World Rugby

Surveillance Studies

Sevens World Series (Women)

Summary of Results: 2011/12 to 2018/19

Colin Fuller and Aileen Taylor

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Summary of key points

Due solely to the smaller number of Tournaments (5/6 v 10) and the smaller number of core teams (11 v 15) involved in the women's Sevens World Series, the total number of match injuries typically recorded in each Series is about one third of those reported in each men's Sevens World Series. This precludes reporting meaningful Series-specific data for some parameters in the women's Sevens World Series. The average injury surveillance data recorded and reported for the period 2011/12 to 2018/19 does, however, provide a high quality and reliable source of information about the risks of injury associated with women's elite Rugby-7s.

Based on the combined data from the women's Sevens World Series over the 8-year period from 2011/12 to 2018/19, the following general conclusions can be presented:

- Rugby-7s forwards are older, taller and heavier than the backs.
- There is a statistically significant reducing trend in the age of forwards but no statistically significant change in backs' age.
- There has been a statistically significant increasing trend in the stature of backs but no statistically significant change in the stature of forwards.
- There have been no statistically significant changes in the body mass of backs or forwards.
- The incidence of injury in women's Rugby-7s is significantly higher than that in women's Rugby-15s but significantly lower than that in men's Rugby 7s.
- Backs have a statistically significant higher incidence of injury than forwards.
- Significantly more injuries occur in the second half of games (first half: 40%; second half: 60%), which is similar to the situation in the men's Sevens World Series.
- The mean severity of injuries sustained in the women's Sevens World Series is significantly higher than that reported for the men's Sevens World Series (women: 53.0 days; men: 44.5 days).
- Overall, the knee, head and ankle are the most commonly injured sites in the women's Series, which is similar to the men's Sevens World Series.
- Ligament sprain, muscle strain and concussion are the most common types of injury reported in the women's Sevens World Series, which is similar to the men's Sevens World Series.
- Concussion remains the most common specific injury for backs (13%) and forwards (20%). Anterior cruciate ligament injuries, however, are responsible for the most days-absence for both backs (17%) and forwards (23%).
- The majority of injuries sustained in the women's Sevens World Series are acute in nature (backs: 95%; forwards: 95%) and most injuries result from contact events (backs: 89%; forwards: 89%).
- Being-tackled (backs: 39%; forwards: 32%) and tackling (backs: 28%; forwards: 27%) are the match events responsible for the most injuries.

1 Introduction

World Rugby is committed to implementing injury surveillance studies at all major World Rugby Tournaments and to disseminate the results within the Rugby community.

The aims of these studies are:

- to record and analyse injuries and illnesses sustained by male and female players at individual Tournaments,
- to identify changing patterns of injury, and
- to bring injury-related areas of concern to the attention of World Rugby's Chief Medical Officer.

Previous surveillance studies in women's Rugby Sevens reported the incidence and nature of match and training injuries sustained during the women's Sevens World Series (SWS) from 2011/12 to 2017/18. This report continues the on-going study of the women's Sevens World Series by reporting match and training injuries and illnesses sustained during the 2018/19 Series.

This review also combines the women's 2018/19 Sevens World Series data with the data reported previously in order to provide an updated overview of the risks of injury and illness in elite women's Rugby Sevens.

2 Methods

All studies were conducted in accordance with the definitions and protocols described in the World Rugby approved consensus statement on definitions and procedures for injury surveillance studies in Rugby (Fuller et al., 2007).

The definition of injury was: *'Any injury sustained during a Sevens World Series Tournament match or training activity that prevents a player from taking a full part in all normal training activities and/or match play for more than one day following the day of injury'*. A recurrent injury was defined as: *'An injury (as defined above) of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury'.*

Specific injuries were classified using OSICS 8 (Orchard, 2010). Injury location, type and cause together with the event leading to the injury were also recorded.

The definition of an illness used in this study was: *'Any medical condition sustained while travelling to a Sevens World Series Tournament, while at a Tournament or while travelling home at the end of a Tournament that prevents a player from taking a full part in all training activities and/or match play for more than one day following the day of onset of the illness.'*

Injuries and illnesses not related directly to Sevens World Series rugby-related activity were not included.

Injury/illness severity was determined by the number of days a player was injured/ill: a player was deemed to be 'injured/ill' until she could undertake full, normal training and be available for match selection, whether or not she was

actually selected. Medical staff were required to make an informed clinical judgement about a player's fitness to train/play on those days when players were not scheduled to train or play. Injured/ill players were followed up after each Tournament to obtain their return to play date: the return to play dates for players with injuries/illnesses that remained unresolved 3 months after the final day of the final Tournament in the Series were estimated on the basis of the clinical judgement and prognosis provided by the injured player's medical staff.

The complete lists of categories and sub-categories used for categorising injury locations and injury types are provided in the rugby injury consensus publication (Fuller et al., 2007).

Differences in players' anthropometric data were assessed using unpaired t-tests; differences in incidences, mean severity and proportions of injuries using z-tests; and differences in median severity using a Mann-Whitney U test. Differences in injury numbers were assessed using the chi-squared test. Trends in data over time were assessed using linear regression analyses. Statistical significance was accepted at the $p=0.05$ level, although it is recognised that this could identify some differences that occurred by chance due to the large number of statistical comparisons being made in the study.

3 Data collection

At the beginning of each women's Sevens World Series, the team's medical staff were asked to explain to squad players the purpose of the epidemiological study. Each player's baseline anthropometric information was recorded on a Player Baseline Information Form (playing position [back, forward]; date of birth; body mass [Kg]; stature [cm]). Players joining a country's squad at a later date were added to the list of players and the anthropometric data recorded at the time the player joined the squad.

