Audit of Sports Injuries and Services

"Project Report submitted in partial fulfillment of the requirements for the degree of MSc. In Sports Medicine in the University of Glasgow"

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Abstract

The main aim of this project was to make a comparison of the incidence and management of injuries in Kuwaiti & Scottish athletes. The comparison between the two is on an ongoing prospective basis.

To prepare for the main study a retrospective pilot observation was conducted to assess the number and type of Kuwaiti athletics injuries. This study was performed during season 1997/1998 during the 4 days of the national final competition. The data were collected by questionnaire and interviews, conducted with 110 athletes representing 8.7% of the 1,262 registered. 110 (47%) from those 232 who participated in the finals were interviewed of whom 76 had reported injuries during the season from 7 athletic clubs. This study identified 76 athletes who had had injuries in previous season. Most of the injuries occurred in young adults (16-19) years representing 44.7% of all injuries. Most of the injuries occurred during training rather than competition sessions with 20% occurring in sprint events. Injuries to the lower limb predominated while the hamstring muscle group and the foot were the most frequently injured anatomical areas. The sample was small however, but this stimulated further study.

A prospective study was performed on Kuwaiti athletes during the season 1999/00. Questionnaires were delivered by post or personal contact and 103 injuries were collated. In addition, a control cohort of 103 athletes was studied to give information concerning the demographics of non-injured athletes. An early peak of injuries was found at the beginning of the season and there was a late rise during the competition stages. Injuries were more frequent among mature adult participants. Significant differences were found in the average of hours of daily training and participation in warm-up and cool-down exercises between the injured and non-injured groups. Most injuries occurred during training sessions. Sprinters, hurdlers and jumpers sustained most injuries.

Doctors diagnosed the majority of injuries, which were mainly treated in the sports club injury clinics. Rehabilitation was directed virtually equally by coaches and

physiotherapists. A third of the athletes suffered an injury recurrence. Each injury caused athletes to miss on average 4 weeks of activity. Muscle strains and ligament sprains were the most common injuries. Injuries to the lower limb predominated while the hamstring muscle group and the ankle were the most frequently injured anatomical sites.

Preliminary data was collected from Scottish athletes. The health care needs and requirements of athletes who were members of 16 Scottish athletic clubs were examined with regard to sports injury management. Most athletes confirmed that a GP or physiotherapist would be the first point of contact. Although half of injured athletes knew of the existence of a formal sports injury clinic, only a few attended theses facilities. The athletes' perceived needs can be divided into personnel and the equipment and include other suggestions such as early consultation, investigation and rehabilitation. The presence of a skilled physiotherapist was the most essential element on the eyes of athletes whether they had sustained an injury or not. Most of the injured athletes were self-referrals. This is the first study of customer (athletes) expectation and experience. The majority had their own transport, accepted the principle of paying a fee for treatment and were happy to travel up to 10 miles to obtain good service. The lack of knowledge concerning the existence of these clinics suggests that a programme to advertise the facilities is needed. It is suggested that the use of telephone answering services with a rapid response within 24 hours from a specialist which helped communication. In addition, athletes should be able to access the information concerning these centres by electronic means by an appropriate web page through the Internet.

Chapter one

Introduction and Literature review

1.1. Sports and Exercise Activities

The word Sport is derived from the Latin se deportare. In the fifteenth century, England shortened the version to sport, which meant free time, relaxation, entertainment and games. By the end of the eighteenth century the term sport was used specifically for athletic contests and races (Olivová Vera.1984). Competitive sport has an old history, which originated in ancient Greece around 1370 BC and games were held in ancient Greece known as *Olympia* in 776 BC (Chronicle of the Olympics, 1998). Sport is defined "as any highly structured, goal directed physical activity governed by rules, which has a high level of commitment, takes the form of a struggle with oneself or involves competition with others, but which also has some of the characteristics of play (Kent M. 1998)".

The development of formal sports activities has also been important for scientific research, allowing the application of sports science techniques to measure the impact of physiology, psychology and sociology changes resulting from training and participation. The practice of sport plays a big part in people's lives and has many benefits in the short and long-term both in the young and the adult population. For example, for a professional it means work, for an elite amateur it can be worklike and very competitive; for someone else it could just be a good way to meet people and get out (Martin Lee, 1995).

A recent increase in endurance running has resulted from an increased awareness in the potential of exercise for improving health and fitness. Millions of people are participating in running taking to the roads or parks on a daily or weekly basis. Studies have shown that, men participate more in sport than women. A survey in England in 1991 estimated that approximately 44% of men and 40% of women

were taking some form of regular physical exercise; participation in exercise is welcomed as a way of contributing to improving the health of the nation (Nicholl et al. 1995).

Exercise training improves individuals' performance by developing skills, experience, and fitness. Fitness consists of several factors including aerobic capacity (heart, blood and lungs), local muscle endurance (anaerobic capacity), muscle speed and strength, joint flexibility, and body composition in terms of percentage fat (Grisogone V. 1996).

Sports can be performed by many, but can cause problems and injury for some. In spite of the positive benefits from participation in sports activities, it is expected that these activities increase the risk of injury and may be accompanied by different patterns of injuries in different sports. It is important to study the aetiology of injury so that preventative measures may be introduced. To make meaningful observations on the incidence of injuries, clear definitions must be developed with a view to intervention for prevention and treatment.

It is vital to have standard definitions for sports injuries, where injuries will be collated, it is important to describe the injury in depth if injuries are being assessed to allow comparisons between studies. Many definitions have been used.

" The success of any sports injury surveillance system and its wide scale applicability is dependent upon valid and reliable definitions of sports injury, injury severity and sports participation" (Finch CF. 1997). If differences in sports injury definitions occur comparison between studies will be difficult and may be invalid because of the different methods of resulting data collection.

1.2. Definition of Sports Injuries

In general, sports injury is "a collective name for all types of damage that can occur in relation to sporting activities" (Mechelen et al. 1992). This generalised definition cannot really be universally applied. It does not include any

indication concerning the duration of the injury nor is it clear if the injury was associated with loss of active sessions whether this be a game, competition or a training session.

With the recognition that definitions need to be precise, more practical definitions have been devised including that used by the National Athletic Injury Registration System (NAIRS) in the US and the Council of Europe (1988). This includes "A sports injury is one which occurs as a result of participation in sports and limits athletic participation for at least a day after onset"(Lysens et al. 1991). This definition is more reasonable by giving a clear indication of the loss of sporting activities by at least one day after onset. This definition was established in the eighties and has been further extended by that of The Council of Europe which defined a sports injury as "any injury as a result of participation in sport with one or more of the following consequences: (a) a reduction in the amount or level of sports activity; and (b) a need for (medical) advice or treatment (Mechelen et al. 1992).

