RFU Community Rugby Injury Surveillance Project

CRISP
2013-2014

Season Report
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SECTION 1 - EXECUTIVE SUMMARY

Overall findings

- The overall injury rate in community rugby during season 2013-14 is stable compared with previous seasons with approximately one injury in every three team games.
- The injury rate within community rugby is greater at higher playing levels.
- Time-loss injury rates in men’s senior community rugby are approximately half of those reported for Premiership rugby.
- On average three players per team will be unavailable for match play each week throughout the season due to injury.
- Players at the higher levels of community rugby possess greater stature and fitness capacity but similar functional movement ability compared with those at lower levels.

Key messages

Concussion

- There is a slight increase in reported concussions during season 2013-14 compared with the average over seasons 2009-13, due to higher incidences reported at the higher levels of play.
- Concussion incidence at lower playing levels was unchanged compared with previous seasons.
- Higher incidence at higher playing levels might represent a real increase in concussion risk but may also be due to the promotion of concussion awareness through RFU ‘Headcase’ and the increased profile of this injury through the media.
- There was one concussion for every 31 team games (or 1 in every 15 matches)
- 71% of concussions were sustained in the tackle.

The Scrum

- Changes in the scrum engagement during season 2013-14 make this an area for attention.
- The overall incidence of scrum injuries is stable compared with previous seasons.
- In 2013-14, there has been a trend for more injuries to the hooker compared with previous seasons of CRISP but ongoing surveillance work is required to determine whether this is a meaningful difference.

The Tackle

- Is the most common contact event in match play and most common injury event accounting for 50% of all injuries.
- Good technique for the tackling player is a pivotal area for reducing injuries to the head, shoulder and hand.
- Strategies to reduce injuries to the tackled player should include technique but also conditioning exercises for the knee and ankle.

The Knee:

- Incurs more injuries than any other body site also resulting in the most matches missed.
- Functional movement screening is being carried out to understand more about how player movement control may affect the risk of injury primarily in the lower limb.
Future directions

Injury prevention

- The majority of community rugby injuries are sustained in the lower limb, particularly to the knee, ankle and thigh and the majority of upper limb injuries occur in the shoulder. Season 2014-2015 will see the introduction of an injury prevention warm-up programme comprising specific exercises for these body sites in a sample of community level clubs.

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

- Project information for new and existing clubs
- Previous CRISP annual reports and scientific publications
- Priority areas identified for injury prevention
- RFU and IRB coach education and injury prevention resources
There is growing understanding of the nature and causes of match injuries which occur in rugby union. While a large amount of information is available for the Elite game it may not be appropriate to assume that these injury patterns reflect those in the Community game. Difference in player and match characteristics which exist between Premiership and Community levels may influence injury type and frequency of match play injuries. Furthermore, 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 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 running for five 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. In addition, data over a number of seasons allows examination of injury patterns over time.

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. Further work is now under way to provide greater insight into 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 2013-14 season. For the purposes of comparisons between different levels of community rugby, playing levels were grouped as follows:

<table>
<thead>
<tr>
<th>RFU Levels</th>
<th>Number of clubs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,4</td>
<td>12</td>
</tr>
<tr>
<td>5,6</td>
<td>19</td>
</tr>
<tr>
<td>7,8,9</td>
<td>36</td>
</tr>
</tbody>
</table>

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.

**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:

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

**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.
3.1. Overall injury rate and severity

Injury rate

For the 2013-14 season, information from 1609 matches was included, in which 613 time-loss injuries were reported (any injury resulting in 8 days or greater absence from match play). The information presented in Table 3.1 and Figure 3.1 demonstrates that the overall injury rate over the five seasons has not changed. Although there does appear to be an increase in season 2013-14 compared with 2012-13, this is within the expected natural variation from season to season based on the data over five seasons.

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

<table>
<thead>
<tr>
<th>Season</th>
<th>Player match hours</th>
<th>Match injuries</th>
<th>Injuries per 1000 player hours (95% CI)</th>
<th>Injuries per club per match</th>
<th>Number of matches for one injury</th>
<th>Average matches missed per injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-10</td>
<td>22540</td>
<td>385</td>
<td>17.1 (15.4-18.8)</td>
<td>0.3</td>
<td>2.9</td>
<td>6.1</td>
</tr>
<tr>
<td>2010-11</td>
<td>32820</td>
<td>539</td>
<td>16.4 (15.0-17.8)</td>
<td>0.3</td>
<td>3.0</td>
<td>7.0</td>
</tr>
<tr>
<td>2011-12</td>
<td>37100</td>
<td>645</td>
<td>17.4 (16.0-18.7)</td>
<td>0.3</td>
<td>2.9</td>
<td>6.5</td>
</tr>
<tr>
<td>2012-13</td>
<td>24040</td>
<td>399</td>
<td>16.6 (15.0-18.2)</td>
<td>0.3</td>
<td>3.0</td>
<td>7.0</td>
</tr>
<tr>
<td>2013-14</td>
<td>32180</td>
<td>613</td>
<td>19.0 (17.5-20.6)</td>
<td>0.4</td>
<td>3.0</td>
<td>6.4</td>
</tr>
<tr>
<td>2009-14</td>
<td>1486880</td>
<td>2581</td>
<td>17.4 (16.7-18.0)</td>
<td>0.4</td>
<td>3.0</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Figure 3.1. Overall injury incidence for CRISP over five seasons.
Injury rate between playing levels

The injury incidences for clubs in level 3/4 and 5/6 were significantly higher than for level 7/8/9 during season 2013-14 (Table 3.2) but statistically there was no significant difference between level 3/4 and 5/6. Figure 3.2 also shows that this has been a consistent finding over five seasons of CRISP for the different playing levels. There is no difference in the mean severity (number of matches missed) between playing levels.