Medical staff recorded injuries/illnesses sustained during each Tournament on a Tournament Summary of Injuries and Illnesses Report Form, which was returned to the study co-ordinator at the end of the Tournament. A member of the team's medical staff also recorded detailed information about each injury and illness on an Injury/Illness Report Form (date of injury/illness, date of return to play, location and type of injury/illness, cause of injury/illness, event leading to injury/illness). Injury/illness Report Forms were returned to the study co-ordinator when the final piece of information had been entered on the Form (normally the return-to-play date).

4 Results

Results for previous women's Sevens World Series have been presented in earlier World Rugby reports (Fuller and Taylor, 2018). The women's Sevens World Series 2018/19, which consisted of 6 Tournaments in USA, Dubai, Australia, Japan, Canada and France, took place over the period 20 October 2018 to 16 June 2019. This study recorded players' anthropometric data and match and training injuries and illnesses sustained by the eleven core teams (Australia, Canada, China, England, Fiji, France, Ireland, New Zealand, Russia, Spain, USA) taking part in all six of the 2018/19 Sevens World Series Tournaments. Teams' match and Tournament-based training activities were also recorded.

4.1 Players' anthropometric data

Table 1 summarises the numbers and anthropometric data for players categorised as backs, forwards and all players in the 2018/19 Sevens World Series together with values averaged over the period 2011/12 to 2018/19.

Table 1: Players' anthropometric data: 2018/19 Sevens World Series.

Series / Measure	**Mean** (*Standard deviation, number of players*)		
	Backs	***Forwards***	***ALL players***
2018/19			
Stature, cm	167.6 (5.0, 120)	172.2 (5.6, 96)	169.6 (5.8, 216)
Body mass, Kg	66.2 (5.3, 120)	73.4 (6.9, 96)	69.4 (7.1, 216)
Age, years	23.1 (3.6, 120)	24.0 (4.0, 96)	23.5 (3.8, 216)
All Series (2011/12 – 2018/19)			
Stature, cm	167.0 (5.3, 816)	170.7 (5.7, 627)	168.6 (5.8, 1443)
Body mass, Kg	65.5 (5.5, 817)	71.4 (6.2, 630)	68.1 (6.5, 1447)
Age, years	23.6 (3.7, 818)	24.5 (3.8, 630)	24.0 (3.8, 1448)

Based on the all-series data, forwards are significantly older ($p<0.001$), heavier ($p<0.001$) and taller ($p<0.001$) than backs.

Trends in players' age, stature and body mass over the period 2011/12 to 2018/19 are shown in Figures 1 to 3, respectively.

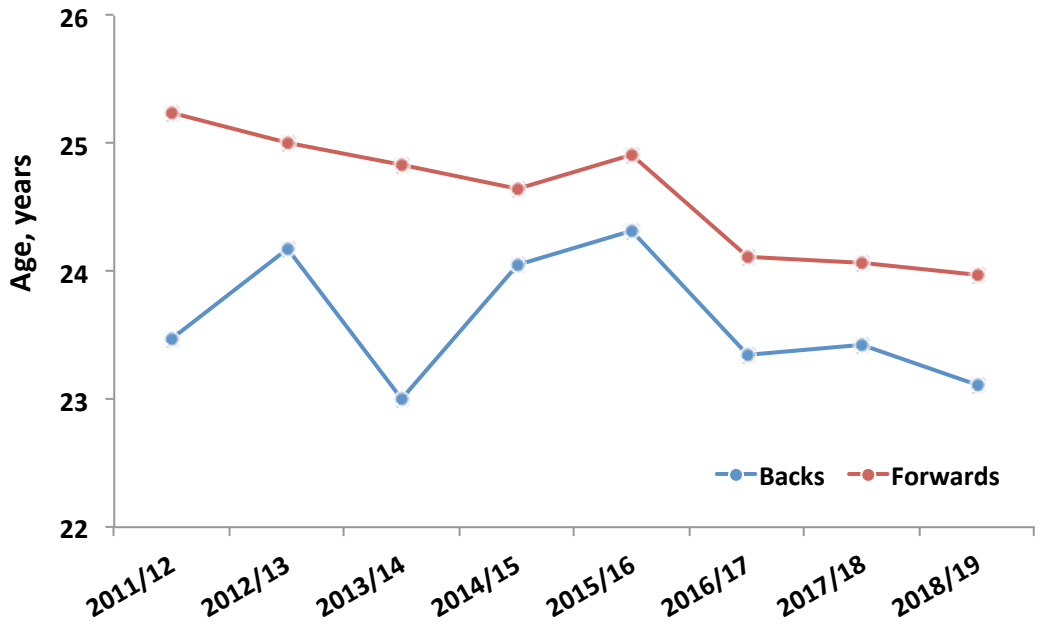

Fig 1. Trends in players' age (years)

