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A Temporal Comparative Study of Women's Rugby Injuries Presenting to an Emergency Department

S. Gilmartin, J. Ryan

Emergency Department, St Vincent's University Hospital, Elm Park, Dublin 4

Abstract

Aim
We aimed to examine the change in injury patterns, diagnostics and treatments provided to female rugby players in an emergency department between two separate seasons ten years apart.

Methods
A search was carried out on attendances from 01/07/2007 to 30/06/2008 and from 01/07/2017 to 30/06/2018. The records of females presenting following rugby injuries were studied to establish demographics, investigations used, injury suffered and definitive care.

Results
There was a 242.9% increase in attendances with women's rugby injuries. There were increases in high impact injuries: dislocations (0% vs 2.8%), wounds (4.8% vs 6.3%) and concussions (2.4% vs 10.4%). Ct scans are utilised more (2.4% vs 6.9%). Follow up has changed with increased specialist opinion with team physicians (0% vs 7.7%), hand clinics (4.8% vs 9.0%) and concussion clinics (0.0% vs 6.9%).

Discussion
Women's rugby injury presentations are increasing. We have seen a rise in significant injuries. Patients now require first level diagnostics and specialist follow up care.

Introduction

Women's rugby is a rapidly growing sport[1]. Following multiple initiatives launched by the Irish Rugby Football Union (IRFU), participation levels in Ireland have grown in line with worldwide rate of growth. Current reports note that over 50% of clubs now have a women's section[2]. This is in keeping with an overall increase in the number of women participating in sport in Ireland[3]. The growing popularity of women's rugby in Ireland was demonstrated by the successful hosting of the 2017 women's world cup. Following this the IRFU has released their 'women in rugby' action plan[4]. This reported 1,341 adult players nationally with 2,500 active youth players. The IRFU is planning to increase participation and coaching numbers by 20% over the next five years. Despite the rapid expansion in playing numbers the sport continues to lag behind its men's counterpart in terms of medical research. There is a dearth of published data studying women's rugby injuries and injury epidemiology [5,6], with only one reporting on the role emergency departments play in their care[7].

The IRFU in conjunction with the University of Limerick are pioneering women's rugby injury research with the development of the Irish Rugby Injury Surveillance (IRIS) study[8,9]. The IRIS study aims to measure the long term injury incidence and trends in both men's and women's amateur rugby union in Ireland. The study is surveillance in nature and does not record medical treatment received.

St Vincent's university hospital is located on the south side of suburban county Dublin. There are twelve women's rugby clubs in the hospital's immediate catchment area[10]. The last review of rugby injuries presenting to our department in 1992 reported only one presentation secondary to women's rugby participation[11]. The aim of this study is to describe the change in injury patterns, diagnostics used and treatments provided to women's rugby players in our emergency department between two seasons ten years apart.

Methods

St Vincent's university hospital is a tertiary referral centre located in south Dublin. The emergency department sees 55,000 new patients per year. The electronic patient tracking system 'MAXIMS©' was used to identify patients. Triage notes were searched for variations of the word 'Rugby' in order to maximise patients captured. The search words used were 'Rugby' 'Ruby', 'Rguby', 'Rugb' and 'Rugbie'. This search was performed on all patients' triage notes attending from 1st of July 2007 to 30th of June 2008 and from 1st of July 2017 to 30th June 2018. We chose these dates as it follows the pattern of the winter rugby season. Female patients presenting with injuries secondary to rugby participation were identified. The medical notes and radiology records of patients were studied in order to establish patients' age, type of rugby played, imaging used, laboratory investigations performed, injury suffered and definitive care provided. The two twelve month periods were compared to establish changes in patient characteristics, injury patterns and treatment plans over the past decade. For the purpose of coding, any patient diagnosed with bruising, sprain or soft tissue injury were categorised as 'soft tissue injuries'. Patients diagnosed with specific soft tissue injuries such as ACL tears, meniscal tears or tendon injuries were classified as other due to low frequency (less than 1%). In the event of a fracture, where the diagnosis recorded in patient notes differed from the radiology report, the radiology report was accepted as the correct diagnosis.

Data was recorded and analysed using Microsoft excel. Chi-Square test was used to assess statistical significance with a confidence interval of 95%. Ethics approval was approved by the local ethics committee.

