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# EFFECT OF AN INJURY PREVENTION PROGRAM ON MUSCLE INJURIES IN ELITE PROFESSIONAL SOCCER

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## ABSTRACT

Owen, AL, Wong, DP, Dellal, A, Paul, DJ, Orhant, E, and Collie, S. Effect of an injury prevention program on muscle injuries in elite professional soccer. *J Strength Cond Res* 27(12): 3275–3285, 2013—Due to the continual physical, physiological, and psychological demands of elite level soccer increasing the incidence and risk of injuries, preventative training programs have become a common feature of soccer players training schedule. The aim of the current investigation was to examine the effectiveness of a structured injury prevention program on the number of muscle injuries and the total number of injuries within elite professional soccer. The present study was conducted over 2 consecutive seasons, of which the first (2008–2009) being the intervention season and the second the control season (2009–2010). In total, 26 and 23 elite male professional soccer players competing within the Scottish Premier League and European competition participated. The training program was performed twice weekly for the entirety of the season (58 prevention sessions). The results revealed an increase in the total number of injuries within the intervention season (88 vs. 72); however, this was largely due to the greater number of contusion injuries sustained within the intervention season ( $n = 44$ ) when compared with control season ( $n = 23$ ). Significantly less muscle injuries were observed during the intervention season (moderate effect), and this occurred concomitant with a bigger squad size (large effect,  $p < 0.001$ ). The findings from this study identify that a multi-component injury prevention–training program may be appro-

appropriate for reducing the number of muscle injuries during a season but may not be adequate to reduce all other injuries.

**KEY WORDS** soccer, injury, prevention, hamstring, muscle injury

## INTRODUCTION

Soccer is regarded as a high intensity intermittent contact sport exposing players to continual physical, technical, tactical, psychological, and physiological demands (5,11,40). At the elite level, the regular demands of match play and training performed during the season's entirety makes players susceptible to injury. Intuitively, losing players to injury will be to the detriment of team success (2), particularly for teams unable to replace players of similar abilities due to limited resources. Therefore, injury prevention programs have gained greater impetus as part of the player's daily training schedule.

At the elite male professional level within soccer, the incidence of injuries during competitive match play is suggested to be approximately 24.6–34.8 per 1000 match hours (2,38,47) with injuries encountered during training sessions showing to range between 5.8 and 7.6 per 1000 training hours (2,47). Among the highest number of injuries per season are those players competing in the English League (1.3 injuries per player) (15,22). Almost one-third of all soccer-related injuries are muscle related, with the majority (92%) affecting the following major muscle groups of the lower extremity: hamstrings (37%), adductors (23%), quadriceps (19%), and calf muscles (13%) (17,24). The Football Association Audit of Injuries identified the hamstrings to be the most commonly injured muscle, constituting 12% of all strains. Indeed, players are 2.5 times more likely to sustain a hamstring than a quadriceps strain during a game (24,55).

Although the cause of injury is not always known, there are a number possible factors that may increase its incidence, these may include insufficient warm-up (56), poor flexibility (25,58), muscle imbalances (10,42), muscle weakness (9,31), neural tension (49), fatigue (57), and previous injury (17,42).

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