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Original research

Match and training injury risk in semi-professional rugby union: A four-year study

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ABSTRACT

Objectives: Describe medical-attention and time-loss injuries during matches and training in a Welsh Premiership Rugby Union team.
Design: Prospective cohort observational study.
Methods: Injury incidence, severity, burden, location, type, and cause were determined in sixty-nine players from one semi-professional Rugby Union team.
Results: Medical-attention and time-loss injury incidence was greater for matches (incidence, 95% confidence interval = 122.8, 108.9–138.4 and 99.8, 87.3–114.0) than training (incidence, 95% confidence interval = 2.2, 1.8–2.6 and 1.7, 1.4–2.1) per 1000 player-hours. Injury severity was similar for matches (time-loss ± standard deviation = 24.9 ± 30.8 days) and training (time-loss ± SD = 22.4 ± 29.1 days), with injury burden greater for matches (burden, 95% confidence interval = 3148.8, 3019.8–6479.2) than training (burden, 95% confidence interval = 49.7, 36.7–129.6). Lower-limb time-loss injuries were most common during matches (incidence, 95% confidence interval = 46.0, 37.9–55.9) and training (incidence, 95% confidence interval = 1.3, 1.0–1.7) per 1000 player-hours, whilst upper-limb injuries were most severe in matches (time-loss, 95% confidence interval = 38.8, 28.3–44.4 days) and training (time-loss, 95% confidence interval = 45.9, 17.5–52.7 days). The prevalent cause of contact-injury was tackling (31%) with running (11%) the common cause of non-contact injury.
Conclusions: Time-loss match-injury incidence, severity, and burden were similar to data reported in the professional tier, with similar patterns of injuries for location, type, and inciting event. These figures are greater than previously reported for semi-professional Rugby Union, warranting further investigation at this level of play.

Practical implications

- Injury rates in semi-professional Rugby Union matches appear to be similar to those reported in the professional tier of the sport, whilst the rate of injury from training is slightly lower than for professional Rugby Union.
- Contact events are the predominant cause of injury. Nevertheless, non-contact injuries occurred during accelerating and running events.
- The lower limb was the most commonly injured site, with the upper limb resulting in greatest injury burden. Therefore, coaches are encouraged to consider conditioning programmes and injury prevention strategies to reduce the incidence and severity of these types of injury.

1. Introduction

Rugby Union is a popular team sport with over 9.6 million registered players in over 124 countries worldwide with participation continuing to rise across all tiers of the game.[1] Rugby Union is fairly unique amongst invasion sports as it is characterised by frequent collisions alongside intense running and has a relatively high-risk of injury during both matches and training.[2] Due to the increasing physical demands such as greater high-speed running, increased contact events and a necessity for enhanced strength and power,[3] prioritising player welfare is essential for health and performance, as lower injury burden is a significant advantage for team success.[4] One way to improve player welfare is by the development of injury prevention strategies, such as pre-activity movement control injury prevention programmes, which are informed by injury surveillance research.[5]

Recent trends in injury surveillance research have seen a focus on international, professional, and amateur Rugby Union cohorts.[6–8] Although this work spans the competition spectrum, there is a paucity of research within the semi-professional tier, despite competitions

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being commonplace in both the Northern and Southern hemispheres. The limited research that does exist in semi-professional rugby suggests that match-injury incidence is greater in the elite game[2,6] and lower in the community game[8,9] when compared with the semi-professional tier.[10–12] However, it is often difficult to compare these data across standards of play due to differences in injury definition (e.g., medical-attention vs time-loss injury).[13] Injury definition is often decided based on factors such as, the available access to and the standard of medical support and the regularity of contact between players and medical personnel. These factors can be variable in the semi-professional and community game and may also account for the lack of training-injury data in the research below the elite tier of the game. Although it is well established that injury rate is higher during match-play compared to training,[8,14] training and practice are not without risk of musculoskeletal injury.[15] Training exposure amongst semi-professional players is likely to be higher than that observed in the community game. Nevertheless, there is no published data on training injury within semi-professional Rugby Union.

The suggested increase in injury incidence in community and elite Rugby Union since professionalisation in 1995,[16] allied with reported differences in injury across standard of play,[8] highlights the need for up-to-date research within each tier of the sport. Therefore, the primary aim of this study was to provide a contemporary assessment of medical-attention and time-loss match- and training-injury incidence, severity, burden, location, type, and cause within a semi-professional team across four competitive seasons; a secondary aim was to compare injury rate between forwards and backs.