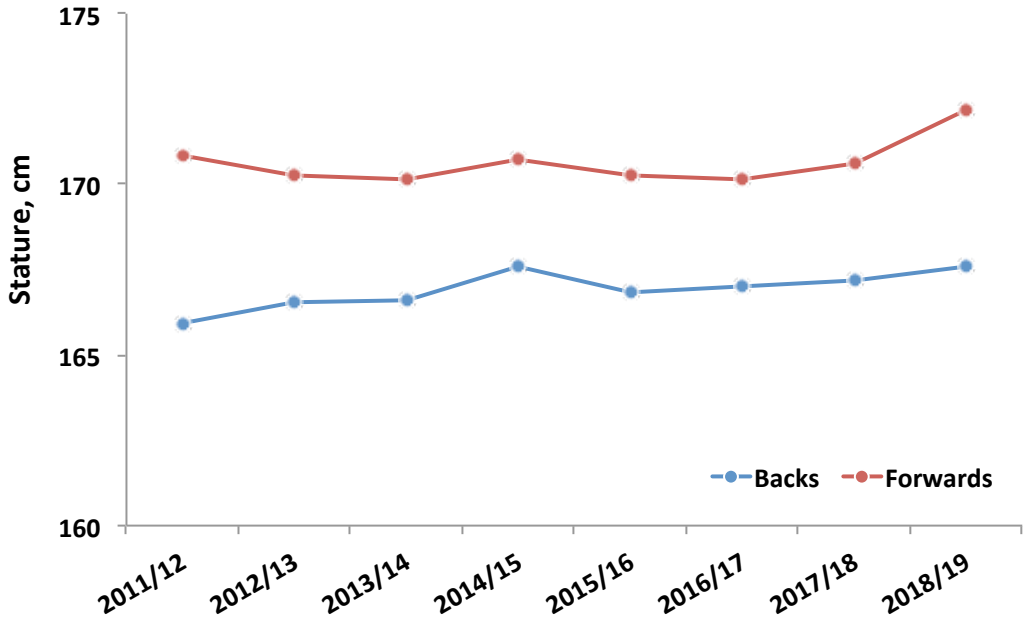

Fig 2. Trends in players' stature (cm)

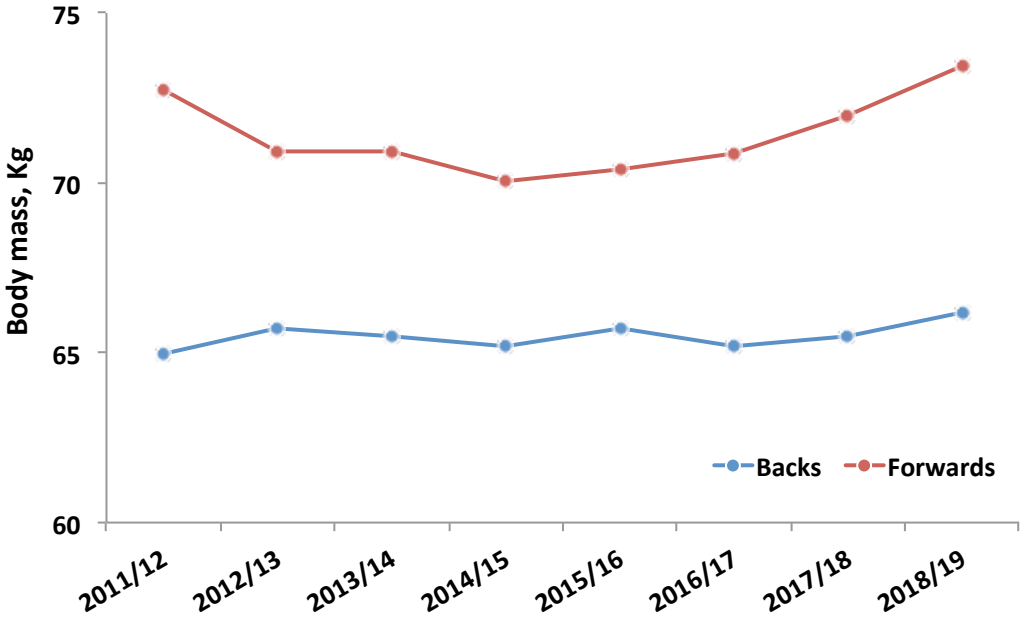

Fig 3. Trends in players' body mass (Kg)

Backs have been getting significantly taller (p=0.020) but the changes for forwards have not reached statistical significance (p=0.265). There have been no statistically significant changes in the body mass of backs (p=0.188) or forwards (p=0.536) over the period 2011/12 to 2018/19. There has been a significant reducing trend in the age of forwards (p=0.001) over this period but no significant trend in the age of backs (p=0.492).

4.2 Match injuries

4.2a Incidence of injury

Table 2 summarises the numbers of match injuries, match exposures and incidence of match injuries recorded for backs, forwards and all players during the 2018/19 women's Sevens World Series and the equivalent values over the period 2011/12 to 2018/19.

Table 2: Number, match exposure (player-hours) and incidence (injuries/1000 player-match-hours, 95% confidence interval) of match injuries: 2018/19 Sevens World Series.

Series / Measure	*Backs*	*Forwards*	*ALL players*
2018/19			
Injuries	55	20	75
Exposure	352.8	264.6	617.4
Incidence	155.9 (119.7 – 203.1)	75.6 (48.8 – 117.2)	121.5 (96.9 – 152.3)
All Series (2011/12 – 2018/19)			
Injuries	240	134	374
Exposure	2130.0	1597.5	3727.5
Incidence	112.7 (99.3 – 127.9)	83.9 (70.8 – 99.4)	100.3 (90.7 – 111.0)

The difference in incidence of injury between backs and forwards during the 2018/19 Series was statistically significant (p=0.006) and the long-term difference between backs and forwards is also statistically significant (p= 0.006).

Despite the much higher incidence of injury observed for backs during the 2018/19 Series, there remain no statistically significant trends in the incidences of injury for backs (p=0.361) or forwards (p=0.920) over the period 2011/12 to 2018/19; see Figure 4. The high incidence of injury sustained by backs in 2018/19 merits careful on-going examination, as it may reflect a potential change in the playing style of backs in the women's Sevens World Series.

The higher incidence of injury observed for backs compared to forwards reflects a similar difference seen in the men's Sevens World Series (Fuller and Taylor, 2019).

