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Effect of COVID-19 lockdown on injury incidence and burden in amateur rugby union

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ABSTRACT

Objectives: To analyse match and training injury incidence rates and burden from pre-(2019) and post-COVID-19 (2021) seasons;
To analyse injury related variables as mechanisms, type, body locations, severity and the differences of the most common injuries according to playing positions.
Design: An observational study was performed according to the consensus statement on injury definitions and data collection from World Rugby. Injury variables were collected retrospectively for 2019 season and prospectively during 2021 season.
Setting: Argentinian amateur rugby club.
Participants: Male (n = 110) senior amateur rugby players.
Main outcome measures: Match and training time loss injuries, time of exposures and injury related variables.
Results: Training incidence rate during post-lockdown season (4.2/1000 player-training-hours) was significantly higher ($p < 0.001$) than the pre-lockdown season (0.9/1000 player match hours). Post-lockdown hamstring strain injury (HSI) and concussions match incidence rates were significantly ($p < 0.001$; $p < 0.05$ respectively) higher in comparison with 2019 season. Regarding playing positions, backs showed a significantly increase ($p < 0.05$) in HSI match incidence rate post lockdown.
Conclusions: After the COVID-19 lockdown, training incidence rate was significantly higher than previous season (2019), showing the impact of the lockdown restrictions. Coaches and medical staff must consider that players probably need more lead-in time for conditioning and more monitoring after periods of no rugby.

1. Introduction

COVID-19 was declared a global pandemic by the World Health Organization on March 11, 2020. In this regard, to counteract the impact of the disease many countries implemented preventive measures like quarantine, lockdown, or self-isolation (Brooks et al., 2020). This led to sports and recreational activities being suspended, negatively impacting the physical, nutritional and mental health of the athletes worldwide (Dönmez et al., 2021; Myall, Montero-marin, & Kuyken, 2021; Roberts, Gill, & Sims, 2020). Specifically in Rugby Union, hereafter 'rugby', competitions were suspended worldwide in March 2020 across all competitive levels, however, international, and professional competitions were gradually restarted during July and August 2020. For example, international tournaments were played during 2020 (i.e., Six Nations, Rugby Championship, Super Rugby) and 2021 (World Rugby, 2021). Conversely, at the amateur level in the Northern Hemisphere countries from Europe, the 2019–2020 season could not be completed (Kenny & Comyns, 2020). Similarly, in the Southern Hemisphere countries like New Zealand, amateur competitions suffered the same consequences regarding restrictions, and were unable to complete the 2020 season (Otago Rugby Football Union, 2020).

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In Argentina, the lockdown started on March 19th, 2020, and for six months, all sporting activities were suspended. The cessation of restrictions and a gradual return to the exercise of training and sports competitions, was on November 6th, 2020, after the announcement of the end of lockdown (Gemelli, 2020). However, many teams began with training sessions provided they strictly followed specific care measures and restrictions (e.g., non-contact training, groups of 10 players or less per session, training equipment not allowed to be shared) from August 21st, 2020 onwards. In the following months, contact training sessions became more flexible for the clubs, until full-rugby training was allowed for the 2021 preseason. This part of the season consisted of 8 weeks of preparation and in this study, both preseasons lasted 8 weeks. After a few months of training where procedures gradually returned to normal, an increased number of COVID-19 cases prompted the announcement of another lockdown on April 14th, 2021 (at the end of our southern hemisphere preseason) which lasted until June 2021 (Cereghini & Gemelli, 2021). After this, and provided health and safety of players, staff and spectators was guaranteed, the Buenos Aires Rugby Union (URBA) officially announced the start of the rugby tournament season from July 31st, which left rugby clubs one month to prepare and be ready for the competitive season (Union de Rugby de Buenos Aires, 2021).

