

# SPORT-SPECIFIC DIFFERENCES IN INTERLIMB ASYMMETRIES DURING THE ISOMETRIC MID-THIGH PULL IN COLLEGIATE ATHLETES

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## INTRODUCTION

The isometric mid-thigh pull (IMTP) can be used to measure interlimb asymmetries in force production, which may be associated with reduced athletic performance and increased risk of injury.

While asymmetries have been studied in general populations, there is a lack of data comparing these asymmetries across collegiate sports such as football, basketball, and track.

## PURPOSE

The purpose of this study is to examine differences in peak force asymmetries, rate of force development (RFD), and net force asymmetries across multiple time epochs during the isometric mid-thigh pull (IMTP) among athletes from three collegiate sports.

## METHODS

This study was conducted with 138 collegiate athletes (n=138; Football=108, Basketball=14, Track=16) who performed bilateral IMTP assessments on two force platforms.

The variables measured included peak force asymmetry percentage, net force asymmetry at multiple epochs (50ms, 100ms, 150ms, 200ms, 250ms), and RFD asymmetry at the same time intervals.

These asymmetries were quantified using the equation (higher value- lower value)/total\*100.

Linear mixed models were used to determine the effect of sport on each asymmetrical measure

Body mass was not included as a covariate, which may influence the interpretation of findings.

## RESULTS

The peak force asymmetry was significantly greater in track athletes who had a mean of 14.43%, while football had 7.57% and basketball had 8.78% (p=0.014) (See Figure 1).

The net force asymmetry for all measurements (50ms, 100ms, 150ms, 200ms, and 250ms) for all three sports exhibited significant differences (p<0.05) (See Table 1).

Basketball athletes demonstrated significantly higher net force asymmetry at each epoch compared to football and track athletes (p<0.01).

The greatest peak force asymmetries were displayed in track athletes while the greatest net force asymmetries were found in basketball.

Finally, RFD asymmetries at each epoch had no significant differences among the three sports (p>0.05).

## CONCLUSION

In summary, comparing the interlimb asymmetry values for peak force, net force, and RFD yielded results that suggest sport-specific neuromuscular demands.

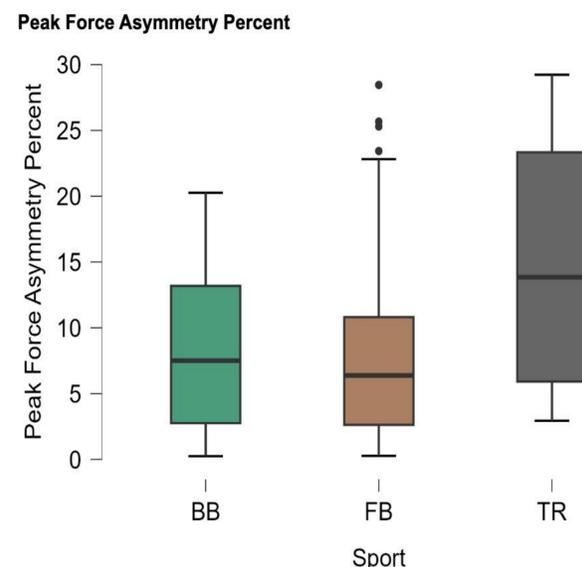
Track athletes exhibited the highest rate of peak force asymmetry which may be the result of the unilateral nature of some track events like jumps and hurdles.

Basketball athletes demonstrated consistently higher net force asymmetry across all epochs which may indicate potential differences in movement adaptations compared to the other sports.

## PRACTICAL APPLICATIONS

Examining asymmetry differences across collegiate sports may clarify their sport-specific demands and illuminate expected variations among the three sports.

Understanding asymmetry differences in various collegiate sports could help coaches and trainers tailor training to reduce muscle imbalance and optimize performance.



**Figure 1.** Illustrates differences in peak force asymmetries between basketball (BB), football (FB), and track athletes (TR)

**Table 1.** Illustrates a comparison of Peak Force, Net Force and RFD across epochs in IMTP among three collegiate sports

	Net Force 50ms	Net Force 100ms	Net Force 150ms	Net Force 200ms	Net Force 250ms	RFD 50ms	RFD 100ms	RFD 150ms	RFD 200ms	RFD 250ms
<b>Basketball</b>	52.04 ± 14.95‡,‡	30.49 ± 14.17‡,‡	23.72 ± 12.11‡,‡	17.60 ± 9.40‡,‡	15.92 ± 10.0‡,‡	34.60 ± 7.72	32.81 ± 6.13	32.505 ± 6.263	32.89 ± 8.93	34.31 ± 16.15
<b>Football</b>	6.10 ± 4.15	6.46 ± 4.78	6.72 ± 4.94	7.00 ± 5.40	6.95 ± 5.19	18.36 ± 17.59	16.79 ± 16.90	17.074 ± 15.262	15.81 ± 15.39	16.11 ± 18.47
<b>Track</b>	7.90 ± 6.09	8.89 ± 7.31	8.57 ± 5.11	8.72 ± 4.80	10.23 ± 6.16	23.60 ± 27.56	18.65 ± 14.67	16.789 ± 9.639	15.70 ± 10.04	18.00 ± 11.41

RFD = rate of force development, \* denotes significant difference from basketball, ‡ denotes significant difference from football, † denotes significant difference from track