

THE EPIDEMIOLOGY OF INJURIES IN CLUB RUGBY IN NAMIBIA

by

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DECLARATION

I, Vernon Mark Morkel, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or will be submitted for another degree at this or any other university.

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It is being submitted for the degree of Master's of Sport Medicine in the School of Medicine in the Faculty of Health Sciences of the University of the Free State, Bloemfontein.



(Signature)

on this 29th day of January 2016

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ABSTRACT

Background: Several studies have reported the epidemiology of injuries in professional rugby union, but there are limited studies about amateur rugby, especially in a third-world setting. No epidemiological studies have been done on injuries in Namibian club rugby. Namibian rugby does not have an injury prevention programme, so the expectation is that there is a high rate of injuries and recurrent injuries in Namibian rugby.

Aims: The aim of the study was to investigate the epidemiology of injuries among club rugby players in Namibia, with specific reference to recurrent injuries. The ultimate goal will be to use the results of this study to develop an injury prevention programme for Namibian rugby.

Method: A prospective, descriptive study was undertaken to investigate the injury epidemiology among the players of 11 Namibian premier league rugby teams. Of the 414 players who played in premier league matches, 117 players suffered 156 injuries. The researcher visited all 11 clubs to collect the data from the injured players. The researcher conducted telephone interviews with the players who were not personally interviewed. All data were recorded on data collection forms, and the data included the players' anthropometric data, dates of injuries and return from injury, time the match injury occurred, match event causing the injury, body location of injury, diagnostic investigations done and treatment received and whether the injury was recurrent.

Results: The injury rate of time-loss injuries in matches was 74.4 injuries per 1 000 player-match hours for the season. Most injuries (87.7%) took more than seven days to recover from, which is longer than expected. Most injuries (34.4%) occurred during the final quarter of a match. The tackle was responsible for most (48.4%) of all time-loss injuries and all contact match events caused 83.5% of all match injuries. Significantly more running injuries (12.3% or 9.1 per 1 000 player-match hours) were recurrent than first-time injuries (5.7% or 4.3 per 1 000 player-match hours) ($p=0.05$). Backline players (44.5 injuries per 1 000 player-match hours) had more injuries than forwards (29.9 injuries per 1 000 player-match hours), with the highest injury incidence among inside backs (scrumhalf, flyhalf and centre positions) (23.8 injuries per 1 000 player-match hours). Most injuries (78.2%) were match

injuries, compared to only 21.8% training injuries. The most frequent anatomical sites for injury in this amateur club league were the ankle (17.3% of all injuries), hamstring muscle (16.7%), knee (15.4%) and shoulder (15.4%). Concussion accounted for only 4.5% of all injuries. Of the total 156 injuries in this study 76 were recurrent injuries, meaning that 48.7% of all the injuries were recurrences of previous injuries. It is the highest recurrent injury rate reported to date in rugby union.

Conclusions: The injury rate is very high, compared to other amateur club settings. Injuries are, on average, much more severe in this league than in other amateur and professional leagues. The incidence of recurrent injuries is significantly more than has ever been reported for rugby union. This high injury burden may be due to the lack of an official injury prevention programme in Namibian rugby. The results of this study can be used to introduce an injury prevention programme for Namibian rugby.

Keywords: Injury incidence, injury severity, recurrent injury, injury prevention, amateur rugby, premier league, Namibia rugby

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LIST OF ABBREVIATIONS

BMI:	Body mass index
CT scan:	Computer tomography scan
IRB:	International Rugby Board
MIE	Match injury exposure
MRI :	Magnetic resonant imaging
NRU:	Namibia Rugby Union
RTP:	Return to play
RWC:	Rugby World Cup
SARU:	South African Rugby Union
TIE	Training injury exposure

CHAPTER 1: INTRODUCTION

1.1. SCOPE OF THE RESEARCH

Numerous epidemiological studies of injuries in rugby union have been done, but most of these studies were done in professional rugby and in a first-world setting. Few studies have been done on rugby injuries in an amateur setting and a third world country. No study of injuries in Namibian rugby has ever been done and there were no data available regarding rugby injuries in Namibia. This study investigates the extent of the injury problem in Namibian club rugby and establishes the causes and mechanisms of these injuries, in order to make recommendations to reduce the injury rate. The ultimate goal would be for the Namibia Rugby Union (NRU) to use the data from this study to introduce an injury prevention programme.

1.2. AIMS

The aims of this study are to determine the incidence of injuries in club rugby players in Namibia and to determine the prevalence of recurrent injuries and associated factors. Achieving this aim would result in recommendations with regard to injury prevention, especially in reducing the injury incidence, injury severity and recurrent injuries.

1.3. STUDY SYNTHESIS

Chapter 1 provides a short summary of the study with regard to the scope of the research, the aims of the study and the study synthesis.

Chapter 2 offers a review of literature with regard to rugby injury epidemiology and recurrent injuries in rugby. The chapter starts with the epidemiology of recurrent injuries and the different injury definitions according to the *Consensus statement on injury definitions and data collection procedures for studies in rugby union* (Fuller, Bahr, Dick & Meeuwisse, 2007). This is followed by an explanation of how to determine match and training injury rates according to match and training exposure. The body site of injury and the different injury types are discussed. The mechanism or match event causing the injury and when during the match injuries occur are also discussed. Risk factors for rugby injuries are discussed under the following headings:

- Grade of play;
- Current injury;

- Previous injury;
- Ground surface hardness;
- Overtraining;
- Playing position;
- Incomplete injury rehabilitation;
- Foul play; and
- Body size and wearing head gear.

Injury prevention is discussed with reference to the BokSmart programme of the South African Rugby Union (SARU) and the RugbySmart programme in New Zealand. Finally, a comparison is made between injuries occurring in amateur rugby and professional rugby.

Chapter 3 describes the methodology of this prospective, descriptive study to determine the incidence of injuries in Namibian club rugby. It describes the study population and provides the inclusion and exclusion criteria for participation in this study. The chapter also explains the procedure that was followed and the measurement instruments that were used to collect the data. The pilot study is described and the following measurement, and methodology errors that were considered, are discussed:

- Variation and bias during literature review;
- Variation and bias during execution of the study;
- Inter-observer variation;
- Systematic error (bias)
- Non-responder bias; and
- Recall bias.

The chapter also comments on the method of data analysis, implementation of the study and possible ethical aspects.

Chapter 4 presents the results of the epidemiological study, starting with the study population and demographical data. The following data on first-time and recurrent injuries and factors associated with sustaining injuries were described:

- Incidence of injuries;

- Severity of injuries;
- Match time of injury occurrence;
- Match event causing injuries;
- Playing position at risk for injuries;
- Body location at risk for injuries;
- Treatment received;
- Usage of diagnostic interventions;
- Invasive treatment procedures; and
- Recurrent injuries.

Chapter 5 discusses the results of this study; aspects that were statistically significant are discussed in greater detail. The study found that the average height and weight of Namibian club players are similar to that of other amateur rugby union players, but the amateur players have, on average, smaller physiques than professional players. A particularly high injury incidence rate was recorded in this study compared to other amateur rugby leagues in New Zealand and England. The average injury severity in this study was found to be higher than for other amateur and professional rugby players in England, South Africa and New Zealand. The data agrees that most injuries occurred in the second half and the last quarter of matches, similar to findings of other studies. The tackle and other contact events were confirmed to be the match events causing the most injuries. Backline players had more injuries than forwards, with the highest incidence among inside backs (scrumhalf, flyhalf and centre positions). Fewer training injuries than match injuries occurred, with a higher percentage of training injuries being recurrent injuries. This study found the most frequent anatomical sites for injury to be the ankle, hamstring muscle, knee and shoulder, with a high percentage of recurrent hamstring injuries and a high percentage for first-time ankle injuries. Chapter 5 also discusses the diagnostic investigations and treatment options the players utilized. The study recorded that 48.7% of the injuries were recurrences of previous injuries – this is the highest recurring-injury rate reported to date in rugby union. This is one of the most significant findings of this study, which needs to be investigated further. The chapter discusses injury prevention options that can be implemented in this league to reduce the high rate of injury incidence, injury severity and recurrent injuries. Finally, the limitations of the study are discussed.

In conclusion, Chapter 6 contains a summary of the results and recommendations to reduce the high injury incidence, severity and recurrence rates. The goal is for the Namibia Rugby Union (NRU) to use the results of this study to implement an injury prevention programme.

1.4. CONCLUSION

This study aims to determine the epidemiology of injuries in Namibia club rugby players and to determine the prevalence of recurrent injuries and associated factors. The results of this study can then be used to do recommendations to reduce injuries. The ultimate goal would be the introduction of an injury prevention programme for Namibia rugby.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

Rugby union is one of the most played and watched sports in the world, with approximately five million registered players in over 117 countries, and a 19% annual increase in player numbers since 2007 (Williams, Trewartha, Kemp & Stokes, 2013). Like other full-contact sports, rugby union is characterised by opposing players engaging in frequent physical confrontations and high-intensity running. This leads to a relatively high risk of injury (Roberts, Trewartha, England, Shaddick & Stokes, 2013). Rugby union is a high-intensity field-based contact team sport, considered to be the third most popular team sport in Namibia. The Namibian national rugby team qualified to participate in the last five Rugby World Cups (RWC) (1999 to 2015). In 2013 there were 1 236 registered club rugby players and 5 580 school rugby players in Namibia (Rugby Africa, 2015).

Several studies have reported the epidemiology of injuries occurring in professional rugby union, but there are few studies in amateur rugby, especially in a third-world setting, such as in Africa. Medline, Sport discuss, CINAHL and Academic Search Complete databases were searched for recurrent, subsequent, repeat and re-injuries in rugby union and sports in general. The majority of the studies found were general injury epidemiological studies undertaken in professional rugby. In these articles only a few paragraphs were dedicated to recurrent injuries (Chalmers *et al.*, 2004; Brooks *et al.*, 2005; Holtzhausen, Schweltnus, Jakoet & Pretorius, 2006; Fuller *et al.*, 2008; Fuller *et al.*, 2012; Scheiders *et al.*, 2009; Viljoen & Saunders, 2009; Williams *et al.*, 2013). Haseler, Carmont and England (2010) and Roberts *et al.* (2013) conducted epidemiological studies of injuries occurring in English community rugby, but did not focus on recurrent injuries. Swenson, Yard, Fields and Comstock (2009) studied patterns of recurrent injuries amongst high school athletes from a variety of different sports in the United States. This researcher found no epidemiological studies of rugby injuries in a third-world setting, except for South Africa.

Along with other contact sports, there is general agreement that playing rugby involves a degree of risk (Haseler *et al.*, 2010). Sports injuries are often recurrent and it is recognised that a subsequent injury may be strongly influenced by a previous injury (Finch & Cook, 2013). Previous injury is associated with as much as a four-fold increase in the risk of re-injury (Creighton, Shrier, Shulz, Meeuwisse & Matheson, 2010).

Athletes are three times more likely to discontinue sport participation after a recurrent injury than after a new injury, and some recurrent injuries are more likely to require surgery than

new injuries (Swenson *et al.*, 2009). Recurrent injuries tend to cause longer absences than first-time injuries (Hamilton, Meeuwisse, Emery & Shrier, 2011). At all levels of sport, players may return to full participation before an injury has recovered completely (Fuller *et al.*, 2007). The risk of recurrent injury is highest soon after the index (initial) injury (Hamilton *et al.*, 2011). Many recurrent injuries soon after the initial injury can be attributed to inadequate rehabilitation or early return to play after the initial injury (Hagglund, 2006).

Few club rugby teams in Namibia have team doctors, physiotherapists or conditioning coaches, and few players have access to or can afford these services. This situation may lead to injuries not being properly diagnosed, treated and rehabilitated. If inadequate or inappropriate medical and rehabilitation guidance was given, players may return to play too soon and risk re-injury. These factors may lead to a high prevalence of recurrent injuries in players in this league. This study will therefore investigate the epidemiology of injuries among club rugby players in Namibia, with specific reference to recurrent injuries. A study of this nature has never been done in Namibia. The results of this study will be used to develop an 'injury prevention programme for Namibian club rugby.

2.2. EPIDEMIOLOGY OF RECURRENT INJURIES

Recurrent injuries account for about 10.5% of all injuries in sport (Swenson *et al.*, 2009). In England, 18% of injuries in community rugby were recurrent (Roberts *et al.*, 2013). A similar incidence was found in professional rugby in New Zealand in 1998 (Targett, 1998). Subsequent injuries to the same location are reported to make up 10% to 25% of all injuries (Hamilton *et al.*, 2011). Holtzhausen *et al.* (2006) report that recurrent injuries to the same anatomical structure were responsible for 13% of injuries in South African Super 12 rugby players in 1999.

A meta-analysis of injuries in professional rugby union showed that the incidence of new injuries was much higher than that of recurrent injuries (78 and 11 per 1 000 player hours respectively) and that recurrent injuries (30 days to return to play (RTP)) were more severe than new injuries (20 days to RTP) (Williams *et al.*, 2013). In girls' high school sports the overall risk of subsequent injury is almost three times higher than the risk of initial injury (Rauh, Macera & Wiksten, 2007). Recurrent injuries are often more severe than the initial injury (Swenson *et al.*, 2009) and previous sports injury can increase the risk of sustaining a similar injury significantly (Fuller, Bahr, Dick & Meeuwisse, 2007).

2.3. DEFINITIONS OF INJURY

Previous inconsistent use of descriptive terms for recurrent injuries makes the study of recurrent injuries very difficult. The recent consensus statements on injury definitions based on RTP criteria provide a consistent methodology for reporting and recording index and recurrent injuries (Fuller *et al.*, 2007). These statements, however, do not differentiate between the types of recurrent injuries that can occur, e.g., a re-injury of an injury that had previously healed, or an exacerbation of an unhealed injury. Neither do the statements include the rehabilitation status of the index injury at the time the player returned to full training/match play (Fuller *et al.*, 2007).

Determining whether a player has achieved complete recovery from an injury is a complex decision based on objective and subjective indicators (Creighton *et al.*, 2010). Whether the index injury was an acute injury of sudden onset or an overuse injury with a gradual onset will also influence the definition of a recurrent injury (Fuller *et al.*, 2007). The more severe an injury, the less the likelihood that the player will return to play in that season – the delayed return to play reduces the chance of a player with a severe injury experiencing a recurrence of that injury in that season (Fuller *et al.*, 2007).

In this study injuries will be defined according to the International Rugby Board (IRB) definition in the *Consensus statement on injury definitions and data collection procedures for studies in rugby union* (Fuller *et al.*, 2007).

