World Rugby

Surveillance Studies

Rugby Sevens 2020 Tokyo Olympics

Men's and Women's Tournaments
Final Report

Colin Fuller and Aileen Taylor

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Contents

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 Rugby Sevens reported the incidence and nature of injuries sustained during the men's Sevens World Series (Fuller and Taylor, 2020), women's Sevens World Series (Fuller and Taylor, 2021), men's 2009, 2013, 2018 Rugby World Cup Sevens and men's and women's 2016 Rio Olympics (Fuller et al., 2017). This report continues the on-going study of World Rugby Sevens competitions by reporting injuries sustained during the men's and women's Rugby-7s tournaments at the 2020 Tokyo Olympics.

It should be noted that, due to the health risks posed to players, team support staff, tournament support staff and spectators resulting from the 2020 Coronavirus pandemic, the men's and women's 2020 Tokyo Olympics Sevens tournaments were delayed and played over the period 26 to 31 July 2021.

2 Methods

Both 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 scheduled 2020 Olympics match or any training activity conducted in Japan in the 5-day period prior to the first scheduled match 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 the Orchard coding system (Orchard, 2010). Injury location, type and cause together with the events leading to the injuries were also recorded.

The definition of an illness used in this study was: *'Any medical condition sustained while travelling to the 2020 Olympic Tournament, while at the Olympic Tournament or while travelling home at the end of the Olympic 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 Olympic Rugby Sevens activities 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 he/she could undertake full, normal training and be available for match selection, whether or not he/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 the Tournaments to obtain their actual return to play date: the return to play dates for players with injuries/illnesses that remained unresolved 3 months after the final game in the 2020 Olympics were estimated on the basis of a 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).

Where appropriate, differences in players' anthropometric data were assessed using unpaired t-tests; differences in the incidences, mean severity and proportions of injuries were assessed 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. Where applicable, statistical significance was accepted at the $p \leq 0.05$ level, although it is recognised that this could identify some differences that occurred by chance, due to the number of statistical comparisons being made in the study. For some parameters, potential differences between competitions were assessed by comparing the 95% confidence intervals associated with the parameters for each sample population.

Results obtained at the Olympic Sevens tournaments were also compared with the average results previously reported for the women's 2012/13 to 2019/20 Sevens World series (SWS) (Fuller and Taylor, 2021) and the men's 2008/09 to 2018/19 SWS (Fuller and Taylor, 2020).

3 Data collection

The men's and women's 2020 Tokyo Olympics tournaments took place in Tokyo, Japan; the men's matches took place from Monday, 26th to Wednesday, 28th July 2021 and the women's matches from Thursday, 29th to Saturday, 31st July 2021.

Each team's medical staff was asked to explain the purpose of the injury surveillance studies to their squad of players. Players' baseline anthropometric information (playing position [back, forward]; date of birth; body mass [Kg]; stature [cm]) was recorded before the start of the tournaments.

Medical staff were asked to record injuries and illnesses sustained during the tournament on the World Rugby online Injury Surveillance Web App, with a member of the team's medical staff recording detailed information about each injury and illness reported (date of injury/illness, date of return to play, location and type of injury/illness, cause of injury/illness, event leading to injury/illness). All information entered on the ISS Web App was checked and followed up with team medical staff, if required.

4 Results

Results are presented separately for the men's and women's tournaments. When assessing the results presented in this report, it is essential to take into account that the overall match exposure levels and the numbers of injuries sustained during each of the tournaments were relatively small and, therefore, the confidence intervals reported for the results are wide. For this reason, the data have not been "over-analysed" by using too many sub-categories and, for some results, information for backs and forwards have been combined in order to provide more meaningful information.

4.1 Women's 2020 Olympic Sevens

Countries taking part in the women's 2020 Olympic Sevens were: Australia, Brazil, Canada, China, Fiji (Bronze medal), France (Silver medal), Great Britain, Japan, Kenya, New Zealand (Gold medal), Russian Olympic Committee, USA.

Of the 12 participating women's teams, listed above:

(i) All teams provided anthropometric data reports;

(ii) All teams apart from the Russian Olympic Committee team provided training exposure reports;

(iii) All teams apart from the Russian Olympic Committee team provided injury and illness reports.

4.1.1 Players' anthropometric data

Table 1 summarises the numbers and anthropometric data of players categorised as backs, forwards and all players who were registered for the 2020 Tokyo Olympics, together with the equivalent values for the 2016 Rio Olympics.

Table 1: Players' anthropometric data: 2016 Rio and 2020 Tokyo Olympics.

