Original articles

Incidence and nature of the most common rugby injuries sustained in Argentina (1991-1997)

E Bottini, E J T Poggi, F Luzuriaga, F P Secin

Abstract

Objective—To study the incidence of the most commonly sustained injuries in Argentine rugby and analyse them according to type, position and age of the players, and phase and time of play.

Methods—A prospective registry of injuries was constructed in different provincial unions of Argentina. Data were collected during a whole weekend each year from 1991 to 1997. χ^2 with Yates correction test, contingency tables, odds ratios (OR), and 95% confidence intervals (CI) were calculated (Epi Info Version 6.04a).

Results—A total of 924 injuries were registered in 1296 rugby games, involving 38 933 players. The mean (SD) incidence per weekend was 2.4 (0.2)% (95% CI 2.22 to 2.53), and the number of injuries per season was 24 188. Overall, senior players suffered more injuries than those in younger divisions (OR = 1.53; 95% CI 1.34 to 1.76; $p < 0.0001$). The most common type of injury was pulled muscles of the lower limbs (11.7%, $p < 0.0001$). Overall, the knee was the most susceptible to injury (14.1%, $p < 0.0001$). Senior players suffered more pulled muscles of the lower limbs (OR = 2.99; 95% CI 2.01 to 4.46; $p < 0.0001$), ankle ligament distension (OR = 1.69; 95% CI 1.12 to 2.53; $p = 0.01$), knee trauma (OR = 1.69; 95% CI 1.06 to 2.68; $p = 0.02$), bleeding wounds on the face (OR = 3.86; 95% CI 2.24 to 6.70; $p < 0.0001$), and knee ligament distension (OR = 2.14; 95% CI 1.16 to 3.96; $p = 0.01$). Younger players had a greater risk of suffering muscular or ligament injuries of the cervical column (OR = 3.0; 95% CI 1.05 to 10.08; $p = 0.04$). The forwards had a higher risk of injury (OR = 1.41; 95% CI 1.23 to 1.61; $p < 0.0001$). The most commonly injured player was the flanker (15.5%,

$p < 0.01$), and the most common mechanism was in open play (33%). More injuries were sustained in the second half (OR = 1.17; 95% CI 1.03 to 1.34; $p = 0.01$).

Conclusions—Injuries are the cause of significant morbidity among rugby players in Argentina. A more thorough investigation and a greater understanding of the mechanisms are crucial in order to update the rugby laws and reduce this high injury incidence.

(Br J Sports Med 2000;34:94-97)

Keywords: trauma; rugby; injury; epidemiology

Medical Committee of the Argentine Rugby Union (UAR)

E Bottini,
E J T Poggi
F Luzuriaga

Urology Department,
Centro de Educación
Médica e
Investigaciones
Clínicas Norberto
Quirno, Las Heras
2900, (1425) Capital
Federal, Buenos Aires,
Argentina
F P Secin

Correspondence to:
Dr F P Secin, Montes de
Oca 630 6A (1270), Capital
Federal, Buenos Aires,
Argentina.

Accepted for publication
6 October 1999

Rugby entails frequent powerful body contact, potentially exposing players to a large number of injuries.¹⁻⁶ Only American football, professional ice hockey, and Australian rules football carry a higher incidence of injury.^{7 8}

The objective of this study was to determine the incidence of the most common rugby injuries sustained in Argentina and analyse them according to type, position and age of the players, and phase and time of play. Incidence and nature of injuries are compared between divisional categories (young versus seniors) and field position (forwards versus backs).

Materials and methods

Players were eligible for the study if they were members of any category of rugby club affiliated to the Argentine Rugby Union (UAR). Injuries occurring in rugby games of all categories played during a single weekend (Saturday and Sunday) in different provincial unions of Argentina were prospectively registered.

The study was performed every year from 1991 through to 1997, except for 1996. The weekends were randomly chosen between June and July—that is, the middle of the season. All the information gathered during these six years was subjected to statistical analysis. Ages were grouped into a young category (8-21 years of age) and a senior category (adults above 21).

