



ENGLAND RUGBY

PREMIERSHIP INJURY AND
TRAINING AUDIT 2010-2011
SEASON REPORT

JANUARY 2012





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1

EXECUTIVE SUMMARY

- The overall risk of match and training injury in the Premiership remains stable. This contradicts the perception that injury risks in the elite game continue to rise and highlights the importance of data collected as part of a whole league injury surveillance studies that minimises the effects of statistical fluctuation seen when considering a single club or team.
- Although the likelihood of sustaining a match injury increased by 16% in 2010-11 compared with 2009-10, it remained comfortably within the “normal range” seen since the study began in 2002 and reflects normal season by season variation rather than any statistically significant change in injury risk. The average severity of injury reduced from 22 days in 2009-10 to 21 days in 2010-11, which also reflects normal season by season variation.
- There was very limited change in the types of match or training injury that were either the most common or resulted in the greatest days absence in 2010-11 compared with previous seasons.
- High ankle ligament (Inferior tibiofibular syndesmosis) strains were the second highest ranked match injury in 2010-11, having not been in the top 5 highest risk match injuries since the study began. It is unclear whether this represents greater awareness of the injury and more accurate reporting or a “true” difference in injury incidence. These injuries are typically contact ankle injuries sustained in the tackle or ruck and will be monitored in 2011-12.
- The likelihood of sustaining a recurrence of a previous injury in matches continues to fall. Both the likelihood of sustaining a recurrence of an injury in a match and the days absence resulting from recurrent injuries decreased again in 2010-11 and continues to be a falling trend. The match injury recurrence rate fell from 10% to 7% in 2010-11. This is likely to be as a result of continued efforts by clubs to refine practical tools to help medical teams and coaches evaluate when a player is appropriately rehabilitated from injury.
- There was very limited change seen in 2010-11 with respect to the time of injury during the season. There was a small rise in the tackle as the associated match injury event and a trend towards more injuries in the fourth quarter but none of these changes are viewed as particularly significant.
- Despite a significant increase (29%) in game time played by players 21 years and under in 2010-11, this group of younger players were not at an increased risk of injury in 2010-11 when compared to players aged 22 and above.
- A small increase in the risk of rugby skill contact injury and conditioning non weights injury risk highlights the need for more detailed information about training sessions. At present the audit collects information about training session content and duration but do not record any markers of intensity. With the increasing use of GPS by clubs to monitor playing load across the league, this is an area that needs to be reviewed. We will explore the feasibility of collecting training intensity/load information in 2012-13 either through GPS or via player self rating of perceived exertion (RPE). It is hoped that we will be able to pilot these two approaches in 2012-13.
- A number of other analyses of the database or further investigations into specific areas of injury risk identified by the Injury and Training audit are in progress or planned. These include:
 - A detailed analysis of current elite game medical and strength and conditioning staff practices regarding hamstring injury prevention, diagnosis, treatment and rehabilitation – due to report early 2012
 - Analyses of the audit database from 2002 to 2011. These are underway and include an evaluation of the change in player anthropometric (height, weight and body mass) data over the study period, trends in the injury profile over the same period with a focus on the most common and highest risk match injuries and a study designed to assess the extent that previous injury may be a risk factor for subsequent injury.
 - A detailed audit of outcomes following Concussive injury that will include evaluation of pre and post injury performance statistics, symptom resolution, psychometric function and time to return to play. This study will start in pre-season 2012.

- Strategies to minimise the risk of injury whilst optimising performance are constantly being formulated and evaluated by club and country coaching, medical and conditioning staff. At the November 2011 IRB Medical Conference the principle of focussing injury prevention efforts on “controllable” injuries was discussed. Controllable injuries are those that arise in situations that coaches, administrators, conditioners and/or medical staff are most able to positively influence.

Potentially controllable injuries include those that occur during training, non contact match injuries, injuries that occur at the set piece or are as a result of foul play. Approximately 50% of all injuries fall into this controllable group. This strategy is likely to shape the next steps of injury prevention at all levels of play worldwide and is consistent with the approach taken by the Injury and Training audit to date.



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KEY RESULTS

The Rugby Football Union and Premiership Rugby Ltd has conducted an annual injury audit of England and Premiership teams since 2002. An injury is included in the audit if it prevents a player from training and/or playing for more than 24 hrs (see Methods section for a full definition).

This report is based on data collected from the 2010-2011 season and found that:

- 746 match injuries at Premiership clubs were reported; this equates to an average of 62 match injuries per club per season and 1.9 injuries per club per match with each injury leading to an average of 21 days absence from training and/or playing.
- The incidence (or likelihood of sustaining a match injury in 2010-11 was 93 injuries per 1,000 hrs. This was an increase of 16% in 2010-11 (80 injuries per 1,000 hrs). This equates to an increase of 0.3 injuries per club per match or 110 more injuries over the course of the season compared with 2009-10.
- The average severity (days before return to fitness/availability for match selection) as a result of match injury in 2010-11 was 21 days compared with 22 days in 2009-10
- As a consequence of the increase in incidence of match injury, the total number of days absence as a result of match injury increased by 11%, to 1917 days absence per 1000hrs in 2010-11 compared with 1722 days absence per 1000 hrs in 2009-10.
- Since the study began in 2002, the likelihood of sustaining a match injury has varied between a lower limit of 75 injuries per 1000 hours (2005-6) and an upper limit of 100 injuries per 1000 hours (2002-3 and 2008-9), with an average severity of injury between 16 (2002-3) and 23 (2008-9) days and the total days absence per 1000 hours between 1556 (2002-3) and 2285 days (2008-9).
- The precise reasons for the small increase in the match injury risk seen in 2010-11 compared with 2009-10 are unclear. It appears to be as a result of both an increase in a number of different injuries that resulted in 4-7 days absence and a very small absolute increase in injuries that resulted in more than 84 days absence.

- Days absence due to Knee Anterior Cruciate Ligament (ACL) ruptures (an uncommon match injury that typically results in more than 84 days absence) increased from 3 (2009-10) to 5 in 2010-11 and this had a very significant effect on both the overall average severity of match injury and the total days absence as a result of match injury in 2010-11.
- 340 training injuries at Premiership clubs were reported; this equates to an average of 28 training injuries per club per season. Injuries occurring during rugby skill sessions resulted in an average of 25 days absence from training and/or playing and injuries occurring during strength and conditioning session resulted in an average of 17 days absence.
- The likelihood of sustaining an injury during training increased by 16% in 2010-11 (2.8 injuries per 1000 hrs) compared with 2009-10 (2.4 injuries per 1000 hrs). This equates to an increase of 3.5 injuries per club or 42 more training injuries over the course of the season compared with 2009-10.
- As a consequence of the increase incidence and average severity of training injuries sustained during rugby skill sessions, the total days absence, as result these injuries, increased by 29%, 76 days absence per 1000hrs in 2010-11 compared with 59 days absence per 1000hrs in 2009-10. The increase in incidence of training injuries sustained during strength and conditioning sessions resulted in the increase in the total days absence, as result of these injuries. An increase of 11%, 41 days absence per 1000hrs in 2010-11 compared with 37 days absence per 1000 hrs in 2009-10.
- The rise in the risk of injury during rugby skills contact sessions and conditioning non weights sessions were the causes of the small increase in training injury risk seen in 2010-11. This is principally as a result of contact events in the rugby skill sessions

(69% of all rugby skill contact session injuries in 2010-11) and running related injuries (78% of all conditioning non weights training injuries in 2010-11). Time spent on these two activities reduced in 2010-11 so it is likely that any difference in injury risk is as a result of differences in training session content and/or intensity.

- Since the study began in 2002, the likelihood of sustaining a training injury during rugby skill sessions has varied from a lower limit of 1.7 injuries per 1000 hours and an upper limit of 3.3 injuries per 1000 player hours, with an average severity of injury between 19 and 28 days and the total days absence per 1000hours between 37 and 93 days.
- Since the study began in 2002, the likelihood of sustaining a training injury during strength and conditioning sessions has varied from a lower limit of 1.3 injuries per 1000 hours and an upper limit of 2.7 injuries per 1000 player hours, with an average severity of injury between 13 and 18 days and the total days absence per 1000hours between 23 and 44 days.

- The likelihood of sustaining a recurrence of a previous injury in matches and the days absence resulting from recurrent injuries decreased again in 2010-11 and continues to be a falling trend. The match injury recurrence rate fell from 10% to 7%. Work defining practical tools to help medical teams and coaches evaluate when a player is appropriately rehabilitated from common and high risk injuries should continue.
- There was very limited change in the types of match or training injury that were the most common or highest risk in 2010-11 compared with previous seasons.
- The England Rugby Injury and Training Audit is now the largest and most comprehensive elite game injury dataset in the world and provides much of the data needed to drive a leading elite game injury risk management programme in England.



3 | INTRODUCTION

The Rugby Football Union and Premiership Rugby Ltd first commissioned an injury surveillance study across the Premiership and England teams in 2002. The study is now conducted annually and The England Rugby Injury and Training audit is the world's largest study of professional rugby union injuries and training practices.



Injury surveillance is now considered to be an important obligation for professional sporting bodies. However the degree to which it is successfully undertaken varies substantially between different sports.

The England Rugby Injury and Training audit is unique in the way that it measures both the risk of injury sustained during training and the extent to which training practice may impact on subsequent match injury risk.

The England Rugby Injury and Training audit is admired for its robust methodology, the high level of compliance from respondents and for the number of scientific publications it has generated. The consistent methodology and mandated data collection by club medical and strength and conditioning staff has led to annually consistent results enabling the results from each season to be compared with each other.

The England Rugby Injury and Training audit is pivotal in both providing the baseline data needed to assess trends in injury and in guiding further investigation into injuries that are common, severe or increasing in incidence.

This report presents the high level findings from the 2010-11 England Rugby Injury and Training Audit and compares them with the results from the 7 previous Injury and Training Audit seasons (2002-03, 2003-04, 2005-06, 2006-07, 2007-08, 2008-09 and 2009-10). These results are intended to inform discussion about the direction of the injury risk management programme for elite rugby in England.

After 4 years of being hosted at the University of Nottingham (2007-11), the study will be hosted by the University of Bath for the period 2011-2014. The principles of the project are unchanged but it is anticipated that a number of specific linked studies will be developed

MOST COMMON
INJURY IS
DEAD LEG

4 SCOPE OF THE RESEARCH

Premiership first team squad members who were registered with the RFU were invited to participate in the audit. Written informed consent was obtained from each player. The total number of consented players for the 2010-11 season was 542. All eligible players gave their consent to be included in the study.

For the 2010-11 season, all matches in the Guinness Premiership, LV Anglo-Welsh cup and European Competitions (Heineken and European Challenge Cup) were included.

Injuries sustained while players represented England are reported separately.

Match and training injury data, and training exposure data, were provided by all 12 Premiership clubs in 2010-2011. A complete set of data was collected (as in 2009-10, 2008-09).

RFU unique player registration numbers were used to identify players throughout the study in order to maintain anonymity and medical confidentiality.

Medical personnel at each Premiership club and the England senior team reported the details of every injury to their players who were included in the study group together with the details of the associated injury event using a standard injury report form. Strength and conditioning staff recorded player's weekly training schedules on a standard training report form.

Individual match exposure was recorded every week for each player by reference to match video; this identified the position played, whether he was in the starting line-up or a replacement and the total time he spent on the field.

Injury diagnoses were recorded using the Orchard codes (OSICS). This sports specific injury classification system allows detailed diagnoses to be reported and injuries to be grouped by body part and injury pathology.