Tournament/ measure	**Mean** (*Standard deviation, number of players*)		
	Backs	***Forwards***	***ALL players***
2016 Rio Olympics			
Stature, cm	165.6 (5.3, 82)	169.5 (5.9, 66)	167.3 (5.9, 148)
Body mass, Kg	64.1 (5.6, 82)	69.2 (6.9, 66)	66.4 (6.7, 148)
Age, years	25.7 (3.8, 82)	26.8 (4.2, 65)	26.2 (4.0, 148)
2020 Tokyo Olympics			
Stature, cm	166.6 (5.3, 89)	170.7 (6.5, 67)	168.3 (6.2, 156)
Body mass, Kg	64.7 (5.2, 89)	71.0 (6.7, 67)	67.4 (6.7, 156)
Age, years	25.1 (3.4, 89)	26.5 (3.7, 67)	25.7 (3.6, 156)

At the 2020 Tokyo Olympics, forwards were significantly older (p=0.014), taller (p<0.001) and heavier (p<0.001) than backs. There were no statistically significant differences between the players' anthropometric measurements at the 2020 Tokyo Olympics compared to the 2016 Rio Olympics for backs (age: p=0.280; stature: p=0.219; body mass: p=0.465) or forwards (age: p=0.660; stature: p=0.267; body mass: p=0.126).

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), players competing at the 2016 Rio and 2020 Tokyo Olympics were slightly older (SWS: 24.1 years), slightly shorter (SWS: 169.0 cm) and slightly lighter (SWS: 68.4Kg).

4.1.2 Injuries and illnesses

The eleven women's teams returning full information sustained eleven match injuries (backs: 8; forwards: 3), no training injuries and no illnesses as a result of 62 team-games (backs: 57.9 player-match-hours; forwards: 43.4 player-match-hours; all players: 101.3 player-match-hours) and 989 player-training-hours. The detailed discussion presented below, therefore, refers solely to match injuries.

4.1.2a Incidence of match injuries

Table 2 summarises the number of match injuries, exposures and incidences of injuries at the 2020 Tokyo Olympics for backs, forwards and all players together, for comparison, with the corresponding incidences of match injuries sustained by backs and forwards during the 2016 Rio Olympics.

Table 2: Numbers, exposures (player-match-hours) and incidences (injuries/1000 player-match-hours, 95% confidence interval) of match injuries sustained at the 2016 Rio and 2020 Tokyo Olympics.

Tournament	*Backs*	*Forwards*	*ALL players*
2016 Rio Olympics			
Injuries	6	2	8
Exposure	64.3	48.2	112.5
Incidence	93 (42 – 208)	42 (10 – 166)	71 (36 – 142)
2020 Tokyo Olympics			
Injuries	8	3	11
Exposure	57.9	43.4	101.3
Incidence	138 (69 – 276)	69 (22 – 214)	109 (60 – 196)

Although the incidence of injury for backs was twice that for forwards at the 2020 Tokyo tournament, the difference was not statistically significant (p=0.308). There were also no significant differences between the incidences of injuries sustained at the 2020 Tokyo and 2016 Rio Olympics for either backs (p=0.465) or forwards (p=0.589).

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), the overall incidences of injury at the 2016 Rio and 2020 Tokyo Olympics were slightly lower than that for the SWS (106 injuries/1000 player-match-hours).

4.1.2b Severity of injury

Table 3 summarises the mean and median severities of all injuries sustained during the 2016 Rio and 2020 Tokyo Olympics.

Table 3: Mean and median severities of match injuries sustained at the 2016 Rio and 2020 Tokyo Olympics.

Tournament/ severity	***Severity (95% Confidence interval)**, days*		
	Backs	***Forwards***	***ALL players***
2016 Rio Olympics			
Mean	39 (17 – 61)	250 (-)	92 (23 – 162)
Median	29 (21 – 95)	250 (-)	33 (21 – 250)
2020 Tokyo Olympics			
Mean	141 (60 – 222)	79 (0 – 158)	124 (61 – 187)
Median	130 (10 – 318)	48 (29 – 159)	106 (17 – 268)

The severity values shown in Table 3, for both the 2016 Rio and 2020 Tokyo tournaments, should be interpreted with caution, as the numbers of injuries sustained in both competition were small; this is reflected in the 95% CIs. Although the 2020 Tokyo Olympics mean and median severity values of injuries sustained by backs were twice the values reported for forwards, the differences are not statistically significant (mean: p=0.285; median: p=0.683).

