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**Epidemiological Study of Injuries Among Footballers**  
**in Gaza Strip**

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**Master of Rehabilitation Science .**

**هـ 1429/م 2008**

## Declaration

I certify that thesis submitted to the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any of the same) has not been submitted for a higher degree to any other university or institution.

Signature

Usama Ali Rasheed Abu Iebda

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## *Dedication*

*To my parents  
my wife,  
my brothers and sisters,  
my friends,  
my patients,  
my Islamic University  
and to all I love ..*

## *Acknowledgement*

I gratefully acknowledge the clubs involved in the study, including the voluntarily participating players and the managerial and coaching staff. The help from the contact persons are also greatly appreciated. I would like to express my gratefulness to my supervisors Assist. Prof. Dr Adnan Al-Hindi Faculty of science and Assist.Prof. Dr.Fadel Naim for their carefully supervision. Finally, I appreciate the patience and support of my family.

## Abstract

The aim of this study is to investigate the extent of sport injury problem—that is, the first step in the sequence of injury prevention.

The specific objectives of this study are to determine: 1- Injury rate 2- Injury percentage 3- Mechanism of injury 4- Anatomical region of injury, type of injury and severity of injury in the sport of football among football athletes in Gaza Strip. .

The study took the form of a retrospective analysis of injuries. Information on injuries was collected from over 200 football athletes distributed in 8 football teams by the use of a specifically designed questionnaire.

A total of 206 questionnaires were administered, and 182 were answered, giving an overall response rate of 88.3%.

(153/182) players sustained injuries during the season, with injury percentage of 84 %. A percentage of 62.1% of players sustained an injury of the right body part and 37.9% of the left body part.

Some 57.5% of the players kicked with their right leg, 7.8% with their left leg, and 34.6% kicked with either leg.

The lower extremity was the site of 79.1% of the all injuries, whereas the Ankle was the most common injured location (24.8 %) followed by the knee (17.6%), the hamstring muscle(12.4%). Sprains (24.8%) and strains (23.5%) contusion (11.8%) and inflammation (11.1%) were the major injury types.

The most common injury was Ankle sprain, representing (20.9%) of all injuries followed by Hamstring muscle strain (11.7%), adductor strain and inflammation of the knee (7.8%) for each. (51%) were recurrent from old injury, while (49%) were new injuries. (57.5%) of injury were traumatic and (42.5%) were overused.

The most common traumatic injuries were ligament sprain (23.9%), and contusion (20.5%). The most common overused injury was muscle strain (38.5%).

Competition related injuries represented (52.3%) of those reported, while (47.7%) sustained in the training. Of all injuries the moderate injury with absence of (8–27 days) accounted for (41.2%, minor severe (30.7%) and (28.1%) were major severe.

The single most major injury of all injuries was fractures (8.5%) with more than 28 day absenteeism from participation.

Most injury mechanisms were classified as being non-contact (64.7%), whereas twisting is the most common mechanism happened mainly in the competitions (21/153).

Doctors (67/153) assessed mainly the player during the season, followed by coaches (27/153) and Physiotherapist (25/153).

In conclusion; Professional footballers in Gaza Strip are exposed to a high risk of injury and there is a need to investigate ways of reducing this risk. There is a significant risk of ankle and knee problems among the footballers of Gaza Strip. The high level of ligament sprains and muscle strains observed increases the importance of implementing effective fitness training programmes and in particular warming up and cooling down procedures for players.

In general, this study concluded that there is a strong argument for the introduction of rehabilitation programmes at each stage of recovery and before a return to competition.

## ملخص الدراسة

هناك احتياج كبير في قطاع غزة لمعلومات عن إصابات لاعبي كرة القدم وذلك لوضع برامج تأهيلية ووقائية من أجل مساعدة الرياضيين للعودة إلى الأنشطة الرياضية المختلفة كالتمرين ومباريات المنافسة.

هذه هي الدراسة الأولى الشاملة التي تبحث في الإصابات الرياضية لكرة القدم في قطاع غزة وهي دراسة تحليلية استعادية حيث تم تحصيل معلومات الدراسة من أكثر من مائتين رياضي موزعين على ثماني فرق رياضية وذلك عن طريق استبانته تم إعدادها من قبل الباحث لتتناسب طريقة البحث العلمي المتبع عالمياً مع الأخذ بالاعتبار خصوصية بيئة قطاع غزة.

الهدف الرئيسي من هذه الدراسة هو بحث طبيعة الإصابات الرياضية ومدى حدوثها بين لاعبي كرة القدم من الفرق الممتازة والمشاركة في دوري قطاع غزة لعام 2007/2006م وتعتبر هذه الدراسة هي الخطوة الأولى للمساهمة بالمعلومات الإحصائية اللازمة لعمل برامج وقائية وتأهيلية تساعد على الحد من الإصابات الرياضية المتكررة بين أعضاء الفرق المختلفة.

الأهداف الخاصة من هذه الدراسة هي تحديد معدل ونسبة حدوث الإصابات، تحديد ميكانيكية الإصابات، تحديد أعضاء الجسم الأكثر عرضة للإصابات ونوع وحدة الإصابات بين لاعبي كرة القدم من الدرجة الممتازة في قطاع غزة.

اشتملت الدراسة على 182 استبانته من أصل 206 بمعدل نسبة استجابة 88.3%. تم حصر 153 إصابة خلال الموسم الرياضي 2007/2006 بمعدل 3 إصابات لكل 1000 ساعة مشاركة رياضية بنسبة حدوث مئوية تعادل 84%. 62.1% من اللاعبين تعرض لإصابة في الجهة اليمنى من الجسد، نسبة حدوث الإصابات للجزء السفلي للاعبين كانت 79.1%.

تعرض مفصل الكاحل لأكثر الإصابات بنسبة 24.8% تلاه في المرتبة الثانية مفصل الركبة بنسبة 17.6% ومن ثم عضلات الفخذ الخلفية بنسبة 12.4%. تشير النتائج إلى أن 64.7% من الإصابات حدثت بدون احتكاك مباشر مع الخصم والالتواء كان أكثر ميكانيكية مسببة للإصابات بمعدل 23.5%.

أكثر المعالجون شيوعاً للإصابات كان الأطباء بمعدل 43.7% يليهم المدربون بنسبة 17.6% نسبة حدوث الإصابات في مباريات المنافسة 52.3% بينما نسبة حدوث الإصابات في التدريب كانت 47.7%. التواء الكاحل كان أكثر أنواع الإصابات شيوعاً بنسبة 20.9% يليه التمدد الزائد للعضلات الخلفية بنسبة 11.7%.

51% من الإصابات حدثت نتيجة لإصابة قديمة بينما وصلت نسبة الإصابات المباشرة إلى 57.5% مثلت الإصابات الناتجة عن الإفراط في الاستخدام نسبة (42.5%). أكثر الإصابات

المباشرة شيوفاً كان التواء المرابط بنسبة (23.9%) بينما أكثر الإصابات الإجهادية شيوفاً كان تمدد العضلات الزائد وذلك بنسبة (38.5%).

خلصت الدراسة إلى وجوب احتواء فترة التدريب الرياضي على برامج تدريبية مبنية على أساس علمي تعمل على تقليص نسبة الإصابات الرياضية بين لاعبين كرة القدم في قطاع غزة وخصوصاً أثناء فترتي الإحماء والتبريد كما أوصت الدراسة إلى تبني برامج تأهيله رياضية خلال فترات الشفاء من الإصابات وقبل العودة لمزاولة النشاط الرياضي على أن يقوم أخصائي تأهيل رياضي مؤهل علمياً بتطبيق هذه البرامج وذلك بمساعدة المدرب المسئول عن الفريق .

في النهاية أشارت الدراسة إلى حاجة القطاع الشديدة لمزيد من الأبحاث والدراسات في مجال الوقاية والتأهيل الرياضي وذلك مواكبة للدراسات العالمية.



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## ABBREVIATIONS

The following abbreviations, listed in alphabetical order, are used in this thesis:

<b>ACL</b>	Anterior cruciate ligament
<b>Am J S M</b>	American Journal of Sports Medicine
<b>ANOVA</b>	Analysis of variance
<b>BJSM</b>	British Journal of Sports Med
<b>BMI</b>	Body mass index
<b>CI</b>	Confidence interval
<b>CNS</b>	Central nervous system
<b>ICD</b>	International Classification of Diseases
<b>FA</b>	Football Association
<b>FIFA</b>	Federation of International Football Associations
<b>F-MARC</b>	medical assessment and research centre of FIFA
<b>J Med Sci Sports</b>	Journal of Medical Science and Sports
<b>MCL</b>	Medial collateral ligament
<b>NCAA</b>	National Collegiate Athletic Association
<b>NEISS</b>	National Electronic Injury Surveillance System
<b>NS</b>	Not significant
<b>OA</b>	Osteoarthritis
<b>OR</b>	Odds ratio
<b>OSICS</b>	Orchard sports injury classification system
<b>OSTRC</b>	Oslo Sports Trauma Research Center
<b>PNS</b>	Peripheral nervous system
<b>PRICE</b>	<b>P</b> Protection: i.e. crutches, cane, cast, brace
	<b>R</b> rest:
	<b>I</b> Ice
	<b>C</b> Compression
	<b>E</b> Elevation
<b>RCT</b>	Randomized controlled trial
<b>ROM</b>	Range of motion
<b>RR</b>	Relative risk
<b>UEFA</b>	Union of European Football Associations

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Sport medicine history

The origins of sports medicine lie in ancient Greece and ancient Rome where physical education was a needed aspect of youth – training and athletic contests first became a part of everyday life during these times. In the 5th century, however, the care of athletes was primarily the responsibility of specialists. These were trainer-coaches and were considered to be experts on nutrition, physical therapy, and hygiene as well as on sport-specific techniques. The first user of therapeutic exercise was Herodicus, who is known as Hippocrates' teachers. Until the 2nd century AD, when the first "team doctor", Galen, was appointed to the gladiators, the physician only became involved if there was an injury (Wikipedia the free encyclopedia, 2008).

Ibn –Sina (979-1037) suggested modalities of treatment like heat in form of warm baths, exercise in form of different movements and massage to enhance injury healing process, what are similar to the today's rehabilitation procedures (Snock, 1984).

#### 1.2 Sports medicine team

Sports medicine has always been difficult to define because it is not a single specialty, but an area that involves health care professionals, researchers and educators from a wide variety of disciplines. Its function is not only curative and rehabilitative, but also preventative, which may actually be the most important one of all.

It is suggested that the ideal sports medicine team consists of the following:

- \* Family physician
- \* Sports physician
- \* Orthopedic surgeon
- \* Radiologist
- \* Physical therapist / physiotherapist

- \* Massage therapist
- \* Podiatrist
- \* Dietician / nutritionist
- \* Psychologist
- \* Athletic trainer /sports trainer
- \* Coach
- \* Fitness adviser

A range of other professionals including osteopaths, chiropractors, exercise physiologist, bio mechanists, nurses, occupational therapists, orthotists and optometrists (Brunker & Khan, 2001).

Although this combination is ideal, in the majority of settings, sport medicine teams will be far smaller depending on the needs and demands of a particular sport and the availability of sports medicine practitioners (Gregory and Lynn, 2003).

Unfortunately, in Gaza Strip exist no possibility for such a medical team. In a study done by Elsharif, who studied the medical coverage of footballers injuries in Gaza Strip concluded that (82%) of the sport medical therapist are volunteers, (27.1%) qualified as a trainer, (25.7%) are nurse, (18.6%) are physiotherapist, (12.9%) are first – aid professional, (4.3%) are specialist in sport injury, (1.4%) are general practioners and (10%) included other professionals (Elsharif, 2003).

### 1.3 Rehabilitation

Rehabilitation is the development of a person to the fullest physiological, social, vocational, avocational and educational potential consistent with his or her physiological or anatomical impairment and environmental limitation (National Center for Medical Rehabilitation Research).

#### 1.3.1 Sport Rehabilitation

In sports medicine, rehabilitation includes procedures designed to restore athletes to their previous level of function within the shortest time possible. Rehabilitation begins immediately after injury and culminates in return to sport or return to the highest functional level possible based on the nature and severity of the injury (Delee et al., 2003).

For an athlete, it must also include a period of reconditioning to ensure optimal levels of fitness, including flexibility, strength, and endurance, which are necessary to achieve optimum performance and to minimize the risk of re-injury. Rehabilitation includes the application of therapeutic exercise and physical agents (Fu and Stone, 1994).

### 1.3.2 Rehabilitation modalities

Modalities are physical agents that create an environment for optimal healing while reducing pain. Modalities include forms of heat, cold, light, water, electricity, and massage. The goal for the use of any of these modalities is to return the performer safely to maximum capacity in a timely manner (Richard et al., 2002).

The physical modalities should not be used in isolation or as a substitution for rehabilitative exercise, but they are more effective when used as a part of a comprehensive treatment approach including medical intervention as well as exercise and education.

### 1.3.3 Goal of Sport Rehabilitation

Development of sport rehabilitation program is a problem-solving process. This requires careful evaluation of the injured football player for development of goals and a plan of care that addresses the impairments, functional limitations and disability experienced by the football player in order to return them to their previous level of sports activity.

There are four sport rehabilitation phases:

**Phase 1:** Limit additional injury and control pain and swelling.

**Phase 2:** Improve strength and flexibility (range of motion) of the injured structures.

**Phase 3:** Progressively improve strength, flexibility, proprioception, and endurance training until near-normal function is attained.

**Phase 4:** Return to exercise and sports symptom free.

On the other hand, the rehabilitation program depend on the phase of rehabilitation that includes specific goals like

- 1- Limiting inflammation
- 2- Decreasing pain and swelling
- 3- Improving muscles strength
- 4- Promoting joint motion
- 5- Improving joint flexibility
- 6- Improving endurance and power
- 7- Improving cardiovascular endurance
- 8- Promoting coordination
- 9- Maintaining neuromuscular control ( Delee et al., 2003).

#### **1.4 Sports injuries**

Sport injury may be defined as a tissue damage that occurs as a result of participation in sport or exercise (Bahr & Maehlum, 2004).

Sports injuries are classified as traumatic acute injuries and overuse injuries according to their characteristics, the onset of symptoms, their type and location, and the mechanisms of injury.

Traumatic acute injuries occur suddenly and have clearly defined cause or onset. Occur either during a tackle or without contact with another player. Pain is generally the initial immediate sign of the acute injury and is followed by edema, which may appear in the next hours of the injury. Acute traumatic injury are typically contusion, sprains, strain,, joint injury, fractures, dislocation and other like wounds, concussion etc.

In contrast, overuse injuries, as their name suggests, occur gradually over time as the result of repeated microtraumas and often happen because of the stresses associated with a particular sport. After a warm up, they may be less intense or disappear. Overuse injuries become chronic only as a result of returning to the training session or continuing the match (Bahr & Maehlum , 2004).

### 1.4.1 Football injuries

Football is the world's biggest team sport and attracts new players every year. In January 2007, there were 207 associations joined to FIFA (Federation of International Football Associations) with 53 member associations in UEFA (Union of European Football Associations). ([www.fifa.com](http://www.fifa.com)) ([www.uefa.com](http://www.uefa.com)).

Football is a moderate-contact sport in which the basic rules are few and open to interpretation by the referee. This can lead to rough play and increased exposure to injury. Although it is similar in many ways to other team field sports, football is unique in the use of the head and feet to advance the ball, creating injury patterns and problems particular to this sport. The ball may be advanced by heading (striking with the head), passing (kicking the ball to another player using any portion of the foot), or dribbling (running while controlling the ball with the feet). The ball also may be controlled with the chest or thighs.

The standard ball used in this sport weighs 400 to 450 g is made of molded plastic or stitched plastic-coated leather. The plastic prevents the ball from becoming saturated with water. The standard size of the ball has a circumference of 68.5 to 71 cm and should be inflated to a pressure of between 8.5 and 15.6 pounds per square inch (psi).

Most football injuries appear to occur without contact, during a change of direction, or slowing down or landing after a jump, and take the form of a knee or ankle sprain or muscle injury. In contact injuries, tackles with the ball at the feet or sliding tackles and elbowing or butting during mid-air (above ground) collisions predominate. The lower extremities are primarily involved. The knee and ankle are most frequently injured because the stresses and direct and indirect insults imposed by fast, explosive movements expose them to greater risks. The most recurrent knee lesions are sprains, especially of the tibial collateral ligament and anterior cruciate ligament, together with meniscus and cartilage lesions. Anterior cruciate ligament injuries are nearly always indirect, without contact, whereas tibial collateral ligament injuries are usually the result of collision with an opponent (Ekstrand, 1982).

### 1.4.2 Mechanism of injury in Football

The most common injury mechanisms are tackling, being tackled, running, shooting, twisting, turning, jumping and landing.

