The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

University of Cape Town

The incidence of injury and exposure times of footballers playing in a professional football club in the PSL during a football season

A DISSERTATION PREPARED BY THEODORE CALLIGERIS (CLLTHE003) IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER OF PHILOSPHY DEGREE IN SPORTS PHYSIOTHERAPY (MPHIL SPORTS PHYSIOTHERAPY) FROM THE UNIVERSITY OF CAPE TOWN

University of Cape Town

Theodore Calligeris

Supervisors:

Associate Professor Mike Lambert

Dr.T. Burgess

Division of Physiotherapy

School of Health and Rehabilitation Sciences

and

MRC/UCT Research Unit for Exercise Science and Sports Medicine

Department of Human Biology

University of Cape Town

29TH JANUARY 2012

Declaration

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

No part of this dissertation may be reproduced, stored in a retrieval system, or transmitted in any form or means without prior permission in writing from the author or the University of Cape Town.

University of Cape Town

……………………………………………………………….

(Signature)

………………………………………………………………

(Date)

Acknowledgements

I would like to acknowledge the support of:

- My supervisors Prof. Mike Lambert and Dr. Theresa Burgess from UCT.
- Mr. George Comitis The CEO of AJAX CT football club.
- Mr. Gavin Benjefield (AJAX CT Medical Team).
- Mr. Lorenzo Meyer (AJAX CT Medical Team).
- Mr. Craig von Weilligh (AJAX CT Medical Team).
- The players of AJAX CT who participated in the study.

University of Cape Town

Table of contents

Declaration ... 1

Acknowledgements ... 2

List of Tables ... 5

List of Figures ... 6

List of Abbreviations ... 7

Abstract ... 8

Chapter 1 ... 10
Introduction ... 10

Chapter 2 ... 13
Literature review: Injuries associated with football ... 13
Introduction ... 13
Studies on soccer injuries pre-F-MARC ... 14
The influence of methodology ... 15
Establishment of F-MARC ... 16
Studies on soccer (football) injuries post-F-MARC ... 17
Incidence and type of injury ... 17
Training load ... 17
Playing surface ... 18
Summary of the literature ... 18

Chapter 3 ... 20
The incidence of injury and exposure time in football players ... 20
Introduction ... 20
Methodology ... 20
Participants and study design ... 20
Inclusion criteria ... 21
Exclusion criteria ... 21
Sample size ... 21
Informed consent and data collection ... 21
Results ... 22
Description of players ... 22
Quantification of exposure type ... 23
Injuries ... 28
Discussion ... 40

Chapter 4 ... 44
Summary and conclusion ... 44

References ... 46

Appendices ... 51
Appendix 1 Letter of Consent from AJAX CT CEO ... 51
Appendix 2 Informed Consent Form ... 52
Appendix 3 Players Baseline Information Form ... 56

University of Cape Town

Appendix 4 Injury Report Form *57*
Appendix 5 Exposure Report Form *58*
Appendix 6 Letter of Consent from the Research Ethics Committee UCT *59*

List of Tables

Table 1: *Players included in the analysis* 23

Table 2: *Average age, height and weight relative to playing position* 23

Table 3: *The total different exposure times per player over one season* 26

Table 4: *The average exposure time (min), expressed as an average and 95% confidence intervals for training, match & recovery for each player* 27

Table 5: *The exposure time (min) expressed as an average and 95% confidence intervals for conditioning, endurance and testing of each player* 28

Table 6: *Average time off from training and competition in relation to the injured body part. The data are shown as averages (-95% to +95% CI)* 30

Table 7: *Injuries according to body part expressed as a percent of the total number of injuries* 30

Table 8: *Average time off in relation to the injured side of the body* 31

Table 9: *Time off (days) from training and competition in relation to injured body part relative to playing position. The data are shown as means ± SD* 31

Table 10: *Time off (days) training and competition in relation to injured body part relative to playing position* 32

Table 11: *Average time off from training and competition in relation to type of injury. The data are shown as averages (-95% to +95%)* 33

Table 12: *Percent of the type of injuries sustained* 33

Table 13: *Recurrent vs acute injuries* 34

Table 14: *Time off (days) training and competition in relation to injury type relative to playing position* 35

Table 15: *Number of non-recurrent injuries relative to playing position* 36

Table 16: *Number of the recurrent injuries relative to playing position* 36

Table 17: *Injuries sustained from training and competition due to trauma or overuse in relation to the playing position* 37

Table 18: *Injuries sustained during matches and training relative to playing position* 37

Table 19: *Injuries sustained due to contact vs non-contact* 38

Table 20: *Injuries sustained due to contact vs non-contact relative to playing position* 38

Table 21: *Injuries sustained by violation of the Laws* 39

Table 22: *Sanction against player or opponent?* 39

Table 23: *Violation of the Laws relative to playing position and association with injury* 39

University of Cape Town

List of Figures

Figure 1: *Average time (minutes) for training (a), recovery (b), conditioning (c) and endurance (d) for each day through the season. In (a) the ↓ represents a match and * represents a day off from training. The grey line represents the line of best fit.* 24

Figure 2: The average time (minutes) (a) and the total time (b) for training, matches, recovery, conditioning, endurance and testing. The data are represented as the median; 25th and 75th percentile (i.e. box), ±95% CI (whiskers) and maximum and minimum values (•). 25

Figure 3: The distribution of the 130 injuries which occurred during the pre season (0-47 days) and in season (48 -341 days) showing the body parts that were injured. The body parts are on the right of the figure with the symbol to the left e.g. hand/ fingers is represented by the symbol ✖.......... 29

University of Cape Town

List of Abbreviations

ACT	(Ajax Cape Town Football Club)
CT	(Cape Town)
FA	(Football Association)
FIFA	(Fédération Internationale de Football Association)
F-MARC	(Fédération Internationale de Football Association Medical Assessment and Research Centre)
IFAB	(International Football Association Board)
PSL	(Premier Soccer League)
SAFA	(South African Football Association)
USD	(United States Dollars)

University of Cape Town

Abstract

Background: Several studies on European players at the elite or professional level have shown a high risk of injury. However, the studies used different data collection methods, making it difficult to compare results. This suggested a need to standardise the definition of an injury and method of data collection. As a consequence, in 2006 a group under the auspices of *Fédération Internationale de Football Association Medical Assessment and Research Centre* devised the F-MARC Protocol, which includes precise definitions of injury and well as procedures for implementing data collection. There are no data on injuries associated with football in South Africa, which makes it difficult to develop an evidence-based strategy to manage injuries associated with football. Therefore, in an attempt to address the deficiency on soccer related injuries in South Africa, a Professional Soccer League (PSL) team (AJAX CT) was monitored throughout the season by the medical support staff of the team using the F-MARC data collection system devised by FIFA.

Objective: The main objective of this study was to undertake a retrospective epidemiological study documenting the incidence of injury in this team and the exposure time (practice and match) of the players over a full season.

Methods: Injury and training data of the players in the AJAX CT squad (n = 32) with an average age of 24 ± 2 years were recorded on a daily basis according to the methods of the F-MARC protocol. The numbers of days lost from training or matches were recorded as a method to describe the severity of the injury.

Results: One hundred and thirty injuries were recorded in the season. The most affected body parts were the thigh (n=27, 21%) and ankle (n=27, 21%) with the left side of the body mostly affected. The distribution of the latter body part injury was mostly associated with the midfielders, forwards, defenders and goalkeepers in descending order. The overall incidence of injuries was 13.4 injuries per 1000 player hours. Training had a lower incidence of 6.6 injuries per 1000 player hours and matches a higher incidence of 88.9 injuries per 1000 player hours. The most common type of injury documented was haematoma/contusion/bruising (n=43, 33%). The latter type of injury mostly affected the midfielders. Of the total injuries 12% were recurrent and 77% were due to trauma. Sixty-two % of the injuries arose after contact with another player. Most of the injuries occurred during matches (n=87, 67%). Seventy-six percent of the injuries were not associated with any violation of the Laws of the Game. The average time off due to injury was eight days. The exposure type is described in minutes of training, match, recovery, conditioning, endurance and testing time over the full season with a combined average of 18162 minutes (303 hours).

Conclusion: Footballers in South Africa are exposed to a large amount of football (303 hours) over a full season with a relatively high risk of injury (13.4 injuries per 1000 player hours) and a mean time

University of Cape Town

off from participation of eight days. These data differ in comparison to the data from European studies. These findings suggest that monitoring the players' training load and injuries through a season has the potential to improve their management. Furthermore, injury data measured throughout the season have the potential to identify risks and mechanism of injuries. This study highlights the necessity for all clubs in the PSL to adopt a standardised injury monitoring programme using standardised methodology so that the management of professional players in South Africa can be improved.

Chapter 1

Introduction

Football, also known as soccer is the most widely played sport in the world [1] [2] [3] with approximately 240 million people playing regularly in more than 200 countries [4]. Further studies describe an estimated 265 million active football players participate in the game as on 2006 [5] [6] . Fédération Internationale de Football Association (FIFA) world rankings show that 202 countries play football (FIFA Website: www.fifa.com). Furthermore, in 2003-04 there were 1.8 million registered players in South Africa which makes football the most popular sport in the country [7]. According to the FIFA website '*the very earliest form of the game for which there is scientific evidence was an exercise from a military manual dating back to the second and third centuries BC in China*'. This was expanded into Japan (Kemari), Greece (Episkyros) and Rome (Harpastum) from where the game was taken to Britain. From Britain it evolved into the modern game of football. In 1863 the Football Association (FA) was formed in England, becoming the first governing body in the world of football. Subsequently football associations developed in other countries making football a global sport.

It is obvious that with 240 million players, injuries during the training and matches are inevitable. Apart from the pain and incapacitation associated with injuries there is also a financial cost. FIFA has estimated that the average world-wide annual medical cost of soccer injuries is approximately 30 billion United States Dollars (USD) [4]. As the number of football games played per season in various leagues is increasing with an increase in cup competitions, there is an accompanying increased risk of injury. Clubs have responded to this by employing more support staff to manage injuries. This has placed significant economic pressure on the health care structures of clubs [4].

The science of football started emerging in the 1970's. However there were not many international research papers published during this era. By the 1990's there were further research developments and more papers published. A review of 20 epidemiology studies on adult soccer players showed that epidemiological information with regards to soccer injuries was inconsistent and incomplete [4]. Since the 1990's more papers have been published showing how the science and medical support structures of a team have evolved [1] [2] [8-11]. This proliferation of knowledge has led to the establishment of the independent research body of FIFA called F-MARC (Football Medical Assessment and Research Centre) in 1994 uniting an international group of experts in football medicine (FIFA Website: www.fifa.com). The mission of this research body is '*to protect the health of female and male football players on all levels of skill as well as to promote football as a health-enhancing leisure activity*'. F-MARC has also adopted a mission to reduce the incidence of injuries and complaints caused by football. Researchers around the world have contributed to this mission in many ways. For example, in 1998 the International Football Association Board (IFAB) making it illegal (red card offence) to tackle an opponent from behind changed Law XII. This change of law came about after many injuries

University of Cape Town

were associated with this mechanism of tackling. This type of research, which links mechanism of injury to a subsequent law change, reduces the risk of injury of the game.

In South Africa the application of the knowledge of science regarding the description and prevention of injuries in football is lacking at all levels. Football at the level of school and university, have poorly developed support structures. This results in many talented football players either choosing to play the game socially or migrating to the other sports which have better developed support structures. This creates a gap where players are lost in the transition from school to university while those that continue in football develop without optimal structured support. This situation has changed recently as local interest in the domestic league has increased. The local media, corporate sponsorship and other financial support structures have contributed to this growth. However, the growth of applied science of the local game has been lacking. For example, a PubMed search using the term '*soccer football South Africa*' revealed 4 results, '*soccer South Africa*' revealed 36 results and '*football South Africa*' displayed 54 results of which the majority were related to rugby football. The articles on football made no mention of the PSL in South Africa. This is unfortunate because research on football in South Africa is a necessary tool required to answer questions which are specific to the demands of the game in South Africa. Without answering these questions the rate of improvement in the local game will be curtailed.

The South African league (Premier Soccer League or PSL) has no well-documented data describing the injury profiles of professional teams. This has resulted in no progressive scientific research which describes the injury incidence in professional South African football. Without these data it is difficult to determine whether any changes occur after intervention in any aspect of a player's management. This is in contrast to the situation in other places in the world where numerous international descriptive football injury studies have profiled the injuries and outcomes in foreign football leagues [12] [13] [14] [15] [16] [17]. A number of different approaches have been used to define injuries resulting in variations in definitions and methodology and hence outcomes, making inter-study comparisons difficult. Furthermore, the results and conclusions obtained from the few international studies done cannot be directly related and applied to professional football players in South Africa for a number of possible reasons:

1. The physical characteristics of football players differ across continents – most of the studies have been conducted on European players,
2. The playing surfaces are different,
3. The weather conditions are different,
4. The number of football matches played locally differs to other international leagues,
5. The medical facilities and the involvement of support staff differs, and
6. The level or standard of local refereeing varies in comparison to other international levels. Studies show the international reliability in which referees can identify violation of the Laws during match conditions are low[18].

University of Cape Town

Therefore, it is important for credible internationally accepted research methodology to be implemented in professional South African football. The results of such studies will provide data to reduce the risk of injury and measure the efficacy of treatment and rehabilitation strategies. The results will also contribute to the better management of local players and the growth of the game in the PSL in a positive way. Such research needs to describe the injury incidence, mechanism (pathomechanics), involved body part, type of injury (pathology), diagnosis, history of injury and legalities involved (violation of the Laws). These data need to be well documented and collected over a full season to accurately describe a thorough injury profile of a team.

The next section will discuss a review of the literature (Chapter 2). This will be followed by the description of a study, which examined the injury profile and training load of players of a team in the PSL over a full season (Chapter 3). This will be followed by a general discussion and summary and conclusion (Chapter 4).

