

Original Article

**Incidence of Injuries in Rugby Amateur Practitioner Participants in the Brazil North Circuit of Rugby Sevens 2016**

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**Abstract:**

Rugby is characterized by intense body contacts and its practice, as professional or amateur, is associated with injuries. However, few studies have investigated the incidence of injuries in amateur rugby practitioners. The aim of this study is to analyze the incidence of injuries in amateur rugby players participating in the North Circuit of Rugby 7s, 2016 - Manaus Stage. Sixty-five subjects of both sexes ( $24.82 \pm 4.61$  years;  $75.11 \pm 17.13$  kg;  $166.0 \pm 0,095$  cm; and BMI  $26.82 \pm 5.18$  kg/m<sup>2</sup>) composed the sample. A structured questionnaire with closed and open questions applied in other studies was applied to collect data. To analyze the variables, a Pearson's chi-square test and student's t-test were used. The results presents that 18 subjects (28%) having been affected by some injury and 47 subjects (72%) does not reported any injury at North Circuit of Rugby 7s. Joint injuries occurred more frequently compared to muscle and bone injuries (56%, 39% and 5%, respectively). The most affected region was upper limb (56%). The practical experience times of injury group were lower than the no injury group (25.71 vs. 37.58 months, respectively). Further, the involvement in others physical activities (besides rugby) was higher in no injury group. The experience time and the involvement in other physical activities seem to be the most preponderant factors in the onset of injuries. Thus, it is suggested that the guidance of amateur practitioners and dissemination of methods allow a healthy practice.

**Key Words:** Lesions, Amateur Rugby, Backwards, Forwards

**Introduction**

Rugby has shown a significant increase in the number of players in Brazil, with more than sixty thousand subjects at different levels of skill, stimulated even with the return of rugby the Rio 2016 Olympics (Confederação Brasileira de Rugby (<https://ww2.brasilrugby.com.br/pages/sobre-nos>; Gutierrez, Antonio, Kater, & Almeida, 2017). In this sense, the recreational practice of rugby has also increased. However, given its intense physical contact characteristic, it causes high injury rates, especially in this kind of practitioners (Gabbett, 2000).

In addition to intense physical contact, factors such as differences in practitioners' skill, position in the field, psychological and physiological stress, may contribute to the high incidence of injuries during a game of rugby when compared to other sports (Gissane, Jennings, Kerr, & White, 2002). In this sense, research focused in the injuries caused by rugby practice has recently grown (Bohu et al., 2015; Cruz-Ferreira, Cruz-Ferreira, Santiago, & Barata, 2017; Pereira & Martins, 2016; Lopez et al., 2016; Swain, Lystad, Henschke, Maher, & Kamper, 2016) mainly with professional players.

In the other hand, only a few investigations (Gabbett, 2000, 2002a) have analyzed injuries that affect amateur level practitioners. In Brazil, just the study conducted by Alves, Soares, e Liebano (2008) had amateur level practitioners as investigation subjects. In this study, the authors followed 42 amateur practitioners of rugby during 5 months collecting data of injury occurrence. The authors reported high injuries rates among the practitioners, further suggesting that these injuries may be associated to the lower in-field skills of the sample components, low experience in the game or the practice of other physical exercises besides rugby.

Additionally, it is natural that the studies focused on the south and east axis (Alves et al., 2008; Lopes et al., 2011; Toledo, Eijnisman, & Andreoli, 2015) of the Brazil, given the greater development of these regions. Therefore, considering rugby is a sport with a recent expansion throughout the country and an greater involvement in physical activities (i.e. sports practices) should be encouraged in order to promote health benefits, it is important that more studies related to the incidence of injuries in Brazilian amateur practitioners are conducted also in other regions of Brazil. Moreover, studies concerning to the rugby characteristics in different regions of Brazil (i.e. north region) can contribute to the development of the knowledge about how rugby can be practice in a secure way, preventing injuries even with it high body contact. Thereby, the aim of this study was to characterize the injury profile in rugby amateur practitioners' participants in the North Circuit of Rugby Sevens (NCR 7s) 2016 – Manaus Stage.

