An investigation into the risk factors and management of rugby injuries in the greater Durban area.

By

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Dissertation submitted in partial compliance with the requirements for the Master's Degree in Technology: Chiropractic at Durban University of Technology.

I, Andrew Murray Tuck, do declare that this dissertation is representative of my own work in both conception and execution.

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Dedication

This dissertation is dedicated to my family, my friends and everyone that helped make this project possible.

Thank you for your understanding and encouragement.

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Abstract

Objective: Majority of studies to date have focused on injury profiles and types of injuries in rugby, without looking at the risk factors associated and the management of these injuries. It was thus the aim of this study to determine the risk factors and management of rugby injuries in the greater Durban area.

Methods: This was a prospective, cross-sectional based study, using a self-administered questionnaire, developed specifically for this research utilizing a focus group and pilot study. The questionnaire details a patient injury history, rugby history, resources, management, coaching and training parameters. Letters of informed consent and the questionnaire were distributed to 300 players / coaches for completion and data was analysed using Pearson's correlation and t-tests.

Results: A response rate of 70% (n=210) was achieved. Selected risk factors were found to be significantly related to current and / or previous injury. New risk factors which did significantly impact injury, were also determined.

Conclusion: It is advised that coaches and players take note of significant injury risk factors and management protocols in order to improve player health and decrease injury risk. Further research may look into the factors identified in order to set up better structures in order to prevent further injuries.

Key words: injuries; questionnaires; cross-sectional study's; risk factors; management; sports; rugby.

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Definitions:

Rugby a game played by two teams, each of 15 players, with an oval shaped ball, on a field measuring 100 metres by 70m plus two in goal areas or dead ball areas that are 10 metres by 70 metres (Robinson, 1998).

Set play occurs with the play is stopped and restarted with the line-outs, scrums, penalties or free kicks (Robinson, 1998).

Open play occurs once the set play is complete and allows anyone in the field to play with the ball either by running in space, kicking, tackling or been part of the ruck or maul (Robinson, 1998).

Line out is simply a way of getting the ball back into play, quickly and fairly, by throwing it back along the line of touch or the area beyond the field of play (Robinson, 1998).

Scrum is a set piece consisting of eight players from each team pushing over the ball (Robinson, 1998).

Penalty/ Free kick is what is awarded to a team if the opposition team breaks the law. As a result, the attacking side can decide to take a scrum, kick for touch to get a lineout, or take a quick tap/kick and play on (Robinson, 1998).

Tackle is if a player with the ball, in the field of play, is held by an opponent and or brought down (Robinson, 1998).

Ruck is defined as two players, one from each team in the field of play, on their feet and shoving each other, with the ball on the ground between them (Robinson, 1998).

Maul is defined as three players, one from each side and the ball carrier, in the field of play, and all of them wrestling for possession of the ball (Robinson, 1998).

Chapter 1
Introduction

This chapter explains the rationale behind the study, dealing with the aims, objectives, hypothesis and limitations of the study.

1.1 Introduction

Rugby is one of the most popular sports played today, with more than three million people across the world playing the game, in more than a hundred different countries, in five different continents around the world (Brooks and Kemp, 2008). By definition, rugby is a game played by two teams, each of 15 players, with an oval shaped ball, on a field measuring 100 metres by 70m plus two in goal areas or dead ball areas that are 10 metres by 70 metres. Within the field there are two sets of rugby poles which are used for the kicker to kick at. The game is played by carrying, passing, or kicking the ball in order to ground it over the goal line to score as many points as possible, while at the same time observing fair play according to the rules governed by the international rugby board in a good, sporting and competitive spirit (Robinson, 1998).

Various factors play a role in high injury rate

- Previous injury (Deroche et al., 2007; Quarrie et al., 2001; Gabbe and Finch, 1997).
- Poor training which leads to low physical fitness (Bell et al., 2000).
- Increased age of the player (Noakes and du Plessis, 1996).
- Size of the players (Caine, Maffulli and Caine, 2008; Quarrie et al., 2001).
- The level of play (Noakes and du Plessis, 1996).
- The player's position (Noakes and du Plessis, 1996).
- Training (Braham et al., 2004; McManus et al., 2004; Dryden et al., 2000; Gabbe and Finch, 1997; Noakes and du Plessis, 1996).

- Coaching (Short and Short, 2005; Jowett and Cockerill, 2002; Dryden et al., 2000).

In addition to the risk factors, the use of standardised management protocols should be followed in order to reduce the progression or reoccurrence of these injuries (Beardmore et al., 2004). Mismanagement or over playing of players by coaches (Dryden et al., 2000), players returning to play too quickly after injury (Beardmore et al, 2004), and players not undergoing specific rehabilitation with position specific demands (Eaton and George, 2005) are all factors that have a direct effect on injury. However cooling down after training and not been injured in the previous 12 months (McManus et al., 2004) were found to be protective against injury. Thus management or mismanagement of an injured player is of vital importance, as it can either prolong or else be detrimental to the sportsman's health.

Research conducted by McManus and Cross (2004) on elite junior rugby players revealed that further research is needed to identify the aetiology of injury at all levels of competition and to use these findings to develop effective injury prevention strategies in the sport. McManus et al., (2004) also suggested that further research is needed to understand how identified risk factors influence injury risk at community level of Australian non-elite rugby players. This is further supported by Braham et al., (2004) who showed that identification of injuries and their risk factors is required in order to develop risk controls within the context of sports injury prevention.

Therefore in order to understand the gaps that are apparent in the risk factors and management of rugby injuries provided for rugby players, it is important to address and identify all risk factors associated with rugby in this area. Once these gaps have been identified, appropriate structures can then be implemented in order to fulfil the needs of non elite, and elite rugby players. Thus it can be determined whether the market attributed to chiropractic (or any other medical personnel) can contribute to reducing risk factors and provide correct management in rugby.

It was thus the aim of the study to investigate both the risk factors and management of rugby players in the greater Durban area. In doing that, all the risk factors to rugby in this area can be identified, which risk factors can be modified or reduced given the correct funding and attention, and if a chiropractor or any other health care profession has a role to play in minimizing these risk factors.

1.2 Aim:

The aim of the study was to determine the risk factors and management of rugby injuries in the greater Durban area.

Thus the following information was gathered

- Patient information
- Rugby history
- Knowledge and perception
- Training, Coaching and Management of players
- Player Injuries
- Resources

1.3 Objectives and Hypothesis:

1.3.1 The first objective was to determine the risk factors leading to rugby injuries in the greater Durban area. This was quantified according to

- Previous injury
- Existing injury
- Age and Size of player
- Level of play
- Time of the season
- Position
- Training
- Trainer
- Coaching

- Facilities
- School Equipment
- Sponsorship
- Personal Protective Equipment
- Medical Aid
- Knowledge and Perception

It was hypothesised that none of the above factors would increase the risk of injury.

1.3.2 The second objective is to determine the standard or variation in management of rugby injuries in the greater Durban area. This was quantified according to

- First aid
- Medical staff
- Medical facilities

It was hypothesised that none of the above factors would increase the risk of injury.

1.3.3 The third objective was to determine the relationship between the varying risk factors and management to the injury rate among rugby players in the greater Durban area. This was done by using the cross tabulations, and the Pearson Chi squared test. This was to determine any associations or relationships between these factors, and to assess whether the results in this study are comparable or equivalent to results achieved in other studies.

It was hypothesised that there would be no relationship between the risk factors and management of injuries compared to the injury rate.

1.4 Rationale

1. Rugby is one of the countries most popular sports (Brooks and Kemp, 2008), however it demands high levels of skills and fitness and is played at a high intensity and speed. With this high speed and intensity comes a greater risk of injury (Noakes and du Plessis, 1996). More players are thus getting injured at games and at practise (King et al 2005, King and Gabbett 2007), and across all age groups (Gabbett, 2007).

2. Injury may be caused due to certain risk factors (Deroche et al., 2007; Bell, 2000; Dryden et al., 2000) and may be prolonged by mismanagement. (Dryden et al., 2000; Beardmore et al., 2004; Eaton and George, 2005) In all sports there are certain factors that may either promote or prevent these injuries and if these enabling factors or detracting factors are enhanced or reduced respectively, the resultant injuries could be reduced (Ingle, 2009).

3. Research conducted by Beardmore et al., (2004), Braham et al., (2004), McManus and Cross (2004) and McManus et al., (2004) have identified the need for further identification of risk factors to develop proper risk control and thus injury prevention. By identifying all the risk factors involved with rugby, structures may be put in place to reduce the risk factors and thus manage the injuries correctly.

4. By investigating these factors and management protocols, the risks associated with the sport can be identified, it can be found out what the reasons are behind the risks, and it can thus be seen if a chiropractor or other health professional may play a role in the reduction or modification of these factors.

1.5 Limitations

The study was such that it required both concession (Appendix G) and active participation of the participant in the study. The participants needed to be truthful and honest in their answering of the questionnaire, based on the fact

that their responses remain anonymous. It is also assumed that the respondent, under the supervision of the researcher, understood the questionnaire and the information that is required from them.

1.6 Conclusion

In summary, this Chapter deals with the background of the study. Chapter Two looks at the literature behind the need to assess the risk factors and management of rugby injuries in the greater Durban area. Chapter Three looks at how the questions were structured, using methods and materials to meet the objectives above. Chapter Four presents the results and discussion of the questions answered in the administered questionnaire, and Chapter Five presents the conclusions and possible recommendations for further research to be done in the future.

Chapter 2
Literature Review

2.1 Introduction

This chapter provides the reader with a definition of rugby and explains the relating biomechanics. It looks at the aetiology, incidence and prevalence, anatomical locations, mechanisms of rugby injuries. Additionally it looks at various risk factors, resources, prevention and management of rugby injuries that occur within the sport in the greater Durban area.

As mentioned, rugby is one of the most popular sports played today (Brooks and Kemp, 2008). It is a game played at a high intensity and a high speed that requires a particularly high level of skills and fitness. With these higher levels of skills and fitness, the quick and intense nature of the game subsequently leads to a higher risk of injury (Noakes and du Plessis, 1996). More players are getting injured (King and Gabbett, 2007; King et al., 2005). There are more people presenting to hospital for serious rugby injury (Rourke et al., 2006), and the injury rate seems to be spread right across all age groups (Gabbett, 2007).

2.2 Background of rugby

2.2.1 The game

Rugby is a game played by two teams of 15 players. The game is played by carrying, passing, or kicking the ball in order to ground it over the goal line. These acts are performed according to the rules governed by the International Rugby Board in a good, sporting and competitive spirit (Robinson, 1998).

The game consists of two types of play. There is the set play, which is the start or restart of play. This consists of the line-outs, scrums, penalties or free kicks. This is when play starts, or is stopped and restarted. Then there is open

play which takes place once the set play is complete. This allows anyone in the field to play with the ball. There are five main parts to open play. There is running in space and kicking if you are on the attack and have the ball. There is tackling if you are on the defence. Then there is the ruck and the maul which involves both the attacking team and the defending team which are both explained further on in this chapter (Robinson, 1998).

2.2.2 Set pieces

The line-outs occur when the ball is kicked out by either team and is thus thrown back into the field of play. The lineout is simply a way of getting the ball back into play, quickly and fairly, by throwing it back along the line of touch or the area beyond the field of play (Robinson, 1998) .

The scrum is a set piece consisting of eight players from each team pushing over the ball. The scrum occurs when there is a handling error or knock on, which results in play being stopped. The scrum is set, the scrumhalf puts the ball into the scrum and the game commences. The scrum consists of three rows, with the first row having two props and a hooker, the second row having two locks, and the third row having two flanks and an eighth man. All eight players must stay bound to the scrum until it ends (Robinson, 1998).

A penalty or free kick is awarded when the opposition players break the rules. As a result, the attacking side can decide to take a scrum, kick for touch to get a lineout, or take a quick tap/kick and play on (Robinson, 1998).

2.2.3 Open play

According to Robinson (1998) if a player with the ball, in the field of play, is held by an opponent and brought down, he is tackled. If the ball carrier is brought to ground, a ruck will form. If the ball carrier is tackled but not brought to ground, a maul will form. The rest of open play is running, kicking, and passing of the rugby ball with the common goal to score tries (Robinson, 1998).

2.3 Biomechanics of rugby

2.3.1 Positions

In a team of 15, there are eight forwards and seven backs. Of the eight forwards, there are two props whose main job is to push in the scrum and lift the jumper in the lineout. There is a hooker whose main job is to push in the scrum and to throw into the lineout. The two locks normally push in the scrum and jump in the line out, and complete and constitute what is known as the tight five. The two flanks and the eighth man complete the eight man forward pack. They are more involved in the loose aspect of play or open play, which as stated is the rucks, mauls, tackling, running and passing (Van Noordwyk, 2009).

Of the backs there is a scrum half and a fly half, whose main job is to kick and pass the rugby ball. The two centres, two wings and a fullback make up the remainder of the backline. They are mainly involved in the open play of running, tackling and passing. Each position however requires its own specific set of skills and function (Van Noordwyk, 2009).

2.3.2 Rugby training

Blair (1990) as cited by Noakes and du Plessis (1996) believed poor training methods were the reason New Zealand rugby teams lacked fitness. The forward players main activity is to contest the possession of the ball. They therefore needed a high degree of strength fitness and power fitness, especially in the upper body, as well as a good endurance fitness to have the ability to move around the field. Back line players main activity is to run and tackle. They therefore should develop power and reaction speed necessary to evade tackles and stay on their feet in tackles. It was thus concluded endurance fitness is the most necessary fitness to recover from the sprints and maintain their speed for the full game, as well as acceleration to get off the mark well and to be strong to withstand tackles (Noakes and du Plessis, 1996).

In England, Hazeldine and Mcnab (1991) as cited by Noakes and du Plessis (1996) established that different playing positions can be divided into four groups on the basis of their fitness requirements. The four groups are the two props and two locks, the back-row (the two flanks and the eighth man) and the hooker, the halfbacks (the scrum half and the fly half) and the other backs (the two centres, two wings and the fullback). It was also concluded that each group should have a different training program according to the position that they play.

In Australia, Dwyer (1992) as cited by Noakes and du Plessis (1996) went a step further by introducing a total program of individualised player preparation, including fitness training, strength training and analysis of individual player patterns and weakness.

In summary, it is well accepted that rugby is a high intensity, interval type activity. Most of the actions are of an explosive nature, fuelled by oxygen independent energy systems, thus requiring proper fitness and training techniques in order to cope with the high paced nature of the game (Noakes and du Plessis, 1996).

2.3.3 Fitness training

Noakes and du Plessis (1996) devised fitness and training principles for rugby players that they stated are essential to improve the player's capability. The first principle is that there are four different types of fitness and that each type of fitness is specific. The four types are endurance, speed, flexibility and strength. Each type of fitness is specific to the type of training undertaken and to the specific muscles being trained. The second principle is that fitness required for rugby is different to any other kind of game. The third principle is that there are a range of fitness requirements that are common to all playing positions, and that general fitness requirements include jogging, running, and upper body strength to tackle and wrestle for the ball. Hence all players, regardless of their position, must develop minimum levels of fitness for those aspects of the game that are common to all playing positions. Thus fitness

and training play a huge roll in the preparation and education of a player on how to play the game.

2.3.4 Skills training

Rugby training should consist of two main elements, field work and gym work. Field work should constitute about three to four hours a week, usually being two practise sessions each lasting a duration of one and a half to two hours. In those practise sessions the basic skills of scrumming, line-outs, tackling or being tackled, rucking, mauling, running with the ball, passing the ball and kicking of the ball are taught. Basic fitness drills such as stretching, agility drills and running should also be done to keep the fitness of the players up (Noakes and du Plessis, 1996).

Gym work should constitute about four to six hours a week, usually being three to four sessions of which all the major body groups are trained for strengthening mainly, but also flexibility and strength endurance for the coming season (Noakes and du Plessis, 1996).

It is now known what the game of rugby is and can see what is required to play the game at first team level. Now let us look at some of the problems regarding the risk factors and management that play a role in the amount of injury in the game.

2.4 Rugby Injuries

2.4.1 Aetiology

Injury can be defined as any pain or disability suffered by a player during a match or at a training session, that requires advice or medical treatment or results in the player missing a subsequent match or training session (Gabbett, 2007; King et al., 2006). There are two main types of sports injuries that are recognised, namely extrinsic and intrinsic injuries, otherwise known as acute or chronic injuries (Noakes and du Plessis, 1996).

2.4.2 Extrinsic (acute) injuries

Extrinsic injuries may facilitate the manifestation of an injury. It is a factor that has an impact on the athlete while he or she is participating in sport (Caine, Maffulli and Caine, 2008). It is an external force that is applied to the body by someone (example: an opponent) or something (example: goalposts). The more serious injuries seem to be as a result of extrinsic injuries, usually being collision between players or collisions between players and structures. These are the most common to the sport of rugby (Noakes and du Plessis, 1996).

2.4.3 Intrinsic (overuse) injuries

Intrinsic injuries are not as a result of external trauma but instead are a result from repetitive overuse (Noakes and du Plessis, 1996). Factors affecting these types of injuries are biological and/or psychological factors predisposing the athlete to the outcome of an injury. They are viewed to predispose the athlete to react in a specific manner to an injury situation (Caine, Maffulli and Caine, 2008). Woolmer, Noakes and Moffat (2008) defined an intrinsic injury as an internal problem or failure of the body. Noakes and du Plessis (1996) described intrinsic injuries as 'wear-and-tear' injuries, characterized by a gradual or slow onset of discomfort and/or loss of mobility. Injuries can be further classified according to profile, whether the injury occurred at a game or in training, anatomical location, mechanism of injury and risk factors.

2.5. Injuries in a Game compared to Training

Injuries in matches constitute the largest portion of rugby related injuries in epidemiological studies (Brooks and Kemp, 2008; Hughes and Frickers, 1994; Dalley, Laing and Mccartin, 1989). According to Hughes and Frickers (1994) study which showed that out of 133 injuries during the season, 122 were from the match at an average of 91% and only 11 at 9% were from the training field. This is confirmed by Brooks and Kemp (2008) where 80-90% of all reported injuries occurred in matches, with the reported injuries tending to rise with age and competitive level as well as in comparison with other sports.

2.6 Mechanism of Injuries

The mechanism of injury is how the injury occurs. According to Dalley, Laing and Mccartin (1989) who did a study of rugby union injuries, the tackle was by far the biggest mechanism of injury, with 330 out 853 injuries being recorded. After that was open running with 88 injuries, the ruck with 88 injuries, and the maul with 59 injuries. Set pieces like the scrum, lineout and kicking were minimal, with the scrum constituting only 30 injuries, the lineout only 18 and kicking the ball 24 injuries. Dalley, Laing and Mccartin, (1989) also showed that tackles are reported to cause some of the most high risk rugby injuries, including shoulder dislocations, shoulder instability, ACL tears, MCL tears, chondral and meniscal injuries and concussions.

Hughes and Fricker (1994) showed contact between players accounted for 83,5% of all injuries. Tackling accounted for 50,4%, rucks and mauls accounted for 22,6%. Non- contact injuries made up 16,5% of injuries. Of these non-contact injuries, 90% were sprains, strains or tears of the muscles, ligaments or tendons. Set phases were safe with scrums contributing 5,3% of injuries and line-outs 1,5%.

In a study by Brooks and Kemp (2008), the majority of rugby injuries sustained were in contact or collisions with other players, with the tackle accounting for more than half the match injuries. After the tackle, the ruck and maul and open play or running cause a high percentage of injuries, where only a small portion of players seem to be injured in the scrum (Brooks and Kemp, 2008). So it is evident that the majority of the injuries occur in the tackle, either by tackling, being tackled or colliding with another player.

2.7 Anatomical Location of Injuries

Dalley, Laing and Mccartins study in 1989 showed a total of 924 injuries which were observed over the course of a season. The head and leg were the worst at 233 counts each. The knee was second at 117 counts. Following that there were 81 shoulder injuries, 70 hand injuries, 38 back injuries, 48 neck injuries,

13 foot injuries, 19 arm injuries, 2 abdominal injuries, 58 chest injuries and 12 classified as other.

Hughes and Frickers (1994) study showed interesting and similar figures, where 133 injuries occurred in over 10000 hours of playing or training. Overall, the lower limb was the most injured region with 64 injuries at 48%, the head and neck next at 22,6%, and the upper limb 17,3% of all the injuries.

In their study the head was the most commonly injured body part, accounting for 17,3% of the total injuries of which the majority were lacerations, concussions, non-specific bruising and fractures. There were only four injuries to the cervical spine, one of them being soft tissue damage to a fullback resulting in only one missed training session. The other three were chronic injuries to front row forwards, resulting in all these players missing the season. The thigh contributed 13,5% of all injuries, of which half were haematomas of the thigh and the other half been hamstring strains or tears.

The shoulder was the most commonly injured joint accounting for 12% of injury, of which the worst were three gleno-humeral dislocations and a fractured clavicle. The lower leg constituted only 11,3% of the injuries, with the worst being a fractured fibula. The remainder were haematomas to the calf or calf muscle strains. The knee involved 10,5% of injuries, of which 64% were ligament sprains or tears. The worst injury was a ruptured anterior cruciate ligament which caused a player to miss the season. Groin injuries were fairly rare, with only 3 reported.

According to Brooks and Kemp (2008), the lower limb is the most common injury location, constituting 41-45% of all injuries. The knee, thigh and ankle are the most common of the lower limb injuries. Of these, the most common knee injuries were medial collateral ligament injuries, meniscal injuries and patellar femoral pain syndrome injuries. Haematomas and hamstring injuries were the most common thigh injuries where lateral ligament damage and achillies tendon injuries made up the bulk of ankle injuries. Head and non catastrophic neck injuries were the second most common injuries, constituting

12-33% of all injuries. The most common of these head injuries were lacerations of the head or face, concussions and facial fractures. The upper limb represented a smaller proportion of injuries at 15-24%. Of these the shoulder was the main part injured, with AC joint injuries, rotator cuff injuries and shoulder instability injuries being the most common.

All in all, the lower limb seems to be the most injured part of the body, especially at the knee and ankle region. The head and neck are next where the main injuries are lacerations or concussions, followed by the upper limb of which the shoulder seems to be the most injured joint.

2.8 Risk Factors for Injuries

In any sport and with any injury, there are a wide variety of predisposing factors that may lead to those injuries, and rugby is no different.

2.8.1 Previous injury

Deroche et al., (2007) showed previous experience with sports injury contributed positively to the prediction of perceived susceptibility to sports related injuries. Previous injury can lead to fibrosis, adhesions and limited joint motion and function, predisposing the injured site to further injury (Caine, Maffulli and Caine, 2008). Dryden et al., (2000) found that injury in the past year put female hockey players at risk of injury, which was confirmed by Caine, Maffulli and Caine (2008) who showed that previous injury is a significant predictor of overuse injuries in female gymnasts.

McManus, et al., (2004) showed that not being injured in the past twelve months was protective against injury in non elite Australian football players, and Gabbe and Finch (1997) showed that previous injury was a risk factor for injury in community level Australian football players. Quarrie et al., (2001) also showed that those with a pre season injury missed a greater portion of the season than those without.

Thus the literature indicates that having a previous injury puts you at risk for further injury. In terms of rugby, this can play a role in the way the player addresses the next practise session or game. Previous injury can lead to perceived susceptibility in future rugby games. This can cause a player to be hesitant going into practise/game, making them more of a risk if there was not a perception that they were at more risk. Similarly, a player can be over eager going and too keen to get back, over doing it and thus placing themselves at further risk (Ingle, 2009).

2.8.2 Existing injury

Having an existing injury may also have an effect on the prediction of injury. This was noted by McManus et al., (2004) who showed that having existing back pathology and excessive foot pronation were risk factors in non-elite Australian football players.

This is in agreement by Van Noordwyk (2009) who indicated that a player carrying an injury into a game may not perform to their optimum function on the field compared to a player that is fully fit. It is therefore necessary to establish whether the players are playing with an injury or not.

2.8.3 Age of player

Studies of schoolboy rugby have shown that the frequency of injury rises with an increase in age (Nathan et al., 1978 as cited by Noakes and du Plessis, 1996). Roux (1992) as cited by Noakes and du Plessis (1996) also found that there was an increase in injury rate as there was an increase in age groups. This is shown to be much the same all around the world as confirmed by studies done by Davidson et al., (1978) in Australia, Lingard et al., (1976) in New Zealand, and Williams (1984) in Wales as cited by Noakes and du Plessis (1996). This can probably be explained by the increased size of older players and the greater intensity to which the game is played (Noakes and du Plessis, 1996).

2.8.4 Size of player

Player size is generally determined measuring their weight and their height. There is a huge concern classifying participants according to age as there can be a mismatch between the smaller and larger boys (Caine, Maffulli and Caine, 2008). This is confirmed by Roy and Collegues (2000) who evaluated the morphological differences in pee wee hockey players, finding major differences between weight and height compared to grip strength and impact force of the player.

Research conducted by Quarrie et al., (2001) showed that players whose height was between 179-181centremetres, and whose weight between 81 and 87 kilograms missed the greater portion of their rugby season through injury. Research by Braham et al., (2004) however showed there was no significant difference in injury rate between different heights, weights and body mass indices.

Thus it is important to determine the height and weight of the players in Durban, so we can compare the stats to those studies done by Quarrie et al., (2001) and Braham et al., (2004).

2.8.5 Level of play

Level of play is important as the higher the level of play and the higher the intensity of the game, the more chance of severe traumatic injury (Noakes and du Plessis, 1996). Studies by both Roux, (1992) and Nathan et al., (1990) as cited by Noakes and du Plessis (1996) showed that at all ages, A or 1st team players are at a greater risk of injury, and that approximately 20% of all school boy injuries occur at u19A level. The same pattern was seen by Davidson in 1987 as cited by Noakes and du Plessis (1996).
This is probably explained by the increased competitiveness and increased expectation at these higher levels. Thus it is important to determine the highest level of play the players are playing at, so it can be determined how it affects the injury rate as well as see how it correlates to the injuries

experienced. In this study the participants were all first team players, so level will be compared to whether they had played provincial or national level rugby.

2.8.6 The time of season

Injury profiles conducted by Clark et al., (1990); Nathan et al., (1983); Roux et al., (1987) and Roux, (1992) as cited by Noakes and du Plessis (1996) showed that most injuries occur either in pre season or in the first two months of the season. In a study done in England, 61% of the injuries of English rugby playing school boys occurred in the first half of the season, with 36% in the first four weeks (Sparks, 1981 as cited by Noakes and du Plessis, 1996). In a study done in Wales, a similar trend occurred with the incidence of injury peaking in pre season and then dropping off after that (Williams, 1984 as cited by Noakes and du Plessis, 1996).