**Table 3.2.** Match injury incidence and severity for time-loss injuries between playing levels in season 2013-14.

<table>
<thead>
<tr>
<th>Playing level</th>
<th>Total number of player match hours</th>
<th>Total number of match injuries</th>
<th>Injuries per 1000 player hours (95% CI)</th>
<th>Injuries per club per match</th>
<th>Number of matches for one injury</th>
<th>Mean severity (matches missed)</th>
<th>Mean player matches missed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3/4</td>
<td>6410</td>
<td>151</td>
<td>24.6 (20.7-28.5)</td>
<td>0.5</td>
<td>2.0</td>
<td>6.0</td>
<td>76</td>
</tr>
<tr>
<td>Level 5/6</td>
<td>9540</td>
<td>191</td>
<td>20.0 (17.2-22.9)</td>
<td>0.4</td>
<td>2.5</td>
<td>6.8</td>
<td>68</td>
</tr>
<tr>
<td>Level 7/8/9</td>
<td>16500</td>
<td>271</td>
<td>16.4 (14.5-18.4)*</td>
<td>0.3</td>
<td>3.0</td>
<td>6.4</td>
<td>48</td>
</tr>
</tbody>
</table>

*Significantly lower incidence compared with Levels 3/4 and 5/6 (P<0.05)

Table 3.2 also shows the ‘Mean player matches missed’, expressed in terms of the total number of occasions over the season that a club has players who are unavailable for match play due to injury (number of injuries x matches missed due to these injuries). For example a club with 10 injuries over the season, each of which results in 5 matches absence, would result in a total of 50 ‘player matches missed over the season.

**Figure 3.2.** Injury incidence for CRISP over five seasons by different playing levels
Impact of injury rate and severity between levels

Clubs in level 7/8/9 are likely to have at least two players unavailable each week due to injury, while clubs in level 3/4 (due to a higher incidence than level 7/8/9) and 5/6 (due to a higher severity than level 7/8/9) are likely to have an average of three players unavailable each week due to injury. When all playing levels were combined, 67% of time-loss injuries were classed as moderate (between 8 and 28 days absence) and 33% were severe (greater than 28 days absence).

Further information for treatment time-loss injuries:

- The injured player was removed from play for 81% of all time-loss injuries.
- 18 (3%) injuries required an ambulance (12 for forwards; 6 for backs). Therefore an ambulance was used for one in every 44 matches.
- 171 (28%) injuries were referred to a hospital. This equates to a player being referred to hospital with one injury in every 9 team games (4.5 complete matches).
- 32 (8%) injuries required surgery, equating to one in every 50 team games (25 complete matches).

Injury recurrences

Overall, injuries reported as recurrent (those of the same site and injury diagnosis) accounted for 18% of all time-loss injuries (19% in 2012/13). There were no differences in recurrent injuries between groups with the higher overall injury incidence of new injuries for higher playing levels reflecting the patterns for all injuries regardless of recurrence.

There was no difference in the severity of injury for recurrent (7.0 matches missed) and non-recurrent (7.1 matches missed).
Community rugby compared with other playing populations

While there are some differences within different levels of community rugby (shown in Figures 3.2 and 3.3), the overall injury rate is considerably lower than that of International and Premiership rugby for injuries which cause the player to be absent from training or match play for 8 days or longer as shown in Figure 3.3.

**Figure 3.3.** A comparison of injury rates for different levels of community rugby with elite level and schools rugby.

3.4. Site of injury

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

**Figure 3.4.** The most common injury sites (and matches missed) all time-loss injuries in 2013-14.

When injured body sites are grouped into regions, Figure 3.5 demonstrates that the lower limb accounts for the most injuries. The higher overall injury rate in levels 3/4 compared with 5/6 and 7/8/9 clubs is largely due to a higher rate in upper limb injuries. This may be linked to the previous finding that there are more tackles per match in level 3/4, that the tackle is the main cause of shoulder injury, and that that there is a higher risk of injury per tackle in this level compared with levels 5/6 and 7/8/9. More information on the injury risk for specific contact events was reported in a previous CRISP publication: **Collapsed scrums and collision tackles: what is the injury risk?**

**Figure 3.5.** Injury incidence according to body region by playing level for all time-loss injuries in 2013-14.
3.5. Type of injury

The most common injury types in community rugby, causing the player to miss at least one match are those associated with joint/ligament damage (Figure 3.6). There is a higher incidence of this injury type in Levels 3/4 compared with Levels 5/6 and Levels 7/8/9 which largely accounts for the higher overall injury rate in this group.

![Graph showing injury type comparison for all time-loss injuries in 2013-14.](image)

Figure 3.6. Playing level comparison for injuries according to injury type for all time-loss injuries in 2013-14. *Nerve and neural injuries include concussions.*
3.6. Injury diagnoses

The top five most common injury diagnoses for all clubs combined and different playing level groups are presented in Figure 3.7. As a specific diagnosis, concussion was the most prevalent (9% of all injuries), followed by hamstring strains. Rotator cuff injuries/shoulder impingements were the most common upper limb injury diagnosis. It should be noted that Figure 3.7 represents only 27% of the most common all injuries and there is a large range of different diagnoses accounting for the remaining 63%.

While the injuries presented in figure 3.7 represent the most common specific diagnoses, when injuries relating to the joint structure were grouped (e.g., ligament/cartilage/dislocations), it was found that knee injuries of this injury grouping accounted for 12% of all injuries, ankle injuries accounted for 8% and shoulder injuries accounted for 8%.

