A Prospective Study of Injury and Activity Profile in Elite Soccer Referees and Assistant Referees

Abstract:

Injuries to soccer players have been extensively examined, but not the injury experience of referees and assistant referees. This study aimed to determine the injury incidence and activity profile of soccer match officials. A 12 month prospective cohort study was used to collect activity and injury data of 31 participants who reported their training and match exposure and their injury incidence by means of weekly online questionnaire. Study participants spent a mean of 2632 hrs training and 1704 hrs officiating over the 12 month study period. Thirty eight injuries were recorded, (8.8 injuries/1000 hr of training (CI 6.2 to 12.0) and 16.4 injuries/1000 hr for match officiating (CI 10.9 to 23.8)). (Risk Ratio 4.3, 2.1 to 8.9). Fifty five percent (CI 40 to 70%) of the injuries were to muscles, and 76% (CI 61 to 87%) were to the lower leg. Overuse injuries represented 61% (CI 45 to 74%) of all cases. Findings showed that the injury frequency rate associated with soccer referees is higher than that in a number of other non contact sports. The injury incidence associated with training for soccer referees is higher than that associated with training for soccer players. Further prospective studies are merited to examine effectiveness and availability of injury management programmes to establish the welfare of this population.

Introduction

Referees are integral to most sporting events. The injury profile and the associated risk factors in soccer players have received wide attention in recent years.1-6 Although the demands placed upon referees differ from those placed on players, both training and match supervision cause physiological and biomechanical loading which may put this group at risk of injury. There is a paucity of studies which investigate the injuries suffered by referees in soccer. Assessment of injuries have been conducted in Gaelic Football and Australian Rules Football referees.7,8 Although the demands placed upon referees differ from those placed on players, both training and match supervision cause physiological and biomechanical loading which may put this group at risk of injury. In the absence of prospective studies examining the general referee population over a longer period, the present investigation aimed to determine the incidence of injuries and activity profile in referees and assistant referees during a calendar year officiating in a national level competition. It also aimed to compare these findings to those of soccer players.

Methods

A prospective cohort study was carried out over 12 month period. Data was recorded weekly by means of a web based survey which is recommended as best practice for sport injury surveillance of non team based athletes.9,10,11 Ethical permission was granted by the Trinity College Faculty of Health Sciences Research Ethics Committee. An injury was defined according to the definition for soccer injury as:12 Any physical complaint sustained by a player that results from a soccer match or soccer training, irrespective of the need for medical attention or time loss from soccer activities.

Thirty one participants took part (27 males and 4 females) age [mean (SD)] 33.2(6.2) years. All were involved in elite refereeing or assistant refereeing. All completed a baseline questionnaire to establish age, gender and match official experience. Complete baseline data were available for 31 participants. Thirty eight injuries were recorded, 26 (68%) were to the lower leg. Risk Ratios (RR) were calculated using the method described by McNeil.16 All computations involving a 95% confidence interval (CI) were calculated using the Confidence Interval Analysis Package software. All computations involving a 95% confidence interval (CI) were calculated using the Confidence Interval Analysis Package software.

Results

The 31 participants represented 64% (31/48) of elite officials at League of Ireland level who were available at the time of study commencement. All were part-time officials, of whom 30 were in full-time employment and one was a full-time student. The mean (SD) time they had been involved in soccer officiating was 11.4 (6.3) years. An equal number (14) described themselves as a referee or an assistant referee, while three stated that they performed both roles. All had officiated in the elite Football Association of Ireland, League of Ireland competition, while six had also carried out international duties. On average, each official participated in 2.1 matches per week (range 1-4 matches). The total number of matches was 257 (CI 230 to 286). (Risk Ratio 4.3, 2.1 to 8.9). Fifty five percent (CI 40 to 70%) of the injuries were to muscles, and 76% (CI 61 to 87%) were to the lower leg. Overuse injuries represented 61% (CI 45 to 74%) of all cases. Findings showed that the injury frequency rate associated with soccer referees is higher than that in a number of other non contact sports. The injury incidence associated with training for soccer referees is higher than that associated with training for soccer players. Further prospective studies are merited to examine effectiveness and availability of injury management programmes to establish the welfare of this population.
Thirty eight new injuries were reported by 21 match officials over 12 months representing 68% (CI, 50 to 81%) of the study cohort. Fifty seven percent (CI, 33 to 79%) of referees and 85% of assistant referees (CI, 58 to 96%) reported injuries among those who performed both roles (67%, CI 21 to 94%). Three injuries (8.8%) involved contact, both of these were during training. Of these injuries, 12/38 required absence from officiating duties (31.6%, CI, 19 to 48%). Specifically, seven injuries required a one week absence (18.4%, CI, 9 to 33%), three required two week absence (7.9%, CI, 2.7 to 20.0%) and two injuries required a three week layoff (3.8%, CI, 1 to 17%). Of the 38 injuries reported, 12 had been reported by the same participants in the previous 12 months (32%, 19 to 48). Muscle strain was the most prominent injury type and the lower leg the most injured site. Muscles were the most frequently injured body structure with 55% (CI, 40 to 70%) (see Tables 2 and 3).

