# Title: Training injury incidence in an amateur women's rugby union team in New Zealand over two consecutive seasons

**Running Title: Training injuries in amateur women's rugby union**

# Abstract

**Objectives:** To describe the training injury incidence in amateur women's rugby union in New Zealand over two consecutive seasons.

**Methods:** A prospective cohort observational study of 69 amateur women's rugby 15s team players. Training exposure and training injury incidence were calculated.

**Results:** The 38 training injuries resulted in a total injury incidence of 11.4 (8.3 to 15.6) per 1,000 training hrs. There were 12 injuries that resulted in a time-loss injury incidence of 3.6 (95% CI: 2.0 to 6.3) per 1,000 training-hrs. Forwards recorded more total (RR: 1.8 [95% CI: 0.9 to 3.5]; $p$=0.0516) and time-loss (RR: 2.0 [95% CI: 0.6 to 6.6]; $p$=0.2482) injuries than Backs. The tackle was the most common injury cause for total (3.0 [95% CI: 1.6 to 5.6] per 1,000 training-hrs.) injuries, but collisions (1.5 [95% CI: 0.6 to 3.6] per 1,000 training-hrs.) with the ground or another person were the most common cause for time-loss injuries. The training injuries occurred most often to the lower limb and during the latter part of training sessions. These injuries were mostly minor in nature resulting in minimal time-loss away from training.

**Discussion:** The time-loss injury incidence (3.6 per 1,000 training-hrs.) for the amateur women's rugby 15s team players was higher than that reported for National (1.2 per 1,000 training-hrs.) and Rugby World Cup for women (0.2 to 3.0 per 1,000 training-hrs.) competitions.

**Conclusion:** The training injury incidence in amateur women's rugby union in New Zealand was higher than that reported for national and international rugby union injury incidences.

# Introduction

The game of rugby union has gained international popularity with approximately 8.5 million registered players in over 121 countries worldwide.[1] As rugby union is a collision sport, players are exposed to repeat high-intensity activities (e.g. running, tackling, rucks, mauls, passing and sprinting) interspersed with short bouts of low intensity activity (e.g. jogging and walking).[2] As a consequence of the participation of players in match and training activities, there is an increased risk of musculoskeletal injuries occurring.[2] In addition to this, there are biomechanical factors to consider with females reportedly having lower physiological capacities (e.g. reduced speed and less agility, lower muscular strength and power, and lower estimated maximal aerobic power) when compared with males, placing them at a higher injury risk.[3]

There is a paucity of studies reporting on women's rugby-15s training injuries. In a recent systematic review and pooled analysis,[1] the pooled training injury incidence was 1.5 (95% CI: 0.8 to 2.2)[1] per 1,000 training-hrs, but this varied from 0.2[4] (2010 Rugby World Cup for women [RWC(W)])to 3.0[5] (2006 RWC(W)) injuries per 1,000 training-hrs and 5.5[6] (Collegiate) per 1,000 athletic-exposures (AE). These studies were typically undertaken over a tournament[4, 5] or a single[6-8] competition season, utilising different methodologies that make comparisons difficult.[1] Although women's rugby-15s has grown in participation over the past few decades worldwide,[1] the number of published studies reporting on these activities has not been at the same rate. In particular, there are no amateur women rugby-15s studies from New Zealand that have been published to date, despite this being the base for the world champion 'Black Ferns'.[9] Therefore, the aim of this study was to report the incidence, site, type and timing of amateur women's rugby-15s training injuries over two consecutive competition seasons and to compare these with published studies on women's contact and collision sports.

# Methods

A prospective cohort observational study was undertaken to document training injury incidence occurring in an amateur women's rugby-15s team over two consecutive competition seasons. Preseason commenced from December, with competition matches in April until August each year. The team

participated in the women's division of the domestic competition comprised of eight teams. Prior to the competition season commencing, all players provided written consent to participate in the research and all procedures were approved by the institutional ethics committee. All registered players were considered amateur as they derived their main source of income from other means and did not receive match payments. Matches were played under the rules and regulations of the New Zealand Rugby Football Union.