The injury definitions and data collection methods utilised in this study are compliant with the IRB Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union

542 PLAYERS FROM 2010-11 SEASON

5 DEFINITIONS

5.1 INJURY

An injury was defined as 'any injury that prevents a player from taking a full part in all training activities typically planned for that day and/or match play for more than 24 hours from midnight at the end of the day the injury was sustained'. For example, if a player was injured during a match on Saturday and he was able to take a full part in training on Monday, the incident would not be classed as an injury. If the player's training was restricted on Monday due to the injury received on Saturday, the incident would be classed as an injury and reported.

5.2 INJURY SEVERITY

Injury severity was measured as time (days) lost from competition and practice and defined as the number of days from the date of the injury to the date that the player was deemed to have regained full fitness not including the day of injury or the day of return. A player was deemed to have regained full fitness when he was 'able to take a part in training activities (typically planned for that day) and was available for match selection.'

5.3 RECURRENT INJURY

An injury of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury.

5.4 INJURY INCIDENCE AND DAYS ABSENCE

The likelihood of sustaining an injury during match play or training is reported as the Injury incidence. The Injury incidence is the number of injuries expressed per 1,000 player-hours of match exposure (or training exposure). Equally important to the player and/or his team is how long players are absent. This is known as the days absence and is also expressed per 1,000 player-hours of match exposure (or training exposure).

5.5 STATISTICAL SIGNIFICANCE

A result is considered to be statistically significant if the probability that it has arisen by chance is less than 5% or 1 in 20. In this report statistical analysis has been performed for the match and training injury incidence and days absence. 95% Confidence intervals (CI) have been reported and a significant difference between the values for incidence and days absence with previous seasons was assumed if the 95% confidence intervals for the parameters did not overlap.

6

RESULTS PREMIERSHIP CLUBS

6.1 MATCH INJURIES

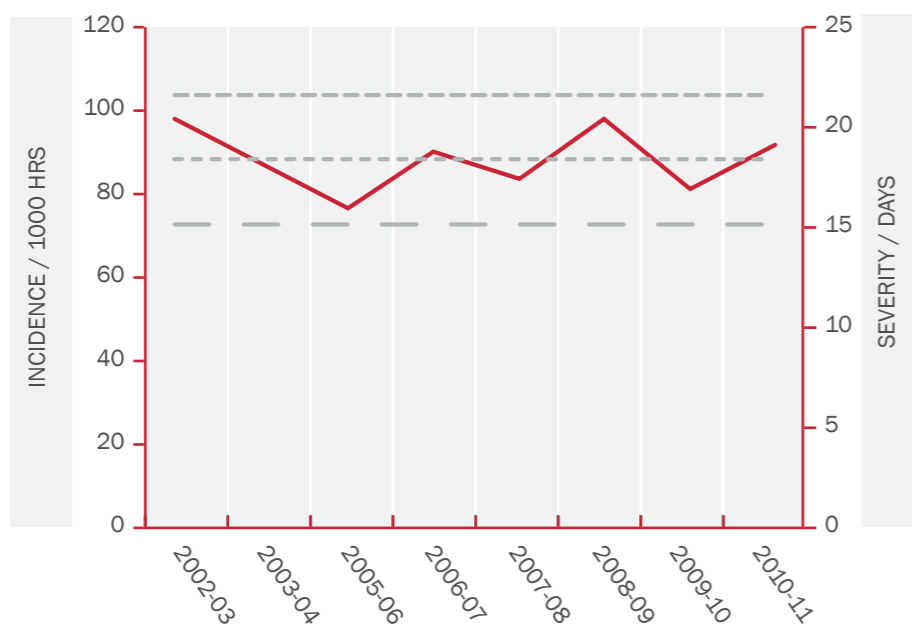
TABLE 1 > Match injury incidence, average severity and days absence since 2002-3

Season	Total number of match injuries	Injuries / 1000 hrs (95% CI)	Injuries per club per match	Average severity, days	Days absence \ 1000 hrs (95% CI)	Days absence per club per match
2002-03	748	100 (92-107)	2.0	16	1556 (1444-1667)	31
2003-04	653	88 (82-95)	1.8	20	1773 (1637-1909)	35
2005-06	482	75 (68-82)	1.5	21	1591 (1449-1733)	32
2006-07	755	90 (84-97)	1.8	21	1879 (1745-2013)	38
2007-08	660	83 (77-89)	1.7	19	1613 (1490-1736)	32
2008-09	769	100(93-107)	2.0	23	2285(2123-2446)	46
2009-10	636	80(73-86)	1.6	22	1722(1588-1856)	34
2010-11	746	93(86-99)	1.9	21	1917(1779-2054)	38

There were 403 team games included in the match analysis for 2010-11.

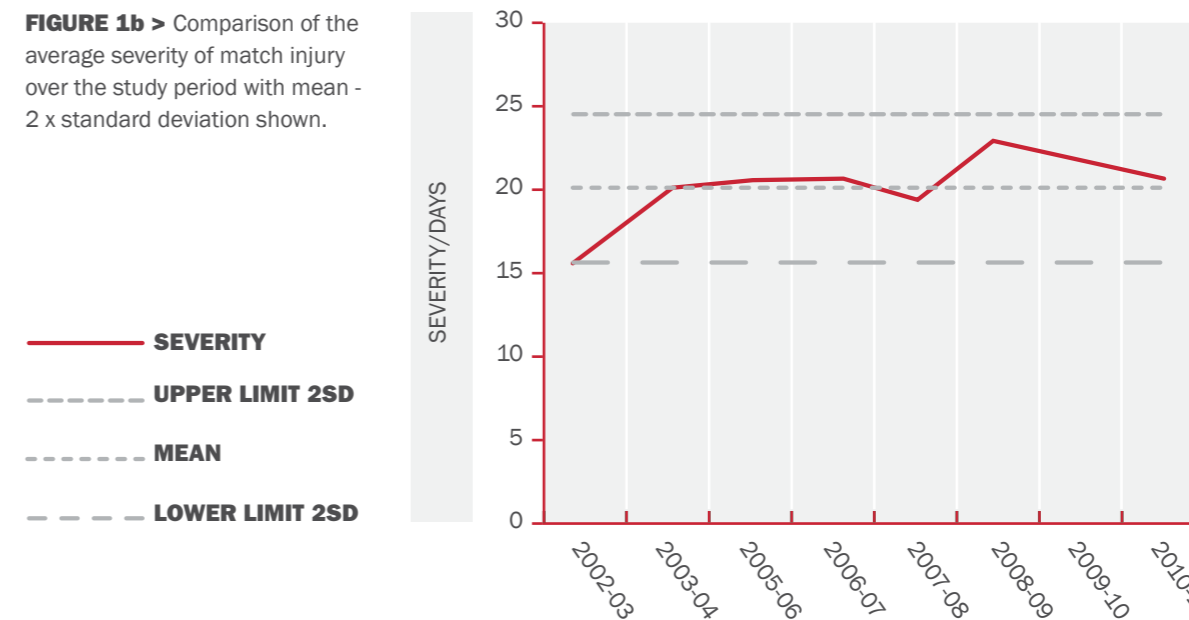
FIGURE 1 > Figure 1a. Comparison of the incidence of match injury over the study period with mean \pm 2 x standard deviation shown.

— INCIDENCE
 - - - - UPPER LIMIT 2SD
 - - - - MEAN
 - - - - LOWER LIMIT 2SD



Note - For a normal distribution, 95% of all data should fall between (Mean - 2 x standard deviation) and (Mean + 2 x standard deviation).

FIGURE 1b > Comparison of the average severity of match injury over the study period with mean - 2 x standard deviation shown.



Note - For a normal distribution, 95% of all data should fall between (Mean - 2 x standard deviation) and (Mean + 2 x standard deviation).



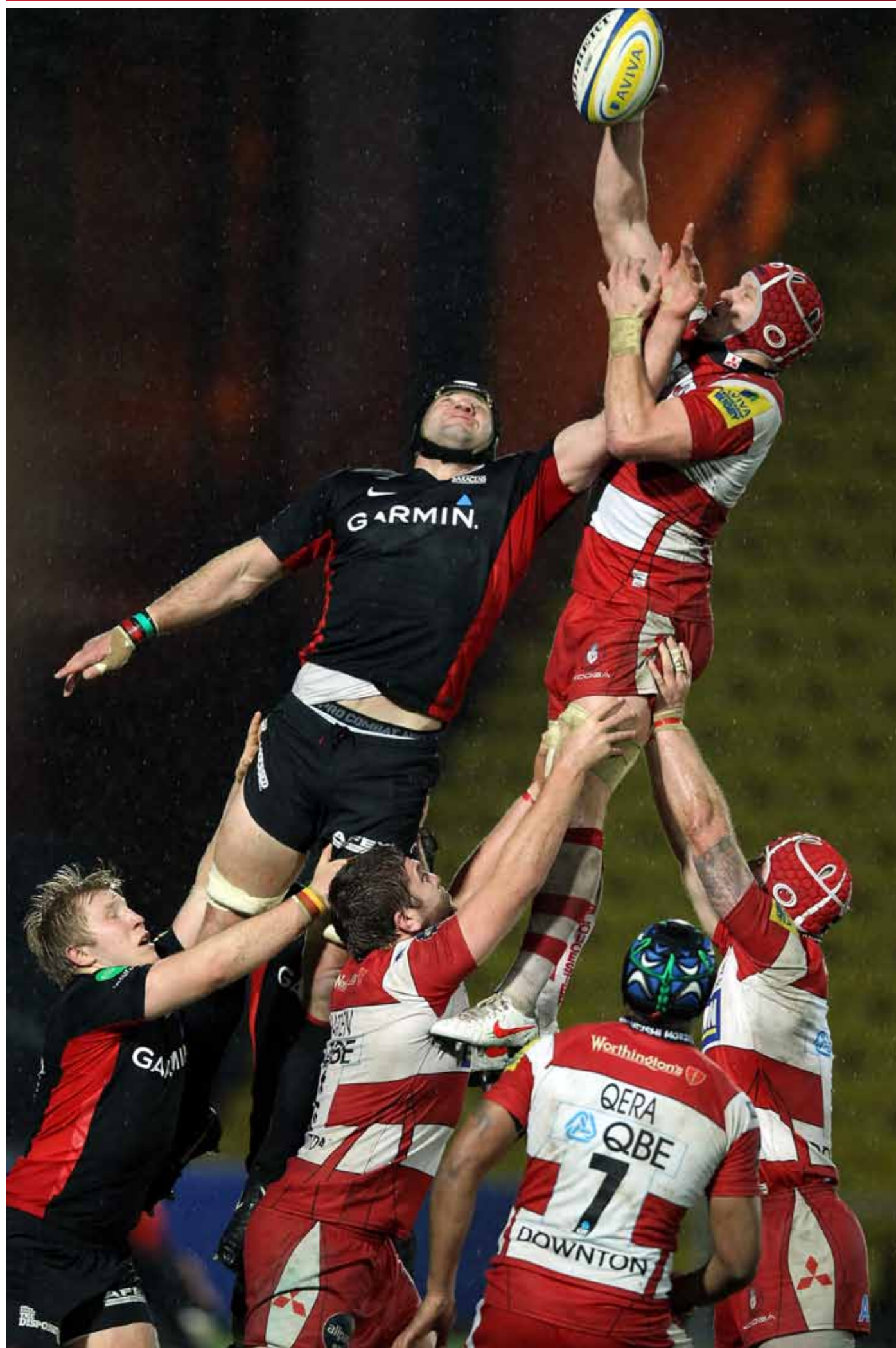
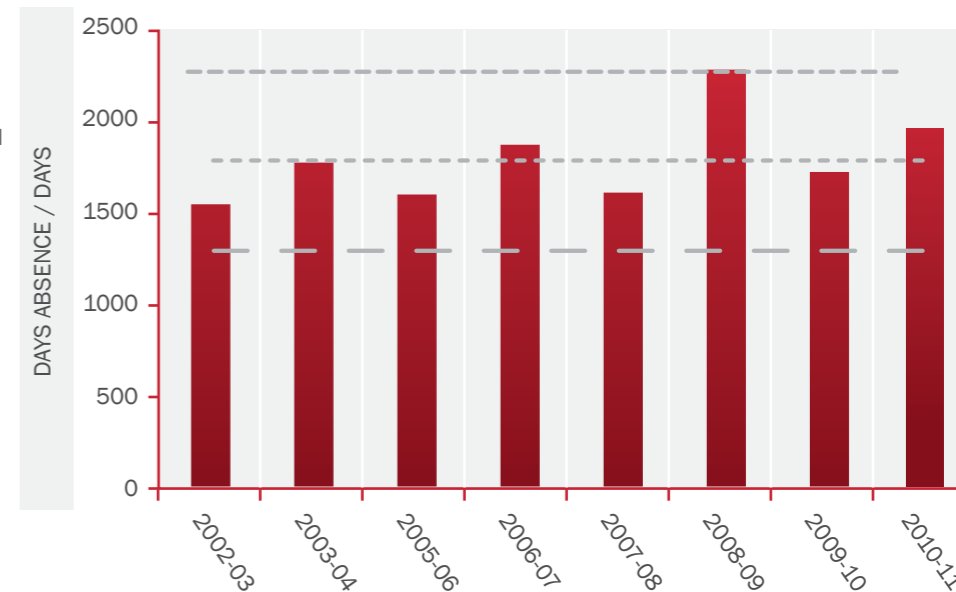