Tackling is usually seen in football matches when players try to get possession of the ball. The lower extremities are often injured during tackling as players cannot respond quickly enough to avoid such rapid and unpredictable movement.

During running and twisting and turning, the main causes of injury are inferior playing surfaces and inappropriate footwear. Uneven playing surfaces may result in more loading on the ligaments and muscles. When external loading is greater than the ligaments and muscles can tolerate, injury usually follows. Incorrect footwear, which provide insufficient frictional force, will eventually lead to slipping. On the other hand, too much frictional force will produce large torque when twisting and turning, which may also lead to injury.

In addition, injuries often happen during jumping and landing, which are integral components of activities such as heading, shooting, and goalkeeping. Causes of such injuries are incorrect landing technique and collisions between players after take off and before landing (Ekstrand & Gillquist, 1983).

### 1.4.3 Consequences of football injury

It has been estimated that around one-tenth of a professional team is on sick-leave each week because of injury (Hawkins et al., 2001).

Most injuries are not severe and the players can return to play within a couple of weeks. Sometimes, a player is forced to give up his or her career earlier than desired because of injury. Even if players can successfully return to play, some injuries (knee injuries in particular) are also associated with a high degree of medical disability and premature development of osteoarthritis (Drawer & Fuller, 2001).

## **1.5 The extent of the football injury problem in Gaza Strip**

In Gaza Strip Football is a very common competitive sport. Unfortunately, till now incidence of sport injuries in Gaza Strip has not been investigated in several high profile sports and that may be due to the lack of recording system of sport injuries in the sport clubs.

In addition to the national team there are 18 registered football competitors' teams in Gaza Strip and an additional unknown number of non-competitors, therefore epidemiological data about injuries in football sport in Gaza Strip are required to assess the risk of injury in this sport, so that injury prevention and rehabilitation strategies can be addressed.

## **1.6 Significance of the study**

Football is a very common competitive sport in Gaza Strip. It involves exercise performance of high intensity and direct physical contact, which is similar to all sports that can lead to injury risk. Unfortunately, till now no injury risk has been investigated in several high profile sports in Gaza Strip.

There is no effort in Gaza Strip towards ensuring the health and safety of professional footballers, sincere efforts must be made to prevent and control injuries, data must be made available through an effective injury recording system, and knowledge of the factors that influence injury is required. Therefore there is a need to conduct an epidemiological study concerning the common football injuries among the football players in Gaza Strip to assess the risk of injury in this sport so that injury prevention and rehabilitation strategies can be addressed.

In light of the lack of research in the sport injuries of football, this will be the first study investigating injury among football players in Gaza Strip.

## 1.7 Operational Definitions

### Consensus about study design and definitions

After informal discussions during the 1st World Congress on Sports Injury Prevention in Oslo in June 2005, an Injury Consensus Group was gathered with the purpose of establishing definitions and methodology, implementation and reporting standards that should be adopted in studies in injury in football (Ekstrand et al ., 2006).

In this study of injuries among professional football players in Gaza Strip, the researcher implemented the operational definitions that were adopted by the previously outlined consensus model approach of the Medical Assessment and Research Centre of the FIFA (Federation of International Football Associations), but in some issues they varied slightly to proper the environment of Gaza Strip .

The definition of injury, recurrent injury, injury rate, injury percentage, mechanism of injury, anatomical region of injury, type of injury, severity of injury will respectively described according to the study of the above mentioned group.

### Injury

An football injury 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.

Injuries are classified by body side, location, type, onset, severity, mechanism of injury, how the injury occur (traumatic or overuse) and whether the injury was a recurrence or a new one.



In this context, a traumatic injury refers to an injury resulting from a specific, identifiable event. These kind of injuries are classified according to damage happened as follow:

<b>Sprain</b>	Acute distraction injury of ligaments or joint capsules
<b>Strain</b>	Acute distraction injury of muscles and tendons
<b>Contusion</b>	Tissue bruise without concomitant injuries classified elsewhere
<b>Fracture</b>	Traumatic break of bone
<b>Other</b>	Injuries not classified elsewhere. Examples: wound, concussion, etc

An overuse injury refers to one caused by repeated micro-trauma without a single, identifiable event responsible for the injury.

Injuries should also be classified as to whether they occurred during a match or training session.

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

### **Injury rate**

A team with 25 players who train 6 hours a week during a 40 –week season will have a combined exposure time of 6000 participation hours. If the team sustains a combined total of 30 injuries during the same period, the injury rate is 5 injuries per 1000 participation hours ( $30/6000 \times 1000$ ).

Injury rate is defined as the number of injuries per 1000 hours of player activity time, or number of injuries per 1000 athlete-exposures.

Athlete-exposure is one athlete participating in one competition or one training session where he is exposed to the possibility of being injured, no matter what amount of time is involved. For example, two competitions involving 20 participants and three training sessions involving 20 participants would result in a total of 100 athlete-exposures ( $2 \times 20 + 3 \times 20$ ).

### Injury percentage

Injury percentage is defined as the number of injured players divided by total number of players.

### Mechanism of injury

Injuries mechanisms are divided into two main categories:

- Contact mechanism with the ball or other players (Tackling, Tackled, Collision and Use of elbow).
- Non-contact (Twisting/turning, Running, Over stretching, Falling , Shooting and Jumping).

### Location of injury

The location of injuries is recorded using the categories listed in table 1.V

**Table(1.V) Location of Injury**

Head and neck	Upper limbs	Lower limbs
<input type="checkbox"/> Head	<input type="checkbox"/> Shoulder	<input type="checkbox"/> Hip
<input type="checkbox"/> Face	<input type="checkbox"/> Clavicle	<input type="checkbox"/> Groin
<input type="checkbox"/> Neck	<input type="checkbox"/> Upper arm	<input type="checkbox"/> Quadriceps
<input type="checkbox"/> Cervical spine	<input type="checkbox"/> Elbow	<input type="checkbox"/> Hamstrings
<b>Trunk</b>	<input type="checkbox"/> Forearm	<input type="checkbox"/> Adductors
<input type="checkbox"/> Sternum	<input type="checkbox"/> Wrist	<input type="checkbox"/> Knee
<input type="checkbox"/> Ribs <input type="checkbox"/> Abdomen	<input type="checkbox"/> Hand	<input type="checkbox"/> Lower leg
<input type="checkbox"/> Upper back	<input type="checkbox"/> Finger	<input type="checkbox"/> Achilles tendon
<input type="checkbox"/> Lower back	<input type="checkbox"/> Thumb	<input type="checkbox"/> Ankle
<input type="checkbox"/> Pelvis <input type="checkbox"/> Sacrum		<input type="checkbox"/> Foot <input type="checkbox"/> Toe
<input type="checkbox"/> Other injury.....		

### Injury severity

The number of days that have elapsed from the date of injury to the date of the player's return to full participation in team training and availability for match selection injuries are categorized as:

Minor :      (1-7 days lost)

Moderate:    (7-28 days lost)

severe :      (>28 days lost).

**dominant leg** : preferred kicking leg

**Training exposure**

Team based and individual physical activities under the control or guidance of the team's coaching or fitness staff that are aimed at maintaining or improving players' football skills or physical condition.

Pre-match warm up and post-match cool down sessions should be recorded as training exposure.

**Competition exposure**

Play between teams from different clubs.

Match exposure between teams from the same club should be regarded as training exposure.

## 1.8 Study Objectives

### General objective:

Obtaining epidemiological data regarding the characteristics of injuries among football athletes in Gaza Strip to assess the risk of injury in this sport so that injury prevention and rehabilitation programs can be addressed .

### Specific objectives :

- To determine the incidence, anatomical region, onset, severity, and types of injury sustained by footballers in Gaza Strip.
- To classify the football event (training or competition ) during which injuries occurred most commonly .
- To identify the mechanism of injury that may contribute to injury .
- To identify the persons engaged in assessment of injury .

## 1.9 Research Questions

- 1-What is the injury rate of match and training injuries among footballers in Gaza strip?
- 2-In which body side is the injury most occur in relation to dominant part?
- 3-What is the incidence of new and recurrent injuries ?
- 4-Are the injuries more due to trauma or overuse ?
- 5-Are injuries mostly occur in competition or training?
- 6-What is the type, location and severity of the injuries occurred among football athletes in Gaza strip?
- 7-How is the mechanisms of the injury sustained by the football athletes?
- 8-Who treat the sport injuries?

## 1.10 Limitation of the study

- 1- Lack of previous studies in the area of sports injuries in Gaza Strip.
- 2- Lack of sports injuries recording system among all of the football clubs.
- 3- Difficulties in translation of the medical definitions into the every day Arabic language
- 4- Most of football players are not educated enough to deal with the high medical definitions.

5- Players who sustained multiple injuries over the study time may have been discouraged from providing information on all injuries sustained, because of the requirement to complete a separate form for each injury sustained.

## 1.11 Context of the study

### 1.11.1 History of Sports and Football

Sports are timeless activities; ones that humans have enjoyed since at least ancient times, as exemplified by the Greek Olympic Games. Indeed, ethnographic and archaeological evidence such as cave paintings and the accounts of early European explorers indicate sports may well go back to the very beginning of humankind. Many of the sports played and celebrated today, such as football, even have their roots in various kicking and running ball games played throughout medieval Europe. Sports such as golf and horse racing were also played among the European aristocratic classes, especially those of Britain.

Of course ancient Olympics, medieval aristocrats, cave people, and hordes of peasants kicking a ball from one village to the next is, despite the genealogy, rather far removed from sports as we know them today. ([www.historyofsports.net](http://www.historyofsports.net))

A game very similar to football was played 3000 years ago in Japan. One of the earliest forms of football in which players kicked a ball around on a small field has been traced as far back to 1004 B.C. in Japan. The Munich Ethnological Museum in Germany has a Chinese text from 50 BC that mentions football-like games between teams from Japan and China. A text dating from 611 AD confirms that football was played in Kyoto, the ancient capital of Japan. The Chinese, Japanese, Roman, Ancient Greek, Persian, Viking, and many more played a ball game long before our era. The Ancient Greeks and the Roman used football games to prepare warriors for battle, although the Greeks permitted carrying of the ball. Olympic games in ancient Rome featured a 50-minute football game with twenty seven men on a side. In south and Central America a game that resembled football called "Tlatchi" was played long ago. ([www.worldtopix.com](http://www.worldtopix.com))

The development of modern sports is tied very much to the history of the industrial revolution and the creation of the first public schools, the latter of which sought to incorporate physical activity in the curriculum. The net result of this process was to cleanse (as in reduce violent elements) and codify various games such as soccer or rugby and of course later on, basketball and football.

In 1885, the professional way of playing the football was legalized by The Football Association, paving an eventful landmark in the history of Soccer. This move changed the way the game was played universally. Football became the greatest sport on the face of the planet. In 1888, William McGregor, a Scot, created the English Football League by asking 12 clubs to comply with a standard home and “away from home” fixture list. The director of Aston Villa club is credited with merging 12 clubs, namely: ([www.historyofsports.net](http://www.historyofsports.net))

The laws of the game are currently determined by the International Football Association Board (IFAB). The Board was formed in 1886 after a meeting in Manchester of The Football Association, the Scottish Football Association, the Football Association of Wales, and the Irish Football Association. The world's oldest football competition is the FA Cup, which was founded by C. W. Alcock and has been contested by English teams since 1872. The first official international football match took place in 1872 between Scotland and England in Glasgow, again at the instigation of C. W. Alcock. England is home to the world's first football league, which was founded in Birmingham in 1888 by Aston Villa director William McGregor. The original format contained 12 clubs from the Midlands and the North of England.

The Federation Internationale de Football Association (FIFA), the international football body, was formed in Paris in 1904 and declared that they would adhere to Laws of the Game of the Football Association. The growing popularity of the international game led to the admittance of FIFA representatives to the International Football Association Board in 1913. The board currently consists of four representatives from FIFA and one representative from each of the four British associations. (Wikipedia the free encyclopedia, 2008)

In 1912, 21 national associations were already affiliated to the Federation Internationale de Football Association (FIFA). By 1925, the number had increased to 36, while in 1930 - the year of the first World Cup - it was 41.

Between 1937 and 1938, the modern-day Laws of the Game were set out by future FIFA President Stanley Rous. He took the original Laws, written in 1886 and subject subsequently to piecemeal alterations, and drafted them in a rational order. (They would be revised a second time in 1997.)

By the late 1930s there were 51 FIFA members; in 1950, after the interval caused by the Second World War, that number had reached 73. Over the next half-century, football's popularity continued to attract new devotees and at the end of the 2007 FIFA Congress, FIFA had 208 members in every part of the world. ([www.fifa.com](http://www.fifa.com))

### **1.11.2 FIFA recognition of the Palestinian football federation**

In 1998, the FIFA official recognition of the Palestinian football federation was declared during FIFA conference in Paris. Since that time Palestine had become a full member in FIFA, which enables the Palestinian Federation to participate in FIFA training courses for coaches, referees, managers and sport injury professional. Palestine restarted the participation in the competitions of the World Cup and Olympics games in 1996, where the last Palestinian athletics sharing was on 1933.

In 1999. Mr. Platter, the FIFA chairman visited Palestine and put the first stone for the Palestinian Football building as well as international stadium in Gaza Strip. (Elsharif, 2003)

### **1.11.3 Football in Gaza Strip**

Gaza Strip is a region divided into five governorates : North Gaza, Gaza City , Mid – zone , Khan-younis and Rafah. Football, is one of the most popular team sports in Gaza Strip, thus 18 football teams in this region are registered in the football Union of Gaza with a population over than 800 players participate every year in the national

competition. Football teams in Gaza Strip are grouped into two divisions: the first and the second divisions.

The first division is more competitive than the second one because it is the one from which Champion Clubs are selected . In addition, the national team football players are selected from teams of the first division. Therefore, there could probably be an expectation of more injuries in the first division than in the second division. However, it should be considered that the second division teams are fighting in order to get a place in the first division. After each league season, the last team in first division moves to the second division whereas the first in second division joins the first division.

As both divisions are in continual competitive events, the researcher believes that there might be a high risk of both acute and overuse football injury occurrence. Some football players in Gaza Strip participate in competition at both national and international level, which expose football players to more risk of injury.

Although the level of tournament competitions generally in Palestine and specifically in Gaza Strip is not higher than that of developed countries, the researcher believes that the injury prevalence, type, mechanism and other related causal factors could be the same or even more than those observed in developed countries.

In Gaza Strip, the causes of football injuries may be worsened by financial problems and consequently the state of playing surfaces and equipment may not be of good quality despite their role in injury prevention.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Rehabilitation program

Development of a rehabilitation program is a problem-solving process. This requires careful evaluation of the injured football player for development of goals and a plan of care that addresses the impairments, functional limitations and disability experienced by the football player in order to return them to their previous level of sports activity. ( Delee et al., 2003).

It is thought that every rehabilitation program should provide a four-phase approach to treat and assess the progress of an athlete with an acute injury.

##### **Phase I:** Limit additional injury and control pain and swelling

The PRICE (protection, rest, ice, compression, elevation) approach is essential in this phase.

**1-Protection:** After an injury, the area is protected either by splinting, bracing, or taping/wrapping. Crutch ambulation for lower extremity injuries can be very helpful until a normal, pain-free gait pattern can be reestablished.

**2-Rest:** The injured ligament, muscle or tendon should be rested to allow healing to begin. Rest may be absolute (complete cessation of activity) or relative (activity modified to avoid stressing the injured tissue) until healing and recovery occur.

**3-Ice:** Ice significantly helps to minimize pain, swelling and inflammation. Ice may be applied in the form of an ice pack, ice massage (large ice cube rubbed directly on the skin), or ice bath. Ice should be applied for 15-30 minutes every 3-4 hours, for up to the first 2-4 days depending on the extent of the injury.

**4-Compression:** Compression of an injured joint, muscle or tendon through the use of a compressive wrap may help to minimize swelling. This can be accomplished with an elastic bandage or other type of compressive garment wrap.

**5-Elevation:** The injured limb should be elevated above the level of the heart to optimally assist with venous and lymphatic drainage and therefore control edema.

**Phase II:** Improve strength and flexibility (range of motion) of the injured structures.

In this phase, pain-free movement of a joint and stretching that prevents contractures is encouraged and movements that results in stress on the injured area is avoided. As the pain and inflammation decrease, more stretching and mobilization continues until symmetric motion is achieved with normal movement patterns.

**Phase III:** Progressively improve strength, flexibility, proprioception, and endurance training until near-normal function is attained.

In this phases, pain-free isometric contractions are encouraged in an effort to retard muscular atrophy. They should be performed several times throughout the day. A simple method can be to recommend 10-second contractions, with 10 repetitions, 10 times a day. Resistance training can be in the form of exercising against gravity, free weights machines, and resistance tubing. The strengthening should be as functional as possible, attempting to match the demands of the sport. Resistance tubing strengthening is attractive because of its ease and simplicity; however, the greatest tension with resistance occurs at the end ROM, where the muscle is usually weakest and the joint is most vulnerable. Therefore, this should be reserved for later stages of the strengthening program.