The injury definition utilised for this study was "*Any physical complaint, which is caused by a transfer of energy which exceeds the ability of the body's ability to maintain its structural and/or functional integrity, that is sustained by a player during rugby trainings, irrespective of the need for medical attention or time-loss from rugby activities.*"[10]

Only team-organised field-based training sessions were included in this study. This was initially three times per week (Dec to Feb) then twice a week until the competition season finished. All training sessions were 90 minutes in duration. Players were encouraged to undertake their own individual gym and aerobic conditioning training sessions on non-team field based training days, and these were not included in the study. All field-based training sessions were undertaken utilising RugbySmart warm-up and cool-down activities (https://www.rugbysmart.co.nz) and the activities undertaken for the training were coach directed.

Injury rates were determined using previously described methods.[11, 12] All injuries were recorded on a standardized injury reporting form, regardless of severity. Recorded details of each injury included, date of onset of injury, date of return to training, location, type, player position, player role (forward, back), training period (1st half 0-45 min; 2nd half 46-90 min) and Orchard Code,[13] to enable further analysis for total and time-loss analysis. If more than one injury occurred to an injury site, these were recorded individually as injury type. As a result, there were more injury types than total injuries recorded. Severity of injuries were recorded as mean (days-absence) and also within grouped severity time-loss values (slight: 0-1 days; minimal: 2-3 days, mild: 4-7 days, moderate: 8-28 days and severe: >28 days).[10] Both total and time-loss injuries were recorded and reported throughout the study. This was undertaken to provide a true picture of the injury incidence in women's rugby union.[14] Time-loss

injuries were classified as those injuries that resulted in the player being unable to take a full part in future rugby training or match activities.[10] In terms of this study, this was any injury that was classified as mild, moderate or severe. Injuries classified as slight or minimal were not classified as time-loss as no matches were missed and these injuries did not meet the time-loss definition.[10]

*Statistical analysis*

All the data collected were entered into a Microsoft Excel spreadsheet and analysed with Statistical Package for Social Sciences for Windows (SPSS; V25.0.0). Training exposure was calculated based on the number of players present at the training session being exposed for 90 min, positional groups exposure was based on the number of players in the group (i.e. forwards and backs). Training injury incidence was calculated as the number of injuries per 1,000 training-hrs, with 95% confidence intervals (CI's) for total and time-loss injuries. A one-sample chi-squared ($\chi^2$) test was used to determine whether the observed injury frequency was significantly different from the expected injury frequency by competition year and for total training injuries recorded. To compare between injury rates per year and for total injuries recorded, risk ratios (RR's) were used. RR's were assumed to be significant at $p<0.05$.

# Results

Over the study 69 (age: 26.5 ±7.4 yrs.; stature: 1.65 ±0.72 m; mass: 86.6 ±15.9 kg; playing experience 4.3 ±4.2 yrs.) players participated (41 forwards; 28 backs). There were 38 total training injuries (11.4 [95% CI: 8.3 to 15.6] per 1,000 training-hrs and 12 time-loss injuries (3.6 [95% CI: 2.0 to 6.3] per 1,000 training-hrs) recorded (see Table 1). There were no observable differences between total (24 vs. 14; $\chi^2_{(1)}=3.1$; $p=0.0769$) and time-loss (7 vs. 5; $\chi^2_{(1)}=0.4$; $p=0.5094$) training injuries recorded in 2019 compared with 2018. There were more total (20 vs. 14; $\chi^2_{(1)}=1.1$; $p=0.3035$) and time-loss (5.7 vs. 5.0; $\chi^2_{(1)}=0.0$; $p=0.8305$) injuries expected in 2018 than actual injuries recorded. However, there were fewer total (18 vs. 24; $\chi^2_{(1)}=11.3$; $p=0.0008$) and time-loss (6.3 vs. 7; $\chi^2_{(1)}=0.0$; $p=0.8478$) injuries expected in 2019 than actual injuries recorded.

Forwards recorded more total (RR: 1.8 [95% CI: 0.9 to 3.5]; $p=0.0516$) and time-loss (RR: 2.0 [95% CI: 0.6 to 6.6]; $p=0.2482$) injuries than Backs, but this was not significant (see Table 2). The lower limb

sustained more injuries (8.4 [95% CI: 5.8 to 12.1] per 1,000 training-hrs.) than the upper limb (RR: 3.5 [95% CI: 1.6 to 7.7]; $p$=0.0009), head/neck (RR: 5.6 [95% CI: 2.2 to 14.5]; $p$=0.0001) and chest/back (RR: 28.0 [95% CI: 3.8 to 205.7]; $p$<0.0001) injury sites. As a result, the lower limb recorded the highest total days-lost (170 days) with a mean of 7.4 ±12.5 days per injury. The ankle recorded the highest total days-lost (68 days) with a mean of 12.0 ±23.6 days-lost per injury.

