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Abstract

Objectives: To describe injury profiles of Australian football players and explore trends across five, women's and girls' competition levels.

Design: Prospective cohort study.

Methods: Injuries were prospectively recorded by team personnel across one or two seasons of Australian football (2017-18 and/or 2018-19) including five, women's and girls' competition levels (elite senior, non-elite senior, high-level junior, non-elite junior (14-17 years), and non-elite junior (10-13 years)). Injury incidence rates were calculated per 1000 hours and injury prevalence calculated for pre-season, early-season, mid-season, and late-season. Descriptive statistics present injury profiles according to activity, body region, pathology, mechanism, and severity.

Results: From the 392 included players, 760 injuries were recorded. Overall injury incidence was 20.9 injuries per 1000 hours. Injury prevalence was highest during pre-season (64.1%). Most injuries were to the lower extremity (n = 440; 58.0%). Ligament/joint sprain injuries were common (n = 147, 19.3%). Several injuries resulted from contact mechanisms (n = 314, 61.4%), with many due to contact with another player (n = 131, 52.8%). Injuries resulting in time lost from participation were common (n = 444, 58.9%). Competition level injury trends were observed, with elite senior (125.1 injuries per 1000 hours) and high-level junior (116.9 injuries per 1000 hours) players having greater match injury incidence compared to their non-elite counterparts (15.5-41.4 injuries per 1000 hours).

Conclusions: This study provides preliminary insight into injury profiles of Australian football players in women's and girls' competitions. These findings can drive future injury risk reduction research specific to this population across the developmental pathway.

Keywords: women, epidemiology, athletic injuries, team sports

Introduction

With the inauguration of the Australian Football League Women's (AFLW) competition in 2017, there has been a substantial increase in participation of women and girls in Australian football. From 2016 to 2018, the total number of club teams competing in women's and girls' competitions grew from 960 to 2281 nationwide.[1] While exciting, this rapidly evolving sport, combined with the relative infancy of participation of women and girls, creates pressure on sport science and medical staff to optimise player safety and continued participation with limited research available in this athlete population.

Injury surveillance is considered the first step in an injury risk reduction strategy to understand the extent of the problem to inform subsequent stages.[2] Since 1997, the Australian Football League (AFL) has implemented a longstanding injury surveillance system for the men's professional league (AFL).[3] This annual injury report, coupled with numerous research studies investigating injury epidemiology in Australian football participation of men and boys at the elite senior[3,4] and junior[5,6] competitions, as well as in adult[7,8] and youth[9-11] community competition levels, has highlighted priority areas for further development of injury risk reduction programs. A recent review suggested the most common injuries sustained in men's Australian football are to the lower extremity (40-68% of all injuries), namely hamstring strains, anterior cruciate ligament (ACL) ruptures, and shoulder dislocations.[12] While this information is integral to understanding injury in Australian football, research has demonstrated sex differences in injury profiles within team sports.[13,14] Therefore, utilising best available evidence from the men's and boys' literature may not be suitable to translate into practice in women's and girls' competitions.[15] Thus, understanding specific injury and risk reduction needs to support women and girls participating in Australian football is necessary.

Prior to the AFLW competition, two studies provided initial insight into injuries sustained by women Australian footballers, indicating lower extremity injuries as a priority for injury risk reduction strategies.[16,17] Additionally, injuries to the wrist/hand were the most prominent presented to the emergency department and head injuries were most common in data collected by teams.[17] Supporting

the professional competition, the AFLW have an annual injury report, which in 2019 confirmed knee and head injuries were key priorities.[18] While this information is essential to setting the foundation for better understanding of injuries in women's Australian football, research methods were limited. Some data were collected retrospectively, with the team-based collection only involving a selection of senior teams in one state and lacked information, such as injury mechanism. Hence, additional research is warranted utilising prospective injury surveillance methods encompassing all competition levels. This is important to determine if injury prevention priorities are similar across women's and girls' Australian football participation contexts or whether it needs to be tailored to the developmental level. Therefore, the purpose of this study was to describe the injury profiles of Australian football players and explore trends across five, women's and girls' competition levels.

