

## Original article

# Shoulder injuries in rugby: Report of its incidence and severity in a group of Portuguese male players during a season



E. Cruz-Ferreira<sup>a,b,c,\*</sup>, A. Cruz-Ferreira<sup>a,b,d</sup>

<sup>a</sup> Faculty of Health Sciences, University of Beira Interior, Portugal

<sup>b</sup> Associação Académica de Coimbra Rugby, Portugal

<sup>c</sup> Orthopaedic Surgery, Sousa Martins Hospital, Local Health Unit of Guarda, Portugal

<sup>d</sup> Mealhada Primary Healthcare Unit, Portugal

## ARTICLE INFO

## Article history:

Received 16 June 2016

Accepted 20 September 2016

Available online 9 November 2016

## Keywords:

Joint  
Traumatology  
Rugby union

## ABSTRACT

**Objective:** Rugby union is a fast growing sport all over the world, due to its nature as a contact sport it is frequent for players to sustain injuries, more specifically on the shoulder joint, were the injuries occur with greater severity.

**Method:** The authors present a cohort prospective study focusing on the incidence and severity of shoulder injuries in a population of 51 male of top-tier Portuguese Rugby Union players aiming, to characterize relevant epidemiological aspects, conducted between September 2013 and May 2014. All data was collected and recorded according to the consensus statement for epidemiological studies in Rugby Union.

**Results:** A total injury incidence rate of 23.68 per 1000 player match-hours was found with a mean severity of injuries of 34.22, a value higher than expected when comparing with previous studies. New and recurrent injuries occurred in a 7:2 ratio. Reported mean severity of 41.57 days in new injuries versus 8.50 days.

**Conclusion:** The proportion of recurrent injuries alerts us for the importance of preventing measures. Poor physical condition of the players seems to have contributed to the increased number of shoulder injuries of our target population. Specific training programs to improve muscle strength and directed training to improve correct technical aspects of the tackling engagement during the fatigue periods of the game could be very important in the prevention of shoulder injuries.

© 2016 Consejería de Turismo y Deporte de la Junta de Andalucía. Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Lesiones del hombro en rugby: incidencia y gravedad en un equipo masculino portugués durante una temporada

## RESUMEN

**Objetivo:** El rugby es un deporte de rápido crecimiento en todo el mundo, debido a su naturaleza, tratándose de un deporte de contacto es frecuente que los jugadores sufran lesiones, más específicamente en la articulación del hombro, donde las lesiones suceden con mayor severidad.

**Método:** Los autores presentan un estudio de cohorte prospectivo centrado en la incidencia y la gravedad de las lesiones de hombro en una población de 51 jugadores de primer nivel de Rugby de la liga portuguesa, caracterizando aspectos epidemiológicos relevantes, datos recogidos de septiembre de 2013 a mayo de 2014. Todos los datos fueron conseguidos y registrados de acuerdo con la declaración de consenso para estudios epidemiológicos de Rugby.

## Palabras clave:

Articulación  
Traumatología  
Rugby

\* Corresponding author.

E-mail address: [cruzferreira\\_em@hotmail.com](mailto:cruzferreira_em@hotmail.com) (E. Cruz-Ferreira).

**Resultados:** La tasa total de incidencia de lesiones fue de 23.68 por cada 1000 horas de competición y jugador, con una severidad media de las lesiones de 34.22 días, un valor más alto de lo esperado comparado con con estudios previos. Lesiones nuevas frente a recurrentes ocurrieron en una proporción de 7:2. La gravedad media fue de 41.57 días en las nuevas lesiones frente a 8.50 días en las recurrentes. **Conclusión:** Los datos de lesiones recurrentes nos alertan de la importancia de las medidas preventivas. La mala condición física de los jugadores contribuyó al aumento del número de lesiones de hombro de nuestra población. Programas específicos de formación, para mejorar la fuerza muscular y entrenamiento específico para conseguir una técnica correcta, especialmente durante los períodos de fatiga del juego, pueden ser muy importantes en la prevención de lesiones del hombro.