FIGURE 2 > Comparison of days absence/1000hrs from match injuries over the study period with mean - 2 x standard deviation shown.

█ **DAYS ABSENCE**
 - - - - **MEAN**
 - - - - **LOWER LIMIT/2SD**
 - - - - **UPPER LIMIT/2SD**



Note - For a normal distribution, 95% of all data should fall between (Mean - 2 x standard deviation) and (Mean + 2 x standard deviation).

SUMMARY OF THE MATCH INJURY RISK

There was an increase in match injury risk (both injury incidence and days absence) in 2010-11 compared to 2009-10; however this was not statistically significant.

LIKELIHOOD OR INCIDENCE OF INJURY

746 match injuries that led to time lost from training and/or match play in a Premiership, European competition or National knockout cup match were reported in the 2010-11 season.

The likelihood of sustaining an injury increased by 16% (80→93 injuries per 1000 hrs) in 2010-11 compared with 2009-10.

The increase compared to 2009-10 was not statistically significant (i.e. the probability that it has arisen by chance is less than 5%), and represents an increase of 0.3 injuries per club per match or 110 injuries over the course of the season.

AVERAGE SEVERITY OF INJURY AND DAYS ABSENCE FROM PLAYING AND TRAINING AS A RESULT OF MATCH INJURIES

The average severity of injuries sustained in a Premiership, European competition or National knockout cup match decreased from 22 days in 2009-10 to 21 days in 2010-11.

The days absence from playing and training as a result of an injury sustained in a Premiership, European competition or LV knockout cup matches which is a function of both the likelihood of sustaining an injury and the average severity of injury also showed an increase in 2010-11 compared with 2009-10

The average days absence per club per match in 2010-11 was 38 compared with 34 in 2009-10.

INJURY RISK IN MATCHES & TRAINING STABLE SINCE **2002**

6.2 TRAINING INJURIES

TABLE 2 > Training injury incidence, average severity and days absence since 2002-3

Season	Total number of training injuries	Rugby Skills			Strength and conditioning		
		Injuries / 1000 hrs (95% CI)	Average severity, days	Days absence / 1000 hrs (95% CI)	Injuries / 1000 hrs (95% CI)	Average severity, days	Days absence / 1000 hrs (95% CI)
2002-03	159	3.3 (2.8-4.0)	28	93 (90-97)	2.3 (1.7-3.0)	13	29 (27-31)
2003-04	217	1.7 (1.4-2.0)	26	44 (42-45)	1.3 (1.1-1.6)	17	23 (22-24)
2005-06	203	2.2 (1.9-2.6)	22	49 (47-51)	1.5 (1.2-1.9)	16	24 (22-25)
2006-07	209	2.1 (1.7-2.5)	18	37 (35-38)	1.6 (1.3-2.0)	16	25 (24-27)
2007-08	318	3.2 (2.7-3.7)	19	60 (51-68)	2.7 (2.2-3.1)	15	44 (36-52)
2008-09	258	2.5 (2.1-2.9)	26	63 (53-73)	2.4 (2.0-2.9)	17	41 (34-49)
2009-10	298	2.8 (2.4-3.2)	21	59(50-67)	2.1 (1.7-2.4)	18	37(30-43)
2010-11	340	3.1 (2.7-3.5)	25	76(66-87)	2.6 (2.1-3.0)	17	41(34-48)

• Total number of training injuries for 2007-08 only includes the injuries occurring in weeks where training exposure data were provided by clubs.



FIGURE 3 > Comparison of the incidence and severity of training injury sustained during rugby skills and conditioning sessions over the study period

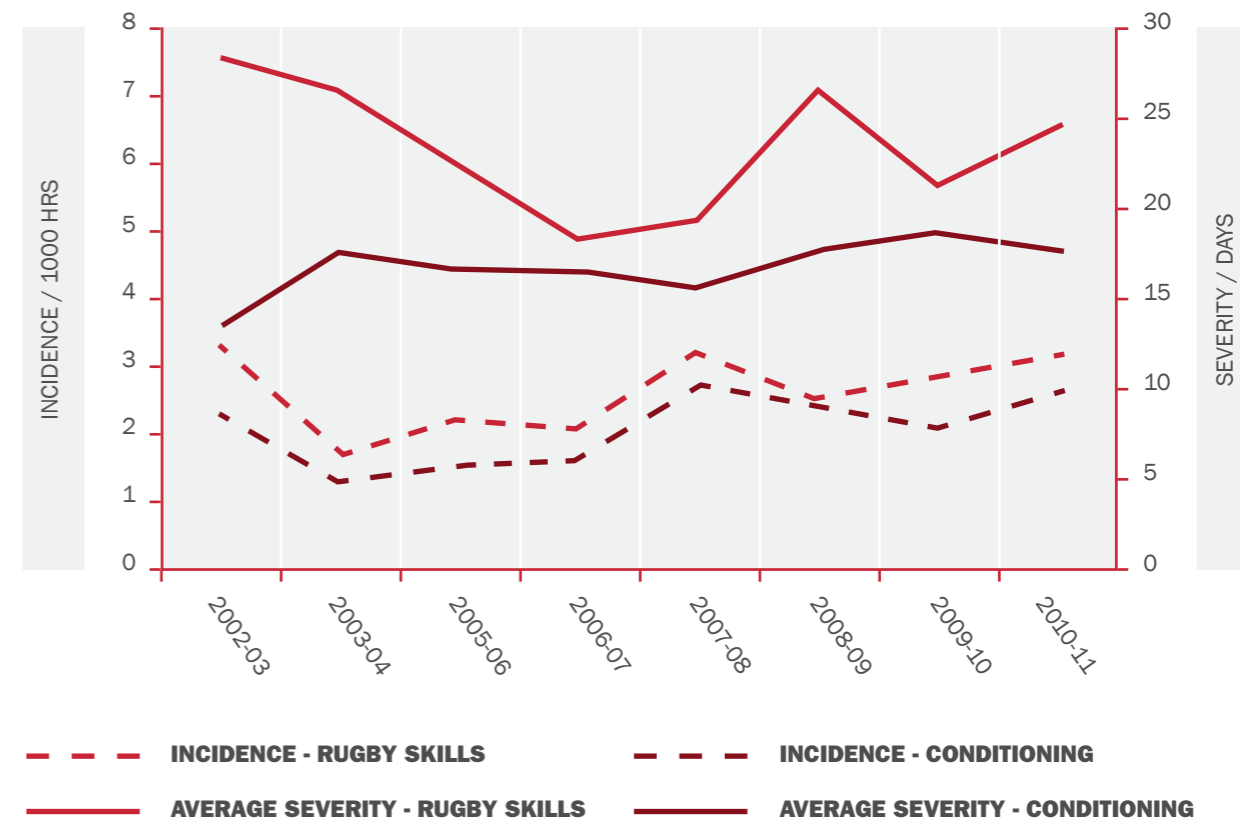
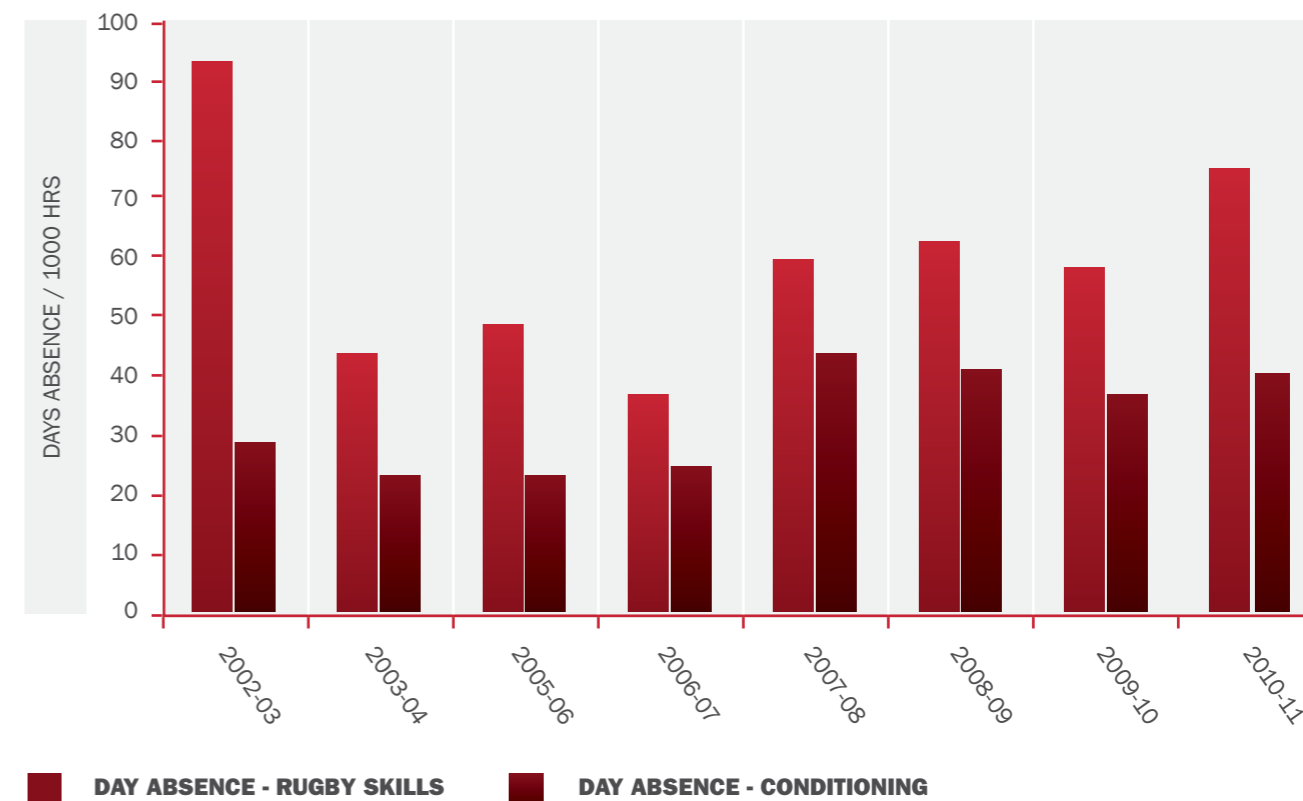


FIGURE 4 > Comparison of Days Absence per 1000hrs of Training injuries over the study period





SUMMARY OF THE TRAINING INJURY RISK

No statistically significant change in risk was seen in 2010-11.

