RFU Community Rugby Injury Surveillance Project

CRISP 2012-2013

Season Report

Contents

1. EXECUTIVE SUMMARY

Overall findings

- The **overall injury rate in community rugby during season 2012-2013 is stable** compared with previous seasons.
- The **injury rate within community rugby is higher at higher playing levels.**
- Time-loss injury rates in men's senior community rugby are **lower than those reported for Premiership rugby** and schools and youth.
- **On average three players per club will be unavailable for match play each week throughout the season due to injury.**

Key injury prevention messages

The Knee:

- Incurs **more injuries than any other body site** but also the most matches missed.
- Functional movement screening is being carried out understand more about how player movement control may affect the risk of injury the lower limbs.

The Tackle:

- Is the most common contact event in match play and most common injury event accounting for 54% of all injuries but also **carries the greatest risk of injury per event** (2.3 injuries per 1000 events).
- Good tackle technique is a pivotal area for reducing injuries.

Collisions (**illegal tackles involving a shoulder charge)*:***

- Are fewer in number compared with legal tackles but **have the greatest risk of injury per event.**
- There is a need for strict law enforcement in the event of these tackles.

Concussion:

- **One for every 45 team matches** of which **76% were sustained in the tackle.**
- Future video analysis of the tackle can help to determine characteristics of head placement during the tackle and whether technique may be optimised

The CRISP project webpages - http://go.bath.ac.uk/rfu-crisp - contain:

- Information for new and existing clubs
- Previous CRISP annual reports, club feedback examples and scientific publications
- Priority areas identified for injury prevention
- RFU and IRB coach education and injury prevention resources

Future directions

Tackle analysis

- To further our understanding of injury risk factors for injury in the tackle, the use video analysis can be explored to understand more about head positioning in the tackle.
- This work can inform strategies which may be used to reduce head impacts in the tackle.
- Video analysis can also be used to assess referee decisions in relation to illegal tackle technique.

New Scrum laws:

- Only 5% of scrums collapsed but for these, the risk for injury was four times higher (2.9 injuries/1000 events) and the severity was six times greater (22 weeks missed/1000 events) than for non-collapsed scrums.
- Recent changes in scrum laws have been implemented to make the scrum safer across all levels of the game. As such, the injury information captured during the season 2013-2014 will be used as part of the evaluation of the effect of these law changes on injuries in the community game.

Functional movement control and fitness:

- The Functional Movement Screening which was started during 2012-2013 will be continued to increase the number of players who have been assessed.
- In addition, during the 2013-2014 testing programme, players will also be assessed for physical fitness (speed, agility, strength, power and endurance). These tests will help to build a more complete profile of the physical characteristics of community rugby players.
- The aim of future work will be to combine information on functional movement control and fitness attributes of community players with the on going injury surveillance data to investigate potential links between these characteristics and a player's risk of injury.
- Understanding **potential risk factors for injury will help to guide future injury management and prevention strategies** with the ultimate aim of improving the physical preparation and reducing the risk of injury in community players.

2. INTRODUCTION

There is growing understanding of the nature of match injuries which occur in rugby union. However, the research conducted to date in the English game has focussed on injuries which have occurred at International and Premiership levels. While detailed information is available for Premiership rugby via annual injury surveillance reports, it may not be appropriate to assume that these injury patterns reflect those in the Community game. Some of the different player and match characteristics which exist between Premiership and Community levels may influence injury type and frequency. However, it is also possible that within RFU levels 3-9 there will be a range of playing abilities and possibly scope for differing injury patterns.

In order to provide information specific to the Community game, a programme of injury surveillance has been established which caters for this range of playing levels. The Community Rugby Injury Surveillance Project (CRISP) is managed by a team at the University of Bath and funded by the RFU Injured Players Foundation on behalf of Community Rugby as part of a commitment by the RFU to reduce injuries within rugby. The Project involves the collection and analysis of information on injuries which occur during 1st XV matches in RFU playing levels 3-9.

The Project has now been in existence for four seasons, during which time the number of injuries reported by club personnel has accumulated to provide greater certainty of the injury patterns which occur and we are confident that we have established a sample that provides robust information each year.

The purpose of this research project is to firstly identify injury patterns within community rugby to understand more about such factors as the number of injuries occurring, the type of injuries, and how they happen. This information can help to inform possible intervention strategies for particularly common or severe injuries and to provide guidance on strategies for medical provision within clubs.

2.1. Methods and definitions

This report provides a summary of the Community Rugby Injury Surveillance Project (CRISP) data for the 2012-2013 season. For the purposes of comparisons between different levels of community rugby, playing levels were grouped as follows:

Group	RFU Levels	Number of clubs (2012-2013)
A	3,4	8
B	5,6	17
C	7,8,9	25

All clubs participated in this Project voluntarily having responded to advertisement material. Only injuries sustained during match play were reported with medical personnel at each club submitting the following information for each 1st team match:

Time-loss injury information

A time-loss injury was defined as one which caused the injured player to miss at least one match (eight days or greater absence from playing). This injury information is presented in Section 3 of the report.

Definitions

Injury incidence

Time-loss injury data is presented as the number of injuries per 1000 player-hours of match exposure. This is a standardised method of presenting injury information so that data can be compared between different groups with a different number of matches. It is calculated by:

$$Injury\ Incidence = \left(\frac{Number\ of\ Injuries}{Number\ of\ matches \times number\ of\ players\ (15) \times match\ duration\ (1.33\ hours)} \right) \times 1000$$

Injury severity

In this study, the severity of the injury is recorded in terms of the amount of time that the player is absent from match play (number of matches missed). For time-loss injuries in this study, a minimum of one match will have been missed while injuries are also classified as 'moderate' (between one and three matches missed), 'severe' (four or more matches missed) and career ending.

Recurrent injury

A recurrent injury is one of the same site and same type as the original injury and occurs after the player has made a full return to match play following the original injury.

Statistical significance

In this report, a result is deemed to be significant if the probability that the result has happened by chance is less than 5%. The use of 95% confidence intervals (CI) provides an estimate of reliability of the value (i.e. small intervals means a very reliable estimate).

All methods and definitions used in this study comply with those outlined in the IRB consensus statement for injury definitions and data collection procedures for studies of injuries in rugby union.

3. TIME-LOSS INJURY INFORMATION

3.1. Time-loss injuries – Summary

For the 2012-2013 season, information from 1202 matches was included, in which 399 time-loss injuries were reported (i.e., injuries resulting in 8 days or greater absence from match play). The injury incidence is compared with previous seasons in Table 3.1 and Figure 3.1, and shows no significant change over time. Table 3.2 shows that the injury rate during 2012-2013 in Group A is greater than Groups B and C. This finding is consistent with seasons 2009-2010, 2010-2011 and 2011-2012.

Table 3.1. Match injury incidence and severity for time-loss injuries over seasons.

	Total number of player match hours	Total number of match injuries	Injuries per 1000 player hours (95% CI)	Injuries per club per match	Number of matches for one injury	Average severity (matches missed)
2009-2010	22540	385	17.1 (15.4-18.8)	0.3	2.9	6.1
2010-2011	32820	539	16.4 (15.0-17.8)	0.3	3.0	7.0
2011-2012	37100	645	17.4 (16.0-18.7)	0.3	2.9	6.5
2012-2013	24040	399	16.6 (15.0-18.2)	0.3	3.0	7.0
2009-2013	**116500**	**1968**	**16.9 (16.1-17.6)**	**0.3**	**3.0**	**6.8**

Table 3.2. Match injury incidence and severity for time-loss injuries between playing levels

2012-2013 Groups						
Group A	4100	81	19.8 (15.5-24.1)	0.4	2.5	6.1
Group B	8080	132	16.3 (13.5-19.1)	0.3	3.1	7.9
Group C	11860	186	15.7 (13.4-17.9)	0.3	3.2	6.4

The information presented in Table 3.1 and Figure 3.1 demonstrates that the the overall injury rate over the four seasons has not changed. Minor differences can be accounted for through natural variation from season to season and do not indicate a trend in any direction.

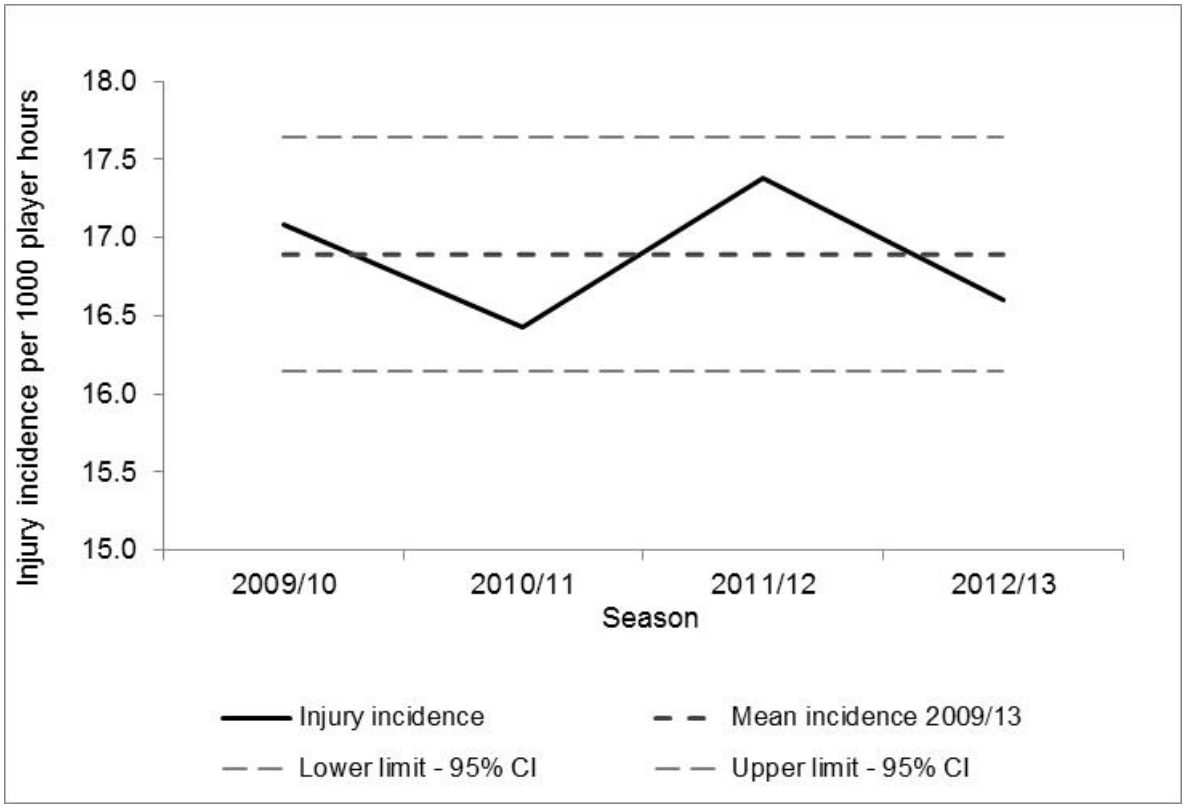

Figure 3.1. Injury incidence for CRISP over four seasons compared against the average for all seasons. Lower and upper 95% confidence intervals represent boundaries within which there is a 95% chance that the true value lies.

