

The effect of previous hamstring injury on eccentric knee-flexor strength in professional rugby union

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Introduction: Hamstring strain injuries (HSIs) are the most prevalent of all injuries in sports that involve high-speed running (Opar et al., 2013, American Journal

of Sports Medicine, 41, 116–125). Once injured the probability of reoccurrence is high and the HSIs are generally more severe resulting in more time before return to play (Opar et al., 2012, Sports Medicine, 42, 209–226). Eccentric knee-flexor weakness and between-limb imbalances in eccentric knee-flexor strength are associated with those athletes with history of HSI in other sports; however, these variables have not been explored in rugby union.

The aim of this study was to determine if lower levels of eccentric knee-flexor strength or greater between-limb imbalance in this parameter during the Nordic hamstring exercise are present in those players with a history of HSI.

Method: With institutional ethical approval, this case-controlled study involved 31 professional rugby union players (age = 24.8 ± 3.8 years; height = 185 ± 6.8 cm; mass = 104.7 ± 13.08 kg) having their eccentric knee-flexor strength assessed using a custom-made device during the preseason (Figure 1). Reports of previous hamstring, quadriceps, groin and calf injury in the last 12 months and history of anterior cruciate ligament (ACL) injury at any stage in the player's career were obtained. HSI was defined as acute pain in the posterior thigh that caused immediate cessation of exercise and damage to the muscle and/or tendon, which was confirmed with magnetic resonance imaging or diagnostic ultrasound examination. Fifteen players had previous HSI.



Figure 1: Nordic Hamstring Exercise performed on the prototype device.

Results: Distributions by group for Nordic Strength and Imbalance are shown in Figure 2. Players with a history of HSI (RED) had a 9% (95% CI = 3–14%; $P = 0.006$, $d = 1.29$) greater between-limb imbalance and were 31N (95% CI = -34–96N; $P = 0.3354$, $d = 0.39$) weaker than controls with no history of hamstring injury (GREEN).

Conclusion: This finding supports persistent weakness despite returning to play and suggests that those players may be at risk of future injury.