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), the mean and median severities of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics were higher than those for the SWS (mean: 53 days; median; 30 days).

4.1.2c Location and type of injury

The number of injuries sustained in a single Olympics tournament is too small to provide a meaningful tournament-based analysis of the sub-locations and sub-types of injuries sustained separately for backs and forwards.

Table 4 summarises the main locations of injuries sustained by ALL players at the 2020 Tokyo Olympics and compares the values with the results for the 2016 Rio Olympics.

Table 4: Main locations of match injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Location of injury	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	*2020 Tokyo Olympics*
Head/neck	12.5 (0 – 35.4)	9.1 (0 – 26.1)
Upper limbs	25.0 (0 – 55.0)	45.5 (16.0 – 74.9)
Trunk	0.0 (-)	0.0 (-)
Lower limbs	62.5 (29.0 – 96.0)	45.5 (16.0 – 74.9)

Based on the 95% CIs, there are no statistically significant differences between the main locations of injuries sustained at the 2020 Tokyo Olympics compared to the 2016 Rio Olympics.

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), there are no significant differences in the locations of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

Table 5 summarises the main types of injuries sustained by ALL players at the 2020 Tokyo Olympics and compares the values with the results for the 2016 Rio Olympics.

Table 5: Main types of match injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Type of injury	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	*2020 Tokyo Olympics*
Bone	12.5 (0 – 35.4)	18.2 (0 – 41.0)
C/PNS	12.5 (0 – 35.4)	9.1 (0 – 26.1)
Joint/non-bone/ligament	62.5 (29.0 – 96.0)	54.5 (25.1 – 84.0)
Muscle/tendon	12.5 (0 – 35.4)	18.2 (0 – 41.0)
Other	0.0 (-)	0.0 (-)

C/PNS: Central and peripheral nervous systems

Based on the 95% CIs, there were no statistically significant differences between the main types of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics. The types of injuries sustained at the 2020 Tokyo Olympics explains the reason for the high injury severity values (fractures: 2; joint dislocations: 2; ACL ruptures: 2). Only one concussion was reported during the 2020 Tokyo tournament.

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), there were no significant differences in the types of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

4.1.2d Nature and cause of onset of injury

Again, the number of injuries sustained in a single Olympics tournament is too small to provide a meaningful tournament-based analysis of the nature and cause of injuries sustained separately for backs and forwards.

Table 6 summarises the nature of onset of injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Table 6: Nature of onset of injury at the 2016 Rio and 2020 Tokyo Olympics.

Nature of injury	***Proportion, % (95% Confidence interval)***	
	2016 Rio Olympics	***2020 Tokyo Olympics***
Acute	87.5 (64.6 – 100)	90.9 (73.9 – 100)
Gradual onset	12.5 (0 – 35.4)	9.1 (0 – 26.1)

The majority of injuries sustained at both the 2020 Tokyo and 2016 Rio Olympics were acute in nature. There were no statistically significant differences between the results for the two tournaments (p=0.810).

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), there were no significant differences in the nature of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

Table 7 summarises the cause of onset of injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Table 7: Cause of onset of injury at the 2016 Rio and 2020 Tokyo Olympics.

Cause of injury	***Proportion, % (95% Confidence interval)***	
	2016 Rio Olympics	***2020 Tokyo Olympics***
Contact	83.3 (53.5 – 100)	50.0 (19.0 – 81.0)
Non-contact	16.7 (0 – 46.5)	50.0 (19.0 – 79.5)

Although there were nearly twice as many contact injuries sustained at the 2016 Rio Olympics compared to the 2020 Tokyo Olympics, the difference was not statistically significant (p=0.093).

Compared to previously published data for the women's SWS (Fuller and Taylor, 2021), there were no significant differences in the cause of onset of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

4.1.2e Match period of injury

Table 8 provides a summary of the periods during matches when injuries were sustained at the 2016 Rio and 2020 Tokyo Olympics.

Table 8: Period of match when injuries were sustained at the 2016 Rio and 2020 Tokyo Olympics.

Period of match	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	***2020 Tokyo Olympics***
First half	28.6 (0 – 62.0)	36.4 (7.9 – 64.8)
Second half	71.4 (38.0 – 100)	63.6 (35.2 – 92.1)

There were no statistically significant differences between the 2020 Tokyo and 2016 Rio Olympics results (p=0.734). Around twice as many injuries, however, were sustained in the second half of matches compared to the first half at both the 2020 Tokyo and 2016 Rio Olympics. This issue has been highlighted previously as an aspect of Rugby 7s tournaments (Fuller et al., 2016).