There were significantly more total training injuries recorded as strains and sprains (8.7 [95% CI: 6.0 to 12.5] per 1,000 training-hrs.) than dislocations (RR: 4.8 [95% CI: 2.0 to 11.6]; $p$=0.0001), contusions (RR: 7.3 [95% CI: 2.6 to 20.6]; $p$<0.0001) and concussions (RR: 29.0 [95% CI: 4.0 to 212.8]; $p$<0.0001) (see Table 3). Although sprains and strains resulted in more time-loss training injuries (2.6 [95% CI: 1.2 to 5.9] per 1,000 training-hrs) than dislocations, fractures (RR: 1.5 [95% CI: 0.4 to 5.3]; $p$=0.5271) and concussion (RR: 6.0 [95% CI: 0.7 to 49.8]; $p$=0.0588) this was not significant. The tackle was the most commonly reported injury cause for total (3.0 [95% CI: 1.6 to 5.6] per 1,000 training-hrs.) injuries, but collisions (1.5 [95% CI: 0.6 to 3.6] per 1,000 training-hrs.) with the ground and other people not being tackled were the most common cause for time-loss injuries. There were more total (RR: 1.2 [95% CI: 0.7 to 2.3]; $p$=0.5164) and time-loss (RR: 1.4 [95% CI: 0.4 to 4.4]; $p$=0.5637) training injuries recorded in the latter stages of training compared with the early parts of training, but this was not significant.

## Discussion

This prospective observational study documented training injury incidence for an amateur women's rugby team over two consecutive domestic competition seasons. The principal findings of this study revealed: (1) A total injury incidence of 11.4 per 1,000 training-hrs; (2) A time-loss injury incidence of 3.6 per 1,000 training-hrs; (3) The lower limb injury incidence was highest with the ankle sustaining the greatest proportion of injuries ;(4) The tackle was associated with a higher injury incidence than any other training event; (5) Sprains and strains recorded the highest injury incidence; and (6) The lower limb body region resulted in most time-loss injury incidence.

The time-loss injury incidence (3.6 per 1,000 training-hrs.) over the duration of the study was similar to the 2006 RWC(W) (3.0 per 1,000 training-hrs.),[5] but slightly higher than the National[7] level (1.2 per 1,000 practice-hrs). Similar to the different participation levels in male rugby union, the training injury incidence may be reflective of the level of playing standard.[15] This can be seen in the second year of the study where the overall injury incidence was 14.7 per 1,000 training-hrs and the significant difference ($p$=0.0008) between expected and actual injuries recorded. This may be due to having new players join the team in the second year of the study and some of them had none to minimal previous rugby union experience. In addition, there were several players who had recently arrived from overseas for the New Zealand experience of women's rugby union and were not conversant with the training methodologies being implemented. As a result, many training injuries occurred in pre-season. This may have been unique to this cohort or there may be other factors involved (i.e. coaching styles, fitness levels etc.) and further research is warranted.

Forwards recorded a higher injury incidence for both the all-inclusive (7.5 vs. 3.9 per 1,000 training-hrs.) and time-loss (2.4 vs. 1.2 per 1,000 training-hrs.) injury definitions, compared with backs. As previously reported,[1] no studies reporting on women's rugby union training injuries provided player position information, therefore, comparisons were unable to be completed. The finding that forwards recorded a higher injury incidence than backs is similar to male professional participants (Forwards: 2.1 vs. Backs: 1.8 per 1,000 training-hrs.)[16] but conflicts with the male Rugby World Cup (RWC) (Forwards: 7.2 vs. Backs: 9.1 per 1,000 training-hrs.)[17] level of participation. Differences in player position injury incidence at professional and RWC participation levels may have been reflective of that study cohort or this may be due to differing demands placed upon players at different participation levels, such as eligibility for selection or limited playing group and pressure to play on. This may be similar at the elite level of women's rugby union; therefore, further training injury research is warranted.