© 2016 Consejería de Turismo y Deporte de la Junta de Andalucía. Publicado por Elsevier España, S.L.U. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Lesões no ombro em Rugby: incidência e gravidade de uma equipa masculina portuguesa durante uma temporada

### R E S U M O

*Palavras chave:*  
Articulação  
Traumatologia  
Rugby

**Objectivo:** O Rugby é um desporto em rápido crescimento em todo o mundo, devido à sua natureza como desporto de contato, ocorrem frequentemente lesões, mais especificamente na articulação do ombro.

**Método:** Os autores apresentam um estudo prospetivo de coorte focado na incidência e gravidade das lesões do ombro numa população de 51 jogadores de rugby, de primeiro nível do campeonato Português, caracterizando aspetos epidemiológicos relevantes. Os dados foram colhidos de setembro de 2013 a maio de 2014. Todos os dados foram obtidos e registados em conformidade com a declaração de consenso para estudos epidemiológicos em Rugby.

**Resultados:** Uma taxa de incidência total de 23.68 lesões por 1.000 horas de jogo-jogador foi registada, com uma gravidade média das lesões de 34.22 dias, um valor mais elevado do que o esperado quando comparado com estudos anteriores. Lesões novas e recorrentes ocorreram numa proporção de 7:2. A gravidade média foi de 41.57 dias em novas lesões contra 8.50 dias em lesões recorrentes.

**Conclusão:** Estes dados alertam-nos para a importância de medidas preventivas. A condição física pobre dos jogadores pode ter contribuído para o aumento do número de lesões de ombro da nossa população. Programas de treino específicos para melhorar a força muscular e preparação individualizada com vista a melhorar aspetos técnicos poderão ser importantes na prevenção de lesões no ombro.

© 2016 Consejería de Turismo y Deporte de la Junta de Andalucía. Publicado por Elsevier España, S.L.U. Este é um artigo Open Access sob uma licença CC BY-NC-ND (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Rugby union is one of the most played and watched sports in the world with more than five million rugby players worldwide,<sup>1-3</sup> being reported a player yearly increase of 19%.<sup>4</sup> In Portugal, a growing interest in rugby union has been also witnessed by all agents involved.<sup>5,6</sup> Due to its nature as a contact sport, there is an increased susceptibility to the occurrence of traumatic injuries, particularly in the shoulder joint.<sup>3</sup>

Most studies report shoulder injury incidence to range from 2.3 to 13 per 1000 player match-hours at amateur and professional level, respectively.<sup>3,7</sup> Reported mean severity is also high and reaches 9.4 weeks for amateur players and 52.6 and 41.1 days for professional forwards and backs, respectively.<sup>7-9</sup>

It is also known that only 6% of all traumatic injuries in rugby union are caused by foul plays<sup>10</sup> and that their natural appearance is a result of normal gameplay.<sup>11,12</sup> Shoulder is one of the most frequently injured joints both in amateur and professional rugby union<sup>13</sup> and it has been reported that between 49% and 72% of all injuries occur on the event of tackling or being tackled.<sup>9,14-16</sup>

The aim of this study is to report the incidence of traumatic shoulder injuries sustained by a group of top-tier Portuguese Rugby Union players, and to characterize some relevant epidemiological aspects.

## Method

### Sample

A total of 51 Portuguese senior male rugby players (age:  $22.10 \pm 4.59$  years; body height:  $1.79 \pm 0.05$  m; body mass:  $88.06 \pm 13.74$  kg) were included in our study. The study conformed to the standards set by the Declaration of Helsinki. Players were informed about the procedures, potential risks and benefits of the study.

### Procedures

A cohort prospective study was conducted, between September 2013 and May 2014, monitoring the incidence of shoulder injuries occurred in a group of Portuguese Rugby Union players, playing in the same team in the top-tier of the Portuguese Rugby Union National Championship (Divisão de Honra).

The Portuguese Top-tier National Championship is a 'round-robin' tournament with the top six teams qualifying to a final play-off. In the case of the team included in our study, the total number of matches played during the 2013/14 season was nineteen. Therefore, the total match exposure time of players in hours (given by  $NmPmDm/60$ , where Nm is the number of matches played, Pm is the number of players in the team and Dm is the duration of the match in minutes)<sup>15</sup> was 380 player match-hours.