During lockdown period, players had to train at home with limited equipment (Washif et al., 2021), whereas when training at clubs, many restrictions were imposed by the government, especially those related to human contact and collision which were suspended. These situations posed a scenario of missing skills training, reducing the chronic load in strength, speed, jumps and other game demands as well as the loss of habitual contact situations and tackles, among other skills. The latter led club coaches and staff to look for the best strategies to counteract the negative impact on physical performance. Recent reviews literature (Halle et al., 2021; Mohr et al., 2022; Stokes et al., 2020) showed the potential changes in sports physical performance, the strategies needed to mitigate those changes, and the estimated time required for players to safely return to a “game ready” status. However, current epidemiological reports (Mannino et al., 2021; Marotta et al., 2022; Platt, Collofello, et al., 2021; Platt, Uhl, et al., 2021) stated a discrepancy regarding injury incidence status after a period of training and competition restrictions. Firstly, many sports at the professional level such as football, national football league and baseball (Marotta et al., 2022; Platt, Collofello, et al., 2021; Platt, Uhl, et al., 2021) reported an increase of injury incidence rates and burden after the lockdown period. On the other hand, in rugby, Starling et al. (2022) reported the influence of an extended period of restrictions in training and matches on injury risk in professional rugby, and showed that there was an increased rate of injury when players first returned to training, but after 10-weeks of preparatory training, when competition resumed, match incidence rate was not higher than pre-suspension (Starling et al., 2022). In that study, authors stated it was likely that well-structured player management and greater player rotation would decrease match injury incidence rates.

COVID-19 lockdown overall presented several problems to players’ health, physical fitness, and mood, impacting negatively in some sports at the professional level (Dönmez et al., 2021; Myall et al., 2021; Roberts et al., 2020). To date, it is unclear how such an irregular season due to different lockdown periods might have affected injury incidence rates and burden at the amateur level in rugby union players where club resources tend to be less than that of professional clubs. Therefore, determining whether there are differences in incidence rates before and after lockdown as well as differences between playing positions would be of interest to club coaches and medical staff to better tailor physical conditioning to player needs. To the best of our knowledge, to date no studies have investigated the influence of an extended period without competitions and structured training practices on the injury epidemiological status of amateur rugby players. Therefore, the aim of the current study was two-fold: i) to analyse match and training injury incidence rates and injury burden from pre and post lockdown seasons (2019–2021) and examine if there may have been any negative effect by the lockdown due to the pandemic; ii) to analyse injury mechanisms, body locations, severity, and the differences of the most common injuries according to playing positions. It was further hypothesized that due to this unusual situation, injury risk would have been increased in the 2021 season compared to pre–lockdown season.

2. Methods

This study was conducted according to the guidelines of the ‘Strengthening the reporting of observational Studies in Epidemiology (STROBE) – Sports injuries and illness surveillance (SIIS) (Bahr et al., 2020). An observational, analytical, study was performed for the period 2019–2021. One-hundred and ten amateur male rugby players volunteered to participate in this study. Participants were members of one rugby club that regularly competes in the Second division of the URBA competition. All players had more than ten years of training and playing experience. The club fielded four male teams, which competed in four grades representing competitive levels of play. Ethical approval for this study was granted by the Institution's Research Ethics Committee in compliance with the Declaration of Helsinki.