2. Methods

A prospective cohort observational study of match and training injuries was undertaken in a Welsh Premiership senior men's Rugby Union squad. The Welsh Premiership division includes 12 semi-professional teams and is the highest level of community rugby within Wales. For reference, the players in this study were exposed to 2 full days of training which included skill work, gym sessions lead by a full-time strength and conditioning coach and 2 evening rugby-based sessions leading to matches being played within the league at the weekends from September to mid-May and had full-time physiotherapy provision and match-day doctors. Each player provided informed consent for their baseline anthropometric and injury data to be collected. Height (cm) and weight (kg) were measured using a stadiometer (Bodycare Ltd, Warwickshire, UK) and digital platform scales (Model 705, Seca, Hamburg, Germany). The study was approved by the local Ethics committee at Bangor University.

Injury surveillance was conducted between July 4, 2016 and March 20, 2020, covering four seasons (2016/17–2019/20). Data on injuries occurring within the 2019/20 season were curtailed on 20th March 2020 due to the COVID-19 outbreak. At the start of each season players' date of birth, height and body mass were recorded. Injury definitions and procedures were compliant with the international consensus statement on injury surveillance studies for Rugby Union when collecting both time-loss and medical-attention injuries.[17] Injury reporting was carried out by a designated full-time physiotherapist (OED). Injury records and exposure data were then extracted on a weekly basis by the researcher (SLE) to minimise missing data. Diagnosis of time-loss injury was coded according to the Orchard Sports Injury Classification System version 10 (OSICS).[18] Match exposure was calculated for player-match-hours (number of players (15) × number of games × game duration hours (80/60)), and training exposure for player-training hours (number of players × number of training sessions × training duration).

Time-loss injury severity was reported as the number of days lost to training and matches. The date when an injury was sustained and the date of returning to full training were used to determine injury severity. For injuries which led to time-loss beyond our data collection period, return to training/play was estimated based on the physiotherapist's injury specific knowledge of the condition and its treatment (1 injury).

The contact and non-contact mechanisms leading to injury were recorded across matches and training as previously described.[17] Contact injuries were categorised according to the inciting event, including being tackled, tackling, rucks, collisions, scrum and other and then further sub-categorised by the following: tackling and tackled from the front, side and from behind, maul, ruck clearing out, ruck cleared out, lineout, scrum, collision, jackling, contesting high ball or unknown. Non-contact injuries were classified as; gym, kicking, running, landing, and passing and further assessed by the specifics of running, running-accelerating, running-decelerating, running-cutting-stepping, running-pivoting, landing, passing, and kicking.

Injury data was collated using an Excel spreadsheet (Microsoft Corporation (2021), Microsoft Excel Version 16.53) and statistical analysis was performed using the R Studio software (RStudio (2020): Integrated Development Environment for R. RStudio, PBC, Boston, MA) using packages “rstatix” and “geepack” (2021). Normal distribution of anthropometric and severity data was assessed using Shapiro–Wilk's (SW) test for normality. Independent *t*-tests were conducted to compare differences in baseline anthropometric data and Mann–Whitney–Wilcoxon tests were conducted to compare differences of mean injury severity between forwards and backs. Match/training injury incidence was calculated as the number of injuries per 1000 match/training hours, with 95% confidence intervals calculated via the Poisson distribution method.[17] Injury burden was calculated as days lost per 1000 match/training hours (total days lost / exposure hours) × 1000 with 95% confidence intervals. General Estimating Equation was used utilising Poisson regression analysis to explore the outcome effect of forwards and backs across injury incidence and nature of injuries sustained in both matches and training, offsetting for exposure hours. Results are presented as Rate Ratio (RR) with 95% CI, and significance was accepted at $p < 0.05$.

3. Results

Sixty-nine players were included across the 4 seasons (2016/17, n = 32; 2017/18, n = 34; 2018/19, n = 36; 2019/20, n = 37) (age (years), SD = 25.7, ±4.5, stature (m), SD = 1.83, ±0.59, body mass (kg), SD = 100.9, ±11.8; 41 forwards; 28 backs). Forwards were heavier (body mass, SD = 106.1, ±6.9, $p < 0.001$) compared to backs (body mass, SD = 93.3, ±5.1) but were similar in age (25.5 ± 4.0 vs 25.8 ± 5.1 years, respectively, p = 0.431) and stature (184.3 ± 6.4 vs 181.2 ± 4.9 cm, respectively, p = 0.07) (SW; age: $p < 0.05$, stature: p = 0.101, body mass: p = 0.061). Total match exposure was 2180 player-match-hours and training exposure was 49,600 player-training-hours.