Figure 3.7. Top 5 specific injury diagnoses in rank order for all playing levels combined, for season 2013-14 and the mean for combined season 2009-13 and for each group playing level (2013-14 only). Numbers within brackets denote percentage of all injuries in each level.
Concussion was the most common injury diagnosis, accounting for 9% of all time-loss injuries (7% in 2012-2013). This equates to 1 in every 31 games (Table 3.3) that a team plays or 1 in every 15 matches (involving two teams) although the rate of injury is higher at Level 3/4 and 5/6 compared with 7/8/9. Approximately 900 teams play each week within levels 3-9, which likely results in around 29 concussions each week across these levels and over 700 in total per season. For 1 in every 4 concussions, the player was referred to the hospital and 15% of concussed players reported seeing a GP.

The results displayed in Table 3.3 show that there was a lower concussion incidence within level 7/8/9 compared with levels 3/4 and 5/6 for season 2013/14.

**Table 3.3.** Concussion incidence and severity between playing levels in season 2013-14.

<table>
<thead>
<tr>
<th>Playing level</th>
<th>Total number of matches</th>
<th>Total number of concussions</th>
<th>Concussions per 1000 player hours (95% CI)</th>
<th>Number of team games for one concussion</th>
<th>Mean severity (matches missed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3/4</td>
<td>307</td>
<td>16</td>
<td>2.6 (1.3-3.9)</td>
<td>19</td>
<td>2.4</td>
</tr>
<tr>
<td>Level 5/6</td>
<td>477</td>
<td>22</td>
<td>2.3 (1.3-3.3)</td>
<td>22</td>
<td>3.4</td>
</tr>
<tr>
<td>Level 7/8/9</td>
<td>825</td>
<td>14</td>
<td>0.8 (0.4-1.3)*</td>
<td>59</td>
<td>2.0</td>
</tr>
<tr>
<td>All Levels</td>
<td>1609</td>
<td>52</td>
<td>1.6 (1.2-2.1)</td>
<td>31</td>
<td>2.6</td>
</tr>
</tbody>
</table>

*Significantly lower than levels 3/4 and 5/6 (P < 0.05).

In line with recent increases in reported concussions in Premiership rugby, Figure 3.8 shows a slight increase in the incidence for 2013-14 compared with 2012-13 which is also largely due to increases in incidence for levels 3/4 and 5/6 as shown in Figure 3.9. This may represent a real increase in injury risk but may also be due to the raised awareness and diagnosis of this type of injury at these higher levels of play through the RFU ‘Headcase’ initiative which has been promoted extensively through the community game. There is also the possibility that the high profile of concussion in the media may have also been a factor in raising awareness for both players and club staff. It would also appear that the concussion rate in level 7/8/9 has not changed and therefore the raised awareness of concussion may not be as prominent within this level of community rugby.

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 guide to the resources available for concussion management can be found in Section 8.

For season 2013-14, the tackle was reported as the injury event for 71% of all concussions (Tackled: 27% and Tackling: 44%). Out of a total 23 concussions sustained by backs in the tackle, 6 were associated with an illegal tackle (26%), whereas only 1 concussion out of 29 (3%) in forwards was the result of an illegal tackle.

For 23% of all concussions, the player missed only one match. While this is within regulations for the 2013-14 season, new regulations introduced in March 2014 (at the end of this data collection period), permit the player to only return after 19 days (missing at least two matches), when the enhanced care setting is not available. Therefore return to play time scales should be closely monitored in future seasons.
Figure 3.8. Incidence of reported concussions over five seasons for all playing levels combined, including the mean incidence over the five seasons with upper and lower limits of 2 standard deviations.

Figure 3.9. Incidence of reported concussions over five seasons for each playing level.
**Hamstring strains**

Hamstring strains account for 6% of all injuries (9% in 2012-2013) 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 Surveillance Project also show that the overall number of days absence due to injury is highest for the Knee (MCL and 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.
Catastrophic injury

For the first time since the inception of CRISP, a ‘near miss’ catastrophic injury (cervical fracture) was reported in our sample population. As such, the incidence of this type of severe injury has been shown to be low, with an incidence of 0.007 injuries per 1000 player hours or one injury per 7434 team games. While this injury was potentially catastrophic, excellent on-pitch and hospital treatment has allowed the injured player to make an almost full recovery.

Injured player welfare

In cases where these injuries are serious enough to significantly change the lives of players or their families, the RFU provides support and assistance. Any reported injuries that may cause permanent and total disability will be followed up by the RFU who will offer the following support:

- Visit to the injured player in hospital
- Meet with representatives of the club or school to provide advice and assistance on how best to help the player and family
- Advise about issues such as family communication, fundraising, and accessing local support
- A partnership of player, family, club and the RFU will be created and this should help relieve the family of some of its immediate worries as well as helping to ensure the player is eventually able to enjoy a good quality of life.

RFU Injured Players Foundation

The RFU Injured Players Foundation (IPF) supports people who sustain a catastrophic injury while playing rugby. The charity provides help and support for both players and their families in the months following of these injuries as well as in the long term. It also incorporates the former SPIRE Rugby Trust charity.

Reporting serious injuries to the RFU

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.

3.6. Events associated with injury

For the 2013-14 season, 74% of all time-loss injuries were sustained during contact events (Figure 3.10). This finding has been consistent over each year of the Project and in the different group levels. Specific sections below are dedicated to provide further information on injury events of particular interest.