Methods

Injury data were collected prospectively over the course of one competitive season for a respective team. The study period occurred over two years, with teams participating in either Year 1 (November 2017-October 2018), Year 2 (November 2018-October 2019), or across both years. In the first year, all teams from southeast Queensland participating in the AFLW, three AFL Queensland (AFLQ) senior community competitions, the Women's Under-18 Championships, and the AFLQ Schools of Excellence Australian football program were invited to participate in the study. One additional junior community team was also invited as a convenience sample. In the following year, a convenience sample of teams from southeast Queensland participating across eight organised women's and girls' competitions were invited to participate. Utilising the five competition level categories defined in the Appendix Table A.1, each player was classified as elite senior, non-elite senior, high-level junior, non-elite junior (14-17 years), or non-elite junior (10-13 years) based on their highest competition participation for the year.

Players were invited to participate if they were playing in a women's or girls' competition for the upcoming season and were without a season-ending injury at the time of recruitment. Sex data was not collected in this study, therefore 'women and girls' are referenced, rather than female.[19] For those

players participating in the state's highest senior community competition level in Year 1, injury data collected were a part of AFLQ's institutional policy. Access to this injury data was approved by the competition's gatekeeper and human ethics approval from Bond University's Human Research Ethics Committee (JF00955). For all other players, explanatory statements were provided outlining injury surveillance during their respective competitive season by team personnel. Approval was received from AFLQ gatekeepers for each competition level and informed consent was gained from the players in each participating team. For those players under the age of 18 years, informed consent was also received from their parent (or guardian). The study to collect injury data for all other players was approved by Bond University's Human Research Ethics Committee (16116).

Designated team personnel, including physiotherapists and sport trainers, collected injury data over their team's respective season. Sport trainers have been shown to have adequate quality for providing basic injury profiling data in community settings.[20] Each team personnel received written instructions, including definitions provided in the Appendix Table A.1, for recording injuries. Team personnel were requested to report the following injury information in a Microsoft Excel spreadsheet: body area; diagnosis; whether the injury occurred during training, match, or outside Australian football; date of injury; date returned to full participation; and mechanism of injury. Individual teams that participated in the state community senior competition in Year 1 provided their spreadsheets to AFLQ, which was then accessed by the primary author at the end of the season. All other teams provided their spreadsheets directly to the primary author at the end of the season. All data received were collated by the primary author into one Microsoft Excel spreadsheet.

Team training schedules were provided to the research team at the end of season to determine training exposure. Individual training exposure was calculated by subtracting the training exposure missed due to injury or known reason for leaving the team during the athlete-season (defined as one player participating in one competitive season) from the total training exposure available for the player's team. Individual match exposure for each participant was determined utilising player selection reports provided by team personnel and publicly accessible data from SportsTG website

(websites.sportstg.com). SportsTG (now rebranded as GameDay) is an AFL managed website that includes a match day management system to report the number of matches played for each player rostered on a team within a competition.[21] To compare injury prevalence over the course of a competition season, each competition season was divided into pre-, early-, mid-, and late-season. For players participating in additional Australian football matches (e.g., an U13 player playing an additional game for U15 team on a weekend) or training sessions (e.g., high-level junior participating on a community team and Talent Academy squad) outside of their typical rostered team during the study period, these matches and training sessions were accounted for in the individual exposure data. Training and match activities for other sports were not accounted for in this study.

All terms and definitions utilised in this study are described in the Appendix Table A.1. Injury events were recorded using time-loss and medical attention injury definitions. Injuries were classified as a new injury, re-injury, or exacerbation. The primary author used the Orchard Sports Injury and Illness Classification System to code the body region injured and pathology type.[22] The mode of injury onset was classified as contact, non-contact, or overuse. Specific injury mechanism information was allocated into best fit categories based upon the data determined by the primary author who has experience in sports injury documentation. To account for differences between competition levels regarding the number of trainings/matches per week, injury severity was determined by the number of calendar days missed between the date of injury onset and the date returned to full training or competition[23] using the categories outlined in the Appendix Table A.1. When a player sustained concurrent injuries, injury severity was only accounted for once, indicated by the most days missed.