The UAR has a total of 22 provincial unions. Four of them participated in the study in 1991 (Buenos Aires, Rosario, Santa Fé, and Centre of Buenos Aires), seven in 1992 (Buenos Aires, Rosario, Santa Fé, Córdoba, Cuyo, Misiones, Austral, and Entre Ríos), 10 in 1993 (Buenos Aires, Rosario, Entre Ríos, Tucumán, San Juan, Alto Valle, Oeste, and Chubut), 10 in

Table 1 Incidence of injury by category, field position, and time of play

	Injuries (%)	Total	Odds ratio	Confidence interval	p Value
Injuries by category					
Senior	364 (3.1)	11 680	1.53	1.34 to 1.76	<0.0001
Young	560 (2)	27 253			
Forwards v backs					
Forwards	565 (2.81)	20 634	1.41	1.23 to 1.61	<0.0001
Backs	359 (1.96)	18 299			
Injuries by time of play					
Second half	499 (1.28)	38 933	1.17	1.03 to 1.34	0.01
First half	425 (1.09)	38 933			

Table 2 Most common injuries in Argentine rugby

Injury	Total	%
1 Pulled muscle of lower limbs	108	11.7
2 Ankle ligament distension	106	11.5
3 Closed head trauma without LOC	81	8.8
4 Knee trauma	81	8.8
5 Bleeding wound on face	79	8.5
6 Knee ligament distension	49	5.3
7 Cut on head	44	4.8
8 Muscular or ligament injury of the shoulder	43	4.6
9 Muscular or ligament injury of the cervical column*	34	3.7
10 Epistaxis	24	2.6
11 Face trauma	24	2.6
12 Rib trauma	21	2.3
13 Lower limb trauma	19	2.1
14 Nose trauma without epistaxis	18	2.0
15 Acromioclavicular joint (sub)luxation	15	1.6
16 Lumbar spine concussion	17	1.8
17 Shoulder luxation	14	1.5
18 Thoracic trauma	10	1.1
19 Bleeding wound in lower limbs	9	1.0
20 Elbow trauma	9	1.0
21 Clavicle trauma	8	0.9
22 Closed head trauma with LOC	8	0.9
23 Other	103	11.1

The top nine causes of injury were statistically different on a contingency table with nine degrees of freedom ($\chi^2 = 706.49$; $p < 0.0001$). LOC, loss of consciousness. *Without neurological injury.

Table 3 Incidence of injury by anatomical region according to different authors

Region	This study Argentina 1999	Davies ⁶ England 1978	Roux ²⁰ South Africa 1987	Clark ¹⁰ South Africa 1990	Gerrard ¹ New Zealand 1994
Lower limbs	42.6 (n=394)	43	37	44	40
Head and neck	35.1 (n=325)	24	29	23	20
Upper limbs	15.3 (n=142)	22	20	27	18
Trunk	6.8 (n=63)	11	13	7	9
Not specified					13

In this study, $\chi^2 = 311.59$; three degrees of freedom; $p < 0.0001$. All values are percentages.

1994 (Buenos Aires, Rosario, Entre Ríos, Córdoba, Cuyo, Noreste, Austral, Mar del Plata, Santa Fé, and Centre of Buenos Aires), seven in 1995 (Buenos Aires, Rosario, Entre Ríos, Centre of Buenos Aires, Mar del Plata, Salta, and Formosa), and four in 1997 (Buenos Aires, Rosario, Noreste, and Centre of Buenos Aires).

Despite the fact that an average of only seven (32%) provincial unions took part in the study each year, the sample was considered to be highly representative because the rugby union of Buenos Aires has about half of the players in the country.

A rugby injury was defined as a lesion sustained on the field during a competitive official match, which required either temporary replacement of the player because of an open or

bleeding wound (law 3), or permanent substitution for the rest of that game.

Medical coverage of all rugby games has been compulsory in Argentina since 1989, otherwise the match is not allowed to begin and the home team loses points. A diagnosis for all the reported cases was made clinically by the respective doctor assigned to the match.

None of the reported injuries were strategic lesions for time outs or substitutions.

Contingency tables, χ^2 with Yates correction test, odds ratios (OR), and 95% confidence intervals (CI) were calculated in the statistical analysis (Epi Info Version 6.04a).

Results

We studied 1296 rugby games, which included 38 933 players; 11 680 of these played in the senior categories and 27 253 in the young categories. In total, 924 cases of injury were recorded, with an incidence per weekend ranging from 2.1% to 2.5% and a mean (SD) of 2.4 (0.2)% (95% CI 2.22 to 2.53). The incidence of injury and number of players involved each year were 2.1% and 4054 in 1991, 2.4% and 5757 in 1992, 2.5% and 8137 in 1993, 2.3% and 9374 in 1994, 2.5% and 6142 in 1995, and 2.1% and 5469 in 1997.