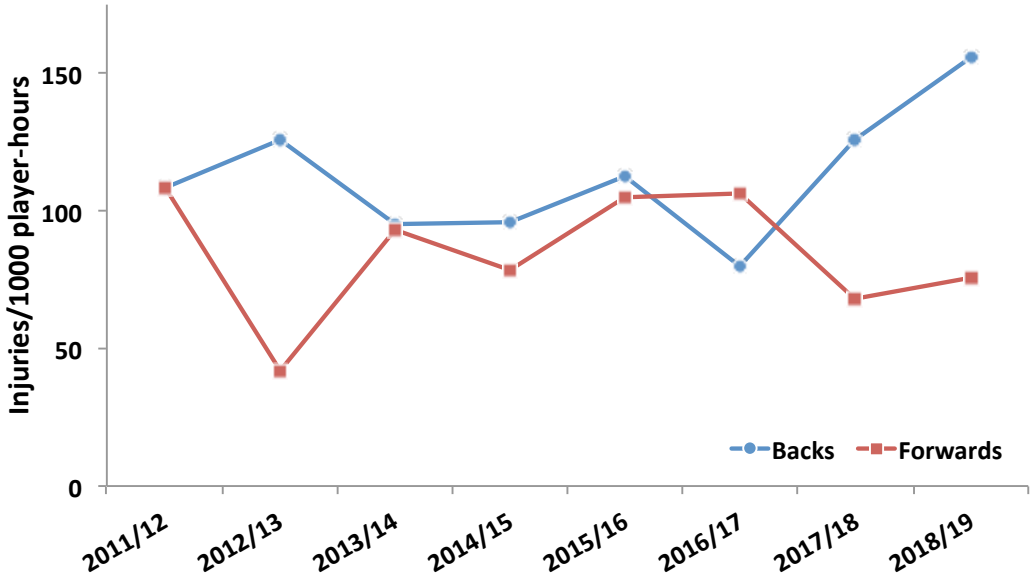

Fig 4. Trends in the incidence of injury

4.2b Severity of injury

Table 3 summarises the mean and median severities of injuries sustained during the 2018/19 women's Sevens World Series for backs, forwards and all players and the equivalent average values observed over the period 2011/12 to 2018/19.

Table 3: Mean and median severities of match injuries: 2018/19 women's Sevens World Series.

Series / Measure	***Severity (95% Confidence interval)**, days*		
	Backs	***Forwards***	***ALL players***
2018/19			
Mean	53.7 (35.9 – 71.5)	51.1 (22.6 – 79.6)	53.0 (38.0 – 68.0)
Median	25.0 (18 – 40)	18.0 (10 – 64)	24.0 (18 – 39)
All Series (2011/12 – 2018/19)			
Mean	54.1 (46.0 – 62.1)	51.9 (40.8 – 62.9)	53.3 (46.6 – 59.8)
Median	32.0 (28 – 37)	29.0 (22 – 34)	30.0 (28 – 34)

There are no statistically significant differences in the mean (p=0.881) or median (p=0.510) severities of injuries sustained by backs and forwards during the 2018/19 Series. There are also no statistically significant differences in the long-term (2011/12 – 2018/19 Series) mean (p=0.749) and median (p=0.260) severities of injuries sustained by backs and forwards.

Over the period 2011/12 to 2018/19, there are no statistically significant trends in the mean severity for backs (p=0.624) or forwards (p=0.477), Figure 5. The decreasing trends observed for median severity has reached statistical significance for forwards (p=0.048) but not for backs (p=0.477), Figure 6.