There was a total of 267 medical-attention match injuries with 217 resulting in time-loss, and 112 medical-attention training injuries with 82 resulting in time-loss (Table 1). This equated to 122.8 medical-attention match injuries (95% CI = 108.9–138.4), with 99.8 resulting in time-loss per 1000 match hours (95% CI = 87.3–114.0). For training injuries, 2.2 medical-attention training injuries (95% CI = 1.8–2.6) with 1.7 resulting in time-loss per 1000 training hours (95% CI = 1.4–2.1) were sustained. Twenty percent of players sustained only one medical-attention injury throughout the study period, 18% sustained 2 injuries and 62% sustained 3 or more injuries. Match and training medical-attention injuries per 1000 h are expressed per season in Fig. 1. One match injury was career-ending and therefore was included when calculating injury incidence; however, it was excluded from the analysis of injury severity and burden due to there being no return from injury date.

Injury incidence was higher during matches compared to training (RR, 95% CI = 51.4, 41.4–64.4, $p < 0.001$) as was injury burden from time-loss injuries (RR, 95% CI = 61.5, 58.7–64.4, $p < 0.001$). Backs were more likely to accumulate greater burden from training injuries compared with forwards (RR, 95% CI = 1.7, 1.6–1.9, $p < 0.001$) (Table 1). Medical-attention injury incidence during matches was greatest in the lower limb (Table 2), with 89% of lower limb injuries resulting in time-loss (incidence, 95% CI = 46.0, 37.9–55.9). The most common sites of medical-attention match-injury were the head/face

Table 1
Injury incidence, mean severity and burden during match play and training across positional categories.

	Total Injuries	Medical-attention injury incidence[a] (95% CI)	Time-loss injury incidence[b] (95% CI)	Mean severity (SD)	Median (days)	Injury burden (95% CI)
Match injuries	267	122.8 (108.9–138.4)	99.8 (87.3–114.0)	24.9 (19.9–32.2)	10	3148.8 (3019.8–6479.2)
Forwards	138	119.4 (101.1–141.1)	96.6 (80.3–116.3)	26.5 (20.0–33.8)	11	1680.7 (1601.1–3524.6)
Backs	129	128.6 (108.2–152.8)	103.6 (85.5–125.3)	23.3 (19.7–30.2)	10	1468.7 (1394.3–3090.1)
Training injuries	112	2.2 (1.8–2.6)	1.7 (1.4–2.1)	22.4 (15.6–29.2)	7	49.7 (36.7–129.6)
Forwards	53	1.1 (0.8–1.4)	0.8 (0.6–1.2)	17.3 (11.8–22.9)	6	18.2 (10.7–55.7)
Backs	59	1.2 (0.9–1.5)	0.9 (0.7–1.3)	31.1 (19.3–34.6)*	9	31.6 (21.5–88.0)*

[a] Incidence is expressed as the number of medical-attention injuries per 1000 match- or training-hours.
[b] Incidence is expresses as the number of time-loss injuries per 1000 match- or training-hours.
* Significantly different when comparing forwards and backs ($p < 0.05$).