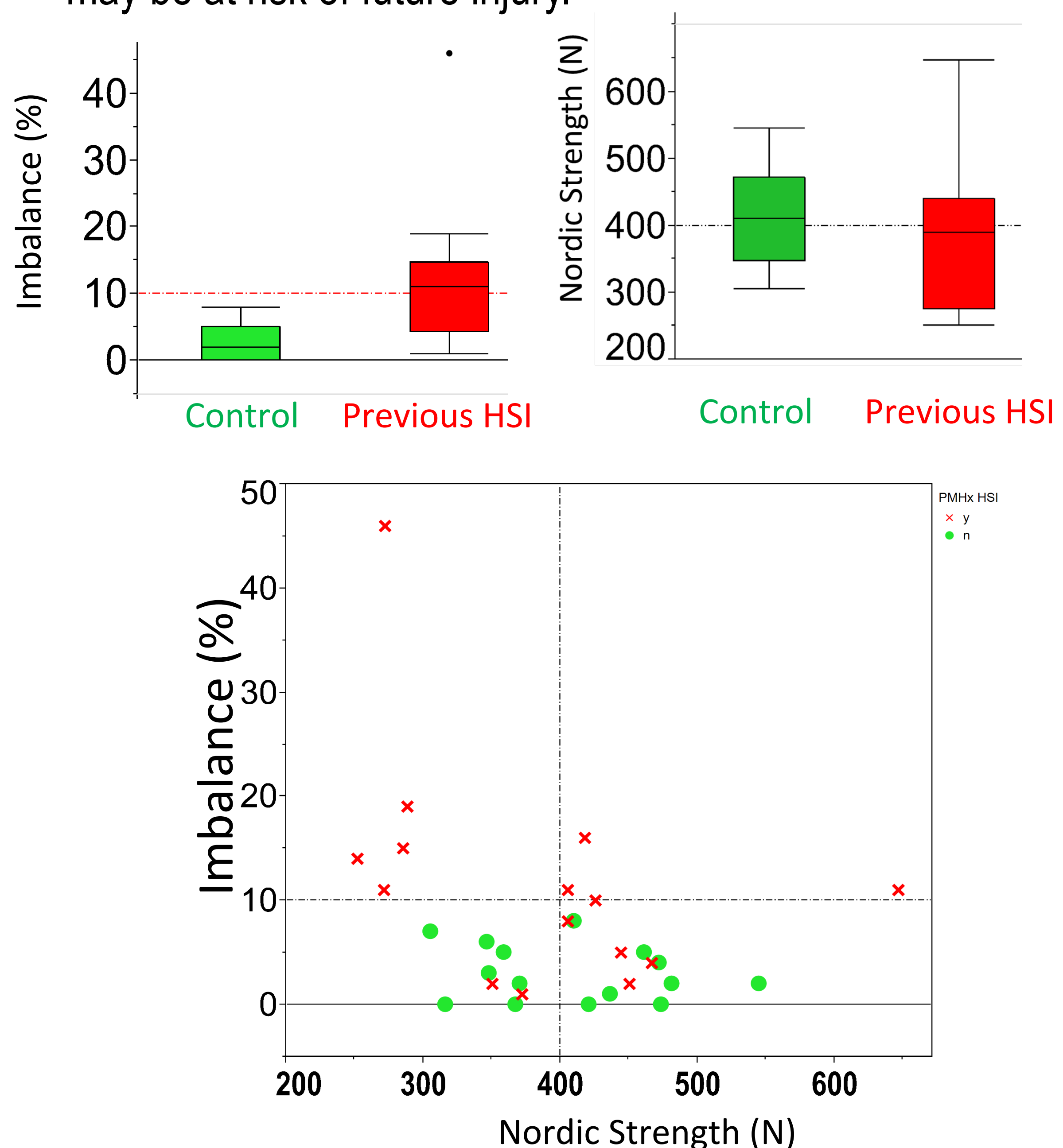


Figure 2: Nordic strength (N) and Imbalance (%) by group (previously HSI versus control)

Changes in adductor, abductor and hip extension strength following an intermittent running test in professional rugby union players

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Introduction: Groin injuries are one of the most frequent injuries in elite level multidirectional team sports (Orchard, 2015, British Journal of Sports Medicine, 42, 798–802). The hip adductors co-contract with gluteus maximus and the hip abductors during the early and late stance phase of running to provide frontal plane pelvic and hip stability. One of the most prominent modifiable risk factors for groin injury is weakness of the adductor muscles. This weakness may be compounded by exercise-induced fatigue. Ensuring the adductor muscles recover fully before subsequent training may be an important factor in the prevention of groin strains in rugby union.

The aim of this study was to determine whether adductor, abductor and hip extension muscles fatigue following maximal high velocity running to volitional exhaustion.

Method: With institutional ethics approval, this case-controlled study involved 28 Professional rugby union players (age = 24.4 ± 3.8 years; height = 185 ± 6.8 cm; mass = 104.7 ± 13.08 kg) having their adductor strength isometrically assessed using the adductor squeeze test at 0°, 60° and 90°/90°. Dominant leg Hip extension, adduction and abduction were tested isometrically using a hand-held dynamometer break test. Players completed a Yo–Yo intermittent recovery test (level 1) to fatigue and were then retested.



Figure 1: Assessment of Adductor Strength at 0°, 60°, 90°/90° using the Sphygmomanometer. Assessment of Hip Extension, Adductor and Abductor strength using the hand-held dynamometer

Results: Following the Yo–Yo intermittent recovery test there were no significant differences observed in adductor squeeze tests at 0°, 60° and 90°/90°, nor hip abduction using the hand-held dynamometer ($P > 0.05$). Hip extension (42.3 kg vs. 39.8 kg) and hip adduction (42.1 kg vs. 37.5 kg) tests using the hand-held dynamometer were significantly reduced following the Yo–Yo intermittent recovery test ($P = 0.035$, $d = -0.8$ and $P < 0.001$, $d = -1.51$ respectively).