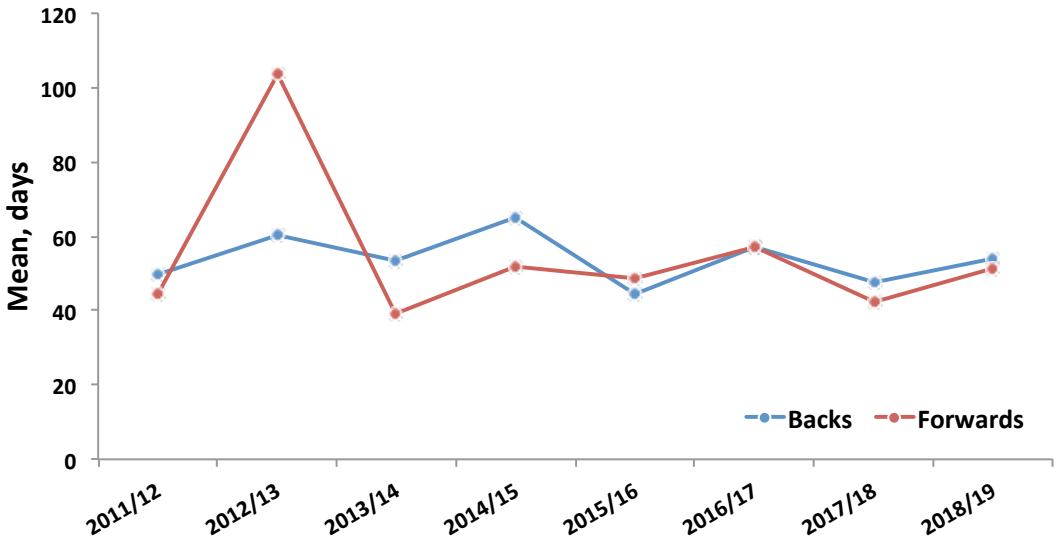

Fig 5. Trends in mean severity

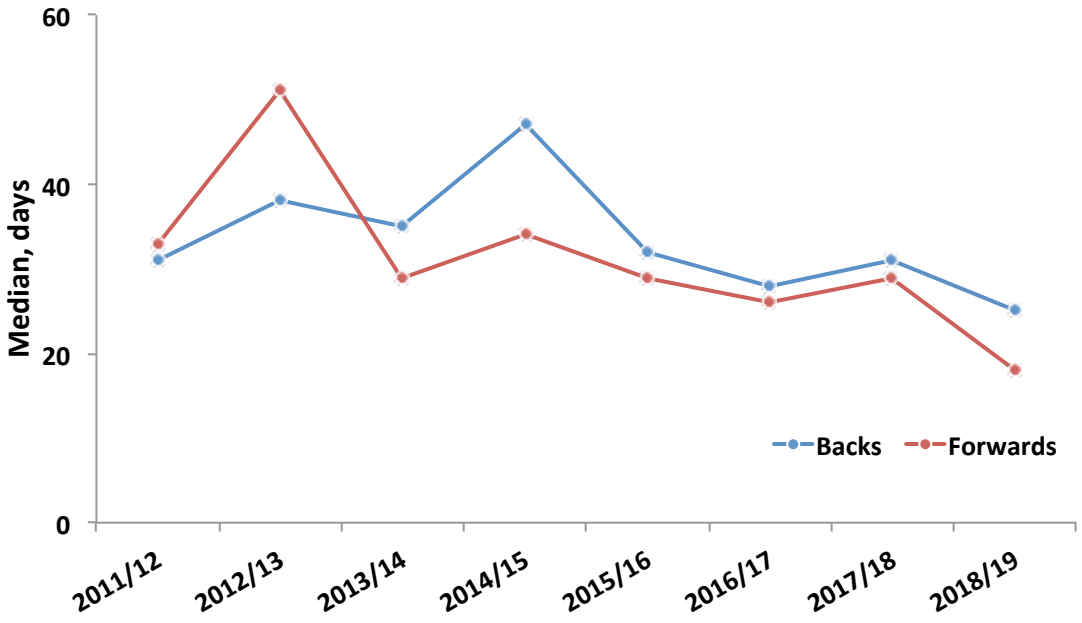

Fig 6. Trends in median severity

The mean severity of injuries sustained in the women's Sevens World Series is significantly higher than that reported for the men's Sevens World Series (p=0.004).

Because injuries falling in the >28 days severity category make up over 50% of all injuries sustained by both backs (56%) and forwards (51%), this category has been sub-divided into 'severe' (29 – 90 days) and 'major' (>90 days) injuires. Figures 7 and 8 show the proportions of injuries falling within the five revised severity categories for backs and forwards over the period 2011/12 to 2018/19:

Minimal: 2 – 3 days
Mild: 4 – 7 days
Moderate: 8 – 28 days
Severe: 29 – 90 days
Major: > 90 days.

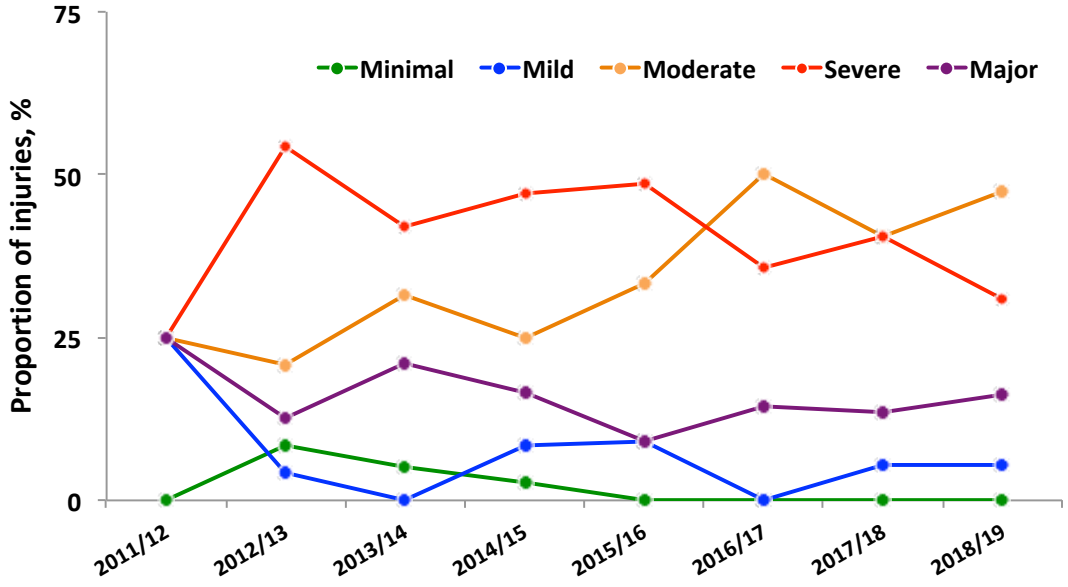

Fig 7. Trends in injury severity categories for backs

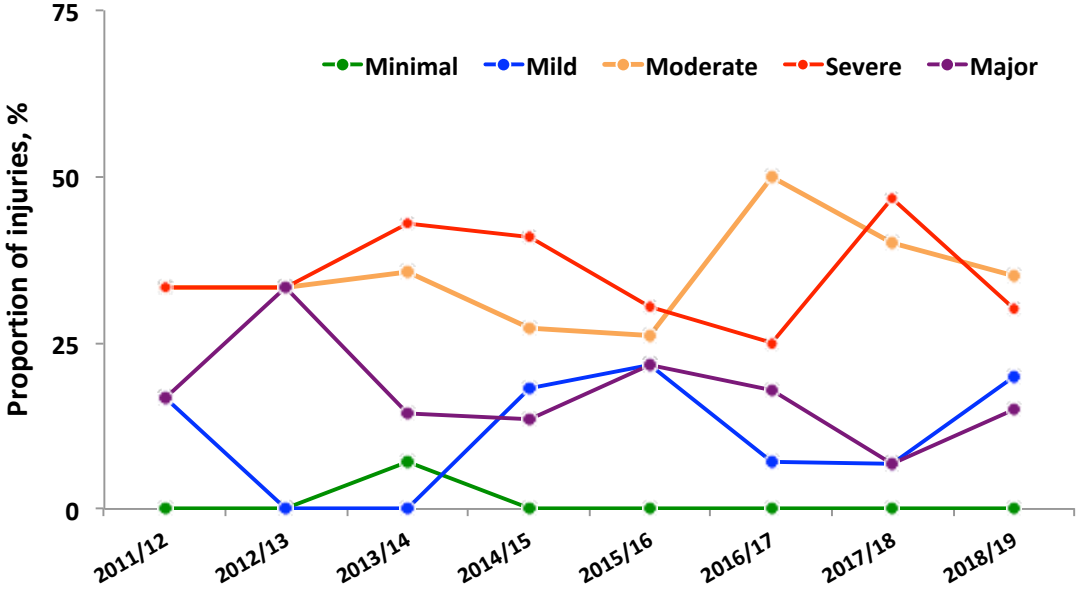

Fig 8. Trends in injury severity categories for forwards

4.2c Location of injury

The number of injuries sustained in a single women's Series is too small to provide a meaningful Series-specific analysis of the sub-locations of injuries sustained by backs and forwards. Table 4, however, summarises the average results for the main and sub-locations of injuries sustained by backs, forwards and all players over the period 2011/12 to 2018/19.