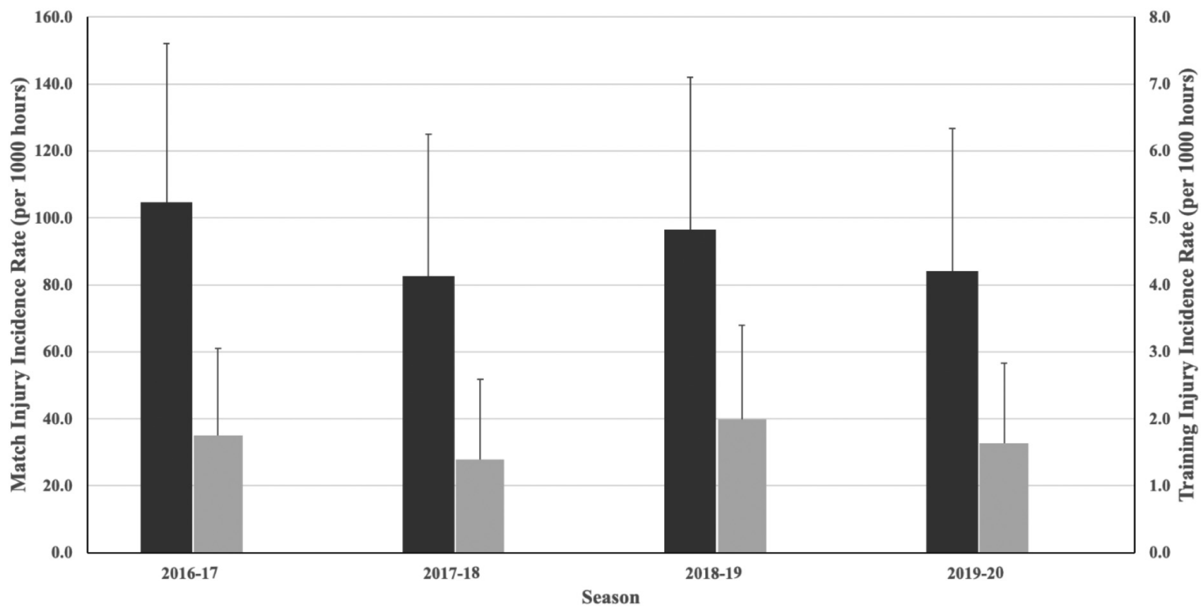

Fig. 1. Match (black) and training (grey) medical-attention and time-loss injury incidence per season from 2016 to 2020.

(26.2 injuries per 1000 match-hours) and shoulder (23.0 injuries per 1000 match-hours), similarly for time-loss injury incidence for shoulder (22.1 injuries per 1000 match-hours) and head/face (16.6 injuries per 1000 match-hours) during match play. Upper limb match injuries were the most severe and resulted in the greatest burden (burden, 95% CI = 1321.5, 1251–2788.4) (Table 2). Medical-attention training injury incidence was greatest in the lower limb (incidence, 95% CI = 1.5, 1.1–1.9), as well as time-loss injury incidence (incidence, 95% CI = 1.3, 1.0–1.7), with greatest mean severity in the upper limb (severity, 95% CI = 45.9, 17.5–52.7) (Table 2). Backs were more likely to sustain lower limb injuries during training compared with the forwards (RR, 95% CI = 1.8, 1.1–2.9, $p = 0.020$).

Joint/ligament (incidence, 95% CI = 42.8, 31.6–53.9) and muscle/tendon (incidence, 95% CI = 49.2, 36.4–62.0) were the most common medical-attention match injury diagnosis, with sprains (incidence, 95% CI = 38.2, 28.2–48.1), strains (incidence, 95% CI = 23.5, 17.2–29.6) and haematomas (incidence, 95% CI = 23.0, 17.0–29.0) showing the greatest incidence. Similarly, time-loss match injury incidence for muscle/tendon (incidence, 95% CI = 43.7, 35.7–53.4) and joint/ligament (incidence, 95% CI = 36.3, 29.1–45.3) (Table 3) was the most common, specifically sprains

Table 2
Match and training time-loss injury incidence, severity and burden by location.

Injury site	Injury incidence[a] (95% CI)			Severity, days	Median, days	Injury burden, days
	All players	Forwards	Backs			
Match injury						
Head/neck	16.6 (11.9–23.0)	20.7 (13.9–30.9)	10.8 (6.0–19.6)	19.0 (7.1–24.5)	7	514.3 (470.5–1119.8)
Upper limb	30.4 (23.8–38.7)	32.8 (23.8–45.0)	27.6 (19.1–40.0)	38.8 (28.3–44.4)	14	1321.5 (1251.2–2788.4)
Trunk	6.4 (3.7–10.8)	5.2 (2.3–11.5)	7.9 (3.9–15.8)	10.7 (6.7–14.0)	7	88.7 (71.0–216.8)
Lower limb	46.0 (37.9–55.9)	36.2 (26.8–49.0)	56.2 (43.3–72.8)	23.6 (14.4–29.5)	9	1224.9 (1156.8–2589.1)
Training injury						
Head/neck	0.2 (0.1–0.3)	0.1 (0.1–0.3)	0.02 (0.0–0.1)	19.2 (13.2–24.0)	3	4.6 (1.4–20.5)
Upper limb	0.3 (0.2–0.5)	0.2 (0.1–0.3)	0.1 (0.0–0.2)	45.9 (17.5–52.7)	16	13.9 (7.3–44.5)
Trunk	0.2 (0.1–0.3)	0.1 (0.0–0.2)	0.1 (0.0–0.2)	11.3 (8.4–12.8)	7	2.5 (0.4–14.4)
Lower limb	1.3 (1.0–1.7)	0.5 (0.4–0.8)	0.8 (0.6–1.1)*	19.2 (12.2–23.0)	9	31.2 (21.1–86.8)