2.1. Data collection

The process implied two instances retrospectively analysed. The pre-lockdown period considered for analysis was between March 15th, 2019, to November 25th, 2019, where data were collected retrospectively from medical records, and during the post-lockdown pandemic period from July 31st, 2021, to November 20th, 2021, where data collection was conducted prospectively. Regarding the 2020 season, there was no data collection due to the lockdown and competitions were cancelled without any games played, whereas the 2021 (i.e., 13 matches) season was shorter than the previous (i.e., 26 matches), due to time and schedule constraints. Data collection was performed exclusively in the club facilities by the main author, digitalized through Google Forms (Google Form-Google, Mountain View, CA, USA), and finally exported to a sheet matrix in which match, and training times were recorded. Injury diagnoses were also classified according to the Orchard Sports Injury and Illness Classification System (OSIICS) (Orchard et al., 2020). The consensus statement on injury definitions and data collection procedures for studies of injuries in rugby developed by the Rugby Injury Consensus Group from World Rugby was used for data collection (Fuller et al., 2007). The injury definition used was: *“Any physical complaint, which was caused by a transfer of energy that exceeded the body's ability to maintain its structural and/or functional integrity, that was sustained by a player during a rugby match or rugby training, irrespective of the need for medical attention or time-loss from rugby activities. An injury that results in a player receiving medical attention is referred to as a ‘medical-attention’ injury and an injury that results in a player being unable to take a full part in future rugby training/match as a ‘time-loss’ injury”* (Fuller et al., 2007). All the data collection were completed when the last player finished the return-to-play process. The demographic characteristics and injury-related variables were collected for each player: match and/or training situation, day of injury occurrence, playing position (backs and forwards), type of

injury, injury location, time of the injury (match or training), mechanisms (contact or non-contact), and action during the injury occurrence. Severity was classified according to the International Olympic Committee Consensus (IOCC) based on the days the player was not fully available to participate in training and competition, as follows: (1–7 days lost), (8–28 days lost), (>28 days lost) (Bahr et al., 2020).

2.2. Data analysis

Match and training exposure were reported from the data recorded, whereas daily training player-hours for each team were calculated as the number of team training hours multiplied by the number of players in the team on that day. Every player continued with their individualised training except in some specific cases (e.g., post-surgery, acute phase of an injury, or illness). The total training player-hours were calculated as the sum of all the daily training player-hours for each team. The formula used was (NP·NM·1.33), where N refers to number, P to players and M refers to match. Injury incidence rates (training, match or overall) were reported as the number of injuries/1000 player-hours of exposure (Brooks, Fuller, Kemp, & Reddin, 2005). To calculate match injury incidence according to playing position match exposure for backs and forwards was individually used. Injury burden was defined as the expected loss in a particular situation within a stated period of time and is quantified using the product of the average consequence of all adverse events (injury severity) and the probability that these adverse events will occur within a specified time period (injury incidence): incidence x severity (Bahr et al., 2020). Injury incidence rates and burden were reported per season.

2.3. Statistical analysis

Categorical variables are reported as presentation number and percentage. Continuous variables that assumed a normal distribution were reported as mean and standard deviation (SD). Otherwise, the median and interquartile range (IQR) were used. The Kolmogorov-Smirnov test was used to determine the distribution of continuous variables. For the comparison between incidence rates, the Chi-squared test was used. For the comparison between incidence rates by playing position Fisher exact test and mid-*p* exact values was used. A p-value <0.05 was considered significant. For data analysis, the IBM SPSS Macintosh software, version 25.0 (IBM Corp., Armonk, NY, USA) was used.

3. Results

3.1. Player's characteristics and exposure

A total of 110 players were included in the study, 44 (40%) backs, and 66 (60%) forwards. The median age of backs was 26 years (IQR 21–29) and 24 years (IQR 22–28) for the forwards. The median BMI for backs players was 25.5 (IQR 24.5–26.9) and 29.2 (IQR 26.6–31.8) for forwards players. Table 1 reports the number of players (overall, forwards, and backs), total exposure, match, and training exposure per season.

A total of 105 injuries were recorded during the period 2019–2021, 54 occurred during 2019 and 51 injuries in 2021. Forwards sustained a total 30 injuries (55.6%) during 2019 season (22 match, 8 training) and 26 (51%) were post-lockdown season (15 match, 11 training); Backs sustained a total of 24 injuries (44.4%) during 2019 season (21 match, 3 training) and 25 (49%) were post-lockdown (16 match, 9 training).

Table 1
Number of players (all, forwards, backs) and player-hours (all, match, and training) per season.