**Phase V:** Return to exercise and sports symptom free.

The athlete then is put through activities that replicate the demands of the sport. For example, running, kicking the ball jumping and landing, using optimal biomechanics. Once the athlete demonstrates that he can successfully deal with the various skills and challenges that will occur in the sport in a controlled situation, then it will be clear that he can safely return to their sport.

## 2.2 Prevention Program

It is thought that the effectiveness of an injury prevention program is depend on many responsibilities that must be carried out by the Coach, Physician, trainer, player and the clubs.

### Coach's responsibilities

The coach has the main responsibility in the injury prevention program. coach should apply injury-safe techniques and put a special focus on methods, which help injury prevention for the whole season as follow:

- Teach the team safety principles and appropriate football skills
- Ensure they are always in adequate condition.
- Master basic skills in the management of acute sports injuries.
- Allowing the athlete's body to recover properly from training
- Provide a well-supervised pre-season physical conditioning program, which include
  - 1-cardio-respiratory stamina
  - 2-Good muscular condition (strength, dynamic power, endurance, flexibility, and proprioception).
  - 3- Well-balanced strength and flexibility exercises for the lower back, abdominal muscles, and muscles of the lower extremity.
  - 4-Gradually increasing of intensity, duration, and frequency to prevent overuse injuries.
  - 5- Resistance-training programs, which should help to prevent injuries by improving muscle balance. (Heidt et.al., 2000).

### Trainer's responsibilities

- Risk-conscious education of players
- Structured, complex pre- and in-season training regimen (including proper complex muscle management and stamina training)
- Reduction of physical overload; appropriate game/training relationship.
- Stretching and proprioceptive training sessions must be held on a regular basis.
- Before exercises, athletes should warm up (by means of stretching and low-intensity aerobic exercises) for more than 5–10 min (Witvrouw et.al., 2000).

Warming up is often overlooked but should be part of any injury-prevention routine.

A good warm up will increase the temperature of muscles, blood flow and oxygen supply to the muscles, the speed of nerve impulses, and the range of motion at joints. It not only helps to avoid injury but also improves performance. The warm up should last between 15 and 30 min but must not be carried out too early; the benefits are lost after about 30 min of inactivity.

- Similarly to the warm up, there must be a cool down after every practice session or game played. Immediately stopping vigorous activities will cause a fast reduction of blood flow in the muscles, hindering the necessary transport of potentially harmful metabolites (hydroxides, lactic acids, etc.) from the muscles. The cool down should consist of a gentle jog followed by light stretching (Ekstrand et al.,1983).

### **Medical Perspectives – The Physician’s Responsibilities**

-The most important role of a physician is to supervise and coordinate injury prevention, to implement preventive measures both for the team and for each individual, and to assess the effectiveness of the employed measures.

- Better education of coaches and players regarding injury prevention strategies to help them include such interventions as part of their regular training programs and to increase general injury awareness among team members ( Dvorak et al., 2000).

-Respiratory functions (using treadmill tests) and isokinetic dynamometric tests on the muscles of the lower extremities before starting and at the end of the pre-season conditioning period.

-To minimize frequency of re-injury, new injuries must be addressed and managed properly, with rehabilitation of the appropriate intensity, quality, and length.

-Players must not be allowed to return to football until injuries are healed, range of motion is restored, and strength has been recovered.

-Proper rehabilitation may break the injury/re-injury cycle but only when the program emphasizes and attains a return to full function, not just symptom relief.

-The team physician must make sure injured players follow the rehabilitation prescription (Nielsen & Yde,1989).

### **Players’ Responsibilities**

-Players must co-operate with conditioning programs and coaches to improve the correct execution of sport-specific drills and techniques

- Wear protective equipment in all contact situations, and follow the rules in order to reduce the risk of injury.
- They are obliged to report all, even minor, injuries to the coaching and/or medical staff and should show full compliance with any injury treatment or rehabilitation program.
- Each player should have and use equipment of good quality and condition.
- Shoes are the most important of any sports equipment in the prevention of overuse injuries to the lower leg.
- The use of shin guards is one of the first preventive measurements applied in football. They were introduced to reduce acute contact injuries to the shin. They cannot prevent all types of shin injuries (e.g. fractures) but can reduce their severity (Francisco et al., 2000)
- Ankle protection (braces and taping) is another evidence-based preventive measure, hindering the development of acute sprains and thus the development of chronic instability as well .
- Knee braces are not applied as often for prevention but mostly to reduce the adverse effect of a previous ligament injury (Inklaar,1994).

### **Clubs' Responsibilities**

- The management of a club must provide all fundamentals human resources and financial background to enable the ideal injury prevention concept to become practice.
  - Clubs must realize the importance of their players (the player is the club's asset) and follow the total loss approach, avoiding injuries.
  - Clubs should be totally committed to optimizing the medical welfare of players of all ages and abilities. To ensure the health and safety of players, every effort must be made to further advance the practices involved with the prevention of injuries.
  - Each club should build a professional staff responsible for the management and prevention of sports injuries, capable of effectively assisting the coaching and conditioning staff in controlling the workload, and who can individualize the conditioning program.
- Good playing-field conditions represent another of the club's responsibility.
- Pitches should be well maintained and be free of holes or other hazards (Piero Volpi, 2006)

## 2.3 Risk factors that lead to injuries by football players

### Extrinsic/External Risk Factors

Extrinsic or external risk factors are environmental factors out of direct control of the footballers. These types of factors include the type of sport, position of player, nature of event, state of the flooring or grounds, safety measures, equipment, coaching, application of the rules by both the players and officials and weather conditions, such as hot, cold, and humidity . Factors such as hard, soft, and uneven playing surfaces, poor lighting, dry field conditions, shoes that are inappropriate or worn out, inappropriate equipment, can all contribute to footballers injuries. Another extrinsic risk factor that is often overlooked is inadequate rehabilitation following a previous injury .

### Intrinsic/Internal Risk Factors

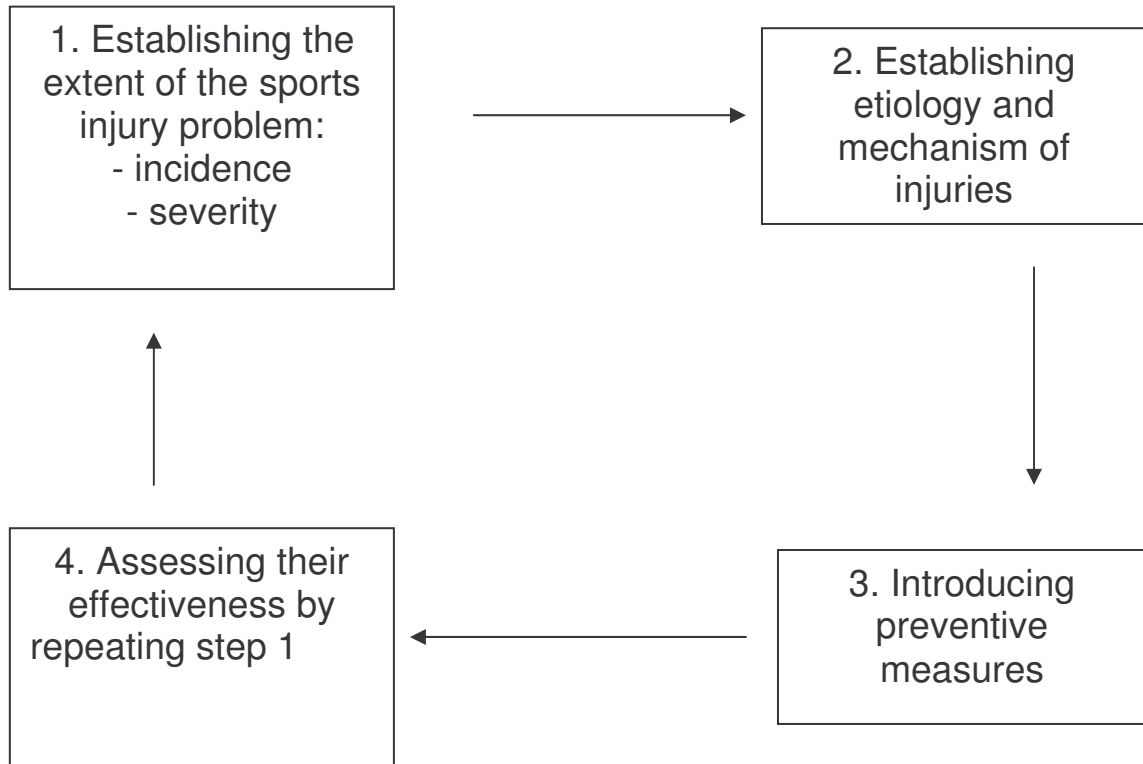
Intrinsic risk factors contribute to footballer injuries include age, gender, injury history, body size, height, weight, local anatomy and biomechanics, aerobic fitness, muscle strength, imbalance, and tightness, ligamentous laxity, central motor control, psychological and psychosocial factors, and general mental ability. Joint instability and ligamentous laxity are risk factors for potential injuries. Joint looseness, or a tendency toward joint hyperextension, increases the risk of injury, even in Athletes with insufficient ligament stability are more prone to hyperextension knee injuries (Van Mechelen et al., 1992).

Another cause of non-contact footballer's injuries is lack of flexibility and mobility. Muscles, tendons, ligaments and joint capsules that are less flexible are often more susceptible to injury. Muscles that cross two or more joints, such as the hamstrings, become injured most often. Injuries that occur as a result of decreased flexibility include muscle strains, sprains and overuse injury (Brukner & Khan, 2001).

Unlike extrinsic risk factors, intrinsic risk factors cannot be corrected quickly. For example, Lighting in a gymnasium can be easily changed, whereas, aerobic fitness takes time to improve, while age cannot not be corrected at all.

## 2.4 Conceptual framework

### 2.4.1 The sequence of prevention in sport rehabilitation



**Figure 1.1** The sequence of prevention in sport rehabilitation (Van Mechelen et al., 1992)

The sequence of prevention in sport rehabilitation should ideally follow a four steps. First, establishing the extent of the sports injury problem, which need to be identified and described in terms of incidence and severity. In the second step, the factors and mechanisms, which play a part in the occurrence of injuries, should be identified. The third step is to introduce preventive measures based on the etiological factors and mechanisms identified in the second step. Finally, the effect of these measures is evaluated by simply repeating the first step (Van Mechelen et al., 1992).

In this study the researcher will exert effort to cover the first step, mainly the extent of the injury problem in Gaza Strip, which includes describing the incidence, severity, type and location of injury.

To help future research in Gaza Strip to find more data available the researcher added other injury classification issues in his study, mainly the injury occurrence, mechanism of injury and the persons treated the injuries.

## 2.5 Epidemiology of sport injuries

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems ( Dicker and Gathany,1992)

The epidemiology in sports rehabilitation is concerned with determining injury occurrence (how much) with respect to who is affected by injury, where and when injuries occur, and what their outcome is, for the purpose of explaining why and how injuries occur and identifying strategies to control and prevent them. The study of the distribution of varying rates of injuries (i.e., who, where, when, what) is referred to as descriptive epidemiology, and the study of the determinants of an exhibited distribution of varying rates of injuries (i.e., why and how) is referred to as analytical epidemiology (Caine et al., 1996).

Epidemiological data are used to formulate appropriate preventive measures. Epidemiological investigation of sport injuries assesses their incidence during the course of individual sports. Football gives rise to both sport-associated injuries, namely, those that stem from the specific ways in which it is played, and sport-occasioned injuries, that is, those that occur incidentally during training or the course of a match. The incidence of injuries can be expressed in several ways, including number per season, number per match and/or training, per hours of activity, per exposure to a type of injury.

Sport injury rates vary from country to country. It is impossible to compare directly the results of the various epidemiologic studies reviewed here because of differences in population size, levels of play, definitions and reporting of injuries. However, some general trends can be observed in all studies.



In the UK, sport related injuries accounted for 33% of all injuries reported in a population survey (Uitenbroek, 1996). In the USA, of the estimated 17 million annual sport and recreation injuries, almost 2 million require hospital emergency room consultations (National Electronic Injury Surveillance System, 1998).

In most studies, ankle sprain is the most common injury type (Sullivan et al, 1980; Albert, 1983; Nilsson and Roaas, 1978; National Collegiate Athletic Association, 2000); however, Ekstrand in his study of 256 football injuries in senior players found knee injuries in 20% of his athletes and ankle injuries in 17% (Ekstrand and Gillquist, 1993). Ankle sprain is implicated as a reinjury 56% of the time (Soderman, 2001).

The incidence of injury varies widely in reported studies, from 2 to 40 per 1,000 exposure hours but with an average of about 12 per 1,000 hours. The rate of injury in games is greater than that in practice. Injuries to the lower extremities account for between 50% and 66% of all injuries. Contusions, ligament sprains (especially ankle sprains), and muscle strains account for about 75% of all injuries. Serious, permanently disabling injuries are, fortunately, rare, accounting for less than 0.1% of injuries at all levels. Knee injuries usually result in the most time lost from participation. (Caine et al., 1996).

## 2.6 Previous related studies

Different research groups have initiated projects to study the incidence and causes of injury in football—for example, the FIFA Medical Assessment and Research Center (F-MARC), Union of European Football Associations (UEFA) and the Oslo Sports Trauma Research Center (OSTRC). The ultimate goal of those studies was to prevent injuries and thereby improve the safety of the sport.

Preventive measures are based on epidemiological research, and the first step in injury prevention is to establish the extent of the injury problem—the incidence, severity, and injury profile of the sport (Ekstrand et al., 2006).

Previous studies have shown that football has a high injury rate and injury percentage. More injuries have been found in football than in field hockey, volleyball, handball, basketball, rugby, cricket, badminton, fencing, cycling, judo, boxing and swimming (Wong and Hong, 2005).

A descriptive epidemiology study carried out by Emery et al., (2005) using an injury surveillance system to identify risk factors for injury in adolescent football players. The study population was a random sample of 21 adolescent football teams (ages 12-18). A certified athletic therapist completed preseason baseline measurements and did weekly assessments of any identified football injury. The injury definition included any injury occurring in football that resulted in 1 or more of the following: medical attention, the inability to complete a session, or missing a subsequent session. The overall injury rate during the regular season was 5.59 injuries per 1,000-player hour. Ankle and knee injuries were the most common injuries reported. There was an increased risk of injury associated with games versus practices (relative risk = 2.89; 95%).

In another study to investigate the incidence of injury among footballers Peterson et al. (2005) assessed injuries according to the International Classification of Diseases (ICD), which describes them in terms of injury type and location, the treatment required, and the duration of subsequent performance limitations. Two hundred sixty four players of different age groups and skill levels was observed for 1 year. Five hundred fifty-eight injuries were documented. Two hundred sixteen players had one or more injuries, only 48 players (18%) had no injury. The average number of injuries per player per year was 2.1. Injuries were classified as mild (52%), moderate (33%), or severe (15%).

The aim of a prospective cohort study done by Junge et al. (2004) was to compare the characteristics and incidence of injuries in male youth amateur football and rugby players. The study comprised an initial baseline examination to ascertain the characteristics of the players and their level of performance, and a one season observation period during which a physician visited the team weekly and documented all occurring injuries. Twelve football and 10 rugby school teams with male amateur

players aged 14-18 years were selected for the study. One hundred forty five football and one hundred twenty three rugby players were followed up over one season. Comparison of the incidence of football and rugby injuries indicated that rugby union was associated with a significantly higher rate of injury than football. The differences were pronounced for contact injuries, injuries of the head, neck, shoulder, and upper extremity, as well as for concussion, fractures, dislocations, and strains. Rugby players incurred 1.5 times more overuse and training injuries in relation to exposure time, and 2.7 times more match injuries than football players. Three rugby players but no football players had to stop their participation in sport because of severe injury. The study concluded that the incidence of injury in New Zealand school teams playing football or rugby union is high, probably in part because of the low ratio of hours spent in training relative to hours spent playing matches. The development and implementation of preventive interventions to reduce the rate and severity of injury is recommended.

In order to study the incidence and mechanisms of injury in football sport and to recommend prophylactic measures Ekstrand and Gillquist (1983) followed 180 players in a senior male football division prospectively for 1 year. Attendance records for games and practice sessions were kept, and all injured were examined and treated by the same orthopedic surgeon. One hundred twenty four players incurred 256 injuries, mostly sprains and strains of the lower extremities. Of these, 62% were considered minor with ankle sprains being the most common (17%), while 11% were considered major with knee ligament sprains being the most frequent (32%). Overuse injuries were most frequent in the pre-season training period. Traumatic leg injuries involved players with inadequate or no shin guards. Of the traumatic knee injuries, (61%) occurred during a collision; non-contact knee injuries were frequently seen in those players with a history of knee injury and existing instability. Study of injury sequence disclosed that a minor injury was often followed within two months by a major one. In addition, with severe injuries incurred during fouls, the individual causing the penalty was injured. This prospective study suggested that those with knee instability and those allowed resuming play with poorly rehabilitated or clinically unhealed injuries have more tendency to sustain further injury. Some injuries can be avoided by using better equipment and by observance of the rules.