An injury is defined as “any physical complaint, which was caused by a transfer of energy that exceeded the body’s ability to maintain its structural and/or functional integrity that was sustained by a player during a rugby match or rugby training, irrespective of the need for medical attention or time-loss from rugby activities. An injury that results in a player receiving medical attention is referred to as a ‘medical-attention’ injury and an injury that results in a player being unable to take a full part in future rugby training or match play as a ‘time-loss’ injury“ (Fuller *et al.*, 2007).

Because of the physical nature of rugby union and the high number of slight contusions routinely encountered during the game, studies in rugby union will normally record injuries as time-loss injuries only if they result in more than one day of absence from training and/or matches (Fuller *et al.*, 2007). Like most studies in rugby union, this study will include time-loss injuries only.

A recurrent injury is defined as “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”

(Fuller *et al.*, 2007). Recurrent injuries can also be categorised according to the time the injury occurs after the first (index) injury, “early” (within two months of a player’s “return to full participation”, “late” (2-12 months after RTP), and “delayed” (more than 12 months after RTP) (Hamilton *et al.*, 2011).

Re-injury is defined as an injury occurring after the index injury has fully healed (Hamilton *et al.*, 2011).

An exacerbation occurs when the index injury has not fully healed at the time of the recurrence. Exacerbations range between 5% and 20% of all recurrent injuries (Hamilton *et al.*, 2011).

Injury severity is defined by the number of days a player took to return to full fitness (Brooks *et al.*, 2005). Injury severity is determined by duration of injury and is based upon the IRB consensus statement, with injuries being defined as minimal (2–3 days), mild (4–7 days), moderate (8–28 days) and severe (>28 days). Slight injuries (0–1 days) did not fall into the injury definition of this study, where injury was included only if it lasted longer than one day. The meta-analysis by Williams *et al.* (2013) found the most common injury severity to be “moderate” (28 per 1 000 player hours), followed by “mild” (23 per 1 000 player hours), “minimal” (17 per 1 000 player hours) and “severe” (15 per 1,000 player hours).

Fitness is defined as the ability to take a full part in training activities typically planned for that day and available for match selection (Brooks, Fuller, Kemp & Reddin, 2005 & Haseler *et al.*, 2010).

2.4. INJURY RATES

According to Viljoen and Saunders (2009) injury rates can be expressed as the number of injuries sustained per 1 000 hours at risk. Match injury rates are calculated on the premise that there are only 15 player positions on the field, regardless of any substitutions made during the game. Match injury rates are calculated under the assumption that rugby union matches last on average 80 minutes (1.33 hours) per game. Training injury rates are expressed as a function of total training exposure time.

Match injury exposure (MIE) is determined by the number of games played during the specified seasonal cycle: **MIE** = hours of play (1.33) x number of players on the field (15) x number of matches played. Match injury rates are then calculated: **Match injury rates** = (number of injuries during matches/MIE) x 1 000 (Viljoen & Saunders, 2009).

Training injury exposure (TIE) is determined in the same way: **TIE** = hours of supervised training x number of contracted players. Training injury rates are then calculated: **Training injury rates** = (number of injuries during training/TIE) x 1 000. Subsequently total injury rate can then be determined as the number of injuries sustained in a seasonal cycle: **Total injury rates** = (number of injuries sustained/ (MIE+TIE)) x 1 000 (Viljoen & Saunders, 2009).

Roberts *et al.* (2013) report a match injury incidence of 16.9 injuries per 1 000 player-match-hours for English community-level rugby union, which is lower than that of the English Premiership, which reports 48 injuries per 1 000 player-hours. Haseler *et al.* (2010) and Roberts *et al.* 2013 found an overall injury rate in English youth community rugby of 24 injuries per 1 000 player-match-hours. In a study of injuries to New Zealand premier club rugby players Schneiders, Takemura and Wassinger (2009) recorded the injury rate for the season as 52 injuries per 1 000 player-match hours. During the 2011 RWC the incidence of time-loss match injuries was 89.1 injuries per 1 000 player-match hours (Fuller, Sheerin & Targett, 2012).

In interpreting injury rates, the methodology of data collection needs to be taken into consideration. Often, community rugby does not have medical personnel at its disposal to record injuries. Underreporting may contribute to the trend in the literature that community rugby has lower injury rates than professional rugby; in the latter rigorous collection of injury data is the norm.

2.5. INJURY SITE

The top five injuries in English community rugby for the 2009/10 to 2011/12 seasons measured as injuries per 1 000 player-match hours, were knee injuries (2.4), shoulder injuries (1.7), ankle injuries (1.7), hamstring injuries (1.4) and concussion (1.2) (Roberts *et al.*, 2013). For non-professional club rugby players in New Zealand in the 2002 season, knee and shoulder injuries (both 14%) and ankle injuries (8%) were the most common injuries classified as either moderate, severe or season ending. Although facial injuries (16%) occurred at a higher rate, the majority of facial injuries were slight injuries, lacerations, bruises and epistaxis (Schneiders *et al.*, 2009).

A meta-analysis of injuries in professional rugby union indicates the body region injured most commonly is the lower limb (47 per 1 000 player hours), followed by upper limb (14 per 1 000 player hours), head (13 per 1 000 player hours) and trunk (9 per 1 000 player hours) (Williams *et al.*, 2013). During RWC 2011 lower-limb injuries (42.4 per 1 000 player hours) represented the highest incidence of body region injured, followed by upper-limb injuries

(16.7), head injuries (16.1) and trunk injuries (9.9) (Fuller *et al.*, 2012). This is similar to the injury incidences at the 2007 RWC (Fuller, Laborde, Leather & Molloy, 2008).

The above indicates that the same body sites are injured in the same sequence in amateur and professional rugby.

Regarding recurrent injuries, Swenson *et al.* (2009) show that the ankle was the most frequently diagnosed body site of recurrent injuries (28.3%), followed by the knee (16.8%), head/face (12.1%), shoulder (12.0%), lower back (6.4%), and upper leg (5.6%) among high school athletes in the United States.

2.6. INJURY TYPE

Schneiders *et al.* (2009) demonstrated that, in New Zealand non-professional club rugby in 2002, hematomas/bruising (21.3%), followed by ligament tear/sprain (20.7%) and muscle tear/strain (14.6%) were the most common types of injuries. Concussion accounted for 5.5% of all injuries (Schneiders *et al.*, 2009). In English community rugby in the 2009 to 2012 seasons joint/ligament were the most common injury type followed by muscle/tendon injuries and fractures/ bone stress (Roberts *et al.*, 2013). The most common injured sites in South African Super 12 rugby players in 1999 were pelvis and hip (19.3%), and head and knee (12.9% each). Together ligament sprains (25.8%) and musculotendinous strains/tears (24.2%) accounted for half the injuries recorded, which is much more than any other type of injury. Fractures represented 8.1% of the injuries, dislocations/subluxations accounted for 6.5%, and intervertebral disk herniation for 3.2% of the injuries. Holtzhausen *et al.* (2006) recorded only one concussion (1.6%).

In a meta-analysis of professional rugby, Williams *et al.* (2013) found that muscle/tendon injuries (40 per 1 000 player hours) and joint (non-bone)/ligament injuries (34 per 1 000 player hours) were the most common time-loss injuries, followed by central/peripheral nervous system injuries (8 per 1 000 player hours), fractures and bone stresses (4 per 1 000 player hours), and lacerations and skin injuries (1 per 1 000 player hours).

The most common diagnosis for recurrent injuries was ligament sprain (incomplete tear) (34.9%), followed by muscle strain (incomplete tear) (13.3%), concussion (11.6%), dislocation (7.0%), and contusion (4.5%). A ligament sprain of the ankle was the most frequent specific diagnosis, accounting for 25.4% of all recurrent injuries (Swenson *et al.*, 2009).

2.7. MECHANISM OF INJURIES

At the RWC in 2007, the tackle was the activity/event that caused the most injuries. However, a much higher proportion of tackle injuries were the result of being tackled rather than from tackling. After tackles, collisions, rucks and scrums caused the most match injuries. In training, full-contact skills activities were the most common causes of injury (Fuller *et al.*, 2008).

In English community-level rugby union contact events accounted for 80% of all injuries, with the tackle the most prevalent injury event. A ball carrier had a higher injury incidence than a tackler. In this study running was the most common non-contact injury event – 10% of all injuries. The scrum and lineout had a relatively low injury incidence, which may be due to the lower velocity of impact and the players having more time to prepare for the moment of impact (Roberts *et al.*, 2013).

The meta-analysis by Williams *et al.* (2013) showed that being tackled (29 per 1 000 player hours) resulted in more injuries than any other match incident. Tackling was the second-most frequent injury incident (19 per 1 000 player hours), which was significantly higher than all other match incidents except the ruck/maul (17 per 1 000 player hours). The mean incidence rates per 1 000 player hours of the other match incidents were, in descending order, collisions, 11; scrums, 7; other, 6; and lineouts, 1 (Williams *et al.*, 2013).

In the 1999 Super 12 competition, the tackle accounted for 40% of game injuries, making the tackle the most dangerous phase of play in that competition. Rucks and mauls caused only 17% of game injuries. (Holtzhausen *et al.*, 2006).

2.8. TIME OF INJURY

The literature consistently reports that injuries occur in the later stages of matches. Williams *et al.* (2013) shows that injury incidence in the first quarter is lower than the other three quarters of the match, with the most injuries occurring in the third quarter (40–60 minutes) of matches. The mean incidence rates per 1 000 player hours of each match period were, in descending order: 40–60 min, 119; 20–40+ min, 112; 60–80+ min, 108; and 0–20 min, 57. Holtzhausen *et al.* (2006) report that 2.4% of match injuries occur in the first 20 minutes of play, 36.6% in the second 20 minutes, 31.7% in the third 20 minutes and 29.3% during the final 20 minutes. According to this study most injuries occur during the second quarter of matches, followed by the third quarter. Roberts *et al.* (2013) report a lower injury incidence in the first quarter of matches than in the other quarters, and higher incidence in the second

match quarter than in the fourth. Roberts *et al.* (2013) also report a higher injury incidence during the months of September and October (first quarter of season), compared to all other months.

2.9. RISK FACTORS FOR RUGBY INJURIES

The following risk factors for rugby injuries were found in the literature:

- Grade of play - Players from higher grades (professional and elite players) reported higher injury incidence rates than players from lower grades (amateur and age-group level). This finding is confirmed by several studies (Brooks *et al.*, 2005; Williams *et al.*, 2013; Murray, Murray & Robson, 2014). The higher injury rate among the higher grades may be associated with the greater size of the players and the faster pace at which the game is played. These factors result in greater forces during the contact phases of the game, leading to greater trauma (Quarrie, Alsop, Waller, Bird, Marshall & Chalmers, 2001).
- Current injury – Chalmers, Samaranayaka, Gulliver and McNoe (2012) observed that players with a history of playing while injured had a 46% higher risk of in-season injury, supporting previous studies that recommend that injured players should be fully rehabilitated before returning to play. Players who enter the season with an injury place themselves at higher risk of both missing play and sustaining a higher injury incidence rate through the following season. Returning to play before full recovery from injury places players who were otherwise fit at a higher risk of further injury. To reduce their risk of sustaining injuries and missing playing time, players should enter the rugby season injury free (Quarrie *et al.*, 2001).
- Previous injury - Having been injured the previous season did not significantly elevate the risk of injury during the season if the player entered the next season injury free. This finding emphasises the importance of full rehabilitation from injury before players are permitted to take the field again after sustaining an injury (Quarrie *et al.*, 2001).
- Ground surface hardness – Chalmers *et al.* (2012) observed a 50% higher injury risk for very hard grounds compared to softer grounds. In a study of rugby union players in New Zealand Alsop, Morrison, Williams, Chalmers and Simpson (2005) found that playing rugby on hard or very hard grounds was associated with a significantly higher risk of injury. Playing on hard grounds causes increased strain on tendons and

ligaments and may thus contribute to higher injury rates in rugby. There is a linear relationship between the state of the pitch and injury, with the incidence of injury being highest on hard pitches.

- Overtraining - Players who undertook 40 hours or more of strenuous physical activity per week were shown to have a 54% higher risk of injury than less active players (Chalmers *et al.*, 2012). Players who were involved in very high levels of strenuous activity (more than 39 hours a week) before the season missed a greater proportion of the season than players who were active for five hours or less a week. Overtraining was one explanation given for a higher level of recurrent injury observed in professional players during the early part of the season (Quarrie *et al.*, 2001).
- Playing position – Williams *et al.* (2013) found, in their meta-analysis, that the difference in the incidence of injuries between forwards (94 per 1 000 player hours) and backs (99 per 1 000 player hours) as well as the difference in average injury severity between forwards (23 days) and backs (21 days) was both trivial.
- Incomplete injury rehabilitation – Numerous studies have shown that a previous injury is associated with up to a four-fold increase in the risk of re-injury. (Targett, 1998; Brooks *et al.*, 2005; Swenson *et al.*, 2009; Hamilton *et al.*, 2011). The treatment of all injuries should include advice on when it is safe to return to sport participation (Creighton *et al.*, 2010). From this it can be deduced that, if an injury is not treated and rehabilitated properly, the risk of re-injury will increase significantly.
- Foul play – Being the victim of foul play at any time during a game increases the injury risk. Foul play can take many forms, including dangerous play and misconduct (Chalmers *et al.*, 2012). Referees should penalize foul play and take greater account for the safety of players (Chalmers, Simpson & Depree, 2004).
- Body size – Lee, Garraway and Arneil (2001) found that players with a larger build have a higher risk of injury. It is unclear if this is a true injury risk factor or a consequence of the relations among various other risk factors. Players with a body mass index (BMI) of greater than 26.5 sustained more injuries than players with a BMI of less than 23 (Quarrie *et al.*, 2001).
- Wearing headgear - Players wearing headgear was at a 23% increased risk of injury. Headgear has been reported to reduce the risk of injury to the scalp and ear, but not concussion. It is suggested that players who wear headgear may play a riskier game

because of the perceived protection provided by wearing headgear (Chalmers *et al.*, 2012).

2.10. INJURY PREVENTION

One of the goals of this study is to assist with the introduction of an injury prevention programme for Namibian rugby. Injury prevention programmes must focus on reducing injury rates, increase injury recovery efforts, inform RTP decisions, and influence other attempts to reduce recurrent injury rates. The South African Rugby Union (SARU) introduced such an injury prevention programme, called “BokSmart”, which is evidence-based and driven, and which implements policies to reduce the number of injuries and manage them more effectively (SA Rugby, 2012). BokSmart specifically targets coaches and referees, who are closest to the player at the time of injury, to ensure a basic standard of prevention, knowledge, and care. BokSmart’s programme has four main components:

1. *Rugby safety workshops*, which are attended every two years by all coaches and referees throughout South Africa. No one may coach or officiate rugby at any level without being BokSmart certified.
2. *Online material* that is freely available at the boksmart.com website and which provides evidence-based research on several sports medicine topics, with practical and illustrated interventions.
3. *The BokSmart Rugby Medic Programme*, which is an entry-level rugby-related first-aid short course that focuses on head, neck and spine injuries, to enable the participants to implement appropriate immediate field-side care, specifically in underprivileged communities.
4. *The BokSmart SpineLine* is a toll-free hotline that provides advice on potentially serious rugby-related head, neck and spine injuries and assists with ambulance transport to the nearest appropriate medical facility, where applicable.

