

ORTHOPEDIC INJURIES IN MEN'S PROFESSIONAL SOCCER IN BRAZIL: PROSPECTIVE COMPARISON OF TWO CONSECUTIVE SEASONS 2017/2016

LESÕES ORTOPÉDICAS NO FUTEBOL PROFISSIONAL MASCULINO NO BRASIL: COMPARAÇÃO PROSPECTIVA DE DUAS TEMPORADAS CONSECUTIVAS 2017/2016

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ABSTRACT

Purpose: The purpose is to compare the incidence and characteristics of injuries sustained in two consecutive seasons of the São Paulo State Football Championship. **Methods:** Prospective study performed using an electronic form previously developed by the Medical Committee of the São Paulo State Football Federation, sent to the physicians responsible for the tournament's series A1 and A2 teams, after each round. **Results:** 17.63 injuries sustained per 1000 hours of matches in the A1 series and 14.91 injuries sustained per 1000 hours of matches in the A2 series. Incidence of injuries per 1000 hours of matches decreased from 24.16 to 17.63 in the A1 series ($p < 0.037$) and from 19.10 to 14.01 in the A2 series ($p < 0.064$). External defenders suffered most injuries, while muscular injuries were most common and lower limbs, the most affected areas. Most injuries occurred between 30 and 45 minutes of the match and only 11.9% of the injuries required surgery. **Conclusions:** Prevalence and frequency of injuries decreased between seasons. Most injuries were sustained in the lower limbs; strains were the most common injuries, followed by strains and contusions; MRIs were the most frequently requested exams and most injuries were classified as moderate (8-28 days). **Level of evidence III, Cross-Sectional Study.**

Key-words: Soccer. Athletes. Injuries. Epidemiology

RESUMO

Objetivo: Comparar a incidência e características das lesões ocorridas em duas temporadas consecutivas no campeonato Paulista de Futebol. **Métodos:** Realizamos um estudo prospectivo, através de questionário eletrônico previamente desenvolvido pelo Comitê Médico da Federação Paulista de Futebol e enviado aos médicos dos times das séries A1 e A2 do Campeonato Paulista de Futebol após cada rodada. **Resultados:** A série A1 apresentou 17,63 lesões por 1000 horas de jogo e a série A2 14,91 lesões por 1000 horas de jogo. A incidência de lesões por 1000h de jogo caiu de 24,16 para 17,63 na série A1 ($p < 0,037$) e de 19,10 para 14,01 na série A2 ($p < 0,064$). Os laterais foram os mais acometidos, as lesões musculares as mais frequentes e os membros inferiores os mais acometidos. A maioria das lesões ocorreu entre 30 e 45 minutos de jogo e somente 11,9% das lesões necessitaram de cirurgia. **Conclusão:** Houve uma queda da prevalência e da incidência de lesões entre as temporadas. A maioria das lesões ocorreu nos membros inferiores, o tipo mais comum de lesão foi o estiramento, seguido de entorse e contusão, o exame mais pedido foi a ressonância magnética e a maioria das lesões foi classificada como moderada (8-28 dias). **Nível de evidência III, Estudo Transversal Descritivo.**

Descritores: Futebol. Atletas. Lesões. Epidemiologia.

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INTRODUCTION

Playing football is complex and involves considerable risk of injury, associated to material economic and sports-related impact. Bench-ing a professional starting athlete, due to injury, for one month, translates in the average loss of € 500,000.00 for the club, and also compromises the success of the team on the pitch¹. Moreover,

because of the combination of physical and emotional stress, professional soccer is a sport with high risk of injury². Epidemiological studies reveal the incidence rate of 16 to 28 injuries in matches and 2 to 11 injuries at practices for every 1,000 hours of exposure, at the professional level³. According to other European

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and American studies on professional men's football, the average injury rate is of 6-8 injuries per 1000 hours of exposure.² Football injuries affect especially the lower limbs – more specifically, the ankles, knees and thighs⁴.

Susceptibility to given types of specific injuries nevertheless varies depending on each athlete's position on field. Significant differences found in the injury incidence rates possibly occur for changes to game style and intensity, and the mood of the match also plays an important role in the specificities of each injury⁵.