Upton et al., (1994) as cited by Noakes and du Plessis (1996) showed that despite a proud rugby tradition in South Africa, South African schools do not undergo the adequate preseason training. A possible reason for these higher preseason injury rates is that the players are not match fit, and thus more attention should be paid to pre- season training. Thus it is important to find out at what time of the season the rugby injuries occurred to determine the level of preseason training and compare it to previous studies done.

2.8.7 Position

Position plays a significant role on the rugby field. Dalley, Laing and Mccartin, (1989) seems to show that the forwards get more injured than the backs. This study showed head injuries occurred to players in all positions, especially to the halfbacks and fullbacks. This study also suggested that props have the highest rate of injury regardless of whether they are tight heads or lose heads. Flankers were the next susceptible no matter which side of the scrum they were on, followed by the number eights and then the hooker. In the backs the fly halves were injured the most, with the centres and wings following them.

Hughes and Frickers (1994) study however indicated that the eighth man was the most frequently injured player with 13,5% of injuries, followed by the centres with 8,3%, and the flanker with 7,9%. In this study the three loose forwards represented 29,3% of the total injuries, but he found there was no difference in the overall injury rate between forwards and backs, with forwards compromising 53,3% of the players and counting 54% of injuries, and the backs composed 46% of the players and 45,1% of the injuries.

According to Brooks and Kemp, (2008) the difference in the incidence of injury between forwards and backs is negligible. Thus it is important to find out what positions are susceptible to what injuries so that proper precautions can be put in place to protect players playing in those specific and unique positions.

In order to understand the gaps that are apparent in the risk factors to rugby injuries, it is important to address and identify all risk factors associated with rugby in this area. Once these gaps have been isolated, appropriate structures can then be identified and implemented in order to best fulfil the needs of the rugby players.

2.9 Resources

Having correct resources can go a long way to bettering the game of rugby. Proper resources can lead to proper infrastructure being set up in the schools and clubs. With proper infrastructure, players can get the best possible preparation for the rugby season, and if an injury should occur, the player can get correct management and the best possible chance to return to the game (Ingle, 2009).

It was already established through McManus and Cross (2004) that further research is needed to identify the aetiology of injury at all levels of competition and to use these findings to develop effective injury prevention strategies in the sport. It was also established through McManus et al., (2004) that further research is needed to understand how identified risk factors influence injury risk at a community level, as well as through Braham et al., (2004) who

showed that identification of injuries and their risk factors is required in order to develop risk controls within the context of sports injury prevention. There is thus the need to establish the resources of the schools and clubs in the Durban area.

Some of the resources that have not been investigated as risk factors for rugby, but do play a vital role in the infrastructure and functioning of a rugby system, both at school or club level (Van Noordwyk, 2009) are listed ahead. Thus by investigating them, we can determine the effect they have on injury, and by understanding them we can put structures in place to possibly better the preparation for injuries as well as reduce the incidence of injury.

2.9.1 Fitness levels and training

Fitness levels play a vital role in the state of the player in both a practice and a game (Noakes and du Plessis, 1996). Low levels of fitness have also been identified as risk factors for training injuries amongst females in the military (Bell et al., 2000) and McManus et al., (2004) showed poor player conditioning and training were risk factors in non elite Australian football players. Pre-season fatigue was significantly associated with higher injury rate in female recreational ice hockey players. Dryden et al., (2000), and Gabbe and Finch (1997) showed that a longer pre season training program created more injuries compared to those who had a short pre-season.

Braham et al., (2004) also identified that due to a short pre-season, players may not be physically fit and therefore more susceptible to injuries, especially in the early part of the season. Braham also stated that non elite football players differ in physical fitness to their elite counterparts, which could contribute to a difference in injury profile. He found that because pre-season is relatively short in community sports, players are not yet physically fit and thus more susceptible to injury.

Although warming up has been shown to decrease the likelihood of injury in sport, warming up or the duration of the warm up did not significantly alter the

risk of injury in rugby players (Alsop, 2005; Gabbe and Finch, 1997). McManus et al., (2004) however found that cooling down after the game or training was protective against injury.

Few studies however examine the impact of fitness on injuries (Caine, Maffulli and Caine, 2008). There is also a paucity of literature on who does the training and what their specific role is. There is a definite balance or equilibrium that needs to be reached in order to achieve the optimum fitness and training levels for rugby (Noakes and du Plessis, 1996). There is thus a need to establish what training has been done, how many hours are going into each training session, and who is doing the training so that the player is monitored to achieve the most optimal level of performance.

2.9.2 Coaching

Jowett and Cockerill, (2002) defined a positive coach player relationship to be a state reached when both the coach and player have a certain level of closeness, commitment, are complimentary to one another and are mutually and casually connected. Short and Short, (2005) confirms this by saying a coach has tremendous influence in the physical and psychological development of their athletes.

A study by Shulz and Collegues (2004) as cited by Caine, Maffulli and Caine, (2008) showed higher levels of coaching accounted for 50% reduction of injuries, and Dryden et al., (2000) showed mismanagement or over playing of players by coaches increased the rate of injury. This is further confirmed by the NCCSI who related inexperienced and untrained coaches to increased injury rate in high school and college cheerleaders (Caine, Maffulli and Caine, 2008).

Coaching is of the highest importance for the preparation of a rugby player to play the game. With proper coaching comes the development of the correct skills required to the play the game. It also develops the understanding of the rules of the game, as well as the nature and intensity at which the game

should be played (Ingle, 2009). Thus poor coaching may lead to lack of skills, understanding or interpretation of the game, predisposing players to increased injury rates. At the same time correct coaching will aid the player in understanding the game, applying the skills and thus working correctly within the game (Van Noordwyk, 2009).

The more coaches there are with a team, the more personal time may be spent with each individual player, the better the player's skills and knowledge of the game. Those coaches that are experienced and have done some sort of training will thus be better equipped to coach than those that have not. In fact Ingle (2009) states that any one wanting to coach first team rugby in South Africa and at school level needs to have completed a level 2 coaching course. Van Noordwyk (2009) agrees in terns of club rugby. There is therefore a need to establish the coaching set up in rugby, how many coaches there are and what their role in the team is. It is also important to establish both the qualifications and what the experience of the coaches is in order to find out whether they are suitable to coach at the semi- elite level of first team, and whether it will impact positively or negatively on injury rate.

2.9.3 Facilities

Correct training both in the gym for strength training and on the field for skills training has been shown to be an integral part of developing a player (Noakes and du Plessis, 1996). This research will look at what access a player has to the use of a gym or a field and if he has access, what protocols he is doing in the gym.

2.9.4 School Equipment

In order for a school or club to develop their rugby teams, certain equipment for training is essential to provide both the skill and the safety to a player who is learning the game. Equipment like scrum machines, shields, tackle bags and rugby post protective padding are essential to providing the safety of the player while training or playing (Noakes and du Plessis, 1996). This study

looked at what essential equipment is there and how it had an effect on the injury rate.

2.9.5 Sponsorship

Essential equipment costs money (Ingle, 2009). Thus sponsorship is looked at in order to see that all the schools and clubs get the basic level of safety equipment and support to maintain it and to build on it.

2.9.6 Personal Protective equipment

According to Caine, Maffulli and Caine, (2008) there are mixed results with regards to protective equipment protecting against injury in various sports. Face guards in baseball and eye protection in female lacrosse players were shown to decrease the risk of head injuries. However other studies have shown an increase of injuries with the use of knee or ankle bracing. According to Noakes and du Plessis (1996), protective equipment must include mouth guards and ear protection for forwards, however soft helmets or scrum caps are optional but have been shown to reduce the risk of concussion.

Not wearing sport specific boots (McManus, et al., 2004) and improper protective gear (Braham et al., 2004) are risk factors that played a role in the determination of rugby injuries. In this study we will determine simply if protective equipment is used or is available, and what effect as a whole it has on the injury rate.

2.9.7 Medical aid

Having medical aid can play a huge role in injury management. By having medical aid, major traumatic injuries can be seen to straight away and recovery of the injured player can start immediately. It would thus be seen as beneficial if the player was on medical aid so in the case that he does get injured, he can get managed correctly and efficiently (Ingle, 2009).

2.9.8 Knowledge and perception

Having the knowledge to follow the correct protocol once a player is injured, or to put the correct structures in place to prevent injury is hugely important (Ingle, 2009). This study looks at if the right paths are been followed, if injuries are assessed or not, and if proper management of injuries takes place or not.

2.10 Management of rugby injuries

2.10.1 First aid

According to the Kwazulu-Natal Rugby Union (KWAZULU-NATAL RUGBY UNION Fixtures booklet, 2008) , no rugby game is allowed to go ahead unless there is a first aid team on site to assess any possible injury that may occur as well as an ambulance to transport an injured player to hospital if needs be (Ingle, 2009).

A study by Glaun et al., (1984) as cited by Noakes and du Plessis (1996) was done in the western cape surveying twenty nine schools on the provision of first aid facilities and whether they were adequate or not. The results showed that even though the schools appreciated the importance of taking care of injured players, this was not matched by practical competence. Majority of schools had access to stretchers, but they were not the correct ones to be used or they were unavailable for use. Furthermore, even though schools possessed first aid kits, most lacked splints, neck braces and other vital equipment to deal with serious or catastrophic injury. The major concern however was the lack of knowledge regarding the correct management of rugby injuries by the coaches managing the teams (Glaun et al., 1984 as cited by Noakes and du Plessis, 1996).

One possible reason suggested for the insufficient medical facilities is the lack of finance to support it. This supports the theory in 2.9.6 that lack of sponsorship could lead to decreased infrastructure to the school or club, which is looked at in chapter 4. The cost of first aid kits, stretchers and neck

collars may be a factor in the lack of equipment, as well as the thought that the benefits or achievements on the rugby field are so great that it is worth sacrificing a few injuries. However schools and clubs which fail to supply adequate equipment for the prevention of injury or for the first aid management of injured players might be exposing themselves to the risk of legal action should their omissions result in the inappropriate management of seriously injured players (Noakes and du Plessis, 1996).

Thus there is a need to provide first aid equipment that is immediately available on all fields on which rugby is played, both in practises and matches. Secondly, adequate training in first aid should be compulsory in for all persons involved, whether they are coaches, referees, touch judges, players or even interested parents. This research will look at what first aid is currently provided.

2.10.2 Medical staff

In terms of rugby injuries, if a player is injured, either in a game or at practise, whether it is traumatic or a repetitive strain, the player needs to be assessed and managed correctly. Depending on the severity of the injury, the injury then needs to be physically assessed by a professional in order to determine the nature and severity of the injury. If the player is not assessed then the proper program will not be put in place. If he is correctly assessed, then the correct and specific diagnosis will be obtained and the correct treatment protocol will be in place (Noakes and du Plessis, 1996).

Beardmore et al., (2004) states that the goal to return a player back to match fitness is to return an injured athlete back to practise or competition without putting the athlete or others for undue risk of injury. Furthermore the team physician should establish and direct the process of returning to play, not the coaches.

Ingle (2009) states that every high school first team should have someone with a medical or first aid background to assess an injury and make a decision

on their return to play. This is confirmed by Van Noordwyk (2009) for club rugby players, but establishes that not all teams will have first aid, let alone a physician to make a decision on the player's injury and whether they should return to play.

Thus the question is asked whether there is first aid available at every rugby match that is been played. It can then be further established if there is some sort of medical staff involved with the team, who the medical staff consists of, what their specific role to the team is and what access do the players have to him. Thus if an injury did occur, the staff member is able to assess the injured player, diagnose an injury if present, treat the injury or recommend treatment for the injury according to Beardmore et al., (2004).

2.10.3 Medical facilities

It has been established that the use of standardised management protocols should be followed in order to reduce the progression or reoccurrence of injuries (Beardmore et al., 2004), and players not undergoing specific rehabilitation with position specific demands (Eaton and George, 2005) is a factor that has a direct effect on injury. This study looked at what access to a medical facility or a medical practitioner a player has, and what effect it has on the injury rate.

2.11 Conclusion

As can be seen from above, there are certain risk factors that may or may not affect the rate of injury in rugby players at community level. Resources need to be established and there are also possible management protocols that need to be identified in rugby players at community level.

Chapter Three will thus look at our methods and materials to achieve our objectives discussed in Chapter One. Chapter Four will look at the results of the study and the discussion around the results. Chapter Five will look at the conclusions of this study and possible recommendations for further study.

Chapter 3:
Materials and methods

3.1 Introduction

This chapter deals with the design of the study, the methodology, the procedure, the measurement tool and the data analysis of the study.

3.2 Study Design

The study was a prospective, cross- sectional survey, which was based on a self-administrated questionnaire (Fink, 1995). The study was an epidemiological study on the relevant risk factors and management of rugby injuries in the population of the greater Durban area. The study was approved by an ethics committee as per the ethics certificate (Appendix L) that was signed by me, my supervisor, the head of department and the chairperson of research ethics committee. The data was collected by means of a self-administrated questionnaire (Appendix I1 and I2), which was completed by the coaches and the players of the respected teams, under the supervision of the researcher. Questionnaires are usually a good source of information, provided that the respondents reply openly and honestly and that the questionnaire has been proven to be reliable and valid (Mouton, 1996).

3.3 Methodology

Selection is based on participant's willingness to complete the questionnaire.

3.3.1 Sampling procedure

No advertising was used. The club participants were recruited using the Natal Rugby Unions club manual book (KWAZULU-NATAL RUGBY UNION Fixtures booklet, 2008), where the school participants were recruited through the Natal Rugby Unions head of schools representative. In order to access

these participants, permission was obtained from the Chairman of the club or director of sport from the schools via the telephone.

3.3.2 Participant Sampling

3.3.2.1 Sample size

The research was aimed at both players and coaches who were playing or coaching at either school or club first side level. There were 23 school sides and 27 club sides that fell under the 'Durban area' according to the KZN Rugby Union, making 50 side's altogether. A sample of 5 players selected from a random allocation chart (Appendix N) and the coach were invited to participate from each team, resulting in 300 participants.

A minimum of seventy percent (70%) response rate (Esterhuizen, 2009) was required, giving a minimum of 175 players and 35 coaches, leading to 210 participants in total. The Questionnaires (Appendix I1 and I2) and a Letter of Information and Consent (Appendix F and Appendix G) of the aim of the study were given to the 300 prospective participants.

3.3.2.2 Allocation

Respondents were divided into two groups. Players formed the first group. Coaches formed the second group. Of the players, there are two sub groups, club players and school players. Of the coaches, there are two sub groups, club coaches and school coaches.

3.3.2.3 Method

Selection was based on participant response to the request to complete the questionnaire. The total population consisting of 50 coaches and 250 players was utilised. The method involved self administration of the questionnaire by the researcher to the participants. The researcher then collected the questionnaire as soon as the questions had been answered.

3.3.3 Inclusion and Exclusion Criteria

3.3.3.1 Inclusion criteria

- All current club and school first team rugby coaches.
- All current club and school first team rugby players selected from the random sample according to allocation table.
- The participants must have completed their informed consent in writing (Appendix G).

3.3.3.2 Exclusion criteria

- The members of the Focus Group were excluded from the main study to prevent bias from any of the participants in the main study as set out in Morgan (1998(a)), Morgan (1998(b)) and Morgan (1998(c)).
- The members of the Pilot Study group were excluded from the main study to prevent bias from any of the participants in the main study as set out by Morgan (1998(a)), Morgan (1998(b)) and Morgan (1998(c)).

3.4 Procedure:

Once the questionnaire was developed and refined, the respective high school Master in Charge (MIC) of rugby was contacted. Thereafter an appropriate time to administer letter of information (Appendix F), informed consent forms (Appendix G) and questionnaires (Appendix I1 and I2) to the group of players selected from the random allocation chart and the coach was made. They then filled out the form and handed it back to the researcher on that same day.

In addition the respected coaches of the Durban Rugby Clubs were contacted by phone in order to set up a time and meeting place to administer the letters of information (Appendix F), informed consent forms (Appendix G) and questionnaires (Appendix I1 and I2).

Participants were also required to sign an informed consent form (Appendix G). The subjects were then requested to complete the questionnaire (Appendix I1 and I2).

3.4.1 Outline of the research packs

The research pack consisted of the Letter of Information (Appendix F) and Consent Form (Appendix G). The Letter of Information consisted of an introduction that contained the basic information about the study, information about the questionnaire and statement of agreement to participate in the study. Information included: the title of the research; the purpose of the research; procedures; risks and benefits; and the time taken to complete the questionnaire.

The consent form consisted of reassurance to participants of their confidentiality of the information and the anonymity of their responses; persons to contact to answer any questions and a statement of agreement to participate in the research study.

Participants were required to sign the *Letter of Information and Consent* (Appendix F and G).

The participants then completed the *Questionnaire* (Appendix I1 and I2).

The Club Chairmen and the Schools Director of Sport/Rugby also received a Letter of Information (Appendices F) outlining the research.

3.5 Measurement Tool

3.5.1 Questionnaire background

Two questionnaires were used to obtain the relevant information needed. The Questionnaires were developed and modified from an existing questionnaire (Sutherland, 2008) (Appendix A2).

3.5.2 Questionnaire development

The questionnaire was broken down into six main sections and each main section had further questions. The main sections and their questions were developed after consulting an existing questionnaire (Sutherland, 2008) and other relating literature (Ingle, 2009; Van Noordwyk, 2009; Brooks and Kemp, 2008; Caine, Maffulli and Caine, 2008; Deroche et al., 2007; Gabbett, 2007; King and Gabbett, 2007; Bartlett, 2006; Cresswell and Eklund, 2006; Hoskins et al., 2006; King et al., 2006; Rourke et al., 2006; Alsop et al., 2005; Eaton and George, 2005; Short and Short, 2005; Beardmore, Handcock and Rehrer, 2004; Braham et al., 2004; McManus and Cross, 2004; McManus et al., 2004; Jowett and Cockerill, 2002; Quarrie et al., 2001; Beardmore *et al.,* 2000; Bell et al., 2000; Dryden et al., 2000; Robinson, 1998; Gabbe and Finch, 1997; Noakes and Du Plessis, 1996; Hughes and Fricker, 1994; Dalley, Laing and Mccartin, 1989).

The questionnaire consisted of 5 sections: (Appendix A3)

1. Patient information,
2. Rugby history,
3. Previous rugby injuries
4. Knowledge and Perception,
5. Training, Coaching and Management,
6. Resources,

3.5.3 Focus group

The focus group consisted of two Durban rugby coaches, two Durban rugby players, two Chiropractic students, two Chiropractors, one researcher and the supervisor of the research project. These participants were selected due to their similarities to the respondents that will ultimately complete the questionnaires with regard to knowledge and age (Fink and Kosecoff, 1985; Morgan, 1998) as well as rugby players, coaches and medical/ support staff who have an interest in the outcome of the study.

The reason for having a focus group is to provide interaction and discussion of the particular topic at hand, thus further developing and understanding the topic. A focus group also assists the researcher in finding and deciding the relevance and appropriateness (Morgan, 1998a) of the questions used in the developed questionnaire. This group analyzed and discussed the information of the questionnaire and the factors that it covers, ruling out any ambiguity. Certain relevant questions were included while some irrelevant questions were omitted.

A Focus Group is used to adapt the questionnaire (Appendix A3) to South African context and to establish the appearance and construct validity as well as to ensure that it met the minimum requirements of reliability and validity set out by Mouton (1996) and Bernard (2000).

The participants were handed the Letter of Information (Appendix D) and Letter of Consent (Appendix E), which they were asked to read and sign. An Informed Consent Form (Appendix C) and Code of Conduct Statement (Appendix B) were also handed to the participants, which they duly signed. The purpose of these appendixes was to ensure that the participants were informed about the intentions of the researcher, the topic that he was researching and the way in which he wanted to conduct the study. It also made the focus group formal and professional, setting a guideline as to how the focus group and the research would be run. Finally it would mean that the

information and material discussed in the Focus Group was confidential and not for general public discussion.

The questionnaire (Appendix A3) was handed to the participants. They were then asked to comment on the questionnaire, what questions they had regarding the questionnaire, and how it could be modified, to accurately record the relevant information within the study.

A tape of the events of the focus group (Appendix M) has been supplied for examination purposes. As this contravenes the confidentiality of the focus group members, it will be excluded from the final submission of this dissertation. Changes made from the Focus Group Questionnaire to the Post Focus Group Questionnaire are listed in Appendix J2.

3.5.4 Pilot Study

Once the questionnaire (Appendix J1) had been evaluated and assessed by the Focus Group, approved by the department, and finally passed by the faculty, it was subjected to pilot evaluation.

1. The Pilot Study involved taking a very small sample from the population (three to five people) for which the questionnaire was intended to be administered, with the purpose of having these people to evaluate the questionnaire. The purpose of this would be to see how long it took to complete the questionnaire and identify problem areas within the questionnaire.

The Post Focus Group Questionnaire (Appendix J1) was then further reviewed in a Pilot Study. The purpose of the Pilot Study, as per Fink and Kosecoff, (1998) and Hicks, (2004), was to ascertain the following information regarding the questionnaire in general and regarding the specific questions relating to the participants:

a. Would there be any questions that were ambiguous and misleading to the participant?
b. Would the questions be appropriate for the participants?
c. Would the information obtained in the survey be consistent?
d. Would the information obtained in the survey be accurate?
e. Would the question yield the correct and necessary information sought by the researcher?
f. Would the researcher be able to use the information collected in the survey correctly?
g. Has the correct amount of time been allocated to the completing of the questionnaire by the participants?
h. Are all instructions clear and easy to understand by the participants?

Changes made from the post focus group questionnaire to the post pilot study questionnaire are listed in Appendix J3.

3.5.5 Final Questionnaire (Appendix I1 and I2)

The final questionnaire was divided into two parts, one for the coaches of both clubs and schools and one for the players of both clubs and schools. The coaches questionnaire consisted of five sections: (Appendix I1 – i.e. post pilot study)

1. Patient information,
2. Rugby history,
3. Knowledge and Perception,
4. Training, Coaching and Management,
5. Resources,

According to the coaches questionnaire,

Section one, requested personal and demographic information on the rugby coach in order to establish if there would be any correlation between these variables and the rugby coaches perception and knowledge of health professionals.

Section two, requested the coaches rugby coaching history.

Section three, requested the knowledge and perception of the health profession by the coaches ie: whether they would send any injured player to be assessed by a medical practitioner, and which medical practitioner they would send him too.

Section four, requested the coaches Training, Coaching and Management structures. This was to assess what training has been done by the players, who did the training of the players, who did the coaching of the players, how many coaches were involved, and whether there was first aid or medical staff involved with the team or not.

Section five, requested a rating of the school/clubs resources. This included assessing what facilities were used and the rating of them, what medical facilities were used, whether the team had sponsorship or not and what the sponsorship entailed, whether the team had protective gear or not and what it entailed, whether supplements were supplied to the team and what they entailed, and what equipment the school/club as a whole had.

The players questionnaire also consisted of five sections: (Appendix I2)

1. Patient information,
2. Rugby history,
3. Rugby injuries,
4. Knowledge and Perception,
5. Training,

According to the players questionnaire,

Section one, requested personal and demographic information on the rugby player in order to establish if there would be any correlation between these variables and the rugby players perception and knowledge of health professionals.

Section two, requested the players rugby history. This included the age they started playing, how many years they have been playing, what the highest level they have played at was, the amount of training they do, what position they play and if there are any other sports that they play.

Section three, requested a listing of all the rugby injuries of the players, if any. It requested the location, how many times it had been injured, how severe the injury was, the impact it had on the players season, how it occurred, when it occurred and whether they received treatment for it or not.

Section four, requested the rugby players knowledge and perception of health practitioners, which practitioners they had seen and which practitioners they think are the best to see.

Section five, requested the training schedule that the players went through, what training was done and who did the training.

3.5.6 Measurement Frequency

One questionnaire was administered per participant.

3.6 Data Analysis

3.6.1 Statistical package used

The programme, which was used to analyse the data, was the latest version SPSS statistical package. SPSS version 15.0 (SPSS Inc., Chicago, Illinois, USA).

3.6.2 Descriptive analysis

Descriptive statistics involved the use of frequency tables and bar charts in the case of categorical variables.

3.6.3 Analytical statistics

A *p* value of <0.05 was considered as statistically significant. Associations between the demographic variables and prevalence of injury were assessed using Pearson chi-square. Comparisons of the quantitative variable between the injured and uninjured groups were achieved using independent samples t-test. Analysis of the risk factors was computed using Binary logistic regression

3.7 Conclusion

The methods and materials have now been introduced in this chapter in order to meet the aims and objectives of the study. The results will be presented and discussed in Chapter Four and Chapter Five presents the conclusions and recommendations to the study.

Chapter 4:
Results and Discussion

4.1 Introduction

This chapter consists of the results of the study using bar graphs and charts to illustrate the results. It also deals with the discussion around the results.

The aim of this study was to investigate the risk factors and management of rugby injuries in the greater Durban area.

4.2 Objectives

1. Determine the risk factors leading to rugby injuries in the greater Durban area.

2. Determine the standard or variation in management of rugby injuries in the greater Durban area.

3. Determine the relationship between the varying risk factors and management to the injury rate among rugby players in the greater Durban area.

4.3 Data

4.3.1 Primary data

The primary data was collected using a self-administrated, prospective, cross-sectional questionnaire (Fink, 1995).

4.3.2 Secondary data

Secondary data was collected from the following sources: journal articles, books, through personal communication with relevant people, focus group and pilot study participants.

4.4 Abbreviations

N	-	Sample Size.
P value	-	Probability value (if <0.05 then significant)
S.E.	-	Standard Error
Std. Dev	-	Standard Deviation

4.5. Response rate for the study

The sample consisted of 27 first teams from club rugby and 23 first teams from school rugby in the greater Durban area. Of this, 50 were coaches and 250 were players, therefore 300 questionnaires were administered.

A total of 210 questionnaires were returned giving a response rate of 70%, which met the requirements set by the Faculty of Health Sciences Research and Ethics Committee.

4.6 Results and Discussion

4.6.1 Demographics

4.6.1.1 Age, Weight and Height

Table 4.1: Descriptive statistics for Age, Weight and Height of participants

		Age	Height	Weight
N	Valid	175	175	175
	Missing	0	0	0
Mean		20.43	1.779	84.31
Std. Deviation		4.849	.1240	12.534
Minimum		15	1.2	41
Maximum		45	2.7	126

There were 175 players participating in the study. The average age was 20.43 years. The weight and height were shown in the table above.