The BokSmart programme aims to change the standard practices of players, coaches, referees, and support personnel involved with rugby in South Africa. BokSmart appears to be affective, as an analysis of serious and catastrophic head, neck and spine injuries between 2008 and 2013 in South Africa shows a 14.6% decrease in the number of these injuries at amateur club level, and a 23.9% decrease at school level (Patricios, 2014).

In 2001 New Zealand rugby, in association with the Accident Compensation Corporation launched RugbySmart, a rugby union injury prevention programme (NZ Rugby, 2015). It is compulsory for all coaches and referees to complete RugbySmart requirements every year to enable them to continue coaching and refereeing. RugbySmart was developed to reduce the number and severity of injuries in community rugby by supplying evidence-based information about injury risks and injury prevention strategies to both coaches and referees. The information is provided to coaches and referees through video presentations and active participation in workshops. These presentations and sessions are supplemented by printed material, and then by Internet resources. Five years after implementation, an evaluation of RugbySmart observed a decrease in injury claims per 100 000 players in areas that RugbySmart specifically targeted. This decrease is supported by an improvement in injury prevention behaviour by players (Gianotti, Quarrie & Hume, 2009),

Chalmers *et al.* (2012) report on a five-year rugby injury prevention programme in New Zealand. The five important themes related to injury prevention are coaching technique, fitness levels, injury management, tackling technique and foul play. Rational and realistic rule changes are also an acceptable way to prevent injury. These rule changes should, however, not change the nature of the game of rugby. Coaches should undergo compulsory training in injury prevention, like safety seminars. Recommendations were also made for improving tackling technique through coaching seminars and resource materials (Chalmers *et al.*, 2004).

Van Mechelen, Hlobil & Kemper (1992) described four steps in a 'sequence of prevention' model as it relates to sports injuries;

- Establishing the extent of the sports injury problem,
- Establishing the aetiology and mechanism of injuries,
- Introducing preventive measures for the above, and
- Assessing the effectiveness of these preventive measures by repeating the first step.

This study wants to attempt to achieve these first two steps. The challenge for the NRU would be to use this information and implement the last two steps.

2.11. AMATEUR VERSUS PROFESSIONAL RUGBY

Epidemiological studies on injuries in rugby union have thus far focused mostly on international, professional and youth rugby union. The vast majority of senior male rugby

players participate in amateur rugby. Information on injury incidence and recurrence is limited in amateur rugby. It can, however, not be assumed that the incidence and types of injury in professional and international rugby are representative of those in the amateur game. Differences in the physical and skill attributes of professional full-time players compared to that of part-time semi-professional and amateur players are likely to impact on the physical demands of the game and subsequently injury frequency, type and severity at the different levels of match play. Numerous studies have shown that injury incidence increases at higher playing levels (Brooks, 2005; Williams, 2013; Murray, 2014). Professional players are also likely to have better access to medical care following an injury, thus influencing the management of, and time loss due to, a given injury. (Roberts *et al.*, 2013, Williams *et al.*, 2013).

In Australian community rugby union, the majority of amateur players have limited medical support on the sideline and the type of advice provided by coaches and support staff varies considerably across the rugby union clubs. It is likely that people called upon to give medical and RTP advice are not fully aware of the scientific evidence behind such advice (Hollis, Stevenson, McIntosh, Shores & Finch, 2012).

2.12. CONCLUSION

It is clear from the literature that recurrent injuries are common in both amateur and professional rugby. Considering the causative factors, such as too early return to play, poor management of injuries, and lack of access to appropriate medical expertise and resources, a large portion of recurrent injuries can be prevented. It is therefore of the utmost importance to record the incidence of injuries, particularly recurrent injuries, in an amateur club league where players do not have access to or cannot afford the appropriate medical expertise and resources, as a first step towards an injury prevention plan.

This study made use of the *Consensus statement on injury definitions and data collection procedures for studies in rugby union* as approved by World Rugby (previously IRB), to ensure consistent use of descriptive terms and definitions to enable comparisons of the results of this study with results of other, similar studies. For the same reason the standard method of determining injury rates, per 1 000 player hours at risk was also used.

The type of injury and the body site of injury are recorded to determine the more common injuries and also which injuries are generally recurrent injuries. This information will be used to determine the differences in injury type and site between amateur and professional rugby.

The match events and mechanisms of injury causing first-time and recurrent injuries will be evaluated to determine which match events cause the most injuries and which methods can be used to reduce the risk of these events causing these injuries. Assessing the risk factors involved in rugby injuries, like current and previous injuries, incomplete injury rehabilitation, overtraining, ground surface condition, foul play, etc. may also assist in developing an injury prevention programme.

One of the goals of the study is to use the information gained to assist the NRU to start an injury prevention programme, similar to BokSmart in South Africa, RugbySmart in New Zealand and SmartRugby in Australia.

CHAPTER 3: METHODOLOGY

3.1. INTRODUCTION

The aim of this study was to determine the incidence of injuries in club rugby players in Namibia and, specifically, to determine the incidence of recurrent injuries and factors associated with recurrence.

3.2. STUDY DESIGN

A prospective, descriptive study was undertaken to determine the incidence of injuries in Namibian club rugby.

3.3. STUDY POPULATION

The study participants were all the first-team rugby players of the 11 clubs that competed in the Namibian Premier Rugby league for the 2013 season. All these players were registered with their clubs and the NRU.

The 11 clubs had a total of 414 players who played for their first teams in the premier league in 2013 – this is an average of 37.6 players per club. The club that used the fewest players had 29 players, and the club that used the most first-team players had 42 players. All the players consented to take part in the study. Eventually, eight injured players could not be reached to collect injury data, and they were excluded from the study. The final sample population was therefore 98%, which is abundantly representative of the study population.

3.3.1 Inclusion criteria

To participate in the study the players had to adhere to inclusion criteria. They had to be:

- Male,
- Above 18 years of age,
- Registered with their clubs for the 2013 season,
- Registered with the NRU as players for 2013 season, and
- First-team players.

3.3.2 Exclusion criteria

If a player displayed any of the following criteria, he was excluded from the study:

1. If a player was female,
2. Younger than 18 years of age,
3. Not registered with a club,
4. Not registered with the NRU, or
5. Did not play for the first team.

3.4. PROCEDURE

Seven of the clubs are located in the central region of Namibia, close to the capital city of Windhoek. These seven clubs were visited by the researcher two to four times during training sessions to collect data. During these visits most of the injured players were interviewed to collect the injury data. The few players who could not be reached personally were interviewed telephonically.

The remaining four teams were located in remote areas. All their first-team players were contacted telephonically and interviewed to collect the data. In total, eight players from all 11 clubs could not be contacted personally or telephonically.

3.5. MEASUREMENT

Injuries were defined according to the IRB's *Consensus statement on injury definitions and data collection procedures for studies in rugby union* (Fuller *et al.*, 2007). Below is a table of definitions related to injury used in this study.

Term:	Definition:
An injury	Any physical complaint that was caused by a transfer of energy that exceeded the body's ability to maintain its structural and/or functional integrity, and that was sustained by a player during a rugby match or rugby training, irrespective of the need for medical attention or time-loss from rugby activities.

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.
Re-injury	An injury occurring after the index injury has fully healed.
An exacerbation	When the index injury has not fully healed at the time of the recurrent injury.
Injury severity	Is defined by the number of days a player took to return to full fitness. Injuries are defined as minimal (2–3 days), mild (4–7 days), moderate (8–28 days) and severe (>28 days). Slight injuries (0–1 days) did not fall into the injury definition of this study, where injury was only included if lasting longer than one day.
Fitness	Being able to take a full part in training activities typically planned for that day and to be available for match selection.

3.5.1 Measuring Instruments

The IRB's injury data collection forms were used in this study, amended to address the research question. This form records the player's and the team's study reference numbers, the date of injury, if the injury was sustained during a match or training, the circumstances surrounding the injury, and the date of the player's return to full training or match play. The nature of the injury (body site injured, type of injury, side injured, recurrence) and the main mechanism (traumatic or overuse) were also recorded. The data topics were all derived from the *Consensus statement on injury definitions and data collection procedures for studies in rugby union* to ensure uniformity in study methods (Fuller, Molloy, Bagate, Bahr, Brooks, Donson, Kemp, McCrory, McIntosh, Meeuwisse, Quarrie, Raftery & Wile, 2007). These forms were adjusted to make provision for recurrent injuries. The additional questions enquired whether an injury was recurrent, and asked about the date of the initial or previous injury and the return date from the injury. The questions also determined whether the initial or previous injury had recovered completely before RTP by the player, and if not, the reason why a player returned before the injury had recovered completely. All clubs and players received an *Information sheet* (Appendix A1), giving the reasons for the study and the benefits to the league as a whole.

A *Baseline information form* (Appendix A4) recorded the anthropometric data of all players who participated in the study. This is standard practice for injury surveillance studies in rugby. This form included the player's age, playing position, height and weight. All players were informed about the study, and had to sign a *Consent form* (Appendix A2), prior to participation.

A *Revised injury report form* (Appendix A3) was completed for each injured player, recording the details about the injury, mechanism of injury and phase of play during injury. All above documents were available in English, since the rugby-playing population in Namibia is fluent in English and it is also the official national language.

Injuries sustained before the start of the study were also considered when identifying an injury as an index or recurrent injury. Minor injuries that impair performance but do not limit participation, like cramping, spasms, minor strains and muscle tightness, are often not recorded by studies into rugby injuries (Devlin, 2000), and were also excluded from this study. Only time-loss injuries of more than one day were recorded. Absences because of illness and non-sport-related injuries were not included in this study.

3.5.2 Collection of data

The researcher collected all the data from all the teams at their various training grounds during their training sessions. Most clubs were visited two to four times to reach all the players. The players who could not be interviewed personally were interviewed telephonically to collect injury data.

3.6. PILOT STUDY

The pilot study was done in the pre-season of 2013, to test the methodology and measuring instruments of the study. A second-league club was used for the pilot study, as this club was not part of the actual study. This second-league club had 29 registered players, of which only five had injuries at that stage. The injured players completed the consent forms and baseline information forms. Thereafter all index and recurrent injuries were recorded on the injury report forms. Three of the five injured players had recurrent injuries. After the pilot study no adjustments were made to the final method of data collection and execution of the study.

3.7. MEASUREMENT AND METHODOLOGY ERRORS

The following measurement and methodology errors were considered.

3.7.1 Variation and bias during literature review

Most injury epidemiological studies in rugby union have been done on professional, elite, provincial and international rugby teams and leagues. Very few injury epidemiological studies have been done on amateur and/or club teams, especially in a third-world setting. Thorough literature searches were conducted through a number of search engines for research articles done on amateur teams and clubs, very few were found

3.7.2 Variation and bias in execution of the study

Seven of the clubs are centrally located and were visited two to four times, and personal interviews were held with most of the players. Interviews with players of the four rural clubs were all done telephonically. This difference of interview methods could have led to bias, although the interviewer did his utmost to minimize this bias.

3.7.3 Inter-observer variation

This error was eliminated by using only one interviewer.

3.7.4 Systematic error (bias)

Systematic bias was minimized by using standard injury definitions of the IRB's *Consensus statement on injury definitions and data collection procedures for studies in rugby union* (Fuller *et al.*, 2007). The data collection process had to be easy, user friendly and accurate. To achieve this, I used the IRB injury surveillance forms (Appendixes A2, A3 and A4) (Fuller *et al.*, 2007), which are tried and tested.

3.7.5 Non-responder bias

I was unable to track eight players from different clubs. They represent less than 2% of the 414 players who did participate in the study.

3.7.6 Recall bias

It is natural for a person to fail to remember the details of an event that occurred more than a year ago. In this study players could often not remember the date of injury, but they did remember against which team they played and whether it was a home or away game. Using the match schedules for 2013 and the two years prior to that, the researcher used the

information the player gave to obtain the right dates. Although recall bias did play a role in the study, measures were taken to reduce it.

3.8. DATA ANALYSIS

Data from the injury report forms were coded and transferred to data capture sheets (Appendix A7), from which it was captured in an Excel spreadsheet. Statistical analysis was done by the Department of Biostatistics, Faculty of Health Sciences, University of the Free State. Data were analysed using descriptive statistics to summarise frequencies, percentages, means, medians and standard deviations. Correlations were drawn between selected variables.

3.9. IMPLEMENTATION OF FINDINGS

This is the first epidemiological study of injuries in Namibian club rugby. Findings from this study should be used to initiate future injury prevention programmes for Namibian club rugby teams. This study should show what the most common injuries are, which possible causative factors are associated with these injuries, and whether players get adequate treatment and rehabilitation for their injuries. This information should be used to reduce the number of injuries among club rugby players and also improve the treatment and rehabilitation of injured players. This can be achieved by the implementation of an Injury prevention programme for Namibia rugby.

3.10. ETHICAL ASPECTS

The study was approved by the Ethics Committee of the University of the Free State (Ethics Approval Number ECUFS 187/2012). The NRU gave written permission for the study to be conducted in the league in 2013 (Appendix A.8).

All the information, personal details and injury status of the players were treated confidentially. The researcher was not blinded for the injured players, but only numbers were used on injury sheets to ensure anonymity from other persons (Appendix A6). Individual players were not identified by any of the reports.

All 11 premier league clubs also gave permission for the study to be done at their clubs. The players who had one-on-one interviews were given an information sheet (Appendix A1) to acquaint themselves with the study. Thereafter they signed a consent form (Appendix A.2), giving permission to participate in the study.

The players who had telephonic interviews were informed about the study and gave telephonic permission to participate.

CHAPTER 4: RESULTS

4.1. INTRODUCTION

In this chapter, the results of the epidemiological study among club rugby players in Namibia in 2013 are presented. Firstly, the study population and demographical data are presented, followed by data on first-time and recurrent injuries and factors associated with sustaining injuries.

4.2. STUDY POPULATION

In total, 414 premier league club players consented to take part in the study and provided baseline anthropometric information. This represented the entire premier club population registered for the 2013 season. Injury data was collected from all matches and practice sessions over one rugby season. The 2013 season consisted of 82 matches by the 11 premier league clubs, with all 11 premier league clubs participating in the study. The total player match exposure was 1 640 hours. It was not possible to determine the total training exposure, because of inconsistent and absent data on the training regimes of the teams.

