

A COMPARISON OF DROP JUMP PERFORMANCE AMONG COLLEGIATE FOOTBALL BASKETBALL AND TRACK ATHLETES



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INTRODUCTION

- The drop jump (DJ) is a commonly utilized to assess the stretch shortening cycle utilization in collegiate athletes.
- While sports such as football, basketball, and track all utilize the stretch shortening cycle, it is unclear to what extent the differences in sport kinematic demands affect stretch shortening cycle capacity.

PURPOSE

- To examine differences in DJ performance among collegiate football, basketball, and track athletes.

METHODS

- A total of 66 male collegiate athletes (n = 39 football players, n = 12 basketball players, & n = 15 track sprinters and jumpers) participated in this study
- Athletes performed two to three trials of the DJ from a 45.72cm platform with hands akimbo on two force platforms sampling at 1000Hz.
- One to two minutes of rest were provided between jump trials.
- Individual linear mixed-models were constructed for each dependent variable (reactive strength index (RSI), peak propulsive force, and propulsive impulse) with Sport and Jump Trial as a Fixed Factor and an interaction of Sport*Jump Trial with each athlete as a random intercept.
- More specifically, a generic model was constructed as $y = \text{Sport} * \text{Trial} + (1 | \text{Athlete})$.
- Models met all the statistical assumptions and model performance was determined using AIC, BIC, and R2.

Table 1. Illustrates the Means \pm SD of each variable of interest by sport and trial

	Jump Height (cm)			RSI			Peak Propulsive Force			Concentric Impulse		
	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3	Trial 1	Trial 2	Trial 3
Basketball (n=12)	30.64 \pm 4.00	31.47 \pm 4.84		0.78 \pm 0.20	0.80 \pm 0.22		2783.55 \pm 653.14	2764.50 \pm 539.66		415.64 \pm 89.91	421.24 \pm 94.27	
Football (n=39)	29.93 \pm 7.20	31.13 \pm 6.77	31.31 \pm 7.53	0.78 \pm 0.21	0.82 \pm 0.24	0.83 \pm 0.26	2604.73 \pm 593.38	2578.83 \pm 743.37	2642.78 \pm 686.91	391.67 \pm 78.42	395.41 \pm 80.32	396.80 \pm 87.41
Track (n=15)	39.60 \pm 8.77	38.63 \pm 9.70	38.00 \pm 9.35	1.80 \pm 0.50	1.87 \pm 0.61	1.89 \pm 0.55	4018.21 \pm 842.72	4111.03 \pm 1084.38	4179.70 \pm 864.40	320.47 \pm 54.78	314.87 \pm 57.63	307.80 \pm 50.85

RESULTS

- There was a significant Sport*Trial interaction for jump height suggesting that track athletes decreased jump height by 3.08cm (CI=5.85-0.31, R2=0.852, p=0.029) between trials.
- Additionally, there was a main effect for Sport suggesting that track athletes jumped 8.81cm higher (CI=2.79-14.83, R2=0.852, p=0.004) than the football and basketball athletes.
- For RSI there was a main effect for Sport with track athletes having a 0.97 higher RSI (CI=0.71-1.24, R2=0.953, p<0.001) than the football and basketball athletes.
- Lastly, for propulsive peak force there was a main effect for Sport suggesting that peak force was 19.95 N/kg higher (CI=13.09-26.82, R2=0.929, p<0.001) in track athletes than the basketball and football athletes.
- There was no Sport*Trial interaction or main effect for Sport for concentric impulse.

CONCLUSION

- Track athletes appear to have greater stretch shortening cycle capacity provided a higher jump height, RSI, and propulsive peak force during the DJ.
- Additionally, there were no differences in DJ performance between collegiate football and basketball athletes.

PRACTICAL APPLICATIONS

- This study highlights the differences in stretch shortening cycle utilization between collegiate sports with track athletes exhibiting greater utilization than basketball and football athletes.