[a] Incidence is expressed as the number of time-loss injuries per 1000 match- or training-hours.
* Significantly different when comparing forwards and backs ($p < 0.05$).

Table 3
Match and training time-loss injury incidence and severity by type.

Injury type	Injury incidence[a] (95% CI)			Severity, days	Median	Injury burden
	All players	Forwards	Backs			
Match injury						
Bone	3.2 (1.5–6.8)	5.2 (2.3–11.5)	1.0 (0.1–7.0)	54.8 (7.7–63.5)	42	226.7 (198.0–514.9)
Joint/ligament	36.3 (29.1–45.3)	38.8 (29.0–52.0)	33.5 (23.9–46.9)	36.5 (23.2–44.2)	14	1526.3 (1450.4–3208.0)
Muscle/tendon	43.7 (35.7–53.4)	37.1 (27.5–50.0)	52.2 (39.9–68.4)	18.2 (12.0–22.2)	7	888.5 (831.0–1896.8)
Skin	3.7 (1.8–7.4)	2.6 (0.8–8.0)	4.9 (2.1–11.8)	6.5 (2.3–8.2)	5	71.3 (55.5–178.0)
Brain/CPNS	12.9 (8.9–18.6)	17.2 (11.1–26.7)	7.9 (3.9–15.8)	27.9 (17.3–35.1)	20	435.9 (395.6–955.7)
Training injury						
Bone	0.1 (0.0–0.2)	0.02 (0.0–0.1)	0.1 (0.0–0.2)	51.2 (26.3–54.6)	61	5.2 (1.6–21.9)
Joint/ligament	0.6 (0.4–0.8)	0.4 (0.3–0.6)	0.2 (0.1–0.3)	30.1 (14.5–35.5)	12	19.4 (11.4–58.1)
Muscle/tendon	1.2 (0.9–1.5)	0.5 (0.3–0.7)	0.7 (0.5–1.0)	17.9 (10.3–21.9)	7	25.0 (16.2–72.6)
Skin	0.02 (0.0–0.1)	0.02[b]	0 (−)	1.1[b]	1	0.1[b]
Brain/CPNS	0.02[b]	0.02[b]	0 (−)	2[b]	2	0.04[b]

[a] Incidence is expressed as the number of time-loss injuries per 1000 match- or training-hours. NOTE: CPNS, Central Peripheral Nervous System.
[b] One injury occurrence.

showing the greatest time-loss injury incidence (incidence, 95% CI = 33.1, 26.2–41.7). The greatest medical-attention injury diagnosis in training was muscle and tendon related injuries (incidence, 95% CI = 1.4, 1.1–1.7), similarly for time-loss injury incidence (incidence, 95% CI = 1.2, 0.9–1.5), and had the greatest injury burden (burden, 95% CI = 25.0, 16.2–72.6) (Table 3). Hamstring strain (14% of injuries), groin strain (14%) and ankle sprain (13%) were the most common specific medical-attention injuries across matches and training. The 26 concussions recorded were all sustained during matches equating to 12 concussions per 1000 match-hours (95% CI = 8.1–17.6), totalling 9% of all match injuries. Mean severity of concussion was 22.1 days lost, and injury burden amounted to 242.8 days lost per 1000 match-hours (95% CI = 179.9–326.9).