Season	All	Forwards	Backs
2019			
Number of players	97	55	42
Total player-hours	14496	8149	6347
Training hours	12416	7040	5376
Match hours	2080	1109	971
2020	**COVID-19 LOCKDOWN PERIOD**		
2021			
Number of players	77	45	32
Total player-hours	5843	3357	2486
Training hours	4723	2760	1963
Match hours	1120	597	523

3.2. Incidences rates

Match incidence rate during 2019 period was 20.7/1000 player-match-hours. After the 2020 lockdown due to COVID-19 match incidence rate (27.7/1000 player-match-hours) was higher ($p = 0.219$) than the pre-lockdown season (20.7/1000 player-match-hours). Training incidence rate post-lockdown season (4.2/1000 player-training-hours) was significantly higher ($p < 0.001$) than the pre-lockdown season (0.9/1000 player-training-hours). Regarding playing position, backs and forwards training incidence rates post-lockdown season were significantly higher ($p < 0.0001$) than the pre-lockdown season. Match, training, and overall incidence rates are exposed per season in Table 2.

3.3. Severity and injury burden

The median severity and injury burden per season are shown in Table 2. For 2019 severity by days lost was 3949; 3326 by match injury while 636 days lost by training injury. Six (11.1%) injuries resulted in 1–7 days lost [median 6 (IQR 4–6) days], 20 (37%) resulted in 8–28 days lost [median 15 (IQR 12–22)] and 28 (57.1%) required more than 28 days lost [median 89 (IQR 38–334)].

Table 2
Number of injuries, severities, incidences rates and injury burden per season (2019–2021) separated by overall, match, and training.

	2019	2020	2021	*P* value
Overall				
Injury count (n)	54	**COVID-19 LOCKDOWN**	51	
Incidence rate[a]	3.7		8.6	< **.001**
Incidence rate forwards[a]	3.7		7.7	< **.007**
Incidence rate backs[a]	0.6		10.1	< **.001**
Severity (median)[b]	32		18	.076
Injury Burden[c]	78		190	
Match				
Injury count (n)	43		31	
Incidence rate[d]	20.7		27.7	.219
Incidence rate forwards[d]	19.8		25.1	.480
Incidence rate backs[d]	21.62		30.6	.301
Severity (median)[b]	38		17	.102
Injury Burden[c]	786		470.5	
Training				
Injury count (n)	11		20	
Incidence rate[e]	0.9		4.2	< **.001**
Incidence rate forwards[e]	1.1		3.4	< **.008**
Incidence rate backs[e]	3.8		10.1	< **.001**
Severity (median)[b]	21		22	.670
Injury Burden[c]	28		75.3	

Bolded P values indicate statistically significant difference between seasons.
[a] Injuries/1000 total exposure (match and training combined).
[b] Days lost.
[c] Days absence/1000 player-hours.
[d] Injuries/1000 player-match-hours.
[e] Injuries/1000 player-training-hours.

Regarding severity by days lost during 2021, there were 1958 days lost, 1235 by match injury while 723 days were lost by training injury. Three (5.9%) injuries resulted in 1–7 days lost [median 6 (IQR 4–6) days], 28 (54.9%) resulted in 8–28 days lost [median 17 (IQR 12–22)] and 17 (39.2%) required more than 28 days lost [median 60 (IQR 35–180)].

3.4. Injury mechanisms and match situations

From the total of injuries that occurred during 2019, 63% were contact injuries and most of them (57.4%) occurred in matches, while during 2021, 47.1% were contact injuries of which 33.3% were match injuries. In both the 2019 and 2021 seasons, 44.4% and 35.3% of the injuries respectively were caused by tackle actions. Regarding non-contact injuries, during 2019 22.2% occurred during matches and 14.8% during training sessions. After lockdown, 25.5% of the injuries occurred during match days and 27.5% during training sessions. In both the 2019 and 2021 seasons the most common causes of non-contact injury were during running actions (14.8% and 25.5% respectively) and sprints (7.4% and 21.6% respectively).