Clements et al. 1999, performed a survey of sports injuries during 1994 to 1997 and defined an injury as "Any musculoskeletal ailment that caused the athlete to reduce, or refrain from, training for at least two days during the period". Other studies have been applied to specific sports, with injury defined as "A specific musculoskeletal abnormality that a runner perceived to be affecting his or her performance" (Bishop and Fallon 1999). This introduces a subjective element and although this study was applied to runners, it could be applied to other participants. Bennell and Crossley 1996, extended the period for up to one week or more "Any musculoskeletal pain or injury which resulted from athletics training and which was sufficient to cause alteration of normal training in any way (mode, duration, intensity, frequency) for a period of one week or more". No comment was made in regard to specific competitions. In general a definition should be applied to allow full collation of data to occur.

Observations in sports injuries should utilise specific definitions, which are easily understood and can be applied by those collating the data.

1.3. Risk factors for Sports Injuries

There is an agreement amongst studies that the outcome of a musculoskeletal injury results from compound risk factors. Injury occurs as a result of a summation of various factors at a given time (Lysens et al.1991). Risk factors may play a part in sports injuries and can be divided into two main categories 'extrinsic and intrinsic' (appendix 1). Many sports injuries in contact sports result from extrinsic factors such as body contact, equipment and the surface used. However, most of injuries in non-contact sports e.g. swimming and athletics result from intrinsic factors and include muscle strains and ligament sprains (Bird et al. 1998).

Extrinsic factors are caused by forces that are extrinsic to the participant, which can be due to a wide variety of situations. They include sport-specific aspects, environmental aspects, training errors, faulty technique, incorrect equipment and surfaces and poor conditions (Taimela et al. 1990 and Mechelen et al. 1992). While training errors and other causes of sports injuries cannot always be controlled by the athlete, specific attention should be paid to training errors e.g. sudden changes in training intensity and duration.

Also other factors such as surface, shoes and the use of warm-up and stretching may help decrease injury rates. For example, proper footwear including insoles has been shown to decrease the incidence of overuse injuries in running athletes while running on sloped or banked surfaces can lead to leg and foot injuries. Most injuries that occur during cold weather are due to rigorous exercise without warm-up. Excessive elevation in muscle temperature, however, also needs to be avoided because this may impair circulatory thermoregulation and may contribute to the destruction of tissue proteins with water loss. In terms of lost time from work or school, the consequences are high (Ryan JM. 1999).

Intrinsic risk factors are those caused by forces generated within a participant's own body (Williams J. 1990). These factors, which may be important in the prevention of sports injuries, are the existence of any mechanical imbalance; history of previous injury; and the physical fitness level of the participant

(Taimela et al. 1990). Most studies have reported that increased joint flexibility, ligamentous laxity and previous injuries were associated with increased numbers of sprains, dislocations and reinjuries (DuRant et al. 1992). The extent and severity of the injury are modified by a number of factors. Malalignments such as excessive pronation and cavus foot deformity are associated with injuries to the tibia, patella, and Achilles tendon. Other factors such as leg-length discrepancy, poor flexibility, muscle weakness and imbalance, deficit in neuromuscular coordination, and ligamentous laxity can cause running injuries (Renstrom AF. 1993).

Increasing age in athletics and in other running participants predisposes to Achilles tendinitis and other overuse syndromes. The elderly have been reported have an increased incidence of overuse injuries. Young athletes are also at increased risk when being exposed to high-intensity training at a very young age. Adolescents are at risk during the rapid growth spurt (Dalton SE. 1992). These factors have been extensively reviewed in the literature and should be communicated to coaches, administrators and medical staff to help develop preventative strategies.

1.4. Frequency of Sports Injuries

Participation in sport is associated with different kinds of injuries, which may be sports specific. There are in the region of 20 million sports injuries each year in Britain, about half of which are attributable to football alone. Many of these injuries are slight and are treated at hospital Accident and Emergency (A&E) departments. However, 75% of all sports injuries can be classified as mild to moderate (Harries et al. 2000). In a study of epidemiology and traumatology of injuries in track athletes in Denmark, Jakobsen et al. 1992 found that, sports injuries accounted for 10% of all casualty ward consultations and concluded that the injury incidence in track athletes was low. In North America sports injuries accounted for up to 27% of all childhood accidents (DuRant et al. 1992).

Injuries may vary from country to country depending on the major participatory sports. In a study of sport and active recreation injuries presenting at an emergency department for treatment in Australia for the period 1989-1993. Finch et al. 1998, found that upper extremity injuries particularly head and facial injuries were most common in cricketers, while wrist injuries were common in roller skaters/bladers. Soccer and netball were associated with more injuries of the lower extremities. Fractures were the most common type of injury in skateboarding and concussion was more common in cyclists. Sprains and strains were most common in netball and basketball, whereas a large proportion of cricketers suffered localised bruising.

1.5. Age related Sports Injuries

"Children and Young Adults"

Although physical activity during adolescence improves fitness and may prevent future disease, there are also adverse effects such as acute or stress musculoskeletal injuries. In a study of leisure injuries among adolescents, Kujala et al. 1999, found that musculoskeletal injuries such as low back pain increased among adolescents (10 to 16 years) who participate in vigorous physical activities.

The number of children taking part in competitive sport is increasing, and it has been predicted they might experience negative effects from intensive sports participation at an early age. The large increase in numbers of participants and the amount of time spent in training and competing has meant that children may present with injuries that were previously seen almost exclusively in adults.

The increase in the number of children taking part in organised sport is reflected in a corresponding increase in the number of recorded sports injuries. A retrospective review of sports injuries in Hong Kong in 16 year olds or younger revealed that ball games accounted for the greatest number of injuries, followed by track and field (Maffulli et al. 1996).

Tucker AM 1997 reviewed the diagnosis, treatment and rehabilitation in common soccer injuries and reported that the frequency of injuries rises as the age of participants increases with a low incidence of injury in preadolescent players. Similarly a prospective study of 496 young Danish footballers aged 12 to 18 years showed that the incidence of injury increased with age (Maffulli et al. 1996).

Low intensity training can stimulate bone length, while high intensity training may inhibit it. Excessive repetitive efforts at an early age may result in serious alterations of the weight bearing joint surfaces. Joint laxity is associated with recurrent ligamentous injury, while tightness is strongly correlated with meniscal injuries and ankle, shoulder and wrist sprains. Menisci may be injured by damage such as a vertical split, which may be seen in young athletes (Fried and Lloyd, 1992).