4.6.1.2 Ethnicity

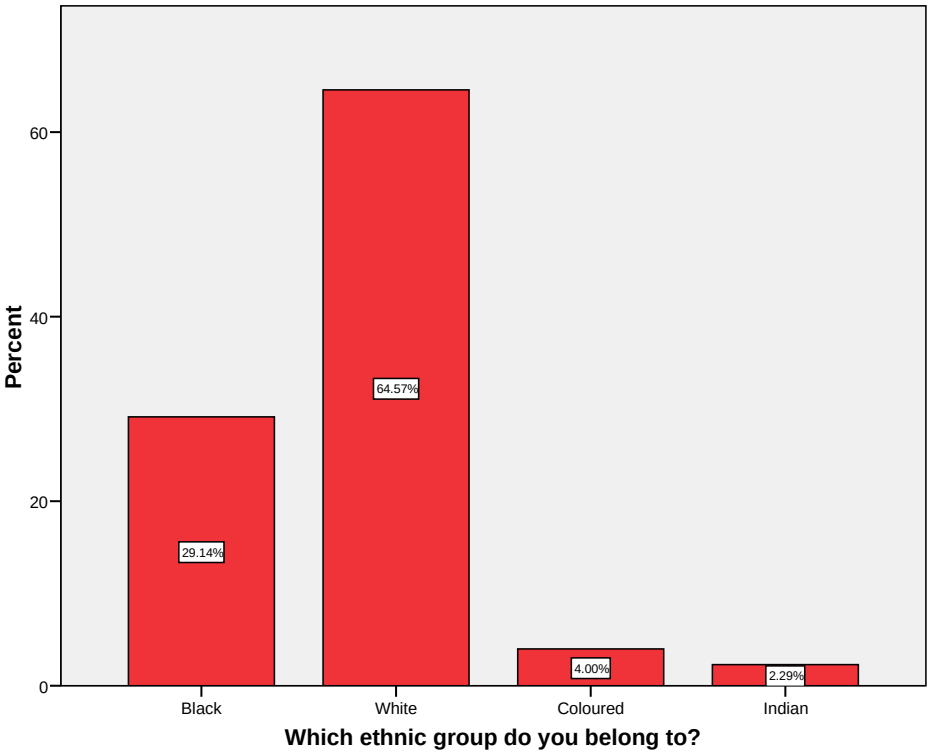

Figure 4.1 What ethnic group do you belong to

From Figure 4.1, we find that the majority of the respondents were White at 64,57 %. After that 29,14% of the respondents were Black, 4,00% were Coloured and 2,29% were Indian.

4.6.1.3 Gender

All the participants were male. This is due to the fact that the research was aimed at schools and clubs where males played the game only.

4.6.2: Injury in the Game compared to Injury in Training

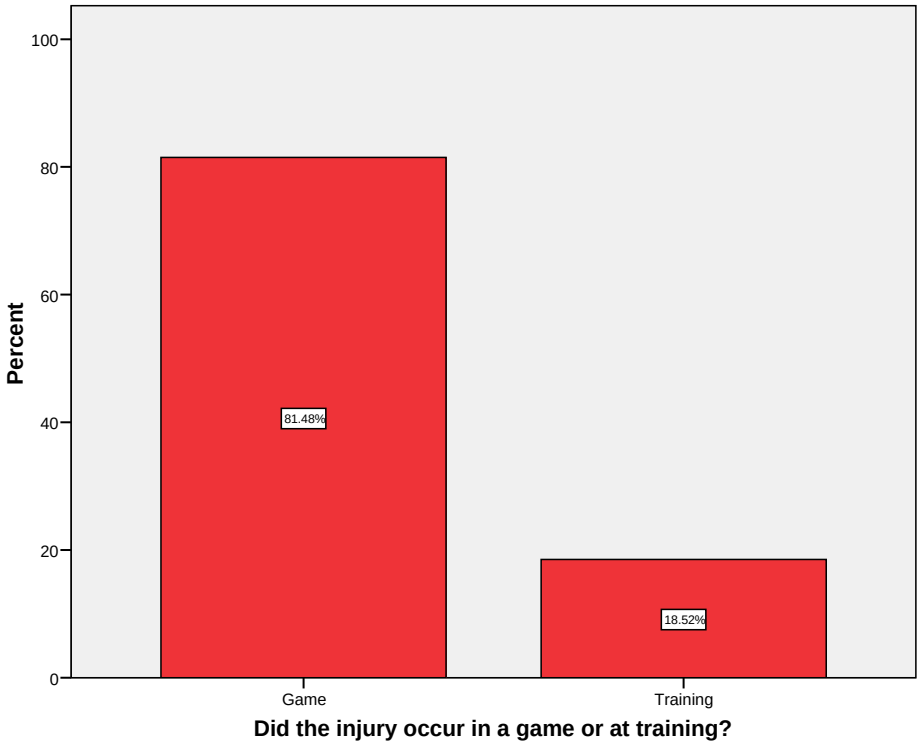

Figure 4.2 Did injury occur in the game or at training

Figure 4.2 shows that 81,5% of the injuries occurred in the game and only 18,5% during training. This is similar to the studies by Brooks and Kemp (2008) that showed 80-90% of all injuries are in matches, as well as Hughes and Frickers (1994) who showed that out of 133 injuries during the season, 122 were from the match at an average of 91% and only 11 at 9% were from the training field.

4.6.3 Mechanism of Injury

Table 4.2: How did the injury occur (mechanism)

		Frequency	Valid Percent
Valid	Tackling	39	36.1
	Being tackled	44	40.7
	In the line out	3	2.8
	In the scrum	8	7.4
	Other	14	13.0
	Total	108	100.0

Table 4.2 above shows that out of 108 injuries that occurred, 39 at an average of 36,1% were caused by tackling and 44 at an average of 40,7% were caused by being tackled. There were three injuries in the line out at 2,8% of the injuries, eight in the scrum at 7,4% of the injuries, and 14 listed as other at 13% of the injuries. Of the injuries represented as other, open play and running were the most common.

This is the same as studies done by Brooks and Kemp (2008) in Rugby Union, where the majority of rugby injuries were sustained in contact or collisions, with the tackle accounting for more than half the match injuries. It is also similar to the study of Dalley, Laing and Mccartin (1989) who showed tackles were reported to cause the most rugby injuries and Hughes and Fricker (1994) who showed that contact between players accounted for 83,5% of all injuries.

4.6.4 Anatomical Location of Injuries

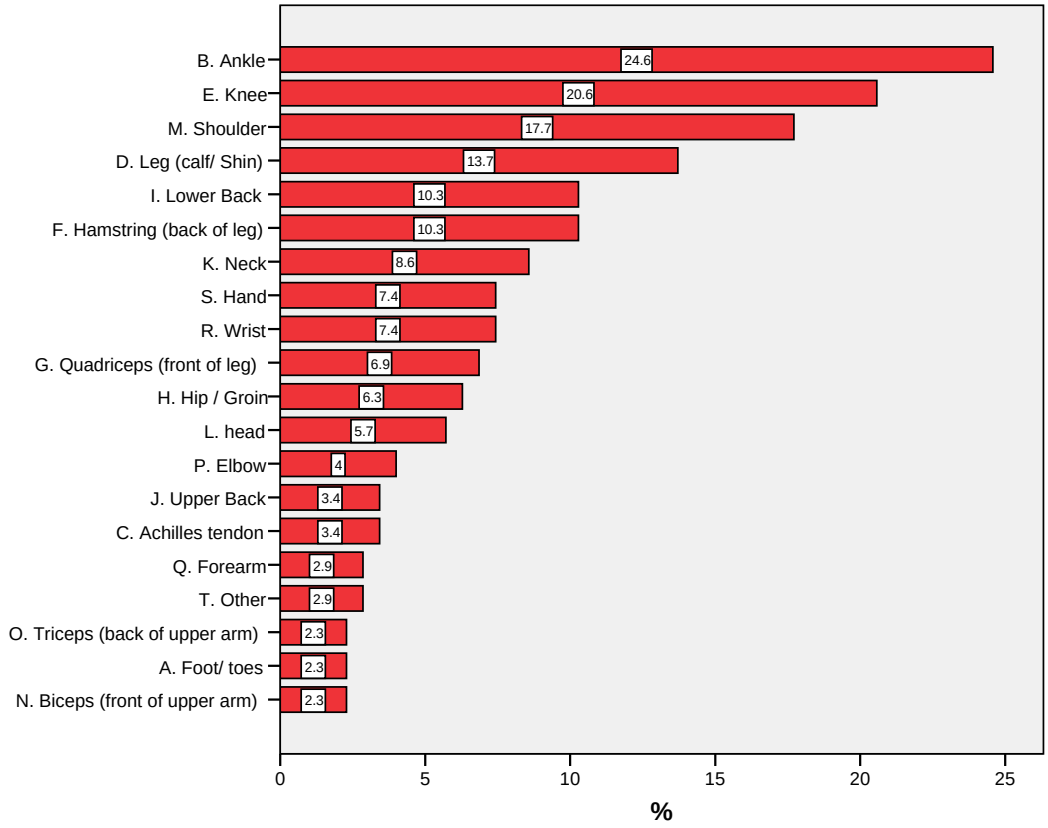

Figure 4.3 Anatomical Location of Injuries

Figure 4.3 shows that the ankle was the most frequently injured body part with 24,6% of the players having an ankle injury in the past season. This was followed by the knee (20.6%) and shoulder (17.7%).

These results are similar to Brooks and Kemp (2008) where the lower limb was the most common injury location constituting 41-45% of all injuries, Hughes and Fricker (1994) where the lower limb was the most injured region with 64 injuries at 48%, and Dalley, Laing and Mccartins study in 1989 which showed the leg was the most injured at 233 counts and the knee was second at 117 counts.

4.6.5 Risk factors and Injury

4.6.5.1 Previous injury

In this study there was no significance between having a previous injury compared to being injured in the past season. This is in contrast to Deroche et al., (2007); McManus et al., (2004);); Quarrie et al., (2001); Dryden et al., (2000); and Gabbe and Finch (1997) who showed previous injury to be a risk factor for injury.

One of the reasons for there being no association between previous injury and injury is that the players were not concerned about the state of their health, but more concerned about the state of their rugby. Another reason could have been that there was no person to report their injuries to, and thus there was no emphasis put on their injury.

4.6.5.2 Existing injury

Having an existing injury had no significance on being injured in the past season. This is in contrast to McManus et al., (2004) and Van Noordwyk (2009) who showed existing injury can predispose a player to injury.

Again emphasis could be on their rugby and not on their physical health. A lack of education regarding injury could also have had an effect on these results.

4.6.5.3 Age, Height, Weight and Injury

Table 4.3 Age and Size of players

	Have you sustained any injury in the past season due to rugby?	N	Mean	Std. Deviation	Std. Error Mean	P value
Age	Yes	109	20.37	5.009	.480	0.760
	No	65	20.60	4.623	.573	
Height	Yes	109	1.785	.1373	.0131	0.432
	No	65	1.770	.0987	.0122	
Weight	Yes	109	85.52	12.907	1.236	0.116
	No	65	82.43	11.770	1.460	

Table 4.3 shows that of the 109 players getting injured, the average age was 20,37 years. Of the players not getting injured, the average age was 20,60 years. These results show that there is no major significance in the variation of the age of the player compared to him sustaining an injury or not.

According to these results, those 109 players that were injured averaged 1,785 metres in height, compared to those who were not injured who averaged 1,770 metres in height. Thus there is no significance between variation in height and injury in this study.

In terms of weight, the average weight for those being injured was 85,52 kilograms, where the average weight for those not being injured was 82,43 kilograms. Thus there was a 3,11 kilogram increase in weight in those players getting injured compared to those players who were not.

The height values thus support Braham et al., (2004) who showed no significance in the variation of the height of patients compared to injury, but the weight value supports Quarrie et al., (2001) who showed more injury associations with particular weight categories. One reason could be that heavier, bigger stronger players generally play at a higher level of rugby which could be a reason why there is a higher injury rate. Another reason could be that bigger players are also required to do most of the physical work on the field, such as hitting more rucks and mauls, which could predispose them to injury.

4.6.5.4 Level of play and Injury

Table 4.4 Level of play

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
What is the highest level at which you have played rugby competitively?	1st team	Count	71	51	122
		% within What is the highest level at which you have played rugby competitively?	58.2%	41.8%	100.0%
	Provincial	Count	37	14	51
		% within What is the highest level at which you have played rugby competitively?	72.5%	27.5%	100.0%
	National	Count	1	0	1
		% within What is the highest level at which you have played rugby competitively?	100.0%	.0%	100.0%
Total		Count	109	65	174
		% within What is the highest level at which you have played rugby competitively?	62.6%	37.4%	100.0%

Chi square 3.766, p=0.152

Table 4.4 shows that of the 122 players that played first team level as their highest level, 71 were injured at 58,2%, where 51 were not injured at 41,8%. For those 51 players that played provincial rugby, 37 were injured at 72,5% and 14 were not injured at 27,5%. The one person that did play national level was injured, giving the injury rate 100%.

Thus the higher the level that you play, the more chance the player has of getting injured. This correlates to Noakes and du Plessis (1996) who stated that the higher the level of play and the higher the intensity of the game, the more chance of severe traumatic injury, as well as Roux (1992) and Nathan et al., (1990) who showed that at all ages, A or first team players are at a greater risk of injury. One possible reason is those players playing at a higher level generally play more games. Another reason is the higher the level you play at, the more intense the games are and there is less time for recovery.

4.6.5.5 Time of the season and Injury

Table 4.5 Time of the season

		Frequency	Valid Percent
Valid	Early	49	45.0
	Middle	42	38.5
	Late	18	16.5
	Total	109	100.0

Table 4.5 shows that out of the 109 injuries, 49 were early in the season at 45%, 42 were mid-season at 38,5% and 18 were injured late in the season at 16,5%. This is similar to injury profiles conducted by Clark et al., (1990); Nathan et al., (1983); Roux et al., (1987) and Roux (1992) who showed that most injuries occur either in pre-season or in the first two months of the season. The study was also similar to Sparks (1981), where 61% of the injuries of English rugby playing school boys occurred in the first half of the season, and Williams (1984), where a similar trend occurred with the incidence of injury peaking in pre-season.

4.6.5.6 Position and Injury

Table 4.6 Position

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
What position do you play?	Prop/hooker	Count	13	19	32
		% within What position do you play?	40.6%	59.4%	100.0%
	Loose forward/Lock	Count	34	9	43
		% within What position do you play?	79.1%	20.9%	100.0%
	Scrumhalf/flyhalf	Count	23	12	35
		% within What position do you play?	65.7%	34.3%	100.0%
	Centre	Count	17	18	35
		% within What position do you play?	48.6%	51.4%	100.0%
	Wing/Fullback	Count	22	7	29
		% within What position do you play?	75.9%	24.1%	100.0%
Total		Count	109	65	174
		% within What position do you play?	62.6%	37.4%	100.0%

Chi square 16.855, p=0.002

Table 4.6 shows that of 32 players playing hooker, 13 were injured at a rate of 40,6%. Of 43 players playing loose forward or lock, 34 were injured at 79,1%. Of 35 playing scrumhalf or flyhalf, 23 were injured at 65,7%. At centre, 35 players played and 17 were injured at a rate of 48,6%. Of 29 playing wing or fullback, 22 were injured at 75,9%. Thus the position in which the players were most injured is lock or loose forward, followed by the wing or fullback and then the scrumhalf or fly half (p=0.002).

These results are similar when compared to Hughes and Frickers (1994) study which showed that the three loose forwards represented most of the injuries at 29,3% of the total injuries, with the number eight the most frequently injured player with 13,5% of injuries, and the flanker with 7,9%. The

results also supported Brooks and Kemp (2008) who showed that the difference in injury between forwards and backs is negligible.

However these results are opposite to Dalley, Laing and Mccartins (1989) study that showed that props have the highest rate of injury. Flankers were the next susceptible, no matter which side of the scrum they were on, followed by the number eight which is similar to this study.

It has already been established in Table 4.3 that bigger or heavier players are more prone to injury. However according to position, the wings and fullbacks, as well as the scrum halves and fly halves are the most injured behind the locks and loose forwards. This means that the backline players are injured more than front row forwards. But front row forwards are normally bigger in size and weight in comparison to the backline players (Ingle, 2009). One reason could be that players are being played out of position by the coaches. Another reason could be that bigger, stronger and heavier players are being used in the running with the ball in backline positions, as oppose to doing the slower, more physical work in the forwards.

4.6.6 Resources

4.6.6.1 Training

In Chapter Two we established that there is a need to establish what training has been done, how many hours were going into each training session, and who was doing the training so that the player was monitored to achieve the most optimal level of performance. These are the results of this study with regard to training:

4.6.6.1.1 Structures of Training

4.6.6.1.1.1 Training done by the Players

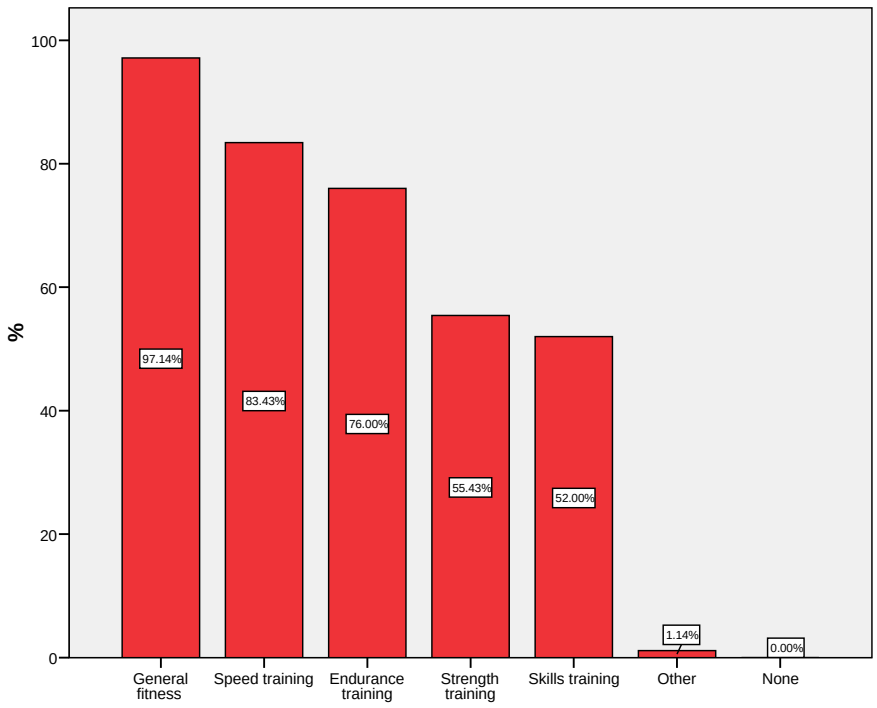

Figure 4.4: Training done by the players

Figure 4.4 above shows that the majority of players that were training were doing the five basic training exercises needed for rugby established by Noakes and du Plessis (1996). It showed that 97% were doing a general fitness, 83% doing speed training and 76% doing endurance training.

However only 55% of the players were doing strength training. This means that 45% of the players were not doing strength training, which is in contrast to the fitness and training principles devised by Noakes and du Plessis (1996).

Also found was that only 50% of the players did skills training. This shows that 50% of the players were not working on skills, which is also in contrast to the fitness and training principles devised by Noakes and du Plessis (1996).

4.6.6.1.1.2 Hours Trained

Table 4.7: Amount of hours training

		At present how many hours per week do you train for rugby?	Of this, how many hours per week is for field training?	On average how many hours of gym work do you do per week?
N	Valid	174	175	116
	Missing	1	0	59
Mean		7.53	5.17	5.03
Std. Deviation		4.824	3.619	2.957
Minimum		0	0	1
Maximum		32	23	20

Table 4.7 above shows that only 116 out of 175 players at an average of 66,3% worked out in the gym. However, there are 37,7% of players not training in the gym. As strength training is identified as a fundamental aspect of fitness (Noakes and du Plessis, 1996), a lack of strength training could be identified as a risk factor to rugby players.

On average, those that did do both forms of training spent five hours per week in the gym, and five hours per week on the field. Thus those that were doing gym work are in accordance with Noakes and du Plessis (1996), who stated gym work should constitute about four- six hours a week, usually being three-four sessions a week of which all the major body groups are trained for strengthening. Those that are on the field are slightly over the recommended time of three to four hours per week, but not significantly so.

4.6.6.1.1.3 Training done by the Coaches

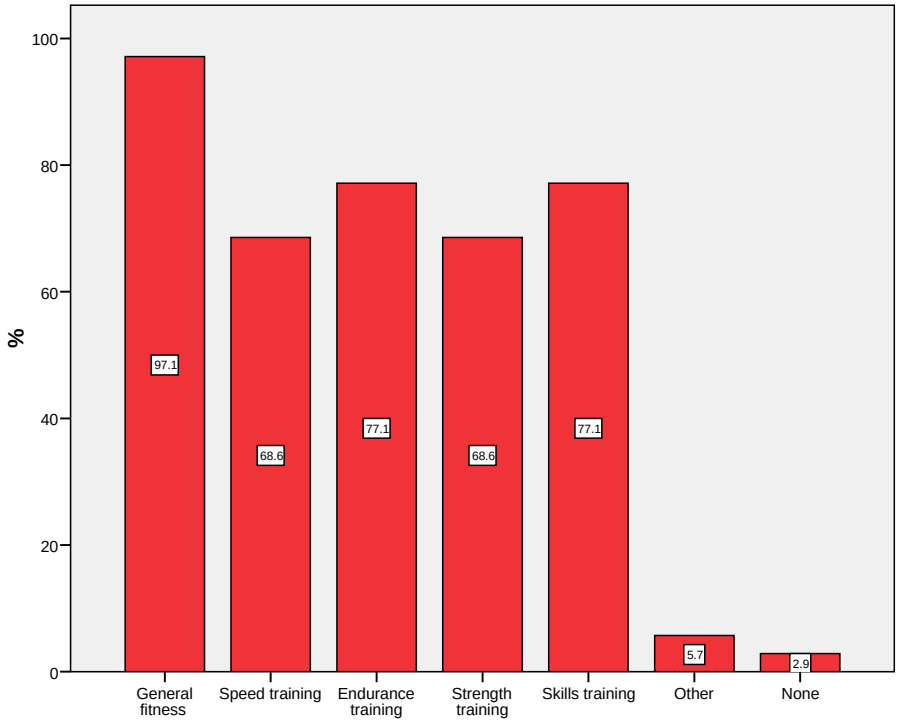

Figure 4.5: What training was done by the coaches

In the questionnaires put forward to the coaches, Figure 4.5 above shows there were slight variations to that of the players. Here 97% of coaches do general fitness with their players, with only 68% doing speed training and 77% doing endurance training. The strength training is slightly higher from the coaches at 68% and the skills training is definitely a higher percentage at 77%.

This shows that the coaches place higher emphasis on skills training than the players did. It may also suggest that the coach's definition or interpretation of what they are training may vary to what the players think they are training, which may indicate a lack of knowledge or perception to training. Not all the players may attend every training session, hence they may perceive that not all the necessary training is being done. A coach may also train different things with different players which may create a perception that not all the fundamentals of training are followed.

4.6.6.1.2 Training and Injury

Few studies however examine the impact of fitness on injuries (Caine, Maffulli and Caine, 2008).

4.6.6.1.2.1 Gym training and Injury

Table 4.8: Gym training and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Do you train in the gym as well?	Yes	Count	78	38	116
		% within Do you train in the gym as well?	67.2%	32.8%	100.0%
	No	Count	31	27	58
		% within Do you train in the gym as well?	53.4%	46.6%	100.0%
Total		Count	109	65	174
		% within Do you train in the gym as well?	62.6%	37.4%	100.0%

Pearson's chi square = 3.144, p=0.076

From this Table we find that 67,2% of the people that trained in the gym were injured, where 32,8% who trained in the gym were not. We also find that of the people that do not train in the gym, 53,4% get injured and 46,6% do not get injured, showing us that the more you gym, the more chance of injury you have.

Despite the fact that strength work is a key form of fitness and needs to be done in order to improve the fitness and conditioning of a player, the results above indicate it may also predispose a player to injury, and thus could be identified as a risk factor. One of the reasons could be the type of training being done in the gym. Another reason could be whether the players are using correct techniques to their training, and whether the players are using position specific programs according to the position that they are playing.

4.6.6.1.2.2 Amount of hours training and Injury

Table 4.9: Amount of hours training and Injury

	Have you sustained any injury in the past season due to rugby?	N	Mean	Std. Deviation	Std. Error Mean	P value
At present how many hours per week do you train for rugby?	Yes	109	8.07	4.725	.453	0.052
	No	64	6.59	4.921	.615	
Of this, how many hours per week is for field training?	Yes	109	5.27	3.807	.365	0.603
	No	65	4.97	3.312	.411	
On average how many hours of gym work do you do per week?	Yes	78	5.04	2.756	.312	0.984
	No	38	5.03	3.373	.547	

Table 4.9 shows that of the players training, 109 were injured and 64 were not injured. The players that were injured spent on average 8,07 hours training where those that were not injured spent 6,59 hours training. Thus overtraining could put you at more risk of injury. This is similar to Gabbe and Finch (1997) who showed longer pre-season training created more injuries, and Dryden (2000) who showed pre-season fatigue was associated with higher injury rates in female hockey players.

Those players only doing field work, 109 players were injured and 65 players were not injured. There was no association between the amount of hours doing field training and the injury rate. Those working in the gym, 78 players were injured and 38 were not injured, thus there was no association between the amount of hours spent training in the gym and those getting injured.

4.6.6.1.2.3 What Training and Injury

There was no significance between what training was done and whether the player was injured or not.

4.6.6.1.2.4 Training for other sports and Injury

There was no significance between the players training for other sports and the injury rate.