**Figure 3.10.** The incidence of injuries for specific match events for all playing Levels combined

The Tackle

- The tackle (both being tackled and tackling) was the most common injury event accounting for 50% of all injuries (25% through being tackled; 25% through tackling). This finding is consistent over seasons and throughout Levels 3/4, 5/6 and 7/8/9.
- The shoulder was the body site most commonly injured in the tackle (21% of all tackle injuries), followed by the head (18%), knee (16%) and ankle (10%).
- Figure 3.11 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.
- Figure 3.12 provides a further breakdown of the 5 most common specific diagnoses when the player is tackled and when tackling.
- Tackles resulted in an average of 6.3 matches absence compared with a mean severity of 6.4 matches missed for all injuries. There was no difference in the severity of the injury whether being tackled or tackling.
Figure 3.11. Percentage distribution by body regions for time-loss injuries sustained when being tackled and when tackling.

Figure 3.12. Top five most common injury diagnoses for the player being tackled and the player tackling. Numbers in brackets denotes the percentage of all tackled or tackling injuries.
The Scrum

The new scrum engagement laws which were introduced for the season 2013-14, provide an interesting back drop to the injuries sustained in the scrum over the season in comparison with previous years. Figure 3.13 shows the scrum injury incidence over 5 seasons and while there is an increase from season 2012-2013 to season 2013-14, the incidence is stable over the five-season period.

![Figure 3.13. Incidence of scrum injuries reported over five seasons.](image)

Further information scrum injuries

- Only 4% (24 injuries) of all time-loss injuries occurred in the scrum.
- There was only one scrum injury reported for level 3/4 (collapsed scrum), with 9 for level 5/6 and 13 for level 7/8/9.
- The severity was a mean of 5.3 matches absence (less than the mean absence for all injuries). Collapsed scrums, resulted in 5.5 and non-collapsed scrums 5.2 matches missed.
- Of the 24 injuries, 20 (including all five collapsed scrum injuries) occurred to front row players (loose head prop: 8 injuries, hooker: 4 injuries, tight head prop: 6 injuries) with second rows sustaining 2 injuries and back row players 2 injuries.
- There was a range of types of injury sustained in the scrum distributed between the shoulder (2 injuries), neck (3 injuries), chest (7 injuries), thigh (1 injury), knee (2 injuries) and lower back (7 injuries).
- Collapsed scrums resulted in injuries to the chest (2 injuries), head, knee and neck (each 1 injury).
Comparing scrum injuries for 2013-14 with previous seasons

Figure 3.14 compares the incidence of scrum injuries sustained by each forward position for season 2013-14 compared with the mean of seasons 2009-10 to 2012/13. Following the new scrum laws introduced in season 2013-14, there is a tendency for a greater incidence of injuries sustained by the hooker compared with the combined incidence from previous seasons. However, this difference was not statistically significant and ongoing surveillance will help to determine whether this is a meaningful difference.

**Figure 3.14.** The injury incidence for each forward position in the scrum for seasons 2009-13 (light grey bars) and season 2013-14 (dark grey bars).
Non-contact injuries

- Overall, non-contact injuries accounted for 17% of all injuries.
- Of non-contact events, running was found to be the most common injury event (11% of all injuries).
- Hamstring injuries accounted for 56% of all running injuries and 6% of all injuries. This is a consistent finding over the five seasons of the project.
- 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 statistical differences between time-loss injury rates between forwards (19.8 injuries per 1000 player hours) and backs (18.0 injuries per 1000 player hours). The mean number of matches missed for an injury to a forward is 6.0, compared with 7.4 for a back. Forwards and backs sustained 87% and 74%, respectively, of all injuries in contact events. When forwards and backs were split down into more specific positional groups there was a significantly higher injury rate for back row forwards compared with second row forwards and inside backs and outside backs (Figure 3.16).

Figure 3.16. 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.
Playing position and injury diagnosis

The most common specific injury diagnoses for forwards and backs were very similar (Figure 3.17) with concussion being the most common injury for both. This shows that despite different positional requirements, forwards and backs are still broadly at risk from the same types of injury.

**Figure 3.17.** The top five specific injury diagnoses for forwards and backs (numbers in brackets denote percentages of total injuries for forwards and backs).
### 3.8. Timing of injuries

Figure 3.18 demonstrates that more injuries occur in the second half of the match and particularly in the fourth match quarter. This is a consistent finding across all playing levels and over previous seasons of the Project. Furthermore, this injury pattern is consistent in both contact and non-contact injuries (Figure 3.18) and more specifically for tackle and running events.

The exact reason for this higher injury incidence later in the match is unknown but might be due to player fatigue which may manifest in terms of muscular fatigue (most likely in running events) but also mental fatigue, affecting the ability of players to carry out match events with appropriate technique (most likely in tackle and other contact event).

![Bar chart showing percentage of time-loss injuries in each match quarter for non-contact and contact injuries.](image)
SECTION 4 - PHYSICAL CHARACTERISTICS OF COMMUNITY RUGBY UNION PLAYERS

An additional aim for 2013-14 was to learn more about the physical characteristics of community rugby union players. By understanding more about these attributes and by combining this information with injury data, we can better understand risk factors for injury which in turn informs future injury prevention strategies. In addition, this valuable information can show how the physical attributes of players might differ between different levels of play.

During the 2013-14 pre-season training period, the CRISP team visited 23 community clubs to assess players for anthropometric characteristics and performance on a battery of functional movement control tests and physical fitness tests. Overall, 418 players were assessed with the results of these tests summarised below. As per Section 3 of this report, clubs/players are divided into level 3/4, level 5/6 and level C 7/8/9).