Football, Basketball, and Track Drop Jump Comparison

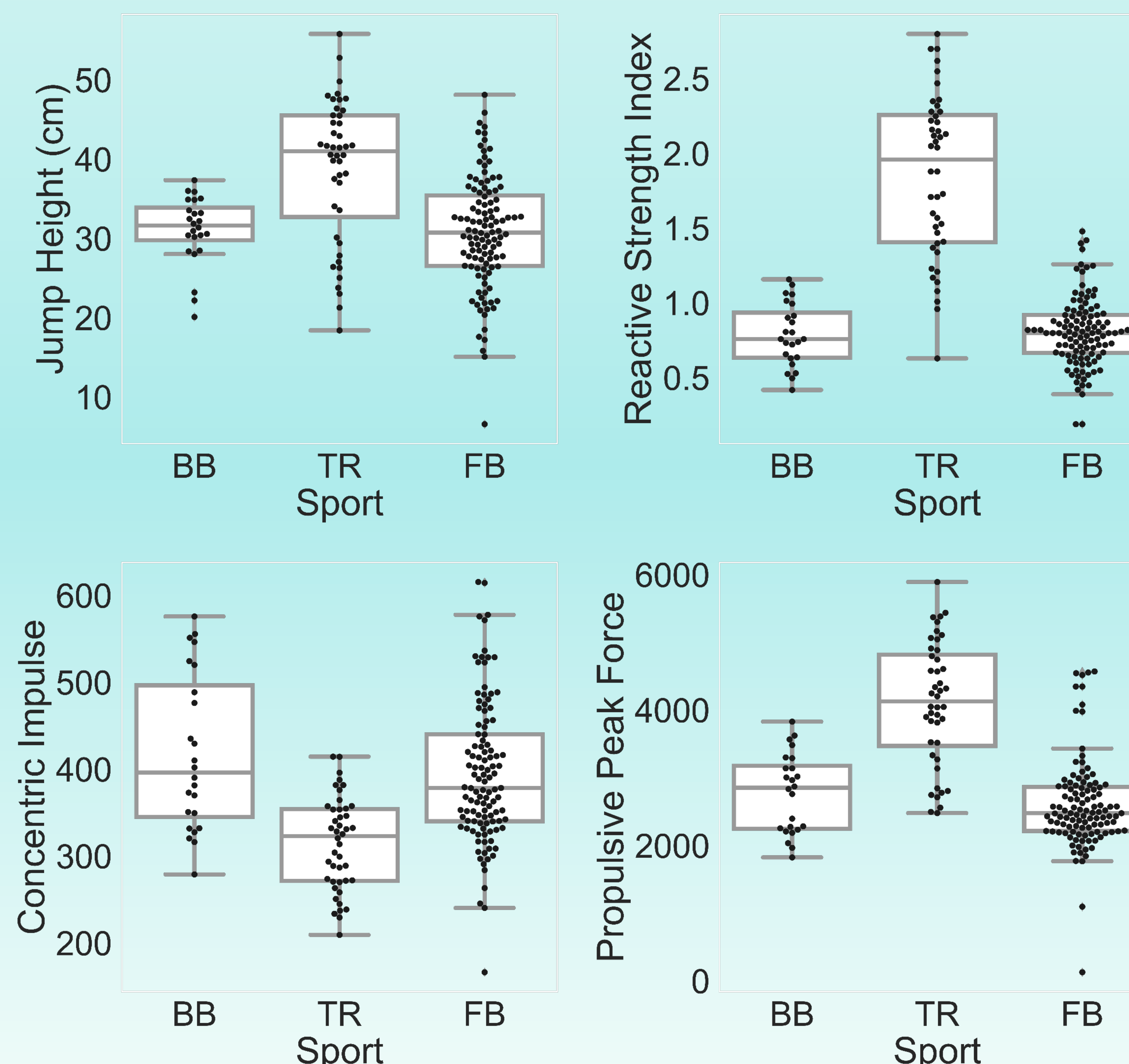


Figure 1. Illustrates the differences in drop jump metrics by sport.