Tennis is a popular racquet sport played by different age groups. Bylak and Hutchinson 1998, reported that acute (traumatic) injuries are not common in young tennis players and most injuries in this age group are caused by overuse (chronic) injury of the muscle-tendon bone units. Injuries to the back, neck and groin occur in numbers roughly equal to that of the upper extremity including injuries to the shoulder, elbow and wrist. Overall leg injuries (hamstring, knee and ankle) occur approximately twice as often as upper extremity injuries. This is because of two reasons, first, tennis involves repeated short bursts of activity with quick stop-start and sharp, lateral movements and accelerations, which place high demands on the lower extremities. Second, young athletes may be less flexible and weaker in specific anatomic areas, including the lower extremity, which may predispose to overuse injuries.

"Older or Veteran Athletes"

Despite the benefits of increased activity, injury has been identified as the second most common barrier to sport participation in older age groups. In soccer players, the frequency of injuries rises as the age of participants increases (Tucker AM, 1997). Overuse injuries such as tendinitis and stress fractures are associated

with increasing age and may reflect reduced strength and flexibility of the lower limb serving to decrease the shock-absorbing capabilities of the foot (Matheson et al. 1989). Older tennis players or players with poorly cushioned footwear with absent medical arch support may also be prone to foot injuries. Plantar fasciitis is also common in older runners (Bylak and Hutchinson 1998).

Matheson et al. 1989, studied musculoskeletal injuries occurring with physical activity in older adults and compared this with injuries in a younger age group. They found that in both groups running was the most common single physical activity occurring at the time of an injury and in the older group racket sports and walking were the next most common sports. They also found that the frequency of osteoarthritis was more common with increasing age. Muscle weakness is a common finding with osteoarthritis and attempts at increasing strength play an important role in reducing activity-related symptoms.

A reduction in muscle strength, cardiovascular fitness, joint flexibility and bone mass occur with aging, but benefits appear to be achieved by low intensity exercise sufficient to produce only minimal increases in physical fitness. In a study of athletics and osteoarthritis, Buckwalter et al. 1997 reported that joint injury increases the risk of Osteoarthritis. Sports that subject joints to repetitive high levels of impact and torsional loading increase the risk of joint injury and subsequent degeneration. Appropriately prescribed exercise training can produce significant functional improvements in the middle-aged and elderly adults muscular strength and endurance, flexibility, movement efficiency, and cardio respiratory capacity (Adams W.1991).

1.6. Musculoskeletal system

The musculoskeletal system is always at risk of injury in sports participation. The classification of musculoskeletal injuries concerns primarily the type of injury and injury classes are contusions, strains, dislocations and fractures (Taimela et al. 1990).

The mechanism of injury is varied. It may be divided into (a) traumatic injuries caused by direct force and (b) overuse syndromes caused by repetitive microtrauma (Williams J. 1990).

a) Traumatic injuries: Traumatic injuries are common among participants in sports activities. The cause and severity are usually obvious and may occur suddenly with immediate pain and swelling which may develop to reach a maximum after several hours. The causes usually relate to either "extrinsic risk factors" or "intrinsic risk factor" (appendix 1). Contact sports, such as football, rugby and other team sports tend to have higher rates of traumatic injuries (Lysens et al. 1991).

b) Overuse syndromes: Overuse injuries as noted above are generally caused by repetitive overloading, resulting in microscopic injuries to the musculoskeletal system. They are caused by a level of repetitive microtrauma sufficient to overwhelm the tissue's ability to adapt (Charles Bull R.1999). Stress fractures or fatigue fractures can be caused by frequently repeated movements under normal load, e.g. long-distance running and can occur in any bone of the body, but the most common are in the lower limbs such as metatarsal bones, tibia, fibula, femur, hip and pelvis (Bennel et al. 1996).

1.7. Sports Specific injuries

Team sports such as handball, soccer and basketball involve frequent contact and may have a high injury incidence. Collision is frequent in American football and is relatively infrequent in soccer (Fried and Lloyd 1992). Football players are subceptible to knee injuries. The spectrum of knee injuries spans mild contusions to severe combined ligamentous and meniscal injuries (Tucker AM. 1997). Investigations in runners document a considerable injury risk, especially those running long distances. In comparison with team sports few track athletes are injured due to contact with other athletes as most track disciplines are individual sports.

Jakobsen et al. 1992, recorded that 40% of injuries in team sports such as European handball or basketball involved injury to the arm, hand or finger, and reported that only 18% were overuse injuries.

Different types of muscle injury may occur depending on the mechanism of trauma. Lesions consist of lacerations, contusion or strains (Kujala et al.1997). Muscle strains are common injuries in footballers, Tucker AM. 1997, indicated that strains occur commonly in soccer participants in the pelvis and thigh region with the most frequently affected muscles being the adductors, quadriceps and hamstrings. Most of the lost time was related to soft tissue injuries due to sprains and strains of muscles and tendons (Fried and Lloyd 1992). The most frequently injured body areas in different sports such as American football, soccer and baseball were the knee, ankle and shoulder (DuRant et al. 1992). Shoulder injuries are also most common in tennis players (Bylak and Hutchinson 1998).

Bird et al. 1998, followed up a cohort of 356 rugby players prospectively throughout one competitive club season in 1993. They found that the lower limb was the body region most often injured in games (42.5%) and practice sessions (58.4%). Outwith the lower limb category, the head and face, thigh, knee and ankle were the most commonly injured sites. Sprains and strains were the most common type of injury in games (46.7%) and practice sessions (76.1%). These studies confirmed that in contact sports such as rugby and football, there is a high risk of injuries not only during games but also in training.

There are different physical characteristics required in athletics for events such as running, jumping and throwing. In addition, within these disciplines there are further sub-divisions. Performing such different activities may associate an athlete with event-specific types of injuries. The present study included injuries associated with all track and field athletic events (appendix 2). These activities may place the athletes at risk of injury by subjecting the skeleton to repeated high mechanical loads. These result from ground reaction forces and muscular contraction (Bennel et al. 1996).

Most athletics injuries occur in the track events while the incidence of injury in the field events has been reported as 10% of all athletics injuries (Watson and DiMartino 1987). Acute muscle strains, joint sprains, or fractures are more common in sprinting and jumping (frequently involving the large muscle groups of the thighs); conversely, the great majority of distance running injuries reflect overuse and repetitive injuries from training. Overuse injuries are commoner in middle- and long-distance runners than in sprinters, hurdlers, and jumpers. In jumpers injury correlates with the method of take-off (Jakobsen et al. 1992).