Table 4: Locations of match injuries: 2011/12 to 2018/19 Sevens World Series.

Series / Location of injury	*Proportion, % (95% Confidence interval)*		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
Head/neck	21.3 (16.1 – 26.4)	26.9 (19.4 – 34.4)	23.3 (19.0 – 27.5)
Head/face	18.3 (13.4 – 23.2)	26.1 (18.7 – 33.6)	21.1 (17.0 – 25.3)
Neck/cerv[l] spine	2.9 (0.8 – 5.0)	0.7 (0 – 2.2)	2.1 (0.7 – 3.6)
Upper limbs	20.4 (15.3 – 25.5)	23.1 (16.0 – 30.3)	21.4 (17.2 – 25.5)
Shoulder/clavicle	7.5 (4.2 – 10.8)	11.9 (6.4 – 17.4)	9.1 (6.2 – 12.0)
Upper arm	0.8 (0 – 2.0)	0.0 (-)	0.5 (0 – 1.3)
Elbow	2.1 (0.3 – 3.9)	0.7 (0 – 2.2)	1.6 (0.3 – 2.9)
Forearm	1.3 (0 – 2.7)	2.2 (0 – 4.7)	1.6 (0.3 – 2.9)
Wrist	2.1 (0.3 – 3.9)	1.5 (0 – 3.5)	1.9 (0.5 – 3.2)
Hand/fingers	6.7 (3.5 – 9.8)	6.7 (2.5 – 11.0)	6.7 (4.2 – 9.2)
Trunk	6.3 (3.2 – 9.3)	9.0 (4.1 – 13.8)	7.2 (4.6 – 9.8)
Ribs/upper back	4.6 (1.9 – 7.2)	5.2 (1.5 – 9.0)	4.8 (2.6 – 7.0)
Abdomen	0.4 (0 – 1.2)	0.7 (0 – 2.2)	0.5 (0 – 1.3)
Low back	0.8 (0 – 2.0)	2.2 (0 – 4.7)	1.3 (0.2 – 2.5)
Sacrum/pelvis	0.4 (0 – 1.2)	0.7 (0 – 2.2)	0.5 (0 – 1.3)
Lower limbs	52.1 (45.8 – 58.4)	41.0 (32.7 – 49.4)	48.1 (43.1 – 53.2)
Hip/groin	1.3 (0 – 2.7)	3.0 (0.1 – 5.9)	1.9 (0.5 – 3.2)
Thigh, anterior	4.2 (1.6 – 6.7)	2.2 (0 – 4.7)	3.5 (1.6 – 5.3)
Thigh, posterior	5.4 (2.6 – 8.3)	6.0 (2.0 – 10.0)	5.6 (3.3 – 7.9)
Knee	21.7 (16.5 – 26.9)	14.2 (8.3 – 20.1)	19.0 (15.0 – 23.0)
L-Leg/Achilles	4.2 (1.6 – 6.7)	5.2 (1.5 – 9.0)	4.5 (2.4 – 6.7)
Ankle	12.9 (8.7 – 17.2)	9.0 (4.1 – 13.8)	11.5 (8.3 – 14.7)
Foot/toe	2.5 (0.5 – 4.5)	1.5 (0 – 3.5)	2.1 (0.7 – 3.6)

The majority of injuries sustained by both backs (52.1%) and forwards (41.0%) are located in the lower limbs. Overall, the knee (21.7%), head/face (18.3%) and ankle (12.9%) are the most common locations for backs. For forwards, the most common are the head/face (26.1%), knee (14.2%) and shoulder/clavicle (11.9%). Based on the 95% confidence intervals for each sub-category, there are no statistically significant differences in the sub-locations of injuries sustained by backs and forwards.

4.2d Type of injury

Similarly, there are too few injuries sustained during a single Series to provide a meaningful Series-specific analysis of the sub-types of injuries sustained by backs and forwards. Table 5 summarises the types of injuries sustained by backs, forwards and all players over the period 2011/12 to 2018/19.

Table 5: Types of match injuries: 2011/12 to 2018/19 Sevens World Series.