4.6.6.2 Trainer

4.6.6.2.1 Structures of Trainers

4.6.6.2.1.1 Who did the training answered by Players

Table 4.10: Who did the training

		Frequency	Percent
Valid	Coach	87	49.7
	Coach and staff	1	.6
	Coach and private	80	45.7
	Coach and other	1	.6
	Staff member	1	.6
	Staff member and private	2	1.1
	Private	3	1.7
	Total	175	100.0

4.6.6.2.1.2 Staff member or Outsider by Players

Table 4.11: Was he a member of staff, or outsider brought in specifically for training

		Frequency	Valid Percent
Valid	Staff member	37	29.6
	Outside	88	70.4
	Total	125	100.0

4.6.6.2.1.3 Professional qualification of the trainer

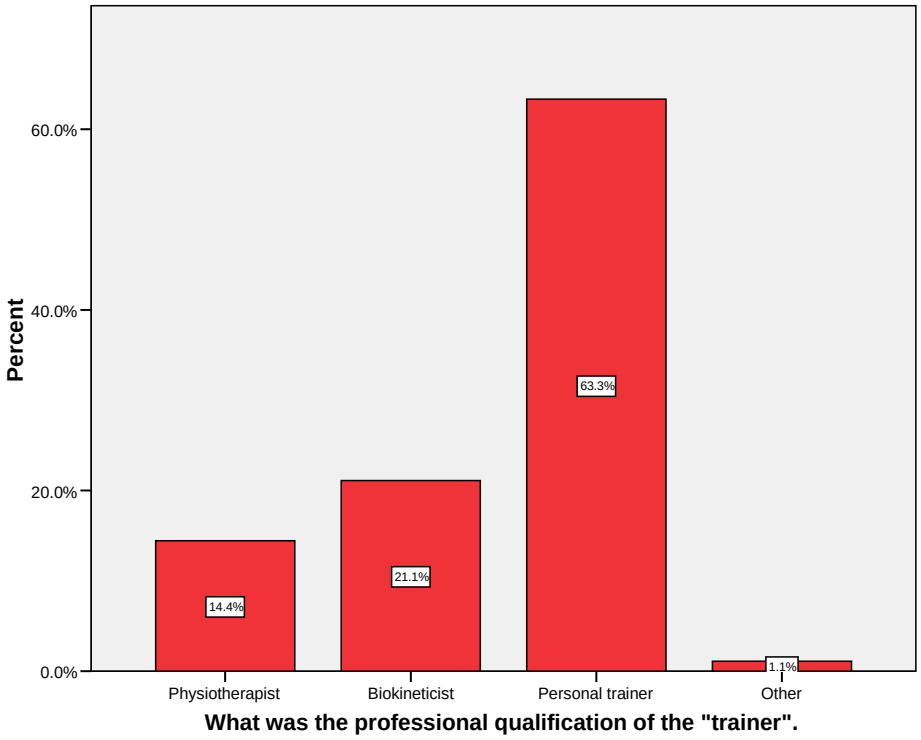

Figure 4.6: What was the professional qualification of the trainer

Table 4.10 indicates that with 49,7% of the players, the coach does the fitness and training and with 45,7% of the players, a professional trainer works with the coach to do the training. Table 4.11 indicates that 29,6% of the time it is a staff member and 70,4% of the time it is an outsider doing the training. Figure 4.6 indicates that of the professional trainers, personal trainers are used the most at 63,3%, followed by a biokineticists at 21,1% and the physiotherapist at 14,4%.

These results indicate that half the teams have professional training and half the teams do not. It also indicates that the professional training varies amongst different professionals, and is not specific to one profession. The fact that 70,4% of the time an outsider does the training could also be a contributing factor to the varied perception of training between players and coaches.

4.6.6.2.1.4 Who did the training by Coaches

Table 4.12: Who did the training

		Frequency	Valid Percent
Valid	Coach	22	66.7
	Coach and Professional	9	27.3
	Staff member	1	3.0
	Private	1	3.0
	Total	33	100.0

4.6.6.2.1.5 Was he a member of staff or outsider brought in specifically for training

Table 4.13: Was he a member of staff or outsider brought in specifically for training

		Frequency	Valid Percent
Valid	Staff member	1	9.1
	Outside	10	90.9
	Total	11	100.0
Total		35	

4.6.6.2.1.6 What was the Professional Qualification of the "trainer"

Table 4.14: What was the Professional Qualification of the "trainer"

		Frequency	Valid Percent
Valid	Chiropractor	1	10.0
	Biokineticists	5	50.0
	Personal trainer	4	40.0
	Total	10	100.0

As shown in Table 4.12, Table 4.13 and Table 4.14, according to the coaches questions the coach did 66,7% of the training, where in 27,3% of the teams, the coach worked with a professional to do the training. Of the outsiders or professionals, 90,1% were outsiders and 9,9% were staff members. Of the outsiders coming in to do professional training, 50% were biokineticists and 40%were personal trainers and one was a chiropractor.

In comparison between the coaches and the players training questions there are slight variations to the way the questions are answered. Again this suggests a lack of knowledge or interpretation as to who the trainer was, what his qualification was or what his role in the team may have been. The fact that 90% of the time the professional trainer coming in is from outside the school or club, could also play a role in the ambiguity of the training between players and coaches.

4.6.6.2.2 Trainer and Injury

4.6.6.2.2.1 Person who did the training and Injury

Table 4.15: Person who did the training and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Who did the training?	Coach	Count	50	36	86
		% within Who did the training?	58.1%	41.9%	100.0%
	Coach and staff	Count	1	0	1
		% within Who did the training?	100.0%	.0%	100.0%
	Coach and private	Count	55	25	80
		% within Who did the training?	68.8%	31.3%	100.0%
	Coach and other	Count	1	0	1
		% within Who did the training?	100.0%	.0%	100.0%
	Staff member	Count	1	0	1
		% within Who did the training?	100.0%	.0%	100.0%
	Staff and private	Count	1	1	2
		% within Who did the training?	50.0%	50.0%	100.0%
	Private	Count	0	3	3
		% within Who did the training?	.0%	100.0%	100.0%
Total		Count	109	65	174
		% within Who did the training?	62.6%	37.4%	100.0%

Chi square 8.977, p=0.175

This table shows that out of the 86 players, with just the coach doing the training, 50 of the players were injured at 58,1% and 36 were not injured at 41,9%. However, when the coach and a private member did the training, 55 out of 80 at 68,8% were injured and 25 out of 80 at 31% were not injured. This shows that having a private trainer may increase the rate of injury.

This is opposite to studies by Caine, Maffulli and Caine (2008) which linked unskilled coaches to higher amounts of injuries in high school and college

cheerleaders, and Dryden et al., (2000) who linked mismanagement of players with an increase in injury. One of the reasons could be that with a professional trainer present, more players were coming to be assessed for injuries and thus more injuries were being documented that otherwise would not have been without a professional trainer. Another reason is those teams that have personal trainers generally can afford it or play at a higher level of rugby, which may be the reason for the high injury rate.

4.6.6.2.2.2 Professional Qualification of the "Trainer" and Injury

There was no significance between the professional qualification of the “trainer” and the injury rate. Again this shows that the players are not concerned with qualification of the trainer, but the fact that there is someone there to give professional advice if an injury occurred.

4.6.6.3 Coaching

As we established in Chapter Two, there is a need to establish the coaching set up in rugby, how many coaches there are and what their role in the team is. It is also important to establish both the qualifications of the coaches and what their experience is in order to find out whether they are suitable to coach at the semi- elite level of first team, and whether it will impact positively or negatively on injury rate. Here are the results.

4.6.6.3.1 Structure of Coaching

4.6.6.3.1.1 No and Types of Coaches

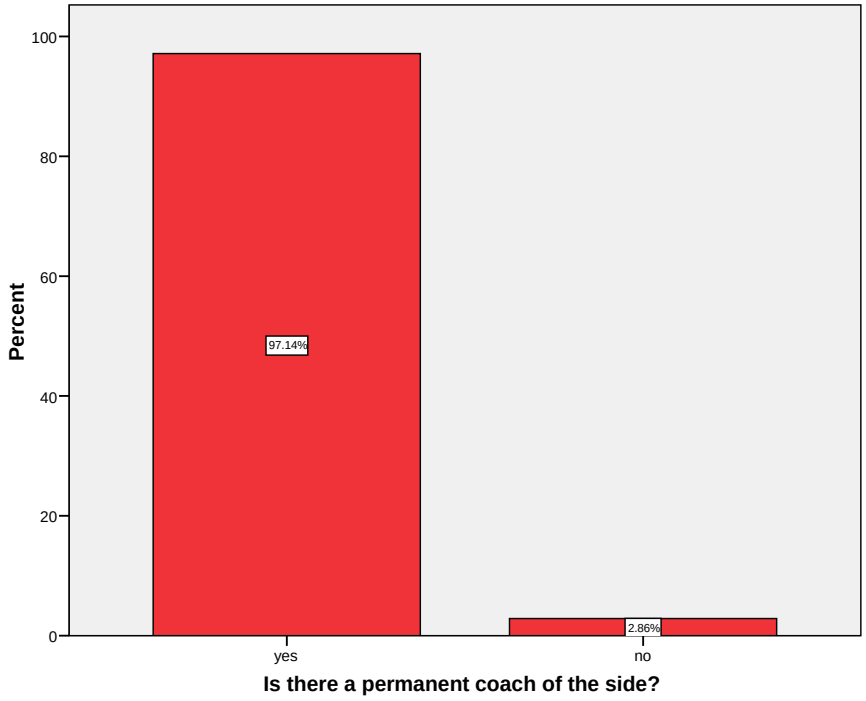

Figure 4.7: No and types of coaches

4.6.6.3.1.2 Is there more than one coach of the side

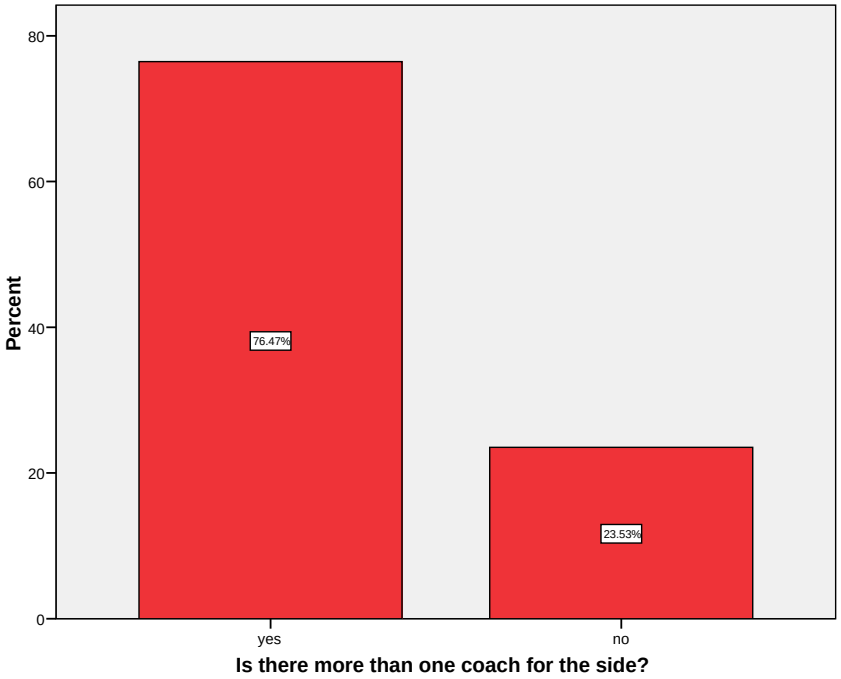

Figure 4.8: Is there more than one coach of the side

4.6.6.3.1.3 How many coaches are there

Table 4.16: How many coaches are there

		Frequency	Valid Percent
Valid	1	2	7.4
	2	17	63.0
	3	8	29.6
	Total	27	100.0

4.6.6.3.1.4 What is the specific role of each coach

Table 4.17: What is the specific role of each coach

	Count	%
Forwards coach	25	71.4%
Backline coach	26	74.3%
Defensive coach	10	28.6%
Other	5	14.3%

Figure 4.7 shows that in 97,1 % of the sides there is at least one coach looking after the team, with only 2,9% of the teams not having a coach. Of these 97%, Figure 4.8 shows that 76,4% have more than one coach per side and 23,6% only have one. Of this 76,4%, Table 4.16 shows that 17 teams had two coaches at 63%, and eight of the sides had three coaches at 29,6%. When there is more than one coach as shown in Table 17, 71% of the time there is a forwards coach, 74% of the time there is a backline coach, 28% of the time there is a defensive coach and 14% of the time there is another coach.

4.6.6.3.1.5 Coaching Qualifications

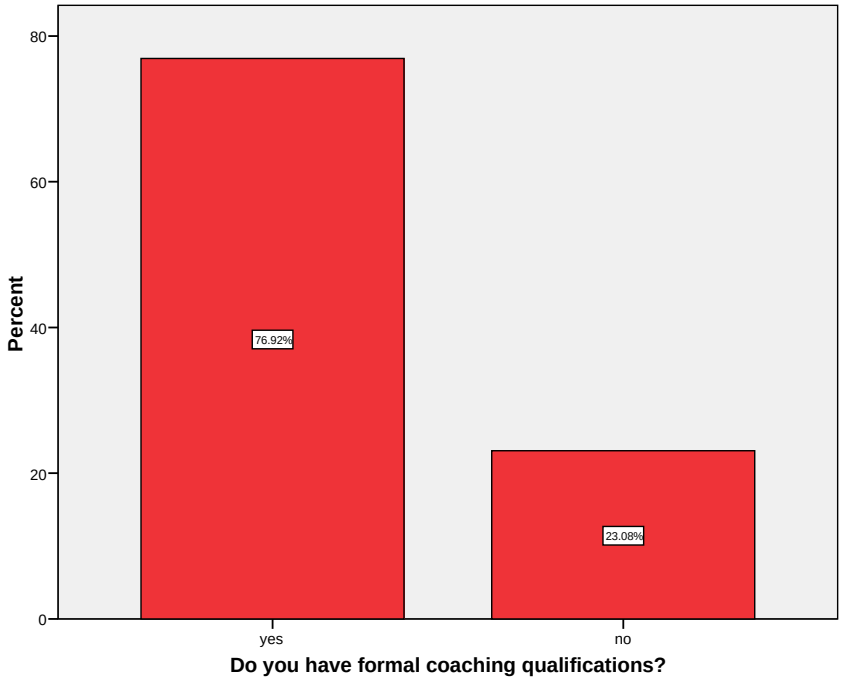

Figure 4.9: Coaching qualifications

4.6.6.3.1.6 Level of Coaching Qualification

Table 4.18: Level of Coaching Qualification

		Frequency	Valid Percent
Valid	1st team	2	9.5
	Provincial	17	81.0
	National	2	9.5
	Total	21	100.0

Figure 4.9 indicates that 76,9% of coaches had some form of coaching qualifications compared to the 23% that did not. Table 4.18 shows that only 9,5% of the coaches had done some sort of basic training, where 81% of the coaches had completed their Level One coaching qualification at the Natal Rugby Union, or a course with similar credentials and coaching quality. A percentage of 9,5% even had national qualifications. This indicates a higher level of coaching expertise and knowledge. Thus with this knowledge surrounding the game, coaches should be able to make more educated decisions about the game and the injuries relating to it.

4.6.6.3.1.7 Experience of the Coach

Table 4.19: What experience do you have as a coach

N	Valid	20
	Missing	15
Mean		12.25
Std. Deviation		9.262
Minimum		2
Maximum		38

The average experience in years was 12.3 years, with the minimum amount of years being two years and the maximum been 38 years. This is excellent as it shows that with an average of 10 years, most coaches are experienced at their level of work. This should mean that they have a good knowledge of the game, and are able to make more accurate rugby decisions pertaining to both injuries and the game.

4.6.6.3.1.8 Highest level the Coach has coached at

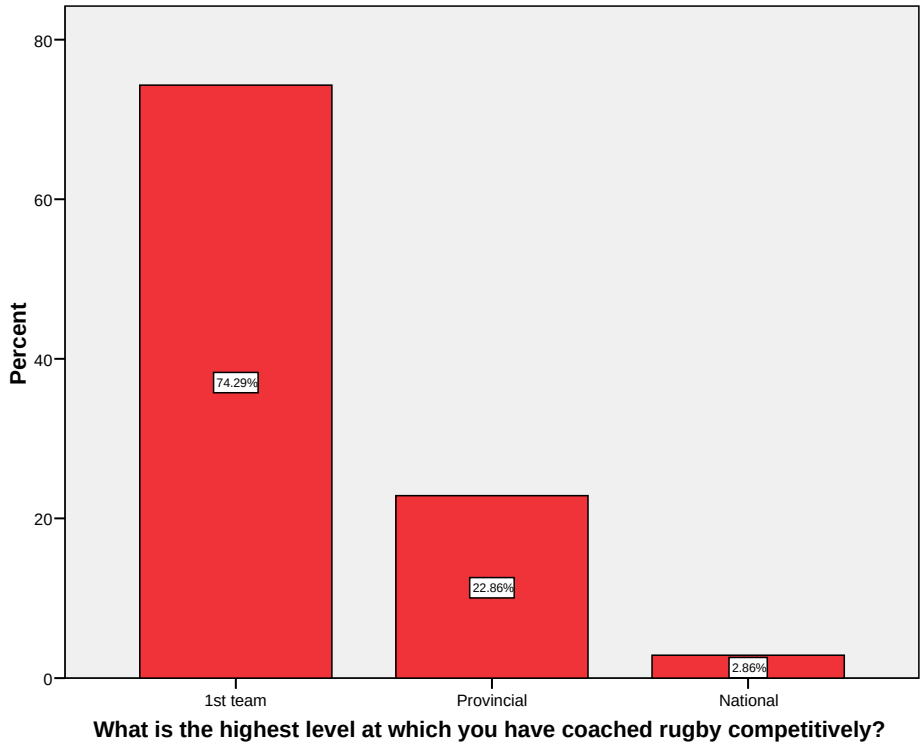

Figure 4.10: Highest level the coach has coached at

The questionnaire was aimed at current first team level coaches, therefore the minimum level that they would have coached at was first team. So of those coaching first team level, 22,8% had experience at provincial level and 2,6% at national level.

This indicates that over 25% of the coaches coaching first team have experience at coaching a provincial or national level team, which is excellent for the level of coaching in the Durban region.

Thus the coaching standards in the Durban area are good. There are sound structures in place in which almost all teams have at least one and possibly more than one coach to work on the various needs of the players. Coaches are highly qualified according to the qualifications set by the Kwazulu-Natal Rugby Union. Coaches are also experienced in terms of the amount of time spent coaching in years as well as their experience at provincial or national level. Thus more knowledgeable, educated and accurate decisions should be made regarding Rugby and the injuries associated with it.

4.6.6.3.2 Coaching and Injury

4.6.6.3.2.1 Highest level coached and Injury

Table 4.20: Highest level coached and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
What is the highest level at which you have coached rugby competitively?	1st team	Count	74	55	129
		% within What is the highest level at which you have coached rugby competitively?	57.4%	42.6%	100.0%
	Provincial	Count	30	10	40
		% within What is the highest level at which you have coached rugby competitively?	75.0%	25.0%	100.0%
	National	Count	5	0	5
		% within What is the highest level at which you have coached rugby competitively?	100.0%	.0%	100.0%
Total		Count	109	65	174
		% within What is the highest level at which you have coached rugby competitively?	62.6%	37.4%	100.0%

Chi square 7.128, p=0.028*

There was a significant association between the highest level of coaching and injury (p=0.028). Those who coached first team level had the lowest rate of injury at 57,4%. Those who coached provincial had a 75% injury rate and those that coached at national level had the highest injury rate at 100%.

One of the main reasons for these results is that the higher the intensity the players play at, the more chance there was of them getting injured. Another possible reason is that players have a certain level of closeness and commitment to their coaches (Jowett and Cockerill, 2002; Short and Short, 2005). Players could be willing to put their bodies on the line due to their commitment to their coaches, thus putting them at further risk of injury.

4.6.6.3.2.2 More than one coach and Injury

Table 4.21: More than one coach and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Is there more than one coach for the side?	yes	Count	89	41	130
		% within Is there more than one coach for the side?	68.5%	31.5%	100.0%
	no	Count	18	21	39
		% within Is there more than one coach for the side?	46.2%	53.8%	100.0%
Total		Count	107	62	169
		% within Is there more than one coach for the side?	63.3%	36.7%	100.0%

Chi square 6.427, p=0.011*

With more than one coach, 89 of the 130 players were injured at 68,5%, whereas 41 at 31,5% were not. There was thus a significant association between having more than one coach and injury (p=0.011). Again, Short and Short (2005) state that a coach has tremendous influence in the physical and psychological development of their athletes. Thus one reason for high injury rate could be performance driven to impress or perform for the sake of the coach.

Another reason may be that poor coaching is associated with a high injury rate. This is similar to studies by Shulz and Collegues (2004), showing that higher levels of coaching accounted for 50% reduction of injuries, and Dryden et al., (2000), showing that mismanagement or over playing of players by coaches increased the rate of injury. This is less likely as it has already been established that the qualification and experience of the coaches is good.

4.6.6.3.2.3 How many coaches and Injury

There was no significance between having many coaches and the players getting injured.

4.6.6.3.2.4 Level of qualification and Injury

Table 4.22: Level of qualification and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
What level of qualification?	1st team	Count	6	4	10
		% within What level of qualification?	60.0%	40.0%	100.0%
	Provincial	Count	60	25	85
		% within What level of qualification?	70.6%	29.4%	100.0%
	National	Count	9	1	10
		% within What level of qualification?	90.0%	10.0%	100.0%
Total		Count	75	30	105
		% within What level of qualification?	71.4%	28.6%	100.0%

Chi square 2.359, p=0.307

Of the coaches that just coached first team, six players were injured at 60% where four were not at 40%. Those coaches with provincial qualification had a 70,6% injury rate in their players out of 85 players, and those with national recognised qualifications had a 90% injury rate out of 10 players injured. Thus the higher the level of qualification, the higher the injury rate is.

Thus there is a significant association between level of coaching qualification and injury. It has already been established that good coaching will decrease the risk of injury (Shultz and Collegues, 2004; McManus et al., 2000). It has also been established from the results of this study that the level of coaching in the Durban area is of a high standard. Thus the influence of the coach on the player to perform has to be established as a risk factor.

4.6.6.4 Facilities

4.6.6.4.1 Structure of Facilities

4.6.6.4.1.1 What Facilities were used

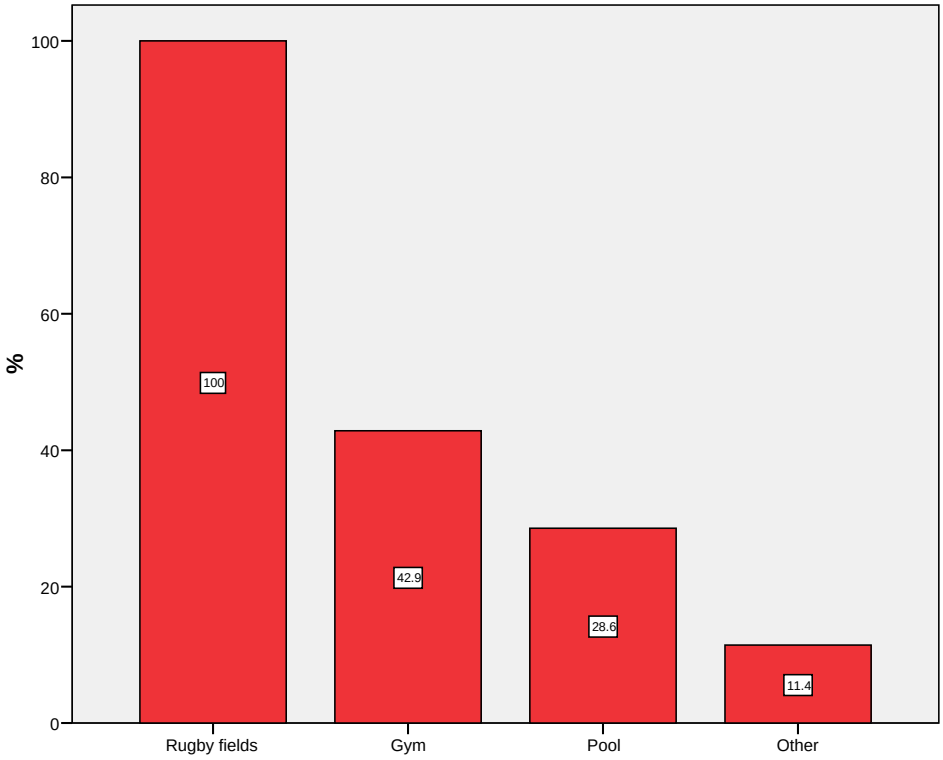

Figure 4.11: What facilities were used

Figure 4.11 shows that 100% of the teams used rugby fields for training, but only 42,9% of the teams had gyms. It also shows that 28,6% used pools, and 11,4% used other facilities that were not specified.

This lack of a gym may tie in with previous results that not enough strength work is being done. Strength work is a fundamental aspect to conditioning according to Noakes and du Plessis (1996), therefore it must be established as a risk factor to injury.

4.6.6.4.1.2 Were they the Schools ,Clubs, or Outsiders Facilities

Table 4.23: Were these facilities that of the Schools /Clubs, or were they Outside Facilities

		Frequency	Percent
Valid	Schools	13	37.1
	Schools, clubs	2	5.7
	Schools clubs and outside	2	5.7
	Schools and outside	1	2.9
	Clubs	14	40.0
	Clubs and outside	1	2.9
	Outside	2	5.7
	Total	35	100.0

Of the 35 schools and clubs participating in the study, 13 of the schools had their own facilities, and 14 of the clubs had their own facilities. This means only eight of the schools/clubs did not have their own facilities or had to share facilities.

This indicates that more than half the schools and more than half the clubs have their own facilities, however some schools and clubs did not have their own facilities. This raises further questions as to whether they have to share facilities, whether the players have full access to the facilities, who controls the use of the facilities and who else uses the facilities.

4.6.6.4.1.3 State of the Facilities

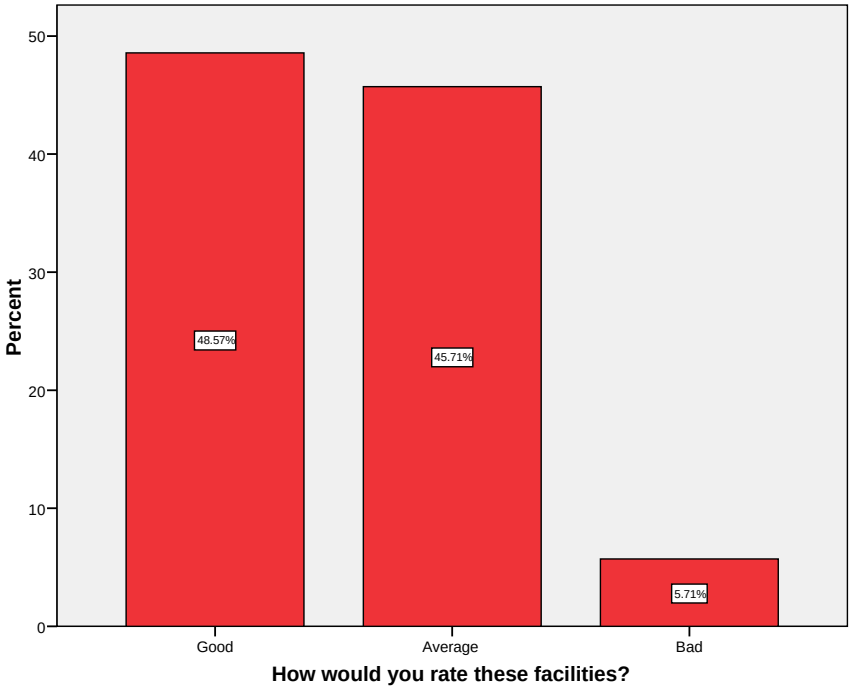

Figure 4.12: State of the facilities

Of these facilities that were used, 48,6% of the facilities were rated as good, 45,7% rated their facilities as average, and 5,7% rated their facilities as bad. In general that means that the facilities were good enough to play at.