While there are some differences within different levels of community rugby, the overall injury rate is considerably lower than that of International and Premiership rugby for injuries of the same severity definition as shown in Figure 3.2.

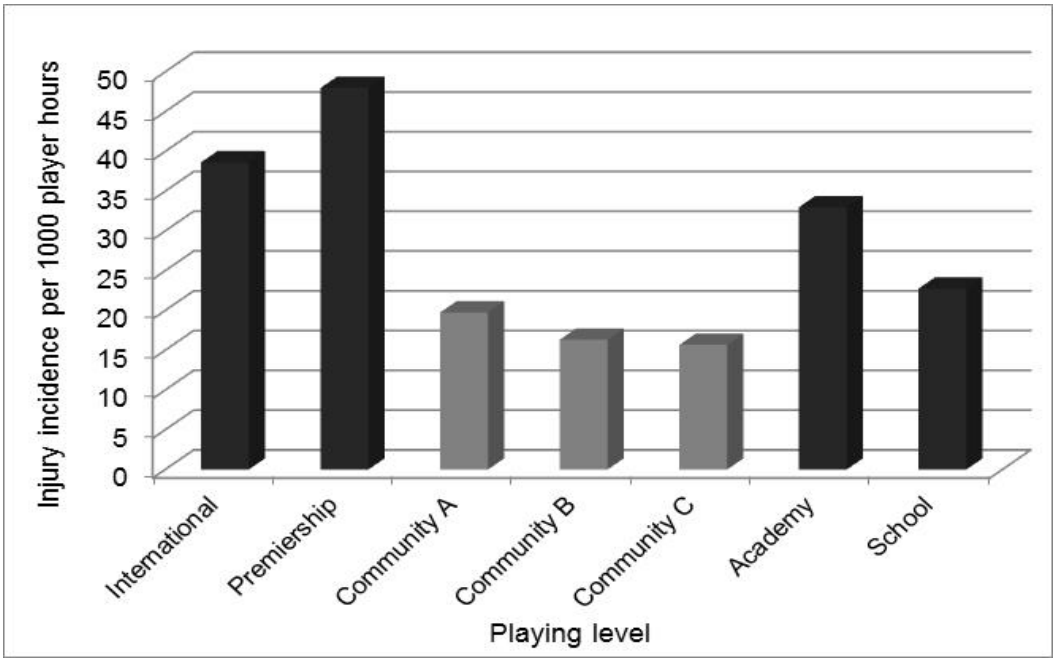

Figure 3.2. A comparison of injury rates for different levels of community rugby with elite level and schools rugby.

Data sources: Community levels A, B and C are taken from the 2012-2013 findings of the current report. International data has been extracted from a previous publication (Fuller C.W. et al, Br. J. Sports Med. 2008, 42: 452-459) and Premiership data is taken from the England Rugby Premiership injury and training audit 2011-2012 Season Report. Information on academies and Schools derives from the Game wide report on injury risk in English youth rugby over seasons 2006-2007 and 2007-2008 (published by the University of Bath/RFU, April 2011).

3.2. Severity of injury

Table 3.3. Mean number of matches missed per time-loss injury during the 2012-2013 season.

	All	Group A	Group B	Group C
Mean number of matches missed	7.0	6.1	7.9	6.4

Clubs in Group C are likely to have at least two players unavailable each week due to injury, while clubs in Groups A (due to a higher incidence than Group C) and B (due to a higher severity than Group C) are likely to have an average of three players unavailable each week due to injury.

Figure 3.3 shows that the higher injury rate in Group A clubs compared with Groups B and C is due mainly to the higher injury rate for injuries lasting greater than 28 days.

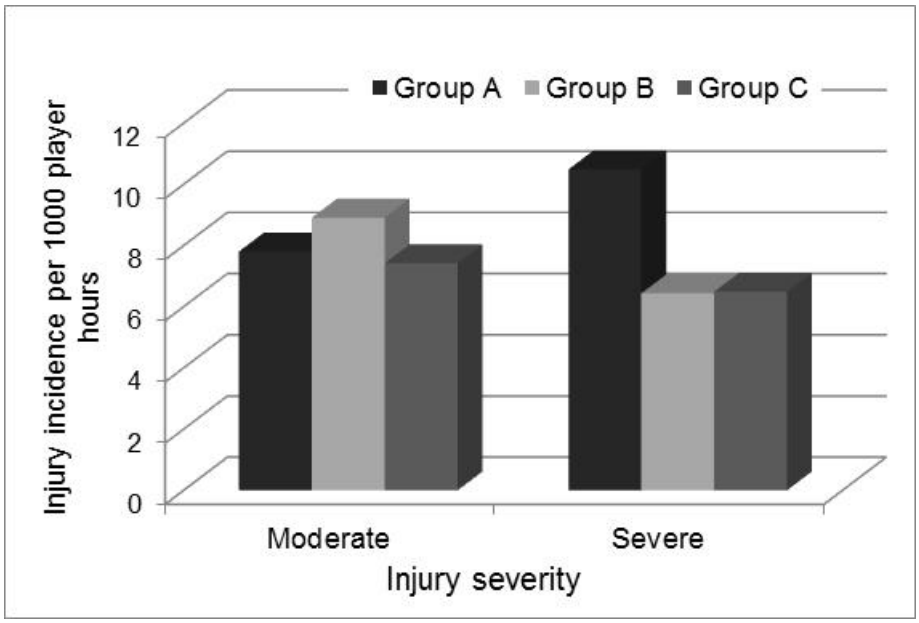

Figure 3.3. Group comparison for injury severity for 2012-2013 season. Moderate (8-28 days absence), Severe (> 28 days absence).

Further information for time-loss injury severity:

- For all clubs combined, 52% of time-loss injuries were classed as moderate (lasting between 8-28 days) and 48% were severe (lasting greater than 28 days).
- Career ending injures comprised only 1% of all time-loss injuries.
- No catastrophic injuries (including serious spinal cord injuries, traumatic brain injury or fatalities) were reported during the season for the clubs involved in this study.
- The injured player was removed from play for 85% of all time-loss injuries
- 18 (5%) injuries required an ambulance (12 for forwards; 6 for backs). Therefore an ambulance was used for one in every 67 matches.
- 108 (27%) injuries were referred to a hospital. This equates to a player being referred to hospital with an injury, 1 in every 11 matches. 32 (8%) injuries required surgery.

3.3. Injury recurrences

Overall, injuries reported as recurrent (those of the same site and injury diagnosis) accounted for 19% of all time-loss injuries. There were no differences in recurrent injuries between groups (Figure 3.4) with the higher overall injury incidence in Group A compared with Groups B and C being attributable to new (non-recurrent) injuries.

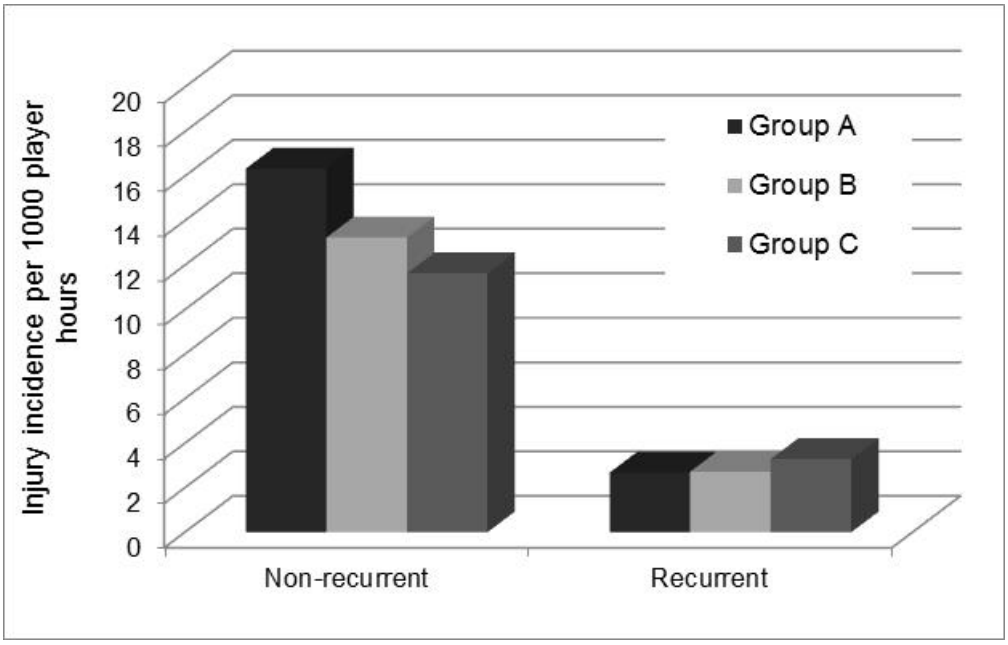

Figure 3.4. Comparison between groups for non-recurrent and recurrent time-loss injuries.

