ASSOCIATION BETWEEN STEP LENGTH, FLIGHT TIME, CONTACT TIME AND ISOMETRIC MID-THIGH PULL ASYMMETRY

[1]David Rincon Cruz, [1]Matthew P. Gonzalez, PhD, CSCS*D, [2]Michelle Aldana, [2,3]Samuel Montalvo, PhD, CSCS*D, CPSS,
[3]Martin Dietze-Hermosa, PhD, CSCS*D, & [1]Sandor Dorgo, PhD, CSCS*D, FNSCA
[1]The University of Texas at San Antonio, San Antonio TX.
[2]Wu Tsai Human Performance Alliance, Stanford Medicine, Stanford University, CA.
[3]Brigham Young University – Idaho, Rexburg, ID

INTRODUCTION

- Sprint kinematics such as step length, flight time and contact time are various metrics that allow us to assess stride patterns to optimize sprinting mechanics for maximal speed.
- The isometric mid-thigh pull (IMTP) is often used to assess ground reaction forces, peak force, and rate of force development.
- The association between asymmetries in sprint kinematics and IMTP performance remains unclear.

PURPOSE

- To assess the association between step length, flight time and contact time asymmetry in a 30-meter fly sprint and peak force asymmetry in the IMTP.

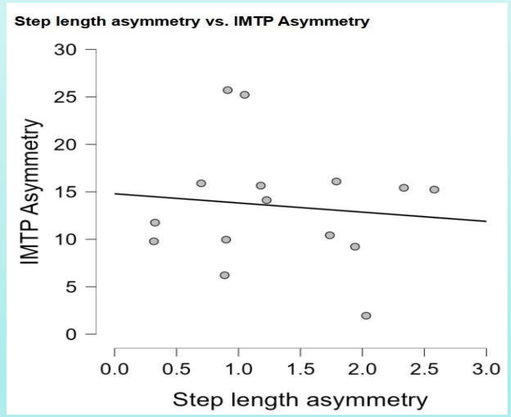
METHODS

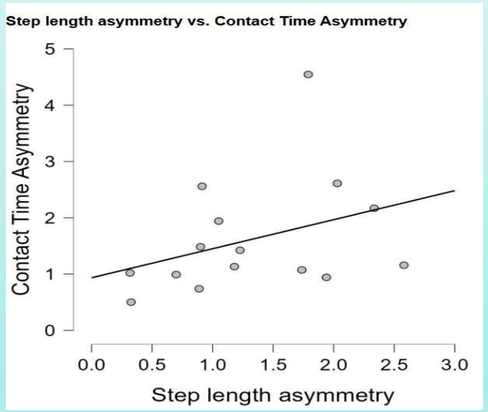
- A group of 15 collegiate track athletes (males = 5, females = 10) who compete in spirting, jumping, or hurdle events performed a 30 m fly sprint and the IMTP.
- Athletes performed one to two trials of sprints with step kinematics, contact time and flight time was measured using photoelectric cells.
- Athletes also performed two to three trials of IMTP using a force platform under each foot.
- Interlimb asymmetries were quantified for step length, flight time, contact time and IMTP peak force measures using the equation: (higher value – lower value)/total*100.
- A Spearman's (r) correlation coefficient was conducted to examine the association between step length, flight time, contact time and IMTP peak force asymmetries.

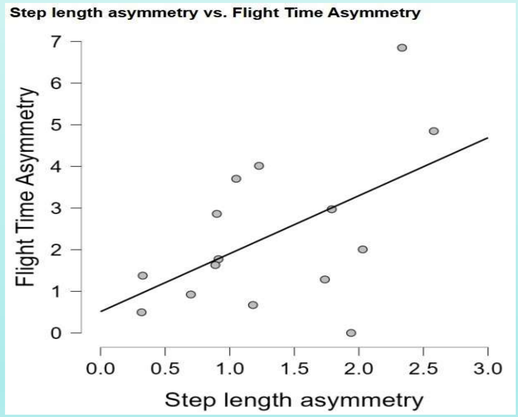
RESULTS

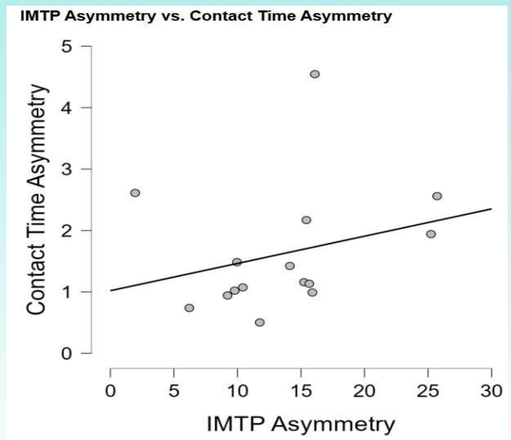
- Correlation analyses indicated predominantly non-significant associations between asymmetry measures. Key finding include:

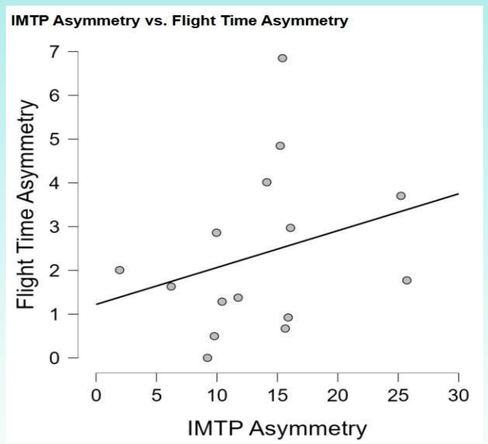
		Spearman's rho	p-value
Step Length Asymmetry	IMTP Asymmetry	0.007	0.985
Step Length Asymmetry	Contact Time Asymmetry	0.500	0.060
Step Length Asymmetry	Flight Time Asymmetry	0.489	0.067
IMTP Asymmetry	Contact Time Asymmetry	0.404	0.137
IMTP Asymmetry	Flight Time Asymmetry	0.314	0.254
Contact Time Asymmetry	Flight Time Asymmetry	0.629	0.014

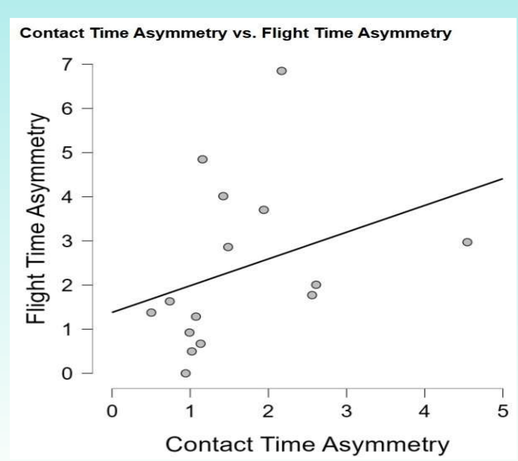












CONCLUSION

- The findings of this study indicated that there is no significant association between step length, flight time, contact time and IMTP asymmetry collegiate track athletes.
- This suggests that asymmetries in sprint-specific kinematics and maximal strength in collegiate track athletes may be independent factors.

PRACTICAL APPLICATIONS

- In collegiate track athletes, coaches should separate assessment and training in sprint mechanics and strength asymmetries, as these metrics may be reflected independently.