A study performed with elite athletes suggests that the different roles involved in each position require specific technical, physiological and tactical demands from the players. Central defense players, for instance, are more likely to jump for the ball than external defenders, whereas external midfielders generally cover greater distances when running than central midfielders⁶.

Professional men's football injuries largely influence the final results of the teams in both national leagues and European cups and leagues. Such findings reveal the importance of preventing injuries to increase the teams' chances of success and titles⁷.

Implementing prevention strategies for a given population requires understanding and obtaining evidence on the specific pattern of said sample. As such, several epidemiological investigations have been conducted worldwide, and is common practice in the main leagues, world tournaments^{2,8} and World Cups.^{9,10}

Though football is the most popular sport in Brazil and the country is a global reference in the practice, there are few epidemiological studies and data on the regional and national leagues. The purpose of this investigation is to compare the incidence and specificities of injuries occurred in two consecutive seasons to better understand the pattern of such injuries, in order to establish prevention measures to avoid them.

METHODOLOGY

This research project was approved by the Ethics Committee of the Federal University of São Paulo /Escola Paulista de Medicina. (Number 1.660.701)

This is a prospective study performed by means of an electronic form previously developed by the Medical Committee of the São Paulo Football Federation (Federação Paulista de Futebol), sent to the physicians in charge of the teams of the A1 and A2 series of the São Paulo State Football Championship, after each round of the 2017 São Paulo State Football Championship. Data was compared to a prior similar study conducted during the last season, following data collection and statistical analysis¹¹.

The above mentioned form was sent after each round to analyze the incidence of the injuries and characteristics thereof. The form was comprised of 15 questions on the specificities of the match, athlete and injury (Appendix 1). As this was an electronic questionnaire there was no consent form.

The definition used to determine a football injury was the consensus statement set out by Fuller et al.¹² for the 2005 FIFA consensus, described as: "Any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities". A form was sent for each injury occurred to analyze the outcome of each reported injury, filled out after the athlete returned to both training and matches. There are eight questions in the form, to indicate the complementary tests and exams and the final diagnosis (Appendix 2).

The São Paulo Football Federation was asked to provide the records on the different matches to obtain the time of each match, classified as follows: morning (matches beginning before 12 p.m.), afternoon (matches before 6 p.m.) and night (matches after 6 p.m.).

Incidence of injuries was calculated to assess injury risk, expressed as the number of injuries per 1000 hours of exposure.^{12,13} The following formula was used to calculate exposure:

Exposure = number of matches x number of players starting the match (22) x duration of the match in minutes (90) / 60

The following formula was used to calculate incidence at matches:

$$\text{Incidence} = \frac{\text{number of injuries at matches} \times 1000 \text{ hours/time of exposure}}{\text{Exposure}}$$

Statistical Analysis

Parametric statistics was used for data is both quantitative and uninterrupted. The Two-Proportions Test was used to characterize the distribution of the relative frequency of the qualitative variables. Differences with $p < 0.05$ were deemed statistically relevant. Software SPSS V17 was used to perform the analysis.

RESULTS

Mapping of the Injuries

The average age of the injured players was 27.5 years, whereas the average time loss caused by injuries was of 23.5 days. Most matches occurred in the afternoon (39.9%), 11.3% matches were held in the morning and 48.8%, at night.

A total of 160 injuries were described during all 305 matches, with an average of 0.52 injuries per game. As for playing position, 32.1% of the injuries were sustained by external defenders, 29% by forwards, 22.1% by central defenders, 18.3% by external midfielders, 16% by central midfielders and 4.6% by goalkeepers. Most injuries occurred at the end of the first half of the match, between 31-45 minutes (25,6%) (Figure 1)

In what concerns the location of injury, the most common injuries were: lower limbs (73.8%), head (17.5%), upper limbs (6.3%) and trunk (1.9%). Injuries occurred most often on the right side (47.5%), and the side did not apply in 13.1% of the cases. There was contact in 51.9% of the injuries. As for the type of injury, the most common injuries were muscle strains (34.4%), followed by sprains (18.1%) and contusions (13.1%). (Figure 2) With respect to final diagnosis, the most frequent diagnoses were: hamstring strain (16.5%), adductor muscle strains (12.7%), crush/laceration injury to the face (10.8%) and concussion, Medial Collateral Ligament (MCL) injury, Anterior Cruciate Ligament (ACL) injury and quadriceps injury (4.4%). (Figure 3)

There were 17.63 injuries per 1000 hours of matches in the A1 Series, and 14.91 injuries per 1000 hours of matches in the A2 Series. When grouped, 15.89 injuries occurred in 1000 hours of matches in both series.