Contact events amounted to 82% of all medical-attention match injuries, with 81% of all contact match injuries resulting in time-loss. The tackle event resulted in the most contact injuries, particularly when tackling from the front (31% of contact injuries), being tackled from the front (20% of contact injuries) and side (11% of contact injuries). Eighty-two percent of non-contact match injuries resulted in time-loss, with all non-contact injuries primarily occurring when players were accelerating (15%), running (11%) and cutting (10%), and more likely to be located in the hip/groin (21%), posterior thigh (17%) and lower leg (11%). Muscle/tendon damage accounted for 71% of all non-contact injuries, and backs were more likely to sustain non-contact match injuries compared to the forwards although not significant (RR, 95% CI = 2.0, 1.3–3.5, $p = 0.051$). Similarly, non-contact events amounted to 62% of injuries during training, with 83% of non-contact training injuries resulting in time-loss. Backs were more likely to sustain non-contact training injuries compared to the forwards (RR, 95% CI = 1.6, 0.9–2.6, $p = 0.049$).

4. Discussion

The primary aim of this study was to assess medical-attention and time-loss match and training-injury within a semi-professional team across four seasons. Medical-attention injury incidence was 122.8 injuries per 1000 match-hours with 99.8 injuries per 1000 match-hours resulting in time-loss, and 2.2 training-injuries per 1000 training-hours with 1.7 per 1000 training-hours resulting in time-loss. Injury severity and burden from time-loss training injuries were higher for the backs when compared with forwards. The tackle event was the most common inciting event of match-injury, with running-related injuries more common in training. Time-loss training-injury incidence was slightly lower than professional rugby (3 injuries per 1000 training-hours[2]). Time-loss match-injury incidence and severity were comparable to those reported in professional rugby (81–99 injuries per 1000 match hours; 18–20 mean days lost per match injury[2,14]) with similar patterns observed for injury location, type, and inciting event for medical-attention and time-loss injuries.[2]

Time-loss match injury incidence in this study (99.8 injuries per 1000 match-hours) was similar to the injury incidence range reported for professional players (81–88).[2,14] Medical-attention injury rates for match-play in this study (122.8 injuries per 1000 match-hours) were also considerably greater than previously reported at this level (52 injuries per 1000 match-hours).[12] Match injury severity (25 days lost) was only half those previously reported for combined semi-professional and community rugby cohorts (52 days lost).[10] Caution should be taken when comparing injury severity across standards of competition as it is crucial for the definition of injury to be the same across the varying degrees of medical support available. Nevertheless, match injury severity and burden in the current study were similar to those reported in professional and international rugby (18–37 mean days lost per injury; 2178–2570 days lost per 1000 player-hours).[2,19] The rise in injury rates within international rugby has been attributed in part to increases in player body mass, and thus forces occurring in contact.[20] Although research to confirm this trend of increasing body mass within semi-professional rugby is limited, there is evidence of some parity in body mass between semi-professional and professional cohorts,[20] and our data report similar player stature and body mass (stature; 1.83 m, body mass; 100.9 kg) to those observed in international Rugby Union players (stature; 1.84–1.88 m, body mass; 102.8–111.2 kg).[6,21]

It is crucial to note that the interpretation of "semi-professional" as a level of play can vary between leagues across the world and therefore can also perhaps explain the higher incidence rate within our cohort compared to other leagues considered to be semi-professional.[22] Methodological differences between studies, including the method of calculating player exposure, frequency of contact between medical professionals and teams, rigour in data collection, and the potential underestimation of injury rate when collating injury incidence data across several teams may explain some of the discrepancies in injury rate across studies.[6,23,24]

A novel aspect of the current study was the inclusion of training injuries within a semi-professional cohort. A lack of research on the nature of training injury in this population means that no direct comparison within this standard of play is possible. A recent meta-analysis of injuries in senior men's professional Rugby Union suggested that time-loss training injury incidence equated to 2.6 injuries per 1000 training-hours.[25] This figure is reported to be higher in international rugby with 4.9 injuries per 1000 training-hours in preparation for the Rugby World Cup.[6] Our data suggest that training-injury incidence in this semi-professional rugby team was 1.7 injuries per 1000 training-hours and lower than the international standard rugby. Notably, although the severity of training injuries was similar to those observed in international and professional rugby, the consequent training-injury burden in the current study was lower compared to figures from professional and international rugby.[6,26] Training is a controlled environment whereby injury risk can be modified and minimised through modes of athlete monitoring and training load modification[27]; therefore, to further understand the impact of training volume on training injury incidence, it is important to implement these monitoring strategies to understand the causation of training injury but also mitigate injury incidence in training.