Throwers may have different injuries from runners and jumpers, for instance, rupture of the long head biceps and rotator cuff dysfunction may occur in javelin and shot put events (Charles Bull R. 1999). Cook et al. 1990, suggested that approximately 60% of running injuries result from training errors. These include rapid mileage increase, excessive interval training, excessive 'speed work' on hills, running on poor surfaces, poor flexibility training, the influence of a previous injury, failure to recognise physical limitations secondary to a biomechanical problem, excessive toe running and old, worn or improper footwear.

1.8. Types of athletic injuries

Although head injury is rare in many sports and particularly in athletics, the risk is significant whenever athletes perform competitively in sports entailing physical contact with other players or objects. Most head injuries are caused by falls or collisions and as a result of blunt injuries. Amateur and recreational participants in boxing, some martial arts, and varieties of football including soccer, rugby, American football, and Australian Rules football, may exhibit cognitive deficits following head injury (Collie et al. 2001).

Many sports involve repeated forceful arm actions such as baseball, javelin throwing, tennis and swimming, which produce a high incidence of shoulder injury. Shoulder rotator strength ratio (internal/external or external/internal) has been proposed as an important predictor of the likelihood of shoulder injury

(Wang et al. 2000). Of the throwing sports 75% of the injuries involve the upper extremity with most involving the glenohumeral joint. The glenohumeral joint is the most mobile joint in the body, comprising the head (ball) of the humerus and the glenoid (socket) of the scapula (shoulder plate) (Branch et al.1999). Excessive external rotation and repetitive throwing in the cocking phase process causes fatigue. The muscles become less able to control external rotation leading to shoulder pain in javelin throwers (Herring L. 1998).

The elbow is stressed in different ways depending upon the sports discipline. In athletics, javelin throwing has the highest incidence of elbow injuries. This is caused by forced external rotation and abduction. The majority of cases are blamed on faulty technique, the damage occurring during abnormal and poorly controlled distention of the joint capsule and the medial ligament of the elbow (Benazzo et al. 2000). Most elbow injuries occur during the late cocking and early acceleration phase and are diagnosed as chronic overuse injuries (Frostick et al. 1999).

Ruptures of the back muscles may occur in javelin and discus throwers and pole-vaulters. The rupture is often located in the long back extensors and the large flat back muscles. Scoliosis may occur in javelin throwers, however, although evident this may not cause them significant problems in the short term (Benazzo et al. 2000). Low back and buttock pain are fairly common complaints in elite athletes accounting for about 5% of complaints. The majority of these disorders are related to mechanical factors or muscle tone. Pelvic pain is a frequent problem in distance runners and sprinters (Metzmaker et al. 1985).

Groin pain occurs frequently in sports activities. The injury may be acute but it often leads to chronic pain with diffuse symptoms that are difficult to characterise. Overloading can be caused by sideways kick movements during hard track training in hurdles and high jumpers. Overuse injury of the iliopsoas muscle can occur during strength training, running up hill, hurdling, steeple chasing, long jump and high jump (Williams et al. 1998). A high incidence of groin pain (acute and overuse strains) has also been reported in soccer players because of the upper leg stresses inherent during the game (Tucker AM. 1997).

Serious abdominal trauma is an uncommon sporting problem. Ryan JM. 1999, recorded that occult gastrointestinal bleeding and hollow visceral injuries, can occur in long distance runners resulting from repeated microtrauma of the caecum against the hypertrophied muscle wall causing colic.

The hamstring muscles group consists mainly of three muscles that span the hip to the knee. The hamstrings can act at both hip and knee joints simultaneously to maintain and coordinate the two main joints' movement such as extending the hip and flexing the knee. (Agre CJ. 1985). Several factors predispose the hamstrings to injury including weakness of muscle strength, an imbalance of antagonists and an imbalance from the contralateral leg (Yamamoto T. 1993). Hamstring syndrome pain is localised at the hamstring origin and can be caused by nerve compression causing pain in the buttock. The syndrome has been found among sprinters, hurdles and long distance runners (Servant and Jones 1998).

Hamstring muscle injuries are usually strains and represent a continuum of injuries from delayed onset muscle soreness (DOMS) and partial strain injury to complete rupture of the muscle. Muscle strains may also occur in explosive sports such as sprinting, and long and triple jumpers, but middle distance runners can also be affected. The biceps femoral muscle is the most commonly injured muscle of the hamstring group (Kujala et al.1997). Acute hamstring injuries are common in athletics events such as sprinting, hurdling and long jumping. The injury usually includes sudden severe buttock or thigh pain during strenuous athletic activity, often with the sensation of a crack, snap or pop. Complete rupture of the conjoined hamstring tendon is rare (Servant and Jones 1998).

Hamstring muscle weakness predisposes to muscle strain and hamstring strength training has been widely used as the main process for preventing hamstring strain and is applied in the reconditioning process after injury (Yamamoto T. 1993). Insufficient warm-up and muscle strength imbalances may precede the injury (Kujala et al.1997). Sprains and strains occurring in the first few minutes of the sport activity are usually the result of inadequate stretching and/or warm-up.

Returning to training before complete healing and rehabilitation may lead to a further severe injury. It has been suggested that injury to the hamstring could be predicted at pre-season screening if a discrepancy is present between the hamstring and quadriceps muscle groups (Fried and Lloyd 1992).

The quadriceps muscle group plays an important role in jumping and in specific activities such as kicking a football (Fried and Lloyd 1992). The quadriceps muscle is subject to rupture during fast acceleration in general and with traumatic jumping or landing events in particular. Quadriceps soreness is common after extreme effort, such as a marathon and can be the rate-limiting step in return to fitness (Satterthwaite et al.1996). Reduced dynamic strength of the quadriceps has been associated with knee injuries and strengthening exercises of the quadriceps muscles seem to be important for the prevention and rehabilitation of knee injury (Hahn et al. 1999).

It has been reported that quadriceps insufficiency, poor flexibility, sudden increase in mileage or intensity, excessive pronation, malalignment and poor equipment are the main aetiological factors in patellofemoral pain (Messier et al. 1991). Jumper's knee is an inflammation of the patellar tendon, which is common in jumpers and occurs mainly in sprinters, but rarely in other runners. Excessive bounding, particularly on to a hard surface and inappropriate footwear are common triggers, as are mechanical knee problems, such as poor patellar tracking and weak ankle dorsiflexors and tight hamstring (Cook et al. 1997).