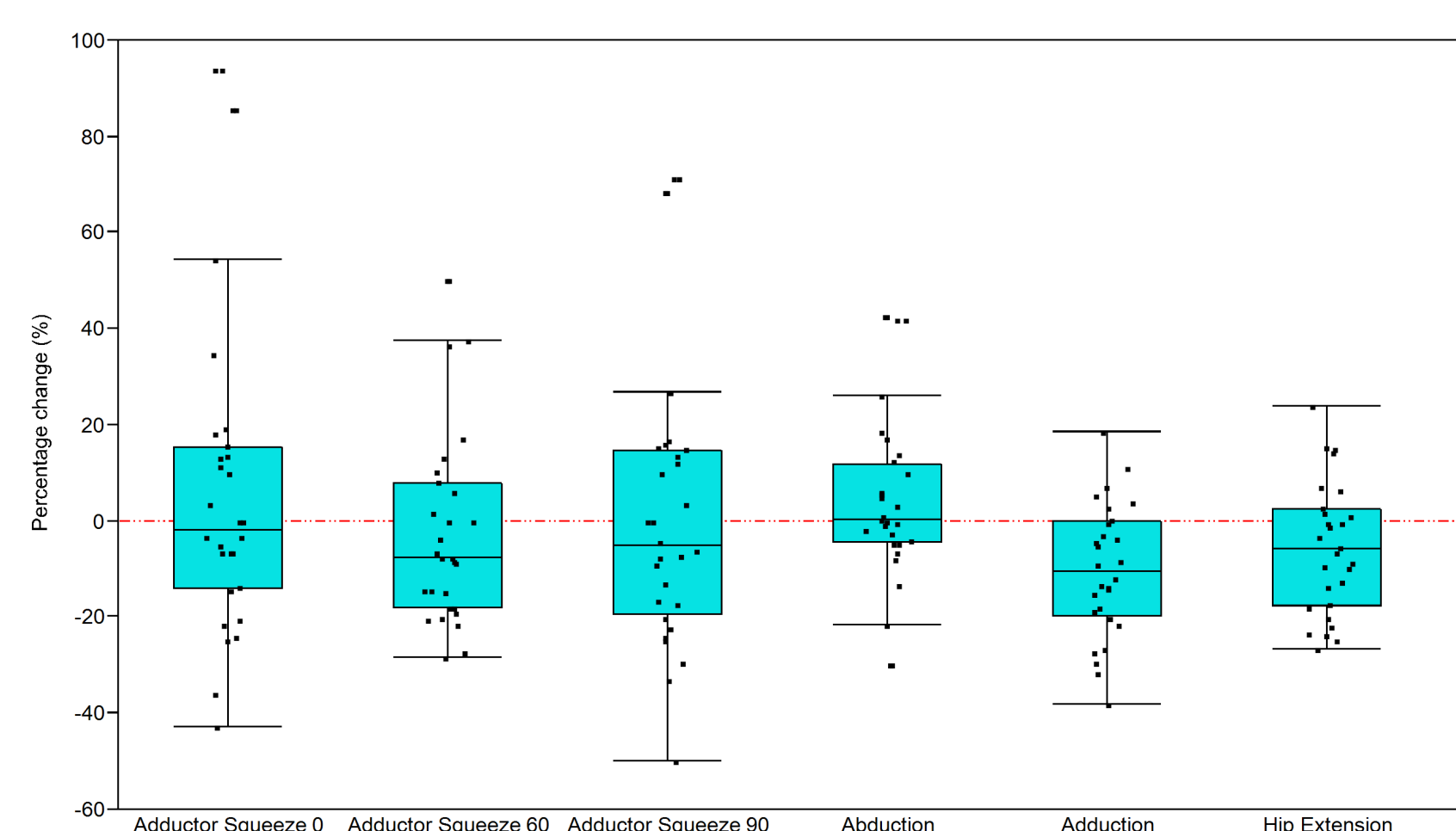


Figure 2: Percentage change for for all tests

Conclusion: The assessment of hip extension and hip adductor strength using handheld dynamometry appears to be more sensitive to fatigue than adductor squeeze testing and should be considered pre- and post-training and/or matches as a player monitoring tool.