In a prevalence Cohort study Le Gall et al. (2006) have investigated the incidence of football-related injuries in elite French youth players. Injuries sustained by players in the younger than 14-, 15-, and 16-year-old age groups during 10 seasons were diagnosed and documented by a sports physician according to type, location, severity, the date the injury occurred, and playing position. Altogether, 1152 injuries were documented across all age groups with 69.1% and 30.9% sustained during training and matches, respectively. A total of 4.8 injuries per 1000 hours' exposure time were recorded and 11.2 and 3.9 injuries per 1000 hours for matches and training, respectively. There was no significant difference in injury frequency between age groups. The youngest group sustained more training injuries ( $P < .05$ ) and osteochondroses ( $P < .05$ ) and fewer match injuries than did the oldest group. Injury incidence varied throughout the season, peaking in September in all groups. The majority of injuries lasted less than 1 week (60.2%), contusions were the predominant injury type (30.6%,  $P < .05$ ), and the upper leg was the site most often injured (24.5%,  $P < .05$ ). The study concluded that those players younger than 14 years incurred more injuries in training and sustained more growth-related overuse disorders. Older players were more often injured during matches. Injury incidence and the frequency of overuse disorders were highest early in the season.

In a prevalence Cohort study by Emery and Meeuwisse (2002), they have identified and compared injury rates and risk factors for injury in adolescent indoor and outdoor football in the same cohort of players. The study population was a random sample of 21 adolescent (ages 13-17 years) outdoor football teams ( $N = 317$ ). The sub cohort included players continuing to play in the indoor football season ( $n = 142$ ). The injury definition included any injury occurring in football that resulted in medical attention, the inability to complete a session, and/or missing a subsequent session. The overall injury rate found in indoor soccer over 20 weeks was 4.45 injuries per 1000 player hours. The overall injury rate found in the 13-week outdoor soccer season among a similar cohort was 5.59 injuries per 1000 player hours. The relative risk of injury suggests that there was no significant difference between injury rates by age group or gender in indoor football compared with outdoor football. The risk of injury in the most elite division of play was greater in outdoor compared with indoor football (relative risk, 3.22; 95% confidence interval, 1.8-6.12). The most commonly injured body part in

both indoor and outdoor football was the ankle, followed by the groin in indoor and the knee in outdoor football. There were no significant differences in overall injury rates found by gender or age group for indoor compared with outdoor football.

To examine injury incidence and distribution among elite Danish and Swedish footballers, a prospective study was carried out by Hagglund et al. (2001) from January to June 2001. Exposure to football and injury incidence, severity and distribution were compared between the countries. Swedish players had greater exposure to training (171h vs. 123 h per season,  $P < 0.001$ ), whereas exposure to matches did not differ between the countries. There was a higher risk for injury during training in Denmark than in Sweden (11.8 vs. 6.0 per 1000 h respectively,  $P < 0.01$ ), whereas for match play there was no difference (28.2 vs. 26.2 per 1000 h). The risk for incurring a major injury (absence from football more than 4 weeks) was greater in Denmark (1.8 vs. 0.7 per 1000 h,  $P = 0.002$ ). The distribution of injuries according to type and location was similar in both countries. Of all injuries in Denmark and Sweden, overuse injury accounted for 39% and 38% (NS), and re-injury for 30% and 24% ( $P = 0.032$ ), respectively. The greater training exposure and the long pre-season period in Sweden may explain some of the reported differences.

For analyzing of incidence rates Lindenfeld et al. (1994) documented in their study all injuries occurring over a 7-week period at a local indoor football field. All injury rates were calculated per 100 player-hours. The overall injury rates for male and female players were similar, 5.04 and 5.03, respectively. The lowest injury rate was found among the 19- to 24-year-old athletes and the highest injury rate was found among the oldest age group ( $>$  or  $=$  25 years). Collision with another player was the most common activity at the time of injury, accounting for 31% of all injuries. The most common injury types were sprains and muscle contusions, both occurring at a rate of 1.1 injuries per 100 player-hours. Male players suffered a significantly higher rate of ankle ligament injuries compared with female players (1.24 versus 0.43,  $P < 0.05$ ), while female players suffered a significantly higher rate of knee ligament injuries (0.87 versus 0.29,  $P < 0.01$ ). Goalkeepers had injury rates (4.2) similar to players in non-goalkeeper positions (4.5).

A prospective epidemiological study have been carried out by Price et al. (2004) regarding the injuries sustained in English youth academy football over two competitive seasons. A total of 3805 injuries were reported over two complete seasons (June to May) with an average injury rate of 0.40 per player per season. Competition injuries accounted for 50.4% of the total. Strains (31%) and sprains (20%) were the main injury types, predominantly affecting the lower limb, with a similar proportion of injuries affecting the thigh (19%), ankle (19%), and knee (18%). The rate of re-injury of exactly the same anatomical structure was 3%. The study concluded that footballers are at high risk of injury and there is a need to investigate ways of reducing this risk.

To examine the incidences and patterns of injuries that required medical attention among Asian football players, Yoon et al. (2004) conducted a study where a total of 411 Asian football players at both senior and youth elite levels were observed during 50 international matches. Independent injury observers and team doctors determined the occurrence of injuries and recorded the location, type, time, and circumstances of the injuries using a protocol sheet. The overall injury frequency rate was 45.8 out of 1000 hours. As the tournaments progressed into the knockout stages, the incidence and severity of the injuries increased. The most common sites of injuries were the knees (18.5%), lower legs (17.3%), and ankles (14.2%). Although most injuries were diagnosed as contusions, the more serious injuries were those diagnosed as sprains (especially concerning the knee and ankle) or strains (thigh and back). The study concluded that incidences of injuries to Asian football players were higher than those to European players, but the patterns of the injuries showed no major differences. Clinical Relevance: To develop an injury-prevention program, a more solid and comprehensive data need to be collected to identify the risk factors and variables associated with higher incidences of injuries to Asian football players.

In a dutch study for two non-professional football teams, injury rates were analyzed with respect to the factors of age and level of play. In 1 clubs 477 male players, active in teams of different age groups and at different levels of play, were prospectively followed up during the second half of the competitive season. Teams in the 17/18 years age group showed the highest incidence of injury per 1000 players

hours in games. At a high level of play teams have a significantly ( $p < 0.01$ ) higher risk of injury than teams at a low level of play. This difference is noticed within every age group with exception of the 15/16 years age group. At a high level of play teams of senior players have significantly ( $p < 0.005$ ) more prevalent injuries than teams of junior players. Senior players, active at a high level of play, have significantly ( $p < 0.05$ ) more overuse injuries than senior players of a low level of play. At a high level of play significantly ( $p < 0.05$ ) more upper leg injuries are reported. In the total population of football players relatively more sprains are located in the ankle joint and relatively more strains are located on the upper leg. It is concluded that prevention of football injuries primarily should be aimed at teams and their environment and not at the individual football player (Inklaar et al., 1996).

A prospective interventioned controlled study in young amateur players carried out by Junge et al. (2002) for the Federation Internationale de Football Association Medical Assessment and Research Center, Zurich, Switzerland. The study have evaluated the effects of a prevention program on the incidence of football injuries in male young amateur players .Where Seven Football teams took part in a prevention program that focused on education and supervision of coaches and players, while seven other teams were instructed to train and play soccer as usual. Over 1 year all injuries were documented weekly by physicians. Complete weekly injury reports were available for 194 players. The result included incidence of injury per 1000 hours of training and playing football was 6.7 in the intervention group and 8.5 in the control group, which equates to 21% fewer injuries in the intervention group. The greatest effects were observed for mild injuries, overuse injuries, and injuries incurred during training. The prevention program had greater effects in low-skill than in high-skill teams. As a conclusion the incidence of football injuries could be reduced by preventive interventions, especially in low skill level youth teams. Coaches and players needed better education regarding injury prevention strategies and should include such interventions as part of their regular training.

Previous studies also showed that non-body contact was the primary mechanism of injury. Hawkins and Fuller (1999) reported that injuries caused by non-body contact (59%) were more prevalent than injuries caused by body contact (41%). In addition, running, shooting, turning, and jumping caused 39% of all injuries, which were classified as non-body contact. Yde and Nielsen (1990) observed players under 18 years old and reported that 27% of all injuries were due to running, which is classified as non-body contact injury. Hawkins et al (2001) observed four professional football clubs for two seasons and found that the percentage of non-body contact injuries (58%) was higher than body contact injuries (38%). Running (19%), twisting and turning (8%), shooting (4%), and landing (4%) were the most commonly occurring injury mechanisms, and they were classified as non-contact injury.

## 2.7 Summary of the literature review

Football injuries appear to be more serious than injuries resulting from other sporting activities. A general conclusion is that, the epidemiological information of the sport medical aspects of football injuries is conflicting and far from complete. Previous studies of football injuries defined injury differently. In addition, some studies counted injuries occurring in competition, and some counted both competition and training injuries. They used different classification systems to indicate severity of injury; some classified on the basis of the medical treatment used, and some on the number of days absent because of injury. Different methods were used to collect injury data, such as questionnaire, video records, doctor or physiotherapist examination, and these differences have to be accounted for when comparing different studies.

In order to avoid the conflict associated with the definitions and methodology, the researcher in this study of injuries among football players in Gaza Strip implemented the definitions that were adopted by the consensus model approach of the Federation of International Football Association Medical Assessment and Research Centre (F-MARC).



## CHAPTER THREE

### MATERIALS AND METHODS

#### 3.1 Study design

The study was in the form of a descriptive epidemiological study of injuries, information on injuries was gathered retrospectively from 182 elite participants distributed in 8 football teams by the use of a specifically designed questionnaire. Participants were asked to provide information about the injured body part, location, type, severity and mechanism of the injury. Further information was required about whether the injury occurred during training or competitive matches and whether the injury was a recurrent one from old injury or a new one. The consequences of the injury were investigated with regard to absenteeism from training or competition. Finally the subjects were asked about the medical personnel involved in treating the injury and they were required to fill out injury only sustained during the 2006/2007 season.

#### 3.2 Study area

The Gaza Strip province contain of five governorates mainly, North Gaza ( Beat Hanoon, Beat lahia and Jabalia) Gaza City, Mid-zone(Nosirat, Al-Maghazy, Al-Boreej, Deer Elbalah and Al-zawaideh) and South Gaza (Khan Younis and Rafah) (Appendix V).

The study covered all officially registered clubs in the Palestinian Football Union, who participate in the 2006/2007 season. (Appendix VI )

#### 3.3 Study population

The population consist of 16 football teams, with over 350 male football athletes who played with a first team, involved in the national competition, trained with a local clubs in Gaza Strip governorates and participated in the 2006/2007 season.

#### 3.4 Study sample

A sample of 8 teams obtained by the process of dividing a population according to the geographical areas into 5 stratum representing the entire Gaza Strip Governorates

and a random sample is taken from each stratum, the participation rate (182/206) 88.3%.

**Table (3.1) display the randomly selected football teams.**

Governorate	Randomly selected team	No. of players
North Gaza	Ahly Beet Hanoon	24
Gaza City	Ghaza Al-riady	27
	Almashtal	25
Mid-zone	Khadamat Al-Shatae	26
	Ahly Alnoserat	24
South Gaza	Khadamat Almaghazy	25
	Itehad Khanyounis	27
	Khadamat Rafah	28

### 3.5 Questionnaire design

To avoid bias and incorrect answers, data was collected using a face to face structured interview questionnaire. A set of questions were formulated to enable the researcher to focus on necessary data that meet the objectives of the study.

The questionnaire was compiled by the researcher, reviewed and modified many times to meet the objectives of the study (Appendix I ). Item development included expert opinion and questionnaire has been translated into Arabic language (Appendix II).

### 3.6 Data collection

Data collection were obtained retrospectively over the entire 12 months Sport's season including both the preseason and the competitive season. Structured face to face questionnaire were distributed and the researcher handle with every player separately to ensure obtaining proper and unbiased answers. The researcher asked the question in Arabic and filled in the original questionnaire sheet in English. Enough time were given to answer the questions, 206 questionnaires were administrated, 182 questionnaires

were answered, whereas 153 players were injured and 29 were not injured during the 2006/2007 season.

### **3.7 Permission**

An official letter of approval to conduct the study was obtained from the Palestinian Union of Football in Gaza Strip (Appendix IX). In addition, an official letter of approval was obtained from the Ministry of Sport and Youth (Appendix VIII).

### **3.8 Ethical consideration**

Teams Administration office were given full explanation about the purpose of the study and assurance about the confidentiality of the information which will be gathered through them. Consent forms were obtained from all participants, which were attached to every questionnaire to ensure their voluntary participation (Appendix III).

### **3.9 Procedure**

The researcher made initial contact with the team managers of the provincial teams by telephone to ensure participation. Upon agreement, an agreement letters from both the minister of Youth & Sport and the Palestinian football union were delivered to the team managers, stating clearly the purposes of the study.

### **3.10 Pilot study**

To ensure validity of the questionnaire, pilot testing of the study was conducted prior to the beginning of data collection with the 19 players of football team of Rafah Youth Club. Two weeks later the same players filled once again the same questionnaire with no significant changes. The questionnaire was reevaluated, and minor modifications in the translation were made to simplify the English medical words used in the questionnaire. However, pilot subjects were excluded from the study.

### **3.11 Period of data collection**

The researcher started collecting the data on the first of September 2007 and ended it on 28 October 2007, the response rate was 88.3 %.

### 3.12 Inclusion criteria

All players with a first team contract will be included.

### 3.13 Exclusion criteria

All players who refused to participate in the study.

### 3.14 Data management and statistical analysis

Data was analyzed using statistical Package for Social Science (SPSS) version 11. In performing statistical analyses the  $\chi^2$  significance test was used to investigate differences between variables. Statistical significance was assessed using 95% confidence intervals (CIs) and P values, with  $P < .05$  considered significant. Descriptive statistical tests such as frequency distribution and other inferential statistical test such as t test were used.

The Data was managed and analyzed as following

- 1- Over viewing the 153 questionnaires
- 2- Coding the questionnaires
- 3- Data entry
- 4- Data cleaning
- 5- Frequency table for the different variables in the study
- 6- Descriptive and advance inferential statistical analysis.

## CHAPTER FOUR

### RESULTS

#### 4.1 Injury rate and Injury percentage

**Injury rate :** The 8 teams with 182 players trained 6 hours a week during a 40-week season have a combined exposure time of 43680 ( $182 \times 6 \times 40$ ) participation hours. Sustained a combined total of 153 injuries during the same period, the incidence is 3.5 injuries per 1000 participation hours ( $153/43680 \times 1000$ ).

#### **Injury percentage**

The footballers of Gaza Strip sustained during the 2006/2007 season, injury percentage of 84 % ( $153/182 \times 100$ ).

## 4.2 Dominant leg

Figure (4.1) shows that some 57.5% of the players kicked with their right leg, 7.8% with their left leg, and 34.6% kicked with both legs (n = 153).

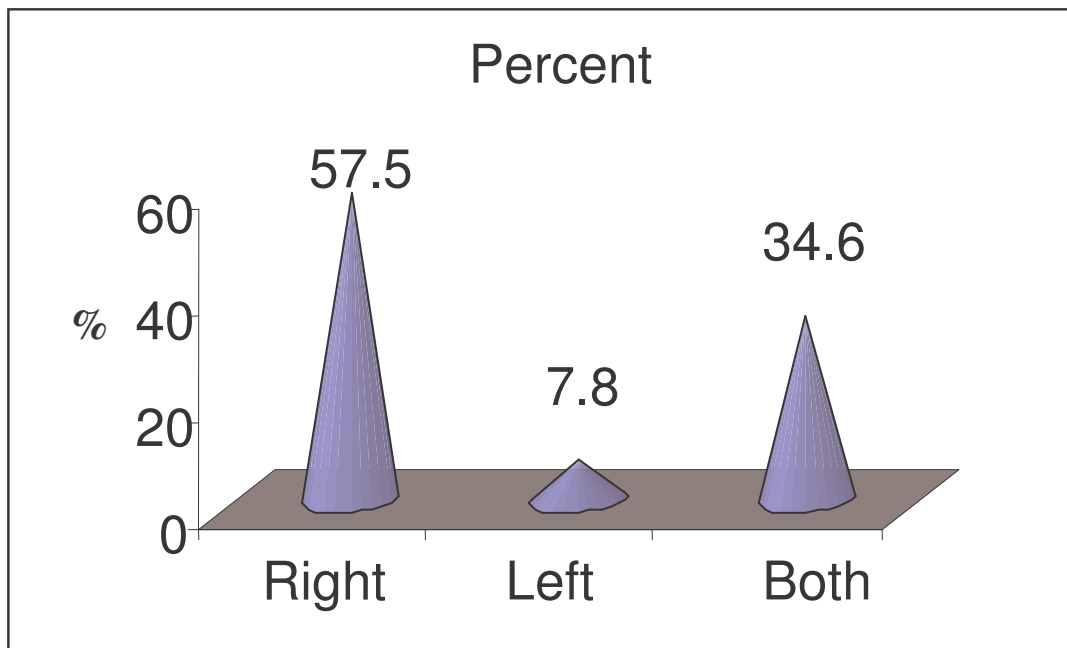


Figure (4.1) Dominant leg

### 4.3 Injured body side

The study result of the injured body side in Figure (4.2) shows that the right body side injuries (95 /153) 62.1% were significantly greater than the left body part (58 /153) 37.9% ( n = 153,  $\chi^2 = 8.948$ , df=1, P=0.003 ).