University of Cape Town

Chapter 2

Literature review: Injuries associated with football

Introduction

The benefits of participating in sport must always be balanced against the risk of being injured during training or competition. Injuries influence the active, healthy lifestyle and impact on the quality of lifestyle at a social and professional level [19] [20]. The treatment of injured players also has a financial cost [21] [22]. The total number of acute and overuse injuries incurred by sports participants in South Africa is unknown. Therefore, the estimated costs associated with the treatment of these injuries in South Africa are also unknown. It follows that the impact of injuries arising from the game is not quantifiable but based on available information can be regarded as considerable [17] [23] [24].

The latest data on the status of South African football showed that in 2003-04 there were 1.8 million registered players in South Africa [7], making football the most popular sport in the country.

As mentioned in the previous chapter the science of football started emerging in the 1970's and grew in the 1990's. No data has been presented in a South African football study describing the incidence, severity, aetiology and prevention of sports injuries which has the potential to be useful in developing the specific management of local players. Describing the incidence, exposure, severity of injury and the time off due to injury are important factors in any epidemiological study. These data provide the ability to assess the effectiveness of injury prevention strategies and manage a player more effectively. Football injuries described in the literature are inconsistent and incomplete [4]. This could be attributed to inconsistency in the research methodology. To make valid inter- and intra- sport comparisons [25] it is important to use similar nomenclature to describe the nature and severity of injuries. Failing to do so limits the application and interpretation of the data, particularly when comparing published data, which may have used different terminology. In the late 1990's there was clearly a need to standardise the nomenclature and basic definitions in research.

Informal discussions during the 1st World Congress on Sports Injury Prevention in Oslo in June 2005, resulted in the *Fédération Internationale de Football Association Medical Assessment and Research Centre* (F-MARC) agreeing to host an Injury Consensus Group comprising a range of experts involved in the study of football injuries. A nominal group consensus model approach was adopted for producing a consensus statement on definitions and methodological issues related to studies of football injuries. A working document identifying key issues associated with data collection and reporting in surveillance, risk factors, and intervention studies was produced to structure discussions at a two day meeting in Zurich [26]. After this meeting, iterative draft consensus statements were prepared and circulated to members of the group for comments before this final statement was produced. This resulted in the F-MARC Protocol, which includes precise definitions of injury and well as procedures for implementing data collection [26].

University of Cape Town

The next section will discuss the available data on football injuries before the terminology was standardised (F-MARC), followed by the steps taken to standardise the nomenclature. This is followed by a discussion on the studies which used the F-MARC definitions for injuries. This section is then summarized and the application of the findings to football in South Africa is discussed.

Studies on soccer injuries pre-F-MARC

A study in 2002 that described the injuries in professional football teams in the UK during the preseason showed that 17% of the total injuries of a team occurred in the preseason, with an average of 22.3 days being missed from training because of injury[14]. A recordable injury was defined as 'an injury sustained during training or competition and which prevented the injured player from participating in normal training or competition for more than 48 hours, not including the day of the injury'. This study indicated that, assuming a preseason lasts for 4-6 weeks (28–42 days), several players could miss 53%-79% of the preseason period because of injury. This study described the injury profile in preseason as being relatively minor overuse and tendon related injuries[14]. The thigh, knee and ankle were the most common locations for injuries. A lesser number of lower leg injuries also occurred. Muscle strains were the most common injury (37%) with ligament sprains the second most common (19%). Achilles tendon injuries were the seventh highest type of injury sustained. The prevalence of Achilles tendonitis (which should rather be described as a tendinopathy) [14] was higher in preseason (three per week) when compared to in season (one per week).

Other studies from the pre F-MARC era showed that the most common types of injuries were muscle strains, ligament sprains, contusions, and other injuries [8]. It has also been shown that 17 - 20% of all the ankle injuries, are ankle sprains [1]. There are also data to show that the injury incidence during matches was higher than in training in European professional men's soccer (football) from 2001 to 2008. The most common injury described was a thigh strain, representing 17% of all injuries. Re-injuries constituted 12% of all injuries, and they caused longer absences from training than first occurring injuries [17]. Other risk factors for injury described in a study amongst elite footballers included age, previous injury and decreased range of motion [27].

A further study of 11 top clubs in five European countries followed the players prospectively investigating the incidence and pattern of injuries throughout the 2001-2002 season [15]. A total of 658 injuries were recorded over one full season. Injury was defined as any injury occurring during a scheduled training session or match causing the player to miss the next training session or match. This study showed that the mean incidence of injuries was 9.4 injuries/1000 hours. This was comprised of 30.5 injuries/1000 match hours and 5.8 injuries/1000 training hours, confirming that most injuries occurred during matches. This study also showed that the risk and severity of match injuries differed from country to country. This can be attributed to the fact that each country has independent injury profiles and that the conditions in countries are the not same despite playing a common sport. In this study thigh strains to the posterior thigh accounted for the highest incidence of injury in players from all countries [15]. Also, national team players had a higher match exposure, with a tendency towards a lower training load. Interestingly, their rate of injury was lower in comparison to

University of Cape Town

the rest of the local players who did not play for the national team [10]. This finding could be due to better conditioning of the players at the higher level, or that players at the higher level had better supervision with well-managed exposure to training. The importance of good management of match exposure in national team players has to be emphasised as a player exposed to more than one match a week, ten weeks before a World Cup, for example, will incur injuries or underperform during the World Cup [2]. This will influence the players' injury profile.

Although information from this study [2] is useful, the lack of the standardisation in the methodology process and questionnaire makes it difficult to compare these data to data from other studies. The varying definitions, questionnaires and methodologies, to name a few variables, differed between studies prompting the need for their standardisation [28]. An example of such variations is the method of data collection used by the Football Association. They designed a specific injury questionnaire for a specific study e.g. one questionnaire for hamstring injuries [29] and a different questionnaire for ankle injuries [30] as well as a pre-season injury questionnaire [14]. Therefore, in summary, despite many publications on injuries associated with football, the data are difficult to compare. As a result the applicability and translation of the data to different regions in the world are limited. The next section discusses the influence of methodology in more detail.

The influence of methodology

The design of a study, particularly studies on the incidence of sport injuries can influence the data as previously mentioned [31]. The potential effects of the variations in study design, methods of analysis and data collection have been clearly illustrated to give different outcomes. This results in different conclusions being reached from the same study depending on how the data were collected and analysed. An example would be describing the incidence and severity in an epidemiological study in sport. Consider the influence of an injury definition where severity of the injury is rated either according to; (i) the number of days a player misses training/competition [32], or (ii) a player missing a match [33]. A player might injure himself on a Tuesday and return to training on the following Wednesday. Using the number of training/competition days as a marker of severity his number per definition will be seven. Applying the second definition, the value might be one or two, depending on whether matches are played weekly or twice a week. Injury definitions describing exposure data also vary in different studies. The most common methods of describing injuries follow [31]:

- injuries /1000 player-hours of exposure – the actual time of player exposure to training and matches,
- injuries /1000 players-exposure – actual number of players exposed per match not accounting for the time exposed, and
- injuries /1000 matches – time exposed per matches played not accounting for the number of players involved.

University of Cape Town

A prospective cohort study which recorded injuries and individual exposure was conducted during 2001 on 14 teams in the Swedish top division. Injury was defined as time-lost injury or as tissue injury for comparison [34]. No significant difference in the risk for injury between tissue injuries and time-lost injuries was found during matches or training sessions [34]. However there was a difference in the number of injuries relative to the type of injury definition 715 (time-lost injuries) and 765 (tissue injury) suggesting there was a lack of robustness in the methods used to define injuries. This type of study further strengthens the case to standardise a method of data collection and analysis in football internationally to make inter-study comparisons more meaningful. Valid and consistent protocols in epidemiological studies will help resolve many issues in sport. The next section describes the process of this standardisation in football.

Establishment of F-MARC

Most formal consensus methods have become increasingly important tools in resolving health and other medical related issues at a national and international level. The purpose of developing a consensus is to define standards for data collection. This has a precedent in medicine where the National Health Institute has developed over 40 consensus development conferences to help resolve medical issues [35]. This has also occurred in sports such as cricket [36] and rugby [37] when consensus documents have agreed to standards about defining injuries. As mentioned above, clear definitions of injuries need to be stipulated as a prerequisite for describing an injury profile. This enables the comparison of data from other studies around the world. Variations in the definitions of sports injuries are a major reason for a difference in interpretation and description of injuries [25 38 39]. This results in similar injuries being categorized differently and therefore data from different studies using different definitions of injury cannot be compared [26].

Consensus methods are becoming part of technology for solving problems. The consensus methods create structured environments in which professional judgment and clinical data can be wisely combined [35]. It is with this as background that the F-MARC Protocol was developed with the goal of including precise definitions of injury and well as procedures for implementing data collection [26]. Definitions of injury, recurrent injury, severity, and training and match exposures in football together with criteria for classifying injuries in terms of location, type, diagnosis, and causation are presented specifically in this protocol [26].

According to this procedure an injury in football terms is defined as '*any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities*'. The injuries are therefore sub divided into further categories. For example, those injuries that result in a player receiving medical attention are referred to as *Medical attention injury* and an injury in which a player is unable to participate in a full part in future football training or match play as *Time loss injury* [26].

The F-MARC model has been accepted by most scientists involved in research on football and needs to be implemented in all football studies, particularly for inter-study comparisons.

University of Cape Town

Studies on soccer (football) injuries post-F-MARC

Incidence and type of injury

A study from the 2006 FIFA World Cup show 145 injuries were sustained throughout the 64 match tournaments [40]. The overall injury rate was 68.7 injuries per 1000 match hours or 2.3 injuries per match, in comparison with 2.7 injuries per match in the 2002 FIFA World Cup. This difference was not significant [40]. The results of both studies could be compared, as the injury definitions in 2002 (pre-F-MARC) were similar to the F-MARC definitions used in 2006. The most common type of injuries in the 2002 and 2006 FIFA World Cup were contusions (51%) followed by muscle strains (15%) and ligaments sprains (14%) [40].

Another study described the injuries profile incurred during the 2010 FIFA World Cup in South Africa [41]. A standardised report form was used namely the FIFA injury reporting and the International Olympic Committee injury and illness surveillance methods. The latter is an injury surveillance system for multi-sports tournaments, used in the 2008 Olympic Games in Beijing. This injury surveillance system has been accepted by experienced team physicians and shown to be feasible for single-sport and multi-sport events [42]. A standardised use of injury definition, report forms and methodology does ensure the comparability of results. A total of 229 injuries were reported with 125 match and 104 training injuries. This was expressed as a total of 61.1 injuries per 1000 match hours and 7.9 injuries per 1000 player hours or 2.0 injuries per match. Contact with another player was the most frequent cause of match and training injuries [41]. The most common injuries described were thigh injuries [41].

Studies done on hip/groin injuries over several seasons on 23 professional clubs showed a total injury incidence of 1.1/1000 hours and were consistent over the seasons studied [43]. It comprised of 3.5 injuries /1000 match hours vs. 0.6 injuries /1000 training hours [43]. The mean absence time per injury was 15 days while re-injuries accounted for 15% of all registered injuries [43]. Muscle injuries are a substantial problem for players and clubs. They comprise approximately one third of all time-loss injuries in men's professional football, and 92% of all injuries affect the four big muscle groups in the lower limbs namely the hamstrings, adductors, quadriceps and calf muscles [23].

Muscle strains and recurrences occur frequently in football. Studies show that 24% of the muscle strains sustained over 4 seasons were classified as re-injuries, leading to an incidence of 1.32 strain recurrences per 1000 hours exposure [44]. The incidence of recurrent strains was higher in matches compared with training (4.51, 95% CI, 2.30-6.72 vs. 0.94, 95% CI, 0.59-1.29; matches vs. training) [44].

Training load

To interpret injury data it is important to document the training load over the same period. A good example occurs in rugby union where a study of English rugby players showed that a volume of training greater than 9.1 hours per week (excluding warm-ups, cool-down and recovery sessions) did not increase the incidence of match or training injuries, but did increase the severity of match injuries

University of Cape Town

particularly in the second half of the season in professional rugby union players in England [45]. This type of information may be useful in epidemiological studies of injuries in football.

Football and rugby are professional sports, which carry an element of mental stress with added pressure. Further studies have described the psychological stress-recovery response relative to training loads in rugby union players [46]. It was shown that players with high training loads and physical stress volumes during the season demonstrated favourable recovery-stress states and they were able to cope with the stress and recover sufficiently. The stress developed from under-recovery states, did not increase with increases in weekly volume when they were assessed over a full season. However the opposite was found during an acute intensive competition phase of a season i.e. a segment of a season.

These markers may be a precursor to injury and add to the outcome of a higher injury incidence in matches as opposed to training. It has also been shown that the greater training exposure and the long pre-season period reduces the risk of injury during training in season [47]. A high total training exposure (Odds ratios 1.02 per 10-hour increase; 95% CI, 1.00-1.04; P = .033) was identified as a risk factor for patellar tendinopathy in elite football players [48]. A shorter recovery time between high intensity actions in football has been shown to be a risk factor in sustaining injuries in general [49].

Playing surface

The type of surface football is played on is another injury risk factor to consider, particularly as many new generation artificial turfs are being introduced [50-52]. A study has shown that the exposure to artificial turf did not increase the prevalence or incidence of injury of patellar tendinopathy in elite football players [48]. Another study describes the incidence of injuries in men playing on artificial turf was 25.4 injuries/1000 player hours and 23.9 injuries/1000 player hours on grass [19]. The ratio for woman, however was 19.2 injuries/1000 player hours on artificial turf and 21.8 injuries /1000 player hours on grass. The most common injuries were joint (bone), ligament, cartilage and contusion injuries to the lower limb on grass and new generation artificial turf. The results from the study show that the severity of injury in males on artificial surface causes players to miss 7.1 days compared to 8.4 days on grass i.e. a difference of 1.3 days increased severity to the grass. The severity in females was 11.2 days on turf and 8.9 days on grass. i.e. a difference of 2.3 days. Although the differences described in this study were small, they are meaningful in a professional environment where time off from competition and training has major implications for the team, player and coach.