4.1. Anthropometry

During club visits, players were assessed for mass, height, body fat and age. The summary of these findings is shown in Table 4.1. Players in Level 3/4 (National leagues 1 and 2N/S) were 2.5 years younger, 3.7 cm taller and 5.5 kg heavier than players in Level 7/8/9. Forwards were 2.2 cm taller, 1.1 years older, 14.9 kg heavier and had 4.4% more body fat than backs (Table 4.2).

<table>
<thead>
<tr>
<th>Playing Level</th>
<th>N</th>
<th>Height (cm)</th>
<th>Age (yrs)</th>
<th>Mass (kg)</th>
<th>Body Fat (%)</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Level 3/4</td>
<td>110</td>
<td>182.4 ± 6.6C</td>
<td>23.0 ± 3.9C</td>
<td>95.8 ± 13.7C</td>
<td>13.7 ± 4.7</td>
<td>28.7 ± 3.6</td>
</tr>
<tr>
<td>Level 5/6</td>
<td>163</td>
<td>181.0 ± 6.7C</td>
<td>24.9 ± 4.7</td>
<td>94.4 ± 13.8C</td>
<td>13.9 ± 4.5</td>
<td>28.8 ± 3.8</td>
</tr>
<tr>
<td>Level 7/8/9</td>
<td>145</td>
<td>178.7 ± 6.4</td>
<td>25.5 ± 5.5</td>
<td>90.5 ± 12.4</td>
<td>15.0 ± 5.9</td>
<td>28.4 ± 4.0</td>
</tr>
<tr>
<td>All</td>
<td>418</td>
<td>180 ± 6.7</td>
<td>24.6 ± 4.9</td>
<td>93.4 ± 13.4</td>
<td>14.2 ± 5.1</td>
<td>28.6 ± 3.8</td>
</tr>
</tbody>
</table>

^A^C = significantly higher measure than corresponding playing groups (p<0.05); ^A^ = Level 3/4, ^B^ = Level 5/6, ^C^ = Level 7/8/9.
Table 4.2. Anthropometric characteristics for community rugby players competing at RFU Levels 3 to 9 for by playing position, height (cm), age (years), mass (kg), fat (%) and BMI. Values are expressed as mean ± standard deviation.

<table>
<thead>
<tr>
<th>Playing Position</th>
<th>N</th>
<th>Height (cm) Mean ± SD</th>
<th>Age (yrs) Mean ± SD</th>
<th>Mass (kg) Mean ± SD</th>
<th>Body Fat (%) Mean ± SD</th>
<th>BMI (kg/m²) Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Row</td>
<td>102</td>
<td>178.0 ± 5.8</td>
<td>24.7 ± 5.2</td>
<td>104.5 ± 11.9</td>
<td>18.7 ± 5.0</td>
<td>33.0 ± 3.3</td>
</tr>
<tr>
<td>Second Row</td>
<td>35</td>
<td>189.5 ± 4.9</td>
<td>25.9 ± 5.8</td>
<td>103.4 ± 9.1</td>
<td>15.2 ± 5.2</td>
<td>28.8 ± 2.2</td>
</tr>
<tr>
<td>Back Row</td>
<td>85</td>
<td>182.6 ± 5.5</td>
<td>25.2 ± 6.2</td>
<td>94.2 ± 9.9</td>
<td>13.9 ± 3.8</td>
<td>28.2 ± 2.5</td>
</tr>
<tr>
<td>Scrum Half</td>
<td>31</td>
<td>174.6 ± 5.0</td>
<td>22.6 ± 3.0</td>
<td>78.6 ± 10.1</td>
<td>11.7 ± 5.1</td>
<td>25.8 ± 3.2</td>
</tr>
<tr>
<td>Inside Backs</td>
<td>88</td>
<td>180.8 ± 5.6</td>
<td>24.9 ± 4.1</td>
<td>88.3 ± 10.9</td>
<td>12.3 ± 4.2</td>
<td>27.0 ± 3.0</td>
</tr>
<tr>
<td>Outside Backs</td>
<td>77</td>
<td>179.7 ± 7.0</td>
<td>23.6 ± 3.5</td>
<td>85.1 ± 9.0</td>
<td>11.5 ± 3.1</td>
<td>26.3 ± 2.2</td>
</tr>
<tr>
<td>Forwards</td>
<td>222</td>
<td>181.6 ± 6.8*</td>
<td>25.1 ± 5.7*</td>
<td>100.4 ± 11.8*</td>
<td>16.3 ± 5.1*</td>
<td>30.5 ± 3.6*</td>
</tr>
<tr>
<td>Backs</td>
<td>196</td>
<td>179.4 ± 6.4</td>
<td>24.0 ± 3.8</td>
<td>85.5 ± 10.5</td>
<td>11.9 ± 4.0</td>
<td>26.5 ± 2.8</td>
</tr>
</tbody>
</table>

a-f = significantly higher measure than corresponding positions (p<0.05); a = Front Rows, b = Second Rows, c = Back Rows, d = Scrum Halves, e = Inside Backs, f = Outside Backs.

* Indicates a significant difference between forwards compared to Backs (p<0.05).
4.2. Physical fitness characteristics of community rugby players

The purpose of carrying out fitness tests on community rugby players was to find out more about the different physical attributes of community levels players but also to assess whether there were any differences between different playing levels. The tests and the type of fitness characteristic they are designed to assess are shown in Table 4.3. The vertical jump and Dyno pull were performed on stable hard surfaces, while the running tests were performed outdoors on grass surface.

Table 4.3. List of fitness tests and what element of fitness, each test assesses.