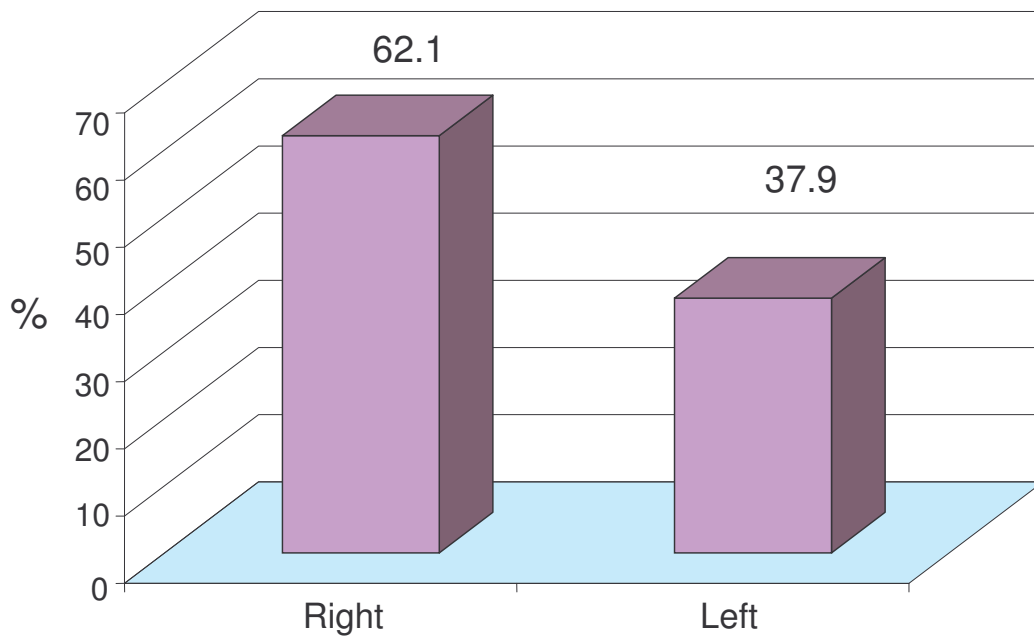


Figure (4.2) Injured body part

#### 4.4 Dominant leg and Injured body part

The subjects in table (4.1) were asked to record the side on which the injury occurred. With regard to the lower limb, 42.5% (58+7x100/153) of injuries were concurrent with the dominant kicking leg, whereas 22.9% (30+5x100/153) were sustained on the non-dominant kicking side. However, (53/153) 34.6% of all subjects kicked the ball with both legs.

Greater number of injuries were sustained to the players' dominant side compared with the non-dominant 42.5%(58+7/153) v 22.9% (30+5/153).

**Table (4.1) Dominant leg and injured body part**

		Injured body part				Total	
		Right		Left		No.	%
		No.	%	No.	%		
Dominant leg	Right	58	(37.9)	30	(19.6)	88	(57.5)
	Left	5	(3.3)	7	(4.6)	12	(7.8)
	Both	32	(20.9)	21	(13.7)	53	(34.6)
Total		95	(62.1)	58	(37.9)	153	(100.0)

( $\chi^2 = 9.000$ ,  $df = 1$ ,  $P = .003$ )



#### 4.5 Location of injured body part

Table (4.3) shows that 79.1% of the injuries affected the lower extremities, which were divided into the following regions: hip, groin, upper leg, knee, lower leg, ankle, and foot. The Ankle was the body part most common injured (38/153) 24.8 %, followed by the injury to the knee constituting (27/153) 17.6% of all injuries, the Hamstring muscle (19/153) 12.4% and the Adductors muscle with the average of (14/153) 9.2% (n= 153).

**Table (4.2) Location of injured body part**

Body part	No	%
Head	1	(.7)
Face	3	(2.0)
Neck	2	(1.3)
Cervicle spine	1	(.7)
Ribs	2	(1.3)
Abdomen	1	(.7)
Lowe Back	4	(2.6)
Pelvis	1	(.7)
Shoulder	6	(3.9)
Clavicle	1	(.7)
Elbow	2	(1.3)
Forearm	4	(2.6)
Wrist	2	(1.3)
Hand	1	(.7)
Thumb	1	(.7)
Hip	2	(1.3)
Groin	1	(.7)
Quadriceps	3	(2.0)
Hamstring	19	(12.4)
Adductors	14	(9.2)
Knee	27	(17.6)
Lower leg	4	(2.6)
Achilles tendon	2	(1.3)
Ankle	38	(24.8)
Foot	7	(4.6)
Toe	4	(2.6)
Total	153	(100.0)

#### 4.6 Type of injury

Figure (4.3) display the type of injury sustained by the Footballers in Gaza Strip whereas the most common type is ligament sprain (24.8%), Muscle strain (23.5%), contusion (11.8% ), inflammation (11.1%) and fractures (9.2%). Injuries grouped as "other" in the table include blisters, bursitis, periostitis, capsular tears, chondral lesions, and dental injuries with individual category amounting of not more than (5.2 %) of all injuries. Injuries classified as sprains, strains, inflammation, contusions and fracture represented 80.4.2% of all the injuries sustained during the season ( n=153).

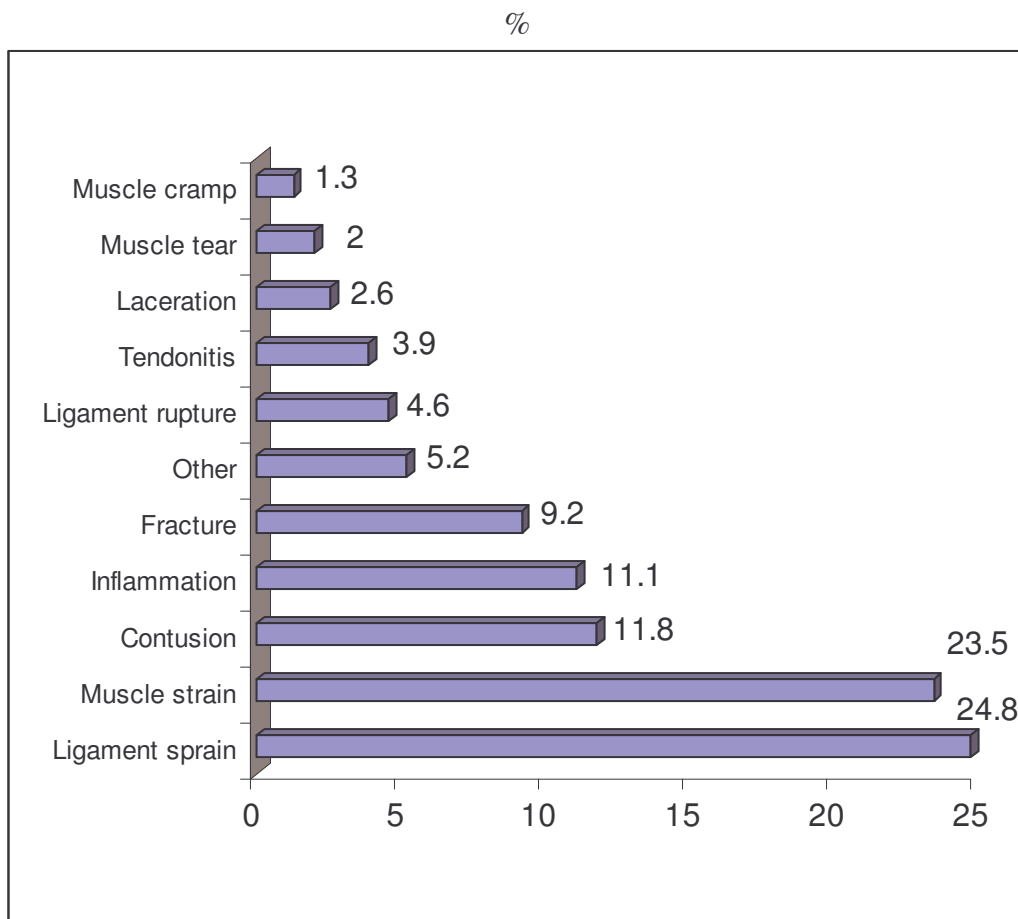


Figure (4.3)Type of injury

#### 4.7 Injury onset

Figure (4.4) indicates that 51% of the all injuries sustained by the footballers of the 8 teams in Gaza strip during the 2006/2007 season were recurrent from old injuries, while 49% were new injuries.

Statistically there is no significant differences between the two results ( $\chi^2=.059$ ,  $df=1$ ,  $P=.8$ ), which indicate that a previous similar injury is one of the greatest risk factor for any type of injury.

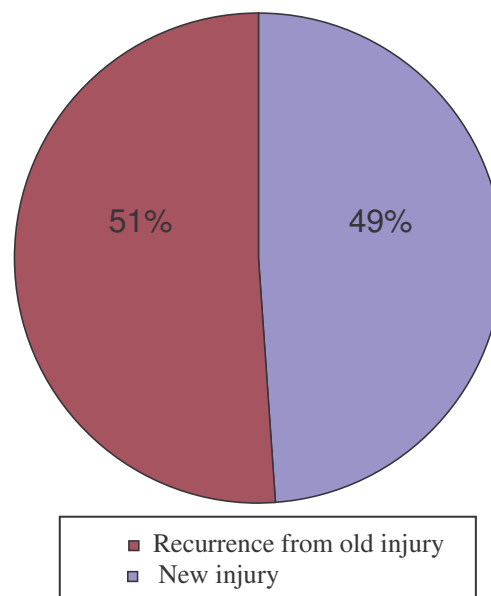


Figure (4.4) Injury onset

#### 4.8 Injury Occurrence

Figure (4.5) display that traumatic injury which occur quickly were made up a higher proportional football injuries (57.5%) than the overused injury which occur slowly over days and weeks (42.5%), although the difference was not statistically significant ( $\chi^2 = 3.458$ ,  $df=1$ ,  $P=.63$ ).

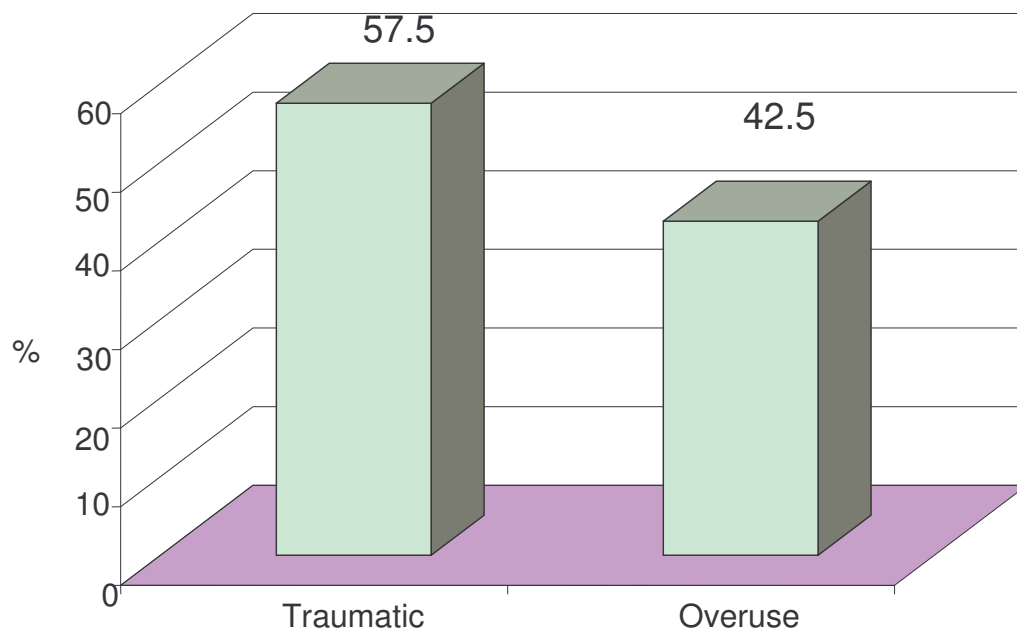


Figure (4.5) Injury Occurrence

#### 4.8 Place of injury

Table (4.3) display the place where the injuries of 153 football player occur. (80 /153) 52.3% injuries were sustained during the competition and (73/153) 47.7% sustained during the training. Statistically there was no significant difference between both frequencies, what makes the injury incidence sustained in during training to be highly considered.

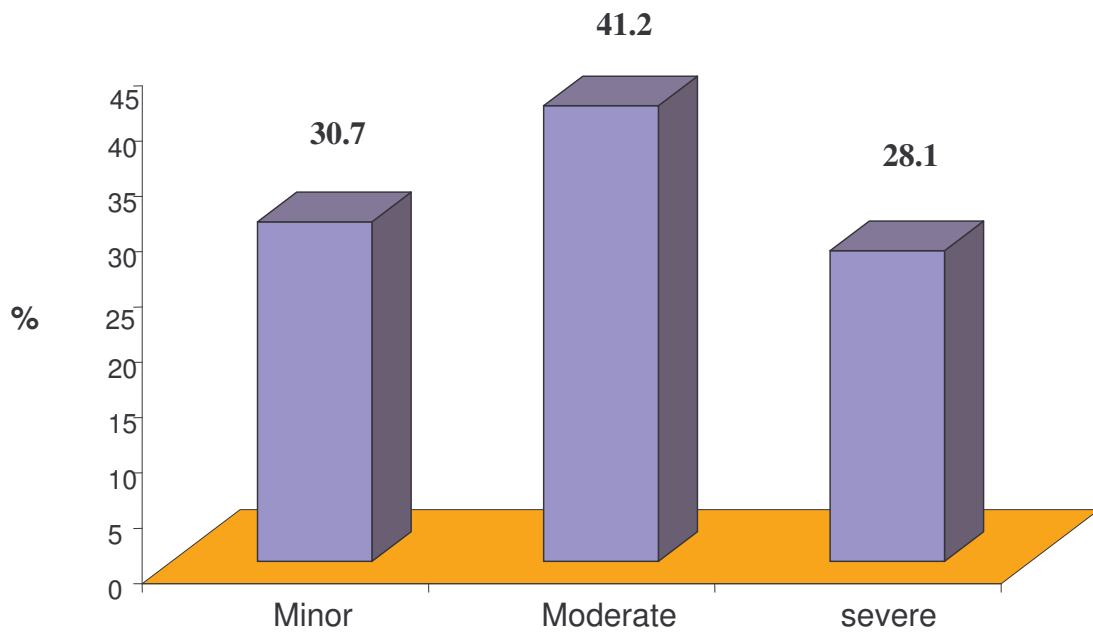
**Table (4.3) Place of injury**

Place	No.	%
<b>Competition</b>	80	(52.3)
<b>Training</b>	73	(47.7)
<b>Total</b>	153	(100.0)

( $\chi^2 = .320$ , df =1, P=0.57 )

#### 4.10 Severity of injury

Injury severity was classified according to absenteeism from play. Minor injuries (seven days or less) accounted for 30.7% of injuries, moderate (8–27 days) accounted for 41.2% of injuries, and severe injuries (> 28 days) accounted for 28.1% of injuries (Figure 4.6).



Figure(4.6) Severity of injury

#### 4.11 Severity of injuries during competition versus training

Figure (4.7) shows the severity of the injuries sustained during training and competition.

The most common injuries occurred in the competition were mainly moderate (24.8%)  $p=0.009$ , while the most common injuries occurred in the training were primarily minor injuries (19.6%)  $p=0.009$ .

The least severe injury were mostly sustained in the competition (11.1%)  $P=0.009$ .