Summary of the literature

The injury incidence, mechanism (pathomechanics), involved body part, type of injury (pathology), diagnosis, history of injury and legalities involved (violation of the Laws) need to be well documented and collected over a full season to accurately describe a thorough injury profile of a team. Another need for such information is for developing injury prevention, treatment and rehabilitation strategies to reduce the incidence of injuries. Furthermore, these data may also provide information about the

University of Cape Town

effectiveness of any training or prehabilitation programmes in reducing the incidence of injury. Injuries need to be avoided or reduced at all cost as they have a negative effect on both the clubs and the players.

There are compelling reasons for collecting injury and exposure data with a standardised protocol. This ensures that the data collected will be comparable with other similar studies. A study of this nature describing the profile of injuries in a professional club in the PSL through a full season has not been conducted in South African football. This is important because regional differences occur in injury data and therefore there is no source of comparison. Using the F-MARC consensus statement as a method of standardising data collection, methodology and interpretation allows for interstudy comparisons and assists in the development of the science of football medicine. The efficacy and consistency of injury and exposure collection will result in a better understanding of injuries in football, which may improve the science of football medicine and thus develop the game of football.

University of Cape Town

Chapter 3

The incidence of injury and exposure time in football players

Introduction

The profile of football in South Africa has been heightened following the 2010 FIFA World Cup. Several epidemiological studies, discussed in Chapter 2, report the incidence of injuries and exposure type in European football. The point was made that it is difficult to translate and apply data from studies conducted in different geographical regions. This means that findings from studies conducted in Europe may not necessarily apply to players in South Africa who are smaller and weaker than their European counterparts [53].The lack of these data in South African football is concerning as we cannot describe the injury profile of this football population. This limits the ability to intervene appropriately. Furthermore, a lack of accurate injury data in football means that the efficacy of implementation cannot be measured. These points highlight the necessity for collecting data on injuries in South African football.

Professional football clubs in the PSL each have their own independently assigned medical team, that have their own methods of recording and managing injuries. However, as mentioned in Chapter 2 the data cannot be compared amongst clubs or used to better describe the problems encountered during a full season because there is no standardised system for data collection. It is clear that injury data in a South African context needs to be collected. Therefore, the aim of this study is to describe the incidence of injuries and exposure times of a professional football club in the PSL over a full season, using a standardised method of collecting data [26].

This study is designed to address all the challenges the medical teams in the PSL encounter. An expected outcome of the study is to show that injury and training load data can be collected in the daily work of the medical staff, without a major disruption to their service delivery. An understanding of injury characteristics in South African football can contribute towards developing injury-prevention strategies and possible rule changes. Additional objectives are to identify the age of the players, anatomical location of the injury, the phase of play and the time off due to injury, just to name a few. A good control of all these variables is associated with reducing the risk of injury.

Methodology

Participants and study design

Forty-four (n = 44) healthy, active male professional footballers that played for the Ajax CT 1st Team and reserve squad were recruited for the study through direct communications with the professional PSL club. Permission was obtained from the Ethics and Research Committee of the Faculty of Health Sciences, University of Cape Town to analyse the data (HREC REF 308/2010) (Appendix 6). The

University of Cape Town

study has a retrospective cohort study design. Participants gave their informed consent for their data to be analysed for the study after the nature, purpose and procedures were thoroughly explained.

Inclusion criteria

Participants included healthy, active male professional footballers who played for the Ajax CT 1st Team (PSL) and reserve team during the 2009/2010 season.

Exclusion criteria

The data of the PSL and reserve team players that broke contract with the club or that were on the transfer list to another club at the beginning of the season were excluded from analysis. Any player who refused signing a consent form was excluded from the study. Players who never made the season selection were also excluded.

Sample size

The sample size fluctuated throughout the season due to transfer of players in and out of the club. The varying numbers of players' in the study through the season are incorporated into the calculation of exposure time through the season.

Informed consent and data collection

The study occurred over one full season, including pre-season and in-season phases. The pre-season phase was defined as the period prior to the in-season phase and started from 15th June 2009 to 1st August 2009. The in-season phase was defined as any football match played by the professional PSL club including all league and cup games from 1st August 2009 to 21st May 2010. Therefore the data collection covered the period 15th June 2009 to 21st May, 2010.

Before the start of the season players were informed about the process of the data collection, which was part of the normal medical support team process. Consent to conduct a retrospective survey was given by the AJAX CT CEO (*Appendix 1*). Players were also asked to sign a consent form at the end of the season in which they gave their permission for their data to be used for research (*Appendix 2*). Players were also told that they could withdraw their data from the study at any stage. One player refused to sign a consent form and therefore his data were excluded from the analysis.

Prior to the start of the data collection at the beginning of the season, the chief sports physiotherapist and chief conditioning trainer from the club attended a briefing and were issued with guidance notes on how to complete the injury report form and exposure report forms. A player baseline information form (*Appendix 3*) was completed by the chief club physiotherapist in consultation with the players. This profiled the injury history and general body composition of each player.

Whenever an injury was sustained by a player in an official club match or practice, the details about the injury was recorded immediately according to the F-MARC injury report form (*Appendix 4*). From that point onwards the player reported directly to the chief sports physiotherapist. The date of the

University of Cape Town

injury, injured body part, type of injury, diagnosis, recurrence, cause, mechanism and description of the injury was recorded on this sheet. If the injury occurred during a match, any violation of the laws which may have been associated with the injury were also recorded.
The exposure time was calculated from the total hours trained per day. The training time for each activity was recorded for each player by the chief conditioning trainer (*Appendix 5*). Training activities were defined according to the following categories:

- Normal field training session with the coach and manager,
- Recovery sessions in the gym comprising of spinning, hydro exercises and stretching,
- Conditioning sessions,
- Endurance sessions, and
- High performance testing sessions.

All injuries during the season were expressed as injuries/1000 hours as described by Brooks and Fuller [31].

The completed injury and training exposure forms were collected and interpreted by an independent sports physiotherapist at the Sports Science Physiotherapy Centre to avoid biased interpretation of the injury and exposure data. Any information requested was disclosed to the chief sports physiotherapist.

Data are presented as percentages, or means and 95% of confidence intervals as appropriate [54]. The exposure data are also presented as box and whisker plots with the box defined as the median and 25 and 75th percentile and the whiskers as the 95%CI. The maximum and minimum values are shown as dots beyond the whiskers.

University of Cape Town

Results

Description of players

A total of 44 players were approached and asked to participate in the study. Forty-three players gave their consent to participate in the study and one player did not wish to participate in the study. The season started with 38 players. A further eight players were not selected for the 1st team before the start of the PSL season and were excluded from the study.

Six players were transferred to other clubs during the season. Three of the six players on transfer were included in the study as the transfers took place late into the season. Five new players entered the team at various stages of the season and were included in the study. Therefore the data of 32 players were included in the analysis. A summary of the recruited players and those players, which were used in the study, is shown in Table 1.

Table 1: *Players included in the analysis*

Playing position	Starting n	Included in analysis n
Goalkeepers	4	4
Defenders	13	10
Midfielders	17	11
Forwards	10	7
Total	**44**	**32**

The average age of the 32 players was 24 ± 2 years. Average height and weight were 1.78 ± 0.10 m and 75.6 ± 4.1 kg respectively. A breakdown of these characteristics according to their position is shown in Table 2.

Table 2: *Average age, height and weight relative to playing position*

Playing position	Age in years	Height (m)	Weight (Kg)
Goalkeepers	26	1.86	80.1
Defenders	21	1.64	70.4
Midfielders	25	1.85	74.9
Forwards	24	1.77	77.1

Quantification of exposure type

The coach supervised training sessions whereas the conditioning, endurance and testing sessions were done on the field with the conditioning trainer. Recovery sessions were carried out the following day after every match or high intensity training sessions. The average time per day for training, recovery, conditioning and endurance are shown in Figure 1. The stage of the season when the matches (n = 46) were played are also shown in Figure 1.

University of Cape Town

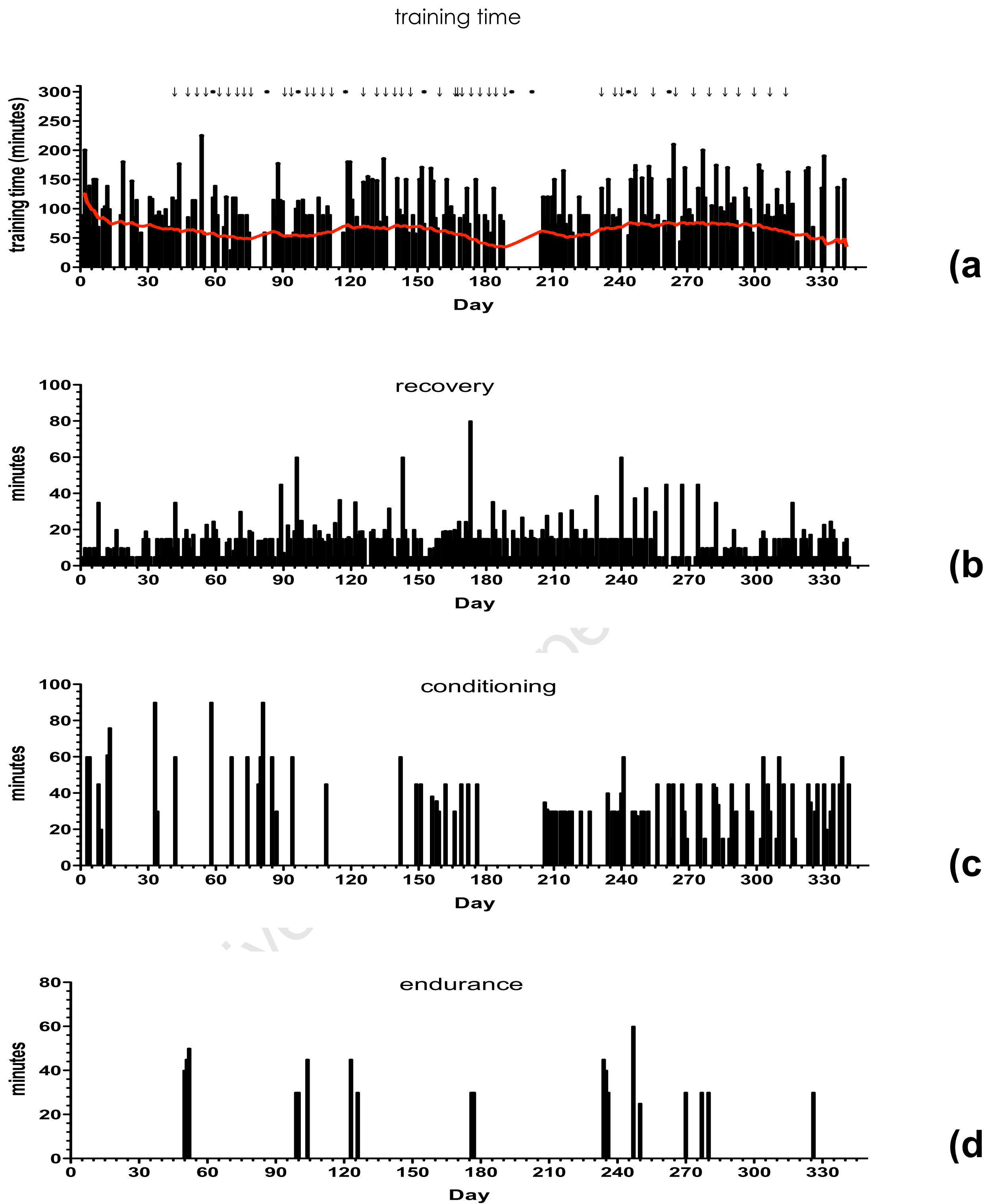


***Figure 1**: Average time (minutes) for training (a), recovery (b), conditioning (c) and endurance (d) for each day through the season. In (a) the ↓ represents a match and * represents a day off from training. The grey line represents the line of best fit.*

A summary of the exposure data are shown in Figure 2. Most of the time was spent training followed by matches, recovery, conditioning and endurance (Figure 2). A small amount of time was used for physiological testing.

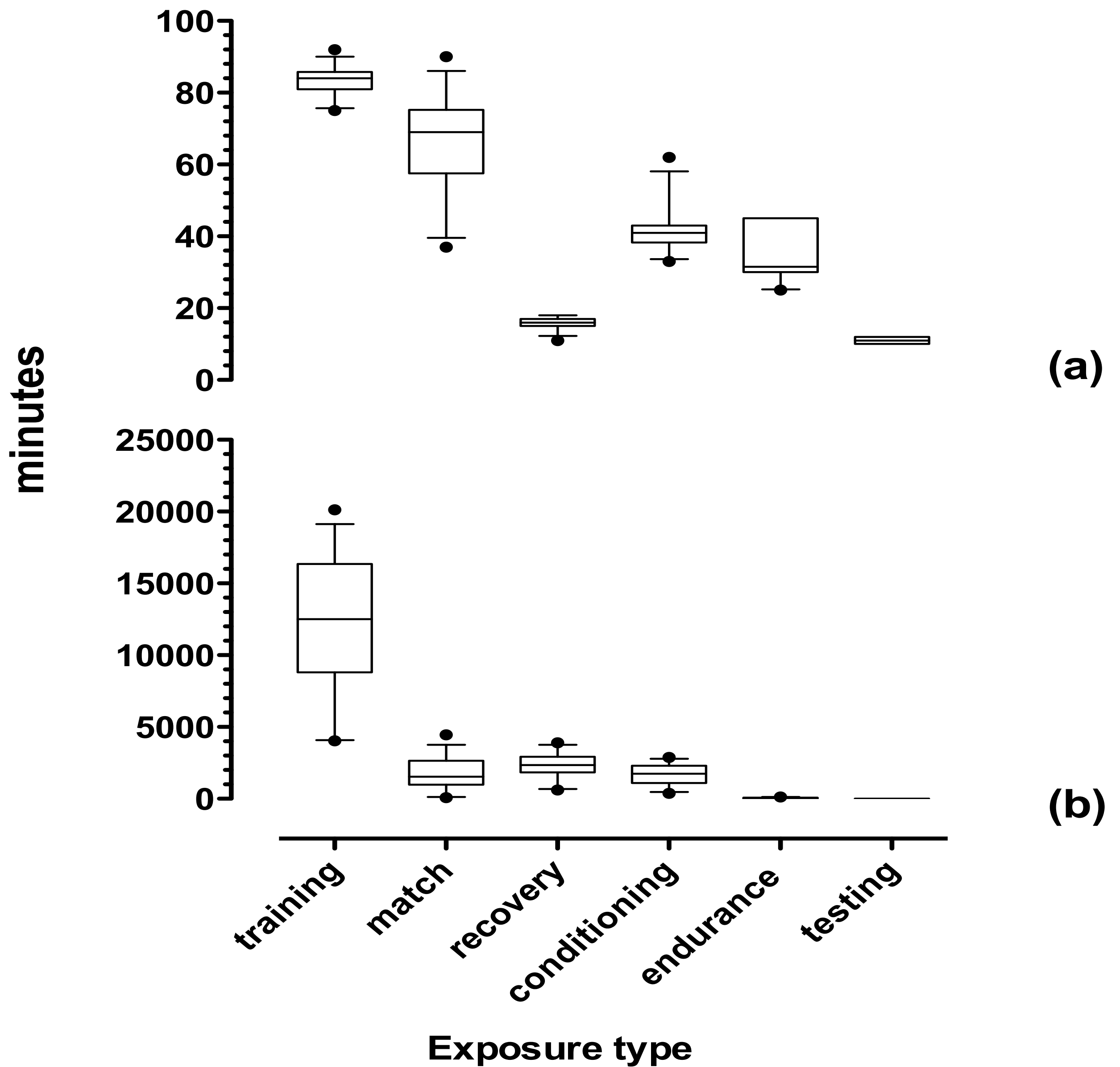


Figure 2: The average time (minutes) (a) and the total time (b) for training, matches, recovery, conditioning, endurance and testing. The data are represented as the median; 25th and 75th percentile (i.e. box), ±95% CI (whiskers) and maximum and minimum values (•).