Most injuries occur in the lower extremity, with the knee being the most common site of the injury in most sports activities (Cook et al. 1990). Most knee injuries are due to extreme stresses of twisting and turning during sporting activities. Common injuries occur affecting the medial collateral ligament (MCL). Meniscal and anterior cruciate ligament (ACL) ruptures. Overuse problems may occur with pattellofemoral pain syndrome and patellar tendinosis. These occur in distance runners and account for one-third to one-half of all running injuries (Nichols CE. 1992). Chronic instabilities present with mechanical symptoms such as locking, catching, clicking, or giving away, particularly with twisting movements (Kakarlapudi and Bickerstaff, 2000).

Patellar tendinopathy affects athletes in many sports and at all levels of participation, but has a particular affinity for elite, jumping athletes. Currently, treatment remains empirically based, as it is not known what interventions may best stimulate response. Conservative treatment includes combinations of rest, exercise, especially eccentric exercise, modalities including ultrasound, heat, and cryotherapy, frictions, biomechanical adjustment and pharmaceutical treatment (Cook and Khan, 2001).

The lower leg or shin splints is a common injury occurring in those undertaking high mileage or high intensity training. The discomfort occurs after running in ever shortening intervals into exercise, suggesting the diagnosis. If shin splints are untreated, further stress may lead to stress fractures.

Stress fractures are common overuse injuries sustained by athletes and cause considerable interference with training and competition. They may account for up to 15% of the injuries seen at sports medicine clinics. Bennel et al 1996, reported that track and field athletes are at high risk of developing stress fractures which are more likely to occur in the dominant limb, especially in events such as long jump and hurdles where excess loading is likely to occur. In runners it occurs most commonly in the shin (tibia) but may also occur in the tarsal and metatarsal bones (Fredericson M. 1996).

Compartment syndromes are painful conditions caused by increased pressure inside a muscle compartment. They may be acute as a result of external impact or overuse e.g. from running on a hard surface without adequate preparation, poor running technique, inappropriate type of shoes or time for adjustment. This injury mainly affects athletes who run long distances or participate in walking events (Peterson and Renstrom, 2001).

Achilles tendon rupture is a common tendon injury with an increasing incidence in older athletes. Achilles tendinitis is common in distance runners, whereas tendon rupture may occur in sprinters and jumpers. Acute inflammation of the Achilles tendon often occurs in untrained individuals who train too intensively (Clement et al. 1984).

It can also occur in well trained athletes who change surface, the type of their shoes or technique or who train in cold weather. Running on a very soft surface and running uphill can trigger pain.

Ankle joint injuries are common in all sports, particularly in jumping events. The episodes of ankle pain in athletics are due to trauma; the most severe injury resulting in a tear of the collateral ligaments. Ankle sprains account for 10 to 28% of all sports injuries, while the lateral ankle complex has been deemed the most frequently injured single structure in the body (Barker et al 1997). Usually injuries of the lateral ankle ligaments result from an inversion and/or internal rotation force applied to a plantarflexed foot during loading of the foot (Marder R. 1994). Predisposing factors to acute lateral ankle injury include a history of previous ankle injury and ineffective rehabilitation of a prior lateral ankle injury (Renstrom and Konradsen, 1997). About 50-75% of injured athletes suffer from recurrent ankle sprains. Studies support the finding that sprains, dislocations and stress injuries are at higher risk of reinjury, particularly during competitions (DuRant et al. 1992).

Foot injuries are extremely common in athletics. Several injuries are seen frequently. Plantar fasciitis pain is exacerbated with any activity involving the base of the heel. "Black toe" which is a haematoma beneath the nail bed is almost almost related to repetitive trauma and may be caused by shoes which are too small, too loose or with prolonged downhill running (McBryde AM. 1995). Repeated jumping by landing on the heels on a hard surface as performed by hurdlers, long and triple jumpers can result in overuse injuries of the foot. Lateral plantar neuritis in the heel occurs often in athletes who train on their toes, such as sprinters. Inflammation can cause swelling and heel pain (Benazzo et al. 2000).

1.9. Prevention & Rehabilitation of injuries

Pre-exercise stretching and adequate warm-up are important in the prevention of hamstring injuries. When warming-up is combined with stretching, the elasticity of muscles is further increased, which means that a greater force or

degree of lengthening are required to tear a muscle. Overall conditioning by increased vascularity with better circulation may increase the supply of nutrients and reduce fatigue (Kujala et al.1997).

Increasing awareness and knowledge of sports injury risk factors is important among athletes, coaches and medical staff to reduce the occurrence of sports injuries and injury recurrence. A history of previous injury is one of the risk factors for the development of subsequent sports-related injuries. An athlete with a previous injury may be more likely to be reinjured because the injury may not have healed completely.

Educating athletes about the nature of overuse bone pain and encouraging them to advise the coach or seek medical attention immediately after the onset of any symptoms would allow early intervention. Brief rests or reduced training at an early stage may facilitate repair and prevent the progression of bone microdamage. This approach might reduce the time missed from training (Bennel et al. 1996).

It is considered that the use of sport-specific equipment is one of the most important preventative factors in many sports. Studies showed that the use of protective materials e.g. headgear, mouth guard, groin guard, gloves, sport tape, footwear and protective padding protect against local injuries. Critchley et al. 1999 reported that the use of headgear in boxing and full contact martial arts reduced peak acceleration by about 15 – 25%.

Bylak and Hutchinson 1998, described 3 phases of the rehabilitation. First the acute phase, which includes the initial treatment process to reduce symptoms and control tissue injury. Second the recovery phase, which involves the process of tissue healing and the use of modalities for normalising functional deficits and reducing tissue overload. Finally a maintenance phase which involves directing all of the previous gains from therapeutic activities towards eliminating subclinical adaptations and promoting the progression of sport-specific gains in function.

1.10. Background information concerning the state of Kuwait

The geography

This is some background information about Kuwait, its geography, population and development provided from the Ministry of Information. Since the 17th century, Kuwait has grown from a small city with a population of 10,000 consisting of a group of families to a modern nation state. During the modern era, Kuwait first drew world attention near the end of the 19th century when it signed an agreement in 1899 giving Britain responsibility for Kuwaiti's foreign affairs. In 1961 Britain relinquished its reserved rights to Kuwait and it became an independent country.

The capital is "Kuwait City". The distance between the north tip of Kuwait and its southern border is 200 km while the distance between the eastern and western borders is about 170 km occupying 17,818 sq km. To the north and west it shares a border with Iraq, and to the south with Saudi Arabia. To the east it has a coastline on the Arabian (Persian) Golf. Because of the location of Kuwait in the Saharan geographical region, the climate of the country is characterised by long, hot and dry summers with an average temperature of 37° C which frequently rises to 50° C or more, and relatively cool and sometimes rainy winters with an average temperature of 0-15° C. Dust storms occur frequently and there is a rise in humidity during summer.