Training, match, and total injury incidence were calculated for each competition level and the total sample for each year, as well as the combined two-year study period. Utilising definitions in the Appendix Table A.1, cumulative incidence proportion and frequency distribution of Australian football injuries sustained during each year and the combined two-year study period for the total sample were calculated. Injury prevalence was determined for each competition level and the total sample for the combined two-year study period. Any injury present at the time of recruitment or

occurring outside of Australian football during the study period was not included in determining the incidence of Australian football injuries that occurred during the study period. However, these injuries were accounted for regarding impacted exposure to participation in Australian football, as well as in calculating injury prevalence. Descriptive statistical analysis was performed using the *dplyr* package from the software R (Version 3.6.3)[24] and Microsoft Excel on collected injury data to determine injury profiles across each competition level and for the total sample. To explore trends across the five competition levels, 95% confidence intervals (CI) were also reported for match and training injury incidence rates for the combined two-year study period. Injury severity (number of days missed) was presented as a mean and standard deviation (SD), as well as a frequency and percentage based on injury severity category. All remaining categorical data were reported as frequencies and percentages.

Results

The Appendix Figure A.1 shows the participant recruitment flow chart for this study, indicating 392 included players. There were 312 players in Year 1 and 126 players in Year 2, with 46 players involved across both years, resulting in 438 athlete-seasons. The cohort included 40 elite senior players, 257 non-elite senior players, 33 high-level junior players, 29 non-elite junior players (14-17 years), and 33 non-elite junior players (10-13 years). During the two-year study period, 164 (41.8%) players experienced a total of 760 Australian football medical attention or time-loss injuries. The training, match, and overall injury incidence results for the total sample and each competition level for Year 1, Year 2, and the two-year study period are shown in Table 1. Appendix Figure A.2 illustrates the training and match injury incidence rates and the CIs across each competition level for the two-year study period. Elite senior (125.1 injuries per 1000 hours, 95% CI 105.9, 147.8) and high-level junior players (116.9 injuries per 1000 hours, 95% CI 92.2, 148.4) had greater match injury incidence rates than the non-elite competition levels (15.5-41.4 injuries per 1000 hours). Elite senior players (34.9 injuries per 1000 hours, 95% CI 31.2, 39.0) also had greater training injury incidence rates than all other competition levels (1.2-9.5 injuries per 1000 hours). Overall, there was a higher incidence of new injuries (656 injuries; 86.3%) compared to re-injuries (53 injuries; 7.0%) and exacerbations (51 injuries; 6.7%). Of the 164 injured players, 93 players (56.7%) sustained more than one injury. The

Appendix Table A.2 displays the player proportion and frequency distribution of subsequent injuries for each year and for the total study period.

Insert Table 1 about here.

Table 2 shows a summary of injury profiles for the total cohort and across competition levels according to activity, body region, mode of onset, and severity. Appendix Table A.3 provides additional injury profile summaries according to specific body region injured, pathology type, and injury mechanism. Appendix Table A.4 demonstrates the mode of onset for specific mechanisms of injury.

Insert Table 2 about here.

A total of 444 (58.9%) time-loss Australian football injuries (388 new injuries, 30 recurrent injuries, and 26 exacerbations) resulted in a total of 5682 days missed (mean ± SD per injury: 15 ± 22 days). Injury prevalence during the pre-season, early-season, mid-season, and late-season for the total sample and each competition level for the two-year study period are shown in Figure 1.

Insert Figure 1 about here.

Discussion

The aim of this study was to describe and profile the injuries sustained by Australian football players and explore trends across five, women's and girls' competition levels. Overall sample results highlighted a higher injury incidence rate in matches compared with training. Injuries to the lower extremity were most frequent, with the knee commonly injured. The most frequent pathology type were ligament/joint sprains. The majority of injuries resulted from contact mechanisms (namely a result of contact with another player). Time-loss injuries were more common, particularly of moderate severity (8-28 days missed). Injury prevalence was highest during the pre-season. Competition level

trends revealed elite seniors and high-level juniors had higher injury incidence rates compared to the non-elite competition levels. The most common body region injured in non-elite seniors and non-elite juniors (10-13 years) was the hand. Non-specific pathology type was more frequent in elite senior players. Minimal severity injuries (2-3 days missed) were also more common in the elite senior competition. These findings provide key preliminary insights into understanding the injury epidemiology and aetiology in women and girls across key levels of participation in Australian football and this information may be used to enhance future injury risk reduction research.

