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Isokinetic data related to rate of force development is better correlated to acceleration sprint performance than peak torque.

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## INTRODUCTION:

Isokinetic tests are commonly used for strength assessment in athletes. Previous data support a relationship with knee strength and sprint acceleration performance [1], although not unanimous [2]. However, due to velocity component of sprint performance, is to be expected that isokinetic data associated with rapid force capacity would be better related with acceleration sprint performance (0-40 m) when compared to peak torque data. Therefore, the aim of this study was to investigate the association between isokinetic data associated with rapid force capacity or peak torque and acceleration sprint performance, and compare with traditional repetition maximum (RM) test.

## **METHODS:**

Seven national level male sprinters (age: 24.14±6.64) completed a 40-m sprint (mean: 5.35±0.19), 6 RM strength test and knee extension and flexion for 5 and 30 repetitions at 90% sec and 180% sec on an isokinetic dynamometer. Isokinetic assessment was tested for peak torque, average peak torque, torque at 0.18 seconds and time to peak torque. Measurements involved one testing day of 6 RM and isokinetic data, and a second testing day of three 40-m sprint trials. Photocells were positioned on every 10-m from the start, the best sprint trial for each participant was used. RM tests were conducted for squat and stiff exercises and were analyzed as absolute load lifted and relative load lifted to body weight. Pearson's correlation test was used to assess the association between data. Correlations were classified as trivial, (<0.1), small (0.1 – 0.29), moderate (0.3 – 0.49), large (0.5 - 0.69), very large (0.7 - 0.89) and almost perfect (0.9 - 0.99) (3). Significance was set at p 0.05. **RESULTS:** 

Very large correlations were found between 10 to 20-m sprint time with time to peak torque at 90° for extension for right and left leg (r= 0.772 and 0.875, respectively; p < 0.05). Very large correlations were found between 20 to 30-m sprint time with time to peak torque at 90° and 180° for extension, both for left leg (r= 0.789 and 0.822, respectively; p < 0.05) and with 6 RM stiff absolute load (r= -0.865; p < 0.05). Very large correlations were found between 30 to 40-m sprint time with time to peak torgue at 90° and 180° for extension, both for left leg (r= 0.755 to 0.783; p < 0.05), average peak torque at 180 for flexion for right leg (r= 0.764; p < 0.05), 6 RM relative stiff load (r= -0.878; p < 0.05) and almost perfect correlations with 6 RM squat relative load (r= -0.954; p < 0.05). CONCLUSION:

Time to peak torque, average peak torque and 6 RM strength test were associated with sprint time. However, time to peak torque was consistently correlated with sprint time across a larger split range (10 to 40-m), differently from average peak torque (30 to 40-m) indicating a more reliable isokinetic data to assess sprint performance. Compared to isokinetic data, 6 RM presented larger correlation but only in (20 to 40-m split). 1. Newman et al. (2004) 2. Kabacinski et al. (2022) 3. Sawilowsky (2009)

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Presentation

Poster

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