The lower limb (consisting of the knee, lower leg, ankle, foot, and toes) was the most common injury location for both the all-encompassing (8.4 per 1,000 training-hrs.) and time-loss (2.1 per 1,000 training-hrs.) injury definitions. However, when viewed by injury site, the ankle recorded the most all-encompassing (2.4 per 1,000 training-hrs.) training injuries while the knee and patella recorded the most

time-loss (0.6 per 1,000 training-hrs.) training injuries. This was similar to some,[4, 7] but not all,[5, 8] studies reporting on women's rugby union training injuries. The head and neck were the most common injury sites at the collegiate and RWC(W) participation levels.[5, 8] In a recent study on injury insurance claims over 12 yrs., female players had higher claim rates for injuries to the knee and ankle when compared to male players.[18] In addition, females had a similar injury rate in the 21 to 30 yr. age group compared with males, but a substantially higher injury rate in the 31 to 40 yr. age group.[18] Unfortunately, these data were not able to differentiate match from training injuries, therefore more research is warranted to identify if the training injury incidence in these injury locations is higher in the similar age groups and participation levels.

When combined, the tackle accounted for nearly a quarter (23.8%) of the total and time-loss (25.0%) injuries. The tackler accounted for more time-loss (16.7% vs. 8.3%) injures than the ball-carrier and this may be indicative of their lack of skill when tackling or the effects of fatigue. This was less than a previous study by Kerr *at al*.,[6] where the tackle accounted for nearly half (40.5%) of the training injuries, however, the ball carrier (22.1%) accounted for a higher percentage of injuries than the tackler (18.3%). Although the tackle recorded the highest number of training injuries, when separated to ball carrier and tackler this was less than collisions. The one concussion that occurred during training also occurred in the preseason during a tackling drill.

It has previously been reported[19] that players with lower momentum going in to the tackle are more likely to be injured. This premise was further supported in a subsequent study that identified[20] that women's rugby union posed the greatest injury risk given the number of possible mechanisms of injury such as the tackle, and the lack of protective equipment inherent in the sport.[21] Players technical ability and proficiency, action within the tackle,[22] and momentum in both attack and defence in the tackle[23] are reportedly major risk factors for injuries occurring. This may be the case with this women's rugby union competition where there is only one level of participation and players of different ability compete against each other. As women's participation is a new growth area in rugby union,[1] the experience and physical and anthropometric characteristics of players are likely to be less, when compared with their male counterparts, yet the women participate under the same rules and regulations as males. As the

mean playing experience in this cohort was 4.3 yrs., they could be considered similar to younger players and not have the experience and physiological conditioning of similarly aged male rugby union participants. In addition, the previously reported[24] differences in agility, aerobic performance, momentum, and fatigue index may also impact on the incidence of injuries that occur in women's rugby union. As the previous research[24] on the anthropometric and physical performance of New Zealand women participants is dated, further research is warranted to explore these areas and any possible influences this may have on the incidence of injuries in women's rugby union.

More than half of total (54.8%) and time-loss (58.3%) training injuries occurred in the later stages of trainings. Previous studies that have reported training injuries in women's rugby union have not reported the training period so no comparisons could be undertaken. Although all players were required to conduct a warm-up prior to commencing training, some players would arrive late due to work or family commitments and either do a jog around the training area or run straight into the training activity. The identification of the injury period will assist with the development of injury prevention protocols for women rugby union players in relationship to warm-ups, types of training activities that place them at risk and any modifications that are required to reduce this injury risk, while still conditioning the players to match type activities.

The majority (71.2%) of injuries that occurred during training resulted in minimal training sessions missed. This was similar to a study at the high school level of participation where minor (<10 days' time loss) injuries accounted for 55.9% of all injuries. However, compared to collegiate (major: >7 days' time loss; 51%) and International (severe: >2 weeks' time loss; 44%) participation levels, the majority of injuries recorded were of the time-loss classification. The differences in the percentage of injuries classified for time-loss are in the methodological approaches utilised by these different studies, and future studies should utilise similar methodological approaches to enable cross-study comparisons.