Severity: There was no difference in the severity of injury for recurrent (7.0 matches missed) and non-recurrent (7.1 matches missed).

Body site: 61% of recurrent injuries were in the lower limb (knee: 21%; thigh: 18%; ankle: 11%) with the shoulder accounting for 25% of recurrent injuries.

3.4. Site of Injuries

The most commonly injured body site is the knee, followed by the shoulder, ankle, head and thigh (Figure 3.5). Knee injuries also account for the most days lost to injury due to the high severity (matches missed) of injuries to this site (Table 3.4).

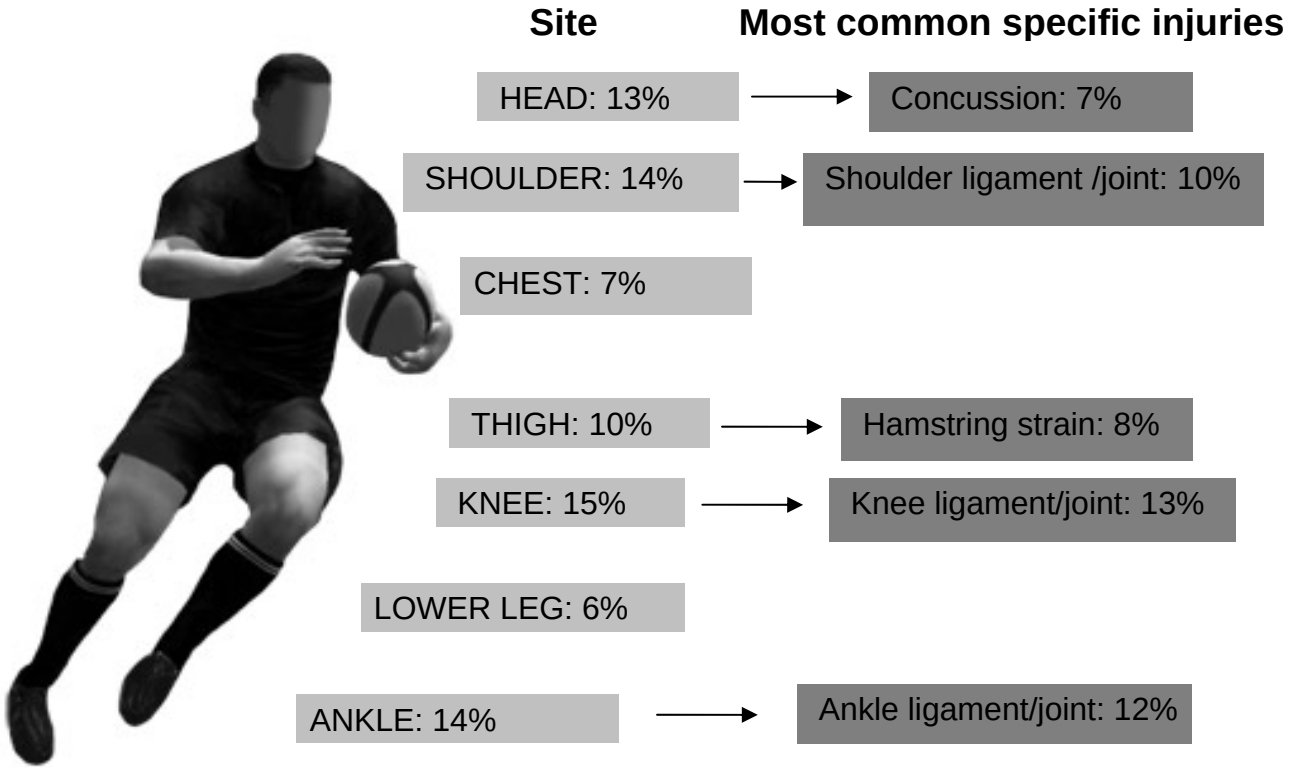

Figure 3.5. The most common injury sites and specific injuries for all time-loss injuries in 2012-2013.

When injured body sites are grouped into regions, Figure 3.6 demonstrates that collectively, the lower limb accounts for the most injuries while also showing that the higher overall injury rate in Group A compared with B and C clubs is largely due to a higher rate in upper limb injuries.

This may be linked to the finding in Section 5 which shows that there are more tackles per match in Group A, and that that there is a higher risk of injury per tackle in this group compared with B and C. In addition, the tackle is the main cause of shoulder injury.

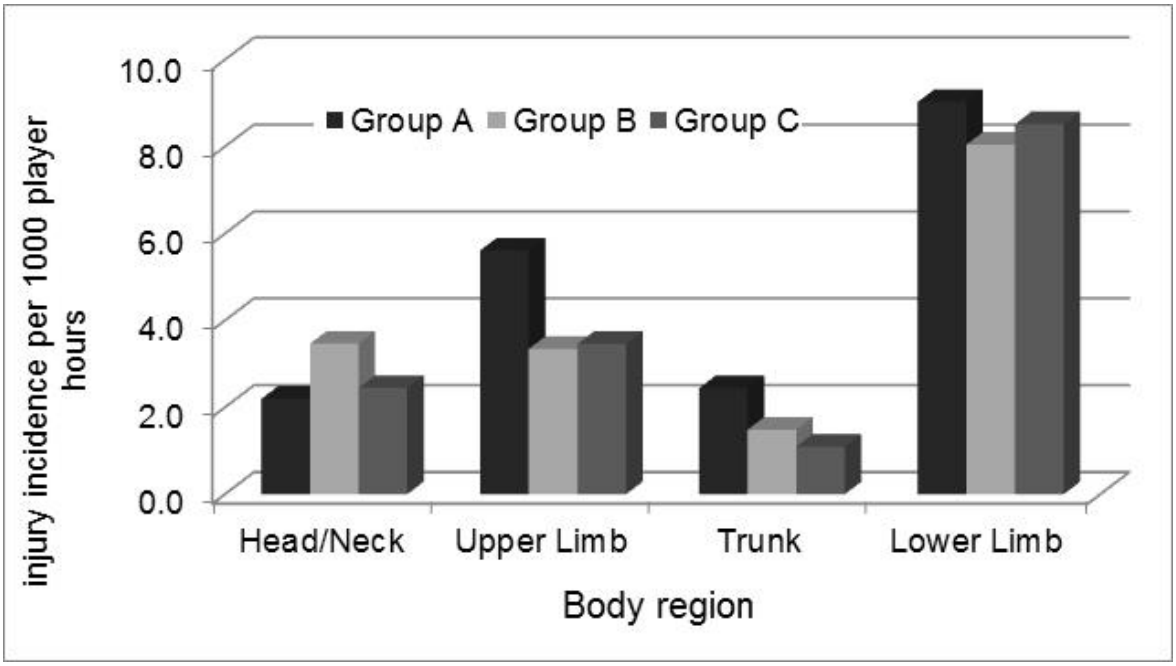

Figure 3.6. Group comparison for injuries according to body region for all time-loss injuries in 2012-2013.

3.5. Type of injury

The most common injury types in community rugby are those associated with joint/ligament damage (Figure 3.6). There is a higher incidence of this injury type in Group A compared with Groups B and C which largely accounts for the higher overall injury rate in this group.

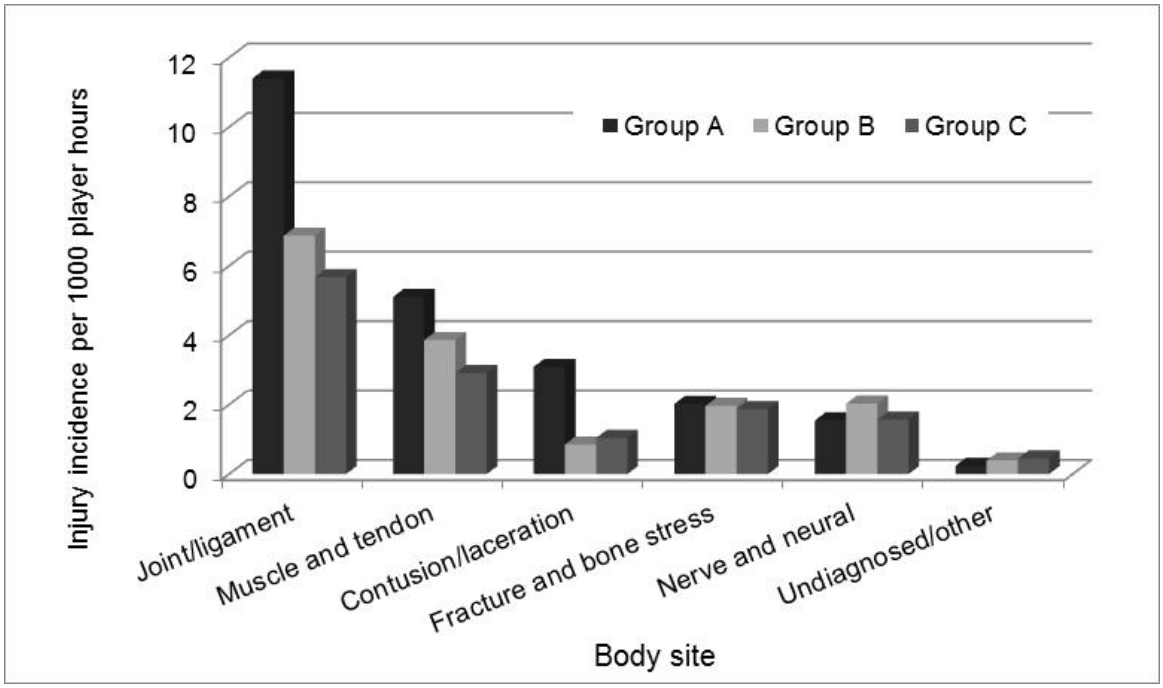

Figure 3.6. Group comparison for injuries according to injury type for all time-loss injuries in 2012-2013. *****Nerve and neural injuries include concussions.