Results

There were 42 presentations with injuries sustained while playing women's rugby between July 2007 and June 2008. This compares to 144 presentations between July 2017 and June 2018 (Table 1). The average age of players in 2007/08 was 27.1 years compared to 25.6 ten years later. In 2007/08 66.7%(28) of presentations were as a result of participation in tag rugby compared to 33.3%(14) rugby union and no patients presented following participation in rugby sevens. Ten years later 25.7%(37) of injuries were as a result of tag rugby, 72.9%(103) rugby union and 1.4%(2) rugby sevens.

Table 1.

	2007/08 (n)	2017/18 (n)	P-value
Attendances(n)	42	144	-
Mean age(years)	27.1	25.6	0.11
Tag	66.7%(28)	25.7%(37)	<0.05
Rugby Union	33.3%(14)	72.9%(105)	<0.05
Rugby Sevens	0%(0)	1.4%(2)	0.44

With regards to investigations performed (Table 2), 76.2%(32) of patients attending over the first period (2007/08) underwent an x-ray, 19% (8) had no investigations performed, one patient (0.2%) had a CT, one patient had an MRI and another patient had an ECG and laboratory investigations. In 2017/18 72.2%(104) of patients had a x-ray performed, 15.8% (23) had no investigations, 6.9% (10) had a CT scan, 4.7%(7) underwent a Sport Concussion Assessment Tool(SCAT), 2.1%(3) had a MRI scan performed, two patients underwent laboratory investigations, one patient had a urinalysis and one patient had an ultrasound scan performed.

Table 2.

Investigation	2007/08 (n=42)	2017/18 (n=144)	P-value
X-ray	76.2%(32)	72.2%(104)	0.61
CT Scan	2.4%(1)	6.9%(10)	0.28
MRI	2.4%(1)	2.1%(3)	0.91
SCAT	0%(0)	4.7%(7)	0.15
Laboratory investigations	2.4%(1)	1.4%(2)	0.65
ECG	2.4%(1)	0%(0)	0.06
Ultrasound	0%(0)	0.7%(1)	0.59
Urinalysis	0%(0)	0.7%(1)	0.59
No Investigation	19.0%(8)	15.8%(23)	0.62

In terms of the injuries sustained(Table 3), soft tissue injuries and fractures are the most common injuries in both study groups 52.4%(22) vs 40.3%(58) and 30.0%(13) vs 29.9%(43) respectively. In the first study period 4.8%(2) of patients had wounds, one patient had a concussion and 4.8% of injuries were classified as 'other'. No patient attended with a dislocation. During the second study period

wounds accounted for 6.3%(9) of injuries, concussion 10.4%(15), dislocations 2.8%(4) and 6.3% of patients were classified as 'other'. No final diagnosis was available for 4.8%(2) of patients in the first study period and 4.9%(7) of the second.

Table 3.

Injuries	2007/08(n=42)	2017/18(n=144)	P Value
Soft tissue	52.4%(22)	40.3%(58)	0.17
Fracture	30.0%(13)	29.9%(43)	0.99
Wounds	4.8%(2)	6.3%(9)	0.72
Concussion	2.4%(1)	10.4%(15)	0.11
Dislocation	0.0%(0)	2.8%(4)	0.27
Other	4.8%(2)	6.3%(9)	0.72
No diagnosis/did not wait	4.8%(2)	4.9%(7)	0.99

Table 4. illustrates the definitive care plans for patients attending the emergency department during the two time periods. Self-care and fracture clinics are the most common discharge plans for both periods. During the second period patients received follow up from team doctors (7.7%) and the concussion clinic (6.9%). There were no patients followed up in such a manner during the first study period

Table 4.

Definitive care	2007/08(n=42)	2017/18(n=144)	P-value
Self-Care	47.6%(20)	29.2%(42)	<0.05
Fracture clinic	26.1%(11)	13.8%(20)	0.06
Surgery	11.9%(5)	12.5%(18)	0.92
ED Review clinic	4.8%(2)	14.6%(21)	0.09
Hand clinic	4.8%(2)	9.0%(13)	0.38
Physio	2.4%(1)	2.1%(3)	0.91
Other(neuro/GP)	2.4%(1)	4.2%(6)	0.59
Team Doctor	0.0%(0)	7.7%(11)	0.07
Concussion clinic	0.0%(0)	6.9%(10)	0.08

Discussion

We hypothesized that there would be an overall increased in presentations to the emergency department secondary to women's rugby injuries. Our results have shown a 242.9% increase in women's rugby related injuries between the two study periods. This increase is due to a rise in presentations from tag rugby (32.1%), rugby union (650%) and sevens rugby. The increase in rugby union presentations has seen an expectant rise in high impact injuries including

dislocations (0% vs 2.8%), wounds (4.8% vs 6.3%) and concussions (2.4% vs 10.4%). These figures are in line with the IRIS study which reports concussion as the most frequent injury suffered by women's amateur players (11%)(9).