4.3. DEMOGRAPHICAL DATA

Most of the injured players (41.9%) were between 22 years and 25 years of age, with 30.7% between the ages of 26 years and 30 years old. Players younger than 21 years accounted for only 13.7% of all players and those older than 30 years only 13.7%. The players younger than 21 years, between 22 and 26 years and older than 30 years had more recurrent injuries than first-time injuries, while only the players between 26 and 30 years had more first-time injuries than recurrent injuries (Figure 1).

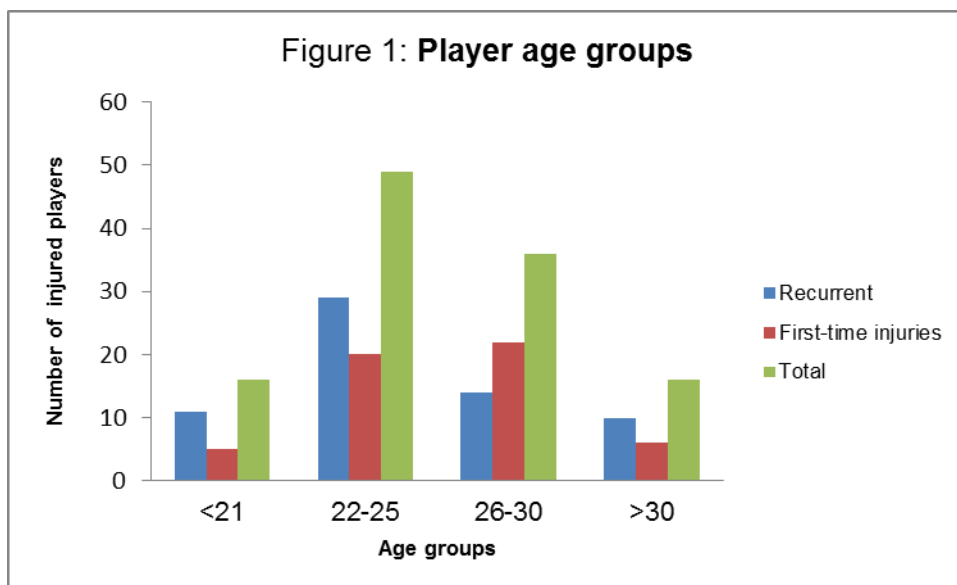


Figure 1: First-time and recurrent injuries according to age group

Table 1 shows the mean height, weight and BMI of all the players, and separately for the forwards and back-line players. The mean height of the players was 1.80 m, their mean weight was 92.7 kg and BMI 28.4. The forwards were taller and heavier than the back-line players, with the forwards mean height 1.83 m, their mean weight 102.5 kg and their BMI 30.5. The mean height of the backs was 1.78 m, their mean weight 92.7 kg and their BMI 25.8.

Table 1: Mean height, weight and body mass index of forwards and backs[Error! Not a valid link.](#)

4.4. INCIDENCE OF INJURIES

A total of 156 injuries were recorded, of which 122 (78.2%) were match injuries and 34 (21.8%) were training injuries. This translates into 74.4 injuries per 1 000 player-match-hours for the season, thus 1.5 injuries per team-match. Of all the players, 83 (70.9%) were injured once in the season, 29 players (24.8%) sustained two injuries and five players (4.3%) sustained three injuries, while 64 players had recurrent injuries, which represents 15.5% of the total 414 players who played premier league matches for the season. In total 56 (45.9%) of the match injuries were recurrent (34.2 recurrent injuries per 1 000 player-match-hours).

The majority of the injuries were of acute onset (89.1%) with only 10.9% of gradual onset (p=0.0006).

4.5. SEVERITY OF INJURIES

Moderate injuries (8–28 days absent) accounted for 51.8% of days absent, severe injuries (>28 days) represented 35.3% of days absent, mild injuries (4–7 days) for 11.6% of days absent, and minimal injuries (2–3 days) accounted for only 1.3% of days lost. There were no career ending or catastrophic injuries recorded.

For moderate injuries (8–28 days absent) there were more recurrent injuries (44) than first-time injuries (36). For all the other severity groups first-time injuries were more common than recurrent injuries (Figure 2).

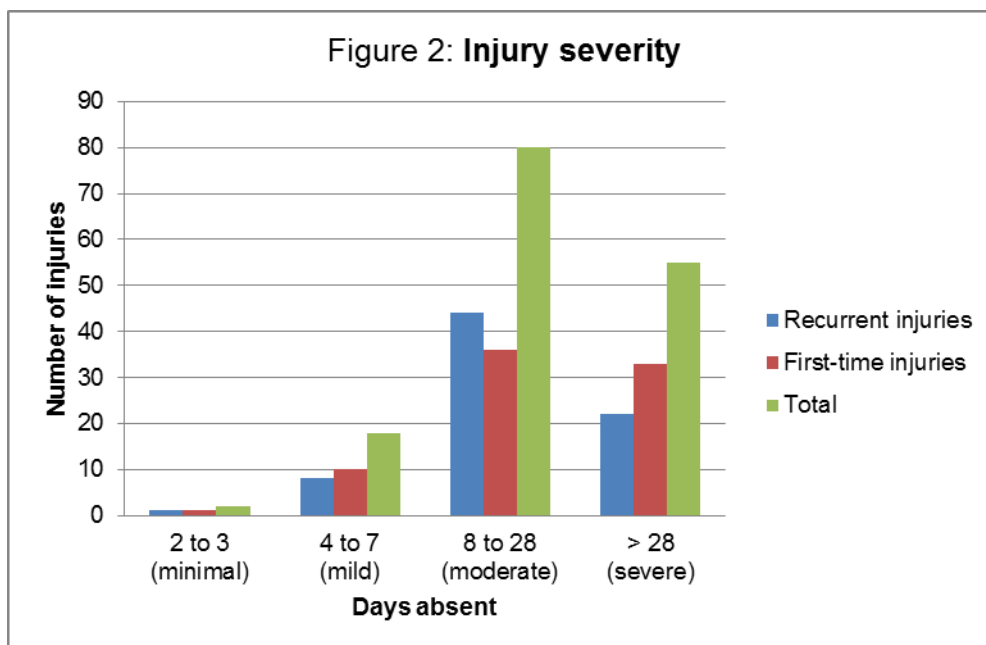


Figure 2: Distribution of the severity of injuries

4.6. TIME OF INJURY OCCURRENCE

Most injuries (42) (34.4% or 25.6 injuries per 1 000 player-match-hours) occurred during the last quarter of the matches, with the first quarter having the fewest injuries (19) (15.6% or 11.6 injuries per 1 000 player-match-hours). This was applicable for both first-time injuries and recurrent injuries. No injuries occurred during the warm-up and cool-down periods of any of the matches, as indicated in Figure 3.

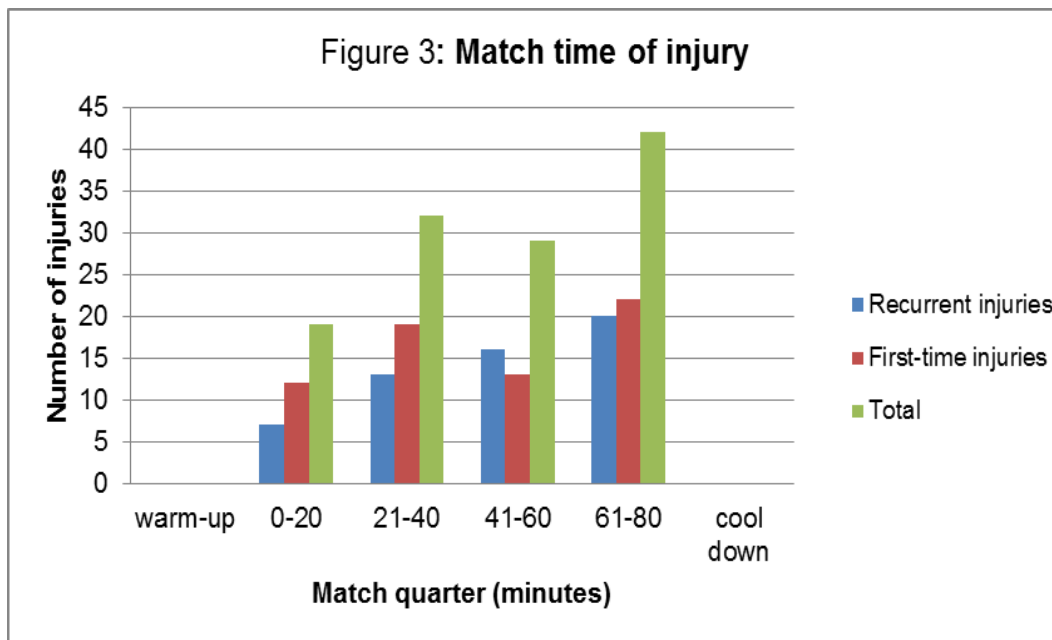


Figure 3: Time of match injuries

4.7. MATCH EVENT CAUSING INJURIES

Significantly more injuries (48.4%) occurred during the tackle than during other phases of play. Tackle injuries consisted of being tackled (29.5%) and tackling (18.9%) (Figure 4). Recurrent injuries were less likely to be caused by being tackled or tackling, with more first-time injuries caused by the tackle. Recurrent injuries were also less likely to be caused by collisions, rucks and mauls, compared to first-time injuries. Running injuries were the third-most-common cause of injuries, with more than half (15) (12.3% or 9.1 injuries per 1 000 player-match-hours) of running injuries being recurrent injuries compared to first-time injuries (7) (5.7% or 4.3 injuries per 1 000 player match hours) ($p=0.05$). There were only two kicking injuries, with both being recurrent injuries. No injuries occurred during lineouts.

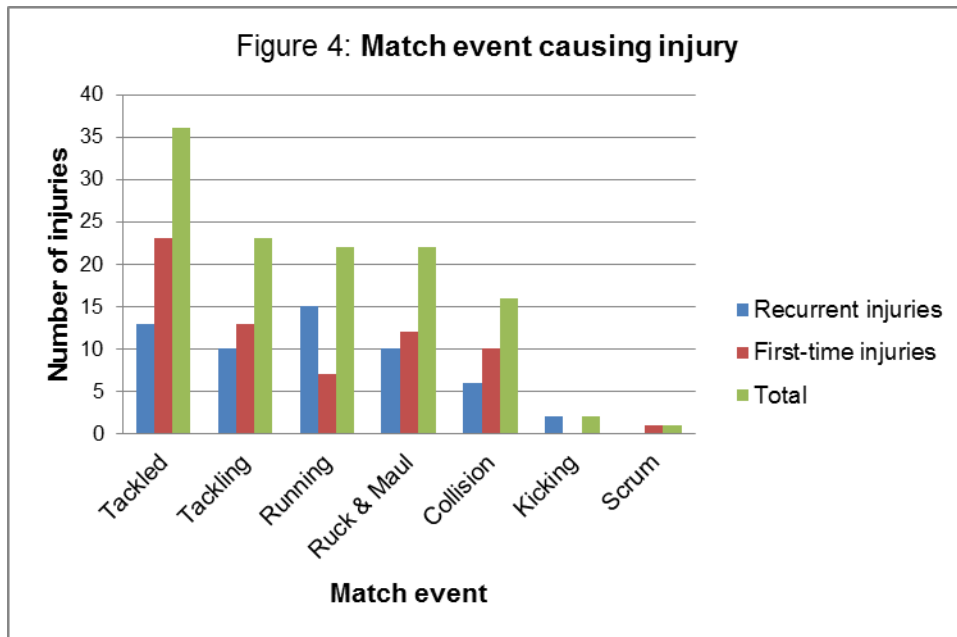


Figure 4: Match event or mechanism of injuries

4.8. PLAYING POSITION AT RISK FOR INJURIES

In this study the back-line players (44.5 injuries per 1 000 player-match-hours) had more injuries than forwards (29.9 injuries per 1 000 player-match-hours), with the highest injury incidence among the inside backs (scrumhalf, flyhalf and centre positions). Loose forwards and outside backs had more recurrent injuries than first-time injuries, with the tight forwards and the inside backs getting more first-time injuries than recurrent injuries.

4.9. BODY LOCATION AT RISK FOR INJURIES

Figure 5 shows the distribution of injuries in terms of body location. Ankle ligament sprains were the most common injury (17.3%), followed by hamstring injuries (16.7%), knee injuries and shoulder injuries (both 15.4%). There were significantly more first-time ankle injuries (12.2%) than recurrent ankle injuries (5.1%) ($p=0.03$). Hamstring injuries, however, were mostly recurrent in nature (11.6%), with only 5.1% of the hamstring injuries being first-time injuries ($p=0.02$). Upper limb, scalp, face and neck injuries were mostly first-time injuries. The remainder of the injury locations showed similar distributions for first-time injuries and recurrent injuries. Lower-limb injuries (61.5%) occurred much more often than upper-limb injuries (22.4%).

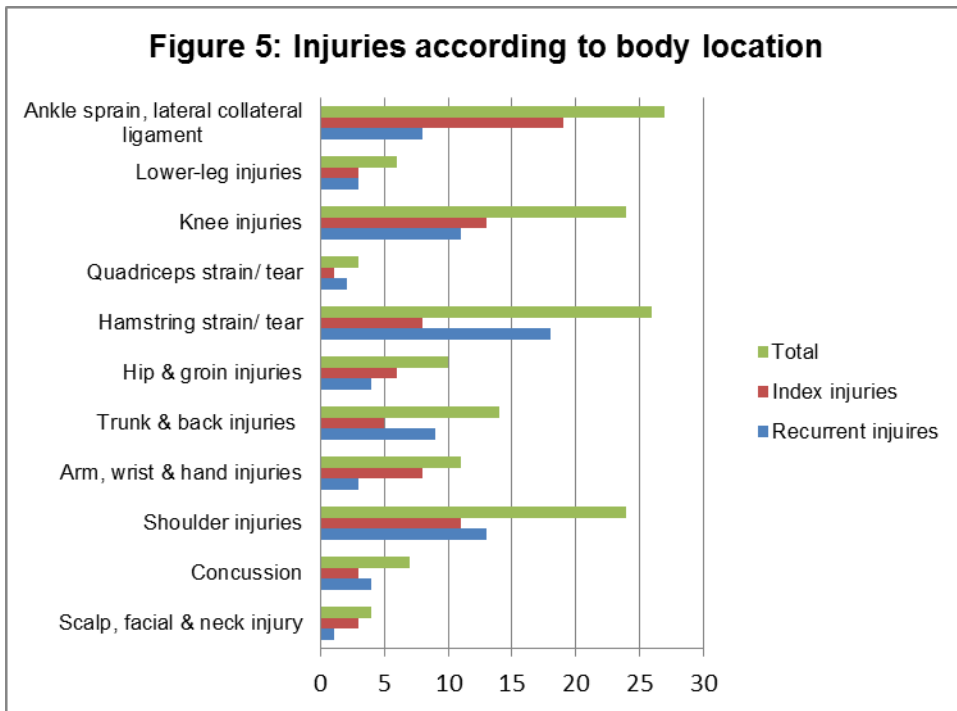


Figure 5: Injuries according to body location

4.10. TREATMENT RECEIVED

In only 25 cases (16.0%) the injured players did not consult a medical practitioner. This means that 84.0% of all injured players did consult a medical practitioner for treatment. Most injured players had physiotherapy (52.6%) and/or visited a medical doctor (50.0%) for their injuries, with only 29.5% of injured players receiving biokinetics rehabilitation (Table 2). The distribution of recurrent and first-time injuries was the same for the different treatment options, with slightly more fist-time injuries visiting a doctor compared to recurrent injuries, while slightly more recurrent injuries received physiotherapy.