4.6.6.4.2 Facilities and Injury

4.6.6.4.2.1 Having Facilities and Injury

Table 4.24: Having facilities and Injury

		Have you sustained any injury in the past season due to rugby?				P value
		Yes		No		
		Count	Row N %	Count	Row N %	
Rugby fields	No	0	.0%	0	.0%	
	yes	109	62.6%	65	37.4%	
Gym	No	56	56.6%	43	43.4%	0.057
	yes	53	70.7%	22	29.3%	
Pool	No	68	54.8%	56	45.2%	0.001*
	yes	41	82.0%	9	18.0%	
Other	No	92	59.7%	62	40.3%	0.028*
	yes	17	85.0%	3	15.0%	

In the teams that did have their own rugby fields, 62,6% were injured compared to 37,4% not injured. Those with their own gyms were more likely to get injured at 70,7%, and even more so for those teams with their own pools at 82%. Thus those with their own facilities seemed to incur more injuries.

As the majority of the participants rated their facilities as good, the state of the facilities cannot be the reason for the high injury rate. One reason could be lack of supervision, or education as to how to use the facilities.

4.6.6.5 School Equipment

4.6.6.5.1 Equipment possessed by the School/Club

Table 4.25: Equipment possessed by the School/Club

	Count	%
Scrum machine	26	74.3%
Tackle bags	29	82.9%
Shields	30	85.7%
Rugby posts	30	85.7%
Rugby posts protective padding	29	82.9%
Other	4	11.4%

Of the clubs and schools, 74,3% had scrum machines, 82,9% had tackle bags, 85,7% had both shields and rugby posts and 82,9% of the rugby posts had protective padding. These percentages are very good as apart from scrum machines at 74%, over 80% of the schools had all the basic equipment needed for basic coaching and development of players.

4.6.6.5.2 Equipment possessed by the School/Club and Injury

There was no association between having equipment and getting injured. This is good as it indicates that the equipment being used may decrease the injury rate.

4.6.6.6 Sponsorship

4.6.6.6.1 Structure of Sponsorship

4.6.6.6.1.1 Is their Sponsorship

Table 4.26: Is their Sponsorship

		Frequency	Percent
Valid	Yes	25	71.4
	No	10	28.6
	Total	35	100.0

Of the 35 teams that participated, 25 of the teams did have a sponsorship at 71,4%, and 10 of the teams did not have a sponsorship at 28,6%. This is quite a low percentage as a team needs sponsorship to purchase equipment and develop infrastructure within the school or club.

4.6.6.6.1.2 What does the Sponsorship Entail

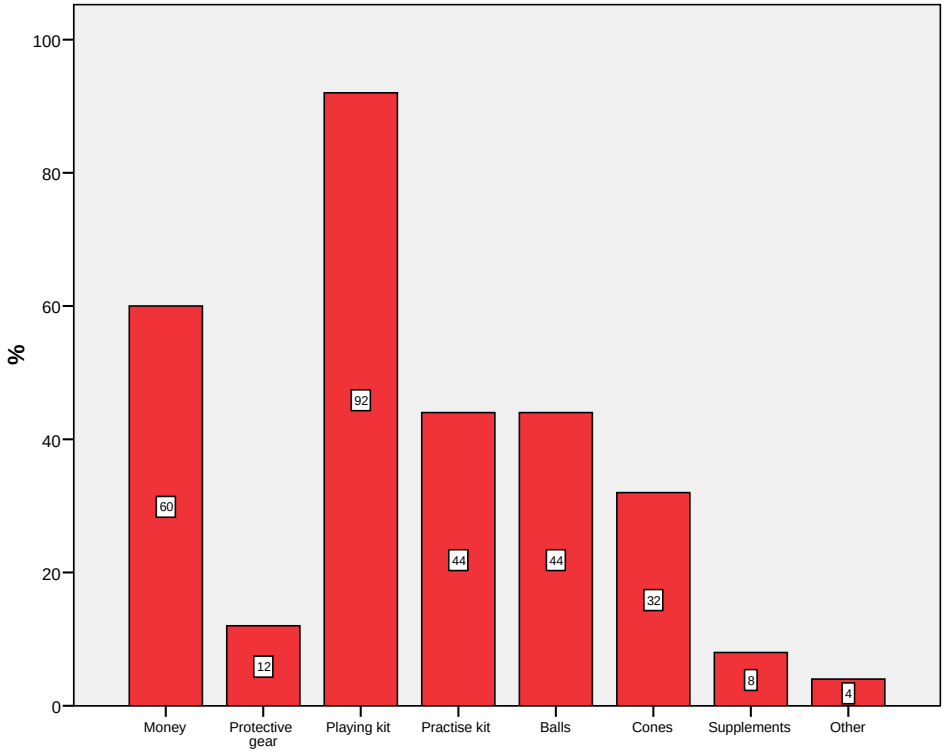

Figure 4.14: What does the sponsorship entail

Figure 4.14 shows that 92% of the teams were sponsored playing kit, and 60% were sponsored money. It also shows that 44% of the teams were sponsored practise kit and balls, 32% were sponsored cones, only 12% o were sponsored protective gear and 8% were sponsored supplements.

4.6.6.6.2 Sponsorship and Injury

4.6.6.6.2.1 Sponsored teams and Injury

Table 4.27: Sponsored teams and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	no	
Does the team have a sponsor/s to support them?	Yes	Count	83	42	125
		% within Does the team have a sponsor/s to support them?	66.4%	33.6%	100.0%
	No	Count	26	23	49
		% within Does the team have a sponsor/s to support them?	53.1%	46.9%	100.0%
Total		Count	109	65	174
		% within Does the team have a sponsor/s to support them?	62.6%	37.4%	100.0%

Chi square 2.676, p=0.102

Table 4.27 shows that of the 125 players that were in teams that were sponsored, 83 were injured at 66,4%. However of the 49 players that were in teams that were not sponsored, only 26 were injured at 62,6%. This indicates that those that have sponsorship for playing and practise kit have more chance of getting injured.

There are thus large variations as to what the different teams receive out of their sponsorship. It must be taken into account that sponsored teams generally play at higher level, therefore there is more load on the bodies and they are likely to play the game at a higher intensity.

4.6.6.7 Personal Protective Equipment

4.6.6.7.1 Structure of Protective Equipment

4.6.6.7.1.1 Is any Protective Equipment supplied

Table 4.28: Is any protective equipment supplied

		Frequency	Percent
Valid	Yes	13	37.1
	No	22	62.9
	Total	35	100.0

Of the 35 teams participating in the study, 13 were supplied protective equipment at 37,1% and 22 were not supplied protective equipment at 62%. This indicates that less than half the teams were supplied protective equipment.

4.6.6.7.1.2 What Protective Equipment is supplied

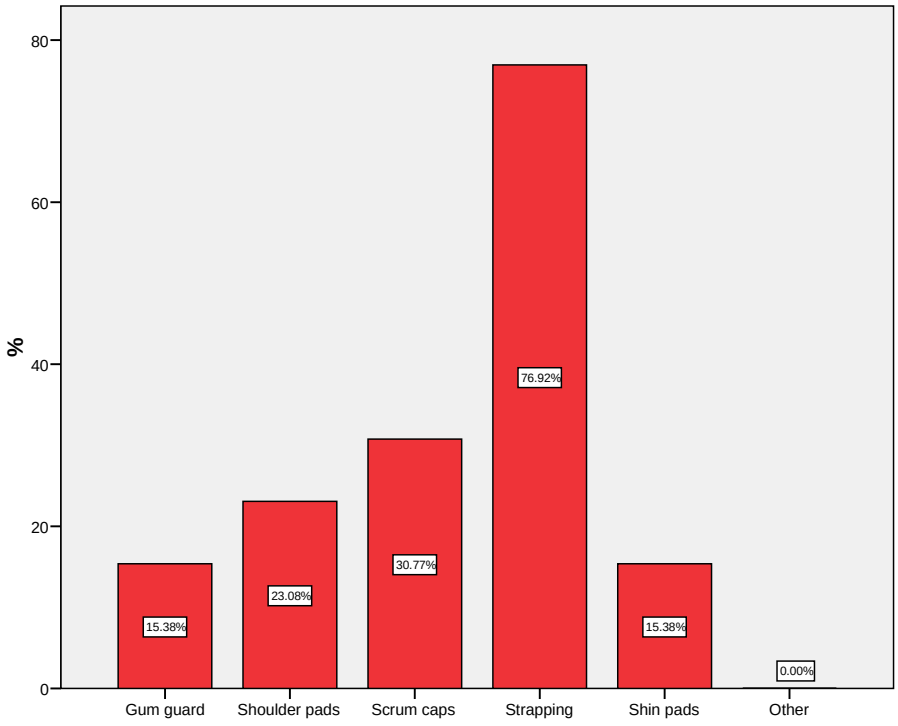

Figure 4.14: What protective equipment is supplied

Of the teams where protective equipment was supplied, strapping was the most at 76,9%, followed by scrum caps at 30,7%, shoulder pads at 23,0% and gum guards and shin pads tied at 15,3%. No other equipment was supplied.

4.6.6.7.2 Having Protective Equipment and Injury

Table 4.29: Protective Equipment supplied and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Is any protective equipment supplied?	yes	Count	49	16	65
		% within Is any protective equipment supplied?	75.4%	24.6%	100.0%
	no	Count	60	49	109
		% within Is any protective equipment supplied?	55.0%	45.0%	100.0%
Total		Count	109	65	174
		% within Is any protective equipment supplied?	62.6%	37.4%	100.0%

Chi square 7.198, p=0.007*

Those players whose teams had protective equipment supplied were significantly more likely to have injuries. Again the higher intensity that the game is played at and the higher level the game is played at, there was more awareness of injuries and thus proper precautions were taken.

4.6.6.8 Medical Aid

4.6.6.8.1. Structure of Medical Aid

4.6.6.8.1.1 Do you have Medical Aid

Table 4.30: Do you have Medical Aid

		Frequency	Percent
Valid	Yes	129	73.7
	No	46	26.3
	Total	175	100.0

In total out of the 175 players that responded, 129 had medical aid at 73,4% and 46 did not have medical aid at 26,3%.

4.6.6.8.2 Medical Aid and Injury

Table 4.31: Medical Aid and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Do you have medical aid	Yes	Count	87	42	129
		% within Do you have medical aid	67.2%	32.8%	100.0%
	No	Count	23	23	46
		% within Do you have medical aid	50.0%	50.0%	100.0%
Total		Count	110	65	175
		% within Do you have medical aid	62.6%	37.4%	100.0%

Chi square 4.272, p=0.039

Of the 129 players that were on medical aid, 87 were injured at 67,2% whereas of the 46 not on medical aid, only 23 players were injured at 50%. There was thus a significant association between players having medical aid, and getting injured. This either means that those without medical aid are failing to record their injuries as they may feel that they cannot afford to have

their injuries assessed by a professional practitioner. However from a positive point of view, it may mean those with medical aid are getting their injuries fully assessed, which will only benefit the player in light of his injury.

4.6.6.9. Knowledge and Perception

4.6.6.9.1 Have Coaches referred players for examination or treatment for rugby injuries

Table 4.32: Have you ever referred players for examination or treatment for rugby injuries

		Frequency	Percent
Valid	Yes	32	91.4
	No	3	8.6
	Total	35	100.0

Of the 35 questionnaires returned, 32 coaches said they had referred players for examination or treatment and only three had not. This means a percentage of 91,4% of coaches are seeking professional medical opinions with regard to the health and injury of their players, where as only 8,6% are not. This is excellent in terms of the coaches knowing what to do if the patient is injured.

4.6.6.9.2 Who has the coach referred the injured player too

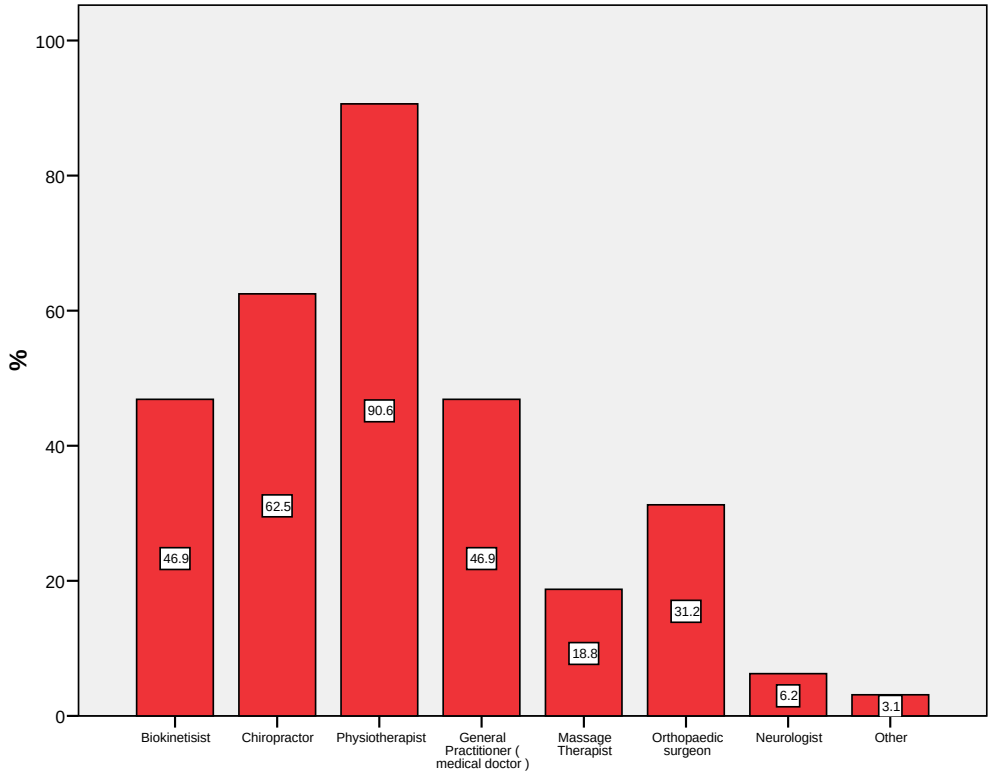

Figure 4.15: Who has the coach referred the injured player to

Of those coaches doing the referring, 90,6% of the time it is to Physiotherapists, 62,5% to Chiropractors, 46,9% to Biokineticists and 46,9% to a General Practitioner. In terms of specialists, 31,6% of the time players will see an Orthopaedic Surgeon where only 6% will see a Neurologist. These are usually done on referral basis from the Physiotherapist, Chiropractor or General Practitioner. Most injuries do not need a specialist opinion, therefore these figures could be lower.

4.6.6.9.3 Median rank of each type of professional

According to coaches, Chiropractors were ranked highest, followed by Physiotherapists and Biokineticists tied, then General Practitioners. These results are good as when players are getting injured, they are being seen by qualified professionals and thus a correct diagnosis and management procedure could be made.

4.6.6.9.4 Have Players received treatment for your Injury

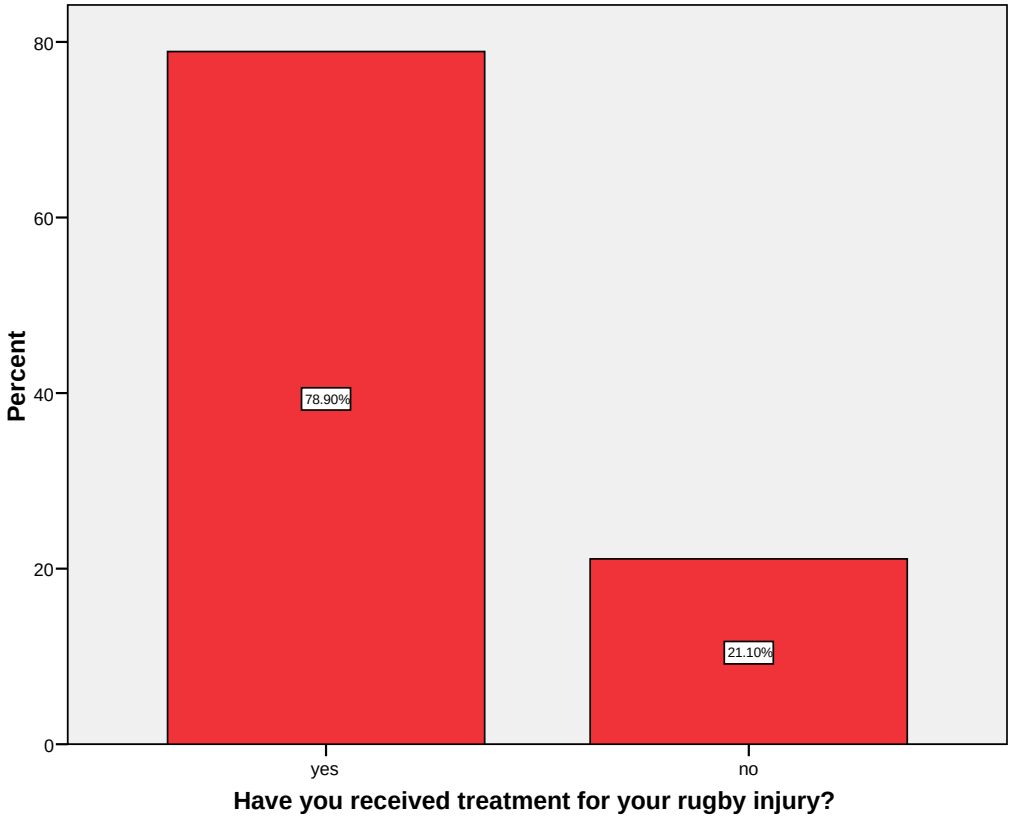

Figure 4.16: Have you received treatment for your injury

In terms of the players, 78,9% have received treatment for their rugby injuries whereas 21,1% have not. This is a good portion of players who are thus seeking professional medical opinions for their injuries.

4.6.6.9.5 What Treatment has been received

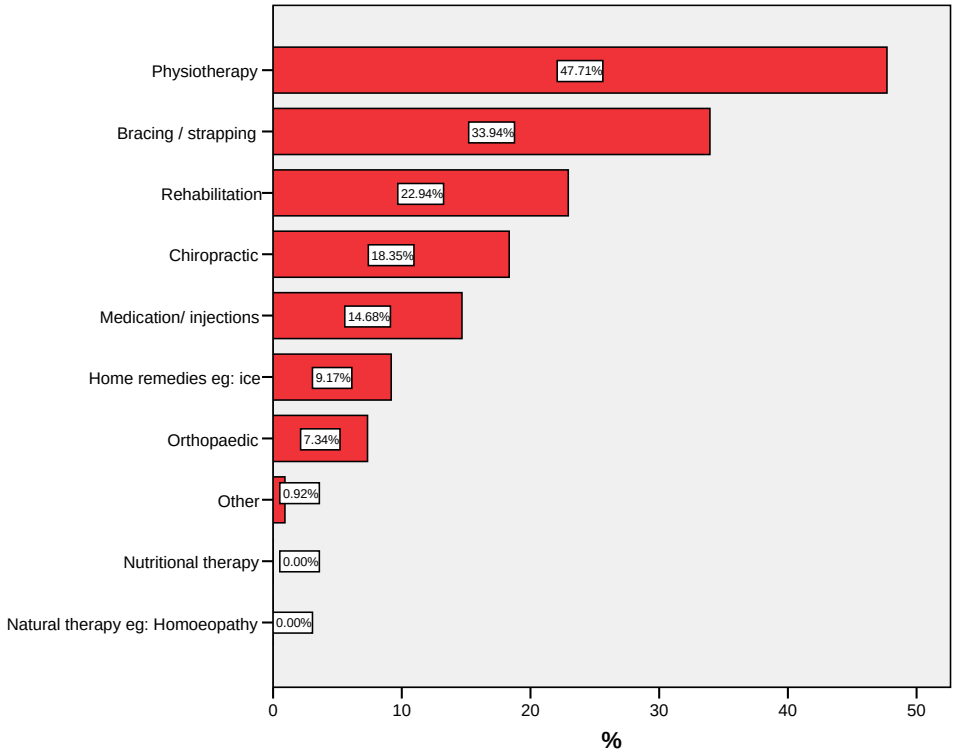

Figure 4.17: What treatment has been received

Physiotherapy was the most common treatment, received by 47.7% of players.

4.6.6.9.6 Have Players seen someone for examination or treatment for their rugby injuries

Table 4.33: Have you ever seen someone for examination or treatment/therapy for your rugby injuries

		Frequency	Percent
Valid	Yes	113	64.6
	No	62	35.4
	Total	175	100.0

Out of the 175 returned questionnaires, 113 players had seen someone for examination or treatment of rugby injury, whereas only 62 players had not. This is a percentage of 64,6% that have gone for treatment, compared to

35,4% that have not. This is quite a high percentage of players that are not seeking medical attention, despite having an injury.

4.6.6.9.7 Who have players seen for treatment

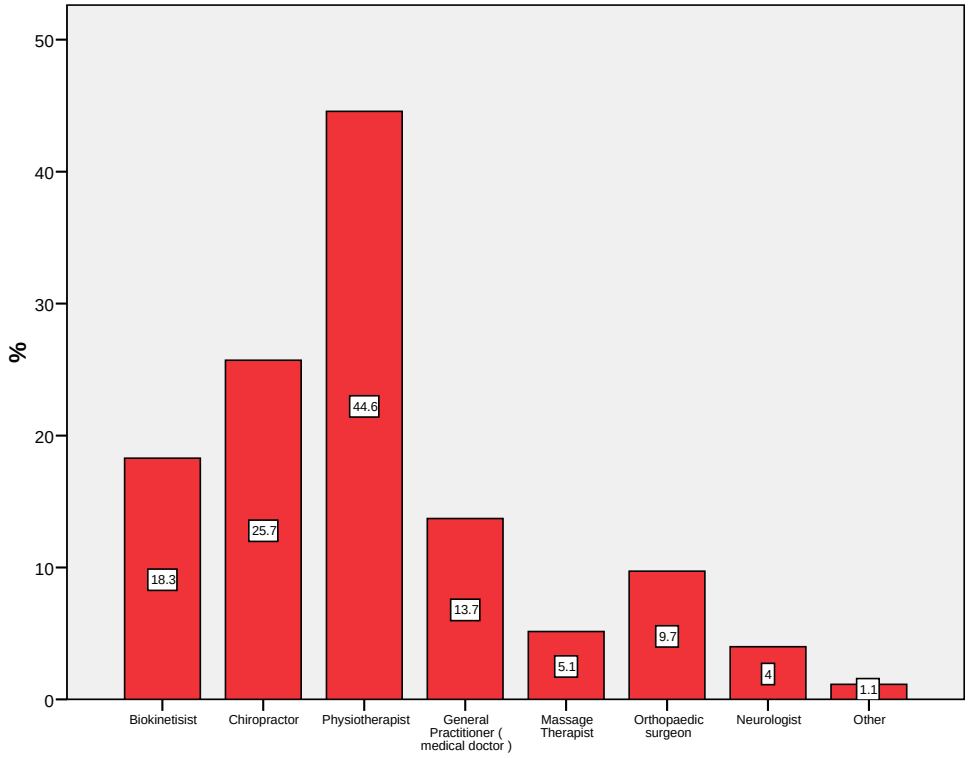

Figure 4.18: Who have you seen for treatment

According to this figure, Physiotherapists were the most commonly sought after practitioners at 44,6% of the time, followed by Chiropractors at 25,7% and biokineticists at 18,3%. Less commonly General Practitioners were sought after 13,7% of the time, Massage Therapists 5,1%, Orthopaedic Surgeons 9,7% and neurologists 4%.

According to players, Physiotherapists were ranked highest, followed by Chiropractors and Biokineticists tied, then GPs.

4.6.7 Management of Rugby Injuries

4.6.7.1 First Aid

4.6.7.1.1 Structure of First Aid

Table 4.34: Is there First Aid at all the games

		Frequency	Percent
Valid	Yes	33	94.3
	No	2	5.7
	Total	35	100.0

Of the 35 teams that replied to the questionnaires, 33 teams confirmed they did have first aid at their games whereas only two teams said that they did not. This is a percentage of 94% that do have first aid at their games and 5,7% that do not.

In accordance with regulation that no game should be allowed to continue without first aid at the side of the field, these percentages should reflect a 100% record. However 94% indicates that most teams are in compliance with the regulations set by the Kwazulu-Natal Rugby Union that no game is allowed to take place without the use of first aid.

4.6.7.1.2 First Aid and Injury

Table 4.35 First Aid and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	No	
Is there first aid at all the games?	Yes	Count	105	60	165
		% within Is there first aid at all the games?	64%	36%	100.0%
	No	Count	5	5	10
		% within Is there first aid at all the games?	50.0%	50.0%	100.0%
Total		Count	110	65	175
		% within Is there first aid at all the games?	62.6%	37.4%	100.0%

Of the 165 players where there was first aid at the games, 105 players were injured at 64% and 60 were not injured at 36%. Of the ten players where there was not first aid, five were injured and five were not injured at 50% each. Regardless of the above results, it should be of absolute importance that first aid is at the game in the case of serious injury.

4.6.7.2 Medical staff

4.6.7.2.1 Structure of Medical staff

4.6.7.2.1.1 Is there Medical staff

Table 4.36: Is there Medical staff involved with the team

		Frequency	Percent
Valid	Yes	19	54.3
	No	16	45.7
	Total	35	100.0

4.6.7.2.1.2 Who is the Medical staff

Table 4.37: Who does the Medical staff consist of

Who does the medical staff consist of	Chiropractor	Count	7
		Column %	36.8
	Physiotherapist	Count	8
		Column %	42.1
	Biokineticists	Count	5
		Column %	26.3
	Personal trainer	Count	4
		Column %	21.1
	Other	Count	3
		Column %	15.8

From Table 4.36 and Table 4.37, it is seen that of the 35 teams that did respond, 19 of them at a percentage of 54,3% did have a medical practitioner working with them, whereas 16 of the teams at an average of 45,7% did not have a medical practitioner working with them. This is an average ratio of medical staff to teams as only half the teams have medical staff. One would think this is a good thing considering that if a patient is injured, he has trained personnel to call on directly in order to asses his injury and make a diagnosis.