**Table 1**  
Shoulder injuries sustained during the Portuguese 2013/2014 rugby season.

Case	Position	Type	Contact	Recurrent	Severity (days)
1	Forward	Joint	Yes	No	60
2	Forward	Joint	Yes	No	60
3	Forward	Joint	Yes	Yes	7
4	Forward	Joint	Yes	Yes	10
5	Forward	Joint	Yes	No	21
6	Back	Joint	Yes	No	35
7	Back	Joint	No	No	21
8	Forward	Dislocation	Yes	No	10
9	Forward	Joint	Yes	No	84

The protocol involved the immediate report of all suspected shoulder injuries by the medical staff of the team to the researchers (all medical practitioners), who then would assess the player. All injured players were followed until their return to practice without limitations.

Data was collected and recorded according to the consensus statement for epidemiological studies in rugby union.<sup>15,16</sup> Information was retrieved regarding: the position of the player; the type of injury sustained (muscle, contusion, dislocation, joint or fracture); if the injury was preceded by contact with the opponent or not; if this was a new or recurrent injury; the number of days the player was absent from practice and/or training.

#### Statistical analysis

We report injury incidence as injury/1000 player match-hours (95% confidence interval – CI) and severity as mean ( $\pm$ standard deviation – SD) days. For continuous variables, normality was assessed using Shapiro–Wilk. As continuous variables were normally distributed, Student's *t*-test was used to compare the severity of injuries between positions, and recurrent versus non-recurrent injuries. Statistical significance was accepted at  $p < 0.05$ . Descriptive and inferential analysis was performed using SPSS® v20.0.

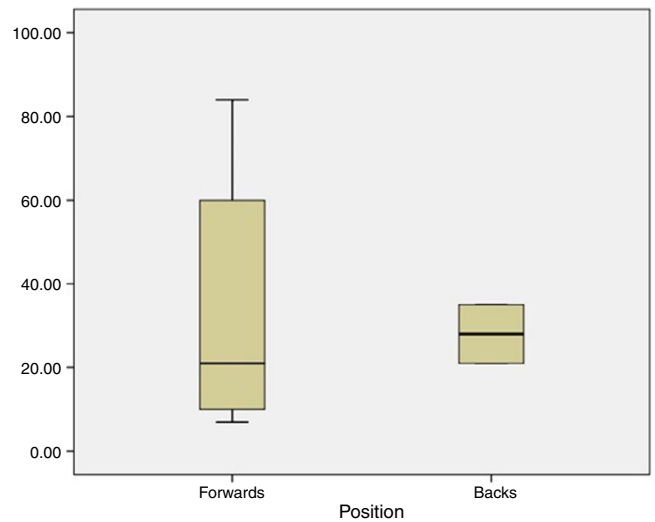
#### Results

A total of nine shoulder injuries sustained during matches throughout the 2013/14 season were reported for rugby players of the team included in our study. Data is summarized in Table 1. This represents a total injury incidence rate of 23.68 per 1000 player match-hours (95% confidence interval – CI: 11.70–43.23). Only one of the injuries was reported as mild (causing an absence of less than 7 days to practice or training), four were considered moderate (absence ranging from 8 to 28 days) and four severe (absence greater than 28 days).