3.5. Injuries according to body location

Lower limbs were the most affected in both seasons. During 2019, the lower limb accounted for 30 injuries (55.6%) and during 2021, it was 31 injuries (60.8%). During pre-lockdown 2019 season the thigh (25.9%), the knee (18.5%), and the ankle (9.3%) were the most frequently injured location. Post-lockdown in 2021 thigh injuries (45.1%) were significantly ($p < 0.05$) higher than the 2019 season. In 2021 other lower limb locations (knee and ankle) presented similar rates (7.8%) but lower than the 2019 season. For the upper limb during 2019, there were 14 injuries (25.9%) and during 2021, it was 4 injuries (7.8%). Pre-lockdown 2019 season upper injuries were significantly ($p < 0.05$) lower than post-lockdown 2021 season. The shoulder/clavicle was the most frequently injured location for upper limb in both seasons. Finally, there were 3 (5.6%) head injuries in 2019 while in 2021 there were 7 (13.7%).

3.6. Most common diagnoses

Table 3 shows the mean severity, match incidence rate and injury burden of the six most common injuries. During 2019, anterior cruciate ligament (ACL) rupture showed the highest burden while hamstring strain injury (HSI) was the injury that showed highest burden in 2021. Regarding match incidence rate HSI showed the highest match incidence rate in both periods, 3.37/1000 player/hours in 2019 and 8.04/1000 player/hours during 2021 season. Post-lockdown HSI match incidence rate was significantly ($p < 0.001$) higher than 2019 season. With respect to concussions, match incidence rate in 2021 showed a significant increase ($p < 0.05$) in comparison with the 2019 season. Match injuries diagnoses according to playing position are shown in Figs. 1 and 2. The most common injury for backs was the HSI in both seasons showing a significant increase ($p < 0.05$) in match incidence rate post-lockdown, being running (50%) and sprinting (50%), the game actions responsible for these injuries. The most common injury for forwards in 2021 were concussions, showing an increase ($p = 0.14$) in match incidence rate than pre-lockdown season. All these injuries were, during tackle actions, specifically, while the player was in the role of tackler.

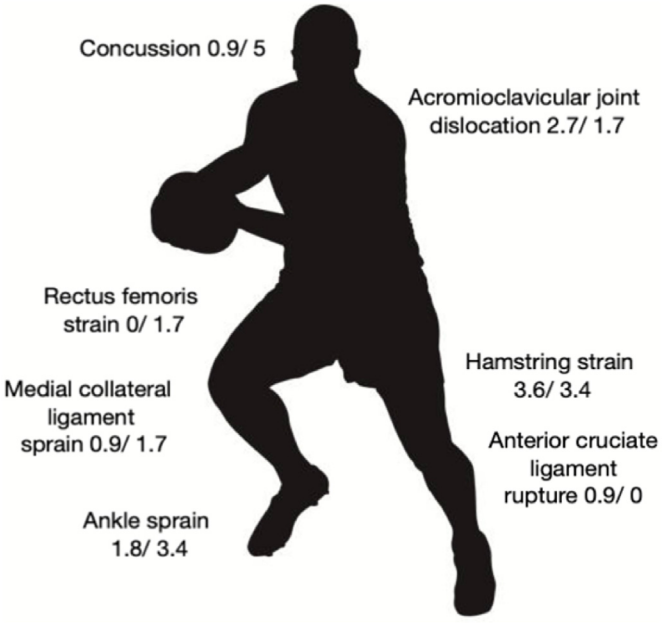

Fig. 1. Match incidence rates of the most common diagnosis in forwards players in 2019 season against season 2021, expressed by injuries/1000 player-match-hours.

4. Discussion

4.1. Summary of main findings

This study reported differences in injury incidence rates and burden between a pre-lockdown season (2019) and a post-

Table 3
The six most common injuries with its respective match incidence rate, severity, and injury burden per season.