Of those teams that had medical staff, Physiotherapists and Chiropractors were the most well represented, with eight Physiotherapists representing teams at 42,1%, and seven Chiropractors representing teams at 36,8%. Following that five teams had Biokineticists working with them at 26,3% and four teams had Personal Trainers working with them at 21,1%. Three teams had other Medical Practitioners that were working with them, however these practitioners were unspecified.

4.6.7.2.1.3 What is the role of the Medical staff

Table 4.38: Roles of the various Medical staff

		Count
Chiro	Injury management	6
Physio	Fitness	1
	Injury management	4
	Rehab.strapping	1
	Strappng	1
Bio	Injury management	1
	Rehab	1
	Warm up	1
Trainer	Strength + Conditioning	1
Other	Medic	2
	Warm up	1

In terms of the roles of each of the practitioners, the Chiropractors were mainly involved with injury management, the Physiotherapists injury management, strapping and rehabilitation. The Biokineticists were mainly involved with injury management and rehabilitation and the Personal Trainers were mainly involved with strengthening and conditioning of the players. Those teams that had a Medic were only involved with warm up.

4.6.7.2.2 Medical staff and Injury

Table 4.39: Having Medical staff and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			Yes	no	
Is there medical staff involved with the team	yes	Count	69	26	95
		% within Is there medical staff involved with the team	72.6%	27.4%	100.0%
	No	Count	40	39	79
		% within Is there medical staff involved with the team	50.6%	49.4%	100.0%
Total		Count	109	65	174
		% within Is there medical staff involved with the team	62.6%	37.4%	100.0%

Chi square 8.920, p=0.003*

When you compare whether there is medical staff on board or not to the amount of injuries, there are more injuries with medical staff on board than when not. This could be as those teams with medical staff are likely to be playing at a higher level, thus the game is played at a higher intensity and there are therefore more risks of injuries.

There could also be a perception that if there is a medical staff member there must be an injury or that if there is no medical staff member then there is no injury or no need to be assessed. This raises the question of whether injury management is made a priority, whether finance is an issue or whether there is a lack of knowledge regarding the value a medical practitioner can offer.

4.6.7.3 Medical Facilities

4.6.7.3.1 Structure of Medical Facilities

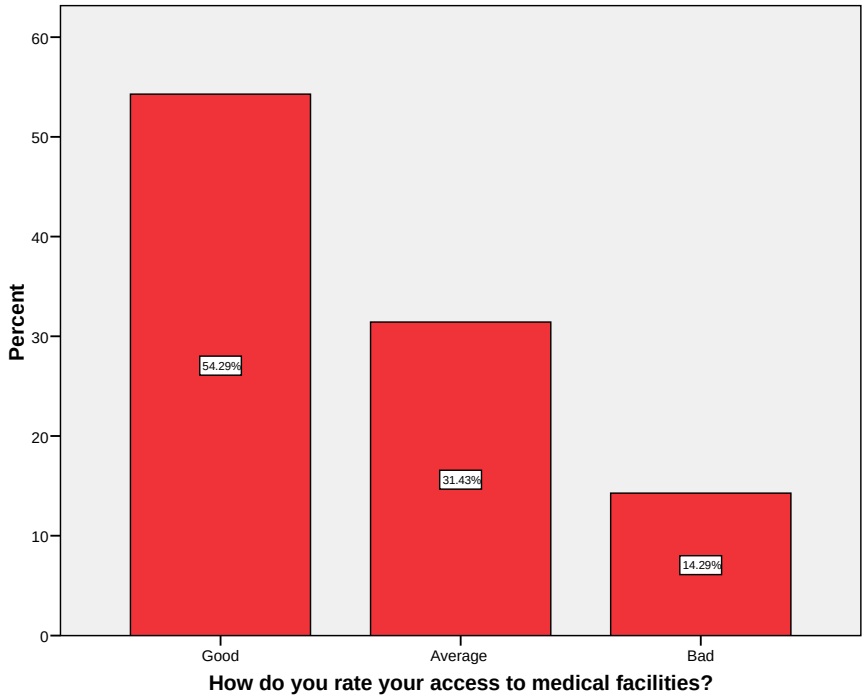

Figure 4.19: Medical facilities

Figure 4.19 shows 54,3% of participants rated their access to medical facilities as good, 31,4% as average and 14,3% as bad. This means that 85,7% of the coaches thought their access to medical facilities was average.

This is good considering some teams may have no access to medical facilities, however it also means that the majority feel that the facilities are only average, which suggests there is room for improvement of medical facilities.

4.6.7.3.2 Medical Facilities and Injury

There was no association between having good access to medical facilities and being injured.

4.7 Objectives and Hypotheses

1.3.1 The first objective was to determine the risk factors leading to rugby injuries in the greater Durban area. This was quantified according to

- Previous injury
- Existing injury
- Age and Size of player
- Level of play
- Time of the season
- Position
- Training
- Trainer
- Coaching
- Facilities
- School Equipment
- Sponsorship
- Personal Protective Equipment
- Medical Aid
- Knowledge and Perception

It was hypothesised that none of the above factors would increase the risk of injury.

REJECTED

1.3.2 The second objective is to determine the standard or variation in management of rugby injuries in the greater Durban area. This was quantified according to:

- First aid
- Medical staff
- Medical Facilities

It was hypothesised that none of the above factors would increase the risk of injury.

REJECTED

1.3.3 The third objective was to determine the relationship between the varying risk factors and management to the injury rate among rugby players in the greater Durban area. This was done by using the cross tabulations, and the Pearson Chi squared test. This was done to determine any associations or relationships between these factors, and to assess whether the results in this study are comparable or equivalent to results achieved in other studies.

It was hypothesised that there would be no relationship between the risk factors and management of injuries compared to the injury rate.

REJECTED

4.8 Summary:

It can thus be concluded that the risk factors seen are level of play dependant. The bigger or heavier players were more likely to get injured. The higher the level of play played at, the more chance the player had of getting injured. When it came to the resources of the schools and clubs, despite there been good resources available, there was a strong association between those teams that had good resources and higher injury rates in them. Even in the management of injuries, there was a significant association between having medical staff and high injury rates.

Further research could relate the risk factors and management established in this study and compare it to the level the teams played at, or possibly the league the teams played in. Comparisons could then be made between the levels or leagues, thus confirming or rejecting if risk factors and management of rugby injuries is indeed level dependant.

Chapter 5
Conclusion and Recommendations

This Chapter deals with the conclusions of the study and looks at what further research can be done to add or augment this study.

5.1 Game and Training, Anatomical Location and Mechanism of Injury

Thus the incidence of rugby injury in Durban, the anatomical location of injury in Durban and the mechanism by which players are getting injured in Durban is congruent or similar to those done by other studies

No further research is needed on these topics.

5.2 Risk factors

5.2.1 Previous Injury and Existing Injury

In this study there was no significance between having a previous injury compared to being injured in the past season. Having an existing injury also had no significance on being injured in the past season.

Further research can look at whether this was due to lack of a Medical Professional to report the injury to; lack of education as to what constitutes an injury, or whether the players were put under pressure to play with or without the injury.

5.2.2 Age and Size of players

The heavier the player was, the more chance he had of getting injured (p=0.116).

Further research could look at the amount of games played and at what level they are played at compared to the age weight, and height of the players. Further research could also look at the phases of play the heavier players are more actively involved (ie: are they more involved in rucks and mauls compared to running and tackling.) and how it effects the injury rate.

5.2.3 Level of play

The higher the level that you play, the more chance of getting injured (p=0.152).

Further research could look at the amount of games played compared to the level the games are played at. Further research could also look at the amount of recovery time players get between games and between training sessions.

5.2.4 Time of the season

More injuries occurred in pre season than any other part of the season.

A further look at the type of preseason injuries compared to the types of injuries later on, as well as a more detailed look at the type of pre season training that is done may give us an indication as to why the pre season injuries are so high.

5.2.5 Position

The position in which the payers were most injured is lock or loose forward, followed by the wing or fullback and then the scrumhalf or fly half (p=0.002). The injuries were spread across all positions and did not vary amongst the

forwards and the backs. Thus it can be concluded that everyone in the rugby field is at equal risk of being injured no matter what position is been played.

Further studies can look at specific injuries to specific positions played, and thus determine if a particular position is more subject to specific injury or not. Further research could also look at comparing the size of a player, the position he is playing in and his role on the field (ie: run, tackle or be more involved in rucks and mauls) in order to see if there are any associations.

5.3 Resources:

5.3.1 Strength Training:

In terms of strength training, only 55% of the players were doing strength training and only 66,3% of the players trained in the gym. Only 42,9% of the teams used gyms and it was also found that the more you gym the more chance of injury you have ($p=0.076$). This indicates that not enough attention is being paid to the importance of strength training, despite the fact that strength work is a key form of fitness and needs to be done in order to improve the fitness and conditioning of a player. It can thus be concluded that lack of correct strength training is a risk factor to injury.

Further studies looking at more details as to the type of gym training could be done. The study could assess weather the gym training was supervised or not, weather the players used correct technique or form in the gym, and weather the programs were player or position specific according to the demands of rugby.

5.3.2 Skills Training:

Only 50% of the players did skills training. There was also a lack of knowledge or perception to what training was being done between the coaches and players.

Again further research could look at the player coach relationship, whether the players know exactly what the coach is asking of them and whether the coaches develop proper communication skills structures so that both the players and the coaches know exactly what training will be done and how the are going to do it.

5.3.3 Over Training:

Over training of the players in terms of the amount of hours spent training could be a risk factor to injury ($p=0.052$).

Further research could look at why they are over training and the player's perception to training. Research can also look at the effect training has on the players performance in order to determine the cause of the association of over training to injury.

5.3.4 Effect of Trainer:

A lack of knowledge or interpretation as to who the trainer was, what his qualification was or what his role in the team may be was shown. Also shown was that having a private trainer may increase the rate of injury ($p=0.175$), even if it was not significant. It can be concluded that there is a lack of knowledge concerning the role of qualified health professionals in Rugby in the greater Durban area.

Further research could look at the perception of players to health professionals in the team and what their specific roles are. Again further research needs to look at the level the teams are playing at as the higher the

level of play the higher the chance of injury. Further studies could also look at the documentation of injuries when medical professional are present compared to documentation of injuries when medical professionals are not present.

5.3.5 Coaching:

Good structures are in place in terms of coaches per side, high levels of coaching qualification and the fact that most coaches are experienced at the job they are dong. There was however significant association between highest level of coaching and injury (p=0.028) and having more than one coach and injury (p=0.0118). There was and an association between higher level of coaching qualification and injury (p=0.307), but it was not significant. It has also been established from the results of this study that the level of coaching in the Durban area is of a high standard. Thus the influence of the coach on the player to perform has to be established as a risk factor.

Further research could look at the details of the player coach relationship, what the players believes the coach demands of him, and what the coach believes the player should deliver in terms of performance and effort. This could also contribute to finding out whether mismanagement of a player is relationship dependant or training ability dependant.

5.3.6 Facilities:

Over 90% of the schools rated their facilities as good, however some schools and clubs did not have their own facilities. Those teams with their own gyms (p=0.057) and own pools (p=0.028) seemed to be more at risk of injury.

Thus further research could look at whether the schools and clubs have to share facilities, whether the players have full access to the facilities, and who controls the use of the facilities. For those schools and clubs with their own facilities, further research could also look at who is over seeing these facilities, whether there is supervision and whether the players know what they are

doing in these facilities to get the best proper results and reduce the risk of injury.

5.3.7 School Equipment

Apart from scrum machines at 74%, over 80% of the schools had all the basic equipment needed for basic coaching and development of players.

No further research is needed.

5.3.8 Sponsorship

Not all teams had sponsorship to support them and there were large variations as to which teams receive what out of their sponsorship. Those that had sponsorship had better playing and practise kit, however also had more chance of getting injured (p=0.102), even though it was not significant.

Further research can look at what level or league the teams that are sponsored are playing at, and how the injury rate varies according to level played.

5.3.9 Protective Equipment

Those teams that had protective equipment had a significant association to getting injured (p=0.007).

Further research could look at the level and league been played compared to the effect of protective equipment. Research could also look at the effect of playing kit on the player's perception of his safety.

5.3.10 Medical Aid

Of the players participating, 129 had medical aid at 73,4% and 46 did not have medical aid at 26,3%. There was also a significant association between players having medical aid, and getting injured (p=0.039).

Further research could look at perceptions of players on having medical aid to how they approach their rugby.

5.3.11 Knowledge and Perception

A percentage of 91,4% of coaches are seeking professional medical opinions with regard to the health and injury of their players and 78,9% of players have received treatment for their rugby injuries. This is very good for the management of the rugby injuries.

Further research could look at those players/coaches who did not seek medical attention for their injuries, and why or what their reasons were for not seeking medical attention.

5.4 Management

5.4.1 First Aid

Of the teams participating, 94% had first aid at their games. This indicates that most teams are in compliance with the regulations set by the Kwazulu-Natal Rugby Union.

No further research is needed here.

5.4.2 Medical Staff

Half the teams participating in the study had medical staff where the other half did not. Those with medical staff on the team however had a significant association to having injuries in their players (p=0.003).

Further research could look at the level or league the teams are playing at, and weather medical staff are further involved as oppose to not being involved in the lower levels of the game.

5.4.3 Medical Facilities:

In terms of medical facilities, 85,7% of the coaches thought they had good access to medical facilities.

Further research could look at what medical facilities were used, as well as a perception of what players expect from medical facilities.

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Appendix A1

6 May 2010

To Whom It May Concern:

I hereby give written consent to Andrew Tuck for the use of a modified version of my Competitive Swimmers Injury Questionnaire to use in his research.

Yours Sincerely

Dr. Kelly Sutherland
Chiropractor

Appendix A2:

Section 1: Patient Information

1. Age in years?

Years

2. What is your sex?

Male	Female

3. Which ethnic group do you belong to?

Black	White	Coloured	Asian	Indian

4.what other exercise do you do on a regular basis besides swimming (i.e. twice a week.)?

……
……
……

5. Do you compete in any other sport besides swimming? If yes, please specify.

……
……
……

6. Please state your worst two injuries form the sport mentioned in question 5.

……
……
……

7. Do you eat a balanced diet?

Yes	No

8. Do you take any supplements?

Yes	No

9. If you answered yes to question 8, please specify what supplements you are taking.

……
……
……

Section 2: Swimming History

7. At what age it you start swimming? …… Years.

8. How many years have you been swimming competitively?
……Years.

9.At present how many hours per week do you train swimming?
……

9.At present how many hours per week of land training to you do?
……

10.On average how many kilometres do you swim per week?
……

11. What is your main stroke?

Butterfly	Backstroke	Breaststroke	Freestyle	Individual Medley

12. What is your second main stroke?

Butterfly	Backstroke	Breaststroke	Freestyle	Individual Medley

13. Would you classify yourself as?

Sprinter (50 /100m)	Middle distance swimmer (200 /400m)	Long distance swimmer (800 / 1500m +)

13. What is your main event?
……
……

14. What is your second main event?
……
……

15. What other events do you swim?
……
……

16. What is the highest level at which you have competed?
……
……

Section 3: Previous Swimming Injuries

17. Have you **ever** sustained an injury due to swimming?

Yes	No

18. If yes, identify the injury? (I.e. was it acute or chronic, was traumatic or a repetitive strain injury?)
……
……

19. Do you **currently** have any injuries due to swimming?

Yes	No

20. If yes, please identify the injury.
……
……

21. Have you **ever** received treatment for your swimming injury?

Yes	No

22. If yes, what type of treatment did you receive?

Bracing / strapping		Medication/ injections	
Orthopaedic		Home remedies eg: ice	
Physiotherapy		Nutritional therapy	
Chiropractic		Natural therapy eg: Homoeopathy	
Rehabilitation		Other	

If “Other”, please specify:
……
……

23 .How often have the following areas of your body been injured while swimming?
(This includes any injuries from swimming sustained at **any time during your swimming career.)**

Seldom- once or twice
Often- 3-5 times
Very Often- more than 5 times

A. Foot/ toes	Very often	Often	Seldom
B. Ankle	Very often	Often	Seldom
C. Achilles tendon	Very often	Often	Seldom
D. Leg (calf/ Shin)	Very often	Often	Seldom
E. Knee	Very often	Often	Seldom
F. Hamstring (front of leg)	Very often	Often	Seldom

G. Quadriceps (back of leg)	Very often	Often	Seldom
H. Hip / Groin	Very often	Often	Seldom
I. Lower Back	Very often	Often	Seldom
J. Upper Back	Very often	Often	Seldom
K. Neck	Very often	Often	Seldom
L. head	Very often	Often	Seldom
M. Shoulder	Very often	Often	Seldom
N. Biceps (front of upper arm)	Very often	Often	Seldom
O. Triceps (back of upper arm)	Very often	Often	Seldom
P. Elbow	Very often	Often	Seldom
Q. Forearm	Very often	Often	Seldom
R. Wrist	Very often	Often	Seldom
S. Hand	Very often	Often	Seldom
T. Other	Very often	Often	Seldom

If “Other”, please specify:
……
……

24. Consider the worst injury that you have sustained during swimming. How would you describe it?

Mild	Moderate	Severe

From the list above (Q. 22 A- T) please state the area that was injured the worst:
……
……

25. How have the injuries listed below affected your swimming?

A. Foot/ toes	Prevented swimming	Limited swimming	No effect
B. Ankle	Prevented swimming	Limited swimming	No effect
C. Achilles tendon	Prevented swimming	Limited swimming	No effect
D. Leg (calf/ Shin)	Prevented swimming	Limited swimming	No effect
E. Knee	Prevented swimming	Limited swimming	No effect
F. Hamstring (front of leg)	Prevented swimming	Limited swimming	No effect
G. Quadriceps (back of leg)	Prevented swimming	Limited swimming	No effect
H. Hip / Groin	Prevented	Limited swimming	No effect

	swimming		
I. Lower Back	Prevented swimming	Limited swimming	No effect
J. Upper Back	Prevented swimming	Limited swimming	No effect
K. Neck	Prevented swimming	Limited swimming	No effect
L. head	Prevented swimming	Limited swimming	No effect
M. Shoulder	Prevented swimming	Limited swimming	No effect
N. Biceps (front of upper arm)	Prevented swimming	Limited swimming	No effect
O. Triceps (back of upper arm)	Prevented swimming	Limited swimming	No effect
P. Elbow	Prevented swimming	Limited swimming	No effect
Q. Forearm	Prevented swimming	Limited swimming	No effect
R. Wrist	Prevented swimming	Limited swimming	No effect
S. Hand	Prevented swimming	Limited swimming	No effect
T. Other	Prevented swimming	Limited swimming	No effect

If " Other", please specify:
……
……

26. Has your injuries **ever** caused you to stop training?

Yes	No

27. What is the **longest period**, which you were unable to swim due to the above-mentioned injury /ies?

Less that 3 months	3-6 months	Greater than 6 months

Section 4: Present Swimming Injuries

28. Are you **presently** suffering with any injuries due to swimming?

Yes	No

29. If you answered yes to Q27 please specify the injury.
……
……
……

30. How would you describe to pain on a scale of 0 to 10 (0 represents no pain and 10 represents severe pain.)

0	1	2	3	4	5	6	7	8	9	10

31. At this moment how does your **present injury** affect your swimming?

Prevents swimming	Severe limitation & pain	Some limitation	Some pain	No effect

32. What is the longest period this **present injury** has prevented you from swimming?

Less that 3 months	3-6 months	Greater than 6 months

33. How long have you been suffering with this injury?

Less that 3 months	3-6 months	Greater than 6 months

34. What do you feel is the most likely cause for your injury?

Insufficient warm-up		Over training	
Stretching		Insufficient rest	
Gala		Poor nutrition	
Other			

If " Other", please specify:
……
……

35. During which activity was your present injury sustained?

Warm-up		Diving	
Tumble turns		Pulling	
Kicking		Fin work	
Paddles		Drills	
Other			

36. Have you ever received stroke correct?

Yes	No

Appendix A3:

Section 1: Patient Information

1. Age in years? | Years |

2. What is your sex?

Male	Female

3. Which ethnic group do you belong to?

Black	White	Coloured	Asian	Indian

4. What school/club do you play for/coach at?

……

5. What region are you from? Eg Durban north, south coast

……

6. Are you a player, coach or manager?

……

For players only,

7. What is your height in cm? | Cm |

8. What is your weight in kg? | Kg |

Section 2: Rugby History

9. At what age did you start playing/coaching rugby?

…… Years.

10. How many years have you been playing/coaching rugby?

……Years.

11. What is the highest level at which you have competed/coached?

……

……

For players only,

12. At present how many hours per week do you train rugby?

……Hours.

13. Of this, how many hours per week is field training?

……Hours.

14. Do you train in the gym as well?

……

15. If yes, On average how many hours of gym work do you do per week?

……Hours.

16. What is your position?

Prop/ Hooker	Loose forward/ Lock	Scrumhalf/ Flyhalf	Centre	Wing/ Fullback

<u>Section 3: Previous Rugby Injuries</u> (For players only)

17. Have you **ever** sustained an injury due to rugby?

Yes	No

If No, then skip toSection4.

18. **If yes**, identify the injury? (I.e. was it acute or chronic, was traumatic or a repetitive strain injury?)

……

……

19. How did the injury occur?

	Tackling
	Being tackled
	In the lineout
	In the scrum
	In loose play

20. What time of the season did it occur?

……

……

21. Did the injury occur in a game or at training?

……

22. Do you **currently** have any injuries due to rugby?

Yes	No

23. If yes, please identify the injury.

……

……

24. Have you **ever** received treatment for your rugby injury?

Yes	No

25. If yes, what type of treatment did you receive?

Bracing / strapping		Medication/ injections	
Orthopaedic		Home remedies eg: ice	
Physiotherapy		Nutritional therapy	
Chiropractic		Natural therapy eg: Homoeopathy	
Rehabilitation		Other	

If “Other”, please specify:
……
……

26 .How often have the following areas of your body been injured while playing rugby?
(This includes any injuries from rugby sustained at **any time during your rugby career.)**

Seldom- once or twice
Often- 3-5 times
Very Often- more than 5 times

A. Foot/ toes	Very often	Often	Seldom
B. Ankle	Very often	Often	Seldom
C. Achilles tendon	Very often	Often	Seldom
D. Leg (calf/ Shin)	Very often	Often	Seldom
E. Knee	Very often	Often	Seldom
F. Hamstring (front of leg)	Very often	Often	Seldom
G. Quadriceps (back of leg)	Very often	Often	Seldom
H. Hip / Groin	Very often	Often	Seldom
I. Lower Back	Very often	Often	Seldom
J. Upper Back	Very often	Often	Seldom
K. Neck	Very often	Often	Seldom
L. head	Very often	Often	Seldom
M. Shoulder	Very often	Often	Seldom
N. Biceps (front of upper arm)	Very often	Often	Seldom
O. Triceps (back of upper arm)	Very often	Often	Seldom
P. Elbow	Very often	Often	Seldom
Q. Forearm	Very often	Often	Seldom
R. Wrist	Very often	Often	Seldom
S. Hand	Very often	Often	Seldom
T. Other	Very often	Often	Seldom

If “Other”, please specify:
……
……

27. Consider the worst injury that you have sustained during rugby. How would you describe it?

Mild	Moderate	Severe

From the list above (Q. 23 A- T) please state the area that was injured the worst:

……
……

28. How have the injuries listed below affected your rugby?

A. Foot/ toes	Prevented rugby	Limited rugby	No effect
B. Ankle	Prevented Rugby	Limited rugby	No effect
C. Achilles tendon	Prevented rugby	Limited rugby	No effect
D. Leg (calf/ Shin)	Prevented rugby	Limited rugby	No effect
E. Knee	Prevented rugby	Limited rugby	No effect
F. Hamstring (front of leg)	Prevented rugby	Limited rugby	No effect
G. Quadriceps (back of leg)	Prevented rugby	Limited rugby	No effect
H. Hip / Groin	Prevented rugby	Limited rugby	No effect
I. Lower Back	Prevented rugby	Limited rugby	No effect
J. Upper Back	Prevented rugby	Limited rugby	No effect
K. Neck	Prevented rugby	Limited rugby	No effect
L. head	Prevented rugby	Limited rugby	No effect
M. Shoulder	Prevented rugby	Limited rugby	No effect
N. Biceps (front of upper arm)	Prevented rugby	Limited rugby	No effect
O. Triceps (back of upper arm)	Prevented rugby	Limited rugby	No effect
P. Elbow	Prevented Rugby	Limited rugby	No effect
Q. Forearm	Prevented rugby	Limited rugby	No effect
R. Wrist	Prevented rugby	Limited rugby	No effect
S. Hand	Prevented rugby	Limited rugby	No effect
T. Other	Prevented rugby	Limited rugby	No effect

If " Other", please specify:
……
……

29. Has your injuries **ever** caused you to stop training?

Yes	No

30. What is the **longest period**, which you were unable to play due to the above-mentioned injury /ies?

Less that 3 months	3-6 months	Greater than 6 months

Section 4: Knowledge and perception:

31. Please indicate which health care provider YOU would choose FIRST FOR TREATMENT if you had each of the following conditions. (Please tick one box per condition only):

	Bio-kineticist	Chiro-practor	Physio-therapist	GP	Phar-macist	Homeo-path	Other
Appendicitis							
Arthritis							
Asthma							
Sore throat							
Fractures							
Headaches- Migraine							
Headaches- Other							
High Blood Pressure							
Muscle spasm							
Neck pain							
Osteoporosis							
Pain in your joints							
Pins and Needles/ Numbness in your arms or legs	*	*	*	*	*	*	
Postural Abnormalities (e.g. Scoliosis or Hyperlordosis)	*	*	*	*	*	*	
Low back pain							
Shoulder pain							
Slipped disc							
Sprains e.g: ankle sprain							
Viral Infections (e.g. Flu)							
Whiplash injuries							

32. If necessary, do you ever see someone for examination or treatment/therapy?

	Yes
	No (if no, skip to question 32)

33. Tick the practitioners that you have consulted:

	Biokinetisist		Massage Therapist
	Chiropractor		Optometrist
	Dermatologist		Occupational Therapist
	Dietitian		Pharmacist
	General Practitioner (medical doctor)		Physiotherapist
	Gynaecologist		Podiatrist
	Homeopath		Psychologist
	Other		

34. If you had a choice of the practitioners in 2.6, please rank the order in which you would appoint them as part of your management team.