There has been a five-fold increase in patients being diagnosed by concussion. These figures are likely influenced by increased research and interest surrounding concussion over the last ten years[12]. There has been an exponential rise in SCAT 5 diagnostic tool usage among patients presenting with a head injury (0% vs 4.7%)[13,14]. Despite this, eight patients were given a final diagnosis of concussion without having ever having a SCAT performed. The rise in concussion diagnosis adds to the growing concerns for player safety in both woman's and men's rugby. Locally in our emergency department, the increase in concussion presentations has seen the introduction of a consultant delivered concussion clinic. This clinic ensures supervised recovery and return to activity for these patients. The concussion clinic provided ongoing care to seven per cent of all rugby related female presentations to our department during the season of 2017/18.

We have seen a rise in CT use from 2.4% to 6.9%. This is possibly secondary to the increase in rugby union related injuries which will result in a larger proportion of high impact injuries involving the head and neck[9]. Up to date guidelines would advise the prompt use of CT Scanning in the diagnosis of these injuries[15]. The general use of CT scans has also increased over the past decade as the modality becomes more widely available[16], this has likely contributed to the increased use of CT in our study population.

The definitive care plans of patients studied are becoming more specialised over the past decade. The rate of patients discharged to 'self-care' fell by 38.7% over the ten year period (47.6% vs 29.2%)($p < 0.05$). There was also a decrease in patients followed up in the local fracture clinic (26.1% vs 13.8%), this is despite the rate of fractures remaining unchanged (30.0% vs 29.9%). Alternatively there is an increased proportion of patients being followed by team physicians (0% vs 7.7%), therapy led hand clinics (4.8% vs 9.0%) and our weekly ED review clinics (4.8% vs 14.6%) which are now led by sports and exercise medicine specialists. As women's rugby becomes increasingly competitive and technical, the demand for specialist medical expertise will likely continue to rise further.

This is the first study of its kind examining women's rugby presentations to an emergency department. It is clear that patients are now presenting with rugby injuries which require specialist resources. This injury surveillance provides an excellent overview of the burden these injuries can place on our services and how increasing patient numbers require an improved availability of diagnostics and specialist definitive care. This will allow us to plan for the future resource and personnel requirements in our department.

Limitations of this study are that it was retrospective and observational in nature. We only reviewed women's rugby injuries and as a result did not account for other sports presentations. Examining this would ensure the increased presentations from rugby related injuries are not secondary to an associated decrease in female presentations from other sports. This is unlikely due to the already mentioned national rise in female sport participation in general[3]. The second time period involved the hosting of the women's rugby world cup groups stages nearby in University College Dublin. This will have affected the results in terms of presentations and definitive care. Although an increase in games played in the area would see an expectant rise in emergency department attendances, the fact that each team may have had an experienced medical team pitch side will have resulted in many injuries being treated on site and hence avoiding emergency department attendance. Finally our results are likely to be an underestimation of exact figures. The key words may not have been documented in the patients triage notes and as a result we likely missed some presentations following women's rugby injuries.

Going forward we aim to monitor presentations on a yearly basis to examine if the increasing trends continue. We also aim to perform a study comparing presentation from women's rugby to their male counterparts. The latest IRIS project report from 2017/2018 season[9] shows similar injury rates between the women's (46.2) and men's (49.7) games (injuries per 1,000 player hours). Differences are seen in the type of injuries suffered. Concussion is the most frequent injury in the men's game and anterior talo-fibuar ligament is the most frequent in the women's game. It will be interesting to see if these results are mirrored by presentations to the emergency department.

In conclusion, presentations to our emergency department secondary to women's rugby injuries are increasing. We have seen a rise in significant injuries including concussion. This will be a growing problem going forward as women's rugby continues to develop in Ireland. Patients require first level diagnostics and specialist follow up care. It is important that all emergency departments are prepared to care for the increasing level of attendances secondary to high impact female sports injuries.

Declaration of Conflicts of Interest:
The authors have no conflicts of interest to declare.

Corresponding Author:
Stephen Gilmartin,
Emergency Department,
St Vincent's University Hospital,
Elm Park,
Co. Dublin
Email: gilmartinstephen@gmail.com

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