Most common diagnoses	2019				2020	2021			
	n	Severity	Match IR[a]	IB[b]		n	Severity	Match IR[a]	IB[b]
Hamstring strain	9	25.8	3.37	16.0	**COVID-19 LOCKDOWN**	17	25.7	8.04	74.0
ACL rupture	5	222.6	1.92	76.8		–	–	–	–
Ankle sprain	4	12.0	1.92	3.3		2	43.5	1.79	14.7
MCL sprain	3	58.0	0.96	55.6		2	36.0	1.79	12.2
Rectus femoris strain	3	23.3	0.48	4.8		3	14.0	1.79	7.1
Concussion	1	17.0	0.48	1.1		6	15.7	4.46	16.0

n: number of injuries.
S: severity (mean in days).
IR: Incidence rate.
IB: Injury Burden (Overall).
ACL: Anterior cruciate ligament.
MCL: Medial collateral ligament.
[a] Injuries/1000 total exposure (match and training combined).
[b] Days absence/1000 player-hours.

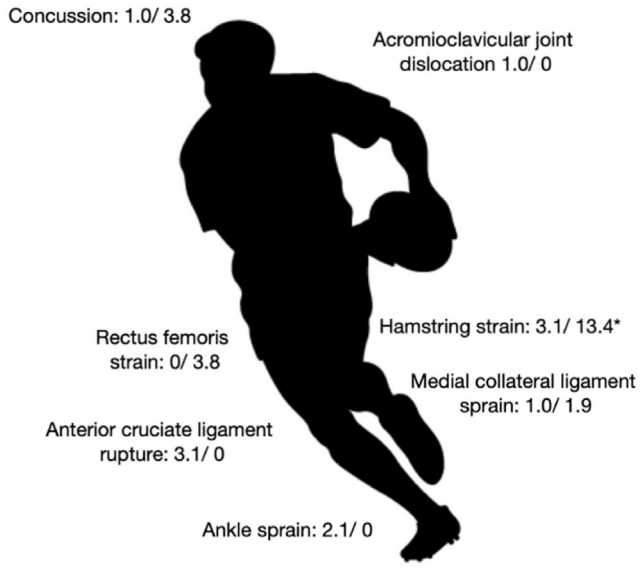

Fig. 2. Match incidence rates of the most common diagnosis in backs players in 2019 season against season 2021, expressed by injuries/1000 player-match-hours. (*: significant difference between seasons).

lockdown season (2021). The main findings of this study were as follows: i) post-lockdown training incidence rate were significantly higher than the previous 2019 season before Covid-19 interruptions. In terms of playing positions, forwards sustained a higher number of injuries than backs, whilst for injury location lower limbs were most affected in both seasons (55.6% and 60.8%); ii) post-lockdown severity (median) was lower than 2019; hamstring strain injuries and concussions were significantly higher ($p < 0.001$ and $p < 0.05$ respectively) in 2021 compared with the 2019 season; iii) the most common injury presentations post-lockdown differed across both positional groups, with HSI the most common injury within backs and they occurred during running and sprinting actions, while concussions were the most common diagnoses for forwards and occurred mostly during tackling.