The breakdown for training categories for each player is shown in Table 3. The mean exposure time per player for training was 12252 min with the mean match exposure 1834 min. Recovery exposure mean per player was 2324 min. There were 236 training sessions over the season.

Table 3: *The total different exposure times per player over one season*

Player	Training Total time	Match Total time	Recovery Total time	Conditioning Total time	Endurance Total time	Testing Total time	Grand Total
1	16275	2585	2955	2355	0	22	24192
2	17195	910	2585	2315	30	22	23057
3	20125	1390	3245	2880	0	12	27652
4	13740	780	2100	1800	30	22	18472
5	5610	1005	790	785	75	0	8265
6	18585	3375	3690	2725	0	22	28397
7	17020	3010	3460	2430	0	22	25942
8	17985	1440	2870	2675	115	22	25107
9	17355	3255	3560	2305	0	22	26497
10	4225	1040	620	680	45	12	6622
11	9075	2370	1810	920	0	12	14187
12	12455	1535	2240	1825	30	22	18107
13	17345	4460	3900	2600	0	12	28317
15	10740	2625	2580	1480	30	0	17455
17	16040	3230	3385	2040	0	12	24707
18	4040	90	720	390	45	0	5285
19	16385	2660	3030	2640	0	22	24737
20	7845	400	1230	1600	90	0	11165
21	10430	1560	1750	1055	90	12	14897
22	9125	970	1955	1640	60	0	13750
23	12265	1375	2005	1460	130	12	17247
24	13905	2800	2775	1755	0	22	21257
29	14185	700	2345	1905	90	0	19225
36	13005	2095	2630	1905	45	10	19690
37	7455	1970	1915	845	40	0	12225
38	12405	1530	2355	1490	0	0	17780
39	13560	915	2345	1755	90	10	18675
40	11215	2735	2590	1515	0	10	18065
41	8720	1960	2005	1050	50	10	13795
42	12575	2315	2615	1900	30	10	19445
43	7055	1460	1560	1190	90	10	11365
44	4125	150	750	535	30	10	5600
Mean	**12252**	**1834**	**2324**	**1701**	**39**	**12**	**18162**
-95%	**10610**	**1457**	**2006**	**1454**	**24**	**9**	**15748**
95%	**13894**	**2211**	**2642**	**1949**	**53**	**15**	**20575**

The average exposure per player in training, match and recovery was 84, 67 and 16 minutes respectively (Figure 2 and Table 4). Players were exposed to a minimum of one to a maximum of 46 matches in the season. There were 224 recovery sessions over the season. The 90 minute match exposure per player is lacking, as many players never achieved full game time.

University of Cape Town

Table 4: *The average exposure time (min), expressed as an average and 95% confidence intervals for training, match & recovery for each player*

	Training			Match			Recovery		
Player	**Mean**	**95% CI**	**n**	**Mean**	**95% CI**	**n**	**Mean**	**95% CI**	**n**
1	85	82 - 89	191	70	61 - 79	37	16	14 - 17	188
2	86	83 - 89	200	54	43 - 64	17	15	14 - 16	170
3	85	82 - 88	236	70	58 - 81	20	16	14 - 17	205
4	85	82 - 89	161	56	42 - 69	14	15	14 - 17	136
5	75	67 - 82	75	72	60 - 84	14	13	11 - 15	62
6	86	83 - 89	217	73	65 - 81	46	16	15 - 18	224
7	84	81 - 87	202	65	57 - 74	46	17	15 - 18	209
8	87	84 - 90	206	48	37 - 59	30	15	14 - 16	193
9	85	82 - 88	205	69	61 - 77	47	16	15 - 18	216
10	92	84 - 99	46	65	53 - 77	16	11	9 - 13	55
11	89	85 - 93	102	76	69 - 84	31	15	13 - 17	123
12	83	80 - 86	150	55	44 - 66	28	16	14 - 17	144
13	84	81 - 87	206	84	79 - 89	53	17	15 - 19	229
15	81	77 - 84	133	82	74 - 90	32	18	16 - 20	143
17	86	83 - 89	187	73	65 - 81	44	17	15 - 19	202
18	79	74 - 84	51	90		1	18	15 - 21	41
19	84	81 - 88	194	63	56 - 71	42	15	14 - 17	198
20	77	71 - 82	102	80	45 -115	5	15	13 - 17	80
21	89	85 - 93	117	50	41 - 59	31	14	12 -15	127
22	81	77 - 85	112	69	51 - 88	14	17	14 - 19	117
23	85	81 - 88	145	63	52 - 73	22	15	14 - 17	130
24	85	81 - 88	164	70	62 - 78	40	16	14 - 18	176
29	83	80 - 87	170	41	27 - 55	17	16	15 - 17	149
36	83	79 - 87	157	62	51 - 72	34	17	15 - 19	157
37	88	84 - 92	85	68	58 - 78	29	17	14 - 19	115
38	83	80 - 87	149	70	58 - 81	22	16	15 - 18	144
39	83	80 - 86	163	37	27 - 46	25	16	14 - 17	148
40	81	77 - 85	138	83	75 - 90	33	17	15 - 19	151
41	76	72 - 80	115	82	74 - 90	24	17	15 - 19	119
42	83	80 - 86	152	66	56 - 77	35	17	15 - 19	157
43	81	77 - 85	87	77	65 - 89	19	18	15 - 20	89
44	81	76 - 86	51	50		3	18	15 - 22	41
Mean	**84**	**82 - 85**		**67**	**62 - 71**		**16**	**15 - 17**	

The exposure time per player with regards to conditioning, endurance and testing is shown below Table 5. A minimum of nine and a maximum of 71 conditioning sessions per player were carried out over the season. The reason for this variation was because not all players were equally fit and because some players missed training sessions because of injury. Less fit players were targeted for more sessions to improve their levels of fitness. The same explanation and reasoning holds for endurance training. A maximum of two high performance tests were done in the season. Players were excluded from testing if they were injured or rested under management orders.

University of Cape Town

Table 5: *The exposure time (min) expressed as an average and 95% confidence intervals for conditioning, endurance and testing of each player*

	Conditioning			Endurance			Testing		
Player	**Mean**	**95% CI**	**n**	**Mean**	**95% CI**	**n**	**Mean**	**95% CI**	n
1	42	37 - 47	56	-		0	11		2
2	43	38 - 48	54	30		1	11		2
3	41	36 - 45	71	-		0	12		1
4	43	37 - 49	42	30		1	11		2
5	56	42 - 70	14	38		2	-		0
6	42	37 - 46	65	-		0	11		2
7	41	36 - 45	60	-		0	11		2
8	42	37 - 46	64	38	19 - 57	3	11		2
9	40	36 - 45	57	-		0	11		2
10	62	45 - 79	11	45		1	12		1
11	54	42 - 66	17	-		0	12		1
12	41	36 - 47	44	30		1	11		2
13	40	36 - 44	65	-		0	12		1
15	38	33 - 43	39	30		1	-		0
17	40	35 - 45	51	-		0	12		1
18	43	36 - 50	9	45		1	-		0
19	40	36 - 44	66	-		0	11		2
20	39	34 - 44	41	45		2	-		0
21	53	42 - 63	20	30		3	12		1
22	41	36 - 46	40	30		2	-		0
23	38	32 - 45	38	33	25 - 40	4	12		1
24	42	36 - 47	42	-		0	11		2
29	37	33 - 41	51	45		2	-		0
36	39	34 -44	49	45		1	10		1
37	44	35 - 54	19	40		1	-		0
38	43	36 - 49	35	-		0	-		0
39	37	33 - 42	47	45		2	10		1
40	38	34 - 42	40	-		0	10		1
41	44	36 - 52	24	25		2	10		1
42	37	33 - 41	51	30		1	10		1
43	34	29 - 39	35	30		3	10		1
44	33	29 - 38	16	30		1	10		1
Mean	**42**	**40 - 44**		**36**	**32 - 39**		**11**	**11 - 11**	

(confidence intervals were not calculated when n < 8)*

Injuries

Over the whole season, 130 injuries were documented, comprising of 15 pre season injuries and 115 in season injuries. A breakdown of all the injuries and when they occurred during the season is shown in Figure 3. This study shows that 12% of all injuries were sustained in the pre season phase. Four injuries did not have a “time off” value and were excluded in the tables involving time off from training and competition. These situations can be attributed to the player either being transferred from the club or the injured player never returned to play before the season ended. The overall injury rate was 13.4/1000 player-hours (95% CI = 11.1 to 15.7 1000 player-hours). Lower rates were found in training (6.6/1000 player-hours; 95%CI = 4.6 – 8.6 1000 player-hours) as opposed to matches (88.9/1000 player-hours; 95% CI = 70.2 - 107.6 1000 player-hours).

The nature of the injuries were varied with the most common body parts injured were the thighs (n = 27) and the ankles (n = 27).

University of Cape Town

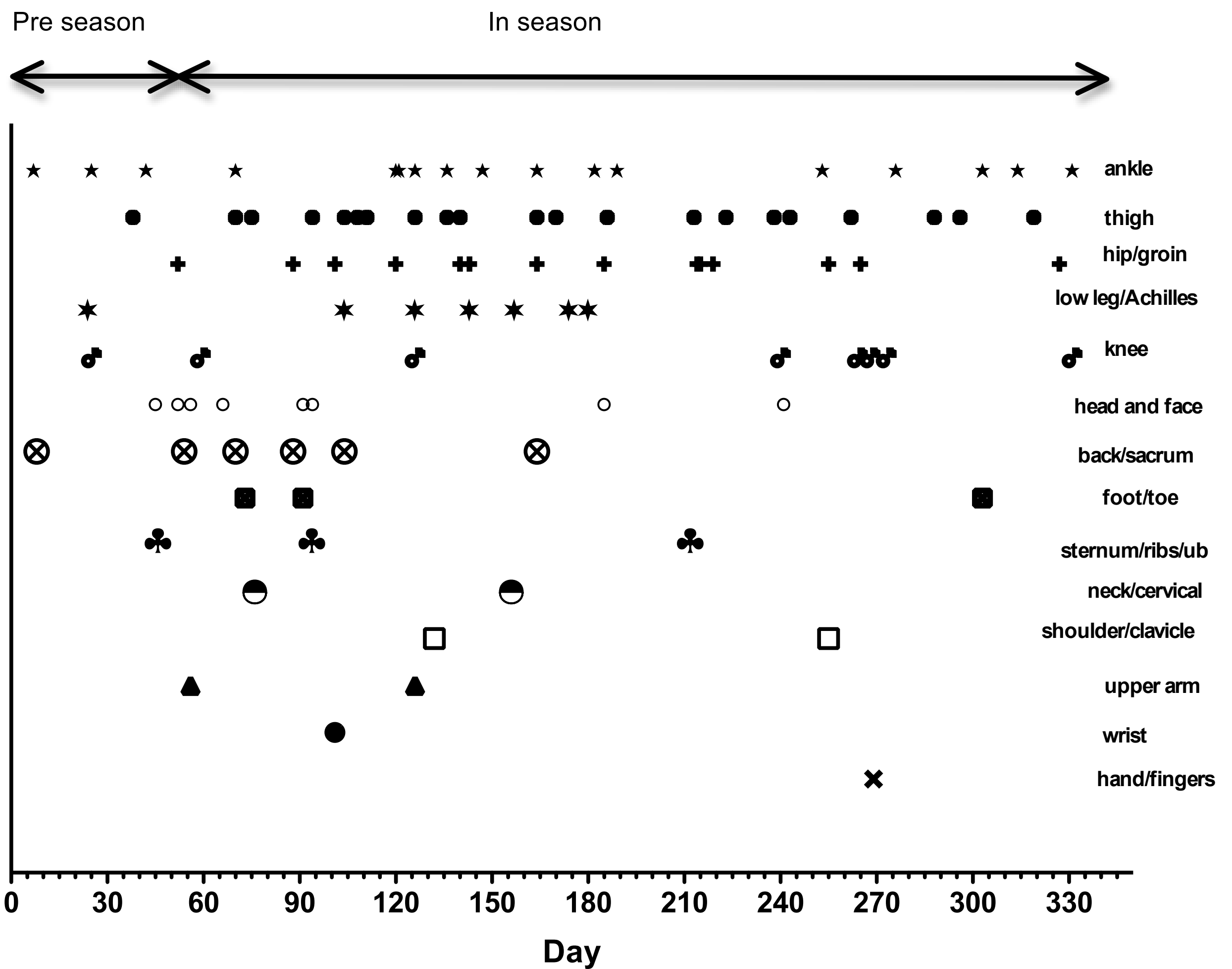


Figure 3: *The distribution of the 130 injuries which occurred during the pre season (0-47 days) and in season (48 -341 days) showing the body parts that were injured. The body parts are on the right of the figure with the symbol to the left e.g. hand/ fingers is represented by the symbol* ✖

University

The average time off for all injuries was eight days. Table 6 displays the number of injuries sustained to the different body parts as well as the average time off. For example, following an injury to the sternum/ribs/upper back, the players were off for an average of 23 days (5-38; min-max). Therefore minor injuries (<7 days) accounted for 18% of the injuries with an average of 1% and a maximum of 2% days lost. Moderate injuries (8-28 days) accounted for 25% of the injuries with an average of 6% and a maximum 7% days lost and severe injuries (>28 days) accounted for 56% of the injuries with an average of 16% and a maximum of 23% days lost in the season (All percentages are expressed as a fraction of time off, divisible by 341 days of the season).