## Material & methods

### Participants

Sixty-five subjects (26 males and 39 females;  $24.82 \pm 4.61$  years;  $75.11 \pm 17.13$  kg;  $166.0 \pm 0,095$  cm; and BMI  $26.82 \pm 5.18$  kg/m<sup>2</sup>) volunteered to participate in the investigation. The inclusion criteria were: adult individuals of both genders; amateur rugby players enrolled in the NCR 7s - Manaus Stage. The exclusion criteria were: own record as semi-professional or professional athlete; be a minor and not to be a participant in the circuit. This study as based on the declaration of Helsinki for biomedical research involving human subjects and procedures were approved by the University Institutional Review Board for Human Subjects. Subjects were informed about the experimental procedures and risks and signed an informed consent prior to participation in the study.

### Procedure and Instruments

The procedures inherent to this investigation were carried out in May of 2016 at the Municipal Stadium Carlos Zamith in the city of Manaus – Brazil. For the data collection, the instrument used was a questionnaire adapted from Toledo et al. (2015) having sixteen closed questions and six open questions. The main variables related to the subjects were: sex, body mass index (BMI), position in the game field, experience time in rugby, practice duration, practice per week, pre NCR 7s injury, injury treatment and injury at NCR 7s. Additionally, to characterize the injuries occurred at the NCR 7s, injury type, injury location, injury diagnostic and injury moment were collected.

### Statistical analysis

The continuous variables were presented in form of mean and standard deviation. The assumptions of normality in the distributions of the variables were verified through the Shapiro-Wilk test. The inferential analyzes used to confirm or refute evidence found in the descriptive analysis were: Pearson's Chi-square or Fisher's Exact in the comparison of groups with and without injury, according to sex, BMI class, position in the field, presence of injury before NCR 7s, habit of preventing these injury and others physical activities besides rugby practice; *t*-independent test in the comparison of groups with and without injury, according to rugby experience (months) and practice time/week. All statistical procedures were performed in the SPSS (Statistical Package for Social Sciences) program, version 24 for MAC OSX and in all analyzes the significance level was set at 5%. Additionally, a descriptive characterization of the injuries occurred during NCR 7s was conducted.

## Results

Eighteen subjects (28%) suffered injury in the event and 47 (72%) reported no injury. Further, the mean values of age and BMI suggest that the sample is composed of overweight young adults (WHO, 2000). Table 1 presents the data according to the occurrence or not of injuries during the NCR 7s. The Injury Group (IG) was composed of 4 men (22.2%) and fourteen women (77.8%).

**Table 1** – Variables collected in NCR 7s

Variables	Injuries NCR 7s			<i>p</i> value
	Yes (n=18) 27,7%	No (n=47) 72,3%	Total (n=65)	
<b>Sex</b>				
Male	4 (22,2%)	22 (46,8%)	26 (40%)	0.07
Female	14 (77,8%)	25 (53,2%)	39 (60%)	
<b>BMI Class</b>				
Normal	12 (66,7%)	19 (40,4%)	31 (47,7%)	0.12
Overweight	3 (16,7%)	19 (40,4%)	22 (33,8%)	
Obese	3 (16,7%)	9 (19,1%)	12 (18,5%)	
<b>Position in the Field</b>				
Forwards	7 (38,9%)	25 (53,2%)	32 (49,2%)	0.30
Backwards	11 (61,1%)	22 (46,8%)	33 (50,8%)	
<b>Rugby Experience (months)</b>				
Mean (SD)	25,7 (20,2)	37,5 (32,5)	34,3 (0,8)	0.15
<b>Previous Injury</b>				
Yes	13 (72,2%)	24 (51,1%)	37 (56,9%)	0.12
No	5 (27,8%)	23 (48,9%)	28 (43,1%)	
<b>Previous Injury Treatment</b>				
Yes	9 (50%)	19 (40,4%)	28 (43,1%)	0.23
No	4 (22,2%)	5 (10,6%)	9 (13,8%)	
<b>Others Physical Activities</b>				
Yes	15(83,3%)	33 (70,2%)	48 (73,8%)	0.28
No	3 (16,7%)	14 (29,8%)	17 (26,2%)	
<b>Practice Time/Week (hours)</b>				
Mean (SD)	6,3 (4,1)	6,6 (2,8)	6,5 (3,2)	0.71

BMI = body mass index

The inferential results of the statistical comparisons between the IG and No Injury Group (NIG) indicate that none of the variables significantly influenced the occurrence of injuries. However, it is important to highlight the percentage values observed in some variables (Position in the Field, Rugby Experience and Others Physical Activities) that may be associated with injury.