<table>
<thead>
<tr>
<th>Test</th>
<th>Purpose of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Jump (cm)</td>
<td>Test of jump height, assessing lower limb explosive power</td>
</tr>
<tr>
<td>Dyno Pull (kg)</td>
<td>Lower back and leg strength using a vertical maximal pull movement from the ground (‘Dead lift’) (measured in kg lifted)</td>
</tr>
<tr>
<td>Power (kg)/Weight (kg)</td>
<td>Above Dyno pull score divided by player's weight to provide a score relative to the individual's weight.</td>
</tr>
<tr>
<td>10 m Sprint (s)</td>
<td>Test of acceleration from standing start</td>
</tr>
<tr>
<td>40 m Sprint (s)</td>
<td>Test sprint speed</td>
</tr>
<tr>
<td>Illinois Agility (s)</td>
<td>Test of acceleration, agility and change of direction</td>
</tr>
<tr>
<td>Yoyo IRT1 (m)</td>
<td>Aerobic intermittent shuttle running endurance test designed specifically for intermittent team sports.</td>
</tr>
</tbody>
</table>

Table 4.4 Performance characteristics for community rugby players competing at RFU level 3/4, 5/6 and 7/8/9. Values are expressed as mean ± standard deviation.

<table>
<thead>
<tr>
<th>Test</th>
<th>Level 3/4</th>
<th>Level 5/6</th>
<th>Level 7/8/9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>110</td>
<td>163</td>
<td>145</td>
</tr>
<tr>
<td>Vertical Jump (cm)</td>
<td>36.8 ± 4.8\textsuperscript{c}</td>
<td>35.7 ± 5.4\textsuperscript{c}</td>
<td>34.4 ± 5.1</td>
</tr>
<tr>
<td>Dyno Pull (kg)</td>
<td>215.6 ± 31.4\textsuperscript{bc}</td>
<td>197.7 ± 31.4</td>
<td>193.6 ± 32.2</td>
</tr>
<tr>
<td>Power (kg)/Weight (kg)</td>
<td>2.3 ± 0.4\textsuperscript{b}</td>
<td>2.1 ± 0.4</td>
<td>2.2 ± 0.4</td>
</tr>
<tr>
<td>10 m Sprint (s)</td>
<td>2.02 ± 0.16\textsuperscript{c}</td>
<td>2.05 ± 0.18\textsuperscript{c}</td>
<td>2.14 ± 0.15</td>
</tr>
<tr>
<td>40 m Sprint (s)</td>
<td>5.77 ± 0.37\textsuperscript{c}</td>
<td>5.87 ± 0.37\textsuperscript{c}</td>
<td>6.02 ± 0.34</td>
</tr>
<tr>
<td>Illinois Agility (s)</td>
<td>17.90 ± 1.25\textsuperscript{c}</td>
<td>18.20 ± 1.15\textsuperscript{c}</td>
<td>18.65 ± 1.06</td>
</tr>
<tr>
<td>Yoyo IRT1 (m)</td>
<td>1055 ± 460\textsuperscript{c}</td>
<td>959 ± 447\textsuperscript{c}</td>
<td>651 ± 358</td>
</tr>
</tbody>
</table>

\textsuperscript{bc} = significantly better performance than playing levels (p<0.05); \textsuperscript{b} = Level 5/6, \textsuperscript{c} = Level 7/8/9.
## Table 4.5. Fitness test scores for community rugby players competing at RFU Levels 3 to 9 organised by 'playing positions', displaying players’ vertical jump height (cm), dyno pull (kg), Power (kg)/Weight (kg) ratio, 10m sprint, 40m sprint and Illinois agility test times (s) and YOYO intermittent recovery test (L1) distances (m). Values are expressed as mean ± standard deviation.

<table>
<thead>
<tr>
<th>Test</th>
<th>Front row</th>
<th>Second row</th>
<th>Back row</th>
<th>Forwards</th>
<th>Scrum Half</th>
<th>Inside Backs</th>
<th>Outside Backs</th>
<th>Backs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Jump (cm)</td>
<td>31.5 ± 4.7</td>
<td>35.0 ± 5.7</td>
<td>35.6 ± 4.7</td>
<td>33.6 ± 5.2*</td>
<td>37.6 ± 4.3</td>
<td>36.0 ± 4.4</td>
<td>38.8 ± 4.3</td>
<td>37.5 ± 5.0</td>
</tr>
<tr>
<td>Dyno Pull (kg)</td>
<td>201.0 ± 35.8</td>
<td>201.2 ± 37.1</td>
<td>206.0 ± 31.4d</td>
<td>203.0 ± 34.3</td>
<td>181.5 ± 27.1</td>
<td>198.4 ± 33.2</td>
<td>205.3 ± 32.9d</td>
<td>198.5 ± 31.0</td>
</tr>
<tr>
<td>Power(kg)/Weight (kg)</td>
<td>2.0 ± 0.4</td>
<td>1.9 ± 0.4</td>
<td>2.2 ± 0.3ab</td>
<td>2.1 ± 0.4*</td>
<td>2.3 ± 0.3ab</td>
<td>2.3 ± 0.4ab</td>
<td>2.4 ± 0.4ac</td>
<td>2.3 ± 0.4</td>
</tr>
<tr>
<td>10 m Sprint (s)</td>
<td>2.16 ± 0.20</td>
<td>2.15 ± 0.17</td>
<td>2.09 ± 0.15</td>
<td>2.13 ± 0.18*</td>
<td>2.02 ± 0.14ab</td>
<td>2.11 ± 0.14ab</td>
<td>1.99 ± 0.14ab</td>
<td>2.01 ± 0.14</td>
</tr>
<tr>
<td>40 m Sprint (s)</td>
<td>6.21 ± 0.37</td>
<td>6.11 ± 0.32</td>
<td>5.93 ± 0.29a</td>
<td>6.09 ± 0.36*</td>
<td>5.75 ± 0.27ab</td>
<td>5.90 ± 0.24acd</td>
<td>5.61 ± 0.25acde</td>
<td>5.70 ± 0.26</td>
</tr>
<tr>
<td>Illinois Agility (s)</td>
<td>19.31 ± 1.17</td>
<td>19.06 ± 0.97</td>
<td>18.13 ± 0.84ab</td>
<td>18.8 ± 1.16*</td>
<td>17.58 ± 0.83ab</td>
<td>18.57 ± 0.87ab</td>
<td>17.41 ± 0.74abce</td>
<td>17.7 ± 0.90</td>
</tr>
<tr>
<td>YoYo IRT1 (m)</td>
<td>574 ± 319</td>
<td>630 ± 278</td>
<td>975 ± 375ab</td>
<td>739 ± 384*</td>
<td>1027 ± 487ab</td>
<td>981 ± 480ab</td>
<td>1018 ± 483ab</td>
<td>1004 ± 480</td>
</tr>
</tbody>
</table>