Table 6: *Average time off from training and competition in relation to the injured body part. The data are shown as averages (-95% to +95% CI)*

Injured Body Part	Average time off (days)	Confidence -95%	Confidence +95%	n	Min time off (days)	Max time off (days)
sternum/ribs/upper back	23			3	5	38
thigh	11	4	18	27	2	79
hip/groin	11	4	17	14	1	41
ankle	10	4	16	27	2	57
knee	7	2	12	10	2	21
low back/sacrum/pelvis	5			7	2	17
lower leg/Achilles tendon	4	1	8	15	1	25
foot/toe	4			5	2	6
head/face	3	2	5	10	2	6
neck/cervical spine	3			2	1	5
shoulder/clavicle	3			2	1	5
wrist	2			1	2	2
hand/finger/thumb	2			1	2	2
upper arm	2			2	1	2
All injuries	**8**	**6**	**10**	**126**	**1**	**79**

(* confidence intervals were not calculated when n < 8)

The injuries according to body part are shown in Table 7. The thigh (21%) and ankle (21%) were the most commonly injured body parts, followed by the hip (12%), groin (12%), knee (8%), head/face (8%), lower back/sacrum/pelvis (6%) and foot/toe (4%).

Table 7: *Injuries according to body part expressed as a percent of the total number of injuries*

Body Part	Percent (%)	n
thigh	21	27
ankle	21	27
hip/groin	12	16
lower leg/Achilles tendon	12	15
knee	8	11
head/face	8	10
low back/sacrum/pelvis	6	8
foot/toe	4	5
sternum/ribs/upper back	2	3
neck/cervical spine	2	2
shoulder/clavicle	2	2
upper arm	2	2
wrist	1	1
hand/finger/thumb	1	1
All Groups	**100**	**130**

Sixty-five injuries occurred on the left side and 57 injuries occurred on the right side of the body. Eight injuries were sustained on other parts of the body. The average time off following an injury to the left side was 10 days (6 -14) and following an injury to the right was 6 days (4 – 8) (Table 8). The majority of the players were right foot dominant.

Table 8: *Average time off in relation to the injured side of the body*

Injured side of the body	Average time off (days)	Confidence -95%	Confidence +95%	n	Min time off (days)	Max time off (days)
left	10	6	14	65	1	79
not applicable	8	0	15	8	2	27
right	6	4	8	57	1	38
All injuries	**8**	**6**	**10**	**126**	**1**	**79**

(not applicable refers to any area of the body excluding the left and right sides)*

The time off from training and competition in relation to injured body part and playing position is shown in Table 9. The longest time off occurred with the defenders sustaining thigh injuries (16 ± 20 days), followed by defenders with ankle injuries (14 ± 17 days).

Table 9: *Time off (days) from training and competition in relation to injured body part relative to playing position. The data are shown as means ± SD*

Lower Limb	means	n
foot/toe	**4±2**	**5**
Midfielders	5±2	4
Defenders	0±0	0
Forwards	2±0	1
Goalkeepers	0±0	0
ankle	**10±15**	**27**
Midfielders	12±17	16
Defenders	14±17	4
Forwards	5±5	7
Goalkeepers	0±0	0
lower leg/Achilles tendon	**4±6**	**15**
Midfielders	6±8	8
Defenders	2±1	5
Forwards	4±0	2
Goalkeepers	0±0	0
knee	**7±7**	**10**
Midfielders	2±1	3
Defenders	9±6	4
Forwards	13±11	2
Goalkeepers	2±0	1
thigh	**11±18**	**27**
Midfielders	12±23	11
Defenders	16±20	8
Forwards	6±6	7
Goalkeepers	3±0	1
hip/groin	**11±11**	**14**
Midfielders	8±7	6
Defenders	14±14	7
Forwards	2±0	1
Goalkeepers	0±0	0

(n=126. No time off data on 4 injuries.)*

Upper limb and trunk injuries were mostly sustained to the head/face region (n = 10). The longest time off occurred with defenders who sustained sternum/ribs/upper back injuries (23 ± 17 days), followed by midfielders who sustained low back/sacrum/pelvis injuries (5 ± 7 days).

University of Cape Town

Table 10: *Time off (days) training and competition in relation to injured body part relative to playing position*

Upper Limb & Trunk	means	n
low back/sacrum/pelvis	**5±6**	**7**
Midfielders	5±7	5
Defenders	3±0	1
Forwards	0±0	0
Goalkeepers	2±0	1
head/face	**3±2**	**10**
Midfielders	2±0	2
Defenders	4±2	6
Forwards	5±0	1
Goalkeepers	2±0	1
sternum/ribs/upper back	**23±17**	**3**
Midfielders	0±0	0
Defenders	23±17	3
Forwards	0±0	0
Goalkeepers	0±0	0
upper arm	**2±1**	**2**
Midfielders	2±1	2
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	0±0	0
neck/cervical spine	**3±3**	**2**
Midfielders	0±0	0
Defenders	5±0	1
Forwards	0±0	0
Goalkeepers	1±0	1
wrist	**2±0**	**1**
Midfielders	2±0	1
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	0±0	0
shoulder/clavicle	**3±3**	**2**
Midfielders	0±0	0
Defenders	5±0	1
Forwards	0±0	0
Goalkeepers	1±0	1
hand/finger/thumb	**2±0**	**1**
Midfielders	0±0	0
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	2±0	1

(n=126. No time off data on 4 injuries.)*

University of Cape Town

Table 11 displays the different types of injuries in relation to the average time off. The most common type of injury was a haematoma/contusion/bruise, representing 33% of all injuries. This was followed by muscle rupture/strain/tear/cramp (n = 38 ; 28%) and sprains/ligament injuries (n = 30; 23%). The reason for the differences in the number of muscle rupture/strain/tear/cramp in Table 11 (n = 36) and 12 (n = 38) is because two players were either transferred or did not complete the season. The same holds true for any other differences found in these tables. Tendon injuries/ruptures/tendinosis/bursitis were less common (n = 2; 2%). A mean difference in the player's length of absence from participation

was evident between the latter injuries despite their equal incidence. The least common injury was a fracture (n = 1), which also had the longest time off (27 days) compared to all the other injuries. Despite haematoma/contusion/bruise being the most common injury, the average time a player was off following this injury was only three days.

Table 11: *Average time off from training and competition in relation to type of injury. The data are shown as averages (-95% to +95%)*

Type of Injury	Average time off (days)	Confidence -95%	Confidence +95%	n	Min time off (days)	Max time off (days)
fracture	27			1	27	27
other	15			1	15	15
muscle/rupture/strain/tear/ cramp	12	6	18	36	1	79
tendon/injury/rupture/tedinosis/bursitis	12			2	6	18
sprain/ligament injury	11	6	16	30	2	57
concussion with/without loss of consciousness	6			2	5	6
other bone injury	5			6	2	12
haematoma/contusion/bruise	3	2	5	43	1	25
abrasion	2			2	2	2
lesion meniscus/cartilage	2			1	2	2
laceration	2			2	1	2
All injuries	**8**	**6**	**10**	**126**	**1**	**79**

(confidence intervals were not calculated when n < 8)*

(n=126. No time off data on 4 injuries; these injuries were 2 muscle rupture/strain/tear/cramp, 1 other bony injury and 1 lesion of meniscus/cartilage injury types.)*

Table 12: *Percent of the type of injuries sustained*

Type of Injury	%	n
haematoma/contusion/bruise	33	43
muscle rupture/strain/tear/cramp	29	38
sprain/ligament injury	23	30
other bone injury	5	7
tendon injury/rupture/tendinosis/bursitis	2	2
concussion with/without loss of consciousness	2	2
abrasion	2	2
lesion meniscus/cartilage	2	2
laceration	2	2
fracture	1	1
other	1	1
Total injuries	**100**	**130**

The chronicity (acute or recurrent) of the injuries is shown in Table 13. Twelve percent (16/130) of the injuries were recurrent and 88% (118/130) acute or first time occurring injuries. Four players did not return to play due to the severity of the injury or were transferred to another club. All four players sustained non-recurrent injuries. These data suggest that most injuries sustained by the players were acute and not chronic due the nature and demand of the PSL season.

University of Cape Town

Table 13: *Recurrent vs. acute injuries*

Recurrent injury?	**n**	**%**
no	114	88
yes	16	12
Total	**130**	**100**

(** 4 players did not return and all were non recurrent injuries)*

The midfielders were the players mostly affected by haematoma/contusion/bruise type of injury (n = 22) with a time off training and competition of 4 ± 5 days. The longest time off after an injury occurred with defenders who sustained fracture type injuries (27 ± 0 days), followed by defenders who sustained a muscle rupture/strain/tear/cramp (16 ± 17 days). The rest of the injuries relating to time off as described earlier are shown below in Table 14.

University of Cape Town

Table 14: *Time off (days) training and competition in relation to injury type relative to playing position*

Type of injury	Means	n
sprain/ligament injury	**11±14**	**30**
Midfielders	12±16	17
Defenders	14±14	5
Forwards	8±8	7
Goalkeepers	2±0	1
haematoma/contusion/bruise	**3±4**	**43**
Midfielders	4±5	22
Defenders	3±2	13
Forwards	3±1	7
Goalkeepers	3±0	1
muscle rupture/strain/tear/cramp	**12±17**	**36**
Midfielders	12±21	12
Defenders	16±17	16
Forwards	7±7	5
Goalkeepers	1±1	3
other bone injury	**5±4**	**6**
Midfielders	3±1	3
Defenders	12±0	1
Forwards	4±2	2
Goalkeepers	0±0	0
concussion with/without loss of consciousness	**6±1**	**2**
Midfielders	0±0	0
Defenders	6±1	2
Forwards	0±0	0
Goalkeepers	0±0	0
Abrasion	**2±0**	**2**
Midfielders	0±0	0
Defenders	2±0	2
Forwards	0±0	0
Goalkeepers	0±0	0
Laceration	**2±1**	**2**
Midfielders	1±0	1
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	2±0	1
Other	**15±0**	**1**
Midfielders	15±0	1
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	0±0	0
tendon injury/rupture/tendinosis/bursitis	**12±8**	**2**
Midfielders	12±8	2
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	0±0	0
Fracture	**27±0**	**1**
Midfielders	0±0	0
Defenders	27±0	1
Forwards	0±0	0
Goalkeepers	0±0	0
lesion meniscus/cartilage	**2±0**	**1**
Midfielders	0±0	0
Defenders	0±0	0
Forwards	0±0	0
Goalkeepers	2±0	1
All injuries	**8±12**	**126**

(n=126. No time off data on 4 injuries.)*

University of Cape Town

Table 15 and 16 show that midfielders are more likely to sustain an injury whether its recurrent or non-recurrent than any other player position, while the goalkeepers sustained the least number of recurrent and non-recurrent injuries. More injuries are first time injuries (n = 114 ; 88%) and the minorities are recurrent (n = 16 ; 12%).

Table 15: *Number of non-recurrent injuries relative to playing position*

Playing Position	**n**	**%**
Midfielders	51	45
Defenders	38	33
Forwards	18	16
Goalkeepers	7	6
Total injuries	**114**	**100**

Table 16: *Number of the recurrent injuries relative to playing position*

Playing Position	**n**	**%**
Midfielders	8	50
Defenders	5	31
Forwards	3	19
Goalkeepers	0	0
Total injuries	**16**	**100**

Seventy seven percent (n = 99) of the injuries were a result of trauma, while 23% (n = 30) were related to overuse injuries.

As described earlier, midfielders are the most prone to injury. However, Table 17 shows that defenders sustained more overuse injuries (n = 13 ; 30%) than the midfielders (n = 11 ; 19%). Forwards were more likely to sustain an injury due to trauma (n = 16 ; 76%) than to overuse (n = 5 ; 24%). Goalkeepers were least likely to be injured and were more prone to traumatic injury as opposed to overuse. This description is synonymous with the demands and action of the goalkeeper. Only one player was unaccounted for as he could not recall the direct mechanism for his injury.

University of Cape Town

Table 17: *Injuries sustained from training and competition due to trauma or overuse in relation to the playing position*

Playing Position	n	%
Midfielder		
Trauma	47	81
Overuse	11	19
Defender		
Trauma	30	70
Overuse	13	30
Forward		
Trauma	16	76
Overuse	5	24
Goalkeeper		
Trauma	6	86
Overuse	1	14
Total injuries	**129**	

(1 player is uncertain)*

University of Cape Town

More injuries occurred during matches (n = 87 ; 67%) than in training (n = 43 ; 33%) over the full PSL season. Of the total injuries the midfielders followed by defenders, forwards and goalkeepers sustained most match injuries. The same pattern is seen in training injuries. A breakdown of these data are shown in Table 18.

Table 18: *Injuries sustained during matches and training relative to playing position*

Playing Position	n	%
Midfielder		
Training	16	27
Match	43	73
Defender		
Training	14	33
Match	29	67
Forward		
Training	9	30
Match	12	70
Goalkeeper		
Training	4	57
Match	3	43
Total injuries	**130**	

A total of 43 (33%) non-contact and 87 contact (67%) injuries were recorded over the full season. Most injuries were related to direct contact with another player. This was the most prevalent contact mechanism (n = 80 ; 62%) followed by contact with the ball (n = 4 ; 3%) and with other object (n = 3 ; 2%). These data are shown in Table 19.

