.21$), absolute peak breaking force (N) ($t = -1.44$, $p = 0.17$, $d = -0.62$), and stiffness ($t = -0.69$, $p = 0.50$, $d = -0.296$).
- There were differences between male and female athletes when referring to some of the absolute measures, including absolute peak propulsive force (N) ($t = -2.58$, $p = 0.018$, $d = -1.11$), absolute eccentric impulse (N/s) ($t = -5.32 = <0.001$, $d = -2.28$) and absolute concentric impulse (N/s) ($t = -4.99$, $p = <0.001$, $d = -2.14$).
- There were no differences in relative peak breaking force (N/kg) ($t = 0.69$, $p = 0.49$, $d = 0.29$), relative peak propulsive force (N/kg) ($t = -0.12$, $p = 0.90$, $d = -0.05$), relative eccentric impulse (N/s/kg) ($t = -1.83$, $p = 0.08$, $d = -0.78$) and relative concentric impulse (N/s/kg) ($t = -1.61$, $p = 0.12$, $d = -0.69$). (See table 1).

CONCLUSION

- Upon analysis, significant differences were found between male and female athletes in relation to absolute measures of both eccentric and concentric impulse, as well as the peak propulsive force.
- However, after accounting for body weight, there were no differences in any DJ performance variables between male and female track athletes.

PRACTICAL APPLICATIONS

- The similar performance in DJ variables suggest that male and female track athletes can be trained similarly resulting in similar relative performance in the drop jump.