*Limitations*

This study was conducted with an amateur women's rugby union team participating in the lower level women's domestic rugby union competition. Although the competition was divided into two rounds, the first round saw all teams participate against each other before the second round, when the group was

divided into two divisions. The current cohort of players participated in the division two competition for the second round of each season, therefore the findings should be interpreted with caution, as they may not reflect the higher participation levels. The time-loss finding of 3.6 per 1,000 training hours (n=12) for the current study may be unique to this cohort and interpretation of these results should be undertaken with caution. The finding that there were more injuries in 2019 when compared with 2018, may be related to a combination of factors. These are: (1) the number of new players that were enrolled with the team in 2019 with no, or limited, playing experience; and (2) the number of forwards when compared to backs (2018: Forwards = 18; Backs = 17; 2019: Forwards = 23; Backs = 11; Total Forwards = 41; Backs = 28). As forwards are more likely to be involved in contact related activities this may have influenced the findings reported in this study. Further research is recommended, and the inclusion of player experience and player role should be recorded to enable further analysis. This study did not record female-specific aspects such as use of oral contraceptives and the phase of the menstrual cycle when the injuries occurred.[25, 26] It has been identified[1] that this aspect may be important for future research and should be considered in any further women's rugby union injury studies.

## Conclusions

The paucity of studies on women's rugby-15s training injuries was the catalyst for this study to report the incidence, site, type, and timing of injuries over two consecutive competition seasons of an amateur women's team in New Zealand. The findings indicate that training injuries occur most often to the lower limb and during the latter part of training sessions. These injuries are mostly minor in nature, resulting in minimal time-loss away from training. The time-loss training injury incidence in amateur women's rugby union in New Zealand was higher than that reported for national and international injury incidences.

## Tables

**Table 1:** Total and time-loss injuries, injury rate, injuries per training and training minutes per injury in an amateur domestic women's rugby union team in New Zealand over two consecutive

years. Data reported as number of injuries, rates per 1,000 match hours with 95% confidence intervals.

**Table 2:** Player position and injury site of training injuries for an amateur women's rugby union team in New Zealand for total and time-loss-training injuries over two consecutive years. Data reported as number of injuries, rates per 1,000 training-hrs with 95% confidence intervals, injury burden total days lost, and mean days lost per injury with standard deviation

**Table 3:** Injury type, injury cause, and training period of an amateur women's rugby union team in New Zealand for total and time-loss-training injuries over two consecutive years. Data reported as number of injuries, rates per 1,000 training-hrs with 95% confidence intervals, injury burden total days lost, and mean days lost per injury with standard deviation

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**Table 1:** Total and time-loss injuries, injury rate, injuries per training and training minutes per injury in an amateur domestic women's rugby union team in New Zealand over two consecutive years. Data reported as number of injuries, rates per 1,000 match hours with 95% confidence intervals.

| | Total injuries | | | Time-Loss training injuries | | |
|---|---|---|---|---|---|---|
| | **2018** | **2019** | **Total** | **2018** | **2019** | **Total** |
| Injuries observed, n | 14 | 24 | 38 | 5 | 7 | 12 |
| Injuries expected, n | 20 | 18 | 38 | 5.7 | 6.3 | 12 |
| Injury rates per 1,000 training-hrs, (95% CI) | 8.2 (4.9-13.8) | 14.7 (9.9-22.0) | 11.4 (8.3-15.6) | 2.9 (1.2-7.0) | 4.3 (2.0-9.0) | 3.6 (2.0-6.3) |
| No. trainings played, n | 60 | 54 | 114 | 60 | 54 | 114 |
| Exposure hrs, n | 1,709.4 | 1,630.1 | 3,339.5 | 1,709.4 | 1,630.1 | 3,339.5 |
| Hrs per injury, m (95% CI) | 122.1 (72.3-206.2)[b] | 67.9 (45.5-101.3)[a] | 87.9 (63.9-120.8) | 341.9 (142.3-821.4)[b] | 232.9 (111.0-488.5)[a] | 278.3 (158.0-490.0) |
| Total no. injuries per training, m (95% CI) | 0.2 (0.1-0.4) | 0.4 (0.3-0.7) | 0.3 (0.2-0.5) | 0.1 (0.1-0.2) | 0.1 (0.1-0.3) | 0.1 (0.1-0.2) |
| Player appearances per injury, m (95% CI) | 64.3 (38.1-108.5)[b] | 33.8 (22.6-50.4)[a] | 45.0 (32.7-61.8) | 180.0 (74.9-423.5)[b] | 115.7 (55.2-242.7)[a] | 142.5 (80.9-250.9) |
| Training minutes played per injury, m (95% CI) | 342.9 (203.1-578.9)[b] | 180.0 (120.6-268.6)[a] | 240.0 (174.6-329.8) | 960.0 (399.6-2,306.5)[b] | 617.1 (294.2-1,294.5)[a] | 760.0 (431.6-1,338.3) |

n = number; m = median; CI = Confidence Interval; SD = Standard Deviation Significant difference ($p$<0.05) than (a) = 2018; (b) = 2019.