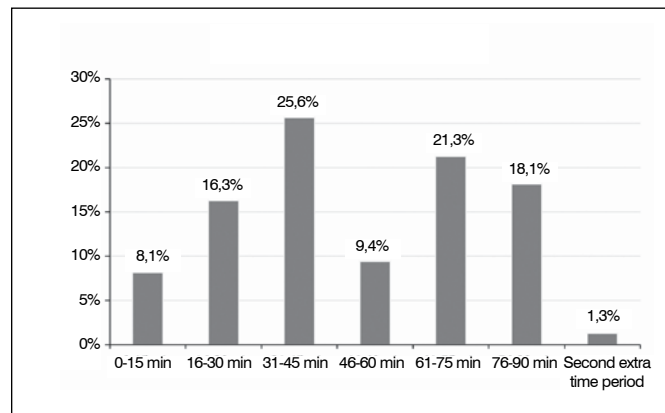


Figure 1. Time distribution.

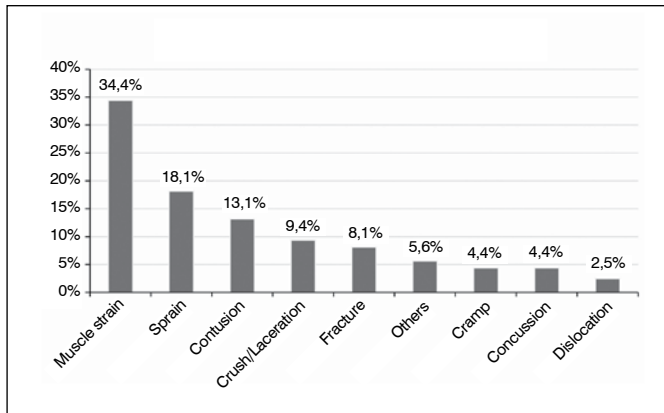


Figure 2. Type of Lesion.

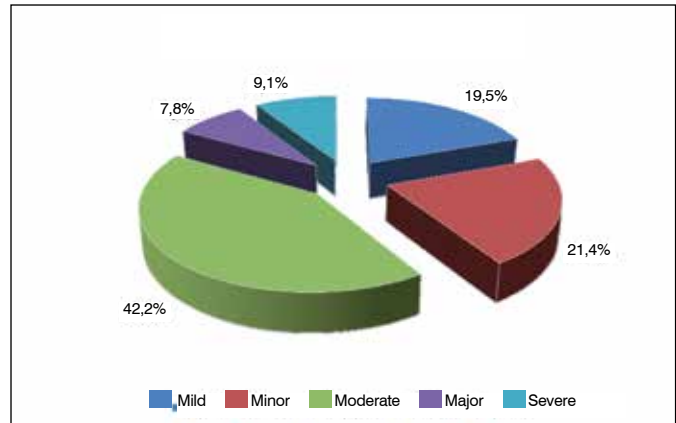


Figure 4. Severity of lesion.

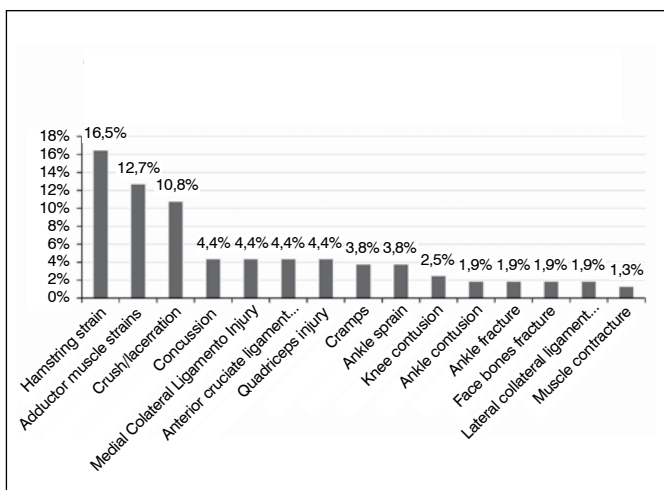


Figure 3. "Final Diagnosis" Distribution (15 Most Frequent Injuries).

