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Original Article

Orthopedic injuries in a formation of a soccer club

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A B S T R A C T

Introduction: Football is one of the most popular sports in the world with approximately 400 million practitioners. All physical activity generates an overload somewhere in the locomotor system, above all, in young athletes. *Objective:* To conduct the epidemiological survey of orthopedic injuries in a medical department of the categories of junior soccer a football club in Curitiba. *Methods:* Epidemiological survey of injuries in 310 different athletes during the 2009 and 2010 seasons. *Results:* The number of recorded visits was 3.64 per athlete orthopedic complaints in two years. Furthermore, we find 2.88 injuries / 1,000 hours of play, and the junior (under 20 and under 18) with the highest rate (3.05). The most frequent injury was contusion (32.15%), lower limbs, especially the thigh (3.94%). The higher incidence of injuries occurred in the Middle - campers (30.65%), being the training responsible for 88.31% of the complaints. *Conclusion:* The epidemiological survey of medical care in a medical department is an important tool for analysis of the main complaints, as well as the primary means of prevention and maintaining the health of athletes.

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Introduction

Football (soccer) is the most widely practiced and most popular sport in the world, with more than 400 practitioners in approximately 186 countries, according to FIFA (Fédération Internationale de Football Association).^{1,2}

Practicing this sport depends on adequate development of tactical, technical, nutritional, psychological and physical factors,³ and the team is divided into: goalkeepers, full-backs, wingers, midfielders and strikers, who cover different distances with differentiated intensities and movements.⁴

All physical activity generates an overload at some point of the locomotor system⁵ and increased levels of sports practice also cause considerable increases in the incidence of injuries.² Moreover, in striving to make a mark and achieve success, players inevitably need to subject themselves to physical and mental efforts that are very close to their physiological limits, which exposes them to a potentially pathological level of activity and results in a high number of sports injuries.⁶

Football is a major cause of injuries among sports players worldwide and is responsible for 50% to 60% of all sports injuries in Europe.^{7,8} Among all the cases of physical trauma treated in European hospitals, between 3.5% and 10% are caused by football. Furthermore, age has been found to be an important factor in studies on exposure to injury risk factors, given that greater numbers of injuries are seen in adults than in young players.^{7,9-11}

It is rare for player training teams to have healthcare professions acting directly in relation to assessment of risk factors and injury rehabilitation. Likewise, few studies have investigated the incidence of injuries among these players.

Objective

To conduct an epidemiological survey on orthopedic injuries among the training categories of a football (soccer) club in Curitiba, seen at its medical department.

Materials and methods

An epidemiological survey was conducted on the injuries that occurred and clinical care that was provided over the course of two seasons (24 months), from January 2009 to December 2010, at a football player training club (Paraná Club), in the city of Curitiba, state of Paraná. The study participants comprised 310 players who were enrolled during the seasons analyzed. Those who continued at the club for the 2010 season were excluded from the total calculation, given that they had already been included in the total for the 2009 season.

According to their ages, they were divided into three categories: child (under 15 years; 116 players), juvenile (under 16 and 17 years; 105 players) and junior (under 18 and 20 years; 89 players).

These categories had different training periods and games, which were divided into preparatory and competitive periods. The total duration was 79 weeks for the child category (1016 hours), 77 weeks for the juvenile category (1254 hours) and 87 weeks for the junior category (1520 hours).

The players' complaints reached a total of 1548 records (clinical = 419; traumatic = 1129), and the following points were highlighted: location and type of injury per body segment; distribution according to the players' tactical positions; and time of occurrence of the injury (training or game). The data were tabulated using the Excel® software (Microsoft Office 2007).

The definition of injury that was used was any event that occurred during games or training at the club that caused reduction or complete withdrawal of the player's participation in the sports activities.¹²

The prevalence of injuries was expressed as the number of injuries per 1000 hours of games/training per player. In addition, the player's position and the time at which the injury occurred (training or official game) were analyzed.

Results

There were 1548 reported complaints, of which 419 (27.07%) were clinical and 1129 (72.93%) were orthopedic. In relation to the total number of orthopedic complaints, there were 3.64 complaints per player, among which the junior category accounted for 36.49% of the injuries, followed by the child category (34.63%) and the juvenile category (28.88%) (Table 1).

In relation to the type of injury, we found the following results, in decreasing order: contusion (32.15%), muscle pain (28.70%), sprains (19,22%), bursitis/tenosynovitis and tendinopathy (8.41%), joint pain (3.37%), wounds (2.48%), contractions (1.15%) and fractures (0.71%) (Table 2).