Table 2: Treatment options for injured players

Treatment options	Number of injured players	Percentage of injured players
None	25	16.0
Physiotherapy	82	52.6
Biokinetics	46	29.5
Medical Doctor	78	50.0

4.11. USAGE OF DIAGNOSTIC INTERVENTIONS

Diagnostic interventions were done on 41% of injured players, with the majority (38.5%) having X-rays done (Table 3). A few players had other investigations, like ultrasound, CT-scan and MRI-scans.

Table 3: Diagnostic interventions for injuries

DIAGNOSTIC INVESTIGATIONS	NO OF PLAYERS	%
X-rays	60	38.5
Ultrasound	4	2.6
CT-scan	5	3.2
MRI	9	5.8

4.12. INVASIVE TREATMENT PROCEDURES

Only 6% of all injured players underwent invasive procedures. Six players had surgery, two suturing and one player had a cortisone injection (Table 4).

Table 4: Invasive procedures for injuries

Invasive procedures	%	No of players
Suturing	1.3	2
Surgery	3.9	6
Cortisone injection	0.6	1
None	94.3	147

4.13. RECURRENT INJURIES

Of the total 156 injuries 76 were recurrent injuries, that is, 48.7%. These injuries occurred in 64 players, which show an incidence of 15.5% for the total 414 players.

A higher percentage of training injuries were recurrent, whereas most match injuries were first-time injuries (Table 5).

Table 3: Diagnostic interventions for injuries

Match vs Training injuries	Recurrent (%)	First-time injury (%)
Match injuries	73.7	82.5
Training injuries	26.3	17.5

Of the 76 recurrent injuries 38 (50%) occurred after complete recovery of the index injury. A re-injury is defined as an injury occurring after the index injury has healed fully. In the case of the other 50% of the recurrent injuries, the index injury did not recover completely – this is defined as an exacerbation (see Section 2.3. for recurrent injury definitions).

Most players (92.1%) who returned to play or full training before their injuries had healed completely did so of their own accord (Figure 6). An important match was the second-most-common reason (18.4%) for early RTP, with only 7.9% doing so because of pressure from a coach.

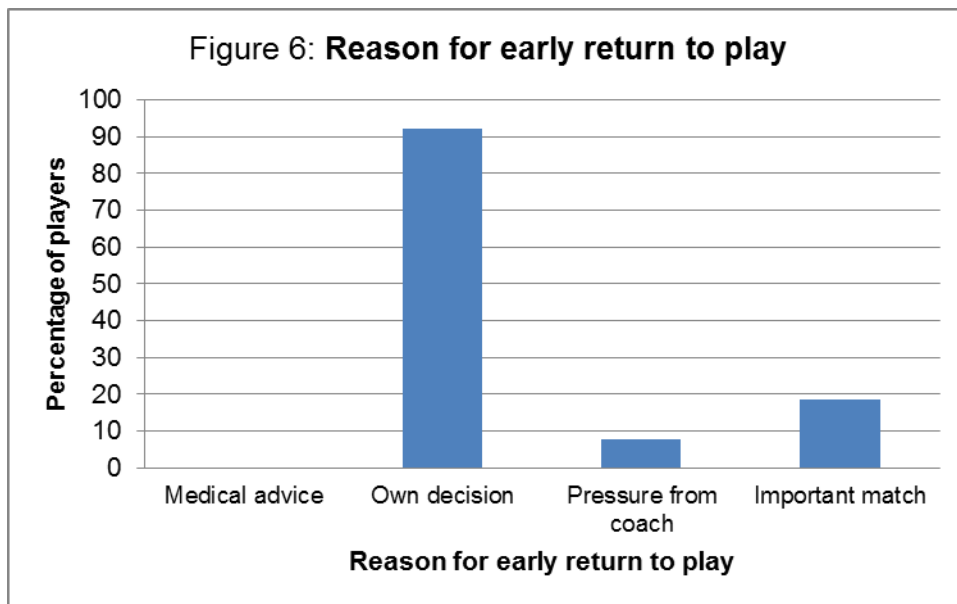


Figure 6: Reasons for return to play before injury had healed completely

4.14. CONCLUSION

A high incidence of injuries was recorded in Namibian premier league club rugby (74.4 injuries per 1 000 match hours and 34 training injuries). The most significant results include that recurrent injuries accounted for 48.7% of all injuries and 50% of recurrent injuries were exacerbations of previous injuries that had not healed completely. The severity of most injuries was moderate and severe, with only a few injuries being minimal and of mild severity. Contact events (tackling, being tackled, collisions, rucks and mauls) were the most common causes of injuries, and most of these injuries were first-time injuries. Non-contact situations (running and kicking) accounted for fewer injuries, but most of these injuries were recurrent. More back-line players were injured than forwards, and inside backs (scrum halves, fly halves and centres) had more injuries than any other playing position. Ankle injuries were the most common injury, with significantly more ankle injuries being first-time injuries. Hamstring injuries were the second-most-common injuries, with recurrent hamstring injuries occurring significantly more often than first-time injuries. These findings will be discussed in Chapter 5.

CHAPTER 5: DISCUSSION OF RESULTS

5.1. INTRODUCTION

This was the first injury surveillance study performed for Namibian club rugby, with special reference to recurrent injuries. No epidemiological data on rugby injuries in Namibian club rugby was available prior to this study. This study demonstrated that recurrent injuries in this league are high, and rehabilitation of injuries is poor.

In this chapter the results of the study are discussed according to the selected literature, with special attention to injury epidemiology and recurrent injuries.

5.2. STUDY POPULATION

The 414 players who participated represent 100% of the study population. After withdrawal of eight players, data was obtained from 98% of the population. This study therefore presents an accurate reflection of the variables tested in this population. In a study of New Zealand premier club rugby 106 injured players participated (Schneiders *et al.*, 2009), and 207 players participated in a study of English youth community rugby (Haseler *et al.*, 2010). For the studies focusing on professional rugby, 546 players took part in the study of injuries in English professional rugby (Brooks *et al.*, 2005) and 75 South African Super 12 players participated in the study of Holtzhausen *et al.* (2006). The number of participants in this study is similar and in most cases greater than that of the above-mentioned studies.

5.3. DEMOGRAPHIC DATA

The majority of the players, 41.9%, were between 22 and 25 years of age, with 30.7% between the ages of 26 and 30 years. Players younger than 21 years made up 13.7%, and players over 30 years also accounted for only 13.7% of all injured players.

The average weight of the injured players was 92.7 kg and their average height was 1.80 m. The forwards were physically bigger than the backs, with an average weight of 102.5 kg and height of 1.83 m among forwards. The backs were physically smaller, on average 92.7 kg heavy and 1.78 m tall. The average weight and height of the players in this study is similar to that of players in New Zealand premier club rugby, where the average weight is 94.3 kg and the average height is 1.81 m (Schneiders *et al.*, 2009). These amateur players were much smaller than English professional players who have, on average, a height of 100.0 kg and an average height of 1.85 m (Brooks *et al.*, 2005). International players at the 2011 RWC had an average weight and height of 102.9 kg and 1.86 m respectively (Fuller *et al.*, 2012). This

confirms the notion that professional and international rugby players are physically bigger than amateur club players.

5.4. INCIDENCE OF INJURIES

In this study the injury rate of time-loss injuries in matches was 74.4 injuries per 1 000 player-match-hours for the season, which is higher than for injuries in English community-level club rugby (16.6 injuries per 1 000 player-match-hours) (Roberts *et al.*, 2013), English youth community rugby (24 injuries per 1 000 player hours) (Haseler *et al.*, 2010) and New Zealand club rugby (52 injuries per 1 000 player-match-hours) (Schneiders *et al.*, 2009).

Williams *et al.* (2013) found the overall incidence in senior men's professional rugby to be 81 injuries per 1 000 player hours, and in English professional rugby the overall injury incidence was 91 injuries per 1 000 player hours (Brooks *et al.*, 2005). Holtzhausen *et al.* (2006) reported 55.4 game injuries per 1 000 player-match-hours in the Super 12 rugby competition, and Bathgate, Best, Craig and Jamieson (2002) report 69 injuries per 1 000 player-match-hours in elite Australian rugby players. All four of the above studies report a greater incidence of injury associated with a higher level of play, as did Fuller *et al.* (2012) for international rugby at the 2011 RWC (89.1 injuries per 1 000 player-match-hours).

These results confirm that the injury rates and incidence is much higher in professional rugby than in amateur rugby. These differences may be due to greater match play intensity, skill, fitness and physical characteristics, resulting in different match play demands consisting of more contact events per match with higher energy transfer in impact (Roberts *et al.*, 2013; Brooks *et al.*, 2005). Professional players are faster, bigger, and fitter and tackle harder. The ball is also in play longer in professional rugby, and professional players devote more time to increasing their speed and power and improving their skills (Bathgate *et al.*, 2002). In professional rugby there are also more efficient injury reporting regimes available (Brooks *et al.*, 2005), which give a more accurate account of injury rates and incidence.

The injury rate in the Namibian club league is, however, much higher than in other amateur club leagues mentioned previously in this study. It has been found that higher injury rates are associated with lack of strength and conditioning, absence of an injury prevention programme and the fact that many clubs do not have qualified medical personnel as part of their support teams. These factors may all have made a contribution to the high injury rate and the high recurrence rate among players in this study.

Fortunately, no catastrophic injuries and no career ending injuries were reported, although one player retired after his injury in his club's last match of the season. This player had earlier decided to retire at the end of the season.

5.5. INJURY SEVERITY

The majority (51.8%) of injuries were classified as moderate (8–28 days absent), with 35.3% severe injuries (>28 days absent), followed by mild injuries (4-7 days absent) at 11.6%; only 1.3% of injuries was classified as minimal (2–3 days absent). Injuries in this league tend to be severe, with only 12.3% of injuries taking seven days or less to recover. The 87.7% of injuries taking more seven days to recover indicate a longer than expected time to recover. Schneiders *et al.* (2009) report only 29.8% moderate, 6.6% severe, 7.8% season ending and 3.6% career ending injuries in New Zealand premier club rugby, which is much fewer injuries taking longer than seven days to recover (47.8%) than the 87.7% of this study.

In professional rugby the most common injury severity is “moderate”, namely, 28 per 1 000 player hours, followed by “mild” (23 per 1,000 player hours), “minimal” (17 per 1 000 player hours) and “severe” (15 per 1 000 player hours (Williams *et al.*, 2013). Brooks *et al.* (2005) found that minor injuries (<7 days absence) accounted for 54% of injuries, moderate injuries (>1–3 weeks) for 26% and major injuries (>3 weeks) for 20% of injuries in English professional rugby. Holtzhauzen *et al.* (2006) report 39% of injuries to be mild in nature, 27% of intermediate nature and 34% severe, in the Super 12 rugby competition, while Bathgate *et al.* (2002) recorded 69% mild, 14% moderate and 22% severe injuries. However, in Namibian club rugby, injuries taking more than seven days to recover accounted for 87% of injuries. In the other studies only between 36% and 47% of injuries needed more than seven days to recover. The conclusion can thus be made that injuries in the Namibian club league are, on average, much more severe than in other amateur and professional rugby setups. The reason for this situation may be inadequate usage or access to sport medicine services for accurate diagnosis and treatment, and also lack of proper rehabilitation of injuries.

In amateur rugby some of the time spent “injured” may mean waiting for treatment appointments, and sometimes poor access to quality rehabilitation prolong recovery time, thus increasing the time absent from training and playing, leading to the perception of increased severity of injuries. For amateur players their commitment to rehabilitation may also be influenced by employment commitments, family responsibilities and social activities. By comparison, professional players usually have immediate access to medical treatment

and rehabilitation personnel and facilities; they also have fewer external constraints, which improve their compliance to rehabilitation. (Haseler *et al.*, 2010).

The severity of recurrent injuries is, on average, 10 days greater than new injuries in professional rugby. This emphasises the need to fully and effectively rehabilitate players before they RTP. There are, however, no studies that compare the severity of recurrent injuries to their index injuries (Williams *et al.*, 2013).

5.6. MATCH TIME OF INJURY

Most injuries (34.4%) occur during the final quarter of matches, with only 15.8% of injuries occurring in the first quarter. In contrast, 41.8% of injuries occurred during the first half and 58.2% in the second half. (Schneiders *et al.*, 2009) report that most injuries occur in the third quarter (28.7%), and more injuries in the second half (55.5%) in New Zealand premier club rugby.

In English professional rugby Brooks *et al.* (2005) report the lowest injury incidence in the first quarter and the highest in the final quarter for players starting a match. Williams *et al.* (2013) and, also in professional rugby, Bathgate *et al.* (2002) found the highest injury incidence in the third quarter. Factors that may lead to more injuries in the third quarter are incomplete warm up or reduced concentration following the half-time break. Efforts should thus be made to improve player preparation and to develop strategies for player substitution to alleviate this risk factor (Williams *et al.*, 2013). Numerous studies found a lower incidence of injuries in the first quarter than in other match periods, which may indicate that fatigue is implicated in injury aetiology (Brooks *et al.*, 2005; Holtzhausen *et al.*, 2006; Williams *et al.*, 2013).

In this study most injuries occur in the second half and in the final quarter, which correlates well with the literature. This trend may be caused by fatigue and reduced concentration. Namibian rugby clubs will have to consider ways to improve fitness levels of players and coaches, and should consider strategies to replace players in the third and fourth quarters to reduce injuries during that part of matches. In the first, second and the fourth quarters there were more first-time injuries than recurrent injuries, with only the third quarter having more recurrent injuries, but the differences were insignificant. This implies that both first-time and recurrent injuries can occur at any time during a match.

5.7. MECHANISM OF INJURIES

The tackle was responsible for 48.4% of all time-loss injuries: 29.5% of injuries were caused by being tackled and 18.9% by tackling. This compares to tackle being the main cause of injury in New Zealand premier club rugby at 47.8% (Schneiders *et al.*, 2009), in English youth community-level rugby at 59% (Haseler *et al.*, 2010), in Super 12 rugby at 46.3% (Holtzhausen *et al.*, 2006), and among elite Australian rugby players at 58.7% (Bathgate *et al.*, 2002).