LIKELIHOOD OR INCIDENCE OF INJURY

340 training injuries (rugby skills and strength and conditioning) that led to time lost from training and/or match play were reported in the 2010-11 season.

The likelihood of sustaining an injury during rugby skills and strength and conditioning increased slightly, 11% (2.8→3.1) and 24% (2.1→2.6) respectively, in 2010-11 compared with 2009-10. Over the last two seasons there has been a gradual increase in the incidence of injuries during rugby skill sessions after a fall in 2008-09.

Average severity of injury and days absence from playing and training as a result of training injuries

The average severity of injuries sustained during rugby skills increased from 21 days in 2009-10 to 25 days in 2010-11 but the average severity of injuries sustained during strength and conditioning decreased from 18 days in 2009-10 to 17 days in 2010-11.

The total days absence from playing and training as a result of training injuries sustained during rugby skills and strength and conditioning increased in 2010-11 compared to 2009-10.

340 TOTAL NUMBER OF TRAINING INJURIES

2010-2011

7 INJURY SEVERITY

7.1 MATCH INJURIES

Injury severity was measured as time (days) lost from competition and practice.

Injuries are grouped as 2-3 days, 4-7 days, 8-21 days, 21-28 days, 28-84 days and > 84 days lost.

TABLE 3 > Match injury severity since 2002-03

Season	Incidence / 1000 hrs						
	2-3 days	4-7 days	8-21 days	22-28 days	29-84 days	>84 days	All
2002-03	24	33	26	4	9	3	100
2003-04	19	26	23	3	14	4	88
2005-06	10	19	24	5	13	3	75
2006-07	17	30	22	6	11	5	90
2007-08	15	4	26	4	10	4	83
2008-09	18	30	26	5	14	6	100
2009-10	15	21	25	4	10	4	80
2010-11	17	27	27	5	11	5	93

An increase in the incidence of injury was seen in all severity groupings in 2010-11 compared to 2009-10. This is to be expected as the incidence has increased overall; however changes in all the categories fall within the ranges seen in the past 7 seasons. In 2010-11 the greatest proportional increase in incidence was seen in 4-7 day severity category (29%). Changes in the incidence of less severe injuries tends to have very little impact on the overall number of days lost.

In 2010-2011 the profile of injuries resulting in the most days absence in the >84 days category has changed slightly with only ACL ruptures being in the top three. Two Achilles tendon injuries resulting in a total of 565 days absence and three tibia/fibula fractures resulting in a total of 477 days absence were in the top three in 2010-11.

TABLE 4 > Injuries causing more than 84 days absence

	2010-11		2009-10		2008-09		2007-08	
	Number of Injuries	Total days absence	Number of Injuries	Total days absence	Number of Injuries	Total days absence	Number of Injuries	Total days absence
ACL Injury	5	1487	3 (+1 retired)	720*	8	1790	3	930
Fracture Foot	1	204	4	816	5	916	1	106
Dislocation / Instability shoulder	4	408	5	717	4	552	5	533

*: Excluding an injury that led to retirement in the subsequent season as no date of return could be identified or estimated.

Comparison of the three top injuries in 2008-9 causing > 84 days absence with 2010-11, 2009-10, 2008-9 & 2007-8 seasons.

Note - these are presented as numbers of injuries and total days absence and not as incidence figures and days absence/1,000 hrs.

7.2 TRAINING INJURIES

TABLE 5 > Training injury severity

Season	Incidence / 1000 hrs						
	2-3 days	4-7 days	8-21 days	22-28 days	29-84 days	>84 days	All
2002-03	0.64	0.49	1.11	0.18	0.42	0.18	3.0
2003-04	0.21	0.40	0.52	0.11	0.30	0.08	1.6
2005-06	0.46	0.58	0.60	0.10	0.35	0.10	2.2
2006-07	0.57	0.42	0.51	0.10	0.20	0.07	1.9
2007-08	0.50	0.76	0.94	0.14	0.38	0.07	2.8
2008-09	0.43	0.57	0.77	0.17	0.31	0.10	2.4
2009-10	0.33	0.76	0.70	0.19	0.34	0.07	2.4
2010-11	0.48	0.76	0.91	0.21	0.32	0.13	2.8

The overall severity of training injuries increased in 2010-11 when compared to 2009-10. 31% of the total days absence due to both match and training injuries are as a result of training injuries. The greatest proportion of the total days absence due to training injuries is due to training injuries resulting in >84 days absence (37%). Hamstring muscle, ACL and calf muscle injuries resulted in the most days absence irrespective of injury severity category. (See later in the report in table 14). Combined they resulted in 29% of the total days absence due to training injuries.



7.3 INJURIES LEADING TO RETIREMENT IN 2010-11

Two players retired in the 2010-11 season as a result of injuries sustained (either during 1st team competitive matches, training or that were cumulative) that were not resolved. The numbers of players retiring through a reportable injury from which a player did not return to full fitness have been collected each season.

The number of retirements as a result of injury from which the player had been deemed to have returned to full fitness before retirement are not reported in the audit and therefore are not included in this report. The figures in this report therefore do not reflect the total number of players who retire as a result of injury.

Since the 2002-03 season, injuries to the knee (7 of 30), shoulder (6), lumbar spine (6), cervical spine (7), and elbow (1) have caused the most retirements.

TABLE 6 > Injuries leading to retirement in 2010-11

Body part	Injury diagnosis	Injury incident
Cervical spine	Cervical Disc prolapse	Match – collapsed maul
Cervical spine	Cervical nerve root compression	Not known – cumulative



8

RECURRENCE OF INJURY

8.1

MATCH INJURIES

TABLE 7 > New and recurrent match injury incidence, average severity and days absence

Season	New injuries			Recurrent injuries		
	Injuries / 1000 hrs	Average severity, days	Days absence / 1000 hrs	Injuries / 1000 hrs	Average severity, days	Days absence / 1000 hrs
2002-03	79	14	1084	19	23	438
2003-04	72	18	1333	13	33	435
2005-06	67	20	1372	10	29	297
2006-07	76	21	1574	8	33	261
2007-08	74	19	1444	9	20	169
2008-09	85	21	1800	14	34	485
2009-10	72	21	1515	8	29	207
2010-11	87	21	1776	6	25	141

Summary of the risk of a recurrence of injury

The incidence of recurrence of injury in matches and days absence resulting from recurrent injuries (overall risk) reduced again in 2011. This is a decrease of 25% when compared with 2009-10.

The Audit uses the IRB consensus definition of what constitutes a recurrent injury (an injury of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury). This definition is extremely inclusive and injuries can be included in this category that some expert opinions might not view as a true recurrence in the commonly accepted meaning of the phrase (e.g. concussion and degenerative articular cartilage injuries). In addition, there is no upper time limit on when a further injury is no longer considered a recurrence.

Incidence, severity and days absence as a result of recurrent injury

There was a 25% decrease in the likelihood of an injury being reported as a recurrent injury compared to 2009-10

The average severity and days absence for recurrent injuries also decreased further in 2010-11 compared with 2008-09 & 2009-10.

Of the recurrent injuries, in 2010-11, 74% occurred within one month of return to play, 22% within 1-6 months, 2% within 6-12 months and 2% were not specified. This is a slightly higher proportion of reported recurrent injuries occurring within one month of return to play when compared to the past 3 seasons. (2009-10 – 62%, 2008-09 - 53% and 2007-08 -51% occurred within one month of injury).

TABLE 8 > The five most common match injury recurrences during 2010-11

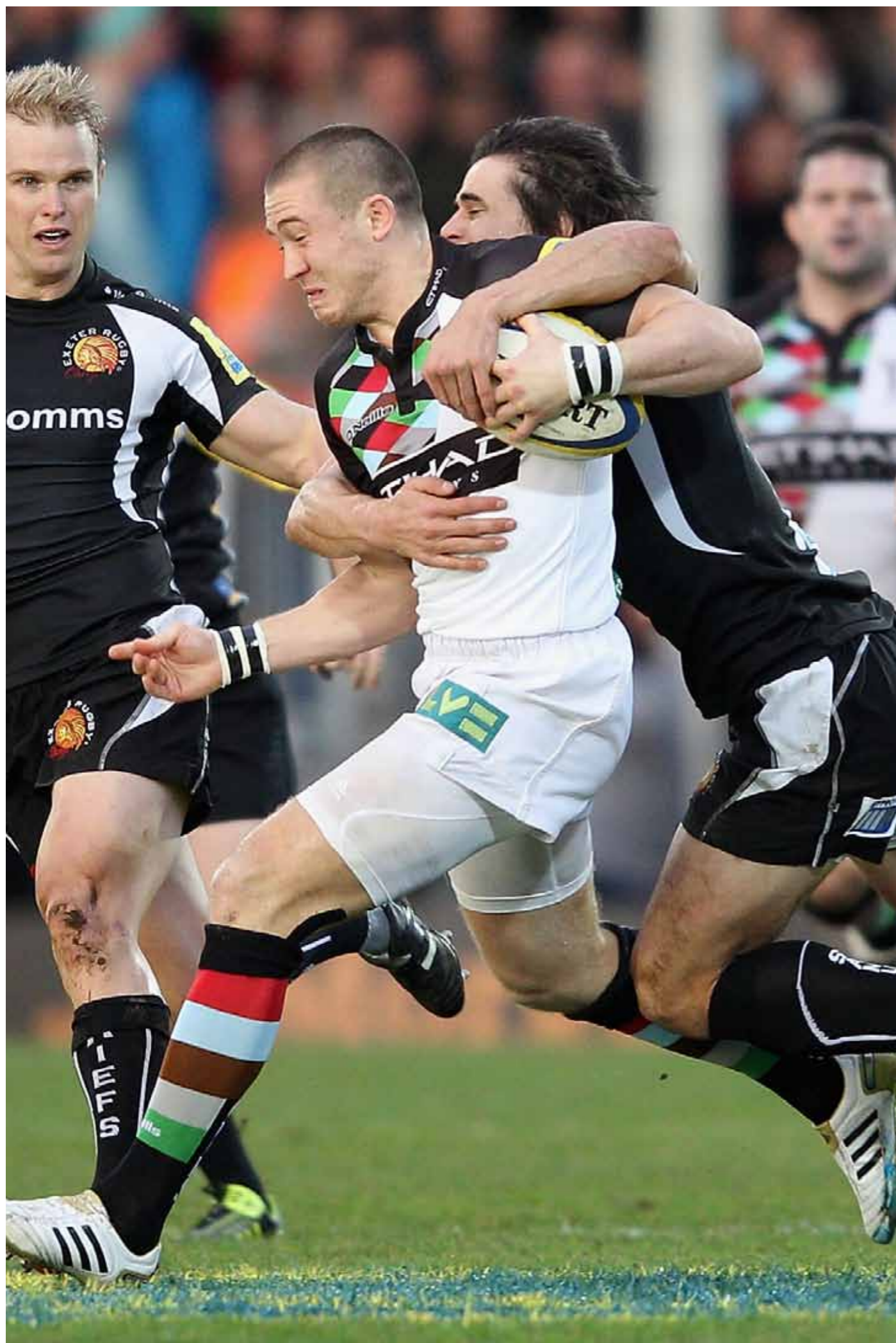
Diagnosis	Number of injuries	Average Severity
Knee cartilage/ degenerative injury	6	34
Hamstring muscle injury	4	30
Cervical nerve root injury	4	23
Calf muscle injury	4	14
Ankle joint capsule sprain	3	4

9% of all match injuries to the hamstring were recurrent injuries during 2009-10, whereas during 2008-9 18 % of all injuries to the hamstring were recurrent injuries.