The results from this study indicated an overall injury incidence rate, using a time-loss and medical attention injury definition and inclusive of training and match participation, was 20.9 injuries per 1000 hours of exposure. Elite seniors and high-level juniors had higher injury incidence rates compared to the non-elite competition levels in both training, match, and overall exposure environments. Research has demonstrated female soccer players with higher skill levels were at greater risk of sustaining injuries compared to low-skilled players.[25] This may be explained by highly skilled players being more likely to be involved in contested game play and exposed to more potential inciting events that may result in injury.[25] Direct comparison of the elite senior men (i.e., AFL) injury incidence rate for similar seasons to the elite senior women in this study is difficult due to the missed-match injury definition used.[4] However, as greater number of injuries are captured with the definition used in this study compared to a missed-match definition,[26] injury incidence at the highest competition levels may be comparable (elite senior women, 45.1 vs. elite senior men, 36.9[27] per 1000 hours). The overall injury incidence rate amongst the high-level juniors girls in this study (26.3 per 1000 hours) was lower than that reported in elite junior boys (37.2 per 1000 hours).[5] Similarly, overall injury incidence rates for the remaining non-elite competition levels in this study were also slightly lower than those reported in the community men's and boys' Australian football literature using similar injury definitions: non-elite seniors (10.2 vs 12.1 to 27.2[7,28,29] per 1000 hours), non-elite juniors (14-17 years) (4.6 vs. 5.4 to 26.2[10,11] per 1000 hours), and non-elite juniors (10-13) (5.7 vs 6.8 to 22.0[10,11] per 1000 hours). These differences in incidence rates could suggest gender differences in

246 competition environments, highlighting the need for future research conducted in women's and girls'
247 competitions to support evidence-informed approaches to injury prevention strategies.
248
249 Injury incidence was greater for matches (60.4 injuries per 1000 hours) than training (13.3 injuries per
250 1000 hours) across all competition levels in this study, which is consistent with Australian football
251 research conducted with those participating in the men's and boys' competitions.[5,7,11,27,28] Of note, the
252 elite senior group had the highest incidence rates and frequency of injuries in both training and
253 matches compared to the other competition levels. An explanation for the greater training incidence
254 rates and frequency of injuries may be due to the elite AFLW structure involves a greater number of
255 training sessions (five sessions/week) compared to the non-elite senior competition (2-3 training
256 sessions/week). Whereas the greater incidence rates and frequency of injuries in matches in elite
257 seniors may be due to a shorter, high-stakes competition phase (at the time of this study, about seven
258 rounds over two months), where AFLW players may perceive pressures to return to play to fulfill
259 their role within the shorter season. This differs to non-elite senior women's competition levels, which
260 participate in approximately 16 matches over six months. Conversely, the men's AFL structure can
261 include about seven training sessions/week with a pre-season competition (two rounds over three
262 weeks) and 22 matches during in-season competition. These differences in sporting structures coupled
263 with the results from this study may provide insight to sport practitioners at the elite senior level
264 regarding investigation of training environments during pre-season and in-season, as well as off-
265 season management to reduce injuries. Additionally, these results may also highlight the need for
266 support from sport governing bodies regarding resources, such as providing sufficient medical staff to
267 support the teams and ensure the pre-season training and in-season match structure is adequate to
268 support an intense competitive AFLW season.
269
270 Most injuries in this study were to the lower extremity, which is consistent with previous women's
271 Australian football research[16,17] and predominantly men's Australian football reviews.[12,30]
272 Specifically, the knee was the most commonly injured body region overall, which reflects the growing
273 concern of ACL injuries in this cohort.[31] Hand injuries were the most frequent region injured in the