Table 3.4. Top five most common specific injury diagnoses with severity (average number of matches absence).

Rank	Injury diagnosis	% of all Injuries	Severity
1	Knee ligament/joint/cartilage	13	11.0
2	Ankle ligament/joint	12	7.0
3	Shoulder ligament/joint	10	8.0
4	Hamstring strain	8	4.1
5	Concussion	7	3.1

Concussion

Concussion is one of the main injury diagnoses in community rugby, accounting for 7% of all time-loss injuries (8% in 2011-2012). Given that there are potentially serious implications associated with this type of injury it is important that diagnosis and recovery guidelines are adhered to. A more detailed analysis of head injuries and concussion in community rugby is presented in section 6 of this report with a guide to resources for concussion management in section 8.

Hamstring strains

Hamstring strains account for 8% of all injuries (9% in 2011-2012) and are the most common diagnosis of all non-contact injuries. Given that this type of injury may be more preventable than those involving contact (where the player has less control over external factors), possible prevention strategies for this type of injury have been outlined in Section 8 of this report.

Knee and ankle ligament/joint injuries

These injuries combined account for 18% of all time-loss injuries and also the greatest severity of all injuries. In addition, many of these injuries are sustained as a result of being tackled. Findings from the Premiership 2010-2011 surveillance project also show that the risk of injury is highest for the Knee (ACL injuries) and the ankle. Section 8 provides links to lower limb injury prevention exercises which are designed to strengthen the muscles around these joints.

3.6. Events associated with injury

For the 2012-2013 season, 77% of all time-loss injuries were sustained during contact events. This finding has been consistent over each year of the Project and in the different group levels.

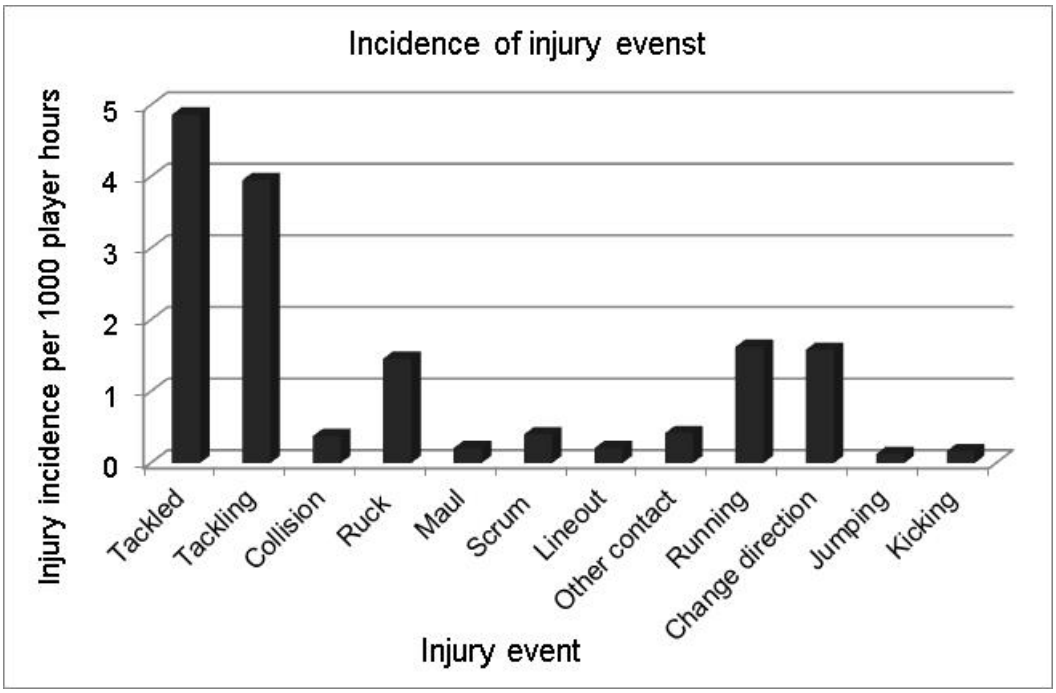

Figure 3.7. Comparison between groups of injury incidence for specific match events.

The tackle

- The tackle (both being tackled and tackling) was the most common injury event accounting for 54% of all injuries (30% through being tackled; 24% through tackling), a finding which was consistent throughout Groups A, B and C.
- The shoulder was the body site most commonly injured in the tackle (20% of all tackle injuries), followed by the head (16%), ankle (13%) and knee (12%)
- Figure 3.8 shows that while the upper limb was more susceptible to injury when the player was tackling, the tackled player sustained more injuries to the lower limb. Table 3.5 shows the most common injuries sustained by the tackled and tackling player.
- The most common types of injury sustained in the tackle were ligaments/joint/cartilage (39%), fractures (11%), nerve-neural (11%), dislocations (7%), muscle strains (9%) and bruising (7%).
- 76% of all concussion injuries were sustained in the tackle (38% when tackling and 38% when being tackled).

- The overall severity of injuries in the tackle was an absence of 6.8 matches compared with a mean severity of 7.0 matches missed for all injuries. There was no difference in the severity of the injury whether being tackled (7.0 matches missed) or tackling (6.6 matches missed).

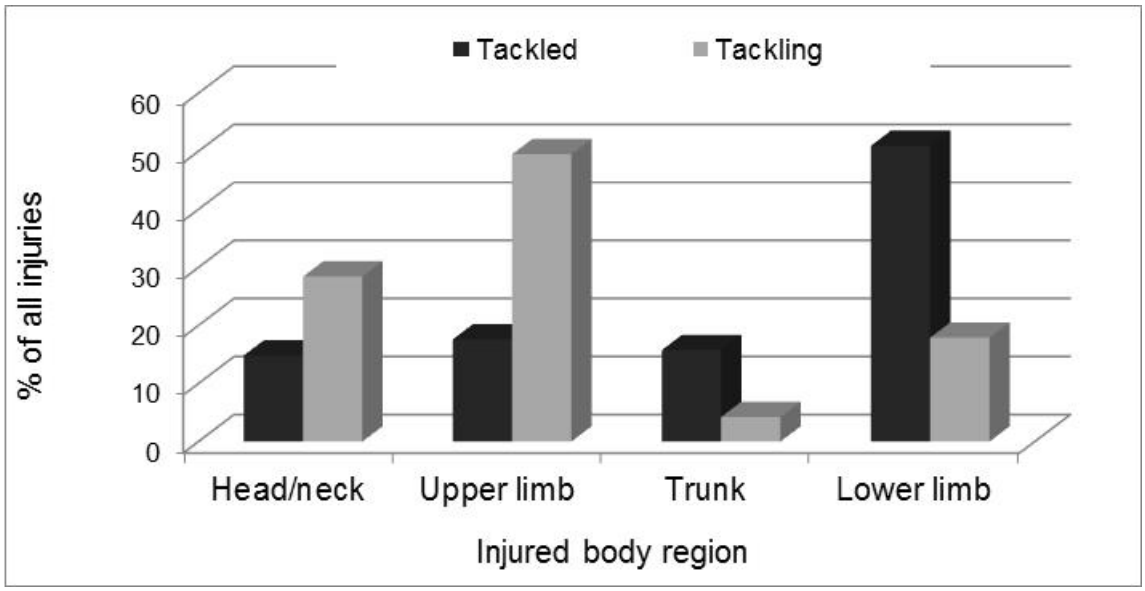

Figure 3.8. Percentage distribution by body regions for time-loss injuries sustained when being tackled and when tackling.

Table 3.5. The top three most common injuries sustained while being tackled and while tackling.

Rank	Tackled	%	Tackling	%
1	Knee ligament/joint	17	Shoulder ligament/joint	21
2	Ankle ligament/joint	17	Concussion	11
3	Shoulder ligament/joint	11	Hand fractures	7

These findings demonstrate that the tackle is an important area to focus injury prevention measures. Section 8 of this report ('Guidance and resources') provides some information focussed on the tackle and how it can be coached to become safer.

The Scrum

- Only 2% (9 injuries) of all time-loss injuries occurred in the scrum
- The severity was a mean of 5.6 matches absence (less than the overall absence for all injuries).
- Of the 9 injuries, 6 occurred to front row players (loose head prop: 2 injuries, hooker: 1 injury, tight head prop: 3 injuries) with second rows sustaining: 2 injuries, and back row: 1 injury).
- There was a range of types of injury sustained in the scrum distributed between the shoulder (2 injuries), neck (1 injury), chest (2 injuries), thigh (1 injury), knee (1 injury) and lower leg (2 injury).
- The most common injury diagnoses were muscle tears and strains (4 injuries) and ligament/joint sprains (3 injuries).

Running

- Of non-contact events, running was found to be the most common injury event (10% of all injuries).
- Hamstring injuries accounted for 56% of all running injuries and 8% of all injuries
- Section 8 contains more information on hamstring injury prevention strategies.

3.7. Effect of playing position on injury

When the injuries for all groups were combined, there were no differences between time-loss injury rates between forwards (15.8 injuries per 1000 player hours) and backs (17.1 injuries per 1000 player hours).

When forward and backs were split down into more specific positional groups there was:

- A higher injury rate for back row forwards compared with front and second row forwards.
- A higher injury rate for inside backs compared with outside backs, and front and second row forwards.