Table 19: *Injuries sustained due to contact vs. non-contact*

	n	%
contact with other player	80	62
non-contact	43	33
contact with other object (specify)	3	2
contact with the ball	4	3
Total injuries	**130**	**100**

Midfielders were more likely to sustain an injury due to contact with another player (n = 40 ; 68%) than any other playing position. Defenders were more likely to sustain a contact injury with the ball (n = 3). Midfielders and defenders had an equal probability of sustaining non-contact injuries.

An attacking forward was most likely to sustain contact injuries with another player (n = 15 ; 71%) and is at no risk of sustaining a contact injury with the ball.

Goalkeepers had the greatest risk of sustaining a contact injury when another player was involved (n = 3 ; 43%). Their risk of sustaining a contact injury with the ball or another object is equal (n = 1 ; 14%). They have the least risk to non-contact injuries than any other player position (n = 2 ; 29%).

These data are summarized in Table 20 below.

Table 20: *Injuries sustained due to contact vs. non-contact relative to playing position*

	n	%
Midfielder		
non-contact	18	31
contact with other player	40	68
contact with other object(specify)	1	1
Defender		
non-contact	19	44
contact with other player	21	49
contact with the ball	3	7
Forward		
non-contact	5	24
contact with other player	15	71
contact with other object(specify)	1	5
Goalkeeper		
non-contact	2	29
contact with other player	3	43
contact with other object(specify)	1	14
contact with the ball	1	14
Total injuries	**130**	

Twenty four percent (n = 31) of all the injuries over the season were as a result of a violation of the Laws. Eighteen percent (n = 24) resulted in a free kick/penalty, 5% (n = 6) in yellow card and 1% (n = 1) in red card offences. These data are presented in Table 21.

University of Cape Town

Table 21: *Injuries sustained by violation of the Laws*

	n	%
no violation of the Laws	99	76
violation resulting in free kick/penalty	24	18
violation resulting in yellow card	6	5
violation resulting in red card	1	1
Total injuries	**130**	**100**

Many studies have not accounted for the laws of the game. The FIFA Fair Play slogan is well presented at every soccer (football) match and depicts the non-biasness (fairness), discipline, respect, honesty and cleanness for the game, players and officials. Table 21 and 22 shows that 24% of all injuries were actions causing the injuries due to violation of the Laws of the games and 76% were not. The referees presented 24 (18%) free kick/penalty, 6 (5%) yellow cards and 1 (1%) red card in reaction to the violation of the Laws. Of the total violations, 6 (19%) were presented to the injured player of the club and 25 (81%) where presented to the opponents. These data show that 24% of all injuries sustained over a season are due to players unfair play.

Table 22: *Sanction against player or opponent?*

	n	%
sanction against injured player	6	19
sanction against opponent	25	81
Total	31	100

Midfielders are mostly involved in injury offences involving free kick/penalty (n = 13) and yellow cards (n = 4). Red card offences were only observed amongst the defenders (n = 1). None of the injuries to goalkeepers were associated with violations of the Laws. These data indicate that injuries associated with the violation of the Laws were highest among midfielders followed by defenders, forwards and goalkeepers.

Table 23: *Violation of the Laws relative to playing position and association with injury*

	n	%
Midfielder		
no violation of the Laws	44	72
violation resulting in free kick/penalty	13	21
violation resulting in yellow card	4	7
Defender		
no violation of the Laws	34	81
violation resulting in free kick/penalty	5	12
violation resulting in yellow card	2	5
violation resulting in red card	1	2
Forward		
no violation of the Laws	14	70
violation resulting in free kick/penalty	6	30
Goalkeeper		
no violation of the Laws	7	100
Total injuries	**130**	

University of Cape Town

Discussion

The first finding of this study was that the mean training and match exposure per player was 12252 minutes (204 hours) and 1834 minutes (31 hours) respectively. This can be compared to European studies that show the mean training and match exposures per player are 15720 minutes (262 hours) and 2400 minutes (40 hours) respectively [55]. This suggests that professional European players are exposed to more football per annum than South African players. This difference between South African football and European football exposure has the potential to impact on injuries during a season and on the cumulative improvement in the level of performance.

Different coaching styles or philosophies and different league structures can be a possible explanation for the differences in exposure. The type of training is another variable, which is not standardised and is determined by the education, experience and philosophies of the coaches and managers [55]. A player not accustomed to such training exposure may be at risk of sustaining injuries.

The second finding of this study shows that 12% of all injuries are sustained in the preseason phase of training. Studies in Europe have shown that preseason injuries contribute to 17% of the total number of injuries [14]. Attention to the risk of preseason injuries and the prevention thereof will improve the injury profile of the squad allowing a better start to the season.

The next finding of the study shows that 130 injuries were sustained in the AJAX team over a full PSL season with an overall injury incidence of 13.4 injuries per 1000 player hours. The injury incidence was 88.9 injuries per 1000 player hours in matches and 6.6 injuries per 1000 player hours in training. Other studies documenting 658 injuries show an injury incidence of 9.4 injuries per 1000 player hours in matches and 5.8 injuries per 1000 player hours in training [15]. Studies involving professional football clubs documented 744 injuries over four years showed that the overall injury incidence was 8.5 injuries per 1000 player hours with 27.7 injuries per 1000 player hours in matches and 3.5 injuries per 1000 player hours in training [12]. A comparison between the data from the different studies is made difficult by the different methodological approaches and definitions of injuries.

FIFA World Cup studies in 2006 and 2010 reported 145 and 229 injuries over the tournament respectively. The incidence of injuries in 2006 were 68.7 injuries per 1000 match hours [40] and in 2010 were 61.1 injuries per 1000 match hours and 7.9 injuries per 1000 training hours [16]. This study represents data from 32 teams across a 64-match tournament over one month. The FIFA World Cup tournament schedule is different to a full season in a professional league. It may however represent a 31 day period of a season where playoffs with finals take place, e.g. a cup tournament. However, the training load leading up to the tournament within a professional league might be different to the preparatory phase of a World cup tournament, therefore the comparisons should be made with caution.

University of Cape Town

The fourth finding of the study shows that most injuries were sustained at the beginning and end of the season. This may be due to the lack of match fitness, strength and conditioning early in the season and the cumulative effect of the repeated and prolonged exposure to football on the players at the end of the season. The latter may have been exacerbated by the PSL demand to complete the league schedule sooner than usual to accommodate the World Cup in 2010. This resulted in more games being played (with less recovery between matches) over a shorter period. With such a scenario it is expected that the risk profile for injuries should increase.

The next finding was that time off as a result of injury is a huge liability to the club and player. The average time off in this study was eight days. A pilot study on professional football describe a mean time off due to injury as 17.3 days [56]. This finding was similar to studies of professional teams over several seasons where the average time loss due to injury was 18 days [57]. The mean time off of eight days after injury in this study of PSL players shows that players in European leagues have over twice as much time off per injury than players participating in the PSL. This can be interpreted in one of two ways; either the injuries of the European players were more serious, or the medical care and management approach of the club towards the player was different. Certain body parts have been shown to have a high risk of injury with a high time loss factor, e.g. thigh (n = 27) with a maximum time off of 79 days. These findings are consistent with other studies [16] [40] [24].

The thighs and ankles are the most injured body parts in football. The most common types of injuries sustained in football are haematoma/contusion/bruise, muscle rupture/strain/tear/cramp and sprain/ ligament injuries [15] [16] [40] [58] [59] [55].

Non-dominant body side injuries (left) (n = 65) occurred slightly more frequently than dominant injuries (right) (n = 57). Other studies have shown contrasting results with dominant body side injuries occurring more frequently than non-dominant side injuries [12]. This was relevant to professional players during competition and training. An interesting observation showed that players took a longer time to return to play if an injury was sustained to the left hand side of the body as opposed to the right. The explanation of this observation could be that most players in the squad were identified as right dominant. The weaker injured left side would then take longer to heal and recover. This observation supports the need to maintain optimal muscle balance (left and right) in a player. However this theory needs to be verified with further experimentation.

These data can be useful in the prevention of injury or re-injury to certain high-risk areas of the body that may result in a player not being able to participate for an extended period. The goal of a medical team presented with such data would be to make them aware of such risks and reduce the incidence of such injuries or prevent future, more severe recurrences.

Football is a contact sport and due to the physical nature of the sport most of the injuries are either due to trauma (contact) or overuse (non-contact). Football studies in Europe show that there is a significantly higher incidence of overuse injuries in the preseason compared to trauma (68% vs. 29%) with the percentage of contact injuries during preseason significantly less than season (29% vs. 40%) [14]. This could be explained as the demands and physical commitment of the players increases in

University of Cape Town

season competition. The percentage of overuse injuries sustained in season in European football is greater than traumatic injuries (56% vs. 40%) [14]. In totality overuse injuries seem to dominate the mechanism of injury in European football. However, the data collected in this study describes a different pattern. For example, Table 5 shows that 77% of all injuries over a full season occur due to trauma and 23% due to overuse, of which one player was uncertain of the mechanism of injury. These findings are in contrast to what current literature describes [16] [40] where there is a higher incidence of overuse injuries. The reason for the different types of injury is multidimensional. For example, factors responsible for this injury pattern may include the different style of play (African vs. European), vision of the game, skill, difference in fitness levels, player's strength, difference in preparation and training methods, nutrition, and the mental state of players. Further studies are required to determine specific contributing factors in South African football. More injuries did occur in matches than in practice which is a similar finding compared to other studies [14] [40] [41] [47] [57].

Recurrent injuries are part of the season injury profile although they represent a smaller part of the profile (12%). The relatively small percent of recurrent injuries may be related to an increase in epidemiological studies describing the risks of injuries [27] and risks of sustaining recurrent injuries, [55] which allow appropriate preventative interventions to be implemented [60]. Major focus is placed on preventing injuries through correct warm-up [60] and exercise programmes [61]. It has been shown that adopting these principles results in a reduction of recurrent injuries. The midfielders and defenders in this study sustained the most recurrent injuries. Identifying the injuries and risks, and intervening with prevention programmes reduce the risk of injury the following season [60] [62]. Most injury prevention programmes may assist to reduce the risks of overuse injuries. Trauma is due to direct contact. Football is a contact sport and contact injuries cannot always be prevented. Increasing awareness of these type of injuries, strengthening high risk contact areas on the body, improving proprioception, agility, co-ordination, neuromuscular control [63], reaction-response time (reflex-reaction exercises) [64], core stability [65], power and peripheral vision together with a better understanding of the game could prevent some contact injuries. However, the validity of the latter comment is not supported by data and therefore further research is recommended. Understanding the importance of correct warm-up and exercise programmes as an intervention, it has been shown that a well-conditioned player will be more likely to remain uninjured after exposure to a high risk injury situation [66-68].

University of Cape Town

The injury patterns differed depending on the players' position. In this study midfielders sustained the most injuries compared to any other player position. A similar injury pattern was described in female players [69]. However, other studies on African players showed defenders sustained most injuries over a full season followed by forwards, midfielders and goalkeepers [59]. Senior European players [30] and European youth players [70] showed a different hierarchy with the defenders sustaining the most injuries followed by midfielders, forwards and goalkeepers [30] [70]. The different styles for football could account for the different risk of injury associated with different positions. It stands to reason that a style, which emphasises a strong, hard defensive pattern of play, with an aggressive attacking option, will result in more defenders and forward players sustaining injuries.

It is obvious that injuries as a result of the violation of the Laws are unnecessary. In this study 24% of all injuries sustained over a season are due to unfair play. This is very high and may be due to the player's frustration, impatience, lack of understanding, implementation and consequences of the Laws of the Game. Inconsistent refereeing during the season due to human error may compound this. The room for human error is another factor to consider when a player decides on how to tackle. Human error of players during tackling and inadequate understanding of the Laws of the Game, and potentially poor application of the Laws by match referees are responsible for violation of the Laws of the Game which result in severe contact injuries [71]. These statistics may support the call for a video referee as well as education for both players and referees. There may also be a need to improve the Laws of the Game to protect players [72]. No studies conclusively describe the injuries sustained by violation of the Laws. This is an important part of assessing the manner in which the injury was sustained Further studies are required to investigate specific injuries as a result of Law violation.

In conclusion, the importance of assessing the incidence of injury and exposure times of footballers playing in a club cannot be underestimated. These data can give the coach, medical staff and management team a clearer perspective of the injury profiles and contributing factors to injury, thereby creating an objective platform to work from prospectively. Furthermore, it may be concluded that it is necessary to collect injury and exposure data with a standardised methodology so that the outcome of the data collected has substance, and may be applied and compared to other studies with correct interpretation. Multiple studies of this nature describing the profile of injuries in a professional club in the PSL through a full season will contribute to developing the science and research in South African soccer. Without the incidence of injury and exposure data, medical professionals and coaches will be compromised in making best practise decisions about the management of their players. A better understanding of the underlying risk factors, exposure to injury and mechanisms of injury in South African football should be promoted.

University of Cape Town

Chapter 4

Summary and conclusion

There are many well documented health benefits associated with physical sports and activity. The risk of injury in sport, and specifically football is well documented. Hence injury prevention is of utmost importance. Epidemiological research is the first step towards preventing injuries and understanding the demands associated with injury [25] . Historically, there were many different methods of collecting data. This made comparisons between studies difficult. Finally, in 2006 a consensus statement for the methodology of measuring football injury and exposures data was published [26]. An advantage of this approach is that it enables a meaningful comparison of data from different studies.

Epidemiological studies on injuries in football in South Africa are lacking with the result that the incidence of injury and the exposures are unknown. In this study conducted on PSL players in a club over a full season, a total of 130 injuries were documented with an injury incidence of 88.9/1000 player hours in matches and 6.6/1000 player hours in training. There are no studies in South Africa against which these results can be compared. However, these data may serve as a basis for describing the type of injury, time loss and exposure profile of each playing position. Attention to the exposure in football is a critical component of this analysis. Without exposure data, the interpretation of injury data is incomplete. Exposure data allows the manager, coach and medical team to make informed decisions about training and match play with the goal of reducing the risk of injury and underperformance associated with over exposure. The practical application of these data is that the coaching staff, management and medical team can now propose that should a midfielder, for example, sustains an ankle injury, he could face the possibility of not participating in football for approximately 12 days. If it is a sprain or ligament injury the average time off could be 11 days. These finding are based on this study. This gives the medical team a guideline to follow, and prepares the coaching staff for the time the player will be unavailable. As more research is conducted and more data are collected, this guideline can be adjusted accordingly.