The population

The Ministry of Planning statistical report states that the population of Kuwait in mid-1999 was 2,273,719 people and approximately 50% of them are younger than 25 years of age. The number of native Kuwaitis was 798,156 of whom 394,499 (49.43%) were male and 403,65 (50.57%) were female. Nearly all of the population is designated urban. It is located within 5 governorates as follows Kuwait City, Hawalli, Farwaniya, Ahmadi and Jahra.

The health service

A health service has been developed available to everyone living in Kuwait, which is free of charge and a general improvement in health is obvious. Recently a new Sport Medicine and Health Awareness Centre was set up in order to assist sport abilities, provide special services for injured athletes and provide them with necessary testing and rehabilitation equipment with advanced methods.

Sports development

The history of sport in Kuwait has two distinct phases, Sport Pre-Independence (1930-1960); and Sport Post-Independence (1961- until now 2001). Kuwait is a very sports-minded nation interested in the development of sports activities and participating in all types of sports. In recent years, sport has become to have an important role in Kuwait society, especially for youth. Forty-one percent of young people spend their leisure time in sports clubs, formed by the Public Authority for Youth and Sport (PAYS).

Government grants were developed for all sports and recreation institutions. The Kuwaiti population is interested in sports in general but in football in particular, the most popular sport in the world, as well as having a keen interest in handball. There are many formal and informal associations promoting various sports. As in most societies, the majority of sports participants are males, but there are special sports facilities also for females. Most athletes are young males engaging in regular exercise in sports clubs and taking part in organised competition. Also, during the school day in physical education classes students are taught special skills to make their daily activities more enjoyable.

The seaside in Kuwait is a frequently used facility with the presence of specific paths for walking and jogging. This is because of the open area and the fresh air by the sea. Moreover, there are outdoor playground areas which are often developed by young males gathering together in their leisure time in the local

neighborhood for football, basketball and volleyball games. These activities are currently becoming popular and taken part by many people.

Many successful Asian and Arabian competitions have been held in recent years for different sports. The country achieved some regional and international successes, which surprised many Arab and Asian countries. Also many Kuwaitis took leading administrative positions in the regional, Arab and international federations.

The Kuwait government took over the responsibilities for the provision of sports clubs with their support needs. The total number of registered sporting participants in Kuwait for the season 1999/2000 was 15,608 male and female athletes, representing 21 sporting clubs, 14 of them participate in multiple sports activities and 7 are specialised in one or two sports only. These clubs are varied in size and have a variable number of athletes. They provide various types of sport activities and physical exercise.

Facilities and activities in these clubs are varied. The 4 major clubs are running complete sport facilities including a football stadium with a synthetic tartan track, gymnasium, squash and tennis courts, swimming pools, small purpose halls (table tennis, judo, fencing, boxing, weightlifting), a handball field, one or two additional football fields, and an administration building. The other clubs have various basic facilities suited to their activities and the size of the club.

The distances between Kuwait City (Ku. C) and the14 sporting clubs are varied from 4.5 km up to 45 km (appendix 3). The farthest two clubs who usually participate in athletics are the Al-Jahra sporting club, which is located in Al-Jahra town, which is one of Kuwait's oldest towns (31 km NE), and the Al-Shabab sporting club, which is located in Al-Ahmadi town (35 km S) Ku. C. Kuwait map and the location of sporting clubs are shown in (appendix 4).

The Kuwait Amateur Athletic Federation (KAAF) was instituted in 1957. In terms of success, the golden age for athletics was in the 1980's, this sport being recognised as the second most successful in national terms. There has been an

increasing number of athletes participating in successive years, e.g. the number of athletes registered in Kuwait for the season 1995/96 was 1,478 and this increased to 1,763 athletes in the 1999/2000 sports season. In general terms the sporting seasons start in September (with the beginning of schools) and end in April/May (before the final exams). In accordance with Islamic customs, Friday is the official holiday and Thursday is a rest day.

Recognising the importance of sport to the community and its value in developing countries, all aspects of sports have been studied with particular relevance to Kuwait. Sports medicine is a growing area and the study of the sports injuries is of vital importance. It was therefore recognised that studies should be undertaken on the incidence of sports injuries within the various sports activities in Kuwait including athletics. Serial studies were therefore initiated looking at injuries in Kuwait with a view to comparing these with the reported incidence in the literature and with a direct comparison with another developed country i.e. Scotland.

Chapter two

Aims Objectives and Introduction

2.1. Aims

- The aim of this project was to provide a profile of athletic injuries in the State of Kuwait. This was studied retrospectively to identify the risk factors, frequency of injuries, management, type of injuries and the anatomical site of injury.
- The second aim was the development of an appropriate questionnaire to be used on a prospective basis.
- Another study was undertaken to assess the Scottish health care system in terms of client needs for sports injuries treatment and management. The aim of this study was that the information collected could be used as a basis for recommendations to facilitate the use of sports injuries centers in Scotland to allow their utilisation as specialist centres for injury diagnosis, treatment and rehabilitation.

2.2. Objectives

- To determine the rate, type and anatomical distribution of musculoskeletal injuries and their causes in athletes in Kuwait.
- To determine the health care acquisition for sports medicine within Kuwait, the site of diagnosis and methods of investigation.
- To develop an appropriate questionnaire to be applied and conducted to prospective studies or to make comparison with other studies in different countries.
- To suggest preventative measures and advice to the governing bodies to minimise the severity of injuries in athletics.
- To find out the most important client needs of athletes and clubs with regard to sports injury management in Scotland.
- To develop frameworks for future athletic care in Kuwait and Scotland.

Chapter three

Methodology

3.1 Introduction

Thomas and Nelson (1990) state that "research is a structured way of solving questions and problems in the field of sport".

In this study different methods were developed to be used to obtain information needed from two different populations representing athletes in Kuwait and Scotland. Surveys were planned to be conducted using both interviews and questionnaires. The questionnaires were prepared to gather data from specific samples representative of the athletic population. There were two different formats of questions in the questionnaire, closed questions and open-ended questions. We used closed questions to allow numerical data and open-ended questions for an element of opinion and expression to be collected.

3.2. General background

The initial aim of this study was to make a comparison of injury incidence and its management in two different populations, Kuwaiti and Scottish athletes. As the comparison of injuries between these two populations was on a long-term prospective basis, a retrospective study of athletic injuries was prepared and conducted in Kuwait as a pilot study to assess the viability of the method, and to measure the incidence of injuries. Data was collected, analysed and discussed and the information, which was found in the pilot study, was used to further develop the questionnaire to be applied to the prospective study to be conducted in both Kuwait and Scotland.

