A COMPARISON OF SPRINT PROFILE MEASURES BETWEEN COLLEGIATE MALE FOOTBALL, BASKETBALL, AND TRACK ATHLETES

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INTRODUCTION

- Horizontal force-velocity (F-v) profiling, or sprint profiling, is a tool that provides insight to the mechanical components related to sprint acceleration
- Sprint F-v profiling highlights variables like relative force (N/kg), relative peak power (Pmax) (W/kg), velocity (m/s), and the ability to orient force in a horizontal direction (RFpeak), which can be utilized to design training programs

PURPOSE

- To compare measurements obtained through sprint F-v profiling between collegiate male basketball (BB), football (FB), and track (TR) athletes

METHODS

- Fifty-one NCAA Division I collegiate male athletes (n=31 football, n=10 basketball, n=10 track) participated in this study
- Each athlete performed two trials of a 30-meter sprint acceleration with the best trial used for analysis. Sprint F-v profiling measures were calculated using the MySprint mobile application
- A one-way analysis of variance was conducted to compare sprint profile variables between sports
- Post-hoc pairwise comparisons were conducted as needed using a Tukey correction with Cohen's d as a standardized effect size
- Significance was set at p<0.05

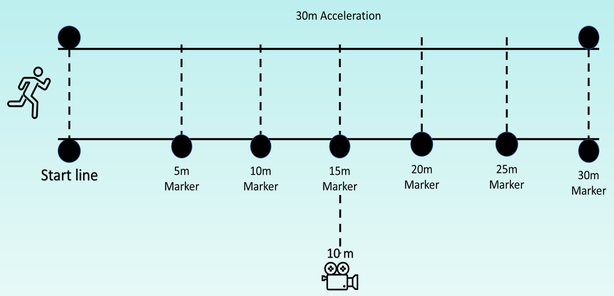

Figure 1. Illustrates the testing set up for sprint profile assessments

Table 1. Comparison of sprint profile variables between sport subsets

	RFpeak	Relative Force	Max Power	Velocity
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Basketball	0.66±0.02	20.99±4.86*ǂ	38.71±7.88*ǂ	7.42±0.47*ǂ
Football	0.66±0.02	14.77±1.42	31.18±3.74	8.46±0.40
Track	0.67±0.02	13.88±0.99	31.49±3.38	9.07±0.69

* Denotes significant difference from the football group; ǂ Denotes significant difference from the Track Group

Figure 2. Comparison of sprint profile variables between Track (TR), Basketball (BB), and Football athletes (FB)

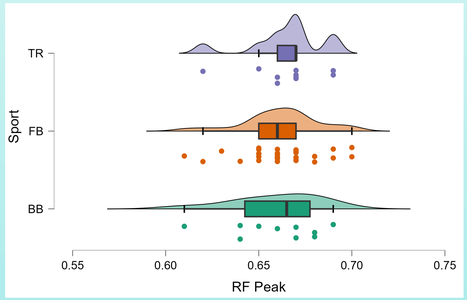

Figure 2a. RFpeak

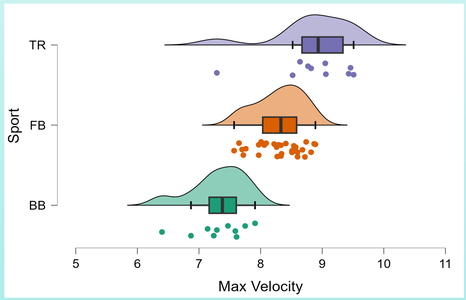

Figure 2b. Maximum Velocity

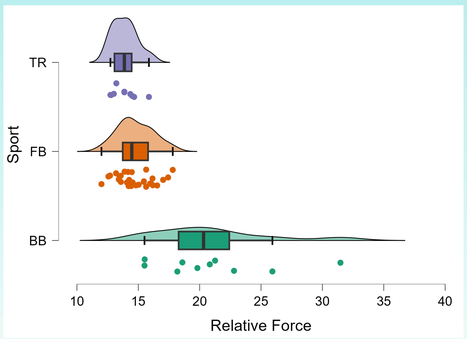

Figure 2c. Relative Force

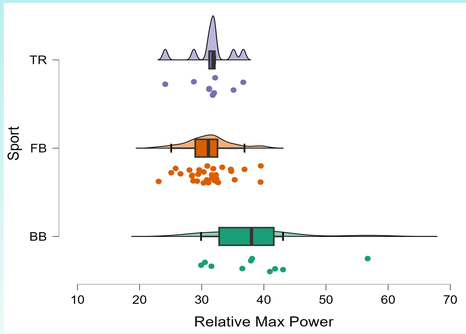

Figure 2d. Relative Max Power

RESULTS

- There were no differences in RFpeak between BB (0.66±0.02), FB (0.66±0.02), and TR (0.67±0.02) (p=0.82, eta^2=0.008)
- There was a significant difference in relative force (p<0.001, eta^2=0.54) with post-hoc pairwise comparisons indicating that BB (20.99±4.86 N/kg) had higher relative force than FB (14.77±1.42 N/kg, mean difference=6.22, p<0.001, d =2.56) and TR (13.88±0.99 N/kg, mean difference=7.11, p<0.001, d=2.92)
- Similarly, there was a significant difference in relative Pmax (p<0.001, eta^2=0.29) with post-hoc pairwise comparisons indicating that BB (38.71±7.88 W/kg) had higher relative Pmax than FB (31.18±3.74 W/kg, mean difference=7.53, p<0.001, d=1.59) and TR (31.49±3.38 W/kg, mean difference=7.22, p<0.004, d=1.52)
- For velocity (p=<0.001, eta^2=0.563), both FB (8.46±0.40 m/s, mean difference=-1.04, d=-2.18) and TR (9.07±0.69 m/s, mean difference=-1.65, d=-3.44) had significantly higher values than BB (7.42±0.47 m/s).

CONCLUSION

- BB, FB, and TR athletes exhibit a strong ability to orient force in a horizontal direction, showing that they perform sprint acceleration with high mechanical effectiveness
- BB displayed a significantly higher Pmax and relative force than both FB and TR and had a force-oriented profile
- FB and TR athletes lean towards a velocity-oriented profile

PRACTICAL APPLICATIONS

- The difference in sprint profile measures among collegiate male athletes suggest that FB and TR athletes may need to improve in relative force and relative peak power through optimized training
- Likewise, BB athletes may benefit from improved velocity training

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