Series / Type of injury	*Proportion, % (95% Confidence interval)*		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
Bone	12.9 (8.7 – 17.2)	16.4 (10.1 – 22.7)	14.2 (10.6 – 17.7)
Fracture	10.4 (6.6 – 14.3)	14.9 (8.9 – 21.0)	12.0 (8.7 – 15.3)
Other bone	2.5 (0.5 – 4.5)	1.5 (0 – 3.5)	2.1 (0.7 – 3.6)
CNS/PNS	14.6 (10.1 – 19.0)	20.9 (14.0 – 27.8)	16.8 (13.1 – 20.6)
Concussion	12.9 (8.7 – 17.2)	19.4 (12.7 – 26.1)	15.2 (11.6 – 18.9)
Nerve	1.7 (0.0 – 3.3)	1.5 (0 – 3.5)	1.6 (0.3 – 2.9)
Joint (non-bone)/lig[t]	47.5 (41.2 – 53.8)	38.1 (29.8 – 46.3)	44.1 (39.1 – 49.1)
Dislocation/sublux[n]	5.8 (2.9 – 8.8)	7.5 (3.0 – 11.9)	6.4 (3.9 – 8.9)
Lesion meniscus	5.4 (2.6 – 8.3)	5.2 (1.5 – 9.0)	5.3 (3.1 – 7.6)
Ligament sprain	36.3 (30.2 – 42.3)	25.4 (18.0 – 32.7)	32.4 (27.6 – 37.1)
Muscle/tendon	22.9 (17.6 – 28.2)	23.1 (16.0 – 30.3)	23.0 (18.7 – 27.3)
Haematoma/etc	11.7 (7.6 – 15.7)	11.2 (5.9 – 16.5)	11.5 (8.3 – 14.7)
Muscle strain/etc	8.3 (4.8 – 11.8)	11.2 (5.9 – 16.5)	9.4 (6.4 – 12.3)
Tendon injury/etc	2.9 (0.8 – 5.0)	0.7 (0 – 2.2)	2.1 (0.7 – 3.6)
Skin	0.8 (0 – 2.0)	1.5 (0 – 3.5)	1.1 (0.0 – 2.1)
Abrasion	0.0 (-)	0.0 (-)	0.0 (-)
Laceration	0.8 (0 – 2.0)	1.5 (0 – 3.5)	1.1 (0.0 – 2.1)
Other injuries	1.3 (0 – 2.7)	0.0 (-)	0.8 (0 – 1.7)

CNS/PNS: Central and peripheral nervous systems

Joint (non-bone)/ligament injuries are the most common main injury type sustained by backs (47.5%) and forwards (38.1%). For backs, ligament sprain (36.3%), concussion (12.9%) and haematoma (11.7%) are the most common types of injury; while, for forwards, the most common are ligament sprain (25.4%), concussion (19.4%) and bone fracture (14.9%). Based on the 95% confidence intervals for each sub-category, there are no statistically significant differences in the sub-types of injuries sustained by backs and forwards.

Figure 9 shows trends in the incidence of concussion and the proportion of all injuries that were diagnosed as concussions over the period 2011/12 to 2018/19. Although there are a slight increases for both the incidence of concussion and the proportion of all injuries diagnosed as concussions during the 2018/19 Series, both values remain below the high levels recorded during the 2016/17 and 2017/18 Series.

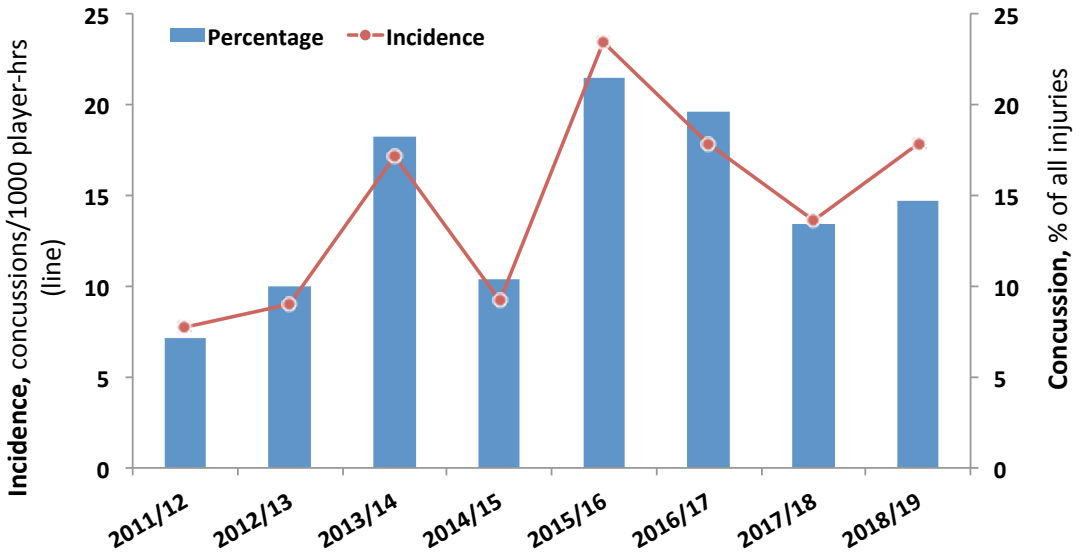

Fig 9. Incidence and percentage of concussions sustained in the period 2011/12 to 2018/2019.

4.2e Most common and highest risk injuries

Table 6 lists the five most common specific injuries sustained by backs and forwards over the period 2011/12 to 2018/19.

Table 6: Five most common injuries sustained by backs and forwards: Sevens World Series 2011/12 – 2018/19 (% of total number of injuries reported).

Backs		***Forwards***	
Injury	*%*	*Injury*	*%*
Concussion	13.0	Concussion	19.7
Knee MCL sprain	8.4	Hamstring muscle strain	5.3
Hamstring muscle strain	5.0	Shoulder dislocat^{n}/instability	4.5
Anterior cruciate ligament injury	4.2	Anterior cruciate ligament injury	4.5
Inf^{r} tib-fib syndesmosis injury	3.8	Hand/finger fractures	3.8
		Ankle lateral ligament sprain	3.8

The injuries listed in Table 6 represent 34% of all injuries sustained by backs and 42% of all injuries sustained by forwards.

Table 7 lists the five injuries resulting in the greatest injury burden (total days lost) for backs and forwards over the period 2011/12 to 2018/19.

Table 7: Five injuries resulting in the greatest injury burden (% of total reported days absence) for backs and forwards: Sevens World Series 2011/12 – 2018/19.