In Kuwait good cooperation of the clubs was achieved, with an excellent return of injury questionnaires. In addition, data were collected from a control group of

non-injured athletes recruited from the same club base. In Scotland, visits were made to athletic clubs to aid familiarisation with the club set up, to make personal contact and discuss issues related to the setting up of a long-term study. Although initial enthusiasm was high, it was quickly realised that data on the incidence of injuries alone would require considerable time and it was felt that secondary studies should be undertaken. After discussion with representatives of SportScotland (Colin McLeod and Gordon Turner) it was felt that a comparison of injury management in Kuwait and Scotland be examined with a particular regard to how athletes perceived and acquired care at the sports injuries clinics network in Scotland. Previous studies had looked at doctors and physiotherapists perceived needs for facilities and this study extended this to examine client needs for treatment and management.

3.3. Methods

3.3.1. The Kuwaiti studies

The incidence and mechanism of injuries was studied in Kuwait utilising both a retrospective and prospective analysis.

3.3.1.1. Retrospective Study

The first study was a pilot observation of Kuwaiti athletic injuries for the season 1997/98. The researchers main aims included familiarisation with the study topic and design and the development of the questionnaire as a research tool, the development of the proposal for the prospective study and an extensive literature review. The primary questionnaire was developed following the literature review and a critique of similar studies. The questionnaire was developed and interview questions applied in the pilot study (Appendix 5 and 5A). Following agreement from the General Secretary of the Kuwait Amateur Athletic Federation (KAAF) and with contact with the established head coaches, a cover letter was sent to all athletic clubs in Kuwait.

This was to confirm the frequency of athletic injuries, the type of injuries and their management. This data was collected during the national final competition at the end of April 1998, which lasted for 4 days. An interview was conducted with 110 athletes by two interviewers, the researcher and co-worker (Ali Al-Wayel). The athletes interviewed represented 8.7% of all 1,262 registered and 32.8% of the 232 who participated in the four days of the competition. Some two-thirds of those interviewed were known to have previous injuries. This questionnaire included basic information such as demographics, sports-related information, the injury pattern and treatment received.

3.3.1.2. The development of the questionnaire

The basic questionnaire, which had been trialled and the preliminary study method, were redesigned and extended following reference to other injury studies questionnaires and identification of problems revealed during the first study. A basic questionnaire had been developed by a previous researcher within the Division of Cardiovascular & Exercise Medicine at Glasgow University (Kirsty Stewart, 1998) and applied to football injuries. Some questions were taken to serve the aim of the present study in athletes. The questionnaire was further reviewed and modified after discussion with the supervisor of the project (Professor W S Hillis) and Kuwaiti focus groups comprising health professionals and sports participants. The design of the questionnaire was developed in English and this was translated into Arabic to be used in Kuwait.

To assess the reliability of the Arabic version, the researcher gave the questionnaire to an Arab medical researcher to re-translate the Arabic version into English to assess the consistency of the content, and following this, the final Arabic version was confirmed. The questionnaire was printed in Kuwait and re-trialled with athletic coaches.

The questionnaire was designed to maintain confidentiality and to be simple enough to guarantee a maximum number of replies. It was designed to be short and with a limited use of easily understood medical terms. Most questions

involved Yes / No answers with a simple reply method and included questions to acquire basic demographic information, sports related information and the injury pattern and treatment.

3.3.1.3. Prospective study

The second survey was a prospective study of Kuwaiti athletic injuries for the season 1999/2000. The survey covered 11 athletic sporting clubs who participate in competitions and was conducted between September 1999 and April 2000. The results were collated during the 8 month athletics season. From the results of the pilot observations, the maximum number of injured athletes for a single club was anticipated at 20-24 per season. Assuming an even distribution it was considered there might be 3 injuries per month and 5 questionnaires were therefore sent each month from 1st August 1999 to 1st April 2000, making a total of 495 forms. One hundred and three forms were completed, a letter of encouragement was sent to the clubs in September 1999 and several phone calls were made and faxes sent to maintain cooperation with the club authorities. Injured athletes were asked to complete the questionnaire (Appendix 6 and 6A).

In summary information was sought which included subject demographics and physical information followed by specific questions regarding event participation. This also included questions regarding training schedules, the level and duration of activity, preparation and recovery activity, training aids and the surfaces used.

Injury information included the locus and timing of the injury, the duration of lost activity and specific medical questions regarding the personnel consulted, investigation performed, the medical diagnosis and site of injury. The site of investigation and treatment and the specific therapy obtained was also noted.

An injury was defined by the researcher by adapting the definition of the National Athletic Injury Registration System (NAIRS) in the US and the Council of Europe 1988, an injury being considered as any mishap that occurred in athletics (track and field) events, which caused an athlete to miss one day or more from training

or competition because of pain or disability. It was felt that this wide definition would include the full spectrum of athletics injuries.

Information was sought concerning the events in which each athlete participated as it was appreciated that there was different physical characteristics required for events such as running, jumping and throwing. In addition, within these disciplines there are further sub divisions (appendix 2).

3.3.1.4. Cohort study

The third survey included a control group of Kuwaiti athletes who had not been injured during the season 1999/2000. These subjects were recruited from the participant clubs and they completed the questions which did not concern injury (Appendix 7 and 7 A). The questionnaires were distributed by personal contact in Kuwait at the end of the season during April and May 2000 and the data were collected from 103 athletes, representing 18.4% of the 559 participants in the national competitions. The demographic data from this non-injured group were used as control.

3.3.2. Audit study

The fourth survey was developed to assess the needs of athletes and clubs with regard to sports injury management in Scotland. This was an audit study to assess perception and ease of access and resulting experience in relationship to the sports injuries clinic network organised by SportScotland. For the injuries studies the names of all clubs and their addresses were obtained from the Scottish Athletics site on the Internet. Letters were mailed to all 157 clubs to invite them to participate in the study. Forty clubs accepted the invitation to participate and a second letter was mailed to these individuals to identify a liaison person for further communication. A final number of 38 clubs identified a liaison person and therefore participated. Many clubs informed the research group that they were interested in the general area of assessing injuries, but did not want to participate

in a long-term study. Further letters were sent to this group and the study to assess client needs and perceptions was undertaken.

The 38 athletic clubs received 10 questionnaires each, making a total of 380 forms in November 2000. Follow up letters were sent to them some 2 weeks later. Two of the clubs withdrew from the study during this time. One hundred and twenty-eight completed forms were received from 16 clubs.