The lower limb was the location with the greatest match and training injury incidence which is consistent with findings from other rugby injury literature.[2,19] Upper limb injuries were the most severe during both matches and training, supporting previous findings within senior professional rugby.[2] With respect to upper limb injuries, shoulder dislocations result in severe time loss from the sport.[28] In support of this we found that shoulder dislocation had the greatest injury burden of all injury diagnoses during match-play (186.5 days lost per 1000 match-hours). Given these findings, implementation of preseason screening, adequate preseason training loads and monitoring of in-week player training loads can aid in identifying players at higher risk of sustaining injury.[29] The league standing for this cohort was mid-table (averaging 6th out of 12 over the course of the study), and it is well-known that increased injury incidence and burden are also significant indicators for team success[4]; therefore building an evidence-based athlete monitoring system may aid in improving player welfare by identifying athletes at greater risk of injury and strengthen injury prevention strategies prior to the competitive season as well as potentially enhancing in-season team performance.

Cause of injury varied by positional group within this cohort. Specifically, during training, backs were more likely to sustain non-contact injuries (RR, 99% CI = 2.0, 1.3–3.5, $p = 0.051$), lower limb injuries (RR, 95% CI = 1.8, 1.1–2.9, $p = 0.020$) and accumulate greater burden from training injuries (RR, 95% CI = 1.7, 1.6–1.9, $p < 0.001$) compared to the forwards. This could be attributed to position-specific conditioning needs for backs to be able to tolerate the greater high-speed running demands during match-play. Further discussing specific injury diagnosis, forwards sustained 62% of all concussions over the course of the 4 seasons. The injury burden from all concussions was 21% lower than those reported for professional rugby (309 days lost per 1000 match-hours).[26] Increases in incidence, severity, and burden of concussions over recent years are possibly associated with enhanced awareness and enforcement of concussion identification by World Rugby. Suitably conservative approaches to the management of these injuries have influenced the overall burden of concussion injuries.

Currently there is a dearth of injury surveillance research within semi-professional rugby and this study provides a contemporary overview of sports injury aetiology in this expanding population. In addition, although data on training injury has been published widely within international and professional rugby cohorts, this study provides the first findings on injury rate during training in semi-professional rugby. The resolution of injury in this study also provides a rigorous overview of injury type, location, and severity for both match and training medical-attention and time-loss injuries, highlighting distinct differences between forwards and backs. However, there are limitations of this work which merit attention. The small sample size from the inclusion of only one rugby team in the study means that caution must be exercised when comparing our data with other findings both within and between standards of play. However, we collected injury data across four competitive seasons and recorded a total of 379 injuries, and as such collected data across a longer time frame than previous injury surveillance studies within semi-professional rugby.[11,12] In addition, thoroughness of data collection is a primary methodologic issue within injury surveillance research. A strength of injury surveillance research with smaller cohorts is that it allows for greater rigour and consistency in reporting and collecting data compared to larger studies with pooled data across multiple teams.[2] Incomplete or inaccurate reporting can lead to significant data loss and has implications for injury incidence, severity, and burden calculations. Notably in this study, the medical staff included a full-time physiotherapist, two sport therapists, a researcher, and team doctors with access to private medical assessments to aid diagnosis and subsequent treatment. All injury data were collected by the physiotherapist who was present at every match and training session and able to review video footage to support decisions. Therefore, our rigorous approach to data collection and processing provides an accurate reflection of medical-attention and time-loss injury incidence in this population.

5. Conclusion

This study provided a comprehensive assessment of the medical-attention and time-loss injury incidence, severity, burden, and nature of injury sustained during matches and training within a semi-professional Welsh premiership Rugby Union team over a 4-year period. Match-injury incidence, severity and burden at this semi-professional level were higher than previously reported and similar to those in professional Rugby Union. However, training-injury rate was slightly lower in this cohort than within the professional and international tiers. Differences were found in the nature and severity of match and training injuries sustained by backs in comparison to forwards. Future research is warranted within this semi-professional tier of Rugby Union, as the patterns emerging in injury incidence, severity and burden are comparable with that of professional levels of play. This will aid coaches, practitioners, and medical staff to adequately prepare these athletes for in-competition demands.

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Declaration of interest statement

None.

Confirmation of ethical compliance

We can also confirm that Ethical Guidelines for human investigations have been followed and this study was granted ethical approval by the Ethics Committee of the School of Sport, Health and Exercise Sciences which has recently merged to form the new School of Human and Behavioural Sciences (approval number: P20-18/19).

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