TABLE 9 > The five most common match injury recurrences during 2009-10

Diagnosis	Number of injuries	Average Severity
Costochondral/sternal injury	5	13
Hamstring muscle injury	5	32
Achilles tendon injury	3	9
Calf muscle injury	3	12
Knee cartilage/ degenerative injury	3	94

The reduction in the likelihood of a recurrent injury as a result of Knee cartilage, degenerative injury, Dislocation/instability shoulder and Concussion is an extremely positive development.



8.2 TRAINING INJURIES

TABLE 10 > New and recurrent training injury incidence, average severity and days absence

Season	New injuries			Recurrent injuries		
	Injuries / 1000 hrs	Average severity, days	Days absence / 1000 hrs	Injuries / 1000 hrs	Average severity, days	Days absence / 1000 hrs
2002-03	2.5	21	54	0.5	34	16
2003-04	1.3	21	27	0.3	36	12
2005-06	1.8	19	35	0.4	21	8
2006-07	1.7	17	30	0.2	15	3
2007-08	2.3	17	39	0.5	23	11
2008-09	2.0	21	41	0.4	27	11
2009-10	2.2	20	44	0.2	21	4
2010-11	2.7	20	53	0.1	58	8

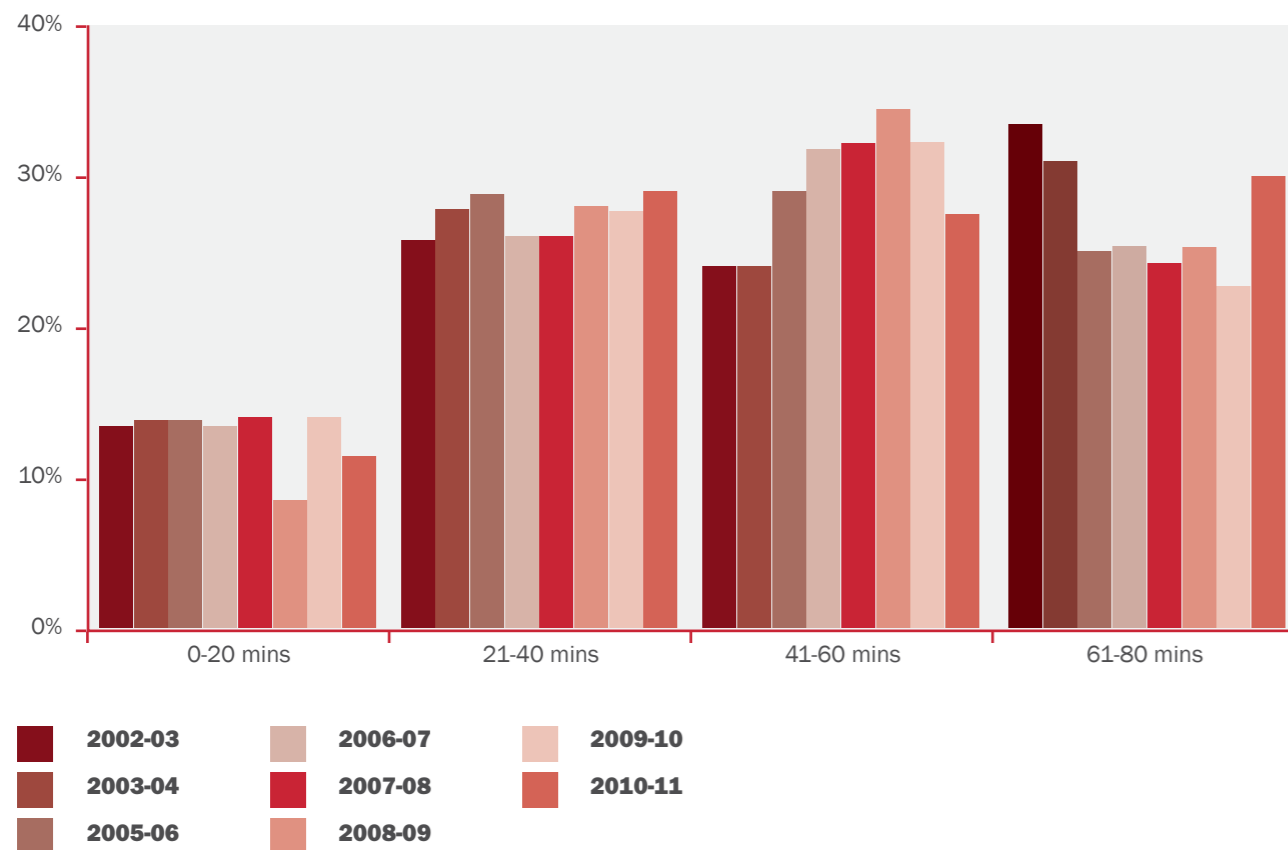
The incidence of recurrent training injuries decreased again in 2010-11 compared to 2009-10, however the average severity and days absence per 1000hrs increased. This was largely due to 3 injuries, an ACL and 2 shoulder injuries, which each resulted in more than > 84 (12 weeks) days absence.

NEW & RECURRENT MATCH & TRAINING INJURIES
DECREASED
 IN 2010-11

9 TIME OF INJURY

9.1 DURING MATCH

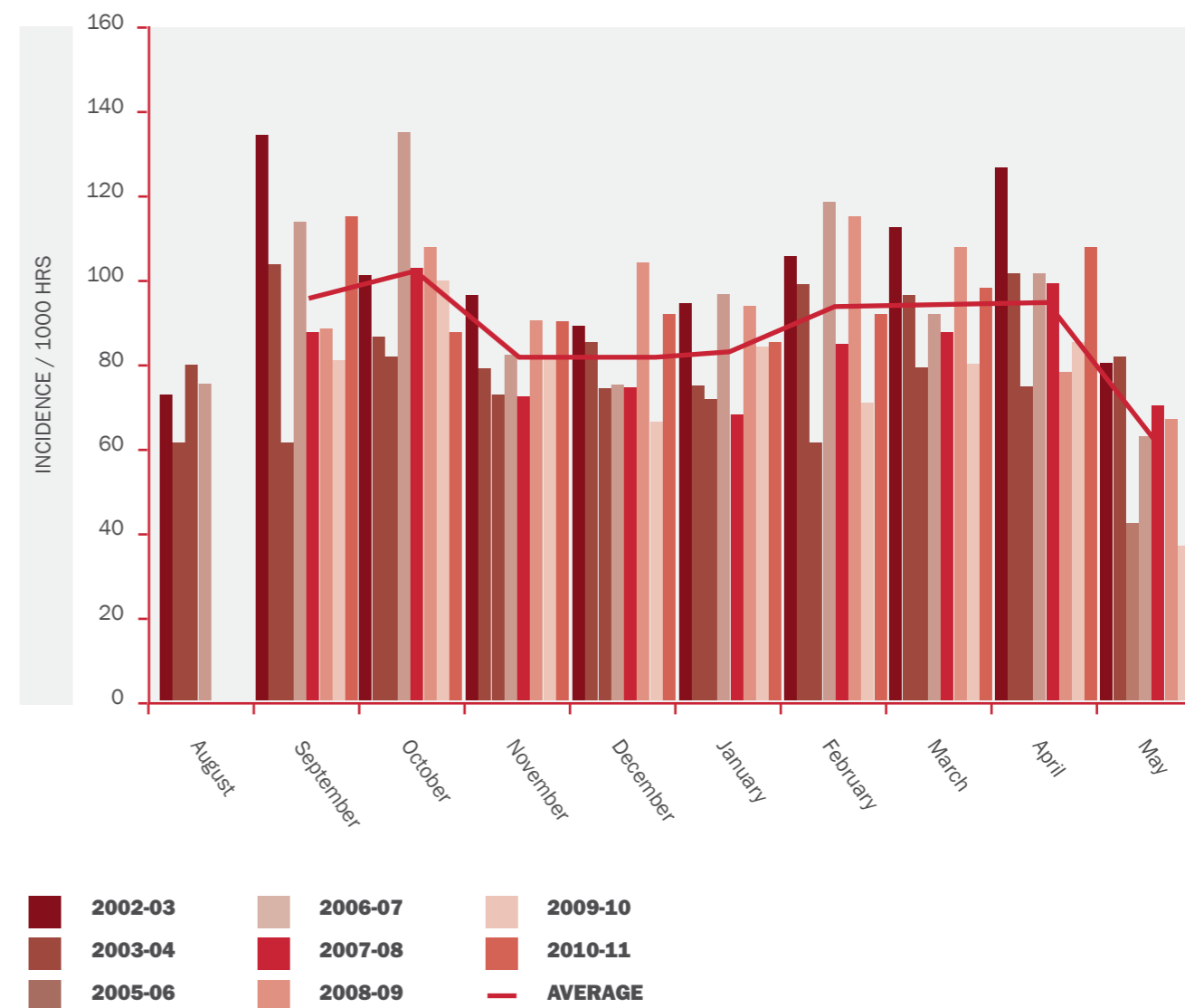
FIGURE 5 > Time of injury during the match



There was an increase in the proportion of injuries sustained in the 4th quarter after a decreasing trend. In comparison there was a decrease in the number of injuries sustained during the 3rd quarter after an increasing trend. No precise time of injury was identified for 11% of all match injuries. This is similar to the proportion of injuries for which no known associated event is known. (see figure 7)