upper limb for the total sample, compared to the shoulder, which is the most prevalent upper limb region injured in the elite men's competition (i.e., AFL).[12] Specifically, hands injuries were the most injured body region in the non-elite senior and non-elite junior (10-13 years) competition levels. This may reflect developing marking (i.e., 'catching') and kicking techniques (resulting in abnormal ball spinning), as a large portion of these injuries were due to contact with the ball. This lack of experience coupled with the growing expansion of new participants across all Australian football women's and girls' competition levels may highlight the importance of improving marking and kicking technique in these less experienced players. Similar to other Australian football injury profiling studies,[4,5,16] many of the injuries in this study were ligament/joint sprains, contusions, and muscle injuries (e.g., strains). Interestingly, non-specific pathology type (e.g., pain in body regions) was also very common in this cohort, particularly in the elite senior group. In conjunction with the scheduling structure resulting in a compact season, AFLW players commonly work full-time while in-season compared to their male counterparts. This additional demand may impact episodes, such as non-specific low back pain, as well as reduce availability in time and resources to manage injuries. Future research is needed to explore some of these sociocultural factors associated with sporting environments specific to women and girls to better understand these findings.

Research indicates body contact injuries are a priority area for injury risk reduction strategies in elite junior boys[5] and community men's Australian football.[30] Findings from this study demonstrate a similar priority may exist in Australian football players across all women's and girls' competition levels, with many injuries due to contact with another player. While Australian football is inherently a contact sport, the relative infancy of women's and girls' competitions may explain a more contested and congested game style, resulting in more frequent contact with other players or the ground. Conversely, the evolution of the men's game over time has led to faster movement of the ball and players, possibly resulting in higher-speed collisions and contact injuries.[5] However, it is important to note that a large proportion of specific injury mechanism data was missing, therefore improvements in injury surveillance are required to enhance our understanding of injury in women and girls participating in Australian football.

Overall, time-loss injuries were more common than non-time-loss injuries in this study, which has implications on the availability of players to participate in training and matches. All competition levels experienced greater proportion of injuries of moderate severity (8-28 days missed) except for elite seniors, which reported more injuries of minimal severity (2-3 days missed). An explanation for this may be due to accessibility to medical staff or attributable to the shortened season and increased pressure to return to play. Thus, athletes may return to play, without full recovery from injury. Further research in elite seniors, particularly in the AFLW, is warranted to better understand the management of players over a compact competitive season.

The percentage of players injured was greatest in pre-season for all groups (that provided data), which then reduced and remained relatively constant across each of the three in-season phases. Considering the infancy of the AFLW competition and growth of new players participating in women's and girls' Australian football competitions, this may suggest that the pre-season training dose may be beyond the capacity of these athletes. Additionally, the talent competitions in the junior girls' space can occur concurrently with their community and school team competitions. This additional load and exposure may have implications for injury risk in the evolving high-level juniors. Therefore, a gradual increase in training intensity and duration may be required in the pre-season, as well as inclusion of appropriate physical development programs in the off-season. As the Australian football talent pathways develop for women and girls, further research is required to understand the impact of load and multiple sport exposure/participation in these players.

A major strength of this study is that it is the first to prospectively investigate injury profiles of Australian football players across five, women's and girls' competition levels. Utilising an injury definition that accounted for training and matches aided in understanding slight/minimal injury severity burden and documentation of overuse injuries.[5] While incorporating data collection measures to include reporting of mechanism of injury to further assist future injury risk reduction research, the injury surveillance challenges, such as lack of resources or time-poor environments, resulted in some

missing data within this study. Additionally, while individual training exposure was partially calculated for time missed due to injury or reasons known for leaving the team, factors such as actual individual attendance or hours participating in other sports were not accounted for. Lastly, the small and unequal sample sizes over the two-year study period highlight the possibility of the data not being representative of the wider population in each of the competition levels, which limits our ability to draw strong conclusions. Additionally, the teams represented in this study are only from one state, and therefore the results may not be representative of all women's and girls' Australian football competitions.