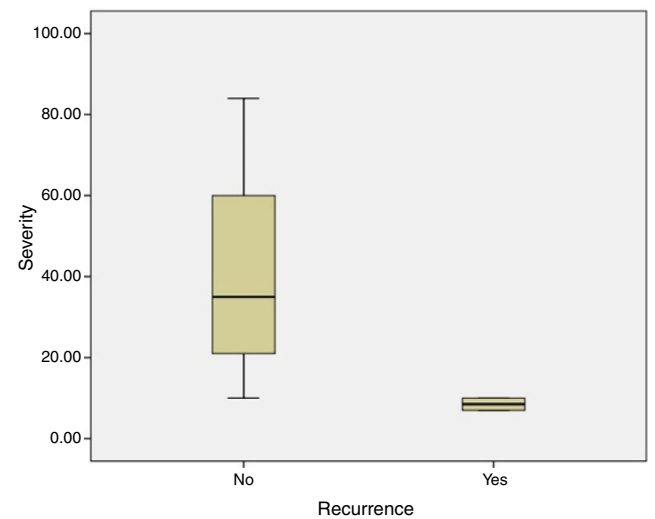
Seven of the injuries were sustained by forwards, and only two by backs, leading to different injury incidence rates: 34.54 per 1000 player match-hours (95% CI: 15.40–67.82) for forwards, and 11.27 per 1000 player match-hours (95% CI: 2.25–36.15) for backs, as it can be seen in Table 1. Mean severity of injuries was 36.00 ( $\pm$ 31.28) days for forwards, and 28.00 ( $\pm$ 9.88) days for backs (see Fig. 1), but no significant statistical differences were found between the two groups ( $p = 0.581$ ), with a global mean severity of injuries of 34.22 ( $\pm$ 27.55) days.

It was also noticed that seven of the injuries were new and two considered to be recurrent. The mean severity reported for recurrent injuries was 8.50 ( $\pm$ 2.12) days, while for new injuries, mean severity was of 41.57 ( $\pm$ 26.97) days (see Fig. 2). Regarding these differences, a statistical significance was found ( $p = 0.017$ ) with new shoulder injuries causing greater absence from practice or match, when compared to recurrences of old injuries.

It is important to notice that, as expected, eight of the nine injuries were sustained after contact with the opponent.



**Fig. 1.** Severity of injuries by position.



**Fig. 2.** Severity of new versus recurrent shoulder injuries.

Regarding the type of injury, and according to the consensus statement for epidemiological studies in rugby union,<sup>15,16</sup> eight of the injuries were classified as 'Joint/ligament' and one as 'dislocation'.

#### Discussion

Considering the incidence of shoulder and upper limb injuries in senior men's professional rugby union (26–84 per 1000 player match-hours)<sup>3</sup> it is clear that our population presented results within the expected parameters (23.86 per 1000 player match-hours), despite the theory presented by some authors that claim that a greater incidence of injury occurs in higher levels of play.<sup>13,17,18</sup>

The mean severity of injuries was 34.22 ( $\pm$ 27.55) days, a value higher than expected when comparing with other studies<sup>11,15</sup> showing mean severity of injuries for forwards to be 21.2 versus 36.00 ( $\pm$ 31.28) in our study, and for backs 26.2 versus 28.00 ( $\pm$ 9.88) days in our study.

Our results also show that new injuries are significant and are associated with higher mean severity. This finding is also consistent with the literature that considers the average severity of new injuries to be higher. Reported mean severity of 41.57 days in

new injuries versus 8.50 days in recurrent injuries alerts us for the importance of preventing measures. Higher level of physical preparation, adequate warm up and the use of protective equipment may help in the prevention of in game shoulder injury.

As limitations of this study we find that a larger number of players and injuries could lead to stronger statistical power, as well as more seasons of follow up to assess with greater certainty the results obtained.

In the light of these results, the authors believe that the rehabilitating support offered in the professional level might play an important role when treating and rehabilitating an injured player. It is of the utmost importance an early and directed individual rehabilitation program in order to achieve a faster and satisfying result.

When comparing our results with other studies that report shoulder injuries, the authors believe that the physical condition and faster exhaustion of the players contributed to the increased number of shoulder injuries of our target population. Specific training programs, to improve muscle strength and technical training, to improve correct technical aspects of the tackling interaction, during the fatigue periods of the game, could be paramount in the prevention of shoulder injuries. It is the author's opinion that more prospective studies, involving specific training programs, are needed in order to better understand the role of physical conditioning and specific muscle strengthening programs, in the prevention of primary and recurrent shoulder injuries during rugby matches.

### Ethical responsibilities

**Protection of people and animals.** The authors state that the procedures followed were in accordance with the regulations set by the responsible Commission for Clinical and Research Ethics and according to the World Medical Association and the Declaration of Helsinki.

