

3-2016

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Recommended Citation

Walker, Josh; Clarke, Sarah B.; Waller, Emma; Robey-Broome, Aaron; and Jensen, Randall L., "Reactive strength index-modified in different plyometric tasks" (2016). *Conference Presentations*. 155.

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COMPARISON OF CLINICAL VERSUS MECHANICAL MEASUREMENTS IN DETECTING LOWER LIMB ASYMMETRIES ASSOCIATED WITH A SECOND ACL INJURY [View project](#)

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Reactive Strength Index-modified in different plyometric tasks

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Purpose

Plyometric exercise training is thought to be essential for the development of the stretch-shortening cycle¹ and can therefore be used to improve performance measures such as vertical jump height².

Reactive Strength Index-modified

(RSI_{mod}) is a reliable method of measuring an athlete's explosiveness during plyometric exercises such as depth jumps and countermovement jumps¹.

The purpose of the research was to measure the **between-limb differences** in RSI_{mod} across three plyometric tasks. The research also investigated differences in RSI_{mod} between the three tasks for both limbs.

Method

Participants:

N=11, Recreationally-active, Age = 20.4 ± 1.5 years, Height = 1.74 ± 0.07 m, Body mass = 80.1 ± 12.9 kg.

Standardised warm-up on a cycle ergometer with jumping video-assisted protocol familiarisation.

Countermovement Jump (CMJ)	Stop Jump (SJ)	Dominant Leg Jump (DLJ)	Non-dominant Leg Jump (NLJ)
<ul style="list-style-type: none"> ✓ Hands placed on hips ✓ Limbs on separate force platforms 	<ul style="list-style-type: none"> ✓ Three steps before jump ✓ Land on both limbs ✓ Limbs on separate force platforms 	<ul style="list-style-type: none"> ✓ Unilateral stop jump ✓ Three steps before jump ✓ Land on dominant limb 	<ul style="list-style-type: none"> ✓ Unilateral stop jump ✓ Three steps before jump ✓ Land on non-dominant limb

All jumps performed in a randomised order. Each jump repeated three times, and an average of each jump was used.

Results

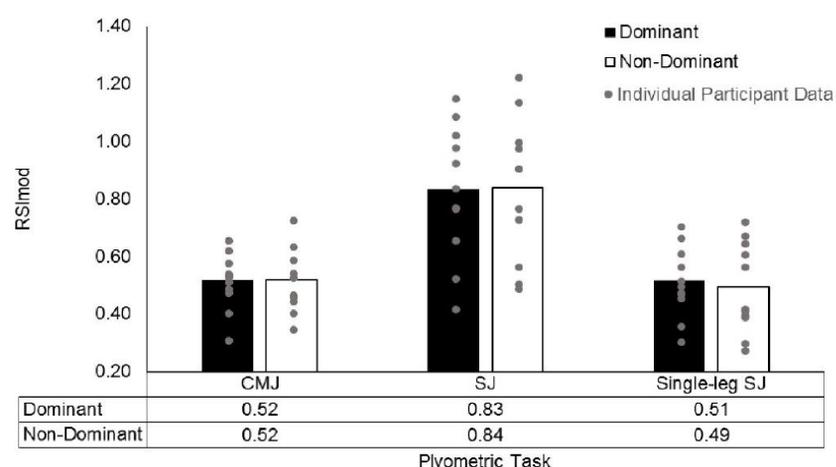
- No significant difference in RSI_{mod} between limbs in any of the jumps ($p > 0.05$).
- For the dominant limb, RSI_{mod} was significantly greater in SJ than CMJ ($p = 0.002$, $d = 1.75$) and the DLJ ($p < 0.001$, $d = 1.74$).
- For the non-dominant limb, RSI_{mod} was significantly greater in SJ than CMJ ($p < 0.001$, $d = 1.66$) and the NLJ ($p < 0.001$, $d = 1.67$).

	CMJ	Stop Jump	DLJ vs. NLJ
Dominant	0.52 ± 0.10 ^b	0.83 ± 0.23 ^{ac}	0.52 ± 0.12 ^b
Non-Dominant	0.52 ± 0.11 ^b	0.84 ± 0.25 ^{ac}	0.49 ± 0.16 ^b
Between-limb Cohen's d	0.02	0.02	0.14
Cohen's d Interpretation³	Trivial	Trivial	Small

^a Significantly different ($p < 0.05$) from CMJ

^b Significantly different ($p < 0.05$) from SJ

^c Significantly different ($p < 0.05$) from matched Single leg Jump



Conclusion

- SJ is a more explosive type of movement, and coaches may want to make use of this form of plyometric task when looking to enhance performance variable such as speed and power.
- As no between-limb differences were found, coaches and researchers probably should not use RSI_{mod} as a measure of limb asymmetry.
- Lower RSI_{mod} in single-limb tasks shows participants were less able to produce similar forces over similar contact times.
- Future studies should measure RSI_{mod} in athletes of different sporting activities, such as team sports vs. individual sports, as well as to establish whether RSI_{mod} limb asymmetries exist in males and females separately.

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Acknowledgements

- This study was supported in part by the Northern Michigan University College of Health Sciences and Professional Studies.
- Thank you to Dr Catherine Tucker the Learning Support Officers at Leeds Beckett University for assisting with equipment setup and data collection.

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