Discussion

No previous studies have examined referees activity profile in terms of training time and type as well as match officiating exposure. Most training time was spent performing endurance activities (46.7%, CI 41.1 to 52.3%) with considerably less spent on interval work (19.7%, CI 13.5 to 26%). The time spent in flexibility training (17.8%, CI 13.3 to 23.4) was almost as much as that spent in interval training. Referees should train above the intensity of physical activity for referees during match play, demands a highly intermittent exercise mode. Intensive and intermittent training sessions which place priority on high-intensity aerobic stimuli, is recommended for this cohort. This is particularly pertinent as 71.6% (CI, 38 to 53%) of all injuries were reported as overuse injuries and this particular group appears to place great emphasis on endurance training over interval, and other types of training. Further study is required to confirm if this is a risk factor for injury in this population. Match officials in the current study reported a higher quantity of officiating matches than in previous work. Although the match officials in this study presented with less experience, the greater demands on officiating time on this group are similar to elite/international referees who perform their duties on a full time basis. Walden et al6 reported match exposure as 43.5 hrs/annum for elite European soccer referees on a full time basis. No previous studies have examined referees activity profile in terms of training time and type as well as match officiating exposure. 

Achilles tendinopathy (18% of all injuries, 95% CI 9 to 33) and muscle strains to the hip and groin (also 18% of all injuries, 95% CI 9 to 33) were the most commonly reported injuries, and strains to the lower leg accounted for 15% of all injuries (95% CI 7 to 30). Overall, injuries to the lower limbs accounted for 76% (CI, 61 to 87%) of all injuries to match officials. The mechanism of injury was overuse for 23/38 injuries (61%, 95% CI 45 to 74%), with 15 (39%, 95% CI 25 to 55%) being the result of trauma. The proportion of overuse injuries that took place in matches (69%) and training (40%) were not significantly different (difference = 28%, 95% CI -6 to 55%). Only two injuries (5.3%, 95% CI 1.5 to 17.0%) involved contact, both of these were during training.

The lower leg was the most common site of injury (53%, CI, 40 to 67). The injury location was reported as being the knee in 37% (CI, 23 to 53%) of all injuries, followed by the ankle in 18% (CI, 3 to 35%) and then the calf (12%, CI, 5 to 21%). The injury location was reported as being the ankle in 18% (CI, 3 to 35%) and then the calf (12%, CI, 5 to 21%). The most common type of injury was muscle strain, in agreement with previous studies that found muscle injuries were the most commonly cited injury in both players and referees. The lower leg was the most common site of injury followed by the hip/groin, although other studies reported a higher incidence of hamstring injury (thigh) than reported in the current study. The injury pattern differs slightly to those sustained by soccer players where thigh and knee injuries were the most commonly cited.

The most common type of injury was muscle strain, in agreement with previous studies that found muscle injuries were the most commonly cited injury in both players and referees. The lower leg was the most common site of injury followed by the hip/groin, although other studies reported a higher incidence of hamstring injury (thigh) than reported in the current study. The injury pattern differs slightly to those sustained by soccer players where thigh and knee injuries were the most commonly cited. This may be explained by the difference in injury mechanism and biomechanics between players and referees. Unlike players, referees do not contact the ball or other players reducing risk of knee injury. Of note, Achilles tendinopathy was reported in this and other studies examining referee injuries as a common injury which may be due to the degenerative nature of Achilles tendon disorders, as referees are usually older than players. It may be specifically related to the type of movement carried out while officiating a game which
requires back pedalling type movements which may load the lower leg excessively.

A limitation of this study was that for 5 injuries a working diagnosis was made on a subjective history only which may have introduced bias despite seeking to be more accurate than self reporting alone. All other injuries were diagnosed by a doctor or physiotherapist. Similarly, volunteers afford the potential for selection bias. However, collecting data from 64% of suitably qualified match officials, along with the prospective design and the length of the current study testify to the strengths of the design. The injury frequency rate associated with elite soccer match officials is higher than that associated with training for soccer players. Irish referees are involved in a greater number of matches than European soccer players. Further prospective studies on large cohorts are merited following this study to confirm this data.

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References