9.2 DURING SEASON

FIGURE 6 > Time of injury during the season



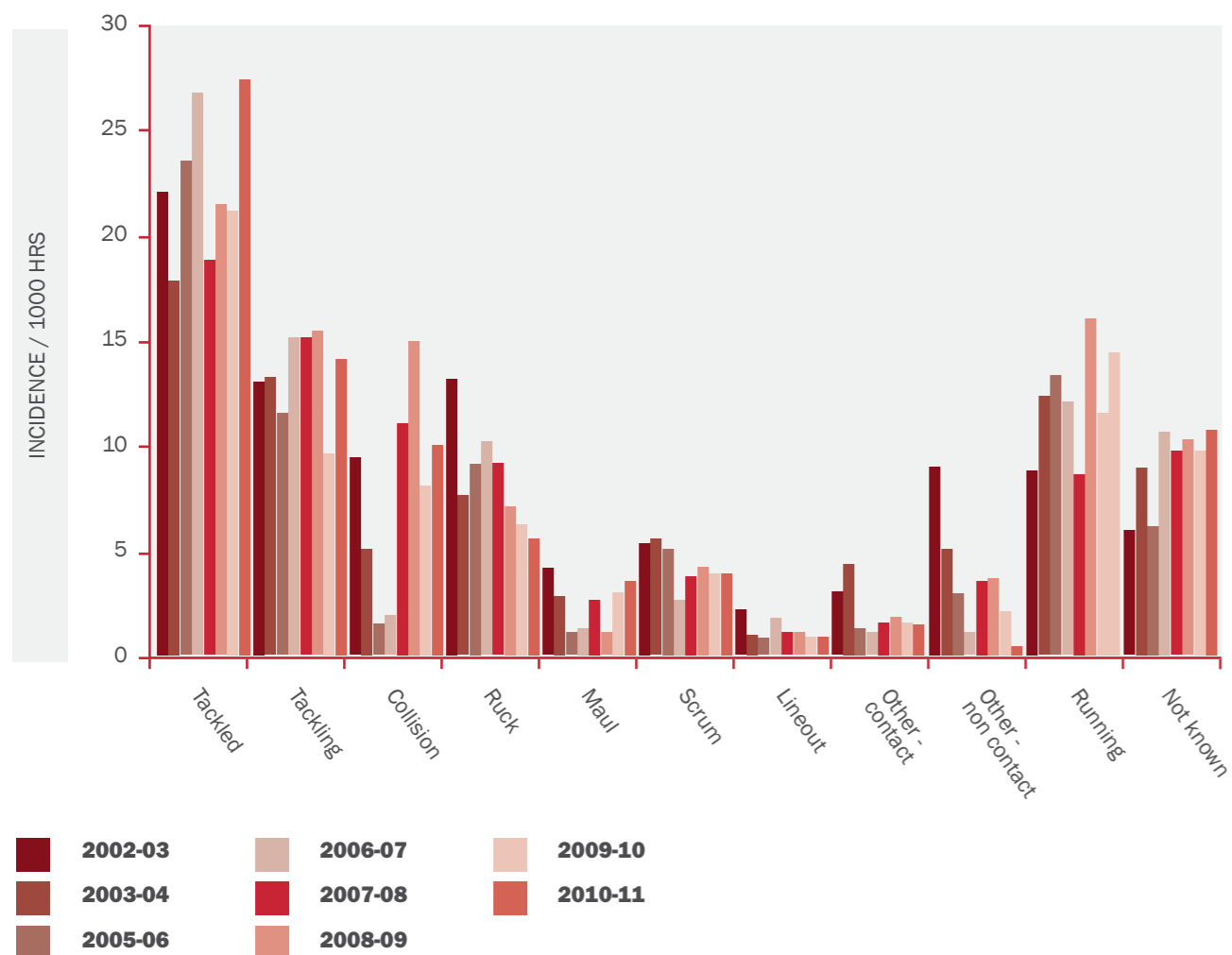
There has been no significant change over the study period in the time during the season and incidence of injury. Injuries are sustained throughout the season with small peaks of injury incidence typically seen in September/October and February/March/April.

The apparent fall in injury incidence in May might be as a consequence of unreported minor injuries by players in their last game of season before the summer break.

10 INJURY EVENT

10.1 MATCH INJURY EVENT

FIGURE 7 > Match injury event



The incidence of injuries as a function of injury event saw a rise in the incidence of injury as a result of the tackle (being tackled and tackling) in 2010-11. The most common injuries as a result of the tackle in 2010-11 were haematoma thigh, MCL injury, Inferior tibiofibular syndesmosis injury and lateral ankle ligament injury to the ball carrier and Acromioclavicular joint injury, concussion and cervical nerve root injury to the tackler. These findings are similar to 2009-10.



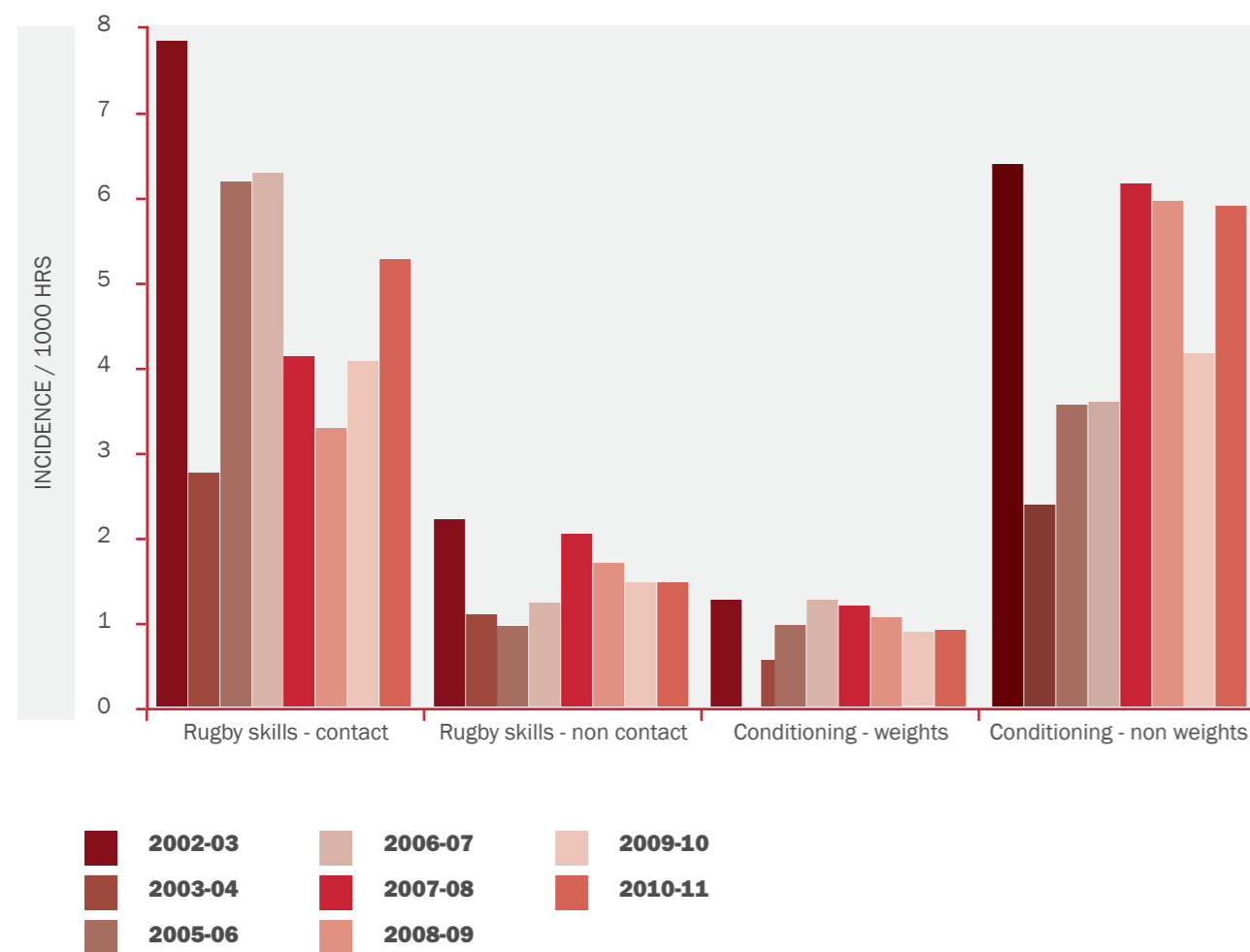
Injuries resulting from accidental and non accidental collision were collected separately in 2009-10. In 2010-11, the incidence of injury resulting from the collision increased when compared to 2009-10. The top three most common injuries arising as a result of match collisions in 2010-11 were similar when compared with 2009-10, (concussion, haematoma thigh and haematoma calf or shin), however there was more MCL injuries reported in 2010-11 when compared to 2009-10 as a result of collisions. (5 compared to 1) Of the total number of injuries resulting from the collision 83% were as a result of a perceived accidental collision (rather than an illegal tackles (without the use of the arms). This is similar to 2009-10(86%).

The incidence of injuries for which the associated event was not identified was similar in 2010-11 to 2009-10 (11% compared with 12%). 65% of the injuries where the associated event was not known were gradual onset injuries compared with 48% in 2009-10.

Similarly there was little change in the most common running related match injuries which were hamstring muscle injury, calf muscle injury, achilles tendon injury and adductor muscle injury.

10.2 TRAINING INJURY EVENT

FIGURE 8 > Training injury event



During conditioning non weights training sessions the most injuries were as a result of running related activities (78%), a similar proportion to 2009-10 (81%). The most common injuries sustained during conditioning non weights sessions in 2010-11 remained the same as 2009-10, with similar percentages. They were hamstring muscle injury (24% v 28%), calf muscle injury (13% v 13%), hip flexor/ quadriceps muscle injury (11% v 7%) and adductor muscle injury (7% v 7%).

It is likely that these small season by season changes reflect “normal” variation. The importance of minimising injury risk whilst optimising performance remains a significant challenge but the increasing use of GPS to monitor training load is likely to enhance our ability to plan training programmes more effectively.

TABLE 11 - Training injury event and average severity of injury

Training Activity	Average severity of Injury		
	2010-11	2009-10	Percentage change
Rugby skills – contact	26	21	+24%
Rugby skills – non contact	21	22	-5%
Conditioning weights	14	22	-36%
Conditioning non weights	17	17	-

The increase in incidence of training injury seen in table 2, can be attributed to an increase in incidence of injury in Rugby contact sessions (↑ 29%) and conditioning non weight sessions (↑42%). The incidence of injury remained similar for rugby skills non contact sessions (↑3%) and conditioning weights sessions (↑3%).

During rugby skill contact sessions the most injuries (29%) resulted from the tackle, with running related activities being the second most common cause of injury (24%).

The proportion of injuries caused by a contact event in rugby skill contact sessions was similar in 2010-11 (68%) compared with 2009-10 (67%). There was a small rise in the proportion of injuries caused by a non contact event in 2010-11(25%) compared with 2009-10 (20%). There were a smaller proportion of injuries for which the associated event was unknown in 2010-11 (7%) compared with 2009-10 (13%).

The most common injuries sustained during contact rugby skill sessions in 2010-11 compared with 2009-10 were hamstring muscle injury, (11% v 8%), calf muscle injury (7% v 6%) and Acromioclavicular joint injury (6% v 5%). Ankle lateral ligament injury sustained during training reduced in 2010-11 (3% v 9%), but there was a rise in the number of concussions sustained during contact training (6% v 1%).

(Note: Of the most common injuries in rugby skill contact sessions in 2010-11 – hamstring – 73% non contact event, calf muscle – 50% non contact event, AC joint – 100% contact event, concussion – 88% contact event (one unknown))

11

INJURY DIAGNOSIS

Injuries have been included in each table if they were one of the 8 most common or greatest risk (total days absence) injury diagnoses during previous seasons.

11.1 MOST COMMON MATCH INJURIES

The most common match injuries in 2010-11 were:

1. Thigh haematoma
2. Hamstring muscle injury (excluding haematomas)
3. Acromioclavicular joint injury
- 4 = Concussion
- 4 = Calf muscle injury
6. Ankle lateral ligament injury

The highest ranked match injuries in the period 2002-10 were:

1. Thigh haematoma
2. Hamstring muscle injury (excluding haematomas)
3. Calf muscle injury
4. Concussion
5. Ankle lateral ligament injury

Acromioclavicular joint injury was seen in the top 5 most common match injuries in 2010-11 for the first time since 2002-03.