	Biokinetisist		Massage Therapist
	Chiropractor		Optometrist
	Dermatologist		Occupational Therapist
	Dietitian		Pharmacist
	General Practitioner (medical doctor)		Physiotherapist
	Gynaecologist		Podiatrist
	Homeopath		Psychologist
	Other		

Section 5: Training, coaching and management:

35. What training has been done both pre-season and in season, if any?

	General fitness
	Speed training
	Endurance training
	Strength training
	Skills training
	Other
	None

If nothing was answered in Q32, then skip to Q37.

36.Who did the training?

	Coach
	Staff member
	Outside professional
	Other

If not the coach, then

37.Was he a member of staff or was he an outsider brought in specifically for training?

……

……

38.Was the trainer qualified to perform adequate training to the team?

……

……

39.Was he experienced in the field that he was working?

……

……

40.Is there a permanent coach of the side?

……

……

41.Is there more than one coach of the side?

……

……

41.If so, how many coaches of the side are there?

……

……

42.What are the specific roles of each coach? Eg; forwards coach, backline coach, fitness coach

……

……

43.What is the qualification of the coach?

……

……

44.What experience does the coach have?

……

……

45.Is there first aid at all the games that are played?

……

……

46.Is there a medical team involved with the team?

……

……

47.Who all does the medical team consist of?

……

……

48. What is the specific role of each member?

……

……

49.What access to each member of the medical team do the players have?

……

……

Section 6: Resources

50.What facilities were used for training?

	Rugby fields
	Gym
	Pool
	Other

51.Were these facilities that of the schools /clubs, or were they outside facilities?

……

……

52. How would you rate these facilities?

Good	Average	Bad

53.Are there hospital facilities in the region where the game is played?

……

……

54.Is there a clinic/ medical centre in the region where the game is played?

……

……

55.What access to these medical facilities do the players have, if any?

……

……

56.Does the team have a sponsor/s to support them?

……

……

57.What does the sponsorship entail?

	Money
	Protective gear
	Playing kit
	Practise kit
	Balls
	Cones
	Supplements
	Other

58.In terms of equipment, does the school club have the following equipment?

	Scrum machine
	Tackle bags
	Shields
	Rugby posts
	Rugby post protective padding
	Other

Thank you.

Appendix B

CODE OF CONDUCT

This form needs to be completed by every member of the Focus Group prior to the commencement of the focus group meeting.

As a member of this committee I agree to abide by the following conditions:

1. All information contained in the research documents and any information discussed during the focus group meeting will be kept private and confidential. This is especially binding to any information that may identify any of the participants in the research process.
2. None of the information shall be communicated to any other individual or organisation outside of this specific focus group as to the decisions of this focus group.
3. The information from this focus group will be made public in terms of a journal publication, which will in no way identify any participants of this research.

Member represents	Member's Name	Signature	Contact Details

Appendix C

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE: :

TITLE OF RESEARCH PROJECT:

An investigation into the risk factors and management of rugby injury's in the greater Durban area.

NAME OF SUPERVISOR : Dr G. Haswell

NAME OF RESEARCH STUDENT : Andrew Tuck

Please circle the appropriate answer

	YES/NO
1. Have you read the research information sheet?	Yes No
2. Have you had an opportunity to ask questions regarding this study?	Yes No
3. Have you received satisfactory answers to your questions?	Yes No
4. Have you had an opportunity to discuss this study?	Yes No
5. Have you received enough information about this study?	Yes No
6. Do you understand the implications of your involvement in this study?	Yes No
7. Do you understand that you are free to	
a) withdraw from this study at any time?	Yes No
b) withdraw from the study at any time, without reasons given	Yes No
c) withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban Institute of Technology.	Yes No
8. Do you agree to voluntarily participate in this study	Yes No
9. Who have you spoken to regarding this study?	

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please Print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature:_____

Researcher's Name: _____ Signature:_____

Supervisor's / Co-supervisor's Name: _____
Signature:_____

Appendix D

LETTER OF INFORMATION

Dear Participant,

Welcome to my study. Thank you for your interest.

The title of my research project is: An investigation into the risk factors and management of rugby injuries in the greater Durban Area

Name of supervisor: Dr. G. Haswell (031-201-0341)
Name of Research Student: Andrew Tuck (083 4625 138)
Name of Institution: Durban University of Technology

The purpose of the study:
This study will involve research on competitive rugby players in the greater Durban area to determine the risk factors influencing the occurrence of rugby injuries in the greater Durban area.

Procedures:
You will be required to complete a questionnaire about rugby injuries and risk factors. The average time for the questionnaire to be completed is 15 – 30 minutes.

Benefits:
Should you be suffering from any injuries during the course of your participation in this research, you are offered 1 optional free Chiropractic treatment at the Chiropractic Day Clinic at the Durban University of Technology. Also the results of this research will be forwarded to the clubs and schools for distribution to your coach, to allow for improved recommendations with regard to your training. This will assist in the general improvement of the state of rugby in this area.

Risks/ Discomforts and Cost:
There are no risk / discomfort or cost involved from your participation in the study.

Confidentiality:
All patient information is confidential and the results will be used for research purposes only. You have the right to be informed of any new findings that are made and you may ask questions of an independent source if you so wish. If you are not satisfied with any area of the study please feel free to contact the Durban University of Technology Research Ethics Committee.

Thank you for your participation,
Yours sincerely,

Andrew Tuck (Researcher)

Dr. G. Haswell (Supervisor)

APPENDIX E

LETTER OF CONSENT

Dear Coach,
This letter serves as a request to perform research at your school/club.
The title of my research project is: An investigation into the risk factors and management of rugby injuries in the greater Durban Area

Name of supervisor:	Dr. G. Haswell	(031-201-0341)
Name of Research Student:	Andrew Tuck	(083 4625 138)
Name of Institution:	Durban University of Technology	

The purpose of the study:
This study will involve research on competitive rugby players in the greater Durban area to determine the risk factors influencing the occurrence of rugby injuries in the greater Durban area.

Procedures:
You will be required to complete a questionnaire about rugby injuries and risk factors. The average time for the questionnaire to be completed is 15 – 30 minutes.

Benefits:
Should you be suffering from any injuries during the course of your participation in this research, you are offered 1 optional free Chiropractic treatment at the Chiropractic Day Clinic at the Durban University of Technology. Also the results of this research will be forwarded to the clubs and schools for distribution to your coach, to allow for improved recommendations with regard to your training. This will assist in the general improvement of the state of rugby in this area.

Risks/ Discomforts and Cost:
There are no risk / discomfort or cost involved from your participation in the study.

Confidentiality:
All patient information is confidential and the results will be used for research purposes only. You have the right to be informed of any new findings that are made and you may ask questions of an independent source if you so wish. If you are not satisfied with any area of the study please feel free to contact the Durban University of Technology Research Ethics Committee.
Thank you for your participation,
Yours sincerely,

Andrew Tuck (Researcher)

Dr. G. Haswell (Supervisor)

I (name) _____ hereby give Andrew Tuck consent to conduct the above-mentioned research at this club/school.
Signature: _____ Date: _____

APPENDIX F

LETTER OF Information

Dear Participant,

I am conducting research on the Risk factors and management of rugby injuries in the greater Durban area. The purpose of this study is to investigate the frequency and nature of injuries among rugby players and to assess and identify all the risk factors that may be associated with the injuries.

This study will include rugby players and rugby coaches, from both clubs and schools in the Durban area. If you agree to participate, you will be required to complete a questionnaire. All the information supplied by you will be treated confidentially and used for research purposes only.

Participation is voluntary and failure to participate will not result in any adverse consequences.

Please feel free to contact Andrew Tuck (researcher), or my supervisor, Dr. Garrick Haswell if you have any questions.

Thank you very much
Yours sincerely,

Andrew Tuck
(Researcher)
083 4625 138

Dr. G. Haswell
(Supervisor)
031 201 0341

I _____ hereby agree to Participate in the above-mentioned study.

Signature: _____ Date: _____

Parent's Name _____

Signature: _____ Date: _____

Appendix G

INFORMED CONSENT FORM

(TO BE COMPLETED BY THE PARTICIPANTS OF THE FOCUS GROUP)

DATE: :

TITLE OF RESEARCH PROJECT:

An investigation into the risk factors and management of rugby injury's in the greater Durban area.

NAME OF SUPERVISOR : Dr G. Haswell

NAME OF RESEARCH STUDENT : Andrew Tuck

Please circle the appropriate answer

	YES/NO	
10. Have you read the research information sheet?	Yes	No
11. Have you had an opportunity to ask questions regarding this study?	Yes	No
12. Have you received satisfactory answers to your questions?	Yes	No
13. Have you had an opportunity to discuss this study?	Yes	No
14. Have you received enough information about this study?	Yes	No
15. Do you understand the implications of your involvement in this study?	Yes	No
16. Do you understand that you are free to		
a) withdraw from this study at any time?	Yes	No
b) withdraw from the study at any time, without reasons given	Yes	No
c) withdraw from the study at any time without affecting your future health care or relationship with the Chiropractic day clinic at the Durban Institute of Technology.	Yes	No
17. Do you agree to voluntarily participate in this study	Yes	No
18. Who have you spoken to regarding this study?		

If you have answered NO to any of the above, please obtain the necessary information from the researcher and / or supervisor before signing. Thank You.

Please Print in block letters:

Focus Group Member: _____ Signature: _____

Witness Name: _____ Signature:_____

Researcher's Name: _____ Signature:_____

Supervisor's / Co-supervisor's Name: _____
Signature:_____

Appendix H

Pilot Study Questionnaire Evalution Sheet

1 What is your opinion of the subject presented in this questionnaire?
(Please tick the most appropriate box)

- 1.1 Extremely interesting ☐
- 1.2 Interesting ☐
- 1.3 Average ☐
- 1.4 Boring ☐
- 1.5 Very boring ☐

2 Do you think the topics raised in this questionnaire were adequately covered?

- 2.1 Yes ☐
- 2.2 No ☐

3 What is your opinion about the Letter of Information?
(Please tick one box only)

- 3.1 Very clear ☐
- 3.2 Clear ☐
- 3.3 Adequate ☐
- 3.4 Unclear ☐
- 3.5 Needs revising ☐

4 How would you describe the instructions accompanying each of the questions?
(Please tick one box only)

- 4.1 Very clear ☐
- 4.2 Clear ☐
- 4.3 Adequate ☐
- 4.4 Unclear ☐
- 4.5 Needs revising ☐

5 Do you think the questionnaire is too long?

- 5.1 Yes ☐
- 5.2 No ☐

6 What is your opinion of the wording of the questionnaire?
(Please tick the appropriate box)

- 6.1 The meaning of **all questions** is absolutely clear ☐
- 6.2 The meaning of **most** questions is clear ☐
- 6.3 There is too much chiropractic/ medical jargon ☐
- 6.4 The questions will not be understood by lay persons ☐
- 6.5 The questionnaire needs to be revised because it is unclear ☐

If you had any difficulty answering any question/s, please write the number/s of the question/s in the space below with a suggestion on how the question/s can be improved?

_____
_____
_____
_____

Appendix J1:
Questionnaire is for both the players and the coaches.
Some questions are applicable to **players only**, others are applicable to **coaches only**.
Please answer accordingly or move to next question/section where indicated.

Section 1: Patient Information

1. Age in years? Years

2. Which ethnic group do you belong to? (for statistical purposes)

Black	White	Coloured	Asian	Indian

3. What school/club do you play for/coach at?

……

4. Are you a player or a coach?

……

For players only, coaches proceed to Q8.

5. Do you have medical aid?

Yes	No

6. What is your height in cm?

Cm

7. What is your weight in kg?

Kg

Section 2: Rugby History

8. At what age did you start playing/coaching rugby competitively?

…… Years.

9. For how many years have you played/ coached?

…… Years.

10. What is the highest level at which you have played/ coached?

……

……

For players only, coaches proceed to Q32.

11. At present how many hours per week do you train for rugby?

……Hours.

12. Of this, how many hours per week is for field training?

……Hours.

13. Do you train in the gym as well?

Yes	No

14. If yes, On average how many hours of gym work do you do per week?

……Hours.

15. Do you play or train for any other sports other than rugby?

……

……

16. What position do you play?

Prop/ Hooker	Loose forward/ Lock	Scrumhalf/ Flyhalf	Centre	Wing/ Fullback

<u>Section 3: Rugby Injuries (For players only)</u>

17. Have you sustained any injury in the past season due to rugby?

Yes	No

If No, then skip toSection4.

18. **If yes**, identify the injury?

Body area	**Traumatic**	**Repetitive strain**
A. Foot/ toes		
B. Ankle		
C. Achilles tendon		
D. Leg (calf/ Shin)		
E. Knee		
F. Hamstring (back of leg)		
G. Quadriceps (front of leg)		
H. Hip / Groin		
I. Lower Back		
J. Upper Back		
K. Neck		
L. head		
M. Shoulder		
N. Biceps (front of upper arm)		
O. Triceps (back of upper arm)		
P. Elbow		
Q. Forearm		
R. Wrist		
S. Hand		
T. Other		

19 .How often have the following areas of your body been injured while playing rugby?
(This includes injuries from rugby sustained at **any time during the past rugby season.)**

	Once	Twice	> Three
A. Foot/ toes			
B. Ankle			
C. Achilles tendon			
D. Leg (calf/ Shin)			
E. Knee			
F. Hamstring (front of leg)			
G. Quadriceps (back of leg)			

H. Hip / Groin			
I. Lower Back			
J. Upper Back			
K. Neck			
L. head			
M. Shoulder			
N. Biceps (front of upper arm)			
O. Triceps (back of upper arm)			
P. Elbow			
Q. Forearm			
R. Wrist			
S. Hand			
T. Other			

If “Other”, please specify:

……

……

20. From the list above (Q. 19. A- T) please state the area that was the worst injured:

……

……

21. With regard to the injury stated above, how would you describe it? (please tick appropriate box.)

Mild	Moderate	Severe

22. How has the injury listed above affected your rugby? (please tick appropriate box.)

Prevented rugby	Limited rugby	No effect

If “ Other”, please specify:

……

……

23. What is the **longest period**, which you were unable to play due to the above-mentioned injury?

Less that 3 weeks	3-6 weeks	Greater than 6 weeks

24. How did the injury occur?

	Tackling
	Being tackled
	In the lineout
	In the scrum
	Other

If other, please specify.

……

……

25. What time of the season did it occur?

……

……

26. Did the injury occur in a game or at training?

……

27. Do you **currently** have any injuries due to rugby?

Yes	No

28. If yes, please identify the injury.

……

……

29. Have you received treatment for your rugby injury?

Yes	No

30. If **yes**, what type of treatment did you receive? (you may tick more than one box)

Bracing / strapping		Medication/ injections	
Orthopaedic		Home remedies eg: ice	
Physiotherapy		Nutritional therapy	
Chiropractic		Natural therapy eg: Homoeopathy	
Rehabilitation		Other	

If “Other”, please specify:

……

……

31. If **no**, what was the reason for not receiving treatment?

……

……

Section 4: Knowledge and perception:

32. if necessary, have you ever see someone for examination or treatment/therapy for your rugby injuries?

Yes	No

33. if yes, which practitioners have you have consulted:

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

34.If you had a choice of the practitioners in 2.6, please rank the order in which you would appoint them as part of your management team.

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

Section 5: Training, coaching and management: (for coaches only)

35.What training has been done both pre-season and in season, if any?

	General fitness
	Speed training
	Endurance training
	Strength training
	Skills training
	Other
	None

If “Other”, please specify:

……

……

If ‘none’ was answered in Q35, then skip to Q40.

36. Who did the training?

	Coach
	Staff member
	Professional
	Other

If “Other”, please specify:

……

……

If not the coach,then

37. Was he a member of staff or was he an outsider brought in specifically for training?

……

……

If outsider brought in specifically for training, then

38. What was the professional qualification of the “trainer”.

	Chiropractor
	Physiotherapist
	Biokineticist
	Personal trainer
	Other

If “Other”, please specify:

……

……

39.Has he had experience in the field that he was working?

	Yes
	No

40.Is there a permanent coach of the side?

	Yes
	No

41.Is there more than one coach for the side?

	Yes
	No

41.If so, how many coaches of the side are there?

	1
	2
	3
	More than 3

42.What are the specific roles of each coach?

	Forwards coach
	Backline coach
	Defensive coach
	Other

If “Other”, please specify:

……

……

43. Do you have any form coaching qualifications ?

Yes	No

44. If so, what level of qualification do you have?

……

……

45.What experience do you have as a coach?

……

……

46.Is there first aid at all the games that are played?

	Yes
	No

47.Is there a medical staff involved with the team?

	Yes
	No

If no,skip to Q50, if yes then

48.Who all does the medical staff consist of?

	Chiropractor
	Physiotherapist
	Biokineticist
	Personal trainer
	Other

49. What is the specific role of each member?

……

……

50.What access to each member of the medical team do the players have?

……

……

51. How much of the training/rehab responsibility is the pts and how much is the medical practitioner?

Section 6: Resources

52.What facilities were used for training?

	Rugby fields
	Gym
	Pool
	Other

If othe,please specify.

……

……

53.Were these facilities that of the schools /clubs, or were they outside facilities?

	Schools
	Clubs
	Outside
	Other

If othe, please specify.

……

……

54.How would you rate these facilities?

Good	Average	Bad

55. How do you rate your access to medical facilities?

Good	Average	Bad

56.Does the team have a sponsor/s to support them?

	Yes
	No

If no, please skip to Q58.

57. What does the sponsorship entail?

	Money
	Protective gear
	Playing kit
	Practise kit
	Balls
	Cones
	Supplements
	Other

If other, please elaborate

……

……

58. Is any protective equipment supplied?

	Yes
	No

59. If so, what protective gear is supplied?

	Gum guard
	Shoulder pads
	Scrum caps
	Strapping
	Shin pads
	Other

If other, please elaborate

……

……

60. Are any supplements supplied to players?

	Yes
	No

61. If so what supplements were used?

	Protein shake
	Creatine
	Steroids
	Multi vitamin
	Other

If other, please elaborate

……

……

62.In terms of equipment, does the school club have the following equipment?

	Scrum machine
	Tackle bags
	Shields
	Rugby posts
	Rugby post protective padding
	Other

If other, please elaborate

……

……

Thank you for participating in my study, your time is greatly appreciated.

Appendix J2:

Post Focus Group Questionnaire Changes

Questionnaire (Appendix A3) changes to produce Questionnaire (Appendix J1):

Formatting Changes (including answer format options):

"Questionnaire is for both the players and the coaches.
Some questions are applicable to **players only**, others are applicable to **coaches only**.
Please answer accordingly or move to next question/section where indicated" was added to the beginning of the questionnaire.

Grammatical and spelling changes:

1. Q19 the ")" was changed from bold to normal.

Questions omitted, added or combined:

Q2 omitted
Q5 omitted
Q5 added
Q15 added
Q31 added
Q31 omitted
Q33 omitted
Q34 omitted
Q33 added
Q34 added
Q38 omitted
Q38 added
Q44 added
Q51 added
Q54 added
Q53 omitted

Q54 omitted

Q55 omitted

Q58 omitted

Q58 added

Q59 added

Q60 added

Q61 added

Q62 added

Question or answer options modified:

1. Q8 added “…competitively…”
2. Q9 added “For…”
3. Q10 removed “competed” and added “played”
4. Q12 added “…for…”
5. Q13 yes/no box was added
6. Q17 “…in the last season…” was added and “…ever…” was removed.
7. Q18 table x was added
8. Q20 changed to “From the list above (Q. 19. A- T) please state the area that was the worst injured:”
9. Q21 was changed to “With regard to the injury stated above, how would you describe it? (please tick appropriate box.)

Mild	Moderate	Severe

11. Q22 changed to “How has the injury listed above affected your rugby? (please tick appropriate box.)”

Prevented rugby	Limited rugby	No effect

12. Q23 changed to “What is the **longest period**, which you were unable to play due to the above-mentioned injury?”

Less that 3 weeks	3-6 weeks	Greater than 6 weeks

13. Q31 “…of your injuries…” was added.
14. “Nothing” changed to “none”, Q32 changed to Q35, and Q37 changed to Q40 between Q35 and Q36.
15. “If outsider brought in specifically for training, then” was placed between Q37 and Q38.
16. Q42 format change
17. Q43 “Do you have the..” changed to “What is”.
18. Q 46 Format changes
19. Q47 “Team” Became “Staff”
20. **If no,skip to Q50, if yes then** was added between Q47 andQ48.
21. Q56 format change

Heading changes:

1. “Coaches proceed to Q8” was added to “For players only” between Q4 and Q5.
2. “Coaches proceed to Q32” was added to “For players only” between Q10 and Q11.
3. “If No, then skip toSection4.” Was added between Q17 Q18.
4.

Questions completely unchanged:

Q1

Questions completely unchanged except for numbering:

Q3 became Q2
Q4 became Q3

Q6 became Q4

Q7 became Q6

Q8 became Q7……..

Q9 became Q8

Q10 became Q9

Q11 became Q10

Q12 became Q11

Q13 became Q12

Q14 became Q13

Q15 became Q14

Q19 became Q24

Q20 became Q25

Q21 became Q26

Q22 became Q27

Q23 became Q28

Q24 became Q29

Q25 became Q30

Q26 became Q19

Q44 became Q45

Q45 became Q46

Q46 became Q47

Q47 became Q48

Q48 became Q49

Q49 became Q50

Q50 became Q52

Q51 became Q53

Q52 became Q55

Appendix J3:

Post pilot study questionnaire changes

Questionnaire (Appendix J1) changes to produce Questionnaire (Appendix H).

Changes in the questionnaire in the piloting process:

Questionnaire was broken up into two separate questionnaires, one for the coaches and one for the players.

Players Questionnaire

The Players questionnaire had five sections, namely: Patient information, Rugby history, Injury history, Knowledge and Perception and Training.

Q1 “Age in years” changed to “Age”.
Q3 “…coach at” was removed.
Q4 was removed.
“For players only, coaches proceed to Q8.” was removed
Q5 became Q4
Q6 became Q5
Q7 became Q6
Q8 became Q7
“/coaching” was removed
Q9 became Q8
“/coached” was removed
Q10 became Q9
“/coached” was removed
Q11 became Q10
Q12 became Q11
Q13 became Q12
“If no gym training is done please go to Q14. If yes” was added between Q12 and Q13.
Q14 became Q13

“If yes” was removed

Q15 became Q14

Q16 became Q15

Q17 became Q16

“past season” changed to “**past season**”.

“If No, then skip toSection4.” was changed to **“If No injury was sustained then please proceed to Section4. If yes”**

Q18 became Q17

“**If yes**” was added

Q19 became Q18

Q20 became Q19

“Injured the worst” was highlighted

“**Please answer the following questions with regards to the injury stated above in Q19.”** was placed after Q19

Q21 became Q20

“With regards to the injury above” was removed

Q21 became Q20

“listed above” was removed

Q22 became Q21

“listed above” was removed

“If your answer was “no effect” please proceed to Q23.” was placed after Q21

Q23 became Q22

Q24 became Q23

Q25 became Q24

Q26 became Q25

Q27 became Q26

Q28 became Q27

Q29 became Q28

“If no then please proceed to Q30.If yes” was added after Q28

Q30 became Q29

“**If yes**” was added

Q30 became Q31

Q32 became Q31

“Have you” replaces “If necessary, do you”

“If no then please proceed to Q33. If yes” was placed after Q31.

Q33 became Q32

“If yes” was removed

Q34 became Q33

Q35 became Q34

Q36 became Q35

“If not the coach,then” was removed

Q37 became Q36

“If outsider brought in specifically for training, then” was removed

Q38 became Q37

Q39- Q62 were removed

Coach’s questionnaire

The Coaches questionnaire also had five sections, namely: Patient information, Rugby history, Knowledge and Perception and Training, Coaching and Management and Resources.

Q1 “Age in years” changed to “Age”.

Q3 “…play for” was removed.

Q4 was removed.

“For players only, coaches proceed to Q8.” was removed

Q5,6,7 were removed

Q8 became Q4

“playing/” was removed

Q9 became Q5

“played/” was removed

Q10 became Q6

“played/” was removed

“For players only, coaches proceed to Q32.” was removed

Q11- Q16 were removed

The entire section three: Rugby injuries was removed, including Q17- Q31. Section three then became Knowledge and perception.

Q32 became Q7

“Seen someone” was changed to “referred any of your players”

“If you have not referred a player for treatment therapy then please go to Q10. If yes” was added between Q7 and Q8

Q33 became Q8

“If yes” and “consulted” were removed and “referred your players to” was added.

Q34 became Q9

Q35 became Q10

“If ‘none’ was answered in Q35, then skip to Q40.” was removed and **“If no training was done then please go to Q14. If training was done”** was placed between Q10 and Q11.

Q36 became Q11

“If not the coach,then” was removed and **“If the coach did the training, please go to Q14. If it was not the coach that did the training, then”** was added between Q11 and Q12

Q37 became Q12

“If outsider brought in specifically for training, then” was removed and “**If the member of staff did the training, please go to Q14.If an outsider was brought in specifically for the training, then”** was placed between Q12 and Q13.

Q38 became Q13

Q39 was removed

Q40 became Q14

“If there is no coach then please proceed to Q21. If yes” was placed between Q14 and Q15.

Q41 became Q15

“If no then please proceed to Q21. If yes” was added between Q15 and Q16.

Q41 was repeated

Q41 became Q16

Q42 became Q17

Q43 became Q18

Q44 became Q19

Q45 became Q20

Q46 became Q21

Q47 became Q22

“**If no,skip to Q50, if yes then”** was removed and **I”f there was no medical staff involved with the team then please go to Q27. If yes”** was added between Q22 and Q23.

Q48 became Q23

Q49 became Q24

Q50 became Q25

Q51 became Q26

Q52 became Q27

Q53 became Q28

Q54 became Q29

Q55 became Q30

Q56 became Q31

“If no, please skip to Q58.” was removed and “**If there is no sponsor then please go to Q33. If yes”** was added.

Q57 became Q32

Q58 became Q33

“If there is no protective equipment supplied then please go to Q35. If yes” was added.

Q59 became Q34

“If so” was removed

Q60 became Q36

“If there are no supplements supplied then please proceed to Q37. If yes” was added between Q36 and Q37

Q61 became Q36

“If so” was removed from Q36

Q62 became Q37

Q38 was added

Appendix I1:
Coach's questionnaire:
Questionnaire is for coaches only.
Please tick x in appropriate boxes, answer questions accordingly or move to the next question where indicated.