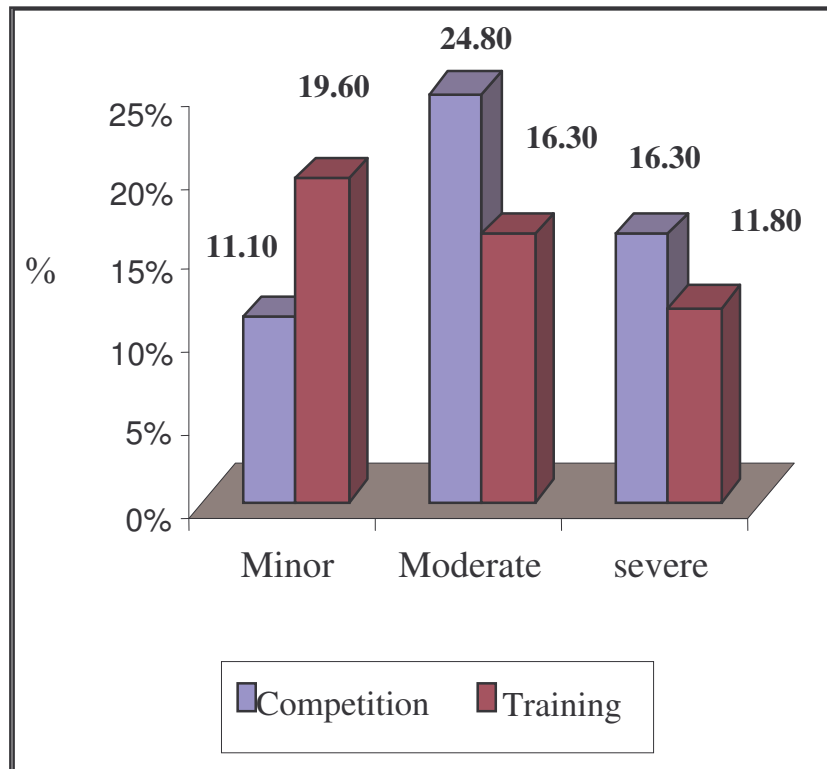


Figure (4.7) Severity of injuries sustained during competition and training

#### 4.12 Mechanism of injury

Table (4.4) shows the injury mechanisms, 29.5% being classified as resulting from contact with another player or the ball (Tackling, collision, use of elbow and tackled ) and 64.7% having a non-contact mechanism. The most common mechanism were twisting (36/153 ) 23.5%, over stretching (27/153) 17.6%, falling (22/153) 14.4% and tackling and been tackled were equally for (18/153) 11.8%. The Table demonstrates a statistically significant trend towards a decrease in contact injuries and an increase in non-contact injuries.

**Table (4.4) Mechanism of injury**

	Mechanism	No	%
<b>Contact mechanism</b>	Tackling	18	(11.8)
	Collision	6	(3.9)
	Use of elbow	3	(2.0)
	Tackled	18	(11.8)
<b>Non-contact mech.</b>	Twisting	36	(23.5)
	Running	11	(7.2)
	Over stretching	27	(17.6)
	Falling	22	(14.4)
	Shooting	3	(2.0)
	Not specific	5	(3.3)
	Other	4	(2.6)
	Total	153	(100.0)

(n = 153,  $\chi^2 = 16.875$ , df =3, P = .001)



### 4.13 Who Assess the injury

Table (4.5) shows the personnel involved in the treatment of injuries. Doctors (67/153) assessed the player mainly during the season followed by coach (27/153) physiotherapist (25/153) and nurse (13/153).

The "other" (8/153) of practitioners were volunteers, sports teachers, and the football players themselves.

**Table (4.5) Who Assess the injury**

Personnel	No	%
Doctor	67	(43.8)
Coach	27	(17.6)
Physiotherapist	25	(16.3)
Nurse	13	(8.5)
Other	8	(5.2)
No one	13	(8.5)
Total	153	(100.0)

#### 4.14 Injury types and location of body part

Table (4.6) shows the injury types and locations of the injuries sustained during the 2006/2007 season. The most common injury was Ankle sprain, representing 20.9% (32/153) of all injuries. Thirty-two out of 38 sprains were located in the ankle (84.2%). Knee joints were accounted only for (7.9%) of all sprains but represented (70.6%) of the inflammation injuries.

Hamstring strains were remarkable equal to the sum of all other muscles strains (18 v 18 injuries;  $p < 0.0001$ ). (33.3%) of the both strains and tendonitis were located in the adductors.

(50%) of the laceration happened to the knee. (50%) of the contusions happened to the shoulder and foot (27.8% and 22.2% respectively). Muscle cramp occurred only to the lower leg (100%). Also muscle tear happened only to the quadriceps (100%). (57.1%) of the ligament rupture sustained to the knee. (66.6%) of the tendonitis occurred to the adductors or Achilles tendon (33% for each).

(42.8%) of all fractures occurred either to the foot or to the forearm (21.4% for each), whereas (28.6%) occurred either to the ankle or to the elbow (14.3% for each). Isolated injury to the knee constituting (62.5%) of all Injuries grouped as "other".

Table (4.6) Injury types and Location of body part

	Type of injury											Total
	contusion	laceration	inflammation	muscle cramp	muscle strain	Muscle tear	Ligament sprain	Ligament Rupture	Tendonitis	fracture	Other	
Head		1 .7%										1 .7%
Face	2 1.3%										1 .7%	3 2.0%
Neck					2 1.3%							2 1.3%
Cervicle spine			1 .7%									1 .7%
Ribs	2 1.3%											2 1.3%
Abdomen					1 .7%							1 .7%
Low back	2 1.3%		1 .7%		1 .7%							4 2.6%
Pelvis											1 .7%	1 .7%
Shoulder	5 3.3%								1 .7%			6 3.9%
Clavicle										1 .7%		1 .7%
Elbow										2 1.3%		2 1.3%
Forearm	1 .7%									3 2.0%		4 2.6%
Wrist							2 1.3%					2 1.3%
Hand										1 .7%		1 .7%
Thumb								1 .7%				1 .7%
Hip	1 .7%		1 .7%									2 1.3%
Groin					1 .7%							1 .7%
Quadriceps						3 2.0%						3 2.0%
Hamstring					18 11.8%				1 .7%			19 12.4%
Adductor					12 7.8%				2 1.3%			14 9.2%
Knee	1 .7%	2 1.3%	12 7.8%				3 2.0%	4 2.6%			5 3.3%	27 17.6%
Lower leg				2 1.3%	1 .7%					1 .7%		4 2.6%
Achilles tendon									2 1.3%			2 1.3%
Ankle			2 1.3%				32 20.9%	2 1.3%		2 1.3%		38 24.8%
Foot	4 2.6%									3 2.0%		7 4.6%
Toe		1 .7%					1 .7%			1 .7%	1 .7%	4 2.6%
<b>Total</b>	18 11.8%	4 2.6%	17 11.1%	2 1.3%	36 23.5%	3 2.0%	38 24.8%	7 4.6%	6 3.9%	14 9.2%	8 5.2%	153 100%

#### 4.15 Injury types and severity

The severity of the different injury types sustained in the 2006 /2007 season periods shown in table (4.7) demonstrate that, the most minor injuries were contusions (9.8%), the most moderate injuries were muscle strain and the single most severe injury of all injuries was fractures (8.5%) with more than 28 day absenteeism from participation. The table also express the similarity of the percentage in moderate injuries in both ligament sprain and muscle strain.

**Table (4.7) Injury types and severity of professional footballers**

Type of injury	Severity of injury						Total n=153	
	Minor n=47		Moderate n=63		Severe n=43			
	No.	%	No.	%	No.	%	No.	%
Contusion	15	(9.8)	3	(2.0)			18	(11.8)
Laceration	3	(2.0)	1	(.7)			4	(2.6)
Inflammation	3	(2.0)	10	(6.5)	4	(2.6)	17	(11.1)
Muscle cramp	1	(.7)	1	(.7)			2	(1.3)
Muscle strain	7	(4.6)	20	(13.1)	9	(5.9)	36	(23.5)
Muscle tear			2	(1.3)	1	(.7)	3	(2.0)
Ligament sprain	13	(8.5)	19	(12.4)	6	(3.9)	38	(24.8)
Ligament rupture			2	(1.3)	5	(3.3)	7	(4.6)
Tendonitis	2	(1.3)	2	(1.3)	2	(1.3)	6	(3.9)
Fracture			1	(.7)	13	(8.5)	14	(9.2)
Other	3	(2.0)	2	(1.3)	3	(2.0)	8	(5.2)
<b>Total</b>	<b>47</b>	<b>(30.7)</b>	<b>63</b>	<b>(41.2)</b>	<b>43</b>	<b>(28.1)</b>	<b>153</b>	<b>(100.0)</b>

(n=153, df=2, F=16.124, P= < 0.0001)

#### 4.16 Injury locations and severity

The severity of injuries and their location sustained by professional footballers of Gaza Strip in the season period is shown in table ( 4.8 ). Nearly a half of the ankle injuries were moderate (18/38) with nonattendance of (7-30) days. Knee and ankle are equally major sever (9:9) with nonattendance of more than 30 days. Moderate severity of the hamstring is significantly more than the sum of both other severities (6.5% v 5.9%,  $P=0.001$  ) and the same significance can apply to the adductors (5.2% v 4%,  $P=0.004$ )

Table ( 4.8 ) Injury locations and severity

Location of body part	Severity of injury						Total n=153	
	Minor n=47		Moderate n=63		Major n=43			
	No.	%	No.	%	No.	%	No.	%
Head	1	(.7)					1	(.7)
Face	3	(2.0)					3	(2.0)
Neck			2	(1.3)			2	(1.3)
Cervicle spine			1	(.7)			1	(.7)
Ribs	1	(.7)	1	(.7)			2	(1.3)
Abdomen					1	(.7)	1	(.7)
Low back	3	(2.0)	1	(.7)			4	(2.6)
Pelvis			1	(.7)			1	(.7)
Shoulder	5	(3.3)			1	(.7)	6	(3.9)
Clavicle					1	(.7)	1	(.7)
Elbow					2	(1.3)	2	(1.3)
Forearm	1	(.7)			3	(2.0)	4	(2.6)
Wrist			2	(1.3)			2	(1.3)
Hand					1	(.7)	1	(.7)
Thumb			1	(.7)			1	(.7)
Hip	1	(.7)	1	(.7)			2	(1.3)
Groin	1	(.7)					1	(.7)
Quadriceps			2	(1.3)	1	(.7)	3	(2.0)
Hamstring	3	(2.0)	10	(6.5)	6	(3.9)	19	(12.4)
Adductor	3	(2.0)	8	(5.2)	3	(2.0)	14	(9.2)
Knee	6	(3.9)	12	(7.8)	9	(5.9)	27	(17.6)
Lower leg	2	(1.3)	1	(.7)	1	(.7)	4	(2.6)
Achilles tendon	1	(.7)	1	(.7)			2	(1.3)
Ankle	11	(7.2)	18	(11.8)	9	(5.9)	38	(24.8)
Foot	3	(2.0)	1	(.7)	3	(2.0)	7	(4.6)
Toe	2	(1.3)			2	(1.3)	4	(2.6)
<b>Total</b>	<b>47</b>	<b>(30.7)</b>	<b>63</b>	<b>(41.2)</b>	<b>43</b>	<b>(28.1)</b>	<b>153</b>	<b>(100.0)</b>

#### 4.17 Injury severity and injury occurrence

Table (4.9) gives the severity of the traumatic (quickly happened) and the overused (slowly happened ) injuries sustained during the 2006/2007 season.

The severity of traumatic injury were almost to be equal (30:28:30) minor, moderate and major respectively.

Traumatic injuries resulted in a significantly more major severity (19.6%  $p=0.01$ ), which lead to more absence from participation in training or competition.

The most of the overused injuries are moderate(35/65), whereas only (13/43)of the major injuries were due to overuse.

**Table (4.9) injury severity and injury occurrence**

		Injury Occurrence				Total n=153	
		Traumatic n=88		Overuse n=65			
		No.	%	No.	%	No.	%
Severity of injury	Minor	30	(19.6)	17	(11.1)	47	(30.7)
	Moderate	28	(18.3)	35	(22.9)	63	(41.2)
	Severe	30	(19.6)	13	(8.5)	43	(28.1)
Total		88	(57.5)	65	(42.5)	153	(100.0)

#### 4.18 Type of injury and place

Table (4.10 ) gives the type of the injuries sustained during training and competition. Injuries classified as muscle strains, fractures, tendonitis and laceration were sustained equally in either competition or training (18:18, 7:7, 3:3, 2:2 ) respectively.

Ligament sprain and inflammation were obviously more sustained in the competition than the training (21:17, 11:6 ) respectively.

Only the injury classified as contusion was more sustained in the training than the competition

**Table (4.10) Type of injury and place**

		Place				Total n=153	
		Competition n=80		Training n=73			
		No.	%	No.	%	No.	%
<b>Type of injury</b>	Contusion	7	(4.6)	11	(7.2)	18	(11.8)
	Laceration	2	(1.3)	2	(1.3)	4	(2.6)
	Inflammation	11	(7.2)	6	(3.9)	17	(11.1)
	Muscle cramp			2	(1.3)	2	(1.3)
	Muscle strain	18	(11.8)	18	(11.8)	36	(23.5)
	Muscle tear	2	(1.3)	1	(.7)	3	(2.0)
	Ligament sprain	21	(13.7)	17	(11.1)	38	(24.8)
	Ligament rupture	4	(2.6)	3	(2.0)	7	(4.6)
	Tendonitis	3	(2.0)	3	(2.0)	6	(3.9)
	Fracture	7	(4.6)	7	(4.6)	14	(9.2)
	Other	5	(3.3)	3	(2.0)	8	(5.2)
<b>Total</b>		80	(52.3)	73	(47.7)	153	(100.0)



#### 4.19 Type of injury and injury onset

Table (4.11) reveal that re-injuries accounted for 51% of all the injuries sustained during the season period. The most common re-injuries were muscle strain (25/78) , Ligament sprain(23/78), and inflammation (12/78).

Of the 78 re-injuries that were documented, 61.6% were either strains or sprains (25/78) 32.1% and (23/78) 29.5% respectively.

Ligament sprains and contusions were equally happened as new injuries accountable for 40% from all new injuries (15+15/78). Also Muscle strain and fractures were equally happened for 29.3% (11+11/78).

**Table (4.11) Type of injury and injury onset**

		Injury onset				Total n=153 No. %	
		New injury n=75		Recurrence from old injury n=78			
		No.	%	No.	%		
<b>Type of injury</b>	Contusion	15	(9.8)	3	(2.0)	18	(11.8)
	Laceration	4	(2.6)			4	(2.6)
	Inflammation	5	(3.3)	12	(7.8)	17	(11.1)
	Muscle cramp	1	(.7)	1	(.7)	2	(1.3)
	Muscle strain	11	(7.2)	25	(16.3)	36	(23.5)
	Muscle tear	3	(2.0)			3	(2.0)
	Ligament sprain	15	(9.8)	23	(15.0)	38	(24.8)
	Ligament rupture	4	(2.6)	3	(2.0)	7	(4.6)
	Tendonitis	2	(1.3)	4	(2.6)	6	(3.9)
	Fracture	11	(7.2)	3	(2.0)	14	(9.2)
	Other	4	(2.6)	4	(2.6)	8	(5.2)
<b>Total</b>		75	(49.0)	78	(51.0)	153	(100.0)

#### 4.20 Injury type and occurrence

Table ( 4.12 ) demonstrate the injuries occurrence among the injury types sustained by football athletes of Gaza Strip in the 2006/2007 season.

The most common traumatic injuries were Ligament sprain (21/88) 23.9%, and contusion (18/88) 20.5%.

The most common overused injuries were muscle strain (25/65) 38.5%, ligament sprain (17/65) 26.2% and inflammation (14/65) 21.5%.

**Table (4.12) Injury type and occurrence in Gaza Strip professional footballers**

Type of injury		Injury Occurrence				Total n=153	
		Traumatic n=88		Overuse n=65			
		No.	%	No.	%	No.	%
Type of injury	Contusion	18	(11.8)			18	(11.8)
	Laceration	4	(2.6)			4	(2.6)
	Inflammation	3	(2.0)	14	(9.2)	17	(11.1)
	Muscle cramp	1	(.7)	1	(.7)	2	(1.3)
	Muscle strain	11	(7.2)	25	(16.3)	36	(23.5)
	Muscle tear	2	(1.3)	1	(.7)	3	(2.0)
	Ligament sprain	21	(13.7)	17	(11.1)	38	(24.8)
	Ligament rupture	5	(3.3)	2	(1.3)	7	(4.6)
	Tendonitis	5	(3.3)	1	(.7)	6	(3.9)
	Fracture	14	(9.2)			14	(9.2)
	Other	4	(2.6)	4	(2.6)	8	(5.2)
	<b>Total</b>	<b>88</b>	<b>(57.5%)</b>	<b>65</b>	<b>(42.5%)</b>	<b>153</b>	<b>(100%)</b>

(  $\chi^2 = 3.458$ ,  $df=1$ ,  $P=0.06$  )

### 4.21 Location of injuries sustained during competition and training

The statistical analysis of the frequencies in table ( 4.13 ) indicate a significant difference of the Ankle ( $p=0.002$ ), Knee ( $p= 0.003$ ) and Hamstring ( $p=0.003$ ) to be sustained more in the competition and to the adductors muscles ( $p=0.001$ ) to be sustained more in the training.

