Can low dose Nordic hamstring exercises reduce the risk of hamstring injury? A randomised control study

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Background: Hamstring strain injuries (HSI) are the most common occurring injury in all running sports, accounting for 11% of all injuries. In Australian Rules Football’s elite competition, hamstring injuries account for 16% of missed playing time or 19.1 games missed per club per year. The primary focus of this study is to investigate whether eccentric strength, which is related to a reduced risk of hamstring injury, can be achieved when utilising a lower dosage of Nordic Lowers (NL) compared to higher doses recommended in the literature, and in conjunction with a full strength and power program.

Methods: Participants for this study (n = 63) were recruited from a Western Australian Football League club. Participants were block randomised into two groups for (1) HSI in the previous 12 months, (2) HSI more than 12 months prior, and (3) age. Both groups undertook a seven-week low dose (n = 30) or recommended dose (n = 33) NL training intervention. The low dose group completed two sets of six repetitions, and the recommended dose group performed three sets of descending repetitions (12, 10 and 8). Both groups trained three times per week after field training sessions (under fatigue). Following intervention, both groups transitioned into a maintenance phase (two sets of six repetitions, twice weekly). Eccentric hamstring strength was measured on Vald Performance Nordbord (patent pending) at baseline, after the seven-week intervention, and at 12 weeks into maintenance. Data was analysed on SPSS via a two-way mixed model repeated measures ANOVA.

Results: Participants (n = 44) completed a repeat of the baseline testing (follow up) upon completion of the seven-week intervention (low dose n = 22, recommended dose n = 22). Measurement recorded was the eccentric strength of the weaker leg, recorded in Newtons on the Nordbord. Low dose group average at baseline was 356.1 N ± 17.5 and at follow up the group average was 347.6 N (SD = 16.7). Recommended dose group average at baseline was 363.5 N (SD = 17.5) and at follow up group average was 354.9 N (SD = 16.7). No significant difference was seen for participants from baseline to follow up (p = 0.349), there was also no significant difference observed between intervention groups (p = 0.746).

Discussion: NL under fatigue may not improve eccentric hamstring strength tested in non-fatigue states. The previously described recommended dose of NL may not be necessary, therefore, prescription of a lower dose could be prescribed in this setting which should then lead to increased adherence, however further studies would be required to determine a definitive high dose.

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Full training but not full function: Isometric hamstring strength deficits identified up to three years following injury in Australian Football athletes

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Introduction: Reduced pre-season measures of concentric and eccentric hamstring strength have been identified as risk factors for future hamstring injury in soccer and Australian Football. The subsequent implementation of eccentric strength interventions has been shown to modulate this risk. However, the use of standalone pre-season assessments to predict future injury have been questioned with screening now advocated for the identification of existing and persisting deficits which may limit current sports participation. This concept is defined as tertiary prevention – assessments and interventions aimed at identification of persisting deficits following injury which may result in future complications such as recurrence or subsequent injury. The aim of this study was to use a simple and inexpensive method to evaluate unilateral isometric hamstring strength in Australian Football athletes with and without a past-history of hamstring muscle injury sustained within three years. This information may inform the implementation of tertiary prevention strategies.

Methods: This case-control study recruited 37 male semi-professional Australian Football athletes (mean ± SD: age, 20.2 ± 2.9 y; height, 1.7 ± 0.5 m; mass, 81 ± 9.2 kg), 10 (27%) of which reported a past-history of hamstring muscle strain injury between 1 and 3 competitive seasons prior. All participants had been fully training for a minimum of one month prior to testing which was conducted during the pre-season, one week prior to the commencement of the season proper. Following collection of injury history and anthropometric data (height, mass, lever length) athletes underwent externally fixated maximal voluntary isometric knee flexion strength assessment using a previously published protocol with established reliability. A backwards stepwise linear mixed model was applied to compare athletes with a without a past-history of hamstring injury.

Results: Peak isometric knee flexion force, torque and torque normalised to body mass were all significantly reduced in athletes who reported a past-history of hamstring muscle injury (coefficient, 95% CI) (−44.8 N, −86.3 to −33.9 N), (−22.2 Nm, −40.5 to −3.7 Nm) and (−0.2 Nm kg−1, −0.4 to 0.0 Nm kg−1) respectively. Knee flexion peak torque normalised to body mass approached significance as a test able to differentiate athletes with a history of HSI (p = 0.068).

Discussion: Semi-professional Australian Football athletes who had sustained a hamstring muscle injury between one and three seasons prior to testing demonstrated significantly reduced hamstring strength. These deficits were evident despite full participation in training. Evaluation of unilateral isometric hamstring strength using these methods is a clinically feasible option that may be used to inform tertiary prevention strategies.

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