Backs		***Forwards***	
Injury	*Injury burden %*	*Injury*	*Injury burden %*
Anterior cruciate ligament injury	16.6	Anterior cruciate ligament injury	22.9
Knee MCL sprain	9.9	Concussion	7.8
Knee cartilage injuries	5.3	Hamstring muscle strain	7.7
Inf^{r} tib-fib syndesmosis injury	4.9	Shoulder dislocat^{n}/instability	5.7
Concussion	4.9	Lower leg fracture	3.5

The injuries listed in Table 7 are responsible for 42% of all days absence by backs and 48% of all days absence by forwards.

4.2f Nature of onset of injury

Table 8 summarises the nature of onset of injuries sustained in the period 2011/12 to 2018/19 by backs, forwards and all players.

Table 8: Nature of onset of injury: 2011/12 to 2018/19 Sevens World Series.

Series / Nature of onset	***Proportion, % (95% Confidence interval)***		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
Acute	94.6 (91.7 – 97.4)	94.8 (91.0 – 98.5)	94.7 (92.4 -96.9)
Gradual	5.4 (2.6 – 8.3)	5.2 (1.5 – 9.0)	5.3 (3.1 – 7.6)

Ninety-five per cent of all match injuries sustained are acute in nature. There is no statistically significant difference between the results for backs and forwards (p=0.936).

4.2g Cause of onset of injury

Table 9 summarises the cause of onset of injuries sustained in the period 2011/12 to 2018/19 by backs, forwards and all players.

Table 9: Cause of onset of injury: 2011/12 to 2018/19 Sevens World Series.

Series / Cause of onset	***Proportion, % (95% Confidence interval)***		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
Contact	88.5 (84.4 – 92.6)	88.5 (83.1 – 94.0)	88.5 (85.3 – 91.8)
Non-contact	11.5 (7.4 – 15.6)	11.5 (6.0 – 16.9)	11.5 (8.2 – 14.7)

Almost 90% of all injuries are the result of contact activities. There is no statistically significant difference between the results for backs and forwards (p=0.992).

4.2h Match events leading to injury

Table 10 summarises the specific match activities causing the injuries sustained by backs, forwards and all players in the period from 2011/12 to 2018/19.

Table 10: Match events leading to injury: 2011/12 to 2018/19 Sevens World Series.

Series / Cause of onset	*Proportion, % (95% Confidence interval)*		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
Collision	10.6 (6.7 – 14.6)	18.9 (12.3 – 25.6)	13.6 (10.1 – 17.1)
Kicking	0.9 (0 – 2.0)	0.0 (-)	0.5 (0 – 1.0)
Lineout	0.9 (0 – 2.0)	0.8 (0 – 2.2)	0.8 (0 – 1.7)
Maul	0.0 (-)	0.0 (-)	0.0 (-)
Ruck	9.8 (6.0 – 13.6)	7.6 (3.1 – 12.1)	9.0 (6.1 – 11.9)
Running	7.2 (3.9 – 10.5)	9.1 (4.2 – 14.0)	7.9 (5.1 – 10.7)
Scrum	0.0 (-)	0.8 (0 – 2.2)	0.3 (0 – 0.8)
Tackled	39.1 (32.9 – 45.4)	31.8 (23.9 – 39.8)	36.5 (31.6 – 41.4)
Tackling	28.1 (22.3 – 33.8)	27.3 (19.7 – 34.9)	27.8 (23.2 – 32.4)
Other	3.4 (1.1 – 5.7)	3.8 (0.5 – 7.0)	3.5 (1.7 – 5.4)

Being tackled (backs: 39.1%; forwards: 31.8%), tackling (backs: 28.1%; forwards: 27.3%) and collisions (backs: 10.6%; forwards: 18.9%) are the events responsible for most injuries to backs and forwards.

The most common activities leading to concussion injuries are tackling (backs: 45.2%; forwards: 34.6%), collisions (backs: 19.4%; forwards: 42.3%) and being tackled (backs: 22.6%; forwards: 34.6%).

4.2i Time of injury

Table 11 provides a summary of the period in a match when injury events take place as a function of playing position.

Table 11: Time that injuries are sustained during matches: 2011/12 to 2018/19 Sevens World Series.

Time of injury	*Proportion, % (95% Confidence interval)*		
	Backs	***Forwards***	***ALL players***
All Series (2011/12 – 2018/19)			
First half	37.3 (31.1 – 43.6)	43.4 (34.9 – 52.0)	39.5 (34.5 – 44.5)
Second half	62.7 (56.4 – 68.9)	56.6 (48.0 –65.1)	60.5 (55.5 – 65.5)

There are significantly (p=0.019) more injuries sustained in the second half compared to the first half of games (risk ratio: 1.7), which is similar to the situation reported for the men's Sevens World Series (Fuller et al., 2017).

4.2j Removal from play

During the 2018/19 Series, 39% of all injured players were immediately removed from play, 15% were removed later in the game and 46% completed the match. Over the period 2011/12 to 2018/19, the figures are immediately: 45%; later: 18%; completed the game: 37%.

For concussion, during the 2018/19 Series, 46% of players were removed from play immediately; 27% were removed later in the game; 27% completed the game. Over the period 2011/12 to 2018/19, the figures are immediately: 55%; later: 18%; completed the game:27%

4.3 Training injuries

Six time-loss training injuries (backs: 1; forwards: 5) were recorded during the 2018/19 Series. These injuries resulted from 5,453 (backs: 2,812; forwards: 2,641) player-training-hours, which equates to an incidence of injury of 1.1 injuries/1000 player-training-hours (backs: 0.4; forwards: 1.9).

The six time-loss training injuries were the result of – contact-rugby skills: 1; non-contact rugby-skills: 2; non-weights conditioning: 2; pre-match warm-up: 1.

Due to the small numbers involved, further analysis of the training injuries is not justified.

4.4 Illnesses

Two time-loss illnesses were recorded during the 2018/19 women's Sevens World Series (respiratory: 1; dermatological: 1). One illness occurred during a tournament and one while travelling home post-tournament.

Due to the small numbers involved, further analysis of the illnesses is not justified.

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