Eccentric hamstring muscle training can prevent hamstring injuries in soccer players

Synopsis


Question: Does eccentric muscle training of hamstring muscles reduce the rate of hamstring injuries in male soccer players? Design: Cluster randomised, controlled trial with concealed allocation. Setting: The 5 top men’s soccer divisions in Denmark. Participants: First team squad soccer players from teams in the top 5 national soccer divisions were included. Players who joined a team after the start of the trial were excluded. Randomisation of 54 teams allocated 26 to the intervention group and 28 to a control group. Interventions: Both groups followed their usual training program. In addition, the intervention group completed 27 sessions of the eccentric hamstring muscle training in a 10-week period during the midseason break, and once a week in the second half of the season. The hamstring exercise (the Nordic curl) involves the player using hamstrings to resist forward falling of the trunk from a kneeling position. Players completed 2–3 sets of 5–12 repetitions of the exercise for 1–3 sessions per week. Outcome measures: The primary outcome was the number of overall, new, and recurrent acute hamstring injuries during one full soccer season. A hamstring injury was defined as any acute physical complaint in the region of the posterior thigh sustained during a soccer match or training. Recurrence of an injury already reported in the trial period was not included to avoid recording the same injury more than once. Results: 50 teams with 942 players completed the study. At the end of the season, there had been 15 hamstring injuries (12 new, 3 recurrent) in the eccentric hamstring exercise group and 52 injuries (32 new, 20 recurrent) in the control group. The number needed to treat (NNT) to prevent 1 hamstring injury (new or recurrent) was 13 (95% CI 9 to 23). The NNT to prevent 1 new injury was 25 (95% CI 15 to 72) and the NNT for recurrent injury was 3 (95% CI 2 to 6). Apart from short term muscle soreness no adverse events were reported in the exercise group. Conclusion: An eccentric strengthening exercise program for the hamstring muscles that can be performed during training can help prevent hamstring injuries in soccer players.

Commentary

It is well documented that acute hamstring muscle strain is the most common injury in many sports that involve repeated bouts of sprinting, including soccer (Ekstrand et al 2011) and Australian Rules football (Orchard and Seward 2011). Prevention of primary and recurrent injury is therefore paramount, but unfortunately little evidence currently exists to support the efficacy of preventive interventions (Goldman and Jones 2011).

This rigorous large-scale trial is extremely relevant for physiotherapists who treat sports people with acute hamstring muscle strains, as it provides the strongest evidence yet that eccentric strength training can significantly reduce the incidence rate of both primary and especially recurrent injury. The intervention was not complicated nor did it rely upon expensive gym-based equipment: repeated sessions of the Nordic hamstring exercise were performed over a 10-week period, and the dosage prescribed produced a preventive effect for at least 12 months. While the Nordic hamstring exercise might be considered an intense load, particularly for people who are unaccustomed to eccentric strength training, it is important to note that no injuries were actually experienced during the conduct of the exercise program. Thus, even though the intervention likely evoked considerable muscle soreness, it was safe.

A minor criticism of this trial is that exposure time was not specifically quantified, which means that it cannot be stated with certainty that there was no difference in the amount of training and/or match participation between the control and intervention groups. However, given the large numbers involved in this study and that professional versus amateur players were evenly distributed between the groups, it is highly likely that any difference in exposure time was only small (if present at all) and thus of no consequence to the reported outcomes.

As acute hamstring muscle strain is likely a multifactorial injury, it is acknowledged that comprehensive preventive programs should be diverse but the fundamental components of these programs must always comprise evidence-based interventions, such as the Nordic hamstring exercise.

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References