**Table ( 4.13) Location of injuries sustained during competition and training**

Location of body part	Place				Total n=153	
	Competition n=80		Training n=73			
	No.	%	No.	%	No.	%
Head	1	(.7)			1	(.7)
Face	2	(1.3)	1	(.7)	3	(2.0)
Neck			2	(1.3)	2	(1.3)
Cervicle spine			1	(.7)	1	(.7)
Ribs	2	(1.3)			2	(1.3)
Abdomen			1	(.7)	1	(.7)
Low back	2	(1.3)	2	(1.3)	4	(2.6)
Pelvis	1	(.7)			1	(.7)
Shoulder	2	(1.3)	4	(2.6)	6	(3.9)
Clavicle	1	(.7)			1	(.7)
Elbow	1	(.7)	1	(.7)	2	(1.3)
Forearm	1	(.7)	3	(2.0)	4	(2.6)
Wrist	1	(.7)	1	(.7)	2	(1.3)
Hand			1	(.7)	1	(.7)
Thumb			1	(.7)	1	(.7)
Hip	1	(.7)	1	(.7)	2	(1.3)
Groin	1	(.7)			1	(.7)
Quadriceps	2	(1.3)	1	(.7)	3	(2.0)
Hamstring	12	(7.8)	7	(4.6)	19	(12.4)
Adductor	6	(3.9)	8	(5.2)	14	(9.2)
Knee	16	(10.5)	11	(7.2)	27	(17.6)
Lower leg			4	(2.6)	4	(2.6)
Achilles tendon	1	(.7)	1	(.7)	2	(1.3)
Ankle	21	(13.7)	17	(11.1)	38	(24.8)
Foot	3	(2.0)	4	(2.6)	7	(4.6)
Toe	3	(2.0)	1	(.7)	4	(2.6)
<b>Total</b>	<b>80</b>	<b>(52.3)</b>	<b>73</b>	<b>(47.7)</b>	<b>153</b>	<b>(100.0)</b>

#### 4.22 Mechanisms of injuries sustained during competition and training

The mechanisms of injury during training and in competition are shown in table (4.14). There were a significantly double percentage of falling injuries during training compared to falling injuries in competition (9.8% v 4.6%,  $p=0.005$ ).

The percentage of contact injuries during training (Tackling, collision, use of elbow and tackled ) was significantly less compared with the percentage in competition (12.4% v 16.9%,  $p=0.005$ ).

Twisting is the most common mechanism happened mainly in the competitions (13.7% v 9.8%,  $p=0.004$ ). Both twisting and falling were equally occurred in the training (9.8% (15/153) for each. Both tackling and bee tackled were also equally occurred in the training for 6.5%(10/153) for each. Shooting and use of elbow were the mostly less mechanisms occurred in the 2006/2007 season.

**Table (4.14) Mechanisms of injuries sustained during competition and training**

Mechanism of injury		Place				Total	
		Competition n=80		Training n=73			
		No.	%	No.	%	No.	%
Twisting	21	(13.7)	15	(9.8)	36	(23.5)	
Running	4	(2.6)	7	(4.6)	11	(7.2)	
Tackling	10	(6.5)	8	(5.2)	18	(11.8)	
Over stretching	17	(11.1)	10	(6.5)	27	(17.6)	
Collision	4	(2.6)	2	(1.3)	6	(3.9)	
Falling	7	(4.6)	15	(9.8)	22	(14.4)	
Shooting	2	(1.3)	1	(.7)	3	(2.0)	
Use of elbow	2	(1.3)	1	(.7)	3	(2.0)	
Tackled	10	(6.5)	8	(5.2)	18	(11.8)	
Not specific	2	(1.3)	3	(2.0)	5	(3.3)	
Other	1	(.7)	3	(2.0)	4	(2.6)	
<b>Total</b>	<b>80</b>	<b>(52.3)</b>	<b>73</b>	<b>(47.7)</b>	<b>153</b>	<b>(100.0)</b>	

## CHAPTER FIVE

### DISCUSSION

#### 5.1 General assessment

The results obtained in this study showed a high commitment from the football players in Gaza Strip to the sport of football with an average of 6 hours a week spent training. An overall injury incidence rate of 3.5 injuries per 1000 participation hours was calculated.

The results showed a high percentage (84%) of players injured at 8 clubs during 2006/2007 season, compares with previous rate reported for UK clubs of 71–79% (McGregor and Rae, 1995) and confirms the high risks to which players in Gaza Strip are exposed.

The right body side injuries (62.1%) were significantly greater than the left body side ( $P=0.0003$ )

The top five body parts injured were the ankle, knee, hamstring muscle, adductors muscle, and foot. The top five injury types were ligament sprain, muscle strain, contusion, inflammation and fracture.

A previous injury was associated with 51% of the injuries . The most injuries tend to be moderate with 8-27 absent days from participation. The most common injury mechanisms were found to be twisting, overstretching, falling, tackling and being tackled. Injuries caused by non-body contact were more prevalent than those caused by body contact ( $P=0.001$ ).

The non-significant statistic ( $P=0.57$ ) between the proportion of injuries sustained by players during competition (52.3%) and during training (47.7%), indicated that a high proportion of injuries were sustained during training, where players are generally under supervision and may logically expect to be at a significantly lower level of risk.

## 5.2 Injury rate: Competition versus training

In the international studies, the rate of football injuries during competitions is much higher than in trainings. Zemper, (1989) found that “the injury rate was 8.6 times higher in competitions than in trainings . McKeag, (1991) reported an 8.7 times higher rate of injuries in games as compared to practices. Similar findings were reported by the NCAA which found that between the years of 1985 and 2000, the injury rate was 8.87 times higher in Competitions than during trainings (NCAA Health and Safety, 2001).

In this present study, the injuries sustained during regular training were almost as high as the injuries were sustained during competitive match play. Specifically 52.3% of injuries were recorded during competitions, while 47.7% were encountered during training. The relatively high rate may raise questions about the type and nature of training. On the other hand, it may reflect a larger amount of time spent in training compared with the amount of time in competition.

A significant difference of the Ankle ( $P=0.002$ ), Knee ( $P= 0.003$ ) and Hamstring ( $P=0.003$ ) to be sustained more in the competition were expected but not of the adductors muscles ( $P=0.001$ ) to be sustained more in the training than competition.

In the present study the most common injuries occurred in the competition were mainly moderate (24.8%)  $P=0.009$ , while the most common injuries occurred in the training were primarily minor injuries (19.6%)  $P=0.009$ . Both rates must be considered in the future research of injury prevention.

In the present study the proportions of muscle strains, fracture, tendonitis and laceration were the same in both training and competition ( 11.8%:11.8%, 4.6%:4.6%, 2%:2%, 1.3%:1.3% respectively ) (Figure 12.4). According to the researcher experience in field of sport injury there is a serious cause of concern, then considering the relaxing atmosphere at the training and the supervision of the trainer, compared with the tense conditions in the competition, the similarities in the rates still high and unexpected.

Generally, the rate of the fractures was not only high but also unexpected among the football player of Gaza Strip in both training and competition (7:7) and must be highlighted for the future research in injury prevention and the trainers must be taught to reduce the violence in the training's hours.

The proportion of other types of injury was different between training and matches, the number of contusions sustained in matches could be expected (7/18) considering the competitive atmosphere of matches compared with training; however, the higher proportion of sprains observed in training (17/38) is cause for concern. There is a need to investigate in detail some of the intrinsic and extrinsic factors that have previously been associated with injuries before preventive strategies can be advised.

### 5.3 Type of Injuries

In the present study the injuries sustained were predominantly sprains, strains, inflammations and contusions, which supports the results of previous research carried out by (Ekstrand et al., 1983; Hawkins et al.,1990) and represented over (71.2%) of all injuries to professional footballers in Gaza Strip during both competition and training. The overall level of ligaments sprains and muscular strains (48.2%) reported in this study dominates all the remaining injury categories.

With a percentage of (24.8%) ligament sprain was the most common injury in this study among football players of Gaza Strip and it happened mostly to the ankles. Generally the injured football players were able to describe a history of “rolling the ankle in” after changing direction, stepping down from a height, or landing on the outside of the foot at the time of injury. According to the researcher experience, the causes for potential injuries of ligament sprain are ligamentous laxity and joints instability and the best way to prevent ligament sprain injury is to develop strength in the muscle groups that help to support and stabilize the joints. It is also necessary to train the ankle’s proprioceptive (balance) capabilities so that the ankle can respond quickly to conditions that may lead to injury.

The high proportion of strains observed during competition (11.8%) and the same in training (11.8%) was also a cause for concern. Hamstring strains were significantly equal to the sum of all other muscles strains (18 v 18 injuries;  $p < 0.0001$ ). Muscular tightness was frequently assumed as an intrinsic risk factor for the development of muscle injury. Football players in Gaza Strip with an increased tightness of hamstring muscles may have a statistically higher risk for later musculoskeletal lesions. This findings suggest that Coaches or any personnel involved in training should obtain a pre-season testing of flexibility of these muscles in order to identify football players at risk of developing muscle injuries. Ekstrand has discussed the relation between muscle tightness and a player’s tendency to muscle strains and showed the beneficial effects of warm up and cool down programmes for reducing muscle tightness and the number of muscle strains.



Football players in Gaza Strip clubs are more liable to muscle strains, because the attention paid to general body conditioning—for example, strength and flexibility training and warming up and cooling downs is less than that found at clubs in Europe.

This view is also due to the general lack of awareness among trainers in Gaza Strip towards the injury prevention strategies. Trainers should be made aware of their responsibility in terms of preventing some of these injuries. They should encourage proper warm-up exercises and stretches prior to matches or training sessions and should prevent previously injured players from playing until their injuries are adequately healed.

#### 5.4 Location of injuries

Muscle and joints of the leg are potentially subjected to great physical stresses during the sport of football, predisposing the lower limb to injury. In the present study about (79.1%) of the injuries were located in the lower extremity, compared with the results of Hawkins & Fuller (1999), who reported a percentage of (86%).

The majority of injuries to the dominant side was due to that side being more commonly involved when tackling or being tackled.

The present study found that ankles (24.8%), knees (17.6%) and the hamstring(12.4%) were the most frequently injured body parts among professional football players in Gaza Strip. A possible reason for the vulnerability of the ankle to injury was its close proximity to the ball, which is the focus of activity in this sport. Therefore the chances of ankle injury are highest when dribbling, shooting, and tackling. Ekstrand and Gillquist (1983) suggested that the level of this type of injury could be reduced by using active treatment of acute ankle injuries and the use of prophylactic taping. For players with a history of ankle injuries, the use of ankle disk training has been reported to be the best means of preventing recurrent sprains by reducing functional instability.

Hawkins et al, (2001) suggested that the knee is very susceptible to injury from large forces produced by kicking the ball. It is also the centre of the lever arm of the leg, so it is susceptible to greater forces being transmitted from the trunk through the hip, and from the ground through the foot and ankle. In addition, the injury to the knee usually occurs while changing direction, cutting, or landing from a jump. Football players are usually unable to return to play because of pain, swelling, and instability or giving way of the knee. The return to play is depending on the exactly diagnosis of the injury. The researcher suggest carefully handling from trainer and players with serious injuries like anterior cruciate ligament sprain or tear.

The third most common location of the injuries among footballers of Gaza Strip was the hamstring muscles, where pain and weakness is usually sudden and often

occurs as a result of explosive movement such as sprinting. Hagglund et al, (2005) reported in their study hamstring strain injury of (16%) and concluded that hamstring injury is usually the result of poor flexibility and strength beside the inappropriate warm-up and cooling down technique. Typically, injury will also occur when there has already been an injury and the athlete returns to activity too quickly.

### 5.5 Recurrence of injuries

In the present study 51% of the reported injuries was attributed to re-injuries, 66% being either strains or sprains to regions of the lower extremity. This aspect needs consideration among the future researcher in this field in Gaza Strip.

If an football player suffers one injury, he is more likely to sustain another injury, often in the same body part. This statement is supported in the literature in that football players who have histories of previous injuries tend to have a higher injury reoccurrence rate than football players with no prior injury (Lysens et al, 1981).

It is thought that, the risk of re-injury is greater because the football players keep on playing during the healing process, where the content and quality of the collagen (scar tissue) still incomplete and deficient

Return to activity too early and too soon and with inadequate rehabilitation have been reported in many international studies as injury risk factors, a high percentage of re-injuries having been found to occur in football. Ekstrand and Gillquist (1983) attributed 17% of the injuries reported in their study to inadequate rehabilitation.

Similarly (Nielsen and Yde,1990) found 25% of the players who were injured had not completely recovered from a previous injury which was of the same type and location.

(Lysens, 1988) reported that 30% of muscular strains and ligament sprains were re-injuries of the same type and at the same location. In the present study the most common re-injuries were muscle strain 32% (25/78), ligament sprain 29.5%(23/78), whereas (84.2%) of sprains were located in the ankle. These types of injury have previously been reported to have the highest risk of re injury.

### 5.6 Mechanisms of injuries

The sport of football by their nature involve significant lower limb manipulation skill, tackling, sudden collisions, passing and trapping the ball. They also require locomotion skills such as jumping, running, stopping and changing direction. The players must be aware and response correctly to uneven surfaces during their movement and that need a significant level of skills development.

Player to player contact injury mechanisms including tackling, being tackled, use of elbow and collisions accounted for (29.5%) of all the injuries documented in the present study compared to a level of (38%) reported by Hawkins & Fuller (1999).

Statistically significant increasing of non-contact injury (twisting, running, overstretching, falling and shooting) mechanisms (64.7%,  $P=0.001$ ) highlighted in the present study to be an important area for consideration if the incidence of injury among professional footballers in Gaza Strip is going to be reduced.

The present study identified twisting (23.5%) as a major cause of a non contact injury mechanism happened mainly in the competition (13.7% v 9.8,  $P=0.004$ ). Ekstrand and Gillquist (1983) also identified twisting as the major causes of non-contact injuries. The main causes of twisting /turning injuries among footballers of Gaza Strip are thought to be the uneven sports ground and the inappropriate sport shoes. Uneven sports ground lead to more external loading on the ligaments of the ankle, which the player can not tolerate and that resulted in sprained ankle. Inappropriate sport shoes, which cannot give sufficient frictional force, will eventually lead the players to lose their balance. On the other hand, too much frictional force will produce large torque when twisting and turning, which may also lead to injury. In order to lower the injury rate among football players of Gaza Strip, more research are needed to focus on ankle sprain.

Non-contact injury mechanisms have been reported to be the cause of most muscle strains (Fu & Stone,1994), what exactly confirm the second major non contact injury mechanism among the footballers in Gaza Strip mainly the overstretching mechanism with a percentage of (17.6%).

It is thought that the mechanism of overstretching is always a cause of injuries usually as the result of poor flexibility and strength along with inappropriate warm-up and inappropriate running technique. Typically, injury will also occur when there has already been an injury and the football player returns to activity too quickly.

The best way to help prevent injury is to develop strength and flexibility of the leg muscles, besides providing enough time for stretching techniques at the training session and the players must be encouraged to be more adherend to the stretching technique.

### 5.7 The personnel assess the injuries

The findings resulted from the present study regarding the personnel involved in the treatment of professional footballers in Gaza Strip were really unexpected, not only because Physicians treated (43.8%) of injuries during the season, but also because of trainers were next to Physicians in the treatment of the injuries 17.6% (27/153), followed by physiotherapists (16.3% ) in the third place.

This aspect needs special consideration because according to Zuluaga, Briggs, Carlisle, McDonald, McMeeken, Nickson, Oddy and Wilson (1995), one of the skills of physiotherapists dealing with team sport, is to utilize experience and / or information from the sport and relevant literature, in order to formulate and implement injury preventive conditioning programme for that sport. Since physiotherapy is the health care profession that is recognized for its role in the management of musculoskeletal dysfunction, physiotherapists have an important role to play in the prevention of soccer injuries.

Physiotherapy contain many therapeutic techniques used in the treatment of sports injuries. These techniques include manual therapy, electrotherapy and exercise physiology such as specific soft tissue mobilizations, re-education of proprioception, stretching, rehabilitative specific exercises for flexibility, strength, endurance and power, and taping and bracing. Other techniques include massage, cryotherapy and other electrotherapy modalities such as heat, TENS, ultrasound and inferential therapy.