Senior players suffered more injuries than younger players ($\chi^2 = 39.31$; OR = 1.53; 95% CI 1.34 to 1.76; $p < 0.0001$) (table 1).

Table 2 summarises the 22 most common types of injury: pulled muscles of the lower limbs were at the top of the list (11.7%; $p < 0.0001$), followed by ankle ligament distension, closed head trauma without loss of consciousness, knee trauma, and bleeding wound on face.

The incidence of the first nine causes of injury proved to be significantly different on a contingency table with nine degrees of freedom ($\chi^2 = 706.49$; $p < 0.0001$) (table 2).

When the incidence of injury was evaluated by anatomical region, it was found that most lesions affected the lower limbs (42.6%) ($\chi^2 = 311.59$; $p < 0.0001$), followed by head and neck (35.1%), upper limbs (15.3%), and trunk (6.8%) (table 3). The knee was the region that sustained the largest number of different kinds of lesions (traumas and ligament distension) (14%).

The top nine causes of injury were compared according to age category (table 4). Senior players had a higher risk of suffering the following injuries: pulled muscles of the lower limbs (OR = 2.99; 95% CI 2.01 to 4.46; $p < 0.0001$); ligament distension of the ankle (OR = 1.69; 95% CI 1.12 to 2.53; $p = 0.01$); blunt trauma of the knee (OR = 1.69; 95% CI 1.06 to 2.68; $p = 0.02$), bleeding wound on the face (OR = 3.86; 2.24 to 6.70; $p < 0.0001$), ligament distension of the knee (OR = 2.14; 95% CI 1.16 to 3.96; $p = 0.01$).

Younger players had a greater risk of suffering either muscular or ligament injuries of the cervical column (OR = 3.0; 95% CI 1.05 to 10.08; $p = 0.04$) (table 4). No cases of neurological compromise of the spine were reported in this study.

Overall, the forwards proved to have a higher risk of injury than the backs (OR = 1.41; 95%

Table 4 Most prevalent type of injuries comparing senior (S) and young (Y) categories

	Injuries (%)	Total	Odds ratio	Confidence interval	p Value
Pulled muscle of lower limbs					
S	0.5	11 680	2.99	2.01 to 4.46	<0.0001
Y	0.17	27 253			
Ankle ligament distension					
S	0.37	11 680	1.69	1.12 to 2.53	0.01
Y	0.22	27 253			
Knee trauma					
S	0.29	11 680	1.69	1.06 to 2.68	0.02
Y	0.17	27 253			
Bleeding wound on the face					
S	0.32	11 680	3.86	2.24 to 6.70	<0.0001
Y	0.08	27 253			
Knee ligament distension					
S	0.18	11 680	2.14	1.16 to 3.96	0.01
Y	0.08	27 253			
Muscular or ligament injury of cervical column					
S	0.03	11 680	3.0	1.05 to 10.08	0.04
Y	0.1	27 253			

Table 5 Percentages of injuries by field position within different divisional categories and total. ($\chi^2 = 50.25$; nine degrees of freedom; $p < 0.01$); forwards and backs are also compared within categories

		Senior	Under 21	Under 19	Under 17	Under 16	Under 15	Total
1.	Flanker	13	21	18	12	15	14	15.5
2.	Hooker	10	17	6	15	10	12	11.6
3.	Prop	11	8	14	16	10	10	11.5
4.	Fullback	11	9	10	12	15	10	11.1
5.	No 8	11	13	9	8	9	15	10.8
6.	Fly half	10	8	8	8	7	9	8.3
7.	Second row	10	8	10	8	6	5	7.8
8.	Scrum half	6	4	13	7	7	10	7.8
9.	Wing	9	8	5	5	12	7	7.6
10.	Inside	9	4	7	9	9	8	7.6
Forwards		55	67	57	59	50	56	57.3
Backs		45	33	43	41	50	44	42.6

All values are percentages.

Table 6 Comparison of positions with higher risk of injury between senior (S) and young (Y) categories

	Injuries (%)	Total	Odds ratio	Confidence interval	p Value
No 8					
S	25 (3.2)	779	1.79	1.02 to 3.12	0.03
Y	33 (1.8)	1816			
Fullback					
S	27 (3.3)	779	1.83	1.07 to 3.13	0.02
Y	35 (1.9)	1816			
Second row					
S	50 (3.2)	1558	2.98	1.92 to 4.63	<0.0001
Y	40 (1.1)	3632			
Fly half					
S	25 (3.1)	779	2.20	1.22 to 3.94	<0.01
Y	27 (1.4)	1816			

CI 1.23 to 1.61; $p < 0.0001$) (table 1¹). When the incidence of injury was estimated for forwards and backs within divisional categories, the forwards uniformly showed higher values than the backs, with the sole exception of the under 16 category where the share was 50 to 50 (table 5).