Section 1: Patient Information

1. Age? | Years |

2. Which ethnic group do you belong to? (For statistical purposes)

Black	White	Coloured	Asian	Indian

3. What school/club do you coach at?

……

Section 2: Rugby History

4. At what age did you start coaching rugby competitively?

| Years |

5. For how many years have you coached rugby competitively?

| Years |

6. What is the highest level at which you have coached rugby competitively?

……

……

Section 3: Knowledge and perception:

7. If necessary, have you ever referred any of your players for examination or treatment/therapy for their rugby injuries?

Yes	No

If you have not referred a player for treatment therapy then please go to Q10.
If yes

8. Which practitioners have you referred your players to? (You may tick more than one box.)

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

9. If you had a choice of the practitioners below, please rank the order in which you would appoint them as part of your management team.

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

Section 5: Training, coaching and management: (for coaches only)

10.What training has been done both pre-season and in season, if any?

	General fitness
	Speed training
	Endurance training
	Strength training
	Skills training
	Other
	None

If “Other”, please specify:
……

……

If no training was done then please go to Q14.
If training was done

11.Who did the training?

	Coach
	Staff member
	Professional
	Other

If “Other”, please specify:
……

……

If the coach did the training, please go to Q14.
If it was not the coach that did the training, then

12.Was he a member of staff or was he an outsider brought in specifically for training?

	Staff member
	Outsider

If the member of staff did the training, please go to Q14.
If an outsider was brought in specifically for the training, then

13. What was the professional qualification of the “trainer”.

	Chiropractor
	Physiotherapist
	Biokineticist
	Personal trainer
	No qualification
	Other

If “Other”, please specify:
……

……

14.Is there a permanent coach of the side?

	Yes
	No

If there is no coach then please proceed to Q21.
If yes

15.Is there more than one coach for the side?

	Yes
	No

If no then please proceed to Q21.
If yes

16. How many coaches of the side are there?

	1
	2
	3
	More than 3

17.What are the specific roles of each coach?

	Forwards coach
	Backline coach
	Defensive coach
	Other

If “Other”, please specify:
……

……

18. Do you have any form coaching qualifications?

Yes	No

19. If so, what level of qualification do you have?

……

……

20.What experience do you have as a coach?

……

……

21. Is there first aid at all the games that are played?

	Yes
	No

22. Is there a medical staff involved with the team?

	Yes
	No

If there was no medical staff involved with the team then please go to Q27.
If yes

23.Who does the medical staff consist of?

	Chiropractor
	Physiotherapist
	Biokineticist
	Personal trainer
	Other

24. What is the specific role of each member?

……

……

25.What access to each member of the medical team do the players have?

……

……

26. How much of the training/rehab responsibility is the players and how much is the medical practitioner?

……

……

Section 6: Resources

27.What facilities were used for training?

	Rugby fields
	Gym
	Pool
	Other

If other, please specify.

……

……

28. Were these facilities that of the schools /clubs, or were they outside facilities?

	Schools
	Clubs
	Outside
	Other

If other, please specify.

……

……

29. How would you rate these facilities?

Good	Average	Bad

30. How do you rate your access to medical facilities?

Good	Average	Bad

31. Does the team have a sponsor/s to support them?

	Yes
	No

If there is no sponsor then please go to Q33.
If yes

32. What does the sponsorship entail?

	Money
	Protective gear
	Playing kit
	Practise kit
	Balls
	Cones
	Supplements
	Other

If other, please elaborate

……

……

33. Is any protective equipment supplied?

	Yes
	No

If there is no protective equipment supplied then please go to Q35.
If yes

34. What protective gear is supplied?

	Gum guard
	Shoulder pads
	Scrum caps
	Strapping
	Shin pads
	Other

If other, please elaborate

……

……

35. Are any supplements supplied to players?

	Yes
	No

If there are no supplements supplied then please proceed to Q37.
If yes

36. What supplements were used?

	Protein shake
	Creatine
	Steroids
	Multi vitamin
	Other

If other, please elaborate

……

……

37.In terms of equipment, does the school club have the following equipment?

	Scrum machine
	Tackle bags
	Shields
	Rugby posts
	Rugby post protective padding
	Other

If other, please elaborate

……

……

38. What topical applications did the players use in the case of an injury?

	Traumeal R
	Deep Heat R
	Voltaren R
	Ice man R
	Other

Thank you for participating in my study, your time is greatly appreciated.

Appendix I2:
Player's questionnaire:
Questionnaire is for players only.
Please tick x in appropriate boxes, answer questions accordingly or move to the next question where indicated.

Section 1: Patient Information

1. Age? Years

2. Which ethnic group do you belong to? (For statistical purposes)

Black	White	Coloured	Asian	Indian

3. What school/club do you play for?

……

4. Do you have medical aid?

Yes	No

5. What is your height in cm?

Cm

6. What is your weight in kg?

Kg

Section 2: Rugby History

7. At what age did you start playing rugby competitively?

Years

8. For how many years have you played rugby competitively?

Years

9. What is the highest level at which you have played rugby competitively?

……

……

10. At present how many hours per week do you train for rugby?

……Hours.

11. Of this, how many hours per week is for field training?

……Hours.

12. Do you train in the gym as well?

Yes	No

If no gym training is done please go to Q14.
If yes

13. On average how many hours of gym work do you do per week?

……Hours.

14. Do you play or train for any other sports other than rugby?

……

……

15. What position do you play?

Prop/ Hooker	Loose forward/ Lock	Scrumhalf/ Flyhalf	Centre	Wing/ Fullback

Section 3: Rugby Injuries

16. Have you sustained any injury in the **past season** due to rugby?

Yes	No

If No injury was sustained then please proceed to Section4.
If yes

17. Identify the injury?

Body area	**Traumatic**	**Repetitive strain**
A. Foot/ toes		
B. Ankle		
C. Achilles tendon		
D. Leg (calf/ Shin)		
E. Knee		
F. Hamstring (back of leg)		
G. Quadriceps (front of leg)		
H. Hip / Groin		
I. Lower Back		
J. Upper Back		
K. Neck		
L. head		
M. Shoulder		
N. Biceps (front of upper arm)		
O. Triceps (back of upper arm)		
P. Elbow		
Q. Forearm		
R. Wrist		
S. Hand		
T. Other		

18 .How often have the following areas of your body been injured while playing rugby?
(This includes injuries from rugby sustained at **any time during the past rugby season.)**

	Once	Twice	> Three
A. Foot/ toes			
B. Ankle			
C. Achilles tendon			
D. Leg (calf/ Shin)			
E. Knee			
F. Hamstring (front of leg)			
G. Quadriceps (back of leg)			
H. Hip / Groin			
I. Lower Back			
J. Upper Back			
K. Neck			
L. head			
M. Shoulder			
N. Biceps (front of upper arm)			
O. Triceps (back of upper arm)			
P. Elbow			
Q. Forearm			
R. Wrist			
S. Hand			
T. Other			

If “Other”, please specify:
……

……

19. From the list above (Q. 18. A- T) please state the area that was **injured the worst**

……

……

Please answer the following questions with regards to the injury stated above in Q19.

20. How would you describe the injury? (Please tick appropriate box.)

Mild	Moderate	Severe

21. How has the injury affected your rugby? (Please tick appropriate box.)

Prevented rugby	Limited rugby	No effect

If " Other", please specify:

……

……

If your answer was "no effect" please proceed to Q23.

22. What was the **longest period**, which you were unable to play due to the above-mentioned injury?

Less that 3 weeks	3-6 weeks	Greater than 6 weeks

23. How did the injury occur?

	Tackling
	Being tackled
	In the lineout
	In the scrum
	Other

If other, please specify.

……

……

24. What time of the season did it occur?

	Early in the season
	Middle of the season
	Late in the season

25. Did the injury occur in a game or at training?

	Game
	Training

26. Do you **currently** have any injuries due to rugby?

Yes	No

27. If yes, please identify the injury.

……

……

28. Have you received treatment for your rugby injury?

Yes	No

If no then please proceed to Q30.
If yes

29. What type of treatment did you receive? (You may tick more than one box)

Bracing / strapping		Medication/ injections	
Orthopaedic		Home remedies eg: ice	
Physiotherapy		Nutritional therapy	
Chiropractic		Natural therapy eg: Homoeopathy	
Rehabilitation		Other	

If “Other”, please specify:

……

……

30. If **no**, what was the reason for not receiving treatment?

……

……

Section 4: Knowledge and perception:

31. Have you ever seen someone for examination or treatment/therapy for your rugby injuries?

Yes	No

If no then please proceed to Q33.
If yes

32. Which practitioners have you have consulted:

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

33.If you had a choice of the practitioners below, please rank the order in which you would appoint them as part of your management team.

	Biokinetisist
	Chiropractor
	Physiotherapist
	General Practitioner (medical doctor)
	Massage Therapist
	Orthopaedic surgeon
	Neurologist
	Other

Section 5: Training:

34. What training has been done both pre-season and in season, if any?

	General fitness
	Speed training
	Endurance training
	Strength training
	Skills training
	Other
	None

If “Other”, please specify:
……

……

35.Who did the training?

	Coach
	Staff member
	Private
	Other

If “Other”, please specify:

……

……

36. Was he a member of staff or was he an outsider brought in specifically for training?

	Staff member
	Outsider

37.What was the professional qualification of the “trainer”.

	Chiropractor
	Physiotherapist
	Biokineticist
	Personal trainer
	Other

If “Other”, please specify:

……

……

Thank you for participating in my study, your time is greatly appreciated.

Appendix K
Statistical analysis

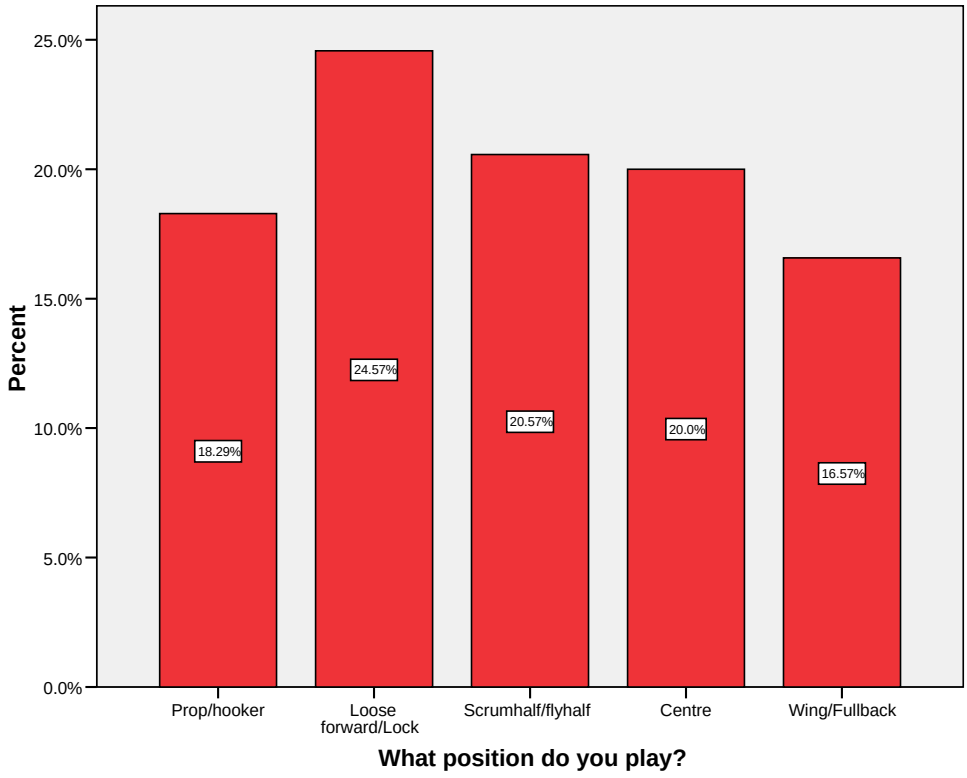
Summary statistics for age started and duration of rugby playing

		At what age did you start playing rugby competitively?	For how many years have you played rugby competitively?
N	Valid	175	174
	Missing	0	1
Mean		11.42	8.44
Std. Deviation		3.817	4.415
Minimum		3	0
Maximum		29	25

Which sports have been played other than rugby

		Frequency	Percent
Valid	Athletics	6	3.4
	basketball	1	.6
	Cricket	19	10.9
	Cycling	1	.6
	Fitness	1	.6
	Golf	3	1.7
	gymnastics	2	1.1
	None	109	62.3
	Running	2	1.1
	Soccer	9	5.1
	Surfing	1	.6
	swimming	4	2.3
	swimming.polo	15	8.6
	Tennis	1	.6
	waterpolo	1	.6
	Total	175	100.0

Position played



Have you sustained any injury in the past season due to rugby

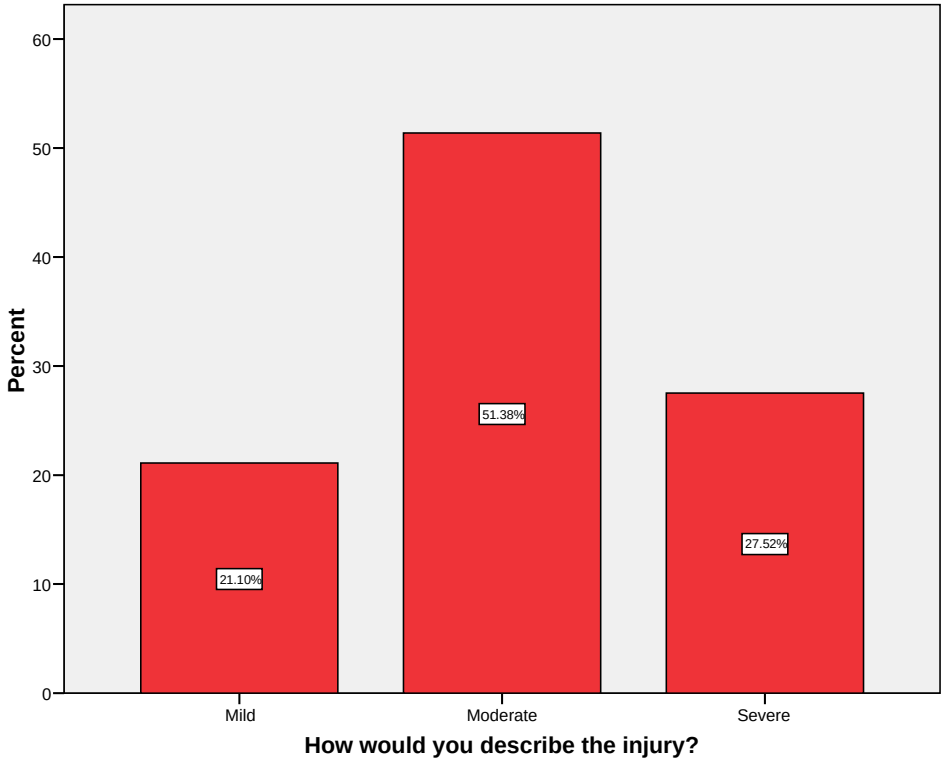
		Frequency	Valid Percent
Valid	Yes	109	62.6
	No	65	37.4
	Total	174	100.0
Missing	System	1	
Total		175	

Number of times rugby injuries occurred at specific sites

	None		Once		Twice		> 3 times	
	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
A. Foot/ toes	162	92.6%	6	3.4%	4	2.3%	3	1.7%
B. Ankle	124	70.9%	32	18.3%	9	5.1%	10	5.7%
C. Achilles tendon	159	90.9%	5	2.9%	8	4.6%	3	1.7%
D. Leg (calf/ Shin)	154	88.0%	8	4.6%	7	4.0%	6	3.4%
E. Knee	136	77.7%	19	10.9%	15	8.6%	5	2.9%
F. Hamstring (front of leg)	154	88.0%	13	7.4%	7	4.0%	1	.6%
G. Quadriceps (back of leg)	161	92.0%	8	4.6%	5	2.9%	1	.6%
H. Hip / Groin	159	90.9%	9	5.1%	3	1.7%	4	2.3%
I. Lower Back	156	89.1%	11	6.3%	5	2.9%	3	1.7%
J. Upper Back	166	94.9%	7	4.0%	2	1.1%	0	.0%
K. Neck	157	89.7%	11	6.3%	6	3.4%	1	.6%
L. head	162	92.6%	9	5.1%	4	2.3%	0	.0%
M. Shoulder	141	80.6%	16	9.1%	14	8.0%	4	2.3%
N. Biceps (front of upper arm)	165	94.3%	4	2.3%	6	3.4%	0	.0%
O. Triceps (back of upper arm)	169	96.6%	4	2.3%	1	.6%	1	.6%
P. Elbow	167	95.4%	5	2.9%	3	1.7%	0	.0%
Q. Forearm	171	97.7%	3	1.7%	1	.6%	0	.0%
R. Wrist	160	91.4%	8	4.6%	4	2.3%	3	1.7%
S. Hand	160	91.4%	7	4.0%	3	1.7%	5	2.9%
T. Other	163	93.1%	8	4.6%	2	1.1%	2	1.1%

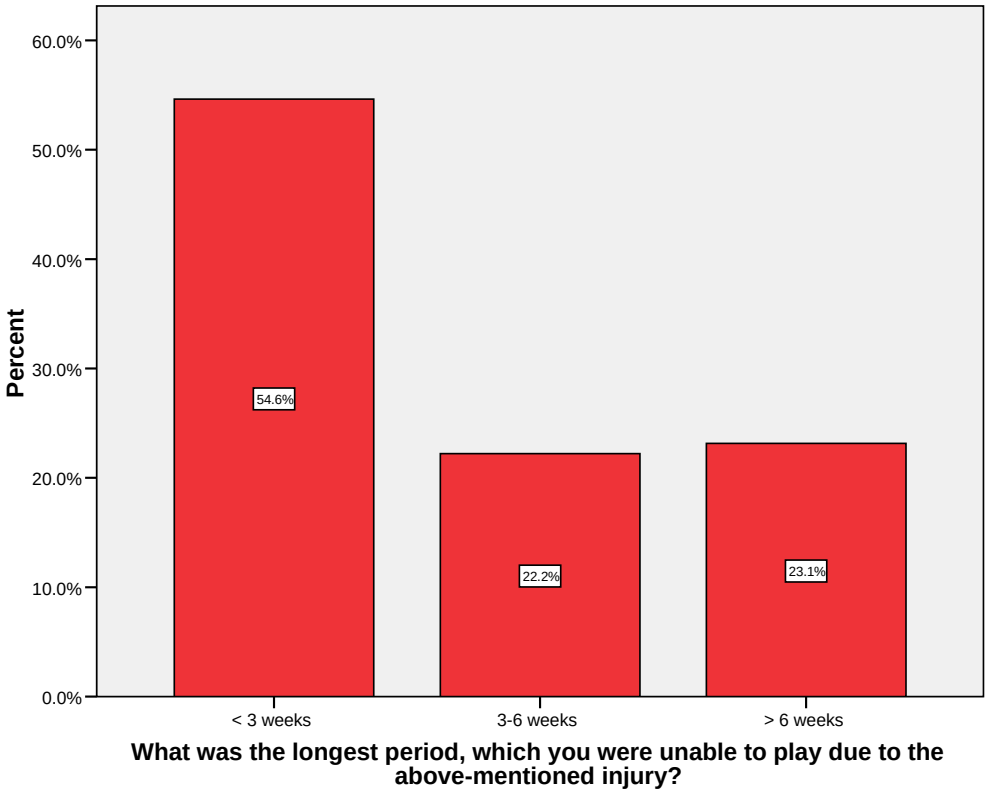
Worst injured area

		Frequency	Percent
Valid	Ankle	19	10.9
	Arm	3	1.7
	Back	6	3.4
	Elbow	1	.6
	Foot	1	.6
	hamstring	4	2.3
	Hand	4	2.3
	Head	3	1.7
	Hip	2	1.1
	Knee	29	16.6
	Leg	3	1.7
	Neck	5	2.9
	None	67	38.3
	Quad	1	.6
	Shoulder	1	.6
	Shoulder	20	11.4
	Thigh	1	.6
	Wrist	5	2.9
	Total	175	100.0



How has the injury affected your rugby

		Frequency	Percent
Valid	Prevented rugby	19	17.4
	Limited rugby	57	52.3
	No effect	33	30.3
	Total	109	100.0
Missing	System	66	
Total		175	



Coaching Experience

		At what age did you start coaching rugby competitively?	For how many years have you coached rugby competitively?
N	Valid	35	35
	Missing	0	0
Mean		26.71	11.83
Std. Deviation		7.209	8.982
Minimum		11	1
Maximum		39	38

Training and Injury

			Have you sustained any injury in the past season due to rugby?		P value
			yes	no	
Training	General fitness	Count	106	63	1.000
		Row %	62.7	37.3	
	Speed training	Count	95	50	0.080
		Row %	65.5	34.5	
	Endurance training	Count	90	42	0.007*
		Row %	68.2	31.8	
	Strength training	Count	68	29	0.022*
		Row %	70.1	29.9	
	Skills training	Count	63	28	0.060
		Row %	69.2	30.8	
	Other	Count	1	1	1.000
		Row %	50.0	50.0	

Professional qualification of trainer and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			yes	no	
What was the professional qualification of the "trainer".	Physiotherapist	Count	8	5	13
		% within What was the professional qualification of the "trainer".	61.5%	38.5%	100.0%
	Biokineticist	Count	14	5	19
		% within What was the professional qualification of the "trainer".	73.7%	26.3%	100.0%
	Personal trainer	Count	36	21	57
		% within What was the professional qualification of the "trainer".	63.2%	36.8%	100.0%
	Other	Count	1	0	1
		% within What was the professional qualification of the "trainer".	100.0%	.0%	100.0%
Total		Count	59	31	90
		% within What was the professional qualification of the "trainer".	65.6%	34.4%	100.0%

Training for other sports and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			yes	no	
Do you play or train for any other sports other than rugby?	yes	Count	43	26	69
		% within Do you play or train for any other sports other than rugby?	62.3%	37.7%	100.0%
	no	Count	66	38	104
		% within Do you play or train for any other sports other than rugby?	63.5%	36.5%	100.0%
Total		Count	109	64	173
		% within Do you play or train for any other sports other than rugby?	63.0%	37.0%	100.0%

Coaching experience and Injury

	Have you sustained any injury in the past season due to rugby?	N	Mean	Std. Deviation	Std. Error Mean	P value
At what age did you start coaching rugby competitively?	Yes	109	26.23	7.316	.701	0.295
	No	65	27.40	6.766	.839	
For how many years have you coached rugby competitively?	Yes	109	11.38	8.495	.814	0.352
	No	65	12.68	9.535	1.183	

No. of coaches and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			yes	no	
How many coaches are there?	1	Count	5	0	5
		% within How many coaches are there?	100.0%	.0%	100.0%
	2	Count	55	30	85
		% within How many coaches are there?	64.7%	35.3%	100.0%
	3	Count	29	11	40
		% within How many coaches are there?	72.5%	27.5%	100.0%
Total		Count	89	41	130
		% within How many coaches are there?	68.5%	31.5%	100.0%

Coaching qualifications and Injury

			Have you sustained any injury in the past season due to rugby?		Total
			yes	no	
Do you have formal coaching qualifications?	yes	Count	72	28	100
		% within Do you have formal coaching qualifications?	72.0%	28.0%	100.0%
	no	Count	17	13	30
		% within Do you have formal coaching qualifications?	56.7%	43.3%	100.0%
Total		Count	89	41	130
		% within Do you have formal coaching qualifications?	68.5%	31.5%	100.0%

Appendix L:

ETHICS CLEARANCE CERTIFICATE

Student Name	[illegible]	Student No	[redacted]
Ethics Reference Number	FHSEC 008/09	Date of FRC Approval	[redacted]
Research Title:	An investigation [illegible]		

In terms of the ethical considerations for the conduct of research in the Faculty of Health Sciences, Durban University of Technology, this proposal meets with institutional requirements and confirms the following ethical obligations:

1. The researcher has read and understood the research ethics policy and procedures as endorsed by the Durban University of Technology, has sufficiently answered all questions pertaining to ethics in the DUT 186 and agrees to comply with them.
2. The researcher will report any serious adverse events pertaining to the research to the Faculty of Health Sciences Research Ethics Committee.
3. The researcher will submit any major additions or changes to the research proposal after approval has been granted to the Faculty of Health Sciences Research Committee for consideration.
4. The researcher, with the supervisor and co-researchers will take full responsibility in ensuring that the protocol is adhered to.
5. ***The following section must be completed if the research involves human participants:***

	YES	NO	N/A
❖ Provision has been made to obtain informed consent of the participants	✓		
❖ Potential psychological and physical risks have been considered and minimised	✓		
❖ Provision has been made to avoid undue intrusion with regard to participants and community	✓		
❖ Rights of participants will be safe-guarded in relation to:			
- Measures for the protection of anonymity and the maintenance of Confidentiality.	✓		
- Access to research information and findings.	✓		
- Termination of involvement without compromise	✓		
- Misleading promises regarding benefits of the research	✓		

SIGNATURE OF STUDENT/RESEARCHER — DATE: 23/04/09

SIGNATURE OF SUPERVISOR/S — DATE: 23/04/09

SIGNATURE OF HEAD OF DEPARTMENT — DATE: 5/5/09

SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE — DATE: 07-05-09.

Appendix N: Random allocation chart

	Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Team																
1		x			x			x		x			x			
2		x				x	x				x				x	
3			x					x	x			x				X
4				x			x			x			x		x	
5		x			x			x			x					X
6			x			x			x			x		x		
7		x			x					x				x		
8				x				x	x		x				x	
9			x			x	x				x					X
10				x		x			x	x					x	
11		x				x					x		x		x	
12		x					x		x			x				X
13			x		x			x		x				x		
14															x	
15				x			x			x			x			X
16			x					x			x			x	x	
17		x				x			x			x	x			
18		x		x			x			x				x		
19			x			x			x			x				X
20		x			x			x					x	x		
21		x				x			x			x			x	
22			x				x				x					
23													x		x	
24					x				x					x		X
25		x														

26			x			x				x			x	x		
27				x				x				x				X
28		x			x	x					x				x	
29			x				x		x				x			X
30		x		x				x				x		x		
31			x			x		x		x					x	
32				x	x		x				x		x			
33		x				x			x			x			x	
34		x					x	x			x			x		
35			x		x					x		x				X
36				x		x			x				x		x	
37		x					x				x			x		
38		x			x					x		x			x	
39		x		x				x					x			X
40			x			x			x		x			x		
41				x	x		x					x			x	
42		x			x			x		x			x			
43			x			x			x					x		X
44				x	x		x				x				x	
45		x			x				x			x			x	
46			x			x	x						x			X
47		x				x		x		x				x		
48				x					x		x				x	X
49		x			x			x				x		x		
50			x			x				x			x		x	