4.2 Men's 2020 Olympic Sevens

Countries taking part in the men's 2020 Olympic Sevens were: Argentina, Australia, Canada, Fiji, Great Britain, Ireland, Japan, Kenya, New Zealand, Republic of Korea, South Africa, USA.

Of the 12 participating men's teams, listed above:

(i) All teams provided anthropometric data reports;

(ii) All teams apart from Australia provided training exposure reports;

(iii) All teams apart from Australia and Fiji provided injury and illness reports.

4.2.1 Players' anthropometric data

Table 9 summarises the numbers and anthropometric data for players categorised as backs, forwards and all players at 2016 Rio and 2020 Tokyo Olympics.

Table 9: Players' anthropometric data: 2016 Rio and 2020 Tokyo Olympics

Tournament/ measure	**Mean** (*Standard deviation, number of players*)		
	Backs	***Forwards***	***ALL players***
2016 Rio Olympics			
Stature, cm	179.0 (6.2, 89)	187.7 (6.1, 63)	182.6 (7.5, 152)
Body mass, Kg	85.9 (7.9, 89)	97.1 (7.2, 63)	90.5 (9.4, 152)
Age, years	25.6 (3.4, 89)	26.3 (3.6, 63)	25.9 (3.5, 152)
2020 Tokyo Olympics			
Stature, cm	179.9 (6.3, 89)	186.6 (5.3, 67)	182.8 (6.8, 156)
Body mass, Kg	84.9 (7.2, 89)	95.8 (6.6, 67)	89.5 (8.8, 156)
Age, years	27.2 (3.7, 89)	27.2 (4.1, 67)	27.2 (3.8, 156)

At the 2020 Tokyo Olympics, forwards were significantly taller ($p<0.001$) and heavier (<0.001) than the backs but there was no difference in their ages ($p=1.000$).

Backs were significantly older ($p<0.001$) at the 2020 Tokyo tournament than at the 2016 Rio tournament. The increased age at the 2020 Olympic games may be related to the 1-year delay in the competition taking place. Backs were taller ($p=0.337$) but lighter ($p=0.379$) at the 2020 Tokyo tournament compared to the 2016 Rio tournament but the differences were not statistically significant.

Forwards were also older at the 2020 Tokyo Olympics compared to the 2016 Rio Olympics but the difference was not statistically significant ($p=0.187$). Forwards were shorter ($p=0.271$) and lighter ($p=0.285$) at the 2020 Tokyo tournament compared to the 2016 Rio tournament but the differences again were not significant.

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), the players competing in the 2016 Rio and 2020 Tokyo Olympics were older (SWS: 24.9 years), taller (SWS: 180.9 cm) and lighter (SWS: 91.8Kg) than players competing in the SWS.

4.2.2 Injuries and illnesses

The ten men's teams returning full information sustained twelve match injuries (backs: 7; forwards: 5), one training injury and no illnesses as a result of 56 team-games (backs: 52.3 player-match-hours; forwards: 39.2 player-match-hours; all players: 91.5 player-match-hours) and 849 player-training-hours. The one training injury sustained corresponds to an injury incidence of 1.2 injuries/1000 player-training-hours. The discussion below refers solely to the match injuries sustained.

4.2.2a Incidence of match injuries

Table 10 summarises the number of match injuries, exposures and incidences of injuries at the 2020 Tokyo Olympics for backs, forwards and all players together, for comparison, with the corresponding incidences of match injuries sustained by backs and forwards during the 2016 Rio Olympics.

Table 10: Numbers, exposures (player-match-hours) and incidences (injuries/1000 player-match-hours, 95% confidence interval) of match injuries sustained at the 2016 Rio and 2020 Tokyo Olympics.

Tournament	*Backs*	*Forwards*	*ALL players*
2016 Rio Olympics			
Injuries	11	3	14
Exposure	64.3	48.2	112.5
Incidence	171 (95 – 309)	62 (20 – 193)	124 (74 – 210)
2020 Tokyo Olympics			
Injuries	7	5	12
Exposure	52.3	39.2	91.5
Incidence	134 (64 – 281)	128 (53 – 307)	131 (75 – 231)

There was no statistically significant difference between the incidences of injuries sustained by backs and forwards at the 2020 Tokyo Olympics (p=0.936). There were also no significant differences in the incidences of injuries sustained between the 2020 Tokyo and 2016 Rio Olympics for either backs (p=0.610) or forwards (p=0.322).