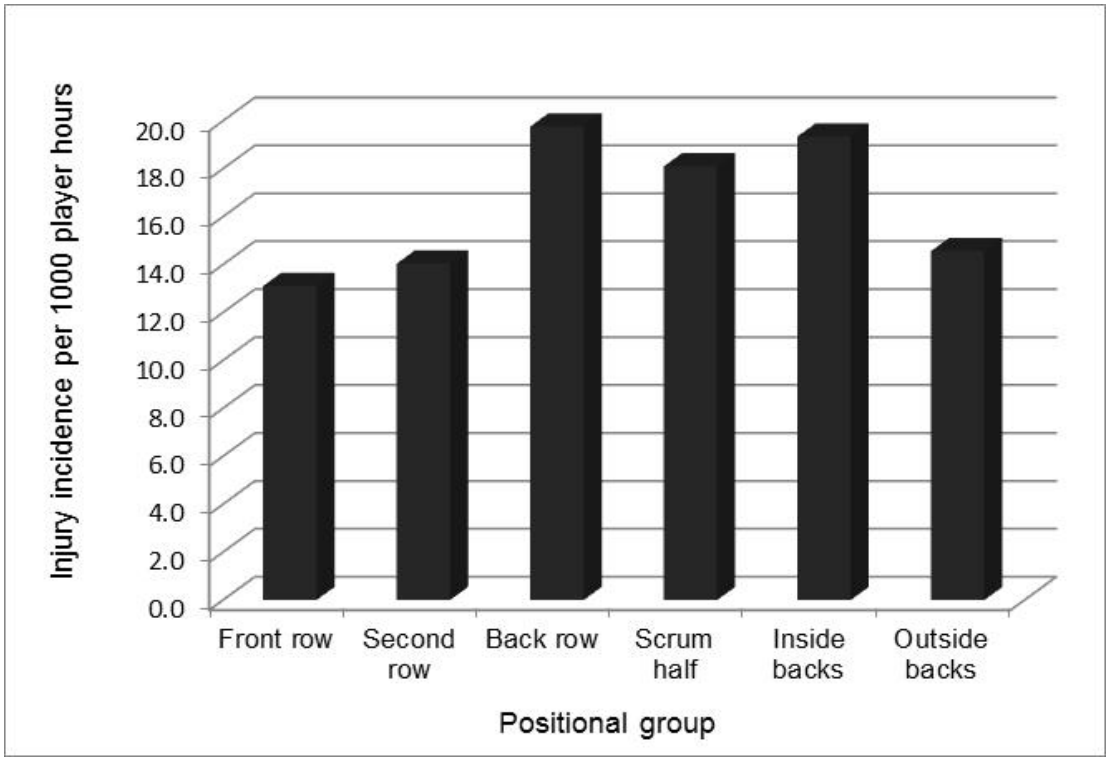

Figure 3.9. Comparison between positional groups for injury incidence. Forwards: Front row: loose head and tight head props, hooker, Second row: left and right locks; Back row: open side and blind side flankers, No. 8; Backs: Inside backs: outside half, inside centre, outside centre; Outside backs: left and right wings, full back.

3.8. Timing of injuries

Figure 3.10 demonstrates that more injuries occur in the second half of the match. This is a consistent finding across Groups A, B and C and over previous seasons of the Project.

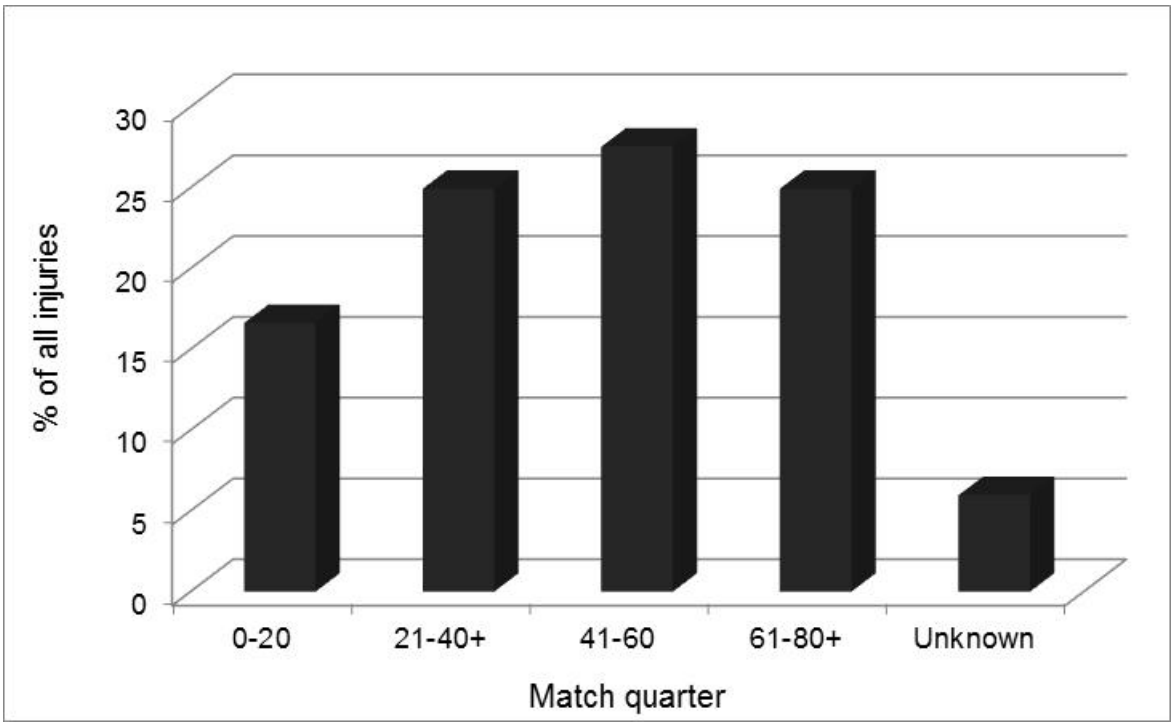

Figure 3.10. Percentage of time-loss injuries in each match quarter.

4. FUNCTIONAL MOVEMENT SCREEN IN COMMUNITY RUGBY PLAYERS

4.1. About the Functional Movement Screen (FMS®)

Functional movement control is the ability of an individual to maintain a balance between mobility and stability while performing movement patterns which are related to those performed in sporting activities. We used seven screening tests that challenge a player's muscular strength, flexibility, endurance, coordination, balance, and movement.

Functional movement screening has been used in American Football, and early indications are that poor scores are linked to poorer athletic performance and greater injury risk. However, this is the first time that such an approach has been taken in community level rugby union players. The aim is to investigate how well community level rugby union players score on the FMS tests and how these scores relate to injury risk.

The seven functional movement screening tests:

Hurdle Step test – *test of whole body stability during a single leg hurdle step*

Deep squat – *testing whole body mobility at extreme ranges*

Inline lunge – *challenge hip, knee, ankle mobility and stability*

Straight leg raise – *testing flexion in the hip*

Rotary stability - *multi-plane pelvis, core and shoulder girdle stability during a combined upper- and lower-extremity movement.*

Shoulder mobility – *testing shoulder flexibility*

Trunk stability push-up – *Test of spine stability in an upper body symmetrical pushing movement.*

The scoring system used in FMS comprises a four-point scale:

0 = pain was associated with movement pattern

1 = unable to perform movement pattern

2 = compensation was present to complete movement pattern

3 = movement pattern was performed exactly as described

Each test – including left and right sides for some tests – is scored, with 21 being the maximum score which can be achieved. In some tests, where both the left and right sides are assessed the lowest score is used in view of the fact that asymmetries between left and right reveal imbalances.

4.2. Functional Movement Screen and CRISP

During the 2012-2013 season, the CRISP team visited 23 community clubs to carry out the Functional Movement Screen on a total of 365 players. The results of these screening tests are summarised below. As per Section 3 of this report, clubs/players are divided into Groups A (levels 3-4), B (levels 5-6) and C (level 7-9).

Results

Across all playing levels, the mean score was 14.4 (Table 4.1). While total scores for Group A appear to be slightly lower than those than Groups B and C, this is partly due to 34% of players in this Group reporting pain during the tests, thus rendering their score for that test to be zero. In Group C, 14% of players reported pain in any one test compared with only 4% in Group B.

While scores for backs appear to be slightly higher than those for forwards (Table 4.2), this does not appear to be attributable to a much higher score in any particular movement pattern.

Figure 4.2 shows that while the majority of scores for most tests are “2”, a higher percentage of participants than normal score a “1” for shoulder mobility. This may be explained by 42% of all participants showing left and right sided differences in scores for this test (Table 4.3). In contrast a high proportion of players score a “3” for the trunk stability push up.