There were 2.8 complaints per 1000 hours of games/training per player, and the highest incidence was for the junior category (3.05) (Table 3).

In correlating injury incidence with the players' positions on the pitch, we found that midfielders accounted for 30.65% of the complaints (Fig. 1). Moreover, the most frequent time for injuries was during training sessions, which accounted for 88.31% (Fig. 2). There was no significant difference in this percentage between the different categories.

Discussion

In the present study, we observed that the number of records of orthopedic injuries was 3.64 per players over the two-year period, with a mean of 2.88 injuries/1000 hours of games/training, and that the junior category (under 18 and under 20) had the highest rate (3.05). These data are similar to those of studies on young individuals found in the literature.¹¹⁻¹⁵

Concordant with the findings of Nilsson & Roaas¹⁶ and Pedrinelli,¹⁷ the injury most often encountered was contusion (32.15%), with greatest frequency on the lower limbs, especially on the thighs (3.94%).

Muscle pain without anatomical injury was the second most frequent complaint (28.70%), particularly in the lower limbs

Table 1 - Incidence of complaints according to category.

	Junior	Juvenile	Child	Total number
Number of players	28.70%	33.87%	37.41%	310
Total number of complaints	36.30%	28.35%	35.33%	1,548
Traumatic	26.61%	21.06%	25.26%	1,129
Clinical	9.69%	7.30%	10.08%	419
Complaints/player	6.31	4.18	4.72	4.99

Table 2 - Incidence of traumatic injuries.

Type of injury	% of total complaints	% of traumatic complaints
Contusion	23.46%	32.15%
Muscle pain	20.93%	28.70%
Sprains	14.02%	19.22%
Tendinopathy/bursitis	6.14%	8.41%
Muscle injury	2.78%	3.81%
Joint pain	2.45%	3.37%
Wounds	1.81%	2.48%
Contractions	0.84%	1.15%
Fractures	0.52%	0.71%

Table 3 - Traumatic complaints per 1,000 hours of games and training.

	Junior	Juvenile	Child	Total
Number of players	89	105	116	310
Total number of traumatic complaints	412	326	391	1,129
Traumatic complaints/player	4.63	3.10	3.27	3.64
Traumatic complaints/1000 hours of games and training	3.05	2.48	3.32	2.88

and lumbar spine. Most previous studies did not cover this complaint in a detailed manner, given that they put the reports on muscle pain (late muscle pain, post-effort myalgia and contractions) together with complaints of muscle injuries (fiber injury). However, we believe that this information is important and that the result may be influenced by the physiological muscle condition under the training found among the younger players, in association with greater volume and intensity of training aimed at improving the yield. In addition, there was a lack of diagnoses through imaging examinations, given that

Injury per player's position

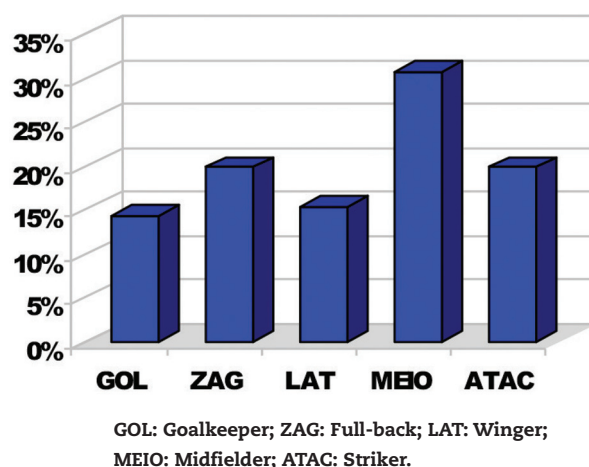


Fig. 1 - Incidence of injuries according to position.

Time for injuries

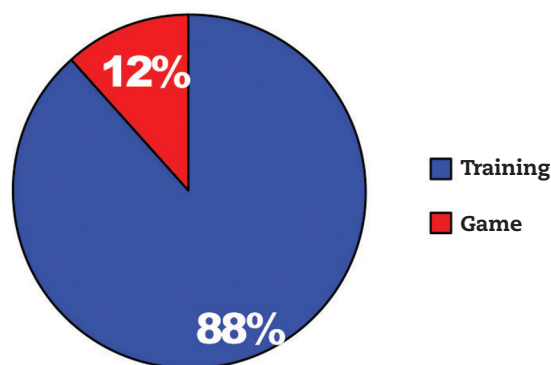


Fig. 2 - Time of injury.

the structure for the training categories has certain restrictions on performing these examinations.