In a meta-analysis of professional rugby, being tackled resulted in more injuries (29 per 1 000 player hours) than any other incident, with tackling being the second most frequent injury incident (19 per 1 000 player hours) (Williams *et al.*, 2013). The high number of injuries caused by the tackle emphasises the importance of good coaching with regard to correct tackling technique, player fitness and conditioning and application of the laws of the game.

In this study running caused 18.0% of all injuries, ruck and mauls also caused 18.0%, collisions 13.1% and kicking 1.6%.

There was only one injury from the scrum (0.8%) and no lineout injuries; this is very low compared to the tackle and other injury mechanisms, but is similar to other rugby setups. For elite Australian rugby players only 2.1% of injuries occurred in scrums and no injuries occurred in the lineout. This reflects the more controlled nature of scrums and lineouts. Referees instruct scrums in a way that ensures a more controlled engagement (Bathgate *et al.*, 2002). In general, there is a relatively low injury incidence in scrums and lineouts, which may be due to lower velocity impacts and the players having more time to prepare before making contact. In contrast, tackles are made in open play and involves a less predictable skill with less reaction time before contact. The greater number of injuries that incurred during the tackle and ruck could be due to a greater number of these events during match play. It has been claimed that the majority of injuries are sustained in the tackle only because the tackle was the most prevalent match event (Roberts *et al.*, 2013).

In this study contact match events caused 83.5% of all injuries. This is similar to English community-level rugby, where contact events accounted for 80% of all injuries (Roberts *et al.*, 2013) and New Zealand premier club rugby, where 74.4% of injuries were caused by contact mechanisms (Schneiders *et al.*, 2009). Brooks *et al.* (2005) report that, in English professional rugby, the most injuries were sustained by contact with another player (72%); as do Holtzhausen *et al.* (2006), who found that this was the cause of 64.5% of all injuries in

Super 12 rugby. Running was the most common non-contact injury event (18%); in English community rugby it represents only 10% of injuries (Roberts *et al.*, 2013).

Recurrent injuries were less likely to be caused by being tackled or tackling, while more first-time injuries were caused by tackles. Recurrent injuries were also less likely to be caused by collisions, rucks and mauls than first-time injuries. Significantly more running injuries (15) (12.3% or 9.1 per 1 000 player-match-hours) were recurrent, compared to first-time injuries (7, or 5.7% or 4.3 per 1 000 player-match-hours) ($p=0.05$). There were only two kicking injuries, with both being recurrent injuries. This indicates that in this study non-contact events cause more recurrent injuries and contact events cause more first-time injuries.

5.8. PLAYING POSITION AT TIME OF INJURY

Back-line players had more injuries (44.5 injuries per 1 000 player-match hours) than forwards (29.9 injuries per 1 000 player-match-hours), with the highest injury incidence among inside backs (scrumhalf, flyhalf and centre position) (23.8 injuries per 1 000 player-match-hours). In English community-level rugby there was no overall difference in injury incidence between forwards (17.3 per 1 000 player hours) and backs (16.5 per player hours) (Roberts *et al.*, 2013). Schneiders *et al.* (2009) also found no differences between forwards and backs in New Zealand premier club rugby. Williams *et al.* (2013) found trivial differences in injury incidence and severity between forwards and backs in their meta-analysis of injuries in professional rugby, as did Brooks *et al.* (2005) in English professional rugby.

In this study loose forwards and outside backs had more recurrent injuries than first-time injuries, with tight forwards and inside backs suffering more first-time injuries than recurrent injuries. Few studies have investigated the injury risk of specific playing positions. Most injuries occur in uncontrolled and open phases of play, like the tackle, running and the ruck and maul situation, none of which are position specific (Holtzhausen *et al.*, 2006).

5.9. REMOVAL FROM PLAY

Most players, 42.9%, left the field of play or training immediately after an injury, 25.6% left the field later and 31.4% did not leave the field at all after sustaining an injury. Although most players left the field immediately after an injury, there were still a significant number of players who did not leave the field at all after injury, meaning that they continued to play with the injury. This may contribute to the fact that the rate of recurrent injuries is high in this league and that the injury severity is much higher than in other player groups mentioned earlier in this study. Slightly more players with recurrent injuries leave the field immediately

after an injury compared to first-time injuries, the fact that they had a previous, similar injury may encourage them to leave the field immediately after recurrence of an injury. For those leaving the field later or not at all there was not a big difference between recurrent and first-time injuries.

5.10. TRAINING INJURIES

In this study, only 21.8% of injuries were training injuries, with the remaining 78.2% occurring during matches. Bathgate *et al.* (2002) report only 12% training injuries, with match injuries accounting for 88% of injuries. Training injuries are consistently reported to be fewer than match injuries; this implies that a player is far more likely to be injured while playing a match than while training. More training injuries, 58.8%, were recurrent, with only 45.9% of match injuries being recurrent. This may be because players start training before they have completely recovered from injuries and they experience a recurrence of the injury during training. Players are more likely to start playing matches only when their previous injury had healed completely, thus reducing the chance of a recurrence during a match.

5.11. BODY LOCATION OF INJURY

The most frequent anatomical sites for injury in the amateur club league of this study were the ankle, hamstring muscle, knee and shoulder. Lower-limb injuries (61.5%) represented the highest proportion of injuries, as other studies of amateur and professional rugby also found. Schneider *et al.* (2009) report 37% for lower-limb injuries for New Zealand premier club rugby, and Roberts *et al.* (2013) report 50% lower-limb injuries in English community rugby.

The lower limb is also the body region with the highest injury incidence in professional rugby, as found by numerous studies (Bathgate *et al.*, 2002; Brooks *et al.*, 2005; Williams *et al.*, 2013). In English professional rugby, Brooks *et al.* (2005) reports hamstring injuries as the second-most-common injury.

Ankle ligament sprains were the most common injury (17.3%). There were significantly more first-time injuries (19) than recurrent ankle injuries (8) ($p=0.03$). Hamstring injuries (16.7%) were second most common and the majority of these hamstring injuries were recurrent injuries (18), compared to only eight first-time hamstring injuries – this also represented a significant difference ($p=0.02$). A previous injury appears to be a major risk factor for another hamstring injury. More has to be done to reduce the recurrence of hamstring injuries, such as identifying players with a higher risk of hamstring injuries and

implementing injury prevention exercises for the hamstring and the rest of the lower limb. Clubs also need to ensure effective and complete rehabilitation of hamstring and other lower limb injuries before players return to full training and match play.

Knee injuries and shoulder injuries represented 15.4% each of injuries. Slightly more knee injuries were first-time injuries (13) compared to recurrent injuries, at 11, but slightly more shoulder injuries were recurrent (13), compared to 11 first-time injuries.

Concussion accounted for only 4.5% of all injuries, which is similar to that reported for New Zealand premier club rugby, namely, 5.5% (Schneiders *et al.*, 2009), but lower than in English community-level rugby, at 7% (Roberts *et al.*, 2013). Four of the concussions in this study were recurrent, with three being first-time concussions. Concussion may be under-reported because of lack in knowledge and experience regarding diagnosis of concussion and attempts by players to avoid the consequences associated with reporting concussion, like mandatory stand-down periods, return to play protocols and sport exclusion (Brooks *et al.*, 2005; Schneiders *et al.*, 2009; Roberts *et al.*, 2013).

5.12. DIAGNOSTIC INVESTIGATIONS AND INVASIVE PROCEDURES

This study found that 41% of the injured players had one or multiple diagnostic investigations to assess their injuries. The majority of them, 38.5%, had X-rays, nine (5.8%) had MRI scans, five (3.2%) had CT scans and four (2.6%) had diagnostic ultrasound procedures. X-rays are readily available and relatively cheap, whereas the other diagnostic modalities are only available in certain centres in Namibia and are much more expensive. That may be the reason why so many injured players had X-rays and so few had the other investigations. X-rays cannot assess soft-tissue injuries like muscle tears, tendon injuries, ligaments sprains and internal structures of joints, like menisci. Most injuries were soft-tissue injuries that could not be assessed by X-rays, thus an accurate diagnosis could not be made by the X-rays. These poorly diagnosed injuries may have led to longer recovery periods.

During RWC 2011, 105 (49.3%) of the injured players made use of single or multiple imaging techniques (MRI: 59; ultrasound: 26; x-ray: 23; CT: 8) for assessment of their injuries (Fuller *et al.*, 2012). MRI scan was done in 56.2% of the injuries that had imaging, this investigation would lead to more accurate diagnosis of soft-tissue injuries.

Only 6% of the players in this study had invasive procedures, six (3.9%) had surgery, two (1.3%) had sutures and one (0.6%) had a cortisone injection. The two injured players who had sutures missed more than 24 hours of practice or match play – that is why they were

included in the study. The other players who had sutures during the time of the study did not miss any training or match play, and were thus not included in the study. During RWC 2011 16 (7.3%) injuries required surgery and 10 (4.7%) injuries were treated with corticosteroid injections (Fuller *et al.*, 2012).

5.13. TREATMENT RECEIVED

In this study 84.0% of all injured players consulted a medical practitioner (doctor, physiotherapist and/or biokineticist) for assessment and treatment. Most injured players consulted a physiotherapist (52.6%) and/or consulted a medical doctor (50.0%) for their injuries. Only 29.5% of injured players had biokinetics rehabilitation. The distribution of recurrent and first-time injuries was the same for the different treatment options, with slightly more players with first-time injuries visiting a doctor compared to players with recurrent injuries, while slightly more recurrent injuries received physiotherapy.

Few clubs in the study area have a doctor or physiotherapist on their support teams. Teams usually make use of paramedics, registered nurses or qualified first-aiders for sideline medical assistance during matches. Injured players will then consult a doctor, usually a general practitioner, or a physiotherapist after the match or during the week. The fact that less than 30% of injured players had biokinetics rehabilitation is a concern, and may be a reason for the high rate of recurrent injuries, that is, because more than 70% of injuries do not get proper rehabilitation.

5.14. RECURRENT INJURIES

Sports injuries are often recurrent and it is known that a subsequent injury (of either the same or a different type) is strongly influenced by a previous injury. This may be due to similar mechanisms of injury or similar risk factors (especially intrinsic risk factors) that are involved in injury causation or incomplete tissue healing from the previous injury. (Finch & Cook, 2013). New injuries occur substantially more frequently than recurrent injuries, with the incidence ratio of new to recurrent injury being 7:1 (Williams *et al.*, 2013). In this study 76 of the total 156 injuries were recurrent injuries, meaning that 48.7% of the injuries were recurrences of previous injuries. It is the highest recurrent injury rate reported to date in rugby union. This is one of the most significant findings of this study, and needs to be investigated further.

In English community rugby 18% of all injuries are recurrences of previous injuries (Roberts *et al.*, 2013). Williams *et al.* (2013) report recurrent injury rates of 11 per 1 000 player hours

in professional rugby. In English professional rugby recurrent injuries account for 18% of all injuries, with a greater severity of recurrent injuries compared to new injuries, highlighting the importance of complete and effective rehabilitation of injured players (Brooks *et al.*, 2005). Holtzhausen *et al.* (2006) recorded 13% of injuries to the same anatomical location in Super 12 rugby and Fuller *et al.* (2012) report 14% recurrent injuries at the 2011 Rugby World Cup.

Lee *et al.*, (2001) reported that players of the Border Reivers District of the Scottish Rugby Union who were injured at the end of the previous season were more likely to be injured in the following season. This may be because they did not allow previous injuries to heal sufficiently before returning to playing and training, or the intensity of their participation increased their risk of injury. Players who ignore their injuries or who do not seek treatment soon after the injury occurred may be more likely to be injured again. These players will become prone to recurrent injuries, especially if they do not rest their injuries for long enough before returning to the game. (Lee *et al.*, 2001). Fuller *et al.* (2007) notes the need to differentiate between “exacerbations” and “re-injuries”, based on whether a player was recovered fully from the preceding index injury. They believe this differentiation will enable researchers to investigate risk factors for these two types of recurrent injuries separately, and enable them to determine how well players have been rehabilitated before the players return to full participation. This is an area for future studies.

In some cases the previous injury is anatomically unrelated to the index injury. It may happen that the index and recurrent injury are in the same body part, e.g. the knee, but with each injury a different structure in the knee is injured. For instance, a previous anterior cruciate ligament injury has been found to increase the risk of new knee injury, especially overuse injury. The reason may be that remaining deficits in physical conditioning, proprioception, or altered movement patterns after a previous injury provide a link to an anatomically unrelated injury in a following season (Walden, 2006). Many early recurrent injuries may be due to inadequate rehabilitation or premature RTP after the initial injury, but some injuries increase the risk of re-injury regardless of the time interval. This may be because of a remaining deficit in the previously injured joint or muscle, which makes the player more prone to re-injury (Hagglund, 2006). Lee *et al.* (2001) report an increased risk of rugby injury for professional players who attended pre-season training for a longer period and for those players who were injured or carried an injury at the end of the previous season.

Efforts to reduce injury should target aspects of the game causing the most absence from playing and training. Strategies targeting lower-limb injury prevention and methods for

increasing safe behaviour in contact situations should be considered. Evidence-based information about injury risks and injury prevention strategies should be provided to coaches and referees. (Williams *et al.* 2013).

5.15. AMATEUR VERSUS PROFESSIONAL RUGBY

In the literature it is clear that a higher level of play in rugby is associated with a greater incidence of injury (Targett, 1998). Possible reasons for the higher incidence of injuries at higher levels of play are increased size and strength of players, longer seasons, increased competitiveness, more effective injury reporting, greater distance covered by players at faster running speeds and more ball-in-play time (Williams *et al.*, 2013).

Studying the impact of rugby injuries at a professional level may not be a true representation of the social and economic impact that rugby has on society. The majority of rugby is played at the amateur level and although the incidence of injury is lower at this lower level, it probably represents a much higher financial and social cost to society. Amateur play should be targeted for public health initiatives, including injury prevention programmes, as amateur players are more in need of such initiatives (Schneiders *et al.*, 2009).

5.16. INJURY PREVENTION

Injury prevention programmes have been introduced by a number of rugby unions to improve player safety and reduce injury rates and severity. SARU, New Zealand Rugby and the Australia Rugby Union introduced BokSmart, RugbySmart and SmartRugby respectively to achieve this goal and have reported great success and results. These three injury prevention programmes are evidence-based and driven, and implements policies to reduce the number of injuries and manage them more effectively. They set the benchmark for other, similar programmes to be introduced by other unions. NRU can use these three programmes as a basis and an example to start a similar, local injury prevention programme. The focus should be on coaches and referees, who are closest to the player at the time of injury, to ensure a basic standard of prevention, knowledge and care.