Table 4.1. Mean FMS scores for all clubs combined and by groups A, B and C by the seven different movement patterns

Movement Pattern	All Clubs	Group A (Levels 3-4)	Group B (Levels 5-6)	Group C (Levels 7-9)
Hurdle Step	2.1	2.1	2.1	2.1
Deep Squat	1.9	2.0	2.0	1.8
Inline lunge	2.1	2.0	2.2	2.0
Active Leg raise	2.2	2.3	2.3	2.2
Rotary Stability	1.9	1.7	1.9	1.8
Shoulder Mobility	1.6	1.3	1.7	1.7
Stability Push-up	2.6	2.4	2.8	2.5
TOTAL	**14.4**	**13.7**	**15.0**	**14.2**

Table 4.2. FMS scores for all clubs combined by positional groups for the seven different movement patterns

Movement Pattern	Front Row	Second Row	Back Row	Forwards	Scrum Half	Inside Backs	Outside Backs	Backs
Hurdle Step	2.0	2.0	2.2	**2.1**	2.3	2.2	2.2	**2.2**
Deep Squat	1.9	1.7	1.9	**1.9**	2.1	2.0	1.9	**2.0**
Inline lunge	1.9	2.1	2.1	**2.0**	2.1	2.1	2.2	**2.2**
Active Leg raise	2.4	2.1	2.2	**2.3**	2.3	2.3	2.2	**2.2**
Rotary Stability	1.8	2.0	1.9	**1.8**	1.9	1.9	1.9	**1.9**
Shoulder Mobility	1.4	1.7	1.6	**1.5**	1.9	1.8	1.7	**1.7**
Stability Push-up	2.6	2.6	2.5	**2.6**	2.6	2.7	2.6	**2.6**
TOTAL	**13.9**	**14.3**	**14.4**	**14.2**	**15.2**	**15.0**	**14.7**	**14.9**

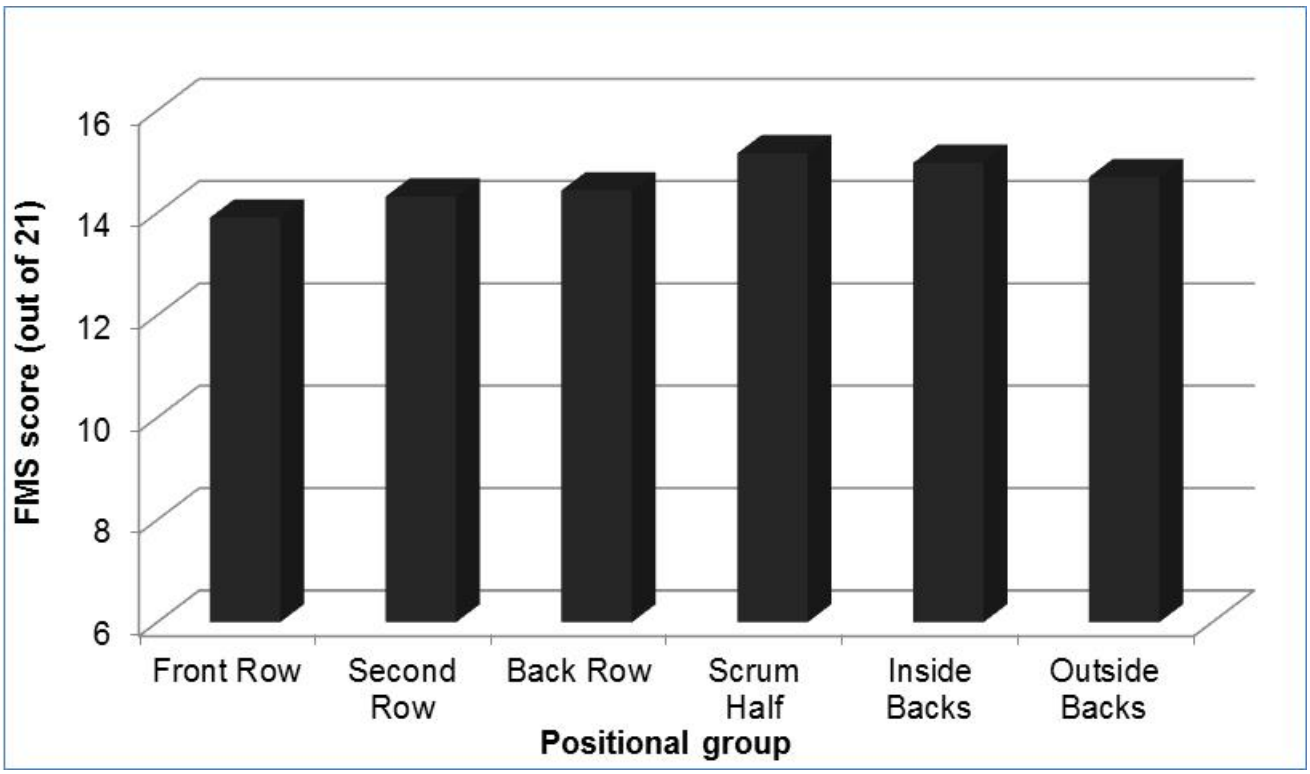

Figure 4.1. Total FMS score for each playing position group.

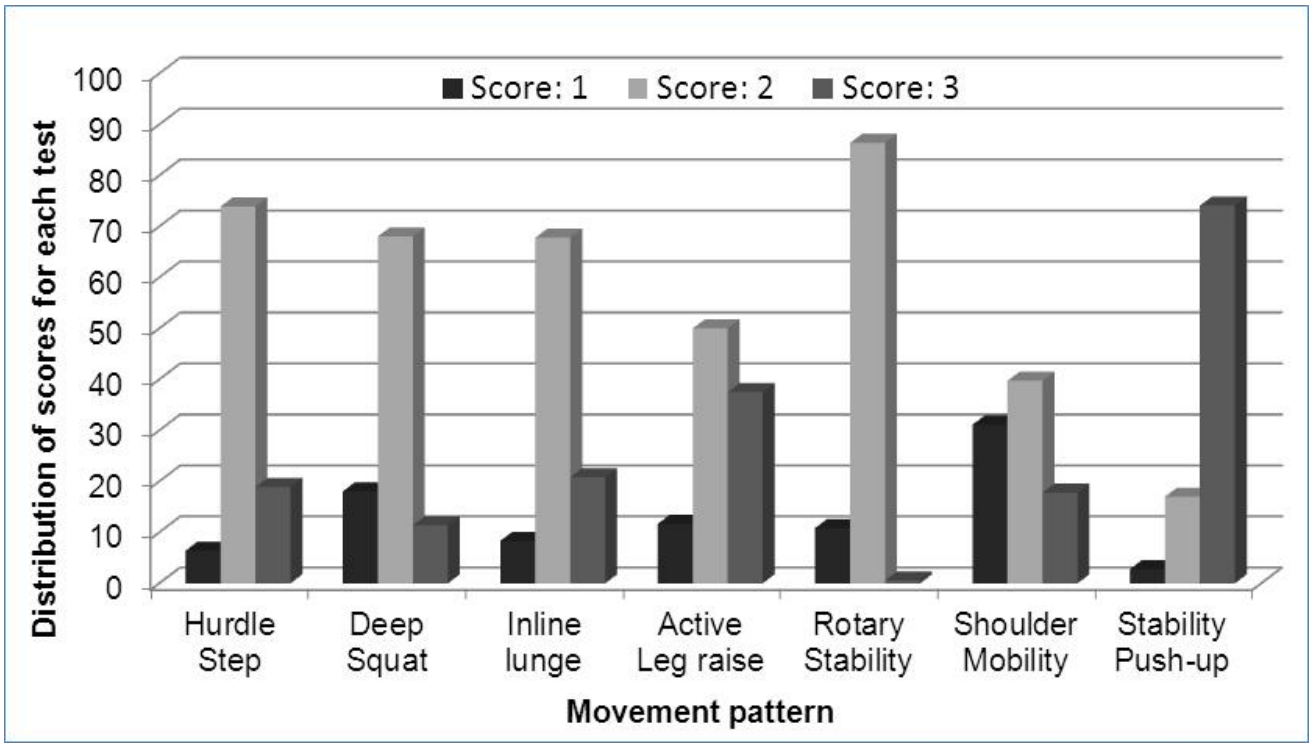

Figure 4.2. Percentage distribution of scores (1, 2 and 3) for each movement pattern for all playing positions and groups combined.

For four of the movement patterns, participants completed the movements using both the left and right sides of the body. For these movements, scores are recorded for both the left and right sides. FMS guidelines state that the lowest score of the left and right should be used when calculating the participant's total score. Table 4.4 shows the percentage of participants who displayed different scores between the left and right sides for a given movement pattern, therefore demonstrating an asymmetry.

Table 4.3. The percentage of participants displaying asymmetries in movement patterns involving assessments made to both the left and right sides.

Movement Pattern	Hurdle Step	Inline lunge	Active Leg raise	Rotary Stability	Shoulder Mobility
Percentage of asymmetries	17	21	18	5	42

Summary

- These results show for the first time preliminary descriptive findings for functional movement control in community rugby union players
- Further work in this area will extend the data collection to include a larger group of players.
- By combining FMS scores with time-loss injury occurrences for individual players it will be possible to examine further whether injured players display any particular deficiencies in functional movement control.

5. PROPENSITY OF CONTACT EVENTS TO CAUSE INJURY IN COMMUNITY RUGBY UNION

Introduction

This report and those of previous seasons demonstrate that the majority of injuries are sustained in contact events and most notably the tackle. However, it should be considered that there are more tackles than any other contact event during match play and we do not know whether contact events which occur relatively infrequently carry a high risk of injury per event, termed a high 'propensity' for injury. We determined the frequency of contact events (such as tackles, rucks, mauls, scrums and lineouts - regardless of whether they resulted in injury) during match play in different levels of community rugby. This information could then be combined with the number of injuries associated with each type of contact event to determine the risk of injury per contact event (the 'propensity' for injury). This information can help focus injury prevention strategies on specific contact events.

Methods

Thirty community rugby matches were filmed and every contact event (tackle; collision tackle, ruck; maul; lineout and scrum) was identified. Injury data were derived from CRISP using combined data from seasons 2009-2010 (n=46 clubs), 2010-2011 (n=67 clubs), and 2011-2012 (n=76 clubs).

Results

Contact events

- There were more contact events in group A matches (~399 events per match) compared with group B (~374 events) and group C (~339 events) and more in group B than C.
- Similarly, there were more tackles, ruck and collision tackle events in group A matches compared with B and C and more in group B than C.
- There were more mauls in group B compared with groups A and C.
- The number of scrums and lineouts per match were not different between groups.
- When all data are combined, there were 141 tackles, 115 rucks and 32 scrums per match.