Sprains are frequent injuries in football practice, especially involving ankles and knees.^{10,11,13,14} Sprained ankles (13.72%) and sprained knees (3.45%) were the most frequent complaints, and in total, sprains accounted for 19.22% of the complaints over the period. Most of the sprained ankles were grade I, of low severity (13.37%), while for the knees, sprains without injury (1.77%) were most frequent.

Ligament injuries to the knees, and especially those that evolve into an unstable condition, are worrying events and modify sports players' performance.¹⁸ In our setting, Carazzato et al.¹⁹ found that the rate of ligament and meniscus injuries among male footballers was 13%, over 20 years of activity at a multisport club. In the present study, four cases of cruciate ligament injury (0.35%) and one case of meniscus injury (0.09%) were diagnosed over the two-year period. We observed that there was a difference in relation to data in the literature, such as in an epidemiological study on football injuries among American students, which showed that the incidence of ligament injuries requiring reconstruction was 12.9%.²⁰ We believe that the significant difference in ligament injuries in relation to the literature occurred due to difficulty in comparing different populations of sports players with regard to preparation. In our study, all the sports players were young and were undergoing preparation similar to that of professional athletes, and thus differed from student sports players, who have less specific preparation with regard to injury prevention. Furthermore, most studies have made analyses on injuries among professional sports players, thus leading to a lack of specific data for training categories, which despite the similarity of their preparation in relation to professional, have intensities and volumes that are clearly lower.

Differing from some studies,²¹⁻²³ in which muscle injuries have appeared in first place, we found in our study that only 3.81% were diagnosed with such injuries. This can be explained in terms of the large differences in injury incidence rates recorded in football that several studies have demonstrated,^{7,9,11,13} considering that there are many conceptual controversies and errors in data gathering methods, lengths of observation, study designs and study types. Moreover, as mentioned earlier, we found some restrictions in relation to confirmation through imaging examinations, which is common in medical departments dealing with training categories.

Bone injuries need to be regarded with caution, given that we did not find any sports players who presented severe fractures. Cohen²¹ reported a fracture and dislocation rate of 5.4% among professional sports players. On the other hand, over the two-year period, we only found eight fracture cases (0.71%). Of these, one was a maxillary fracture and one was a fracture of the medial malleolus that required surgical fixation.

The greatest incidence of injuries was among midfielders (30.65%), followed by strikers (19.84%) and full backs (19.84%), and this was concordant with the findings from a study on professional sports players conducted by Pedrinelli.¹⁷ These data may confirm that the change to a more competitive style of game among the training categories, with the aim of better professional projection, has had a direct influence on the increasing numbers of injuries that are appearing. These sports

players make greater physical demands than the others do (goalkeepers and wingers), since they make excessive numbers of rotational movements and run greater distances at full speed, which increases the injury rate.^{17,21-24}

The level of competitiveness in technical-tactical training sessions resembles that of games, in which competing for possession of the ball and for a place in the first team may favor the incidence of some injuries.^{25,26} Moreover, striving for high muscle yield through physical training has increased the number of injuries. In the present study, 88.31% of the orthopedic complaints occurred during or after training, and only 11.69% during or after games. In a prospective study among professional sports players, Chomiak et al.⁹ observed that trauma was responsible for 81.5% of the injuries that occurred. Few studies have presented comparative results between injuries occurring during training and in games. In this regard, we observed that there was lower incidence in games, among the training categories. This can be explained in terms of the lower burden of games on these sports players than on professional players, while the training load is slightly higher. In addition, the young players present markedly weaker technical and tactical skills, along with lower muscle strength, resistance, coordination and experience.

Conclusion

The type of injury most found was contusion, with greatest frequency in the lower limbs, especially in the thighs. The incidence of injuries was highest among midfielders, during training sessions especially and among players in the junior category.

Epidemiological surveys of attendance provided at medical departments are an important tool for analyzing the main complaints, as well as the main means for preventive measures and maintenance of the sports players' health. Furthermore, structuring and standardization of the medical structure for training categories in Brazilian clubs is becoming increasingly necessary, in order to avoid early incapacitating injuries within professional football practice.

Conflicts of interest

The authors declare that there was no conflict of interests in conducting this study.

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