It is thought that all these techniques contributed to sports injury treatment and enable the athlete to regain his pre-injury level of sport through a well-scheduled rehabilitation programme .The qualified trainers can not deal scientifically with the treatment of the sport injury and may cause additional harm to the footballers.

## CONCLUSIONS & RECOMMENDATION

### Conclusions

The results of the study provide a useful insight into the nature, sites, and outcome of injury among football players in Gaza Strip at the highest level. It is expected that the epidemiological data obtained from this study will not only help professional football clubs in recognizing their injuries, but also will provide insight into the causes of injuries in Palestinian professional football and help future researches in the area of sport injuries.

-The football players in Gaza Strip showed a high commitment to the sport of football with an average of 6 hours a week spent training.

- An overall injury incidence rate of 3.5 injuries per1000 participation hours and a percentage of (84%) of players injured at 8 clubs during 2006/2007 season were calculated.

- Lower limb injuries were found to be predominate with a percentage of (79.1%).

- The top five body parts injured were the ankle, knee, hamstring muscle, adductors muscle, and foot.

- The top five injury types were ligament sprain, muscle strain, contusion, inflammation and fracture

- Most injuries tend to be moderate with (8-27) absent days from participation.

- A proportion of (52.3%) of injuries were sustained by players during competition showed that a high proportion of injuries are still sustained during training (47.7%), where players are generally under supervision and may logically be expected to face lower risk of injury.



## Conclusion

- Fifty one percent of injuries were a recurrence from old injuries, this confirms the big need in Gaza Strip to implement adequate rehabilitation programmes.

- The high level of ligament sprains (24.8%) and muscle strains (23.5%) observed, increases the importance of implementing effective fitness training programmes and in particular warming up and cooling down procedures.

- The most common injury mechanisms were found to be twisting, overstretching, falling, tackling and being tackled.

- Injuries caused by non-body contact were significantly more prevalent than those caused by body contact.

-Unfortunately, till now there are no specialized professionals in sport rehabilitation. Most of the injuries are always treated by coaches or nurses who have no scientific basis in the sport rehabilitation and deal with the injuries in one direction, mainly the pain relieving. This finding confirm the need of specialized medical team.

In general, this study concluded that there is a strong argument for the introduction of rehabilitation programmes at each stage of recovery and before a return to competition.

## RECOMMENDATIONS

1- Rehabilitation and prevention programmes should be adapted and implemented on the basis of the results obtained by this study.

It is important that footballers and coaches be able to recognize common football injuries and be taught how to prevent and treat certain kinds of injuries so that the athlete can continue to play and perform at a level that is appropriate for the demands of the game.

2- Injuries need to be properly managed by a qualified sport injury personnel to restrict the possibility of further damage.

3-The study findings suggest the need for coaches and trainers to implement appropriate warm-up, cool-down, strengthening and stretching techniques.

4- To lower the rate of re injuries among the footballers in Gaza Strip, the coaches should prevent previously injured players from playing until their injuries are completely healed.

5-Coaches and players should be educated about the risk and severity of overuse injuries and injury prevention strategies should be included as part of their regular training.

6- Extra educational program for physiotherapist in the field of sport physiotherapy should be implemented. It can be a one year diploma or a practical workshops to help in a preventative strategies of sports injuries in general and football injuries in specific among all sport population in Gaza Strip.

## Recommendation

7-The Ministry of youth and sport should develop guidelines to aid in school education programs in the area of sport injury prevention, which should cover a wide range of aspects such as facilities, training and treatment..

8- Further epidemiologic studies in Gaza Strip are needed to determine specific preventive strategies ,which could help to reduce the incidence of the injuries among the footballers in Gaza Strip.

9- More research into the aetiology of overuse injuries is strongly recommended.

10- Further research to study the relation between potential internal and external risk factors and injuries among footballers of Gaza Strip is highly recommended.

11- More research efforts are needed to focus on ankle and knee injuries among footballers of Gaza Strip.

12- Areas that warrant further investigation include the prevention and rehabilitation of muscular strains and ligamentous sprains.

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## Appendix I ( Questionnaire in Arabic)

- اسم الفريق: .....
- اسم اللاعب: .....
- 1- عدد أيام التدريب الأسبوعي: .....
- عدد ساعات التدريب الواحد: .....
- 2- القدم التي تستعملها باللعب  
 القدم اليمنى  
 القدم اليسرى
- 3- جهة الجزء المصاب من الجسم  
 الجهة اليمنى  
 الجهة اليسرى
- 4- حدد الجزء المصاب من الجسم ؟

الأطراف السفلية	الأطراف العلوية	الرأس والرقبة
<input type="checkbox"/> مفصل الفخذ / العظم العاني <input type="checkbox"/> عضلات الفخذ الأمامية الرباعية <input type="checkbox"/> عضلات الفخذ الخلفية <input type="checkbox"/> عضلات الفخذ الداخلية " الضامة " <input type="checkbox"/> الركبة <input type="checkbox"/> العضلة التوئمية " البطة " <input type="checkbox"/> وتر العرقوب <input type="checkbox"/> الكاحل " الأتكل " <input type="checkbox"/> القدم <input type="checkbox"/> أصابع القدم	<input type="checkbox"/> الكتف <input type="checkbox"/> الترقوة <input type="checkbox"/> الذراع <input type="checkbox"/> مفصل المرفق " الكوع " <input type="checkbox"/> الساعد <input type="checkbox"/> مفصل معصم اليد <input type="checkbox"/> عظام رسغ اليد <input type="checkbox"/> أصابع اليد <input type="checkbox"/> الإبهام إصابات أخرى: .....	<input type="checkbox"/> الرأس <input type="checkbox"/> الوجه <input type="checkbox"/> الرقبة <input type="checkbox"/> الفقرات العنقية <b>الجزع</b> <input type="checkbox"/> عظمة الصدر الأمامية " القص " <input type="checkbox"/> الأضلاع / البطن <input type="checkbox"/> الجزء العلوي من الظهر <input type="checkbox"/> الجزء السفلي من الظهر <input type="checkbox"/> الحوض / العجز

- 5- حدد نوع الإصابة ؟
- كدمات سطحية  
 تمزق عضلي  
 التهاب الأوتار العضلية  
 جروح في الجلد  
 تمزق غضروفي  
 كسر  
 التهاب  
 تمزق المرباط  
 آخر: .....
- 6- هل الإصابة  
 7- هل حدثت الإصابة في  
 8- هل حدثت الإصابة
- 9- درجة حدة الإصابة: كم يوم انقطعت عن مزاولة اللعب نتيجة الإصابة ؟
- بسيطة ( صفر - 6 أيام )  
 متوسطة ( 7 - 30 يوم )  
 شديدة ( أكثر من 30 يوم )

### 10- ميكانيكية الإصابة :

- التواء  
 كوع الخصم  
 جري  
 قفز  
 انقضاض  
 هجوم  
 مد زائد  
 غير معروف  
 تصادم  
 آخر: .....

### 11- من الذي قام بعلاج الإصابة ؟

- دكتور  
 المدرب  
 أخصائي علاج طبيعي  
 لا أحد  
 ممرض  
 آخر: .....



### Appendix III Consent form

عزيزي المشارك في هذا الاستبيان /..... المحترم

أقدم إليك جزيل الشكر والعرفان لمساهمته الطيبة في تعبئة استبيان البحث العلمي الذي أقوم به

وهو بعنوان

" دراسة استيعادية للإصابات الرياضية للاعبين كرة القدم في قطاع غزة "

وهذا البحث تحت إشراف كلية التربية في الجامعة الإسلامية بغزة ضمن برنامج ماجستير التأهيل، ولحضرتك حق الاختيار الكامل بالمساهمة أو الامتناع عن المشاركة .

المعلومات المستخدمة في هذا الاستبيان هي فقط للبحث العلمي تهدف إلى تحسين الخدمات الصحية المقدمة لشريحة لاعبين كرة القدم في قطاع غزة.

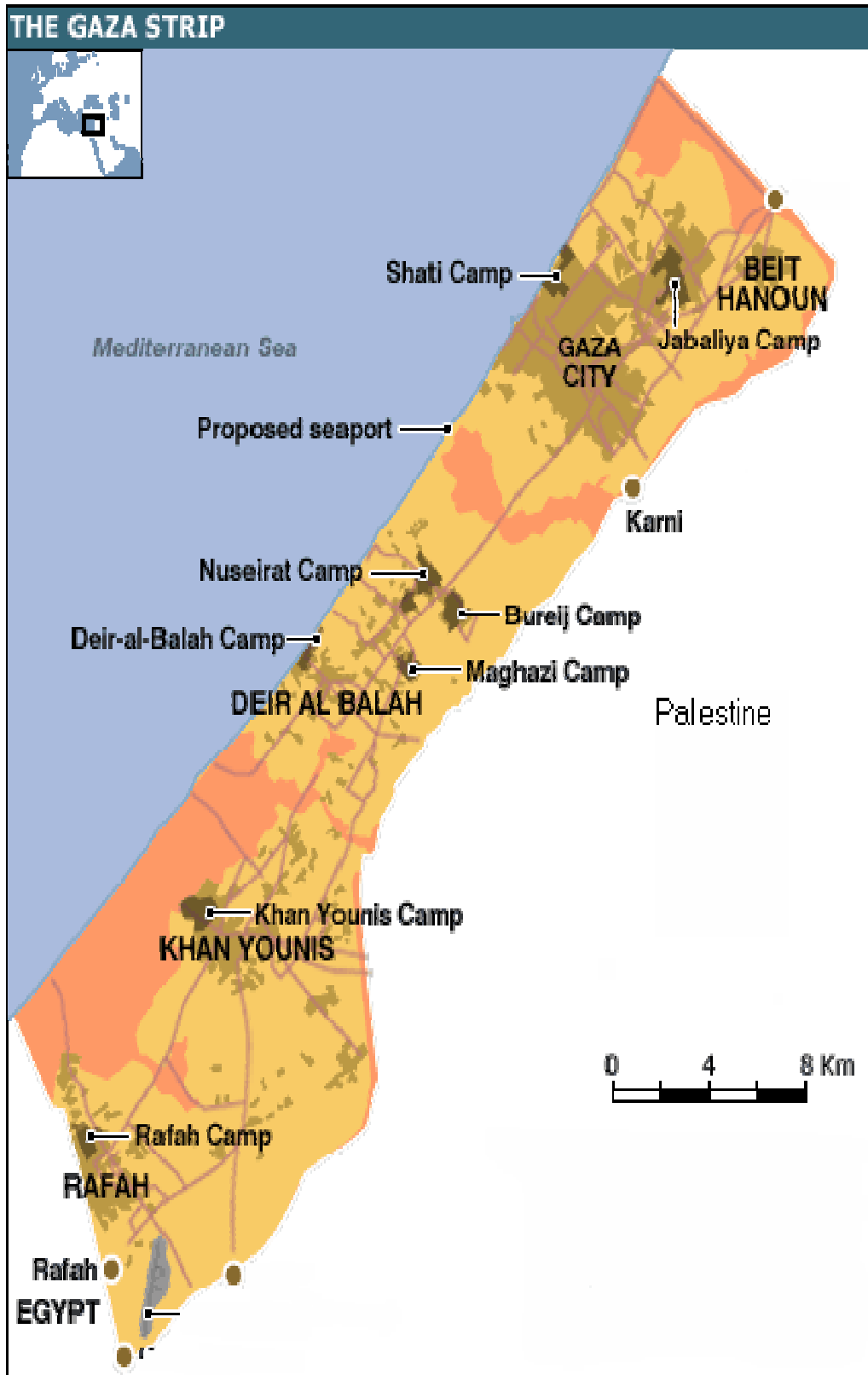
ولمشاركته جزيل الشكر والعرفان

الباحث أخصائي العلاج الطبيعي/أسامة علي أبو لبدة

Appendix IV  
MAP OF PALESTINE



## Appendix V Map of Gaza Strip





Appendix VI The Football teams participated in 2006/2007 season

**ALKHADAMAT CLUB - RAFAH**

EST. 1951

PALESTINE - GAZA

DATE: \_\_\_\_\_



**نادي خدمات رفح**

تأسس سنة ١٩٥١م

فلسطين - غزة

التاريخ: 3-11-02

فرق الأندية التي شاركت في بطولة الدوري التصنيفي ( المحافظات الجنوبية ) غزة

2007 - 2006

م	النادي
1	نادي الأهلي الفلسطيني
2	نادي فلسطين
3	نادي شباب رفح
4	نادي الزوايدة
5	نادي الصداقة
6	نادي إتحاد الشجاعة
7	نادي إتحاد خانيونس
8	نادي أهلي النصيرات
9	نادي خدمات الشاطئ
10	نادي جمعية الصلاح
11	نادي المشتل
12	نادي شباب خانيونس
13	نادي أهلي بيت حانون
14	نادي غزة الرياضي
15	نادي خدمات المغازي
16	نادي خدمات رفح



أمين سر نادي  
أ. صبري النصيرات

فلسطين - رفح - ميدان العودة - ت: ٠٨ ٢١٣٦٧٣٨ - فاكس: ٠٨ ٢١٣٥٣٥٠

Palestine - Rafah - Alawda Square / Tel.: 08 2136738 - Fax: 08 2135350

www.rafaq-sc.com

## Appendix VII Permission letter from the I.U.G to conduct the study

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



الجامعة الإسلامية - غزة  
The Islamic University - Gaza

هاتف داخلي: 1150

عمادة الدراسات العليا

الرقم...ج.س.ع.غ/35/

Date ..... 2007/07/24 التاريخ

### السيد الأستاذ الدكتور

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ أسامة علي رشيد أبو ليدة برقم جامعي 2004/4856 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية والاجتماعية/علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد بحث بعنوان:

### "A retrospective study of injuries in professional footballers in Gaza Strip"

والله ولي التوفيق،،،

عميد الدراسات العليا

د. مازن إسماعيل هنية



صورة إلى:-  
المنسق

Appendix VIII Permission letter to the Minister of Sports & Youth

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



الجامعة الإسلامية - غزة  
The Islamic University - Gaza

هاتف داخلي: 1150

عمادة الدراسات العليا

الرقم.....ج.س.ع/35/

التاريخ.....2007/07/24

الأخ الفاضل/ معالي وزير الشباب والرياضة  
حفظه الله،  
السلام عليكم ورحمة الله وبركاته،

الموضوع/ تسهيل مهمة طالب ماجستير

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ أسامة عني رشيد أبو ليدة برقم جامعي 2004/4856 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية والاجتماعية/علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد بحث بعنوان:

**"A retrospective study of injuries in professional footballers in Gaza Strip"**

والله ولي التوفيق،،،

عميد الدراسات العليا

د. مازن إسماعيل هنية



صورة إلى:-

الملك

14/7/07



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



الجامعة الإسلامية - غزة  
The Islamic University - Gaza

هاتف داخلي: 1150

عمادة الدراسات العليا

الرقم...ج.س.ع./35

التاريخ: 2007/07/24

حفظه الله،

الأخ الفاضل/ رئيس اتحاد كرة القدم الفلسطيني

السلام عليكم ورحمة الله وبركاته،

**الموضوع/ تسهيل مهمة طالب ماجستير**

تهديكم عمادة الدراسات العليا أعطر تحياتها، وترجو من سيادتكم التكرم بتسهيل مهمة الطالب/ أسامة علي رشيد أبو نيدة برقم جامعي 2004/4856 المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية والمجتمعية/علوم التأهيل، وذلك بهدف الحصول على المعلومات التي تساعد في إعداد بحث بعنوان:

**"A retrospective study of injuries in professional footballers in Gaza Strip"**

والله ولي التوفيق،،،

عميد الدراسات العليا

د. مازن إسماعيل هنية



صورة إلى:-

ص.ب. 108 الرمال، غزة، فلسطين  
المتف.

Appendix X Permission letter from the Football Union in Gaza to conduct the study

Palestinian Football  
Association



الإتحاد  
الفلسطيني لكرة القدم

Date:.....

التاريخ : ١٨ / ٧ / ٢٠١٧

No: .....

الرقم : ٢٢٩ / ٢٠١٧

لمن يهمه الامر

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يرجى تسهيل مهمة الطالب / أسامة علي رشيد ابو لبددة ، المسجل في برنامج الماجستير بكلية التربية تخصص الصحة النفسية والمجتمعية / علوم التأهيل ، وذلك بهدف الحصول على المعلومات التي تساعد.

وتفضلوا بقبول فائق التحية والاحترام ،

امين سر الاتحاد الفلسطيني لكرة القدم

جمال ابو حشيش



Gaza - Beit Lahia - ELManshia.st -Tel 08 -2478961 / Fax 08 - 2478962 / Elyarmok TELFAX: 08-2834559 / 08 - 2834299

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