Injury risk per event

- Tackles resulted in the greatest propensity for injury (2.3 injuries/1000 events] and the greatest severity (19 weeks missed/1000 events].
- Injury risk was greater to the player being tackled than the tackling player.
- Collision tackles (illegal tackles involving a shoulder charge) had a propensity for injury of 15.0 injuries/1000 events and severity was 109 weeks missed/1000 events, which were both higher than any other event.
- There was a greater risk of tackle injuries in group A (2.8 injuries per 1000 tackle events) than groups B (2.1 injuries per 1000 tackle events) and C (2.1 injuries per 1000 tackle events).
- No differences were found between groups A, B and C for the risk of injury in mauls, rucks, scrums, and lineouts.
- Analysis of the scrum showed that only 5% of all scrums collapsed, but the propensity for injury was four times higher (2.9injuries/1000 events) and the severity was six times greater (22 weeks missed/1000 events) than for non-collapsed scrums.

Conclusions

- Injury prevention in the tackle should focus on technique with strict enforcement of existing laws for illegal collision tackles.
- The scrum is a relatively controllable event and further attempts should be made to reduce the frequency of scrum collapse.

6. HEAD INJURIES IN COMMUNITY RUGBY UNION

Introduction

In contact sports such as rugby union, there is particular interest in the nature and causes of head injuries. This section provides a more detailed exploration of the data for this body site gathered over three seasons (2009-2010, 2010-2011 and 2011-2012). The information is divided into 'medical attendances' (any pitch attendance made during match play) and time-loss injuries (those causing 8 days or more absence from playing). Playing levels are defined as group A (levels 3-4), group B (levels 5-6) and group C (levels 7-9). Injury rates are presented as the number of medical attendances/time-loss injuries per 1000 player match hours.

6.1. Medical pitch attendances for head injuries

One quarter of all medical attendances are for head injuries. Given that there are on average 4.6 attendances each match, this means that there is likely to be one attendance for each team per match for a head injury. There is a higher rate of medical attendances for head injuries in Group A compared with B and C (Table 6.1).

Table 6.1. Incidence (number of injuries per 1000 player hours) of pitch attendances and player removal for head Injuries according to playing level.

	Injury Incidence (95% CI)	Player Removal Incidence (95% CI)	Chance of Removal %	% of all medical attendances
All Players	55.1(53.5-56.5)	7.5 (7.3-7.7)	14.2	24.0
Group A	69.9 (66.5-73.4)	8.8 (8.4-9.2)	13.6	23.9
Group B	52.1 (49.7-54.5)	7.3 (7.0-7.6)	14.3	24.5
Group C	48.3 (46.0-50.6)	6.9 (6.6-7.2)	15.4	23.6

Playing position

There was a higher rate of attendances for forwards (63 attendances per 1000 player hours) compared with backs (43 attendances per 1000 player hours). A further breakdown to show different positional groups is shown in Figure 6.1. These differences are likely to be reflective of forwards taking part in more contact events during a match.

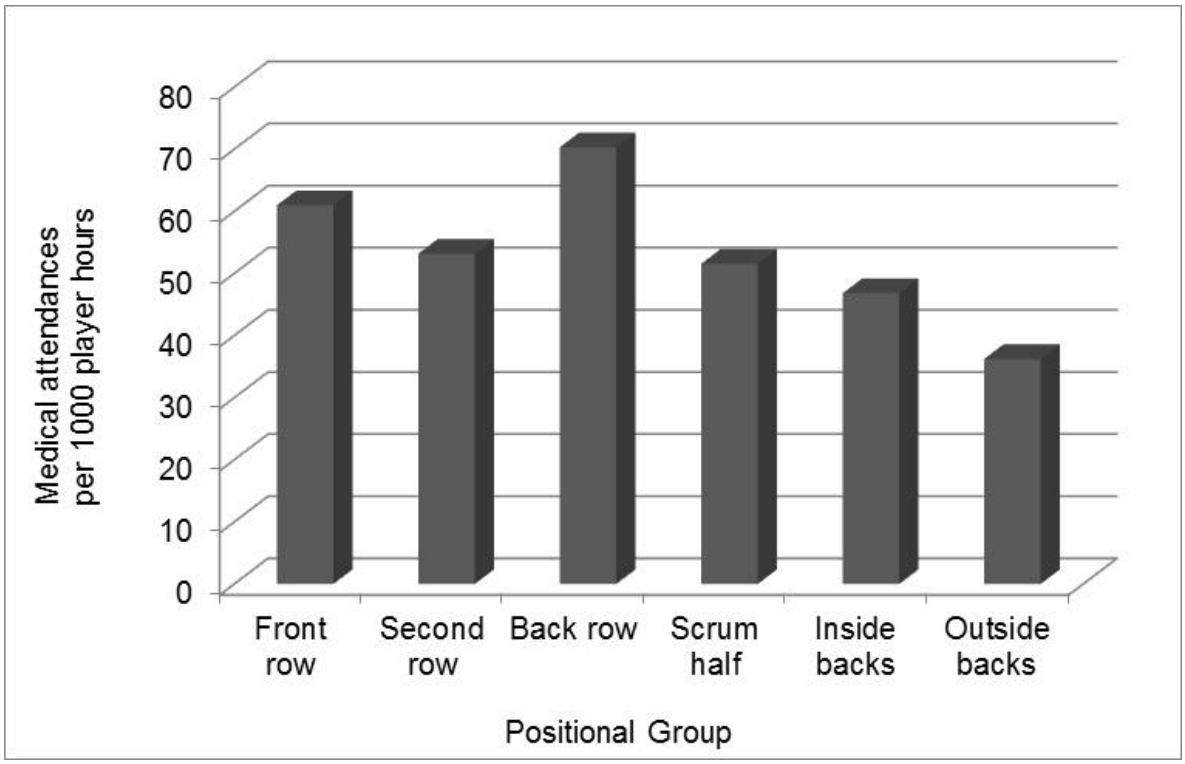

Figure 6.1. Incidence of medical attendances for head injuries by positional group.

Types of head injury

The most common types of head injuries for a medical attendance are shown in table 6.2. Bruising and laceration injuries were most common but there was a greater chance of being removed permanently from play for injuries which were neural (including concussions) and for fractures.

Table 6.2. Incidence of pitch attendances and player removal for head Injuries according to diagnosis of Injury.

	Injury incidence (95% CI)	Player removal Incidence (95% CI)	Chance of removal (%)	% of all medical attendances
Bruising	16.2 (15.4-17.0)	1.3 (1.2-1.4)	6	7.1
Laceration/Abrasion	21.5 (20.6-22.5)	2.4 (2.3-2.5)	15	9.4
Neural	6.7 (6.2-7.2)	2.8 (2.6-3.0)	38	2.9
Fracture	0.5 (0.4-0.7)	0.2 (0.1-0.3)	42	0.2

6.2. Time-loss head injuries

Head injuries account for 12% of all time-loss injuries and concussions accounted for 58% of all head injures (7% of all time-loss injuries). Table 6.3 shows the incidence and severity for head and concussion injuries across the different playing levels.

Table 6.3. The incidence and severity of time-loss head injuries and concussions

		Incidence (95% CI)	Severity (Weeks Missed) (95% CI)
All head injuries			
	All Groups	2.1 (1.8-2.3)	4.4 (3.8-5.0)
	Group A	1.5 (1.0-2.0)	4.2 (2.9-5.7)
	Group B	2.4 (1.9-2.9)	4.7 (3.7-5.7)
	Group C	2.0 (1.6-2.5)	4.2 (3.2-5.2)
Concussion			
	All Groups	1.2 (1.0-1.4)	3.4 (2.7-4.0)
	Group A	0.9 (0.5-1.3)	2.9 (1.6-4.1)
	Group B	1.4 (1.0-1.7)	3.7 (2.6-4.7)
	Group C	1.2 (0.8-1.5)	3.3 (2.3-4.3)

Injury type

Concussion was the most common type of time-loss head injury while the most severe was for fracture injuries (Table 6.4).

Table 6.4. Diagnosis of Type of Head Injury

Diagnosis	Incidence (95% CI)	Severity (Matches Missed) (95% CI)	Percentage of all head injuries (%)
Concussion	1.20 (1.0-1.40)	3.4 (2.7-4.0)	58
Head/facial laceration	0. 30 (00.2-0.40)	4.0 (2.5-5.5)	14
Facial fracture	0.30 (0.20-0.40)	11.4 (7.2-15.6)	15
Bruising	0.10 (0.03-0.16)	2.3 (0.8-3.9)	5
Eye injury	0.11 (0.04-0.17)	4.2 (1.6-6.8)	5
Jaw dislocation/sprain	0.03 (0.00-0.07)	4.0 (0.0-8.5)	2
Other Head Injuries	0.04 (0.00-0.09)	3.0 (0.1-5.9)	2

Playing position

There was no difference in the incidence of time-loss head injuries between forwards (2.2; 95% CI: 1.8-2.6) and backs (1.9, 95% CI: 1.5-2.3).

Injury event

All head injuries were attributed to contact events. Table 6.5 shows the incidence and severity of contact events associated with time-loss head injuries.

Table 6.5. The incidence and severity of all time-loss head injuries and concussions for different match events.