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), the incidence of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics were similar to the incidence of injuries sustained in the SWS (122 injuries/1000 player-match-hours).

4.2.2b Severity of injury

Table 11 summarises the mean and median severities of all injuries sustained during the 2016 Rio and 2020 Tokyo Olympics.

Table 11: Mean and median severities of match injuries sustained at the 2016 Rio and 2020 Tokyo Olympics.

Tournament/ severity	***Severity (95% Confidence interval)**, days*		
	Backs	***Forwards***	***ALL players***
2016 Rio Olympics			
Mean	102 (45 – 159)	28 (12 – 44)	86 (38 – 134)
Median	53 (17 – 234)	27 (14 – 42)	40 (17 – 234)
2020 Tokyo Olympics			
Mean	30 (19 – 41)	108 (41 – 175)	63 (27 – 98)
Median	36 (5 – 47)	122 (19 – 213)	41 (19 – 122)

The severity values shown in Table 11, for both the 2016 Rio and 2020 Tokyo tournaments, should be interpreted with caution, as the total numbers of injuries sustained in both competition were small; this is reflected in the 95% CIs shown for backs and forwards. The 2020 Tokyo Olympics mean ($p=0.024$) and median ($p=0.042$) severity values of injuries sustained by forwards are significantly higher than those for backs. This was a consequence of three major injuries sustained by the forwards (shoulder dislocation, knee meniscus injury, knee ACL).

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), the mean and median severities of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics were greater those sustained during the SWS (mean: 43 days; median: 25 days).

4.2.2c Location and type of injury

The number of injuries sustained in a single Olympics tournament is too small to provide a meaningful tournament-based analysis of the sub-locations and sub-types of injuries sustained separately for backs and forwards.

Table 12 summarises the main locations of injuries sustained by ALL players at the 2020 Tokyo Olympics and compares these values with the results for the 2016 Rio Olympics.

Table 12: Main locations of match injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Location of injury	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	*2020 Tokyo Olympics*
Head/neck	14.3 (0 – 32.6)	41.7 (13.8 – 69.6)
Upper limbs	35.7 (10.6 -60.8)	8.3 (0 – 24.0)
Trunk	0.0 (-)	8.3 (0 – 24.0)
Lower limbs	50.0 (23.8 – 76.2)	41.7 (13.8 – 69.6)

Based on the 95% CIs, there are no statistically significant differences in the main locations of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics.

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), there were no statistically significant differences in the locations of injuries sustained during the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

Table 13 summarises the main types of injuries sustained by ALL players at the 2020 Tokyo Olympics and compares these values with the results for the 2016 Rio Olympics.

Table 13: Main types of match injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Type of injury	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	*2020 Tokyo Olympics*
Bone	14.3 (0 – 32.6)	0.0 (-)
C/PNS	14.3 (0 – 32.6)	41.7 (13.8 – 69.6)
Joint/non-bone/ligament	35.7 (10.6 – 60.8)	41.7 (13.8 – 69.6)
Muscle/tendon	35.7 (10.6 – 60.8)	8.3 (0 – 24.0)
Other	0.0 (-)	8.3 (0 – 24.0)

C/PNS: Central and peripheral nervous systems

Based on the 95% CIs, there were no statistically significant differences in the main types of injuries sustained at the 2016 Rio and 2020 Tokyo Olympics. The main injuries sustained at the 2020 Tokyo Olympics were concussion: 4 and ligament sprains: 3 (ankle-2, knee-1).

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), there were no statistically significant differences in the type of injuries sustained during the 2016 Rio and 2020 Tokyo Olympics compared to the SWS. Although reported concussions were higher, the difference was not statistically significant.

4.2.2d Nature and cause of onset of injury

The number of injuries sustained in a single Olympics tournament is also too small to provide meaningful tournament-based analyses of the nature and cause of injuries sustained for backs and forwards separately.

Table 14 summarises the nature of onset of injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Table 14: Nature of onset of injury at the 2016 Rio and 2020 Tokyo Olympics.

Nature of injury	***Proportion, % (95% Confidence interval)***	
	2016 Rio Olympics	***2020 Tokyo Olympics***
Acute	92.9 (79.4 – 100)	100 (-)
Gradual onset	7.1 (0 – 20.6)	0.0 (-)

The majority of injuries sustained at both the 2020 Tokyo and the 2016 Rio Olympics were acute in nature. There were no statistically significant differences between the two tournaments (p=0.347).