4.2. Incidence rates, severity, and burden

In the present study match incidence rate in 2021 after the lockdown (27.7/1000 player-match-hours), was higher than the previous (2019) season (20.7/1000 player-match-hours). The incidence rate for both seasons were below those reported in recent studies in Argentina (Tondelli, Boerio, Andreu, & Antinori, 2021) and in the northern hemisphere countries (Kemp et al., 2020; Kenny & Comyns, 2020). Similar findings with regards to post-lockdown injuries were reported in a study conducted in national football league (Platt, Collofello, et al., 2021). Other studies (Mannino et al., 2021; Marotta et al., 2022) in football showed no differences in match injuries after the lockdown period, but did not report incidence rates. However, a recent study by Starling et al. (2022) analysed the influence of a prolonged restricted period of matches and training on injury risk in professional rugby showing that there was no significant difference in the overall incidence, severity or burden of injuries sustained but there was a significantly higher ($p < 0.05$) burden of soft tissue injuries (Starling et al., 2022). Nonetheless, in the current study incidence rate for post-lockdown season training sessions (4.2/1000 player-training-hours) was significantly higher ($p < 0.001$) when compared to pre-lockdown season (0.9/1000 player-training-hours). However, our post-lockdown season was shorter (13 matches) than 2019 season (26 matches), so we cannot compare season lengths. The present investigation is the first to report the effects of the lockdown on injury incidences rates in amateur rugby. Interestingly, Starling et al. (2022) reported similar findings to those presented here, showing that post-lockdown training injuries were increased when compared to the previous seasons. Additionally, in a recent study in professional football (Waldén et al., 2022) the authors reported an increased training incidence and burden following the COVID-19 lockdown in comparison with 2015–2019 seasons. It is worth highlighting, that players' internal factors that have been shown to impact the return to sport after an injury such as anxiety (Murphy & Sheehan, 2021), concern about return to performance level, lack of readiness, fears, internal pressure among others, could be considered as likely to be responsible for this injury situation due to the lockdown period. However, each club in the URBA with its respective strength and conditioning coaches and medical staff probably adopted many different strategies to face those potential problems. Likewise, post-lockdown, severity was lower than 2019 and although the incidences were higher post-lockdown, there were no high-severity injuries such as ACL tears (Table 3), as occurred in 2019. In this sense, the days lost were fewer, causing a drop in the median of severity. However, overall injury burden was higher than 2019 (78 days lost/1000 player-hours vs 190 days lost/1000 player-hours respectively) showing a negative impact of the injuries. In contrast, post-lockdown match injury burden was lower, which may be explained by the absence of high severity injuries. These type of injuries can impact negatively on player mental welfare (Murphy & Sheehan, 2021).

4.3. Injuries body locations

With regards to injuries body locations, lower limbs were the most affected in both seasons. Post-lockdown, thigh injuries (45.1%) were significantly higher ($p < 0.05$) than the pre-lockdown season. Previous studies in amateur rugby (Kemp et al., 2020; Yeomans et al., 2018) reported that the knee was one the most common body location to suffer an injury during a regular season, which is in contrast to the current study. Considering that present findings showed that HSI and the Rectus femoris strain were the most incident injuries, perhaps these differences may be explained by the decrease in muscle strength, poor adaptation to sprint actions or scarce time to prepare and cope with game demands. In addition, it could be assumed that upper limb injuries could have been higher than those reported for the pre-lockdown season due to insufficient training regarding contact and collisions situations which may have caused players to be not fully prepared to cope with all game demands, thus, pre-lockdown season upper limb injuries were significantly ($p < 0.05$) lower than 2021.

4.4. Most common diagnosis and mechanisms between playing positions

Regarding the most common diagnosis and the incidence by playing position, HSI showed the highest match incidence rate in both periods, 3.37/1000 player/hours in 2019 and 8.04/1000 player/hours during 2021 season. Post-lockdown HSI match incidence rate was significantly higher ($p < 0.001$) than the pre-lockdown season. Although in this study HSI match incidence rates were among the highest for backs and forwards, backs showed a significant increase compared to forwards during 2021. Considering that backs are most commonly involved in sprints (Darrall-Jones, Jones, & Till, 2016), it