**Confidentiality of data.** The authors claim to have followed the protocols of their work center on the publication of patient data.

**Right to privacy and written consent.** The authors claim to have received written consent of patients and/or subjects mentioned in the article. The corresponding author must be in possession of this document.

### Conflicts of interest

The authors have no conflicts of interest to declare.

### References

1. Burger N, Lambert MI, Viljoen W, Brown JC, Readhead C, Hendricks S. Tackle-related injury rates and nature of injuries in South African Youth Week tournament rugby union players (under-13 to under-18): an observational cohort study. *BMJ Open*. 2014;4(8):e005556.
2. Freitag A, Kirkwood G, Pollock AM. Rugby injury surveillance and prevention programmes: are they effective? Despite the high rates of injury in rugby, the UK government plans to focus on increasing participation. *Brit Med J*. 2015;350(1587):1-5.
3. Williams S, Trewartha G, Kemp S, Stokes K. A meta-analysis of injuries in senior men's professional Rugby Union. *Sports Med*. 2013;43(10):1043-55.
4. Chadwick S, Semens A, Schwarz EC, Zhang D. Economic impact report on global Rugby. Part III: Strategic and emerging markets. Coventry, UK: Centre for the International Business of Sport, Coventry University; 2011. Available at: <http://sportbusinessresources.com/wp-content/uploads/2013/04/RWCMastercard2011.pdf> [accessed 10.05.16].
5. Cruz-Ferreira AM, Fontes Ribeiro CA. Anthropometric and physiological profile of Portuguese rugby players. Part II: Comparison between athletes with different competitive levels. *Rev Bras Med Esporte*. 2013;19(1):52-5.
6. Cruz-Ferreira AM, Fontes Ribeiro CA. Anthropometric and physiological profile of Portuguese rugby players. Part I: Comparison between athletes of different position groups. *Rev Bras Med Esporte*. 2013;19(1):48-51.
7. Bathgate A, Best JP, Craig G, Jamieson M. A prospective study of injuries to elite Australian rugby union players. *Br J Sports Med*. 2002;36(4):265-9.
8. Brooks JH, Fuller CW, Kemp SP, Reddin DB. Epidemiology of injuries in English professional rugby union. Part 1: Match injuries. *Br J Sports Med*. 2005;39(10):757-66.
9. Crichton J, Jones DR, Funk L. Mechanisms of traumatic shoulder injury in elite rugby players. *Br J Sports Med*. 2012;46(7):538-42.
10. Brooks JH, Kemp SP. Injury-prevention priorities according to playing position in professional rugby union players. *Br J Sports Med*. 2011;45(10):765-75.
11. Fuller CW, Sheerin K, Targett S. Rugby World Cup 2011: International Rugby Board injury surveillance study. *Br J Sport Med*. 2013;47(18):1184-91.
12. Headey J, Brooks JH, Kemp SP. The epidemiology of shoulder injuries in English professional rugby union. *Am J Sport Med*. 2007;35(9):1537-43.
13. Targett SG. Injuries in professional Rugby Union. *Clin J Sport Med*. 1998;8(4):280-5.
14. Sundaram A, Bokor DJ, Davidson AS. Rugby Union on-field position and its relationship to shoulder injury leading to anterior reconstruction for instability. *J Sci Med Sport*. 2011;14(2):111-4.
15. Fuller CW, Laborde F, Leather RJ, Molloy MG. International Rugby Board Rugby World Cup 2007 injury surveillance study. *Br J Sport Med*. 2008;42(6):452-9.
16. Fuller CW, Molloy MG, Bagate C, Bahr R, Brooks JH, Donson H, et al. Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union. *Br J Sports Med*. 2007;41(5):328-31.
17. Jakoet I, Noakes TD. A high rate of injury during the 1995 Rugby World Cup. *S Afr Med J*. 1998;88(1):45-7.
18. Bird YN, Waller AE, Marshall SW, Alsop JC, Chalmers DJ, Gerrard DF. The New Zealand Rugby Injury and Performance Project. V. Epidemiology of a season of rugby injury. *Br J Sport Med*. 1998;32(4):319-25.