**Table 2:** Player position and injury site of training injuries for an amateur women's rugby union team in New Zealand for total and time-loss-training injuries over two consecutive years. Data reported as number of injuries, rates per 1,000 training-hrs with 95% confidence intervals, injury burden total days lost, and mean days lost per injury with standard deviation.

| | Total Injuries | | | | Time-Loss Injuries | | | |
|---|---|---|---|---|---|---|---|---|
| | Injury Incidence (Rate) | | Injury Burden (days) | | Injury Incidence (Rate) | | Injury Burden (days) | |
| | n= | Mean (95% CI) | Total | Mean ±SD | n= | Mean (95% CI) | Total | Mean ±SD |
| **Player position** | | | | | | | | |
| Forwards | 25 | 7.5 (5.1-11.1) | 224 | 8.6 ±12.9 | 8 | 2.4 (1.2-4.8) | 190 | 21.1 ±16.1 |
| Backs | 13 | 3.9 (2.3-6.7) | 69 | 5.0 ±6.0 | 4 | 1.2 (0.6-3.6) | 43 | 14.3 ±5.5 |
| **Total** | **38** | **11.4 (8.3-15.6)** | **293** | **7.3 ±11.0** | **12** | **3.6 (2.0-6.3)** | **233** | **19.4 ±14.3** |
| **Injury site** | | | | | | | | |
| **Head/Neck** | **5[e]** | **1.5 (0.6-3.6)** | **53** | **10.6 ±11.9** | **2** | **0.6 (0.1-2.4)** | **44** | **22.0 ±11.3** |
| Head | 1 | 0.3 (0.0-2.1) | 30 | 30.0 - | 1 | 0.3 (0.0-2.1) | 30 | 30.0 - |
| Neck | 4 | 1.2 (0.4-3.2) | 23 | 5.8 ±5.7 | 1 | 0.3 (0.0-2.1) | 14 | 14.0 - |
| **Upper limb** | **8[e]** | **2.4 (1.2-4.8)** | **61** | **6.1 ±6.7** | **3** | **0.9 (0.3-2.8)** | **52** | **17.3 ±6.4** |
| Shoulder | 3 | 0.9 (0.3-2.8) | 26 | 4.7 ±0.6 | 1 | 0.3 (0.0-2.1) | 21 | 21.0 - |
| Elbow | 1 | 0.3 (0.0-2.1) | 2 | 2.0 - | 0 | 0.0 - | 0 | 0.0 - |
| Finger | 4 | 1.2 (0.4-3.2) | 33 | 8.3 ±9.5 | 2 | 0.6 (0.1-2.4) | 31 | 15.5 ±7.8 |
| **Lower limb** | **28[cdf]** | **8.4 (5.8-12.1)** | **170** | **7.4 ±12.5** | **7[f]** | **2.1 (1.0-4.4)** | **128** | **21.3 ±19.4** |
| Hamstring | 2 | 0.6 (0.1-2.4) | 6 | 3.0 ±2.8 | 0 | 0.0 - | 0 | 0.0 - |
| Knee | 3 | 0.9 (0.3-2.8) | 36 | 12.0 ±9.2 | 2 | 0.6 (0.1-2.4) | 34 | 17.0 ±4.2 |
| Patella | 5 | 1.5 (0.6-3.6) | 29 | 7.3 ±6.7 | 2 | 0.6 (0.1-2.4) | 25 | 12.5 ±4.9 |
| Lower Leg | 4 | 1.2 (0.4-3.2) | 11 | 3.7 ±4.6 | 1 | 0.3 (0.0-2.1) | 9 | 9.0 - |
| Ankle | 8 | 2.4 (1.2-4.8) | 68 | 12.0 ±23.6 | 1 | 0.3 (0.0-2.1) | 60 | 60.0 - |
| Foot | 6 | 1.8 (0.8-4.0) | 20 | 3.8 ±5.0 | 1 | 0.3 (0.0-2.1) | 14 | 14.0 - |
| **Chest/Back** | **1[e]** | **0.3 (0.0-2.1)** | **9** | **9.0 -** | **1[e]** | **0.3 (0.0-2.1)** | **9** | **9.0 -** |
| Pelvis | 1 | 0.3 (0.0-2.1) | 9 | 9.0 - | 1 | 0.3 (0.0-2.1) | 9 | 9.0 - |