The most commonly injured player of the team was the flanker with 14.9% each, while the fullback (11.1%) was mostly affected among the backs. The incidence of injury by player position was also different when analysed on a contingency table with nine degrees of freedom ($p < 0.01$) (table 5).

A comparison of senior and younger players with regard to the incidence of injury by player position showed that senior players in the second row ($p < 0.0001$), at fly half ($p < 0.01$), fullback ($p = 0.02$), and number 8 ($p = 0.03$) had a statistically higher risk of injury than their younger counterparts. No difference in the risk of injury was found between senior players and younger players with regard to the rest of the positions (table 6).

Table 7 describes the different phases of play leading to injuries in general and within divisional categories. Loose play was the main cause of injury in all categories with a total of 33%, and foul play was the least common cause

Table 7 Percentages of injuries by phase of play within divisional categories and totals

	Senior	Under 21	Under 19	Under 17	Under 16	Under 15	Total
Loose play	36	21	30	33	37	40	33
Maul	16	21	19	19	18	19	19
Tackled player	16	19	13	14	26	18	17
Ruck	14	21	16	15	9	8	14
Scrum	8	14	9	9	3	3	8
Tackler	8	5	11	9	5	10	8
Foul play	3	0	2	1	2	2	2

All values are percentages.

in all categories. No injuries occurred in lineouts.

The number of injuries suffered during the second half (54%) was higher than in first (46%) ($p = 0.01$) (table 1).

No deaths were recorded during the study.

Discussion

Injuries are an important cause of morbidity among rugby players.¹⁻⁷ A team is estimated to play an average of 22 matches a year in Argentina. Therefore the incidence of injury by the end of the season would rise to 50.6%. The UAR has about 48 000 players, and if one injury occurred per player, there would be 24 188 injured players by the end of the season.

The trends of injury have been fairly stable throughout the years, ranging from 2.5% in both 1993 and 1995 to 2.1% in 1991 and 1997.

Although these figures are inaccurate because 26% of injuries sustained in rugby are iterative,^{8,9} they give a rough picture of the situation.

Our data probably underestimate the true incidence of injury for three reasons. Firstly, it can be assumed that 15–17% of injuries occur during training sessions.^{4,8-10} Secondly, Garraway and Macleod⁹ observed a peak of incidence at the beginning of the season. Other authors reported two peaks, one at the beginning and another after the mid-season break.^{8,10} Despite the fact that the weekends in this study were randomly chosen in the middle of the season, it is not known whether they corresponded to peaks or not. Thirdly, there are several slowly developing joint degenerative lesions resulting from overweight and chronic joint use.⁹

As regards the anatomical distribution of the injuries found in this study, other authors have also noticed that lower limbs, particularly the knee, are mostly affected (table 3).¹⁻¹⁰

It is especially worrisome that younger players proved to have a three times higher risk of muscular or ligament injuries of the cervical column than senior players (table 4). The design of this study does not allow us to retrieve unusual causes of injury in rugby, such as injuries with neurological damage of the spine. However, this observation agrees with a previous study carried out from 1977 to 1997 in which young hookers had a significantly higher risk of suffering disabling injuries to the cervical spine than seniors in Argentine rugby.¹¹

The greater incidence of lesions among senior players confirms that more playing experience does not necessarily reduce the risk of injury,^{8-10,12,13} and it may be linked to their more aggressive attitude to the game. Clear evidence of this is the fact that a senior player is almost four times more likely to receive a "bleeding wound on the face" than a younger player (OR = 3.86; 95% CI 2.24 to 6.70; $p < 0.0001$) (table 4).

We found that forwards have a higher risk of injury than the backs (OR = 1.41; 95% CI 1.23 to 1.61; $p < 0.0001$); however, results from different studies are contradictory on this point (tables 1 and 8).

Flankers received the predominant number of injuries, both overall and within each divisional category (table 5). However, table 8

Table 8 Comparison of incidence of injuries by position according to different authors.