University of Cape Town

Injuries in football are sustained as a result of trauma or overuse. Understanding the site of the injury, mechanism, type and incidence of injury will result in improving methods to prevent injuries from occurring.

An interesting finding in this study was that injuries sustained to the left side of right dominant players took longer to heal and return to play. Future studies should be conducted to investigate this observation and in particular to emphasise the importance of muscle balance and injury.

South Africa has the infrastructure to have a national team, host a premier league, a number of cup finals, a 1st divisions and a number of lower leagues for both genders. However, there are insufficient data describing the incidence of injuries, match and training exposure of football players in South Africa. These data will enable correct monitoring of South African players and enable coach's, clubs

and associations to understand why a player or team is underperforming, has poor player selection due to injury, measure the performance of the medical team and compare training and match programmes to meet international standards.

The importance of monitoring training status and incidence of injury with better management of the players will have several benefits in addition to those stated above. For example, these data are useful for;

1. Club administrators when making decisions when purchasing players – they can estimate costs based on the players injury history,
2. Estimating costs when selling or loaning players to other clubs,
3. Determining the appreciation or depreciation in the value of the players in the squad,
4. Determining squad size,
5. Considering team budget,
6. Appointing the correct number of well qualified medical staff, and
7. Measuring the efficacy of the treatment implemented by the medical team.

Coaching and education workshops of the Laws of the Game, player and healthcare courses [73] and injury prevention programmes like the F-MARC 11+ [60] all contribute to protecting the health of footballers and promote the game of football. Use of the correct consensus statement for research on the epidemiology injury and exposure also contributes to better quality research. Therefore, the standardised methodology should be adopted by the researchers, medical staff and administrators. To work proactively to prevent injuries and monitor exposures [74] a mutual benefit needs to be reached between all parties concerned to ensure increased compliance and accuracy of data collection at no extra administrative effort that may be disruptive to the workplace. It is strongly suggested that an appropriate, user-friendly software program be developed and distributed to all clubs in South Africa through SAFA and the PSL. This will contribute to the data being collected correctly, improve compliance and clarify the interpretation of the football data. Data of this nature will facilitate an increase in the standard of South African football, particularly the support structures that look after the welfare of the players.

University of Cape Town

Chapter 5

References

1. Ekstrand J, Tropp H. The incidence of ankle sprains in soccer. *Foot & ankle* 1990;11(1):41-4.

2. Ekstrand J, Walden M, Hagglund M. A congested football calendar and the wellbeing of players: correlation between match exposure of European footballers before the World Cup 2002 and their injuries and performances during that World Cup. *BJSM* 2004;38(4):493-7.

3. Metzl JD, Micheli LJ. Youth soccer: an epidemiologic perspective. *Clin Sports Med* 1998;17(4):663-73, v.

4. Borms J. HM, Hills A.P. *Epidemiology of pediatric sports injuries: team sports*. Basel (Switzerland): Karger, 2005.

5. Alentorn-Geli E, Myer GD, Silvers HJ, Samitier G, Romero D, Lazaro-Haro C, et al. Prevention of non-contact anterior cruciate ligament injuries in soccer players. Part 1: Mechanisms of injury and underlying risk factors. *Knee Surg Sports Traumatol Arthrosc* 2009;17(7):705-29.

6. Alentorn-Geli E, Myer GD, Silvers HJ, Samitier G, Romero D, Lazaro-Haro C, et al. Prevention of non-contact anterior cruciate ligament injuries in soccer players. Part 2: a review of prevention programmes aimed to modify risk factors and to reduce injury rates. *Knee Surg Sports Traumatol Arthrosc* 2009;17(8):859-79.

7. Alegi P. Football in South Africa. *SA History online*.2004;http://www.sahistory.org.za/sport/football-south-africa.

8. Arnason A, Gudmundsson A, Dahl HA, Johannsson E. Soccer injuries in Iceland. *Scand J Med Sci Sports* 1996;6(1):40-5.

9. Arnason A, Sigurdsson SB, Gudmundsson A, Holme I, Engebretsen L, Bahr R. Risk factors for injuries in football. *Am J Sports Med* 2004;32(1 Suppl):5S-16S.

10. Ekstrand J, Walden M, Hagglund M. Risk for injury when playing in a national football team. *Scand J Med Sci Sports* 2004;14(1):34-8.

11. Engstrom B, Forssblad M, Johansson C, Tornkvist H. Does a major knee injury definitely sideline an elite soccer player? *Am J Sports Med* 1990;18(1):101-5.

12. Hawkins RD, Fuller CW. A prospective epidemiological study of injuries in four English professional football clubs. *BJSM* 1999;33(3):196-203.

13. Junge A, Dvorak J, Graf-Baumann T, Peterson L. Football injuries during FIFA tournaments and the Olympic Games, 1998-2001: development and implementation of an injury-reporting system. *Am J Sports Med* 2004;32(1 Suppl):80S-9S.

14. Woods C, Hawkins R, Hulse M, Hodson A. The Football Association Medical Research Programme: an audit of injuries in professional football-analysis of preseason injuries. *BJSM* 2002;36(6):436-41; discussion 41.

15. Walden M, Hagglund M, Ekstrand J. UEFA Champions League study: a prospective study of injuries in professional football during the 2001-2002 season. *BJSM* 2005;39(8):542-6.

16. Dvorak J, Junge A, Derman W, Schwellnus M. Injuries and illnesses of football players during the 2010 FIFA World Cup. *BJSM* 2011.

University of Cape Town

17. Ekstrand J, Hagglund M, Walden M. Injury incidence and injury patterns in professional football: the UEFA injury study. *BJSM* 2011;45(7):553-8.
18. Fuller CW, Junge A, Dvorak J. An assessment of football referees' decisions in incidents leading to player injuries. *Am J Sports Med* 2004;32(1 Suppl):17S-22S.
19. Fuller CW, Dick RW, Corlette J, Schmalz R. Comparison of the incidence, nature and cause of injuries sustained on grass and new generation artificial turf by male and female football players. Part 1: match injuries. *BJSM* 2007;41 Suppl 1:i20-6.
20. van Beijsterveldt AM, Krist MR, Schmikli SL, Stubbe JH, de Wit GA, Inklaar H, et al. Effectiveness and cost-effectiveness of an injury prevention programme for adult male amateur soccer players: design of a cluster-randomised controlled trial. *Inj Prev* 2011;17(1):e2.
21. Cumps E, Verhagen E, Annemans L, Meeusen R. Injury rate and socioeconomic costs resulting from sports injuries in Flanders: data derived from sports insurance statistics 2003. *BJSM* 2008;42(9):767-72.
22. Collard DC, Verhagen EA, van Mechelen W, Heymans MW, Chinapaw MJ. Economic burden of physical activity-related injuries in Dutch children aged 10-12. *BJSM* 2011;45(13):1058-63.
23. Ekstrand J, Hagglund M, Walden M. Epidemiology of muscle injuries in professional football (soccer). *Am J Sports Med* 2011;39(6):1226-32.
24. Hagglund M, Walden M, Ekstrand J. Injuries among male and female elite football players. *Scand J Med Sci Sports* 2009;19(6):819-27.
25. van Mechelen W, Hlobil H, Kemper HC. Incidence, severity, aetiology and prevention of sports injuries. A review of concepts. *Sports Medicine* 1992;14(2):82-99.
26. Fuller CW, Ekstrand J, Junge A, Andersen TE, Bahr R, Dvorak J, et al. Consensus statement on injury definitions and data collection procedures in studies of football (soccer) injuries. *BJSM* 2006;40(3):193-201.
27. Arnason A, Sigurdsson SB, Gudmundsson A, Holme I, Engebretsen L, Bahr R. Risk factors for injuries in football. *Am J Sports Med* 2004;32(1):5-16.
28. Hagglund M, Walden M, Bahr R, Ekstrand J. Methods for epidemiological study of injuries to professional football players: developing the UEFA model. *BJSM* 2005;39(6):340-6.
29. Woods C. The Football Association Medical Research Programme: an audit of injuries in professional football--analysis of hamstring injuries. *BJSM* 2004;38(1):36-41.
30. Woods C, Hawkins R, Hulse M, Hodson A. The Football Association Medical Research Programme: an audit of injuries in professional football: an analysis of ankle sprains. *BJSM* 2003;37:233-38.
31. Brooks JH, Fuller CW. The influence of methodological issues on the results and conclusions from epidemiological studies of sports injuries: illustrative examples. *Sports medicine* 2006;36(6):459-72.
32. Brooks JH, Fuller CW, Kemp SP, Reddin DB. Epidemiology of injuries in English professional rugby union: part 1 match injuries. *BJSM* 2005;39(10):757-66.
33. Orchard J, Seward H. Epidemiology of injuries in the Australian Football League, seasons 1997-2000. *BJSM* 2002;36(1):39-44.

University of Cape Town

34. Walden M, Hagglund M, Ekstrand J. Injuries in Swedish elite football--a prospective study on injury definitions, risk for injury and injury pattern during 2001. *Scand J Med Science Sports* 2005;15(2):118-25.

35. Fink A, Kosecoff J, Chassin M, Brook RH. Consensus methods: characteristics and guidelines for use. *Am J Public Health* 1984;74(9):979-83.

36. Orchard JW, Newman D, Stretch R, Frost W, Mansingh A, Leipus A. Methods for injury surveillance in international cricket. *BJSM* 2005;39(4):e22.

37. Fuller CW, Molloy MG, Bagate C, Bahr R, Brooks JH, Donson H, et al. Consensus statement on injury definitions and data collection procedures for studies of injuries in rugby union. *BJSM* 2007;41(5):328-31.

38. de Loes M. Exposure data. Why are they needed? *Sports Medicine* 1997;24(3):172-5.

39. Finch CF. An overview of some definitional issues for sports injury surveillance. *Sports medicine* 1997;24(3):157-63.

40. Dvorak J, Junge A, Grimm K, Kirkendall D. Medical report from the 2006 FIFA World Cup Germany. *BJSM* 2007;41(9):578-81; discussion 81.

41. Dvorak J, Junge A, Derman W, Schwellnus M. Injuries and illnesses of football players during the 2010 FIFA World Cup. *BJSM* 2011;45(8):626-30.

42. Junge A, Engebretsen L, Alonso JM, Renstrom P, Mountjoy M, Aubry M, et al. Injury surveillance in multi-sport events: the International Olympic Committee approach. *BJSM* 2008;42(6):413-21.

43. Werner J, Hagglund M, Walden M, Ekstrand J. UEFA injury study: a prospective study of hip and groin injuries in professional football over seven consecutive seasons. *BJSM* 2009;43(13):1036-40.

44. Carling C, Le Gall F, Orhant E. A four-season prospective study of muscle strain reoccurrences in a professional football club. *Res Sports Med* 2011;19(2):92-102.

45. Brooks JH, Fuller CW, Kemp SP, Reddin DB. An assessment of training volume in professional rugby union and its impact on the incidence, severity, and nature of match and training injuries. *J Sports Sci* 2008;26(8):863-73.

46. Hartwig TB, Naughton G, Searl J. Load, stress, and recovery in adolescent rugby union players during a competitive season. *J Sports Sci* 2009;27(10):1087-94.

47. Hagglund M, Walden M, Ekstrand J. Injury incidence and distribution in elite football--a prospective study of the Danish and the Swedish top divisions. *Scand J Med Sci Sports* 2005;15(1):21-8.

48. Hagglund M, Zwerver J, Ekstrand J. Epidemiology of patellar tendinopathy in elite male soccer players. *Am J Sports Med* 2011;39(9):1906-11.

49. Carling C, Gall FL, Reilly TP. Effects of physical efforts on injury in elite soccer. *Int J Sports Med* 2010;31(3):180-5.

50. Ekstrand J, Hagglund M, Fuller CW. Comparison of injuries sustained on artificial turf and grass by male and female elite football players. *Scand J Med Sci Sports* 2011;21(6):824-32.

51. Kordi R, Hemmati F, Heidarian H, Ziaee V. Comparison of the incidence, nature and cause of injuries sustained on dirt field and artificial turf field by amateur football players. *SMARTT* 2011;3:3.