In New Zealand the five important aspects related to injury prevention are coaching technique, fitness levels, injury management, tackling technique and foul play. Rational and realistic rule changes should also be considered for injury prevention. These rule changes should, however, not change the nature of the game of rugby (Gianotti *et al.*, 2009).

The injury sites that RugbySmart in New Zealand pays specific attention to prevent injuries represented about 65% of moderate to serious claims and 73% of the cost to the Accident Compensation Corporation in the 2005/2006 financial years. These injury sites were:

- Neck/spine, contributing 4.2% in number and 5.4% in cost;
- Shoulder, contributing 19% in number and 20% in cost;
- Knee, contributing 25% in number and 31% in cost;
- Leg (upper and lower, excluding knee and ankle), contributing 6.4% in number and 7.1% in cost;
- Ankle, contributing 10% in number and 9.1% in cost; and
- Concussion (Gianotti *et al.*, 2009).

In their study Brooks and Kemp (2011) did not find significantly higher absence due to match injuries in any specific playing positions among the forwards and backs. They found, however, a definite need to design and implement injury-prevention programmes for all players to reduce the injury burden. As a result, injury-prevention strategies for shoulder, hamstring, knee and ankle injuries were prioritized. Studies implementing injury-prevention interventions in other non-collision sports were successful in reducing the incidence of injury to all of the above lower-limb locations (hamstrings, knees and ankles) by utilising exercises designed to improve parameters such as proprioception, core stability and muscle strength (Brooks & Kemp, 2011).

Prior to RWC 2015 the Namibia national team introduced injury prevention exercises for their national players in an attempt to reduce the incidence of common injuries. There is, however, still a need to introduce a comprehensive injury prevention programme, which should involve all club and school teams in the country.

This study attempted to achieve the first two steps described by van Mechelen *et al.* (1992) (see Section 2.10.), to establish the extent of the sports injury problem and to determine the aetiology and mechanism of injuries. The challenge for the NRU is to use this information and implement the last two steps by introducing preventive measures for the first two steps and assessing the effectiveness of these preventive measures by repeating the first step. There is also a need for a qualified first aider to attend all club matches in this league, and for coaches and referees to be trained in first aid and recognition of concussion.

5.17. LIMITATIONS AND METHODOLOGY

There are quite a few limitations to this study. Firstly, the study population of 1 236 club players, with only 414 players playing in the premier league in 2013, was a small number. Furthermore, only 122 injured players and 156 injuries were used in this study.

Only the injury rates of the matches were calculated – training injury rates were not considered. The researcher did not make provision for training exposure in the data collection forms, thus making it very difficult to accurately calculate the injury exposure for the injured players. This meant that the actual injury rates, for both matches and training sessions, could not be calculated. For the event causing injury the researcher had to combine a number of events, because of the low numbers, to make the results more meaningful. For example, rucks, mauls and collapsed mauls were combined, the tackle was not separated in terms of tackles from the front, side and from the back, and scrums and collapsed scrums were also combined.

Foul play was not included as an event causing injury, and chronic overuse injuries were not specifically recorded. The researcher did not discuss/ analyse the injury type, e.g. ligament or muscle injury, but only the body location of the injury. Because of the low numbers the playing positions were grouped into tight forwards, loose forwards, inside backs and outside backs. Each playing position was not analysed individually.

The researcher did not categorize recurrent injuries according to the time the injury occurs after the first (index) injury into “early” (within two months of a player’s RTP), “late” (2-12 months after RT), and “delayed” (more than 12 months after RTP), because the data was not analysed in that way.

Slight injuries (0–1 day absent) were not included in this study, as per the IRB’s *Consensus statement of injury definitions and data collection procedures for studies in rugby union*. This is because of the physical nature of rugby and the high number of slight contusions routinely encountered in the game. Studies in rugby union normally record time-loss injuries only if they result in more than one day’s absence from training and/or match play (Fuller *et al.*, 2007).

Data collection was limited to injured players, therefore it was not possible to compare injured and non-injured players; demographic information for non-injured was not available.

Collecting the data was a challenging undertaking, because training sessions did not always start on time at the clubs, and not all players attended all the training sessions, resulting in

the researcher having to return to club training sessions several times. Four clubs were located between 280 and 400 km from where the researcher was located, forcing him to conduct telephone interviews with players. These distant players only gave verbal consent and they did not sign the consent forms. The researcher was unable to contact eight players, resulting in a 2% dropout.

5.18. CONCLUSION

Of the original sample, 98% of injured players agreed to participate in the study, thus giving an accurate reflection of the results. The players in this amateur league are physically (weight and height) much smaller than professional and international players.

The high injury rate (74.4 injuries per 1 000 player-match hours for time-loss injuries) confirms the suspicion that time-loss injuries in this league are much higher than in other amateur settings. The lack of an injury prevention programme in the country and poor strength and conditioning of club players may contribute to this high injury rate.

Injuries are, on average, more severe in this league than in other amateur and professional leagues, with more than 87.7% of injuries taking more than seven days to recover.

Most injuries occur in the second half and in the final quarter, which correlates with the literature. This pattern may be caused by fatigue and reduced concentration of players. There was no significant difference in the time of a match at which first-time and recurrent injuries occurred – both could happen at any time of a match.

The tackle was responsible for most time-loss injuries, and contact events in general caused most injuries, this correlates with other studies reported in the literature. Coaching players correct tackle techniques and application of the laws of the game during contact events may reduce these injuries. Very few injuries were caused by scrums and lineouts, because these are more controlled events.

Backline players had more injuries than forwards, with the highest injury incidence being found among inside backs (scrumhalves, fly halves and centres). Nearly half the injured players left the field of play or training immediately after an injury, but nearly a third did not leave the field at all after an injury. Significantly more injuries were match injuries, with much fewer training injuries occurring, but there were a greater percentage of recurrent injuries during training than during matches.

Ankle ligament sprains were the most common injury (17.3%), followed by hamstring injuries (16.7%). Knee injuries and shoulder injuries each represented 15.4% of injuries. Lower-limb injuries (61.5%) represented the highest proportion of injuries. Concussion accounted for only 4.5% of all injuries.

Most of the injured players who had imaging, had X-rays (38.5%) done, but most of the injuries were soft tissue injuries that could not be properly evaluated by X-rays. The majority of injured players consulted a doctor, usually a general practitioner or a physiotherapist for assessment and management of their injuries. More than 70% of injured players did not receive adequate rehabilitation of their injuries, which could have led to the long recovery times of injuries.

This study population reported that 48.7% of the injuries were recurrences of previous injuries – this is the highest recurrent injury rate reported to date in rugby union. This finding is one of the most significant findings of this study, and needs to be investigated further.

The importance of implementing an injury prevention programme for rugby in Namibia is emphasized by the high injury rate, injury severity and high rate of recurrent injuries.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

This study was designed to determine the incidence of rugby injuries in the Namibia's premier club rugby league and to determine the prevalence of recurrent injuries and associated factors among players.

The 414 players who participated in the study represented 98% of injured players for this season, which is a good representation of the study population, thus giving an accurate reflection of the results. The study focused on players who played in premier league matches in the 2013 season, and thus excluded players that played in lower level league matches.

The forwards who participated in this study were physically bigger than the backs, which is comparable to findings of other studies in rugby. The physical size (weight and height) of these players was similar to that of players in other amateur leagues, but the amateur players were physically smaller than professional and international players. The bigger physique of professional and international players is regarded as one of the reasons why their injury rates are so much higher than at amateur level.

The injury rate of time-loss injuries in matches was 74.4 injuries per 1 000 player-match hours, which is much higher than in other amateur settings, where injury rates were as low as 16.6 injuries per 1 000 player-match hours. This confirms the researcher's suspicion that injuries rates are much higher in this league than in other amateur settings. The results from this study confirm that the injury rates and incidences are much higher in professional rugby than in amateur rugby. The introduction of an injury prevention programme and improvement of the strength and conditioning of players may reduce this rate. No catastrophic or career-ending injuries were reported.

Injuries are, on average, much more severe in this league than in other amateur and professional leagues, with more than 87.7% of injuries taking more than seven days to recover. In other studies only between 36% and 47% of injuries take more than seven days to recover. Proper sport medicine services for accurate diagnosis and treatment of injuries, access to adequate rehabilitation services for proper rehabilitation of injuries and the usage of RTP protocols need to be available for injured players to reduce their recovery time.

Most injuries occurred in the second half and in the final quarter, which correlates with the literature. This trend may be caused by player fatigue and reduced concentration. Improvement of fitness levels of players, better player preparation and development of strategies for player substitution by coaches in the third and fourth quarters may assist to

reduce injuries during the latter part of matches. There was no significant difference in the time in a match when first-time and recurrent injuries occurred – both types of injuries could happen at any time during a match.

The tackle was responsible for most (48.4%) of all time-loss injuries, and contact match events caused 83.5% of all injuries. This is comparable to other studies, which also report the tackle and contact events as the main causes of injuries in rugby. Coaching players to use correct tackle technique and apply the laws correctly in ruck and maul situations may assist in reducing injuries during these match events. An injury prevention programme should thus include training for coaches regarding the tackle, rucks and mauls; referees should also be educated about applying the laws of the game correctly during these contact events, to reduce injuries.

Running caused 18.0% of all injuries, ruck and mauls 18.0%, collisions 13.1% and kicking only 1.6% of all injuries. There was only one injury from the scrum (0.8%) and no lineout injuries. Many studies also report few injuries during scrums and lineouts. This reflects the more controlled nature of scrums and lineouts, as it is controlled by the referee. This, again, highlights the importance of referee training and education in injury prevention programmes.

Recurrent injuries were mostly caused by non-contact events, like running and kicking, while first-time injuries were mostly caused by contact events, like tackling, collisions and rucks and mauls. Injuries caused by running and kicking should be rehabilitated properly, and players should only RTP once these injuries have recovered completely, to avoid recurrence. Players also need coaching with regard to correct kicking technique.

Backline players had more injuries than forwards, with the highest injury incidence amongst inside backs (scrumhalves, fly halves and centres). Numerous other studies did not, however, find a difference in injury incidence between forwards and backs. Many studies failed to determine the injury risk of specific playing positions, because most injuries occur in uncontrolled and open phases of play, which is not position specific.

Although most players (42.9%) leave the field immediately after an injury there was a significant number of players (31.4%) who did not leave the field at all after an injury, meaning that they continued to play with an injury. This may lead to the high rate of severe injuries and the many recurrent injuries in this league. There is a need for medics with experience in sport medicine to provide sideline medical assistance, to know when an injured player should leave the field, instead of allowing him to continue to play with an injury.

Most injuries were match injuries (78.2%), with only 21.8% being training injuries. This is consistent with most other studies, which also report significant more match injuries than training injuries. This emphasises the need for sufficient experienced and qualified medical personnel to do duty at matches providing care for injured players. However, there is a need for medical staff at the training field too, because injuries also occur at the training ground.

Ankle ligament sprains were the most common injury (17.3%), followed by hamstring injuries (16.7%), and knee injuries and shoulder injuries at 15.4% each. Lower limb injuries (61.5%) represented the highest proportion of injuries, which was consistent with many other studies into rugby injuries. Most hamstring injuries were recurrent injuries (18), with only eight first-time hamstring injuries reported, which was a significant difference ($p=0.02$). To reduce hamstring injuries pre-participation medical examinations have to be done on all players to identify players at high risk of suffering hamstring injuries. Injury prevention exercises, like Nordic drops, have to be incorporated in the training regime of these players. Clubs must also ensure that these players complete their rehabilitation and only return to training and play once their injuries have healed completely.

Ankle injuries, on the other hand, were significantly more often first-time injuries (19) than recurrent ankle injuries (eight) ($p=0.03$). Risk factors for ankle injuries must be identified and addressed to reduce this injury, which is no more common in other amateur and professional settings. The researcher has been informed subjectively by coaches and club administrators that uneven playing fields sporting numerous potholes lead to most ankle and knee injuries. League and club administrators will have to set standards for safe playing fields and ensure that these standards are adhered to in order to reduce the incidence of these injuries.

Concussion accounted for only 4.5% of all injuries, but it is suspected that concussion is under-reported, because of lack in knowledge and experience in diagnosing concussion, and of players not reporting concussion because they want to avoid the consequences of being diagnosed with concussion. The NRU will have to facilitate education courses in concussion to enable medics and players to recognize and manage concussion and understand the consequences of playing with a concussion or suffering a repeat concussion before the previous concussion has recovered completely.

X-ray was the imaging modality most often used (38.5%), because of its affordability and ready accessibility. Most injuries were, however, soft tissue injuries that could not be properly evaluated by X-rays. This lack of an accurate diagnosis of soft tissue injuries may have led to the longer recovery times of these injuries. Other imaging modalities, such as MRI and CT scans, are expensive and not readily available, especially in rural areas. The

recommendation is for clubs to send their injured players to a doctor with knowledge and experience of sports injuries, so that, at the least, an accurate clinical diagnosis could be made, and a treatment and rehabilitation plan could be worked out.

The majority of injured players consulted general practitioners or physiotherapists to assess and manage their injuries. These doctors and physiotherapists were, however, not sports medicine practitioners, and they were not always able to make accurate diagnoses of the sports injury and provide the players with the most appropriate treatment options. More than 70% of the injured players did not report for proper rehabilitation at a biokineticist. The above factors may be reasons why the recovery times of most injuries was so long. The recommendation is to encourage players to consult medical practitioners with an added interest in and knowledge of sports injuries, so that players receive more accurate diagnoses and the most appropriate treatment and rehabilitation for their injuries. Coaches and players must also be educated about the importance of proper rehabilitation of injuries by a rehabilitation expert, like a biokineticist.

Recurrent injuries accounted for 48.7% of injuries in this study, which is the highest recurrent injury rate reported to date in rugby union. This high rate of recurrent injuries may be due to the fact that the NRU does not have an injury prevention programme for its affiliated clubs. New injuries occur substantially more frequently than recurrent injuries, but recurrent injuries are usually of greater severity than new injuries. Some players do not take the time for previous injuries to heal sufficiently before returning to play; some ignore their injuries and do not seek treatment soon after the injury occurred and may therefore be more likely to be injured again. Remaining deficits in the previously injured joint or muscle, deficits in physical conditioning, proprioception, or altered movement patterns after a previous injury may make the player more prone to re-injury. Many early recurrent injuries may be due to inadequate rehabilitation or premature RTP after the initial injury. To reduce this high recurrent injury rate, strategies targeting lower-limb injury prevention exercises and methods for increasing safe behaviour in contact situations should be considered. Injuries have to be accurately diagnosed and players should receive the best evidence-based treatment and rehabilitation for their injuries. RTP protocols should be followed and managed by a qualified trainer. Players should be encouraged to delay their return to training and match play until their injuries have healed completely.