Treatment of the Injuries

When requested, the most common complementary tests and exams were: Magnetic Resonance Imaging (MRIs) (38.9%) and ultrasonography (14.3%), followed by Radiography (6.8%) and Computed Tomography scans (CT) (6.8%). No tests were necessary for 29.5% of the injuries. Surgery was required in 11.9% of the total recorded injuries. Most injuries were deemed moderate according to the severity scale, with time loss ranging from 8 to 28 days (41.9%). (Figure 4)

Comparison: 2016 and 2017 Seasons

The incidence of injuries per 1000h of match dropped from 24.16 to 17.63 in the A1 Series ($p < 0.037$), from 19.10 to 14.01 in the A2 Series ($p < 0.064$), and, when grouped (A1 + A2), from 21.32 to 15.89 from the 2016 to the 2017 season ($p < 0.003$).

The prevalence of injuries also dropped from 35.0% to 26.4% ($p < 0.001$) when the two consecutive seasons were compared.

With respect to the complementary tests and exams requested, the number of cases in which no tests were requested increased from 23.2% to 29.4%, whereas the request for radiographies dropped from 15.4% to 6.9% and for ultrasound exams decreased from 28.2% to 14.4%.

The relationship between surgery and type of injury was also investigated, and strains generally do not require surgery, while fractures are likely to evolve into surgery.

There is also a relationship between the type of injury sustained and the requested tests and exams. MRIs are generally requested

for sprains, while ultrasound exams are requested for strains. No tests or exams were requested for crush/laceration injuries and radiographies are generally requested for fractures.

The severity of the injury seems to be related to the requested tests or exams; in general, no tests or exams are requested for slight severity, minimal severity is generally associated to Computed Tomography scans. Ultrasound exams are generally requested for major severity and Magnetic Resonance Imaging are likely to be requested for severe severity.

DISCUSSION

This investigation essentially focused on the analysis of orthopedic injuries sustained in the São Paulo State Championship of Series A1 and A2, of the 2017 season, which was compared to the 2016 season¹¹. The incidence and characteristics of the injuries of the 2017 season are similar to data available in the literature^{3,14}, though both the incidence and distribution of the injuries of the injuries dropped when compared to the previous season.

Such difference is likely attributable to the decreased exposure of the athletes, considering the number of matches fell from 261 to 305 matches, especially in the number of games of the A1 Series. The decrease in the number of matches allowed for more time between the matches, whereby athletes had a longer recovery period during the 2017 season.

In addition to decreased exposure, other factors may have also contributed to the drop in the incidence and prevalence of injuries, such as the preventive measures clubs implemented and improved pitch conditions.

Strains, sprains and contusions were the most prevalent types of injuries in this study, as was the case of several other investigations available in the literature^{2,15-17}. Only 11.9% of the injuries required surgery, and most diagnoses related to non-surgical treatment. Fractures and severe ligament injuries were generally operated on. MRIs were the most commonly requested tests; A1 Series clubs had the highest rate of MRI requests, likely due to the costs involved, for A1 Series clubs have higher financial support.

The age of the athletes did not affect the type of injury sustained or the respective time loss, both with respect to the comparison between two seasons and between series, as seen in previous studies¹⁵.

Most injuries occurred during the last 15 minutes of the first half of the matches, as was the case of the previous season, unlike the previous studies, in which incidence was higher in the last 30 minutes of the match^{18,19}. However, the tournament in one of such studies was organized as a single-elimination system, which may have translated into greater dedication by the athletes during the last portion of the match.

The greatest limitation of this study from the methodological standpoint is the reliability of the information provided by the clubs' medical personnel, as well as the lack of official records on injuries sustained during the matches. Moreover, it is not possible to accurately measure each athlete's exposure.

CONCLUSION

The incidence and prevalence in the number of injuries sustained in the 2017 season decreased when compared to the 2016 season.

Most injuries occurred in the lower limbs; strains were the most common type of injury, followed by sprains and contusions. MRIs were the most commonly requested test, and most injuries were classified as moderate. Approximately 12% of the injuries evolved into surgery. Results similar to those available in current literature.

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