Thigh haematomas, hamstring muscle, ankle lateral ligament, concussion and calf muscle injuries remain among the most common match injuries throughout the study.

There has been very little change over the study period.

Injury - (region and diagnostic category)	2002-03		2003-04		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11	
	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000 hrs	Rank	Incidence /1000hrs
Head/neck																
Concussion	3	5.6	5=	3.3	5	3.1	5	4.4	2	4.6	4	4.9	4	3.9	4	4.7
Cervical nerve root injury	7	3.4	8	2.6	9=	2.1	7=	3.0	15=	1.5	10	2.5	20=	0.9	11=	2.1
Shoulder																
Acromioclavicular jt injury	5	3.6	12=	2.1	12=	2.0	10	2.5	8	2.9	7	3.6	10=	1.9	3	4.8
Chest/low back																
Costochondral/sternal injury	12=	2.4	9=	2.5	6	2.7	9	2.8	6	3.1	11=	2.2	6	3.5	8	3.3
Rib fracture/contusion	19=	1.3	12=	2.1	7	2.4	17	1.4	9	2.5	30=	0.9	10=	1.9	24=	0.9
Thigh																
Haematoma, thigh	1	9.8	1	6.2	1	5.6	1	7.7	1	5.8	1	6.6	1	4.9	1	7.4
Hamstring muscle injury*	2	6.3	3	4.9	3	4.0	2	5.5	3	4.4	2	6.3	2	4.6	2	5.8
Knee																
MCL injury	9=	2.9	5=	3.3	4	3.7	6	3.9	5	3.6	5	4.7	7	3.4	7	3.7
Knee meniscal/articular cartilage injury	13	2.4	17	2.0	9=	2.1	12=	1.6	13=	1.9	8	3.4	13	1.8	11=	2.1
Lower leg																
Haematoma, calf/shin	6	3.5	4	3.8	18	1.5	7=	3.0	10	2.4	14	1.8	14=	1.5	11=	2.1
Calf muscle injury*	8	3.3	2	5.5	2	4.5	3=	4.5	4	4.1	3	5.0	5	3.8	4	4.7
Ankle/heel/foot																
Lateral ligament injury-ankle	4	5.2	7	3.2	8	2.3	3=	4.5	7	3.0	6	4.1	3	4.0	6	4.2
Inf tib-fib syndesmosis injury													8	2.4	9	3.1

TABLE 12 > Most common match injuries
 (*: Excluding haematomas/contusions)

11.2 HIGHEST RISK MATCH INJURIES

TABLE 13 > Highest risk match injuries

(*: Excluding haematomas/contusions)

Injury (region and diagnostic category)	2002-03		2003-04		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11	
	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs
Head/neck																
Concussion	8	57	12	52	5	66	10	55	10=	40	10	62	18	28	15	45
Cervical disc injury	41	4	32	12	9	49	23	19	25	15	8	77	14	36	24	25
Shoulder																
Dislocation/instability	2	108	2	95	1	176	4	118	2	90	7	86	2	114	9	66
Acromioclavicular joint injury	6	66	22	30	11	48	8	64	10=	40	15	55	12	39	5	92
Rotator cuff injury/ impingement.									4	83	32	11	24	15	18	33
Arm/elbow/wrist/hand																
Wrist/hand fracture	17	27	8	70	21	25	15	40	8	54	6	105	15	36	13	46
Thoracic/lumbar spine																
Lumbar disc/nerve root injury	23	16	10	68	30	14	39	3	18=	26	27	19	19	25	45	3
Thigh																
Haematoma, thigh	9	53	17	38	15	33	7	74	13	39	21	35	10	50	12	47
Hamstring muscle injury*	3	103	3	84	3	93	2	132	5	74	3	138	4	102	6	90
Knee																
MCL injury	5	83	1	106	2	129	5	110	3	88	2	154	5	97	3	108
ACL injury	1	134	4	81	24	24	1	168	1	117	1	232	6=	90	1	184
Meniscal/ articular cartilage injury	4	101	7	74	7	52	3	121	7	67	5	113	1	124	10	66
Lower leg																
Calf muscle injury*	14	32	6	77	4	66	6	80	9	50	17	51	9	60	13	46
Tibia/fibula fracture	10	43	16	40	22=	24	9	58	14=	37	22	32	8	79	4	97
Achilles tendon injury	29	11	5	80	6	53	32	10	18=	26	9	75	13	37	7	87
Ankle/heel/foot																
Lateral ankle ligament injury	7	63	18	37	13	42	13	50	14=	37	12	57	16	33	8	70
Inf. tib-fib syndesmosis injury	22	17	23	28	8	50	14	50	6	70	11	60	6=	90	2	131
Fracture foot											4	133	3	104	20	29

The match injuries of highest risk in 2010-11 were:

1. ACL injury
2. Inferior tibiofibular syndesmosis injury
3. MCL injury
4. Tibia/fibula fracture
5. Acromioclavicular joint injury

The highest ranked match injuries in the period 2002-10 were:

1. ACL injury
2. Shoulder dislocation/ instability
3. MCL injury
4. Hamstring muscle injury (excluding haematomas)
5. Knee meniscal/ articular cartilage injury

ACL injury was once again the highest risk match injury in 2010-11 after dropping out of the top five highest risk in 2009-10.

Inferior tibiofibular syndesmosis injuries were the second highest ranked match injury in 2010-11. It is unclear whether this represents greater awareness of the injury and more accurate reporting or a "true" difference in incidence. These injuries are typically contact ankle injuries sustained in the tackle or ruck and will be monitored in 2011-12.

Tibia/fibula fractures were amongst the top five highest risk match injuries in 2010-11. Shoulder dislocation/instability and foot fractures dropped out of the top five in 2010-11.

There has been very little change in the highest risk match injuries over the study period.

11.3 MOST COMMON TRAINING INJURIES

TABLE 14 > Most common training injuries

(*: Excluding haematomas/contusions)

Injury (region and diagnostic category)	2002-03		2003-04		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11	
	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs
Head/neck																
Concussion															8=	0.07
Cervical nerve root inj.	11=	0.05	27=	0.01	29=	0.01	6	0.06	-	-	27	0.01	18=	0.02	21=	0.03
Shoulder																
Acromioclavicular jt inj.	5	0.13	8=	0.04	8=	0.07	-	-	10=	0.04	17=	0.03	7=	0.06	8=	0.07
Rotator cuff injury/ impinge.									9	0.06	21=	0.02	18=	0.02	8=	0.07
Thoracic/lumbar spine																
Lumbar facet joint inj.	7=	0.09	16=	0.02	8=	0.07	9	0.05	10=	0.04	8	0.08	12=	0.05	15=	0.05
Lumbar disc/nerve root inj.	6	0.11	3	0.14	3=	0.10	10=	0.04	4	0.16	6	0.12	6	0.08	8=	0.07
Lumbar soft tissue inj.	7=	0.09	8=	0.04	3=	0.10	7	0.06	8	0.09	7	0.09	7=	0.06	8=	0.07
Groin/hip/buttock																
Adductor muscle inj.*	16=	0.04	6	0.09	3=	0.10	5=	0.07	2=	0.18	5	0.14	4	0.11	4	0.14
Thigh																
Haematoma, thigh	21=	0.02	20=	0.01	11=	0.06	10=	0.04	7	0.11	11=	0.05	15=	0.03		
Hip flexor/quads muscle inj.*	4	0.18	2	0.15	8=	0.07	4	0.12	6	0.12	2	0.19	5	0.09	3	0.15
Quadriceps muscle inj.															6=	0.08
Hamstring muscle inj.*	1	0.45	1	0.21	1	0.36	1	0.32	1	0.59	1	0.36	1	0.38	1	0.45
Knee																
MCL injury	7=	0.09	11=	0.03	11=	0.06	5=	0.07	10=	0.04	11=	0.05	15=	0.03		
Meniscal/articular cartilage inj	11=	0.05	11=	0.03	6=	0.08	20=	0.02	20=	0.03	9=	0.07	7=	0.06	6=	0.08
Knee joint sprain/jar													7=	0.06	8=	0.07
Lower leg																
Calf muscle inj.*	2	0.33	5	0.11	2	0.16	3	0.13	5	0.14	3=	0.17	2	0.20	2	0.30
Achilles tendon inj.	7=	0.09	7	0.04	11=	0.06	20=	0.02	10=	0.04	9=	0.07	7=	0.06	21=	0.03
Ankle/heel/foot																
Lateral ankle ligament inj.	3	0.20	4	0.12	6=	0.08	2	0.16	2=	0.18	3=	0.17	3	0.12	5	0.11
Inf tib-fib syndesmosis inj	-	-	8=	0.04	17=	0.03	26=	0.01	23=	0.02	21=	0.02	12=	0.05	17=	0.04

The most common training injuries in 2010-11 were:

1. Hamstring muscle injury (excluding haematomas)
2. Calf muscle injury
3. Hip flexor/ quadriceps muscle injury (excluding haematomas)
4. Adductor muscle injury (excluding haematomas)
5. Lateral ankle ligament injury

The highest ranked training injuries in the period

2002-10 were:

1. Hamstring muscle injury (excluding haematomas)
2. Calf muscle injury
- 3 = Lateral ankle ligament injury
- 3 = Hip flexor/ quadriceps muscle injury (excluding haematomas)
5. Lumbar disc/nerve root injury

Hamstring muscle injuries remained the most common training injury throughout the study, with the incidence increasing slightly again in 2010- 11 compared to 2009-10.

11.4 HIGHEST RISK TRAINING INJURIES

TABLE 15 > Highest risk training injuries

(*: Excluding haematomas/contusions)

Injury (region and diagnostic category)	2002-03		2003-04		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11	
	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs	Rank	Days absence (1000hrs)	Rank	Days absence /1000 hrs	Rank	Days absence /1000 hrs
Head/neck																
Cervical disc inj.	-	-	-	-	24	0.2	5	1.8	5=	2.2	24	0.2	27=	0.2	15	1.4
Shoulder																
Dislocation/instability, shoulder	1	8.2	5	2.4	-	-	32	0.02	10	1.4	-	-	12	1.0	7	2.1
Acromioclavicular joint inj.	8	3.4	12	0.8	11	1.4	-	-	27=	0.2	13	1.0	9	1.8	11=	1.6
Rotator cuff/shoulder impingement	-	-	14	0.7	4	2.9	15	0.4	8=	1.7	16	0.7	27=	0.2	11=	1.6
Arm/elbow/wrist/hand																
Wrist/hand fracture	16	0.9	13	0.7	13	1.0	7	1.2	14=	0.8	12	1.1	14	0.8	16=	1.3
Thoracic/lumbar spine																
Lumbar disc/nerve root inj.	9	2.4	1	5.7	9	1.8	4	1.8	3=	2.5	1	7.3	4	2.8	8=	1.7
Groin/hip/buttock																
Adductor muscle inj.*	21	0.5	4	2.4	19	0.8	8	1.2	7	1.9	11	1.3	11	1.1	8=	1.7
Thigh																
Hip flexor/quads muscle inj.*	10	2.0	11	1.1	8	2.1	11	0.8	11	1.2	5	2.7	15=	0.7	16=	1.3
Hamstring muscle inj.*	2	6.4	2	4.2	1	4.6	1	5.1	1	9.5	3	5.0	1	6.1	1	6.9
Quadriceps muscle inj.															8=	1.7
Knee																
MCL inj.	3	4.9	17	0.6	3	2.9	9	1.1	16=	0.7	6	2.1	15=	0.7	24=	0.5
ACL inj.	4	4.6	7	1.7	2	4.1	6	1.7	-	-	4	4.8	7	2.1	2	6.8
PCL,LCL inj.									3=	2.5	27=	0.1	40	0.02	32=	0.2
Meniscal/articular cartilage inj.	12	1.5	3	2.4	5	2.8	30	0.1	5=	2.2	2	6.2	2	3.8	5	3.1
Knee Joint sprain/jar											9=	1.3	15=	0.7	28=	0.3
Lower leg																
Calf muscle injury*	5	4.4	8	1.5	6	2.7	3	2.5	8=	1.7	8	1.8	8	2.0	3	3.8
Tibia/fibula fracture	11	2.0	10	1.3	7	2.4	-	-	-	-	15	0.7	6	2.2	19=	0.9
Achilles tendon injury	6	4.2	6	1.7	10	1.5	25=	0.1	12	1.1	9=	1.3	3	3.3	6	3.0
Inferior tib-fib syndesmosis													5	2.6	14	1.5
Ankle/heel/foot																
Lateral ankle ligament inj.	7	3.7	9	1.4	17	0.9	2	3.0	2	2.7	7	2.0	10	1.7	4	3.8