	Incidence (95% CI)	Average Severity (Matches) (95% CI)	Percentage of injuries
All head injuries			Percentage of all head injuries
All tackles:	1.2 (0.9-1.4)	4.0 (3.2-4.8)	66
Tackled	*0.5 (0.4-0.7)*	*4.0 (2.9-5.1)*	*26*
Tackling	*0.6 (0.5-0.8)*	*4.0 (3.0-5.1)*	*30*
Collision tackle:	0.2 (0.1-0.3)	7.0 (3.9-10.1)	10
Collision tackled	*0.2*	*5.9 (3.2-8.6)*	*9*
Collision tackling	*0.01*	*27 (-25.9-79.9)*	*1*
Ruck/Maul	0.2	5.3 (3.1-7.6)	12
Punched	0.2 (0.1-0.3)	2.9 (1.6-4.3)	10
Non-tackle collision	0.2 (0.1-0.3)	2.8 (1.3-4.2)	7
Concussion			Percentage of all concussion injuries
All tackles	0.8 (0.6-1.0)	3.4 (2.6-4.2)	68
Tackled	*0.4 (0.3-0.5)*	*3.6 (2.4-4.8)*	*33*
Tackling	*0.4 (0.3-0.5)*	*3.2 (2.2-4.3)*	*35*
Collision tackle	0.1 (0.0-0.2)	2.9 (1.0-4.8)	8
Collision tackled	0.1 (0.0-0.2)	3.0 (1.0-5.0)	*8*
Collision tackling	-	-	-
Ruck/Maul	0.1 (0.0-0.2)	3.5 (1.5-5.6)	10
Non-tackle collision	0.1 (0.0-0.2)	2.9 (1.0-4.8)	8
Punched	0.1 (0.0-0.1)	5.5 (0.7-6.3)	6

Conclusion

- The overall rate of head injuries is lower than that in elite rugby union.
- Concussions account for 58% of all time-loss head injuries.
- With an average of 3.4 matches missed, there appears to be good adherence to the recovery guidelines of resting for three weeks following a concussion.
- The tackle is the most common match event associated with all time-loss head injuries.
- On average there will be at least one medical attendance per team for every match for a head injury.
- Pitch side staff should be trained to recognise neurological impairment in injured players.

7. FUTURE DIRECTIONS OF COMMUNITY RUGBY INJURY SURVEILLANCE

The consistent findings over the last four seasons provide a basis on which to further understanding of community level rugby union injuries and to investigate some aspects more closely.

The crucial aspect of linking injury risk to players' training, lifestyle and functional movement competency, is that many of these factors are potentially modifiable. Therefore, in the event that any factor has been shown to increase the risk of injury, interventions to reduce this risk can be prescribed and publicised to the community rugby playing population.

7.1. Exploring further potential risk factors for Injury

To understand more about which factors may be linked to the risk of injury, future work will aim to build on the work already started during 2012-2013 in terms of assessing functional movement control in community rugby union players. We will continue to investigate whether any particular lifestyle, training habit, functional movement ability or physical fitness component affects the risk of injury in the community rugby playing population. Such results may help to further inform injury prevention strategies which can ultimately be disseminated back into the Community game.

7.2. Functional movement screening and Physical fitness testing

Following initial findings as outlined in section 4 of this report, further pre-season testing sessions will be carried out at a sample of clubs within the 2013-2014 cohort. Sessions will include functional movement screening as carried out in 2012-2013 and in addition players will also be assessed for physical fitness using tests to determine levels of strength, power, speed, agility and endurance.

8. GUIDANCE AND RESOURCES

This section of the report includes some guidance towards injury prevention strategies based on the findings presented in this report. These have been approached in terms of how injury may be minimised through:

- **8.1. Physical preparation**
- **8.2. Injury prevention**
- **8.3. Injury management**

Useful online resources

General information on player health is available via the RFU website: http://www.rfu.com/TakingPart/PlayerHealth/

The international Rugby Board (IRB) have also devised the 'Rugby Ready' programme which includes information on physical preparation and injury prevention measures: http://www.irbrugbyready.com

Online RFU Coaching academy

This coaching resource is available to England's many qualified coaches. The RFU Coaching Academy (www.rfuca.com) contains materials for the RFU's three major qualification courses.

Rugby coaching drills

In addition the RFU is working in partnership with Global Sports Coaching and its www.rugbycoachingdrills.com website. This website contains a wealth of resources on coaching and aspects of player preparation for the game.

8.1. Injury prevention - Physical preparation

Lower limb injury prevention exercises

Knee and ankle injuries combined account for 56% of all lower limb time-loss injuries. More information on preparation exercises devised for these high risk sites (and the neck, upper limb and trunk) is available in the 'Injury Prevention' section within 'Player Health' on the RFU web pages:

www.rfu.com/TakingPart/PlayerHealth/InjuryPrevention.aspx

Preventing hamstring injuries

Hamstring strains account for 8% of all time-loss injuries. Nordic hamstring exercises may be beneficial in preventing this type of injury injuries (Brooks *et al*., 2006*). This exercise can be easily integrated into a training programme with minimal time and equipment requirements. More information on how to perform Nordic hamstring exercises can be found on in the 'related links' section on:

http://www.bath.ac.uk/health/projects/rfu-rugby-injury/

**Brooks, J.M., Fuller, C.W., Kemp, S.P.T. and Reddin, D.B. (2006). Incidence, Risk, and Prevention of Hamstring Muscle Injuries in Professional Rugby Union. American Journal of Sports Medicine, 34:1297-1306.*

8.2. Injury Prevention - Technique

This report demonstrates that 76% of all time-loss injuries are sustained in contact events, most notably the tackle. While contact is an essential part of rugby union, correct technique in contact situations may help to minimise the potential for injury.

The RFU provide extensive resources for coach development which reinforce development of technique.

http://www.rfu.com/TakingPart/Coach

The tackle and injury prevention

The information in this report suggests that both tackling and being tackled is a particular injury risk. It is therefore suggested that there should be a focus on the tackle in training.

Although this would increase the overall player exposure to the tackle, it should be noted that a previous study (Brooks *et al*., 2005*) has found a significantly lower injury risk during training activities than during match play and therefore tackle training is unlikely to result in a significant increase in injuries.

The tackle has also been identified as an injury risk factor in other rugby injury surveillance studies. As such, there is a growing body of educational resources dedicated to coaching the tackle from the perspective of both the tackler and the ball carrier. More information about the tackle and safe technique in contact can be found on the IRB Rugby Ready website:

www.irbrugbyready.com

Get more specific link

Maybe ref other resources for this??

Brooks, J.M., Fuller, C.W., Kemp, S.P.T. and Reddin, D.B. (2005). Epidemiology of injuries in English professional rugby union: part 2 training injuries. British Journal of Sports Medicine, 39:767-775.

8.3. Injury management

Clinical governance

This describes the process of ensuring that clubs ensure the highest quality of care for their players. More information on implementing this process can be found on:

http://www.rfu.com/ManagingRugby/FirstAid/ClinicalGovernance.aspx

Reporting injuries to the RFU

Independent of participation in the community rugby injury surveillance project, any club playing within the RFU structure should report the following types of injury to the RFU sports injury administrator.

1. *An individual who sustains an injury which results in their being admitted to a hospital. This does not include those taken to an Accident or Emergency Department and allowed home from there.*
2. *Deaths occurring during or within 6 hours of the game finishing.*

The injury report form for the above can be accessed via:
http://www.rfu.com/ManagingRugby/FirstAid/Injuries.aspx

The RFU have produced guidelines which help clubs to consider their medical provision, including a list of equipment which should be included in a pitch side first aid kit:
http://www.rfu.com/ManagingRugby/FirstAid/CoursesAndGuidelines/FirstAidEquipmentGuidelines.aspx

Courses

There is a range of first aid courses available for club staff. The **RFU emergency first aid course** is a recognised emergency first aid at work (EFAW) course with additional emphasis on aspects relating to rugby:
http://www.rfu.com/ManagingRugby/FirstAid/CoursesAndGuidelines/RFUSportsFirstAidCourse.aspx

The **Immediate Care in Sport Course** (ICIS) is an advanced, rugby union specific course aimed at the pitch side treatment of potentially catastrophic and life or limb threatening injuries by qualified Physiotherapists and Medical Doctors:
http://www.rfu.com/managingrugby/firstaid/coursesandguidelines/icis

Injury rehabilitation

This report shows that recurrent injuries account for 19% of all injuries. This shows that on occasions, players may not have undergone a full rehabilitation.

Injured players should only return to play or full training from a moderate/severe injury after they have been assessed to ensure that they are ready to do so by a suitably qualified coach, doctor or therapist. The rehabilitation of the player should follow a graduated process and incorporate:

1. Restoration of a full range of movement in the joint
2. Recovery of co-ordination and balance
3. The maintenance of fitness by alternative activities such as cycling and swimming
4. The recovery of muscle strength
5. Gradual introduction of rugby specific skills
6. Contact drills followed by full contact
7. Return to full training and match play once the above stages have been achieved.

More information on rehabilitation and returning to play can be found on the RFU website:

http://www.rfu.com/ManagingRugby/ClubDevelopment/Medical/RehabRecovery.aspx

Concussion

RFU 'HEADCASE'

HEADCASE is an RFU resource to raise awareness of best practice with respect to concussion. HEADCASE resources highlight how to recognise the signs and symptoms of concussion with guidelines referring to the prevention and management of concussion. HEADCASE resources outlining the roles and responsibilities of individuals involved in rugby union including coaches, match officials, healthcare professionals and for players are available via the following link:

http://www.rfu.com/headcase

Concussion and returning to play

Suspected concussion injuries should be taken very seriously. Within the last two seasons, the IRB have revised guidelines for concussion diagnosis and management. While the diagnosis is still made by a medical practitioner, the new guidelines allow a graduated return to play protocol whereby through the re-introduction of training without any further concussion symptoms, the player may return to match play after six days. **The graduated return to play may only be implemented under the supervision of a medical practitioner**. If this is not possible the injured player may not return to play until the 21st day after the injury event. The definitive IRB concussion guidelines can be accessed via the following link: http://www.irbplayerwelfare.com/?documentid=3

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Group C:
Alnwick, Baildon, Beccles, Bromley, Burnley, East London, Effingham and Leatherhead, Ellingham and Ringwood, Finchley, Fordingbridge, Frome, Ilkley, Hampstead, Harlow, Keighley, Keswick, Keynsham, Leighton Buzzard, North Dorset, North Ribblesdale, Old Laurentians, Romford and Gidea, St. Just, Tunbridge Wells, Upminster, Yatton, Welwyn.

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