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), there were no statistically significant differences in the nature of injuries sustained during the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

Table 15 summarises the cause of onset of injuries sustained by ALL players at the 2016 Rio and 2020 Tokyo Olympics.

Table 15: Cause of onset of injury at the 2016 Rio and 2020 Tokyo Olympics.

Cause of injury	***Proportion, % (95% Confidence interval)***	
	2016 Rio Olympics	***2020 Tokyo Olympics***
Contact	85.7 (67.4 – 100)	83.3 (62.2 – 100)
Non-contact	14.3 (0 – 32.6)	16.7 (0 – 37.8)

Over 80% of all injuries sustained were due to contact events at both the 2020 Tokyo and 2016 Rio Olympics. There were no statistically significant differences between the two tournaments (p=0.865).

Compared to previously published data for the men's SWS (Fuller and Taylor, 2020), there were no statistically significant differences in the cause of injuries sustained during the 2016 Rio and 2020 Tokyo Olympics compared to the SWS.

4.1.2e Match period of injury

Table 16 provides a summary of the periods during matches when injuries were sustained at the 2016 Rio and 2020 Tokyo Olympics.

Table 16: Period of match when injuries were sustained at the 2016 Rio and 2020 Tokyo Olympics.

Period of match	*Proportion, % (95% Confidence interval)*	
	2016 Rio Olympics	***2020 Tokyo Olympics***
First half	50.0 (23.8 – 76.2)	33.3 (6.7 – 60.0)
Second half	50.0 (23.8 – 76.2)	66.7 (40.0 – 93.3)

Twice as many injuries were sustained in the second half of matches compared to the first half at the 2020 Tokyo Olympics: this issue has been highlighted at previous Rugby 7s tournaments (Fuller et al., 2016). The differences between the 2020 Tokyo and 2016 Rio results were no statistically significant (p=0.390).

5 Conclusions

The low match exposures and the corresponding small number of match injuries sustained in single Rugby Sevens tournaments preclude analysing and reporting detailed results separately for backs and forwards for all injury surveillance parameters. However, the values described for the men's and women's 2020 Tokyo and 2016 Rio Olympics, which are presented in this report, provide a good guide to the match injury risks associated with the men's and women's Olympic Sevens tournaments.

There were no statistically significant differences in the injury surveillance results obtained for the 2020 Tokyo Olympics compared to the 2016 Rio Olympics.

Averaged across the 2020 Tokyo and 2016 Rio Olympics, all injury surveillance parameter values fell within the ranges reported previously for the men's (Fuller and Taylor, 2020) and women's (Fuller and Taylor, 2021) Sevens World Series.

The high injury severity values observed at the Olympic competitions, compared to those reported previously for the Sevens World Series, should be noted.

6. References

Fuller CW, Molloy MG, Bagate C, et al. Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union. *Br J Sports Med* 2007;**41**;328-331.

Fuller CW, Taylor A, Raftery M. Should player fatigue be the focus of injury prevention strategies for international rugby sevens tournaments? *Br J Sports Med* 2016;50:682-7.

Fuller CW, Taylor A, Raftery M. 2016 Rio Olympics: an epidemiological study of the men's and women's Rugby-7s tournaments. *Br J Sports Med* 2017;51:1272-1278.

Fuller CW, Taylor A. Ten-season epidemiological study of match injuries in men's international rugby sevens. *J Sports Sciences* 2020;38:1595-1604

Fuller CW, Taylor A. Eight season epidemiological study of match injuries in women's international rugby sevens. *J Sports Sciences* 2021;39:865-874.

Orchard J, Rae K, et al., Revision, uptake and coding issues related to the open access Orchard Sports Injury Classification System (OSICS) versions 8, 9 and 10.1. *Open Access Journal of Sports Medicine* 2010: 1; 207-214.

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Argentina	Estanislao Salas	-
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Brasil	-	Beatriz da Silva Rodrigo
Canada	Andrew McMillian	Lori Silver
China	-	Kara Jane Fowke
Fiji	William Koong	Jennifer Khalik
France	-	Philippe Bordes
Great Britain	Alastair Little	Isobel Freeman
Ireland	Orla Armstrong	-
Japan	Masahiro Furudate, Kiyokazu Gotanda	Kiyokazu Gotanda
Kenya	Lamech Francis	Ben Mahinda
New Zealand	Damian Banks	Kate Niederer
Republic of Korea	Jae-Hong Kim	-
Russian OC	-	Alexander Borodin
South Africa	Hugh Everson	-
USA	Kevin Ng	Nicole Titmas