The training injuries of highest risk in 2010-11 were:

1. Hamstring muscle injury (excluding haematomas)
2. ACL Injury
3. Calf muscle injury
4. Ankle lateral ligament injury
5. Knee meniscal/articular cartilage

The highest ranked training injuries over the period 2002-10 were:

1. Hamstring muscle injury (excluding haematomas)
2. Lumbar disc/ nerve root injury
- 3 = ACL injury
- 3 = Knee meniscal/articular cartilage
5. Calf muscle injury

Hamstring muscle, lumbar disc/nerve root and ACL injuries remain the highest risk training injuries throughout the study period.

12 UPDATES ON PREVIOUSLY HIGHLIGHTED ISSUES FROM 2007-2010 REPORTS

The 2007-8 report highlighted and commented specifically on Training injury risk and Hamstring injury risk. The 2008-9 report highlighted and commented specifically on Training volume and Hamstring injury risk. Continued monitoring, comparison and comments on these areas for the 2010-11 season are presented below.

12.1 TRAINING VOLUME

TABLE 16 > Average player training hours per week

Year	Training hrs per week		
	Rugby Skills	Strength & Conditioning	Total
2002-03	3.9	2.5	6.4
2003-04	5.0	3.7	8.7
2005-06	4.3	3.1	7.4
2006-07	4.1	3.1	7.2
2007-08	3.0	2.7	5.7
2008-09	3.2	2.6	5.8
2009-10	3.2	2.9	6.1
2010-11	3.1	2.8	5.9

The Total training volume per player at Premiership clubs was similar in 2010-11 to the period 2007-10

In 2009-10 there was an increase in training volume when compared to 2008-09, but no increase in incidence of training injury. Conversely a decrease in training volume reported in 2010-11 compared to 2009-10 and an increase in incidence of training injuries. These differences are not statistically significant.

The increase in rugby skill incidence in 2010-11 was due to an increase of injuries in rugby skill contact sessions. The proportion of rugby skill training volume spent doing rugby skill contact sessions reduced in 2010-11 when compared to 2009-10 and 2008-09. The risk of injury during training is a function of the content/activity, the volume and the intensity. The Injury and training audit does not currently capture the intensity of the training session (or the player's response to the intensity of the session). The rise in rugby skill contact injury incidence, taken with the reduction in rugby skill training volume suggests that differences in the content or intensity of the sessions are the likely cause of the increase in injury.

The observed increase in incidence of injuries in 2010-11 as a result of strength and conditioning training was due to an increase in conditioning non weights sessions. The proportion of training volume spent in conditioning non weights sessions was similar to that in 2009-10, again suggesting that it is not the volume of training, but rather the difference in content and intensity of the sessions that may have resulted in the increase in injury incidence.

12.2 HAMSTRING TRAINING INJURIES

The incidence of hamstring training injuries per 1,000hrs and days absence per 1000hrs each season over the study period is presented in the table.

TABLE 17 > Hamstring training injuries

Year	Incidence/1000 hrs	Days Absence/1000 hrs
2002-03	0.45	6.4
2003-04	0.21	4.2
2004-05	0.36	4.6
2006-07	0.32	5.1
2007-08	0.59	9.5
2008-09	0.36	5.0
2009-10	0.38	6.1
2010-11	0.45	6.9

TABLE 18 > Profile of hamstring injuries

Diagnosis	2002-2004		2007-2008		2008-09		2009-10		2010-11	
	No. of Injuries	Injuries/1000hrs	No. of Injuries	Injuries/1000hrs	No. of Injuries	Injuries/1000hrs	No. of Injuries	Injuries/1000hrs	No. of Injuries	Injuries/1000hrs
Hamstring strain/tear	22	0.11	3	0.03						
Biceps femoris grade I							20	0.16	21	0.17
Biceps femoris grade II							4	0.03	4	0.03
Biceps femoris strain	28	0.14	39	0.34	23	0.21	24	0.19	25	0.2
Proximal (medial) hamstring strain	4	0.02	9	0.08	6	0.06	2	0.02	2	0.02
Distal medial hamstring strain	4	0.02	4	0.04	5	0.05	3	0.02	9	0.07
All muscle strains	58	0.30	55	0.48	34	0.32	29	0.23	36	0.29
Complete avulsion of hamstring origin							1	0.01	-	-
Distal medial hamstring rupture									1	0.01
Hamstring spasm/cramp/trigger pts	11	0.06	11	0.10	5	0.05	5	0.04	8	0.07
Lateral hamstring trigger pts									1	0.01
Hamstring origin tendinopathy							2	0.02	1	0.01
Lateral hamstring insertion tendinopathy			1	0.01			1	0.01	-	-
Medial hamstring insertion tendinopathy	1	0.01							1	0.01
Posterior knee tendinopathy/bursitis							2	0.02	-	-
Posterior thigh pain of neural origin - no fibre disrupt.							7	0.06	6	0.05
Total (All hamstring injury)	70	0.36	67	0.59	39	0.36	47	0.38	54	0.45

The incidence of hamstring injuries increased again slightly in 2010-11. It continues to remain the most common training injury and was the highest risk training injury in 2010-11.

Biceps femoris muscle injuries remain the most common hamstring injury. Posterior thigh pain of neural origin made up 11% of all hamstring training injuries. Running related activities was the cause of 81% of all hamstring training injuries in 2010-11.

12.3 INJURY RISK IN PLAYERS 21 AND UNDER

Comparison of match exposure of younger age groups in the Premiership clubs in 1st team matches revealed an increase of 29% in match exposure of players 21 years and under in 2010-11 (52626 minutes played) compared with 2009-11 (40643 minutes played). This is presented in the table below.

TABLE 19 > Hamstring training injuries

Comparison (2009/2010 first)								
	Registered Players	Registered Players	In Match day squad	In Match Day squad	Match Starts	Match Starts	Total Minutes played	Total Minutes played
Age	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11
22+	400	400	6893	6628	4689	4558	370276	358539
17-21	98	116	1001	1276	469	620	40643	52626
	504	525	7993	8078	5216	5269	415823	418789

Due to the increase in exposure the injury risk between the two years was calculated and is presented below.

TABLE 20 - Comparison of match injury incidence, average severity of injury and days absence per 1000 player hours

Age group	Incidence/1000hrs		Av severity, days		Days absence/1000hrs	
	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11
21 and under	87.1	91.2	29.6	12.4	2582.0	1131.0
22 and over	81.5	96.4	21.2	22.5	1734.0	2168.1
All players	81.1	94.0			1796.4	1998.3

The incidence of match injury for all players increased in 2010-11 compared to 2009-10. In 2009-10 the incidence of injury for players 21 years and under was higher when compared to the older age group. However in 2010-11 the opposite was found. Thus despite an increase in match exposure of players 21 and under, the injury risk when compared to the older age group was lower.

13

RESULTS ENGLAND SENIOR SIDE

The 2010-11 data includes the 2010 Autumn internationals and 2011 Six Nations competition. There was no Summer tour in June 2011 tour due to the 2011 Rugby World Cup. Note this report does not include 2011 RWC training camp or Tournament Data.

13.1 MATCH INJURIES

TABLE 21 > England match injury incidence, average severity and days absence since 2002-3

	Total number of injuries	Injuries / 1000 hrs (95% CI)	Injuries per match	Average severity, days	Days absence / 1000 hrs (95% CI)	Days absence per match
2002-03	53	221 (169-289)	4.4	19	4264 (4010-4533)	85
2003-04	83	207 (167-256)	4.1	11	2371 (2225-2527)	47
2005-06	30	136 (95-195)	2.7	10	1391 (1243-1556)	28
2006-07	30	136 (95-195)	2.7	28	3836 (3586-4104)	77
2007-08	55	162 (119-205)	3.2	24	3876 (2852-4901)	78
2008-09	23	96 (57-135)	1.9	8	813 (480-1145)	16
2009-10	23	88 (52-125)	1.8	19	1712 (1012-2411)	34
2010-11	14	78 (37-119)	1.5	23	1789 (852-2726)	36

14 INJURIES IN 2010-11 SEASON

13.2 TRAINING INJURIES

TABLE 22 > England training injury incidence, average severity and days absence since 2002-3

	Rugby skills			Strength and conditioning		
	Injuries / 1000 hrs (95% CI)	Average severity, days	Days absence / 1000 hrs (95% CI)	Injuries / 1000 hrs (95% CI)	Average severity, days	Days absence / 1000 hrs (95% CI)
2002-03	4.5 (2.6-8.0)	15	69 (60-80)	4.0 (1.0-15.9)	4	16 (8-32)
2003-04	7.6 (5.3-11.0)	12	89 (80-99)	6.3 (3.8-10.3)	13	79 (68-90)
2005-06	0.6 (0.1-4.0)	4	2 (1-6)	0	-	0
2006-07	9.8 (5.9-16.3)	15	149 (131-169)	0	-	0
2007-08	7.3 (4.5-10.1)	9	74 (46-103)	2.5 (0.5-4.6)	12	34 (7-61)
2008-09	6.5 (3.0-10.0)	20	135 (62-209)	12.1 (4.2-20.0)	18	233 (81-385)
2009-10	5.3 (2.3-8.3)	8	46 (20-73)	4.0 (-0.5-8.6)	6	26 (-3-55)
2010-11	1.7 (-0.2-3.5)	7	12 (-1.6-26)	4.4 (-1.7-10.5)	5	22 (-8.5-52.5)

England Match and Training Injury risk

No statistically significant change in risk was seen in 2010-11

Due to the 2011 Rugby World Cup, there was a reduction in the number of matches included in the 2010-11 England analysis as there was no June overseas tour of the Team.

The likelihood of sustaining an injury whilst playing for England senior side reduced again in 2010-11, however the average severity of injury and total days absence as a result of injury increased again in 2010-11 compared to 2009-10. These changes were not statistically significant.

There was a reduction in the incidence of rugby skill training injuries, whilst the incidence of injury sustained in strength and conditioning sessions was similar when compared to 2009-10. These changes were not statistically significant.

Note: the relatively small number of senior England training sessions in the study makes the differences seen in this group much more likely to have arisen "by chance" rather than to be the result of a "true" difference, reflected in the wide 95% Confidence intervals and the lack of statistical significance in the results.



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