Given these limitations, further research is warranted in Australian football to validate and extend the findings from this study and to better understand the extent of and contributors to the injury problem across women's and girls' competitions. Recommendations for future research include use of technology, such as videotaping matches or injury reporting mobile apps accessible to individual players, to assist in comprehensive injury data collection, such as injury mechanism. While system-wide injury reporting is improving at the elite and senior competitions, implementation of injury surveillance at the junior community level is necessary to understand the extent of the injury problem during the development years. Similar to the match day management system that records game participation, sport governing bodies could also explore a standardised, mandatory reporting system for injuries to support development of specific injury prevention strategies. Developing standardised injury surveillance systems is one way to collect comprehensive information to inform preventative strategies. This has significance to the sport of Australian football to not only protect player safety, but also to maintain participation longevity. Additionally, the importance of standardised training sessions for personnel involved in injury data collection may enhance consistency in future research, as well as promote the importance of collecting comprehensive information, particularly in the junior community competition levels. Lastly, future research should collect information on potential environmental and sociocultural factors, such as access to facilities and experienced sport practitioners, that exist within women's and girls' Australian football competitions to further understand an injury problem as a complex, entangled phenomenon.[15,31]

Conclusion

This study provides preliminary insight into the injury epidemiology in Australian football players across five, women's and girls' competition levels. Findings indicate key priority areas for all participation levels include injuries to the lower extremity (namely the knee), ligament/joint sprain pathology type, and contact injuries (particularly contact with another player). Greater injury incidence rates occurred during match play and increased injury prevalence was during the pre-season. Competition level trends highlighted elite seniors and high-level junior players had greater overall and match injury incidence rates compared to non-elite competition levels. Elite senior players sustained greater incidence rates and frequency of injuries in training sessions compared to all other competition levels. Elite seniors also experienced more injuries classified as minimal severity, compared to moderate severity seen in other groups. Lastly, hand injuries were more common in non-elite competition levels compared to elite seniors and high-level juniors. These competition level trends indicate future research is needed to further investigate injury epidemiology to provide developmentally specific injury risk reduction programs and to expand upon these findings. This research provides insight into the initial stages of injury prevention,[2] however further research is needed within this rapidly growing and evolving athlete population.

Practical Implications

- Findings indicate reducing contact-related injuries, ligament/joint sprain injuries, and injuries to the lower extremity are priorities in Australian football players participating in women's and girls' competitions.
- Elite senior women and high-level junior girls playing Australian football have greater injury incidence rates than non-elite competition levels.
- Injury prevalence was greatest during the pre-season, indicating a gradual increase in training intensity and duration may be required and considered by coaches working in women's and girls' Australian football competitions.

- Governing sporting bodies need to consider priorities unique to competition level and the sporting environment specific to women and girls to target developmentally appropriate prevention measures in Australian football.

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Table 1: Injury incidence (per 1000 hours exposure) in Australian football players across five, women's and girls' competition levels during the 2017-2018 and 2018-2019 seasons.

		Year 1 (2017-2018)			**Year 2 (2018-2019)**			**Total study period (2 years)**		
		Training	*Matches*	*Total exposure*	*Training*	*Matches*	*Total exposure*	*Training*	*Matches*	*Total exposure*
Elite senior	Number of individual player sessions	2798	423	3221	2218	202	2420	5016	625	5641
	Total exposure (hours)	4971	731	5702	3993	380	4373	8964	1111	10075
	Number of injuries	145	97	244*	168	42	210	313	139	454*
	Injury incidence (per 1,000 h exposure)	29.2	132.7	42.4	42.1	110.5	48.0	34.9	125.1	45.1
Non-elite senior	Number of individual player sessions	8831	1751	10582	1436	306	1742	10267	2057	12324
	Total exposure (hours)	13247	2627	15874	1927	462	2389	15174	3089	18263
	Number of injuries	38	114	152	20	14	34	58	128	186
	Injury incidence (per 1,000 h exposure)	2.9	43.4	9.6	10.4	30.3	14.2	3.8	41.4	10.2
High-level junior	Number of individual player sessions	1046	247	1293	1122	152	1274	2168	399	2567
	Total exposure (hours)	1569	351	1920	1573	231	1804	3142	582	3724
	Number of injuries	24	61	85	6	7	13	30	68	98
	Injury incidence (per 1,000 h exposure)	15.3	174.0	44.3	3.8	30.3	7.2	9.5	116.9	26.3
Non-elite junior (14-17 years)	Number of individual player sessions	139	20	159	1027	429	1456	1166	449	1615
	Total exposure (hours)	209	30	239	1522	432	1954	1731	462	2193
	Number of injuries	1	2	3	1	6	7	2	8	10
	Injury incidence (per 1,000 h exposure)	4.8	66.7	12.6	0.7	13.9	3.6	1.2	17.3	4.6
Non-elite junior (10-13 years)	Number of individual player sessions	0	0	0	1130	592	1722	1130	592	1722
	Total exposure (hours)	0	0	0	1529	580	2109	1529	580	2109
	Number of injuries	0	0	0	3	9	12	3	9	12
	Injury incidence (per 1,000 h exposure)	0.0	0.0	0.0	2.0	15.5	5.7	2.0	15.5	5.7
Total sample	Number of individual player sessions	12814	2441	15255	6933	1681	8614	19747	4122	23869
	Total exposure (hours)	19995	3738	23733	10544	2085	12629	30539	5823	36362
	Number of injuries	208	274	484*	198	78	276	406	352	760*
	Injury incidence (per 1,000 h exposure)	10.4	73.3	20.4	18.8	37.4	21.9	13.3	60.4	20.9