*af = significantly better performance than corresponding positions (p<0.05); a = Front Rows, b = Second Rows, c = Back Rows, d = Scrum Halves, e = Inside Backs, f = Outside Backs. * Indicates a significant difference compared to Backs (p<0.05).
4.3. Functional Movement Screen (FMS®) and CRISP

**Functional Movement Screen - Background and Methods**

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.

The Functional Movement Screen (FMS) 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.
**Functional Movement Screen - Results**

Across all playing levels, the mean Functional Movement Screen score was 14.1. Scores for the different playing levels are shown in Figure 4.1. While there appears to be a trend for lower scores in level 7/8/9, there was no statistically significant difference in overall scores between any playing level. The breakdown of scores between positional groups is shown in Figure 4.2.

![Figure 4.1](image1)

**Figure 4.1.** Mean (SD) FMS scores for playing level 3/4, 5/6 and 7/8/9.

![Figure 4.2](image2)

**Figure 4.2.** Total FMS score for each playing position group. $^{a/c/e}$ = significantly ($p<0.05$) higher score compared with; $^a$ = Front Rows, $^c$ = Back Rows, $^e$ = Inside Backs.
Table 4.6. FMS scores (0-3) for all clubs combined by positional groups for the seven different movement patterns.

<table>
<thead>
<tr>
<th>Movement Pattern</th>
<th>Front Row</th>
<th>Second Row</th>
<th>Back Row</th>
<th>Forwards</th>
<th>Scrum Half</th>
<th>Inside Backs</th>
<th>Outside Backs</th>
<th>Backs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurdle Step</td>
<td>1.9</td>
<td>2.1</td>
<td>2.0</td>
<td>2.0</td>
<td>2.2</td>
<td>2.0</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Deep Squat</td>
<td>1.7</td>
<td>1.9</td>
<td>1.8</td>
<td>1.8</td>
<td>2.1</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Inline lunge</td>
<td>1.9</td>
<td>2.2</td>
<td>2.1</td>
<td>2.1</td>
<td>2.4</td>
<td>2.1</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Active Leg raise</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
<td>1.7</td>
<td>2.0</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>1.3</td>
<td>1.8</td>
<td>1.4</td>
<td>1.5</td>
<td>1.9</td>
<td>1.8</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Stability Push-up</td>
<td>2.6</td>
<td>2.6</td>
<td>2.5</td>
<td>2.5</td>
<td>2.7</td>
<td>2.7</td>
<td>2.8</td>
<td>2.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13.1</td>
<td>14.4</td>
<td>13.8</td>
<td>13.5</td>
<td>15.4</td>
<td>14.3</td>
<td>14.6</td>
<td>14.6</td>
</tr>
</tbody>
</table>

Figure 4.3 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.
For five of the movement patterns, participants completed the movements using both the left and right sides of the body, for which both the scores are reported. FMS guidelines state that the lowest score of the left and right should be used when calculating the participant’s total score. Table 4.7 shows the percentage of participants who displayed different scores between the left and right sides for a given movement pattern, therefore demonstrating an asymmetry. These results may be important given that previous research in other sports has shown that athletes demonstrating an asymmetry in the Functional Movement Screen, were more likely to be injured.

Table 4.7. The percentage of participants displaying asymmetries in movement patterns involving assessments made to both the left and right sides.

<table>
<thead>
<tr>
<th>Movement Pattern</th>
<th>Hurdle Step</th>
<th>Inline lunge</th>
<th>Active Leg raise</th>
<th>Rotary Stability</th>
<th>Shoulder Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of asymmetries</td>
<td>17</td>
<td>21</td>
<td>18</td>
<td>5</td>
<td>42</td>
</tr>
</tbody>
</table>
4.5. Summary of player physical characteristics

These results show for the first time preliminary descriptive findings for anthropometric, physical fitness and functional movement control and in a large number of community rugby union players. These results provide important information to community clubs in terms of normative values which might be expected for players at particular playing levels.