University of Cape Town

52. Williams S, Hume PA, Kara S. A review of football injuries on third and fourth generation artificial turfs compared with natural turf. *Sports Medicine* 2011;41(11):903-23.
53. Durandt JJ, Evans JP, Revington P, Temple-Jones A, Lamberts RP. Physical profiles of elite male field hockey and soccer players - application to sports specific tests. *SAJSM* 2007;19(3):74-78.
54. Knowles SB, Marshall SW, Guskiewicz KM. Issues in estimating risks and rates in sports injury research. *JAT* 2006;41(2):207-15.
55. Hagglund M, Walden M, Ekstrand J. Previous injury as a risk factor for injury in elite football: a prospective study over two consecutive seasons. *BJSM* 2006;40(9):767-72.
56. Cromwell F, Walsh J, Gormle J. A pilot study examining injuries in elite gaelic footballers. *BJSM* 2000;34:104-08.
57. Ekstrand J, Hagglund M, Waldén M. Injury incidence and injury patterns in professional football: the UEFA injury study. *BJSM* 2011;45(7):553-58.
58. Dompier TP, Powell JW, Barron MJ, Moore M. Time-Loss and Non–Time-Loss Injuries in Youth Football Players. *JAT* 2007;42(3):395-402.
59. Azubuike SO, Okojie OH. An epidemiological study of football (soccer) injuries in Benin City, Nigeria. *BJSM* 2009;43(5):382-6.
60. Soligard T, Myklebust G, Steffen K, Holme I, Silvers H, Bizzini M, et al. Comprehensive warm-up programme to prevent injuries in young female footballers: cluster randomised controlled trial. *BMJ* 2008;337:a2469.
61. Dvorak J JA, Chomiak J, Graf-Baumann T, Peterson L, Rösch D, Hodgson R. Risk factor analysis for injuries in football players. Possibilities for a prevention program. *Am J Sports Med* 2000;28(5):69-74.
62. Soligard T, Nilstad A, Steffen K, Myklebust G, Holme I, Dvorak J, et al. Compliance with a comprehensive warm-up programme to prevent injuries in youth football. *BMJ* 2010;44(11):787-93.
63. Filipa A, Byrnes R, Paterno MV, Myer GD, Hewett TE. Neuromuscular training improves performance on the star excursion balance test in young female athletes. *J Orthop Sports Phys Ther* 2010;40(9):551-8.
64. Borghuis AJ, Lemmink KA, Hof AL. Core muscle response times and postural reactions in soccer players and nonplayers. *Medicine and science in sports and exercise* 2011;43(1):108-14.
65. Leetun DT, Ireland ML, Willson JD, Ballantyne BT, Davis IM. Core stability measures as risk factors for lower extremity injury in athletes. *Med and Sci Sports Exerc* 2004;36(6):926-34.
66. Greig M, Siegler JC. Soccer-specific fatigue and eccentric hamstrings muscle strength. *JAT* 2009;44(2):180-4.
67. Small K, McNaughton L, Greig M, Lovell R. Effect of timing of eccentric hamstring strengthening exercises during soccer training: implications for muscle fatigability. *J Strength Cond Res* 2009;23(4):1077-83.
68. Small K, McNaughton LR, Greig M, Lohkamp M, Lovell R. Soccer fatigue, sprinting and hamstring injury risk. *Int J Sports Med* 2009;30(8):573-8.
69. E Giza KMf, L Farrell, B Zarins, T Gill. Injuries in women's professional soccer. *BJSM* 2005;39:212-16.

University of Cape Town

70. Price RJ, Hawkins RD, Hulse MA, Hodson A. The Football Association medical research programme: an audit of injuries in academy youth football. *BJSM* 2004;38(4):466-71.

71. Fuller CW SG, Junge A, Dvorak J. An assessment of player error as an injury causation factor in international football. *Am J Sports Med* 2004;32(1):28S - 35S.

72. Andersen TE EL, Bahr R. Rule violations as a cause of injuries in male norwegian professional football: are the referees doing their job? *Am J Sports Med* 2004;32(1):62S-8S.

73. Fuller CW, Junge A, DeCelles J, Donald J, Jankelowitz R, Dvorak J. 'Football for Health'--a football-based health-promotion programme for children in South Africa: a parallel cohort study. *BJSM* 2010;44(8):546-54.

74. Hagglund M, Walden M, Til L, Pruna R. The importance of epidemiological research in sports medicine. *Apunts Med Esport* 2010;45(166):57-59.

University of Cape Town

Appendices

Appendix 1 Letter of Consent from AJAX CT CEO

24 February 2010

Professor Marc Blockman
Division of Clinical Pharmacology
Department of Internal Medicine
Faculty of Health Sciences
University of Cape Town/Groote Schuur Hospital

Dear Professor Blockman

In response to your email to Theo Calligeris (15/2/2010) I would like to confirm, in my capacity as CEO of Ajax Cape Town that we are fully supportive of the audit of the injury data of the Ajax team as this will contribute towards better management of our players and improving their health and fitness. Mr Calligeris, as part of his job, gathers information about the injuries and training load throughout the season. This started in December 2008 and is ongoing. To have him analyse this information systematically as part of a thesis would be beneficial to the club and help us to strategise in the future.

Mr Calligeris explained to me that there has been a misunderstanding with obtaining ethical clearance for the information collected for the 2009/10 season. As an analysis of this data is very important to the development of the team I would like to request that permission also be given for the data collected for the season which is presently underway. If necessary I am happy to organise that all the players in the team sign an informed consent that they are happy that the information is analysed in an anonymous way. Furthermore, I understand that the identity of the club will be not be advertised, but I accept that based on the analysis it may be possible to identify which team the data applies to. I would like to state that I do not see this as a concern.

Yours sincerely,

....
GEORGES COMITIS
CEO

AJAX Cape Town (PTY) LTD
cnr Frans Conradie Drive & Bertie Genade Street Parow 7500 P.O.Box 926 Parow 7499 South Africa
Tel.: +27 21 930 6001 Fax: +27 21 939 6403 E-mail: info@ajaxct.co.za www.ajaxct.com
Reg. No. 1998/024537/07

Appendix 2 Informed Consent Form

Informed Consent Form

Consent Form

The incidence of injury and exposure times of footballers involved in a professional football club in the PSL during a football season

Dear Participant

The U.C.T Division of Physiotherapy will be conducting a study to describe the incidence of football (soccer) injuries in a professional premiership football (soccer) team during a full season. The study will describe what injuries occurred during the season and how they were sustained. Information gained from this study will be used by the M.Phil. (Sports Physiotherapy) student for the final year Thesis.

No such study has been conducted in the PSL to date. Due to the fact that injuries do occur it is important to describe them and treat them effectively in order to prevent them from occurring and/or recurring and future interventions can be assessed base on this. It is anticipated that this study will add to a database of knowledge on this participant in South African Football and will furthermore provide the insight into the professionalism of the game.

University of Cape Town

Each participant has been selected if they are contracted to the club and are selected to play for the PSL and/or reserve squad. All participants continue as normally required by the head coach and management personal. No alterations in day to day events will occur that may place the participant at risk.

This study will be supervised by Associate Professor Mike Lambert of the Sports Science Institute and Theresa Burgess, a physiotherapy lecturer from the University of Cape Town. Please take time to read this form thoroughly before signing.

On your first consultation with the physiotherapist

Prior to the season starting the chief club physiotherapist will complete a player's baseline information form with the participant. This will include the participants playing position, age, height body mass, dominant leg, details of previous major injuries.

On physiotherapy appointment (when injured)

All participants who sustain an injury will be assed as per normal by the chief club physiotherapist. The assessment will include participative questions relating to the injury. No paperwork will be demanded or required to be filled in by the participant other than the consent form. Participants are already familiar with the assessment and treatment procedures and will be familiarised with all future procedures that will be used during the study i.e. participative questions about your injury.

On a daily basis

The chief conditioning trainer will collect each participant's exposure time in training or matches.

Potential Risks:

There are no potential risks to the participants that may be associated with the study other than the nature of their profession.

Benefits:

The study aims to investigate the injury profile and exposure times of all footballers involved in a professional football club in the PSL during a full football season.

Participants will be informed on the results of the study and will therefore gain knowledge which will be of benefit to them in terms of educating them regarding their injury history, increasing awareness and incidence in their careers that make contribute their interests in injury prevention techniques that they may need. Participants will also gain information regarding their exposure time to injury, which will be of personal benefit to them. An information sheet will also be provided to each participant on the risk injuries in football.

University of Cape Town

Questions or Concerns:

If at any time you have any questions about the study please feel free to contact any of the individuals listed below. You are assured that all enquiries will remain confidential.

Lorenzo Meyer 082 726 4468

Theo Calligeris 083 300 4991

Theresa Burgess 021 406 6171

Associate Professor Mike Lambert 021 650 4558

Should you have any further queries, feel free to contact:

Associate Professor Mike Lambert

MRC/UCT Research Unit for Exercise Science and Sports Medicine

Department of Human Biology

University of Cape Town

Boundary Road

Newlands

Email: mike.lambert@uct.ac.za

Dr.T. Burgess

Physical Address: Division of Physiotherapy

School of Health and Rehabilitation Sciences

University of Cape Town

Old Main Building

Groote Schuur Hospital

Anzio Road

Observatory

7725

Fax number: 021 406 6323

Email: theresa.burgess@uct.ac.za

University of Cape Town

By placing your signature below it serves as confirmation that you have had adequate time to read through and have understood the consent form and that you are willing to participate in this study. You have the right to withdraw at any time, you may ask questions at any time during the study and all the information recorded is confidential. Your signature is further confirmation that you are aware of

the possible risks involved in this study. Please note that UCT does offer a no-fault insurance that will cover all participants in the event that something may go wrong.

____________________	______________________________	_________
Signature of Volunteer	**Name (Please Print)**	**Date**
____________________	______________________________	_________
Signature of Witness	**Name (Please Print)**	**Date**
____________________	______________________________	_________
Signature of Investigator	**Name (Please Print)**	**Date**

University of Cape Town

Appendix 3 Players Baseline Information Form

FIFA F-MARC

For the Good of the Game

Players' Baseline Information Form

Team-code No: ____________________

Logo

Player's code No.[1]	Playing position[2]	Age[3], years	Stature, cm	Body mass, kg	Dominant leg[4] (L/R/B)	Details of previous major injuries	Study specific variable	Study specific variable

Notes: [1] Use additional sheets if required [2] Goalkeeper, Defender, Midfielder, Forward [3] Age as at the start of season / year / tournament [4] Left, Right, Bilateral

© ICG 2006

Appendix 4 Injury Report Form

Injury Report Form

(Team) Player-code: ______________ Date: __________

LOGO

1A Date of injury: __________ **1B Date of return to full participation:** __________

2A Injured body part

- ☐ head / face
- ☐ neck / cervical spine
- ☐ sternum / ribs / upper back
- ☐ abdomen
- ☐ low back / sacrum / pelvis
- ☐ shoulder / clavicula
- ☐ upper arm
- ☐ elbow
- ☐ forearm
- ☐ wrist
- ☐ hand / finger / thumb
- ☐ hip / groin
- ☐ thigh
- ☐ knee
- ☐ lower leg / Achilles tendon
- ☐ ankle
- ☐ foot / toe

2B Injured body part

☐ right ☐ left ☐ not applicable

3 Type of injury

- ☐ concussion with or without loss of consciousness
- ☐ fracture
- ☐ other bone injury
- ☐ dislocation / subluxation
- ☐ sprain / ligament injury
- ☐ lesion of meniscus or cartilage
- ☐ muscle rupture / strain / tear / cramps
- ☐ tendon injury / rupture / tendinosis / bursitis
- ☐ haematoma / contusion / bruise
- ☐ abrasion
- ☐ laceration
- ☐ nerve injury
- ☐ dental injury

☐ other injury (please specify): ______________________________

4 Diagnosis (text or Orchard code): ______________________________

5 Has the player had a **previous injury** of the same type at the same site (i.e. this injury is a recurrence)?

☐ no ☐ yes

If **YES**, specify date of player's return to full participation from the previous injury: ____________

6 Was the injury caused by **overuse** or **trauma**?

☐ overuse ☐ trauma

7 When did the injury occur?

☐ training ☐ match

8 Was the injury caused by **contact** or **collision?**

☐ no

☐ yes, with another player

☐ yes, with the ball

☐ yes, with other object (specify) ______________

9 Did the referee indicate that the action leading to the injury was a **violation of the Laws?**

☐ no ☐ yes, free kick / penalty ☐ yes, yellow card ☐ yes, red card

If **YES**, was the referee's sanction against: ☐ injured player ☐ opponent

© ICG 2006

Appendix 5 Exposure Report Form

FIFA F-MARC

For the Good of the Game

Exposure Report Form
(for the documentation of team exposures)

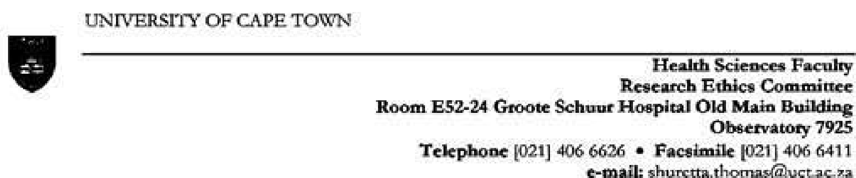
(Team) Player-code: ____________________

LOGO

Date	**Match / Training**	**No. of players** (fully participa-ting in training)	**Duration of training session** (minutes)	**Study specific variable**	**Study specific variable**

© ICG 2006

Appendix 6 Letter of Consent from the Research Ethics Committee UCT



UNIVERSITY OF CAPE TOWN

Health Sciences Faculty
Research Ethics Committee
Room E52-24 Groote Schuur Hospital Old Main Building
Observatory 7925
Telephone [021] 406 6626 • **Facsimile** [021] 406 6411
e-mail: shuretta.thomas@uct.ac.za

05 July 2010

HREC REF: 308/2010

Mr T Calligeris
c/o Prof M Lambert
Physiotherapy
Health & Rehab

Dear Mr Calligeris

PROJECT TITLE: THE INCIDENCE OF INJURY AND EXPOSURE TIMES OF FOOTBALLERS INVOLVED IN A PROFESSIONAL FOOTBALL CLUB IN THE PSL DURING A FOOTBALL SEASON.

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the Ethics Committee has **formally approved** the above-mentioned study.

Approval is granted for one year till the 15th July 2011.

Please submit an annual progress report if the research continues beyond the expiry date. Please submit a brief summary of findings if you complete the study within the approval period so that we can close our file.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote the REC. REF in all your correspondence.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, HSF HUMAN ETHICS
Federal Wide Assurance Number: FWA00001637.

S Thomas

UNIVERSITY OF CAPE TOWN

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

Annual Progress Report

Date	30th June 2011
HREC REF Number	308 / 2010
Protocol number (if applicable) & Protocol title	The incidence of injury and exposure times of footballers playing in a professional football club in the PSL during a football season.
Principal Investigator	Mr. Theodore Calligeris
Department / Office Internal Mail Address	theo@sspc.co.za

List of documentation

Annual Progress Report &
Addressing letter : Professor M. Blockman.

RESEARCH ETHICS COMMITTEE
2011 -07- 01
HEALTH SCIENCES FACULTY
UNIVERSITY OF CAPE TOWN

HREC office use only (FWA00001637; IRB00001938)

☐ Approved ✓	This serves as notification of annual approval, including all documentation described above.		
☐ Not approved	See attached comments.		
Type of review	☐ Expedited ✓	☐ Full committee	
Expiry date	15 JULY 2012		
Signature Chairperson of the HREC		Date	1-7-11