

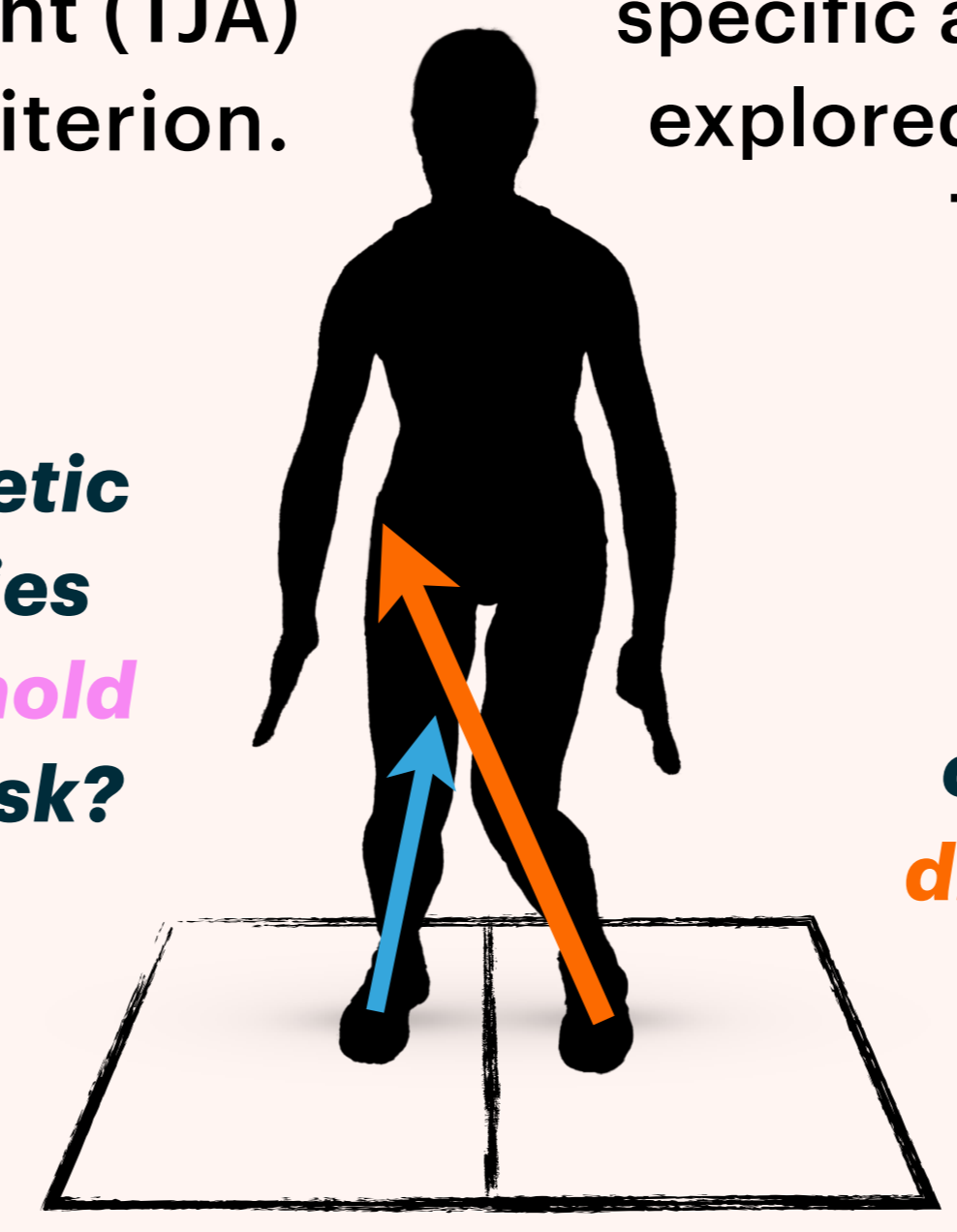
KINETICS DURING THE TUCK JUMP ASSESSMENT EXPOSE SIGNIFICANT CHANGES TO INTERLIMB ASYMMETRIES



Interlimb kinematic asymmetries are an important component of the tuck jump assessment (TJA) quality criterion.

The magnitude of interlimb kinetic asymmetries is task-specific and yet to be explored during the TJA.

Are TJA kinetic asymmetries >10% threshold for injury risk?



Do kinetic asymmetries change during different phases of the TJA?

PURPOSE

AIM(s):
 (a) Analyse interlimb kinetic asymmetries of the TJA; and
 (b) Determine if interlimb kinetic asymmetries changed during the first (C1) and second half (C2) of the TJA.

METHODOLOGY

12 healthy females
 Age 22.0 ± 4.6 yrs; height 1.69 ± 0.07 m; body mass 69.3 ± 10.3 kg.

Repeated tuck jumps
 3x ten-second trials on two Kistler force plates.

Kinetic variables
 Relative peak force, average and instantaneous loading rate, and total impulse calculated.

Symmetry calculation
 $SI\% = (\text{high} - \text{low}) / \text{Total} \times 100$
 Trial with the highest mean asymmetry used for analysis.

Statistics
 First 12 jumping cycles separated into cycles 1-6 (C1) and 7-12 (C2). Paired t-tests and Hedges' g effect sizes.