Table 2 – **Characterization of injuries in Injury Group**

Injury			Location		
Joint	10	15,4%	MMII	7	10,8%
Muscular	7	10,8%	MMSS	10	15,4%
Bone	1	1,5%	Both	1	1,5%
Injury Diagnostic			Moment		
Contusion	5	7,7%	Game 1	2	3,1%
Sprain	9	13,8%	Game 2	7	10,8%
Luxation	1	1,5%	Game 3	4	6,2%
Stretch	1	1,5%	Game 4	3	4,5%
Fracture	1	1,5%	Game 5	2	3,1%
Concussion	1	1,5%			

Table 2 highlights the characterization of the lesions during the NCR 7s. Stands out the moment that the subjects most suffered injuries were in the second game with 7 (39%), followed by the third game with 4 (22%).

## Discussion

The present study aimed to characterize the incidence of injuries in amateur rugby players participating in NCR 7s – Manaus Stage. In the group of amateur practitioners who suffered injury (18), increased percentage values were found in some already reported risk variables (Gabbett, 2003; Gabbett & Jenkins, 2011), however, with no statistically significant effects.

When comparing sports injuries by gender, a higher proportion of female athletes were affected when compared to males. This trend suggests that this result comes from the large participation of women in the event. As to BMI, the present study reveals a greater involvement of lesions in individuals with BMI <24.9 kg/m<sup>2</sup>. On the other hand, there was no significant correlation between injury and BMI in both groups.

Considering the position of practitioners (backwards or forwards), the results found in this study corroborate those in the literature that defenders are more often injured when compared to attackers. Toledo et al. (2015) supported this tendency, presenting data where the position that suffered the most injury was also backwards (62.9%), in detriment to forwards (37.1%). However, the studies from Alves et al. (2008), highlighting the attackers as more injured (58.7%) than defenders (41.3%), and Gabbett, (2005) pointing out defenders as the most injured. In this sense, Cruz-Ferreira & Ribeiro (2013) suggests that the additional body fat of the forwards can serve as desirable protection in situations of contact with impact (defense) and be a disadvantage in speed and attack activities for the backwards. To corroborate this tendency of “protection”, the analysis of the results of anthropometric evaluations in some studies shows that forwards present total body mass and percentage of adipose tissue significantly superior to backwards (Dinardi, Aquino, Ferreira, Bicalho, & Marins, 2015; Gabbett, 2000; Lopes et al., 2011).

The lower average experience of the injured players in the event could be considered a factor favoring injury. From this perspective, it can be inferred that less skilled practitioners engage in bruises, sprains or strains by not positioning the body properly to absorb force or to perform certain abilities (Bottini, Poggi, Luzuriaga, & Secin, 2000; Toledo et al., 2015).

The findings of the present study present percentage data that agree with previous studies, with similar perceptual values. However, the statistical analyzes do not support more affirmations. A possible explanation for such disagreement with other findings reported in the literature would be that the present study analyzed amateur players, in other words, with few hours of training and who practice recreational rugby. In addition, professional players meet a schedule of weekly training and goals inherent to their athlete profession. In this sense, the variable hours of training per week also did not influence the occurrence of injuries.

In addition, when analyzed the existence of previous injury (last six months) as a risk factor for future injury, there was a higher incidence in IG compared to NIG. In the study conducted by Toledo et al. (2015), 54.3% of those who suffered injuries had previous injuries, compared to 25.9% of those who did not have an injury. Alternatively, in the study developed by Gabbett (2002b), the author suggest that some injuries were new, but he did not exclude the possibility that a injury sustained at one site may contribute to injury elsewhere at a later time.

When they report practicing other in physical activities (besides rugby) and depending on which physical activity is developed in parallel, this practice could influence the occurrence of injuries. Exercises such as strength training are widely accepted as beneficial for strength improvements during play. On the other hand, exercises with high volume and low intensity (i.e.: long-term running) may favor the occurrence of injuries due to the total volume of weekly physical practices. In this sense, the results of the present study report that of the 48 individuals who engage in others physical activities, only 13 suffered injury in the NCR 7s. Based on these data, it can be partly inferred that extra physical activities offered a protective factor to the lesions. Thus, these data disagree with the second hypotheses of this study. However, it is important to emphasize that information of what extra physical activity the recreational practitioners are involved in is important to make more conclusive inferences.