Total exposure = training exposure + match exposure.

*Discrepancies in variable count due to missing data.

Table 2: Injury profiles of Australian football players across five, women's and girls' competition levels according to activity, body region, mode of injury onset, and injury severity

		Elite senior (n, (%))	Non-elite senior (n, (%))	High-level junior (n, (%))	Non-elite junior (14-17 years) (n, (%))	Non-elite junior (10-13 years) (n, (%))	Total sample (n, (%))
Activity (n = 758 injuries)							
Training		313 (69.2)	58 (31.2)	30 (30.6)	2 (20.0)	3 (25.0)	406 (53.6)
Match		139 (30.8)	128 (68.8)	68 (69.4)	8 (80.0)	9 (75.0)	352 (46.4)
Injury body region (n = 759 injuries)							
Lower extremity		275 (60.7)	97 (52.2)	58 (59.2)	7 (70.0)	3 (25.0)	440 (58.0)
Head and spine		102 (22.5)	42 (22.6)	24 (24.5)	1 (10.0)	3 (25.0)	172 (22.7)
Upper extremity		66 (14.6)	37 (19.9)	14 (14.3)	2 (20.0)	6 (50.0)	125 (16.5)
Other		10 (2.2)	10 (5.4)	2 (2.0)	0 (0.0)	0 (0.0)	22 (2.9)
Mode of onset (n = 510 injuries)							
Impact/traumatic contact injury		149 (53.2)	94 (67.6)	53 (74.6)	7 (77.8)	11 (91.7)	314 (61.4)
Sudden onset non-contact injury		87 (31.1)	20 (14.4)	9 (12.7)	1 (11.1)	1 (8.3)	118 (23.1)
Gradual onset/overuse		44 (15.7)	25 (18.0)	9 (12.7)	1 (11.1)	0 (0.0)	79 (15.5)
Severity of injury (n = 754 injuries)							
Time-loss	Moderate (8-28 days)	47 (10.4)	44 (23.7)	24 (24.5)	2 (33.3)	4 (33.3)	121 (16.0)
	Mild (4-7 days)	64 (14.2)	39 (21.0)	3 (3.1)	1 (16.7)	3 (25.0)	110 (14.6)
	Minimal (2-3 days)	73 (16.2)	12 (6.5)	7 (7.1)	0 (0.0)	1 (8.3)	93 (12.3)
	Severe (>28 days)	12 (2.7)	27 (14.5)	9 (9.2)	1 (16.7)	3 (25.0)	52 (6.9)
	Slight (1 days)	13 (2.9)	0 (0.0)	1 (1.0)	0 (0.0)	1 (8.3)	15 (2.0)
	Concurrent	34 (7.5)	14 (7.5)	5 (5.1)	0 (0.0)	0 (0.0)	53 (7.0)
	Total	243 (53.8)	136 (73.1)	49 (50.0)	4 (66.7)	12 (100.0)	444 (58.9)
Non-time loss		209 (46.2)	50 (26.9)	49 (50.0)	2 (33.3)	0 (0.0)	310 (41.1)

Percentages calculated based on available injury data within each competition level and for the total sample.

