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Original Research

The Epidemiology of Injuries in Football at the London 2012 Paralympic Games

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Abstract

Background: The epidemiology of injury in Paralympic football has received little attention. A study of all sports at the London 2012 Paralympic Games identified football 5-a-side as the sport with the highest injury rate, meriting further detailed analysis, which may facilitate the development of strategies to prevent injuries.
Objective: To examine the injury rates and risk factors associated with injury in Paralympic football.
Design: Secondary analysis of a prospective cohort study of injuries to football 5-a-side and football 7-a-side athletes.
Setting: London 2012 Paralympic Games.
Participants: Participants included 70 football 5-a-side athletes and 96 football 7-a-side athletes. Athletes from all but one country chose to participate in this study.
Methods: The Paralympic Injury and Illness Surveillance System was used to track injuries during the Games, with data entered by medical staff.
Main Outcome Measurements: Injury incidence rate (IR) and injury incidence proportion (IP).
Results: The overall IR for football 5-a-side was 22.4 injuries/1000 athlete-days (95% confidence interval [CI], 14.1-33.8) with an IP of 31.4 injuries per 100 athletes (95% CI, 20.9-43.6). In 5-a-side competition, 62.5% of injuries were associated with foul play. The overall IR for football 7-a-side was 10.4 injuries/1000 athlete-days (95% CI, 5.4-15.5), with an IP of 14.6 injuries per 100 athletes (95% CI, 7.5-21.6). The most commonly injured body region in both sports was the lower extremity.
Conclusions: To our knowledge, this study is the first to examine IR and risk factors associated with injury in Paralympic football. Future studies are needed to determine mechanisms of injury and independent risk factors for injury, thus informing prevention strategies.

Introduction

Football (more familiarly known in the United States as soccer) is arguably the world's most popular sport, and injury rates in football have been studied extensively in elite able-bodied athletes [1-5]. In recent studies, injury rates in male able-bodied football players have been reported at 27.0 injuries per 1000 player-days [5], with an injury incidence proportion at the summer Olympic Games of 27 injuries/100 players [1]. Approximately 70% of injuries affect the lower limb [4], and 56% of injuries are not associated with time loss [4]. Authors of a study examining football injuries at the 2012 London Olympic Games reported that 74.2% of football injuries occurred in competition and that the injury incidence rate (IR) for football was one of the highest of all Olympic summer sports [1].

The International Paralympic Committee (IPC) has completed injury surveillance at the last 3 Winter Games—a major advance in Paralympic injury epidemiology [6,7]. Injury and illness surveillance was first systematically conducted at summer Paralympic Games in London in 2012 [8,9]. Injuries in Paralympic football have not previously been prospectively studied.

Two versions of football are played in the Paralympic Games: football 5-a-side and football 7-a-side. Football 5-a-side, which is played by athletes with visual impairment, started out as a game for children in schools for the visually impaired (VI) and has become an increasingly popular sport. It evolved in different countries before

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coming under the governance of the International Blind Sports Federation (IBSA) in 1996. Subsequently, an internationally recognized set of rules adapted from the International Federation of Associated Football was developed for the sport [10]. Under these regulations, football 5-a-side made its debut at the 2004 Athens Paralympic Games, and thereafter it grew to its largest number of participants at the 2012 London Paralympic Games. Each team has 4 outfield players and a sighted goalkeeper. Each game has 2 periods lasting 25 minutes and is played on a pitch sized 40 × 20 m for international matches. The pitch is surrounded by boarding (kickboards), 1-1.2 m in height, to form a perimeter and assist players in determining their location on the pitch. The ball, which contains a sound system, makes a noise when it is in motion so players can detect the ball's location. Although athletes with different levels of visual impairment can participate, all players must use an IBSA-approved eyeshade to ensure an equal level of visual impairment during competition. Full details of the rules are available at the IBSA Web site [10].

Football 7-a-side has been a Paralympic sport since 1984 and is played exclusively by athletes with central neurologic injury, including cerebral palsy and traumatic brain injury. Athletes must have ataxia, hypertonia, or athetosis. Players are divided into 4 classes based on their level of physical impairment [11]. The sport is similar to able-bodied football, with the following exceptions: 7 players are on the field at a time per team, the measurements of the playing field are smaller, there is no offside rule, throw-ins may be made with just one hand, and matches consist of 2 periods of 30 minutes each [12].

Injury surveillance is essential to evaluating risk factors for participation in sport with a view to inform the development and evaluation of prevention strategies and protect the long-term health of athletes [13]. Well-developed research methodologies [14-17] are in place to study injuries in professional football, which have been well documented for many years [18]. The lessons learned from these studies are being put into practice in efforts to improve the health of players.

Willick et al [9] reported IR values for all sports at the London 2012 Paralympic Games. The overall IR was 12.7 injuries/1000 athlete-days across all sports (95% confidence interval [CI], 11.7-13.7). Football 5-a-side was identified as the sport with the highest IR (22.4 injuries/1000 athlete-days). The authors of this study also reported an IR for football 7-a-side of 11.2 injuries/1000 athlete-days, which is similar to the overall rate reported for Paralympic athletes in all sports. More in-depth analysis of this same dataset was performed to better characterize injuries in the hope of guiding future injury prevention strategies specific to these sports. Although the incidence rates provide important information, the timing and anatomic location of the injuries, in addition to the demographic information of the injured athletes, should improve injury characterization for guiding these strategies.

The objective of this study was to determine the IR, characteristics of injury, and risk factors for injury in athletes playing football 5-a-side and football 7-a-side at the London 2012 Paralympic Games.

Methods

This sport-specific cohort study was a component of the larger injury and illness surveillance study completed by the IPC at the London 2012 Paralympic Games. One of the 8 football 5-a-side teams in the tournament opted not to participate in the study, whereas all 8 football 7-a-side teams participated. Study participants included 70 athletes from 7 countries who participated in the football 5-a-side competition and 96 athletes from 8 countries who participated in the football 7-a-side competition. Data were collected over a 14-day period, including 3 days prior to the start of competition and 11 days of the competition period. The 7 participating teams in football 5-a-side teams each played 3 group matches (a total of 21 match exposures) followed by 14 medal and ranking match exposures, thus totaling 35 match exposures. The 8 football 7-a-side teams each played 3 group matches (a total of 24 match exposures) followed by 16 medal and ranking match exposures, thus totaling 40 match exposures. A match exposure is defined as one team playing one game; therefore, one match involves 2 match exposures.

Procedures

The Paralympic Injury and Illness Surveillance System was approved by the IPC. Prior to initiation of the study, ethics board approval was obtained through the University of Brighton in the United Kingdom (FREGS/ES/12/11) and the University of Cape Town Health Sciences Research Ethics Committee in South Africa (HREC/REF 436/2012). The athletes provided consent for the use of their de-identified medical data for research purposes at the time of their registration for the Games.

A comprehensive database of basic athlete demographic information was obtained from the IPC, containing the following de-identified information: age, country code, and accreditation number.

Data regarding injuries were gathered from two sources. The first source was a database from an electronic medical data capture system (Atos, Paris, France) that was used at all the athlete medical stations operated by the London Organizing Committee for the Olympic and Paralympic Games (LOCOG). LOCOG medical staff entered all injury encounters when an athlete presented to a medical station with a report of an injury consistent with the predetermined definition of injury. The second source was a database from a novel Web-based injury and illness surveillance system (WEB-IISS)