would have been necessary to perform specific training according to positions aimed at reducing the risk of injury associated with the return to competitions, since it is established that a combination of Nordic curl hamstring exercises and regular exposure to high-speed running appears to be protective against HSI (Stokes et al., 2020). Also, it strengthens even more the efforts that are made to know the risk factors of this injury and what are the best preventive strategies to implement (Attwood, Roberts, Trewartha, England, & Stokes, 2018; John H.M. Brooks, Fuller, Kemp, & Reddin, 2006; Lahti et al., 2020). Secondly, ankle sprains were other of the most common injuries in the post-lockdown season (1.79/1000 player-match-hours). While post-lockdown ankle sprains match incidence rate was lower than 2019, an important aspect to consider is that median severity in 2021 was three times higher, which highlights that players needed more time to recover from this particular injury. Considering, that ankle sprains incidence could be attributed to failure in motor control or previous injuries (De Noronha, França, Haupenthal, & Nunes, 2013; Kobayashi, Tanaka, & Shida, 2016), and this may be specifically due to the lack of specific preparation and the failure to include change of directions, collision and landing within the programs themselves. This has led in recent years to a deeper analysis of the injury etiology to try to reduce the risk as well as the inclusion of preventive strategies. Finally, concussions reported in the current study during both seasons were in the top 3 most common diagnosis, although the 2019 season numbers were well below than previous reports in amateur rugby (Kemp et al., 2020; Kenny & Comyns, 2020; Yeomans et al., 2021). Curiously, the post-lockdown concussion match incidence rate (4.46/1000 player-match-hours) was significantly higher ($p < 0.05$) when compared to 2019 (0.48/1000 player-match-hours). This difference in the incidence rate between seasons and compared to other countries may be due to the injury identifying process and implementation of concussion detection tools in comparison with 2019 at the URBA tournaments. It is worth mentioning that concussion injury is probably still underdiagnosed due to the complexity of recognizing concussions on the field (Tucker, Falvey, Hislop, & Raftery, 2021). According to playing positions, forwards sustained twice the incidence rates of concussions when compared to backs. This higher concussion incidence rate for forwards could be explained by the fact that these players are more heavily involved in contact events than backs (Paul et al., 2022). In addition, a study of head-injury events conducted in professional rugby, reported that “tacklers” were 2.6 times more likely to be injured compared to the ball carrier (Tucker, 2017). Similarly, Cross et al. (2019) showed that the accelerating player, tackler speed, head contact type and tackle type were the tackle characteristics that represented the greatest likelihood for modifying the risk of concussion. Therefore, it is suggested that strategies aiming to prevent head injuries and concussions must be included. For this reason, World Rugby is involved in expanding knowledge and prevention tools regarding this issue, such as the blue card system which enables referees to show a blue card to a player suspected of sustaining a concussion who are then removed from the game. If rigorously implemented by referees, it could aid the work of medical staff. Rugby Unions and federations should be focused on this situation, educating and auditing healthcare professionals, coaches, players, and referees to promote welfare.

4.4.1. Study limitations

Firstly, the inclusion of a relatively small sample size for epidemiology research, and the use of only one club, precludes that the results may be generalized across the amateur rugby community. Secondly, this study lacks the report of non-time loss injuries or medical attention, which could have revealed more about the reality of amateur rugby injuries. Lastly, post-lockdown (2021) season was shorter than pre-lockdown (2019). Finally, these results are not representative of female or young rugby players.

5. Conclusion

This study adds to the epidemiological understanding of injury in male amateur rugby players, and match and training incidence rates during two competitive seasons. After the COVID-19 lockdown, overall and training incidence rates increased significantly compared to pre-lockdown season, showing the impact of the restrictions period. Forwards players attained a higher number of injuries than backs, whilst HSI was the most common injury within backs while concussions were the most common diagnoses for forwards. More specifically, hamstring strain injuries, and concussions were higher in comparison with 2019 season. The present study is the first to analysed differences between pre- and post-lockdown incidences rates and to analysed match incidence rates in senior male amateur rugby players. This study demonstrates that practitioners may consider implementing preventive measures to increase player welfare and reduce the injury risk and improve load monitoring strategies, planning training sessions according to the demands required after a long period of restrictions in amateur rugby.

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None declared.

Ethical approval

Ethical approval for this study was granted by the University of Flores' Research Ethics Committee in compliance with the Declaration of Helsinki. Subjects gave informed consent to participate.

Declaration of competing interest

None declared.

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