	This study 1999	Van Heerden ¹⁴ 1976	Roy ¹⁵ 1974	Clark ¹⁰ 1990	O'Brien ² 1990	Stokes ⁸ 1994
1. Flanker	15.5 (1)	10 (4)	11 (2)	8 (5)	10.7 (6)	13.4 (1)
2. Hooker	11.6 (2)	9.1 (5)	11 (2)	19 (1)	11.2 (5)	8.8 (8)
3. Prop	11.5 (3)	8.4 (7)	9 (5)	6 (7)	12.9 (3)	7.9 (9)
4. No 8	10.8 (4)	8.6 (6)	14 (1)	8 (5)	6.4 (8)	6.7 (10)
5. Fullback	11.1 (5)	10.5 (3)	9.5 (4)	11 (3)	15.3 (1)	10.9 (4)
6. Fly half	8.3 (6)	7.5 (8)	8.5 (6)	7 (6)	7.5 (7)	9.5 (6)
7. Second row	7.8 (7)	8.4 (7)	11 (2)	6 (7)	6.4 (8)	9 (7)
8. Scrum half	7.8 (7)	14.2 (1)	7 (7)	5 (8)	3.2 (9)	10.2 (5)
9. Centre	7.6 (9)	10.5 (3)	9 (5)	10 (4)	14 (2)	11.8 (2)
10. Wing	7.6 (9)	12 (2)	10.5 (3)	15 (2)	12.3 (4)	11.4 (3)
Forwards	57.3	44.5	56	47	47.6	45.8
Backs	42.6	55.5	44	53	52.4	54.2

All values are percentages, and rank order is in parentheses.

shows great variability in the incidence of injury by position according to different authors. Stokes *et al*⁸ also found that flankers were injured most often.

Speed, tackle, and counterattack are key tactical features in modern rugby, so it is no wonder that the most common mechanism of injury was the loose play (table 7). However, most catastrophic injuries, such as disabling lesions of the cervical spine, are particularly related to the scrum in Argentina.¹¹

A lower incidence of injuries caused by foul play (1.9%) (table 7) was found than in other countries such as England (between 12% and 31%)⁶ and South Africa (less than 5%).¹⁰

The fact that the greatest percentage of injuries were sustained during the second half ($p = 0.01$) (table 1) may be related to muscle fatigue and slower reaction time,⁶ which could be prevented by improvement in physical fitness.

A minor number of severe injuries have been reported to result from congenital predisposition¹⁶⁻¹⁹; however, different authors agree that most lesions are preventable.⁵ Gum shields,²⁰⁻²³ knee braces,²⁴⁻²⁷ grease, shoulder pads, and soft helmets may be of help.

A worrisome number of injuries occur in Argentine rugby players, and the true values are undoubtedly higher than found in this study. Measures should be taken to reduce them, placing rigorous emphasis on events related to the high risk positions and situations.

Continuous epidemiological investigation and information on injury mechanisms and their associated risks, as well as permanent updating of rugby rules, are still the basic means of making rugby a safer game.²⁸⁻³⁰

The authors would like to acknowledge Dr Horace A Laffaye, Dr Norberto Frega, Dr Carlos Perandones, and especially the late Dr Joaquín Paz for help with statistical analysis.

Contributors: E B was the mentor of the study, designed the protocol, and initially coordinated data collection and documentation. When he died in 1992, F L took over the pragmatic lead of the research. E J T P, president of the medical committee of the UAR, supervised the investigation and regularly organised meetings with the presidents of the medical committees of the provincial unions to discuss core ideas. F L and E J T P edited the paper. F P S participated in the tabulation and interpretation of the data, and carried out the statistical analysis, literature review, and wrote the paper. The respective presidents of the medical committees of the provincial unions contributed to the

paper by both collecting and submitting data: Drs J C Sylvestre (Rosario), J M Pegassano (Santa Fe), L López (Córdoba), J C Cruz (Cuyo), R Molteni (Centre of Buenos Aires), J Uranga (Entre Ríos), J Altobelli (Tucumán), D Cristobal (Alto Valle), G Sagast (Chubut), J C Alvarez (Noreste), Martinelli (Mar del Plata), R Vallejos (Salta), and G Medcot (Formosa). The guarantor of the paper is Dr Martin Odriozola, Chairman of the ATLS (Advanced Trauma Life Support) of the American College of Surgeons in Argentina.