**Table 3:** Injury type, injury cause, and training period of an amateur women's rugby union team in New Zealand for total and time-loss-training injuries over two consecutive years. Data reported as number of injuries, rates per 1,000 training-hrs with 95% confidence intervals, injury burden total days lost, and mean days lost per injury with standard deviation.

| | Total injuries | | | | Time-Loss training injuries | | | |
|---|---|---|---|---|---|---|---|---|
| | Injury Incidence (Rate) | | Injury Burden (days) | | Injury Incidence (Rate) | | Injury Burden (days) | |
| | n= | Mean (95% CI) | n= | Mean ±SD | n= | Mean (95% CI) | n= | Mean ±SD |
| **Injury type** | | | | | | | | |
| Sprains/Strains | 29 | 8.7 (6.0-12.5)[bcdef] | 84 | 3.6 ±3.3 | 6 | 1.8 (0.8-4.0) | 32 | 10.7 ±2.9 |
| Contusions | 4 | 1.2 (0.4-3.2)[a] | 22 | 7.7 ±13.2 | 1 | 0.3 (0.0-2.1) | 20 | 20.0 - |
| Dislocation | 6 | 1.8 (0.8-4.0)[a] | 29 | 4.3 ±4.0 | 4 | 1.2 (0.4-3.2) | 25 | 12.5 ±5.0 |
| Fracture | 4 | 1.2 (0.4-3.2)[a] | 126 | 31.5 ±20.2 | 4 | 1.2 (0.4-3.2) | 126 | 31.5 ±20.2 |
| Wound | 1 | 0.3 (0.0-2.1)[a] | 2 | 2 | 0 | 0.0 - | 0 | 0.0 - |
| Concussion | 1 | 0.3 (0.0-2.1)[a] | 30 | 30.0 - | 1 | 0.3 (0.0-2.1) | 30 | 30.0 - |
| **Injury cause** | | | | | | | | |
| Tackle related | 10 | 3.0 (1.6-5.6) | 156 | 15.6 ±20.6 | 3 | 1.5 (0.5-4.7) | 111 | 37.0 ±20.4 |
| Ball Carrier | 5 | 1.5 (0.6-3.6) | 40 | 8.0 ±11.2 | 1 | 0.3 (0.0-2.1) | 30 | 30.0 - |
| Tackler | 5 | 1.5 (0.6-3.6) | 116 | 23.2 ±26.2 | 2 | 0.6 (0.1-2.4) | 81 | 40.5 ±27.6 |
| Collision | 6 | 1.8 (0.8-4.0) | 37 | 6.2 ±7.6 | 5 | 1.5 (0.6-3.6) | 68 | 13.6 ±5.9 |
| Fall | 4 | 1.2 (0.4-3.2) | 13 | 3.3 ±1.7 | 0 | - | 0 | 0.0 - |
| Slip | 4 | 1.2 (0.4-3.2) | 10 | 2.5 ±1.3 | 0 | - | 0 | 0.0 - |
| Twist | 9 | 2.7 (1.4-5.2) | 44 | 4.9 ±6.1 | 3 | 0.9 (0.3-2.8) | 39 | 13.0 ±3.6 |
| Overexertion | 9 | 2.7 (1.4-5.2) | 33 | 3.7 ±4.5 | 1 | 0.3 (0.0-2.1) | 15 | 15.0 - |
| **Injury period** | | | | | | | | |
| 1st half | 19 | 5.7 (3.6-8.9) | 123 | 6.9 ±8.1 | 5 | 3.0 (1.2-7.2) | 85 | 17.0 ±8.5 |
| 2nd half | 23 | 6.9 (4.6-10.4) | 170 | 7.7 ±13.2 | 7 | 4.2 (2.0-8.8) | 148 | 21.1 ±17.8 |

CI = Confidence Intervals; SD = Standard Deviation; Significant difference ($p<0.05$) than (a) = Sprains/Strains; (b) = Contusions; (c) = dislocation; (d) = fracture (e) = wound; (f) = concussion.