The NRU should use the results of this study to introduce an injury prevention programme for rugby in Namibia. The injury prevention programmes of SARU (BokSmart), New Zealand Rugby Union (RugbySmart) and of Australia Rugby (SmartRugby) can be used as a basis

and example to start a similar programme locally. The focus should be on coaches and referees, who are closest to the player at the time of injury, to ensure a basic standard of prevention, knowledge and care. The five important aspects related to injury prevention, namely, coaching technique, fitness levels, injury management, tackling technique and foul play, should receive particular attention. Injury prevention strategies for the most common injury sites, namely, the ankle, hamstring, knee and shoulder, should also be prioritized. Potentially catastrophic injuries, such as neck injuries and concussion, must also receive special attention.

CHAPTER 7: LEARNING EXPERIENCE

When I embarked on the journey to acquire this Master's degree in Sport and Exercise Medicine, my only ambition was to learn about sports injuries – how to diagnose and treat them using the latest evidence-based methods. Initially, I regarded the research project as a small and not an integral part of the learning process. I did not realise what a challenge it would be to do the research project. I have a few colleagues back home who also did a similar course at other universities; they only completed the coursework and not the research projects, thus they never received degrees. They declared that they had gained the knowledge of the course, even though they were never awarded the degree. I told myself that I did not want to follow this path. I wanted to complete the whole degree, coursework and research included.

The first challenge was to select a research topic and a research question. I did not know where to start, because I did not have research in mind when I started the course. I had to choose a topic that would fit into my routine, as I faced many time restraints. My private practice occupied my whole day, and often even time after hours and over weekends. My family also required time and attention, although the time I spent on my studies and research had already cut down on this time. I was the time doctor for a senior sport time, where I spent about two hours every day, including match days, which were usually Saturdays. To combine my research with my daily schedule I eventually decided on a research topic that involved the teams of the sport I was involved in. This helped me tremendously to use my time constructively.

It was, however, still difficult for me to find time for research among all the other important parts of my daily life. Initially, I neglected the research, and I soon realised that I would have to make sacrifices in my life if I wanted to complete the research. Firstly, I had to stop doing obstetrics as part of my practice. This gave me more time for research, but resulted in a loss of income, but that was I sacrifice I had to make. I later had to relinquish my position as team doctor of the sports team I was serving, for a period of two years, to have more time for research. I was still involved with a junior team that required less of my time, because this is my passion and the reason why I do sports medicine. During the final year of the research I was asked to return as team doctor to help prepare and accompany the senior team to an international tournament, which I did.

While preparing the research protocol I realised the challenges and difficulties that awaited me when I eventually started the study. Collecting data was a challenge: Sometimes I

arrived at the venue to find that the training time or venue had been changed but I had not been informed. I overcame these obstacles, in the process learning that research requires perseverance. It was also a humbling experience to ask each club and player for permission to do the study and gather the data I needed.

The literature review was the toughest part of my research project, but also a great learning experience. I was specifically looking for articles on recurrent injuries in rugby union and in amateur rugby. I discovered that not many articles had been published on those two topics specifically; in most cases this topic formed a small part of other studies.

To achieve meaningful results I had to reduce the number of items for some of the subheadings of the questionnaire, because the numbers were too low. That was a very challenging task because I had to cut certain items while still conveying the message.

Keeping track of the references was not as easy as I initially thought it would be. Although I followed the correct procedure for referencing, there were sometimes gaps, and time and again I had to go back and improve the referencing, which was quite a time consuming and frustrating process.

Doing assignments and patient study reports as part of coursework involved literature research on a specific topic, and this assisted in preparing me for the research project, especially the literature review. By doing this research and this course I have become a better doctor. I am now more inquisitive, and I read up on the medical conditions of my patients to ensure that I have the latest evidence-based information regarding their specific medical conditions.

I found the last part of the research project, specifically the discussion and conclusion chapters, quite fulfilling. At this stage I could see the results of my efforts in writing the protocol, collecting the data and doing the literature review. In the end it was satisfying to realise that I may have made a contribution to the scientific knowledge on this topic, and that my goals can possibly be realised.

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INFORMATION SHEET

Study title: "Recurrent Injuries in Namibian Club Rugby"

I, Dr. Vernon Morkel, am doing research on the prevalence of recurrent injuries in the Namibian Rugby Union club league. The aim of the study will be to determine the prevalence, nature and associated factors of recurrent injuries in our Premier league. This information will help us monitor the risks of recurrent injuries and identify means of injury prevention, treatment and rehabilitation of injuries in our rugby.

I am hereby asking you as player to participate in this study to benefit our rugby.

I will record details of all injured players at specific times during the 2013 season. All you have to do is only give information about your current injury status. All the players from the premier league club teams are asked to participate. This data will be analysed and summarized, the results will be used to implement an injury prevention program.

There will be no risks for you being involved in the study and all the information will be treated confidentially. Individual players will not be identified by any of the reports done. All players need to give informed consent to participate in the study and all information collected in this study will remain anonymous. Results from this study may be published in a scientific journal.

Participation in the study is voluntary and you may discontinue participation at any time without penalty or loss of benefits to which you would otherwise be entitled to. The results of the study will benefit all club rugby players, because we can use it to improve prevention and treatment of injuries. There will be no reimbursement for anyone taking part in the study.

For further information regarding this study please feel free to contact me at: 0811 278 453 or 061-305 507.

THANK YOU

Dr. Vernon Morkel

CONSENT FORM

To participate in injury surveillance study

Project title: Recurrent Injuries in Namibian Club Rugby

I hereby ask you to participate in this injury surveillance study. You will be informed about the study by me, Dr. Vernon Morkel, during an information session before the study commences.

Your participation in this study is voluntary, and you will not be penalized or lose benefits if you refuse to participate or decide to terminate participation.

If you agree to participate you will be requested to sign copies of the 'Consent Form' and the 'Information Sheet'.

The research study and the above information have been verbally described to me. I understand what my involvement in the study will be and I voluntarily agree to participate.

.....

Signature of Player

.....

Date


.....

Signature of Witness

.....

Date

INJURY REPORT FORM

	Recurrent Injury Surveillance Study: Namibia Rugby Union 2013 INJURY REPORT FORM
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CLUB:		Player Study number:		Date of injury:		Date returned from injury	
					No. of matches missed		

1. ACTIVITY at TIME of INJURY (Complete *either* the MATCH or the TRAINING section):

MATCH	Time of injury	Warm-up	<input type="checkbox"/> 1 0 – 20 mins	<input type="checkbox"/> 2 21 – 40+ mins	<input type="checkbox"/> 3 41 – 60 mins	<input type="checkbox"/> 4 61 – 80+ mins	<input type="checkbox"/> 5 Cool-down	<input type="checkbox"/> 6
	Event causing injury	Collision	<input type="checkbox"/> 1 Ruck	<input type="checkbox"/> 2 Tackled behind	<input type="checkbox"/> 3 Tackled front	<input type="checkbox"/> 4 Tackled - side	<input type="checkbox"/> 5 Kicking	<input type="checkbox"/> 6
	(Tick one box only)	Maul	<input type="checkbox"/> 7 Collapsed maul	<input type="checkbox"/> 8 Tackling-behind	<input type="checkbox"/> 9 Tackling-front	<input type="checkbox"/> 10 Tackling- side	<input type="checkbox"/> 11 Running	<input type="checkbox"/> 12

Scrum 1 Collapsed 1
 3 scrum 4 Lineout 5 Other (state)

Playing position/number at time of injury: Player: Started game 1 Replacement 2

TRAINING Rugby skills, 1 full-contact Rugby skills, 2 semi-contact Rugby skills, 3 non-contact Conditioning, 4 weights Conditioning, 5 non-weights

Was the player using the following items when injured? (tick ALL applicable) Gum shield 1 Shoulder pads 2 Head guard 3

2. CLASSIFICATION of INJURY (Refer to Guidance Information provided for Orchard code {Appendix A.8})

Was the injury? Acute 1 Gradual 2 Was player removed from play/training? Immediately 1 Late 2 Not at all 3

Body location: Type of injury: Side of body:

Orchard code: If coding is unclear, describe injury:

Were diagnostic investigations used? Yes 1 No 2 **If Yes, specify:** X-rays Sonar CT MRI Other

Were invasive procedures used? Yes 1 No 2 **If YES, please specify:** 1 Suturing 2 Surgery 3 Steroid injection 4 Other

Is this injury a recurrence? (see definition) Yes 1 No 2

A recurrent injury is defined as: 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

Do you have an injury after the initial injury which is on a different body site than the initial injury? Yes No

Date of previous injury: Date player returned from previous injury:

Did the previous or initial injury completely recover? Yes (re-injury) No (exacerbation)

If NO, why did you return early to match play/training? Medical advice: Own decision:

Pressure from coach: Important match:

What treatment did you receive? None Physiotherapy Biokinetics Medical Doctor

How many treatment sessions did you attend?



Injury Surveillance Study: Namibia Rugby Union 2013

PLAYER BASELINE INFORMATION FORM

TEAM:

Player Study number	Normal playing position	Date of birth (dd/mm/yy)	Height (cm)	Body mass (kg)	Dominant Leg	Dominant Arm	Player's signature

PERMISSION LETTER TO THE NAMIBIA RUGBY UNION AND THE CLUBS

Permission Letter

Project title: Recurrent Injuries in Namibian Club Rugby

I, Dr. Vernon Morkel, am doing research as part of my Master's Degree in Sports Medicine on the prevalence of recurrent injuries in the Namibian Rugby Union premier league. The aim of the study will be to determine the prevalence, nature and associated causes of recurrent injuries in the Namibian Premier league.

I will record details of all injured players of the nine premier league clubs twice during the 2013 season. The players must give information about their current injury status, this information will be recorded on an Injury Report Form. All the players from the premier league club teams are asked to participate. This data will be analysed and summarised, the results will be used to implement an injury prevention program.

There will be no risks to the players, clubs our Rugby Union and all the information will be treated confidentially. Individual players will also not be identified by any of the reports done. All players need to give informed consent to participate in the study and all information collected in this study will remain anonymous.

Participation in the study is voluntary and any player or club may discontinue participation at any time without penalty or loss of benefits to which they would otherwise be entitled to. The results of the study will benefit all club rugby players, because we can use it to improve prevention, treatment and rehabilitation of injuries. There will be no reimbursement for anyone taking part in the study.

I hereby request the Namibia Rugby Union / Rugby Clubs for permission to conduct this research study on players in the premier league.

For further information regarding this study please feel free to contact me at: 0811 278 453 or 061-305 507.

THANK YOU

Dr. Vernon Morkel

RECURRENT INJURY REPORT FORM: NAMIBIA RUGBY UNION 2013

		For Office Use	
Player Study Number:		<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
Rugby Club		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
Date of injury:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/>
Date returned from injury:	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		<input type="checkbox"/>
No. of matches missed:		<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
1. ACTIVITY at TIME of INJURY			
MATCH:	Time of Injury:	<input type="checkbox"/>	<input type="checkbox"/>
	Event causing injury:	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
	Playing position/ number at time of injury:	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/>
	Player: starter/ replacement	<input type="checkbox"/>	<input type="checkbox"/>
TRAINING:		<input type="checkbox"/>	<input type="checkbox"/>
Was the player using the following items when injured?			
Gum shield:		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Shoulder pads:

Head guard:

2. CLASSIFICATION of INJURY

Was the injury acute/ gradual

Was player removed from play/training?

Orchard code (OSICS codes version 8)

Side of body: L/R/C

Were diagnostic investigations used? Yes/ No

If YES, please specify

X-rays:.....

Sonar:.....

CT-scan:.....

MRI-scan:.....

Other:.....

Were invasive procedures used? Yes/ NO

If YES, please specify

Suturing:.....

Surgery:.....

Steroid injection:.....

Other:.....

Is this injury a recurrence? Yes/ No

Date of previous injury

Date player returned from previous injury

Did the previous or initial injury completely recover?

If NO, why did you return early to match play/training?

Medical advice

Own decision

Pressure from coach

Important match

What treatment did you receive?

None:

Physiotherapy:

Biokinetics:

Medical Doctor:	<input type="checkbox"/>	<input type="checkbox"/>
How many treatment sessions did you have:	<input type="checkbox"/>	<input type="checkbox"/>
Any other rugby injury in 2013? Yes/NO	<input type="checkbox"/>	<input type="checkbox"/>
Player age: (<21) (22-25)(26-30)(>30)	<input type="checkbox"/>	<input type="checkbox"/>
Dominant leg: (L/R)	<input type="checkbox"/>	<input type="checkbox"/>
Dominant arm: (L/R)	<input type="checkbox"/>	<input type="checkbox"/>

LETTER OF APPROVAL FR ETHICS COMMITTEE

Research Division
Internal Post Box G40
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Ms H Strauss/hv

2012-11-08

REC Reference nr 230408-011
IRB nr 00006240

DR V MORKEL
c/o DR M SCHOEMAN
DEPT OF SPORT AND EXERCISE MEDICINE
MULLER POTGIETER BUILDING
FACULTY OF HEALTH SCIENCES
UFS


Dear Dr Morkel

ECUFS NR 187/2012

PROJECT TITLE: RECURRENT INJURIES IN NAMIBIAN CLUB RUGBY

- You are hereby kindly informed that the Ethics Committee approved the above project at the meeting held on 6 November 2012.
- Committee guidance documents: Declaration of Helsinki, ICH, GCP and MRC Guidelines on Bio Medical Research, Clinical Trial Guidelines 2000 Department of Health RSA; Ethics in Health Research: Principles Structure and Processes Department of Health RSA 2004; Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa, Second Edition (2006); the Constitution of the Ethics Committee of the Faculty of Health Sciences and the Guidelines of the SA Medicines Control Council as well as Laws and Regulations with regard to the Control of Medicines.
- Any amendment, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.
- The Committee must be informed of any serious adverse event and/or termination of the study.
- A progress report should be submitted within one year of approval of long term studies and a final report at completion of both short term and long term studies.
- Kindly refer to the ECUFS reference number in correspondence to the Ethics Committee secretariat.

Yours faithfully



PROF WH KRUGER
CHAIR: ETHICS COMMITTEE

cc Dr M Schoeman

PERMISSION LETTER FROM NAMIBIA RUGBY UNION



11 December 2012

TO: Vernon Morkel

PERMISSION TO DO THESIS ON RECURRING INJURIES IN NAMIBIAN CLUB RUGBY

Dear Vernon

Your email and letter of 14 November 2012 has reference.

We have looked at your request and are herewith granting you permission to do your research of recurring injuries in the premier league clubs of Namibia. As agreed, the information must be made available to the NRU.

Good luck with the thesis and I am positive that this will contribute positively to our sport.

Kind regards



Sybrand A. de Beer
CONSULTANT CHIEF EXECUTIVE OFFICER
NAMIBIA RUGBY UNION