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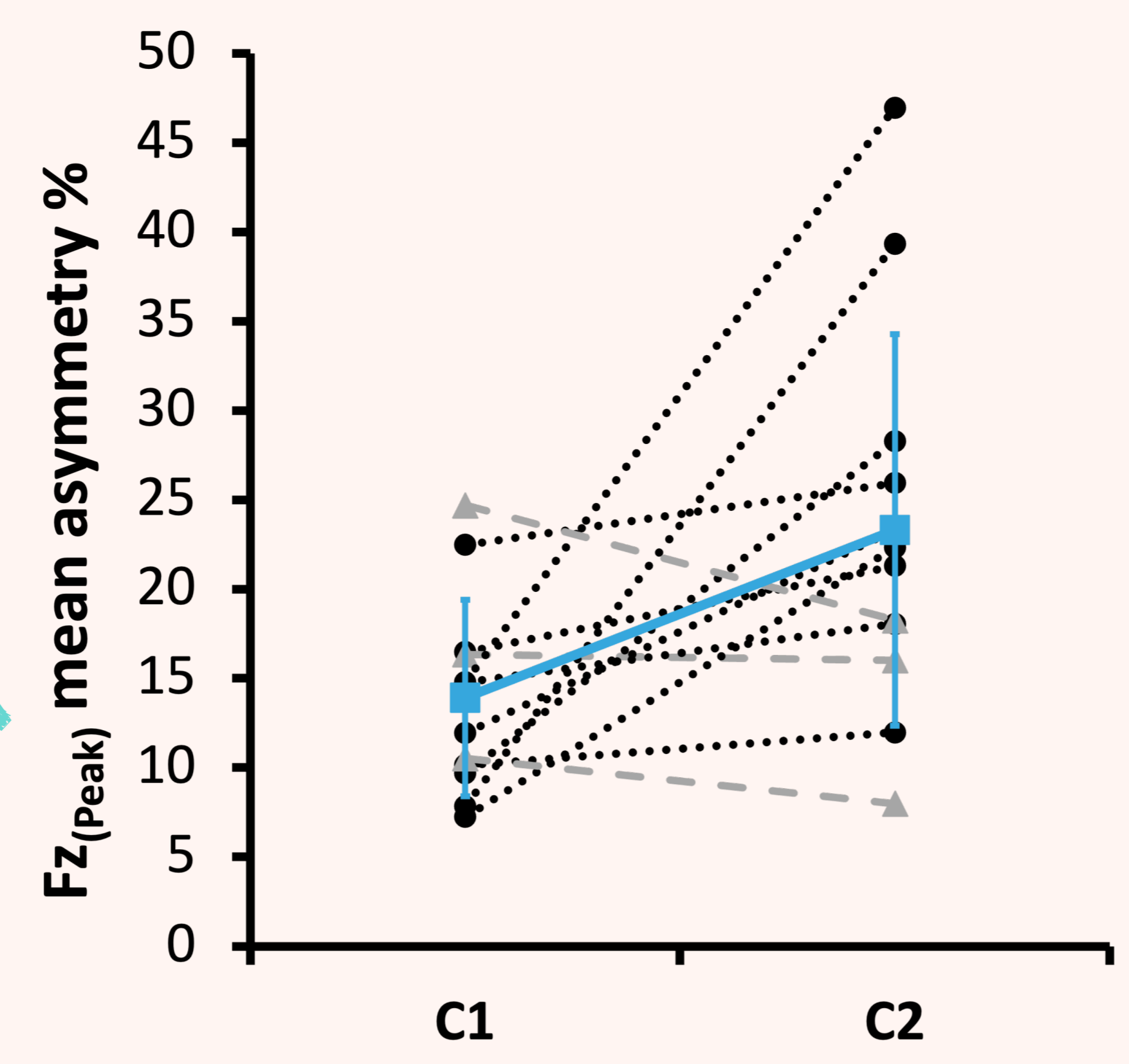
RESULTS

Table 1. Interlimb kinetics and asymmetries during different phases of the TJA

Variable	C1		C2		p	% Change	Effect Size (g)
	Mean ± SD	Mean asymmetry (%)	Mean ± SD	Mean asymmetry (%)			
Fz _(Peak) (BW)	2.73 ± 0.28	13.91	2.77 ± 0.44*	23.30	0.02	67.57	0.69
LR _(Av) (BW·s ⁻¹)	57.85 ± 11.67	20.24	58.57 ± 13.34	27.65	0.06	36.64	0.56
LR _(Ins) (BW·s ⁻¹)	71.37 ± 15.99	22.99	74.94 ± 11.34	27.57	1.72	19.90	0.39
Imp _(Total) (BW·s)	0.31 ± 0.03	14.29	0.32 ± 0.03	21.55	0.06	50.73	0.57

C1 – jumping cycles 1-6; C2 – jumping cycles 7-12; Fz_(Peak) – peak vertical ground reaction force; LR_(Av) – average loading rate; LR_(Ins) – instantaneous loading rate; Imp_(Total) – total impulse; BW – body weight; *p < 0.05; g – Hedges' g effect size.

“A moderate significant increase in mean SI% was observed between C1 and C2 for Fz_(Peak)”



CONCLUSIONS

>10% Mean asymmetry values for all variables & all jumping cycles

68% Fz_(Peak) asymmetry in the 2nd half of the TJA

Fatigue and diminished feed-forward responses may increase the magnitude of asymmetry in Fz_(Peak) due to athletes adopting a greater leg dominance strategy.

APPLICATIONS

Measure **kinetics** of the TJA to supplement the 2D analysis

Analyse the **magnitude** and **change** of **interlimb kinetic asymmetries** during the TJA

Identify leg dominance strategies that may **increase risk of ACL injury**