- Kujala UM, Taimela S, Antti-Poika I, *et al*. Acute injuries in soccer, ice hockey, volleyball, basketball, judo and karate: analysis of national registry data. *BMJ* 1995;311:1465-8.
- O'Brien C. Retrospective survey of rugby injuries in the Leinster province of Ireland 1987-1989. *Br J Sports Med* 1992;26:243-4.
- Gilfeather B. Rugby. *The Practitioner* 1989;233:532-5.
- Gerrard DF, Waller AE, Bird YN. The New Zealand rugby injury and performance project. II. Previous injury experience of a rugby playing cohort. *Br J Sports Med* 1994;28:229-33.
- Waller AE, Feehan M, Marshall SW, *et al*. The New Zealand rugby injury and performance project. I. Design and methodology of a prospective follow up study. *Br J Sports Med* 1994;28:223-8.
- Davies JE, Gibson T. Injuries in rugby union football. *BMJ* 1978;2:1759-61.
- Gibbs N. Injuries in professional rugby league. A three year prospective study of the South Sydney Professional Rugby League Football Club. *Am J Sports Med* 1993;21:696-700.
- Stokes MA, Mc Keever JA, McQuillan RF, *et al*. A season of football injuries. *Ir J Med Sci* 1994;163:290-3.
- Garraway M, Macleod D. Epidemiology of rugby football injuries. *Lancet* 1995;345:1485-7.
- Clark DR, Roux C, Noakes TD. A prospective study of the incidence and nature of injuries to adult rugby players. *S Afr Med J* 1990;77:559-62.
- Secin FP, Poggi EJT, Luzuriaga F, *et al*. Disabling injuries to the cervical spine in Argentine rugby during the last two decades. *Br J Sports Med* 1999;33:33-6.
- Silver JR. Rugby Injuries [letter]. *Lancet* 1995;346:187-8.
- Dalley DR, Laing DR, McCartin PJ. Injuries in rugby football. Chistchurch 1989. *New Zealand Journal of Sports Medicine* 1992;20:2-5.
- Van Heerden JJ. An analysis of rugby injuries. *S Afr Med J* 1976;50:1374-9.
- Roy SP. The nature and frequency of rugby injuries: a pilot study of 300 injuries at Stellenbosch. *S Afr Med J* 1974;48:2321-7.
- Marik PE. Coronary artery dissection after a rugby injury. *S Afr Med J* 1990;77:586-7.
- Bartlett GR, Robertson PA. Acute thoracic disc prolapse with paraparesis following a rugby tackle: a case report. *N Z Med J* 1994;107:86-7.
- Haynes RJ, Evans RJ. Pneumomediastinum after rugby training. *Br J Sports Med* 1993;27:37-8.
- Davies PR, Kaar G. High thoracic disc prolapse in a rugby player: the first reported case. *Br J Sports Med* 1993;27:177-8.
- Jennings DC. Injuries sustained by users and non-users of gum shields in local rugby union. *Br J Sports Med* 1990;24:159-65.
- Chapman PJ. Orofacial injuries and international rugby players' attitudes to mouthguards. *Br J Sports Med* 1990;24:156-8.
- Kay EJ, Kakarla P, Macleod DAD, *et al*. Oro-facial and dental injuries in club rugby union players. *Br J Sports Med* 1990;24:271-3.
- Chapman PJ, Nasser BP. Attitudes to mouthguards and prevalence of orofacial injuries in four teams competing at the second Rugby World Cup. *Br J Sports Med* 1993;27:197-9.
- Requa RK, Garrick JG. Clinical significance and evaluation of prophylactic knee brace studies in football. *Clin Sports Med* 1990;9:853-69.
- Requa RK, Garrick JG. A review of the use of prophylactic knee braces in football. *Pediatr Clin North Am* 1990;37:1165-73.
- Sitler M, Ryan J, Hopkinson W, *et al*. The efficacy of a prophylactic knee brace to reduce knee injuries in football. A prospective randomized study at West Point. *Am J Sports Med* 1990;18:310-15.
- Shewring DJ, Mathewson MH. Injuries to the hand in rugby union football. *J Hand Surg [Br]* 1993;18:122-4.
- Burly HC, Calcinai CJ. The need to make rugby safer. *BMJ* 1988;296:149-50.
- Noakes T, Jakoet I. Spinal cord injuries in rugby union players. How much longer must we wait for proper epidemiological studies. *BMJ* 1995;310:1345-6.
- Roux C, Goedeke R, Visser GR, *et al*. The epidemiology of schoolboy rugby injuries. *S Afr Med J* 1987;71:307-13.

Take home message

Injuries are a worrisome cause of morbidity among rugby players in Argentina. The incidence per season is estimated to be 50.6%. Argentine Rugby Union (UAR) officials should take urgent measures to make rugby a safer game.