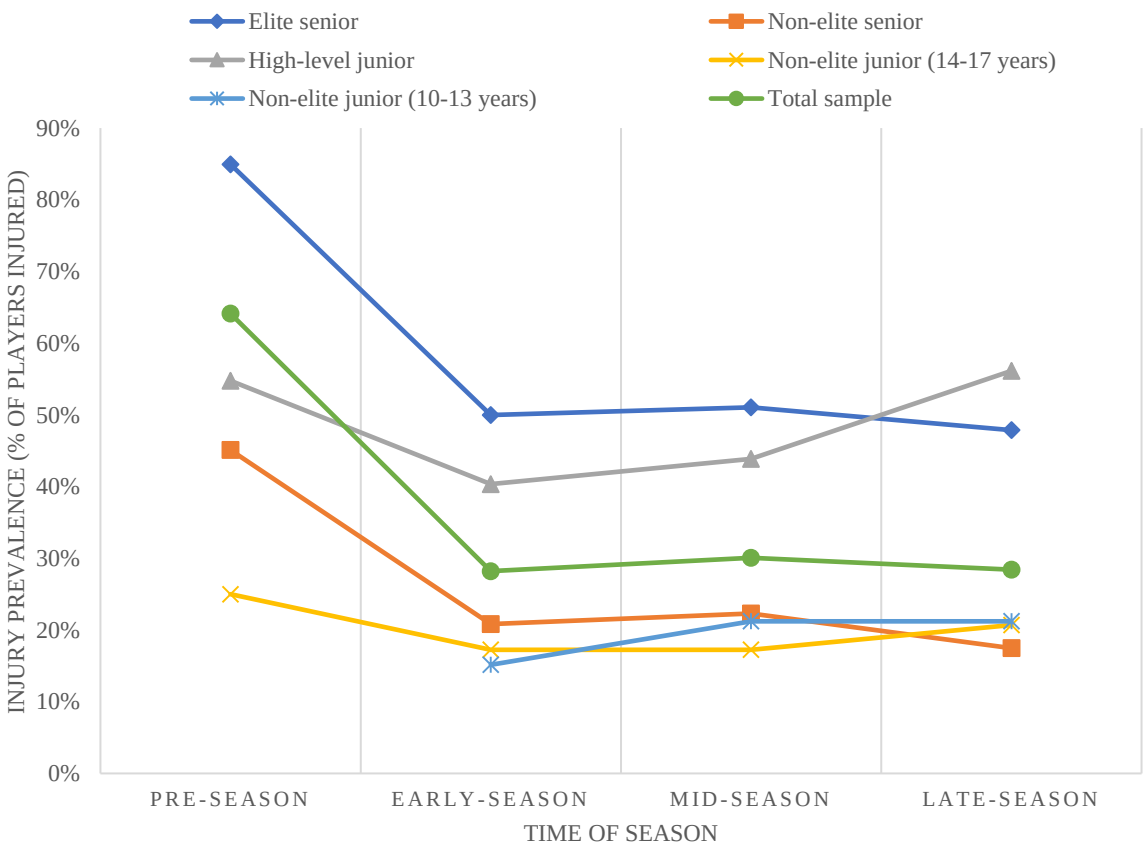

Figure 1: Injury prevalence respective to time of season for the two-year study period. Note: Elite senior: pre-season n = 73 athlete competition seasons, in-season n = 94 athlete competition seasons; Non-elite senior: pre-season n = 51 athlete competition seasons, in-season n = 269 athlete competition seasons; High-level junior: pre-season n = 42 athlete competition seasons, in-season n = 57 athlete competition seasons; Non-elite junior (14-17 years): pre-season n = 4 athlete competition seasons, in-season n = 29 athlete competition seasons; Non-elite junior (10-13 years): pre-season - no data available, in-season n = 33 athlete competition seasons; Total sample: pre-season n = 170 athlete competition seasons, in-season n = 482 athlete competition seasons.