Regarding to the characterization of the injuries, analysis of the results reveals that the anatomical site with the most frequent injury was the upper limb against injuries of the lower limb. These results agree with the findings of Gabbett (2000), where upper limbs (25.3%) were the most affected. According to Safran (2002) (Safran, McKeag, Van Camp, Nascimento, & Gonçalves, 2002), upper limbs are still frequently injured sites, especially the head. However, other findings suggest that the injuries affect more the lower limb (Alves et al., 2008; Bottini et al., 2000; Gabbett, 2002b).

Eventually, an overly aggressive practice style may have contributed to the high injury rates of upper limbs (Gabbett, 2000). In addition to that, this sport has a lot of events that cause an overload in this segment of the body. Evidence suggests that amateur practitioners poorly perform proper execution of movements such as the tackle.

Possibly a low level of skill and physical fitness (Edgar, 1995), may have contributed to the high incidence of upper limbs injury in rugby practitioners in this study. According to the findings of Gabbett (2002a) and Alves et al. (2008), the situation that led to the greatest number of injuries was tackle, accounting for 24.6% of all injuries. In this sense, Whitham (2013) infers that the tackle caused 92% of injuries and resulted in 99% time lost for shoulder injuries. To lower these rates, the same author suggests potential "pre-rehabilitation" methods such as strengthening the muscles around the joint to stabilize the shoulder and training correct techniques are essential to minimize lost time. The finding of this study contributes to the findings of other authors suggesting that appropriate measures are needed to decrease the incidence of injuries in upper limbs.

Regarding the type of injury, the results found here corroborate those of the literature that the main injuries were articular followed by the muscular ones. In the Toledo et al. (2015) study, the main injury were joint (31.4%) and muscular (28.6%). According to Safran et al. (2002), the most observed injury in upper limbs is the acute sprain of the acromioclavicular joint, according to the author this injury occurs due to the direct impact on the shoulder caused by the opponent's attack or by contact with the ground when falling.

However, the study conducted by Gabbett (2000) disagreed from the observed tendency for three consecutive seasons. The incidence in amateur rugby practitioners presented that muscle injuries (28.5%) were the most common type, followed by joint injuries (17,2%). Later another study from the same author (Gabbett, 2002b) showed muscle injuries (40%) as the most common, followed by joint sprains (30%). Based on these findings, we can guide practitioners to formulate warm-up protocols and proprioceptive practice aimed at preventing the most prevalent injuries in rugby. In this way, it is intended to reduce the number of injuries.

In this study, the moment that the highest number of injuries occurred was the second game followed by the third game. These findings suggest that fatigue or accumulated micro-trauma, or both, may contribute to injury in amateur rugby players (Gabbett, 2000). The fact that the highest percentage of injuries occur from the second game may be related to muscle fatigue and slower reaction times, which can be prevented through improved physical fitness (Bottini et al., 2000). According to Gabbett (2002a), the incidence of injuries can increase significantly in amateur sevens rugby practitioners due to successive games in short periods.

It is suggested as the main limitation of the present study that of the 98 participants in the NCR 7s, only 65 were able to participate in our research. Possibly, a number closer to the total would provide somewhat more reliable data. The prevalence of studies reporting the incidence of injuries among male practitioners suggests that further investigations should be developed to reach female practitioners, a fact already highlighted in a recent review proposed by Pereira e Martins (2016). Finally, a more specific survey of how much time each subject actually participated in the game and which physical activities besides the rugby the same practice, could favor more conclusive and reliable findings.

## Conclusions

The findings of the present study reveal that the most frequent injury were joint injuries and the most affected anatomic regions were those of the upper limbs. Time of practice (experience) seems to be the most influencing factor to the occurrence of injury. In the other hand, the involvement in other physical activities play an important protect factor to prevent injuries. It is know that rugby is a sport with intense physical, however, injuries resulting from this practice can be avoided and help to explore the maximum benefits of promoting moments of active leisure and social benefits of this amateur sports practice.

**Conflicts of interest** - The authors declare that they have no competing interested.

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