Physical characteristics: Potential links with injuries

- The results show that players at the highest and middle tiers of community rugby are younger, taller and heavier with less body fat than those playing at recreational/social levels.
- These superior physical characteristics at higher playing levels are associated with better performance in a range of fitness measures.
- It is likely that it is these better fitness levels - particularly in the endurance measures – allow players to carry out a greater workload over the match which results in a greater number of contact events per match as the playing level increases.
- In addition we have previously shown from a CRISP study that there is a greater risk of injury per contact event at higher levels of play.
- While no detailed analysis is available of how injuries specifically occur in contact events at the community level, it is possible that better physical conditioning allows players who are faster with greater mass to enter the contact event with greater momentum, thus imparting more force on the opposing player.
- Therefore, it appears from these results that the injury rate is greater at higher playing levels, possibly due to players being exposed to more contact events which in turn each carry a greater risk of injury than at lower levels of play.

Timing of injuries and fatigue

- Across all playing levels of community rugby, more injuries occur in the third and fourth quarters of the match suggesting that there might be a potential role of fatigue.
- However, there are no differences between playing levels in terms of the percentage of total injuries sustained in each quarter despite players at the lower levels showing lower levels of endurance fitness.
- This is perhaps not surprising given that although players at the higher level have superior endurance fitness, they would also have to sustain a higher work rate throughout the match, resulting in a similar rate of fatigue as those at the lower playing levels.
- It should also be considered that for season 2013-14 teams in level 3/4 were permitted to have five substitutes whereas those in level 5/6 and 7/8/9 are permitted only three with a maximum of eight interchanges per match. This may result in different patterns of substitutions over the match and potentially on fatigue levels.

Functional movement control: Key findings

- We have shown that although there is a tendency for a lower mean score for functional movement control in the lower playing levels there is no statistically significantly difference between different playing level groups. This is due to a large variation of player scores within each level.
Out of the seven functional movement tests, community rugby players scored lowest on the shoulder mobility test, in part due to asymmetries (one shoulder more mobile than the other) and the reporting of pain when performing the movement. The shoulder is also the most injured upper limb site. Further work will explore whether the individual players with a low FMS shoulder mobility score or who reported pain have a greater risk of shoulder injury.

Front row forwards demonstrated the lowest functional movement control scores, while scrum halves score highest. This may be related to Body Mass Index (BMI) for which front row have the highest and scrum halves have the lowest.

**Further work on player characteristics and injury**

Further work in this area will examine the data of individual players and employ additional statistical analyses to determine whether certain physical characteristics place the individual at greater injury risk.
**SECTION 5 - FUTURE DIRECTIONS OF COMMUNITY RUGBY INJURY SURVEILLANCE**

**Continued injury surveillance**

The community rugby injury surveillance project has now been established over multiple seasons. This information provides an increasingly large number of injuries to further our confidence of injury patterns at this level of rugby. Additionally, this information provides the opportunity to compare injury trends over consecutive seasons. In this way, it is possible to examine the potential influence of law changes or the effects of any other methods of intervention on injury patterns.

**Further exploration of injury risk factors**

Further analyses will be carried out to examine in detail the relationship between the player physical attributes presented in Section 4 and injury risk. The important aspect of exploring player functional movement competency, fitness and anthropometrics, 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.

**Injury prevention**

Data from CRISP has shown consistently over multiple seasons that the majority of injuries are sustained in the lower limb, particularly in the knee, ankle and thigh while the majority of upper limb injuries occur in the shoulder. Furthermore, studies from other team sports have shown that the risk of injury can be reduced when players undertake specific exercises which focus on directly on the body sites most at risk of injury. While positive outcomes have been reported for some team sports, this has not yet been applied to rugby union. Based on this evidence, season 2014-2015 will see the introduction of a rugby union specific injury prevention warm-up program in a sample of community level clubs. The results from this study will form the basis of a future randomised control trial, involving a much larger number of clubs. This study is an exciting progression of CRISP and represents the culmination of a number of seasons over which evidence has been collated to provide an evidence base on which to design an injury prevention programme.
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:

6.1. Physical preparation
6.2. Injury prevention
6.3. Injury management

Useful online resources:

**Rugby Football Union (RFU)**
General information on player health is available via the RFU website:
http://www.englandrugby.com/my-rugby/players/player-health/

**International Rugby Board (IRB)**
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.
6.1. 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: http://www.englandrugby.com/my-rugby/players/player-health/injury-prevention/

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 (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 the ‘related links’ section on: http://www.bath.ac.uk/health/projects/ru-fu-rugby-injury/injury-prevention/player-preparation/index.html


6.2. 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.englandrugby.com/my-rugby/coaches/

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

6.3. 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:

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.

3. 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.
4. Deaths occurring during or within 6 hours of the game finishing.

The injury report form for the above can be accessed via:

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:

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:

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:

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.englandrugby.com/news/physiotherapy-sports-therapy-and-rehabilitation-1289873/

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.englandrugby.com/my-rugby/players/player-health/concussion-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. The concussed player must be assessed by a medical practitioner, either at the time of injury or by referral, then have two weeks rest, after which time they must be symptom free. The player must then undergo 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. Therefore, the earliest return to play for a community level player will be 19 days after to the injury.

The definitive IRB concussion guidelines can be accessed via the following link: http://www.irbplayerwelfare.com/concussion
The information collected by the community rugby injury surveillance project has resulted in a number of journal publications and conference communications.

**Journal publications**


**Conference communications:**


Many thanks to the coaches and sports injury staff at all participating clubs in the Community Rugby Injury Surveillance Project for 2013-14.

**Level 3/4:**
Bishops Stortford, Bromsgrove, Caldy, Cambridge, Chester, Cinderford, Esher, Fylde, Hartpury College, Macclesfield, Tynedale, Sedgely Park, Loughborough Students,

**Level 5/6:**

**Level 7/8/9:**

**Community Rugby Injury Surveillance Team**

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