Non-injured athletes used form, **"A"** (Appendix 9) which sought the following information: Club name, first attendance, investigations, awareness of the existence of the clinic in the area, traveling distance, transportation, and facilities. Also, the availability of the doctor, or physiotherapist, or investigation techniques and their comments. They were asked about the cost of assessment and treatment, and for a course of treatment. The final question was asked regarding their main needs for sports injury treatment and their suggestions.

Questionnaire **"B"** (Appendix 9 A) asked the injured athletes to complete the form, which sought the following information: Club name, sports injury attendance, investigations, next attendance, awareness of the existence of the clinic in their area, comments on these clinics. Also, by whom they have been referred, how did they find out the clinic, satisfaction of the treatment and rehabilitation, opening hours, traveling distance, availability of the doctor, or physiotherapist, or investigation techniques and their comments. The final question was asked regarding their main needs for sports injury treatment and a free text section included for suggestions for improvement.

The data was analysed utilising the Minitab statistical package and the value from the injured and non-injured cohort groups compared using an unpaired t-test. Statistical significance confirmed the finding of a P value <0.05.

Chapter four

Retrospective Study for Athletics in Kuwait 1997/98

4.1. Preliminary Pilot Observation

This study was a preliminary pilot observation of Kuwait athletic injuries for the season 1997/98. The data was collated during the national final competition at the end of April 1998, which lasted for 4 days. During the 4 days of competition, an interview was conducted with 110 athletes by two interviewers (Abdul-Majeed Al-Mousawi & Ali Al-Wayel). A small questionnaire was applied to identify the frequency of athletic injuries (appendix 5). Of the 110 interviewees, 76 had been injured and 34 had not suffered any injuries during the entire season.

This study identified the demographic details of the individuals, the potential cause and mechanism of injury, the method of investigation and the treatment applied. During the 4 days of the finals, there was 153 active participants of whom 92 was interviewed of those 58 had sustained injuries during the season. In addition 18 adolescents who had sustained injuries, but were not allowed to compete because of their age, were also interviewed so that a total of 76 injured athletes were identified in the 110 interviewees.

4.2. Results

The results of the athletic injuries recalled by athletes during the four days of the final competition for the season 1997/98 are shown in tables 1 – 8 and figure 1.

Club membership

In this preliminary study, data was obtained from 7 sporting clubs with a total number of 1262 athletes who were registered in the athletic season 1997/98 (table 4.1).

Table (4.1): number of athletes registered among sports clubs and their injuries

No.	Club name	No. of athletes registered	Of the 76 injuries
1.	Qadsia	239	11
2.	Al-Salmiya	232	23
3.	Tadamon	203	6
4.	Al-Shabab	194	14
5.	Khitan	142	6
6.	Kazma	130	4
7.	Fahaheel	122	12
Total		1262	76

Age groups

The number of injuries occurring in different age groups are shown in table (4.2). Results of the sample are split into 3 age groups. From the 110 interviewees, most of the subjects who sustained an injury were aged between 16 and 19 years (34). Those subjects in the youngest age group (10-15) years sustained 18 of the injuries.

Table (4.2): Number of injuries according to the age groups

Injured athletes			
	Adolescent	Young adults	Adults
Age groups	10 - 15	16 - 19	20 and over
Injuries	18 (23.7 %)	34 (44.7 %)	24 (31.6 %)

Athletic events

Recognising that there are different physical requirements in athletic events such as running, jumping and throwing with further sub-divisions within these disciplines. Table (4.3) shows the distribution of injuries occurring in each athletic event and number of participants. Most injuries occurred during track events (46), 19.8% of the total registered athletes or 36.8% of track participants. The majority of injuries occurred in sprint (short distance) events (15 injuries). Thirty injuries occurred in the field events, which consist of 12.9% of the total registered athletes, but 28% of field event participants. Most injuries occurred in the long and triple jumps (10 injuries).

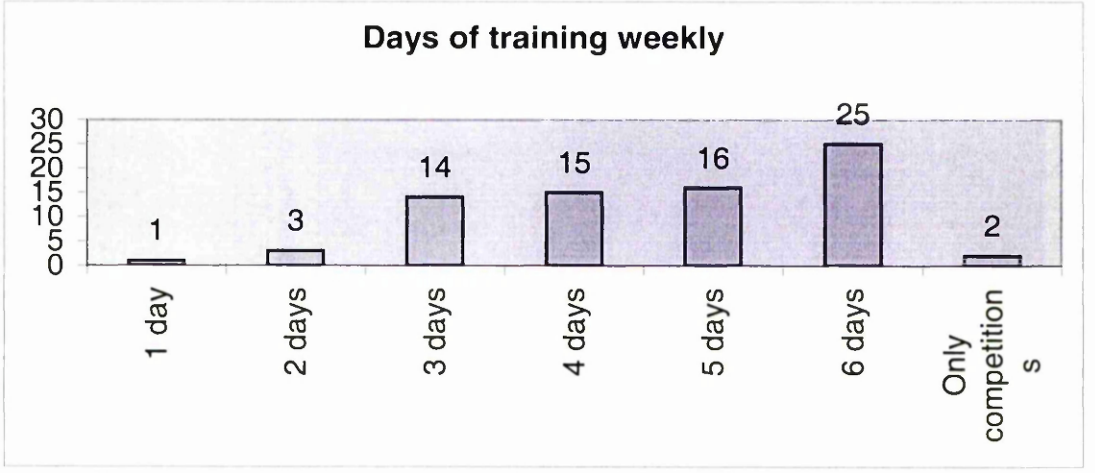
Table (4.3): No. of participants and distribution of injuries by athletic events

Event/Age	Participants 10 – 15 yrs	Participants 16 – 19 yrs	Participants 20 + yrs	No. of injuries	Total	%
Sprint	8	8	8	15	24	62.5
Middle distance	13	8	4	8	25	32.0
Long distance	0	8	7	3	15	20.0
Marathon	0	0	7	0	7	0
Walking	0	0	4	1	4	25.0
Hurdles	8	7	4	9	19	47.4
Steeple chase	0	4	5	2	9	22.3
Multi-events	10	8	4	8	22	36.4
Long & Triple jump	12	10	5	10	27	37.0
High jump	10	7	5	6	22	27.3
Pole vault	0	5	4	2	9	22.3
Shot put & Discus	10	6	5	5	21	23.8
Hammer	0	9	3	4	12	33.4
Javelin	8	5	3	3	16	18.8
Total	79	85	68	76	232	32.8

Days of training weekly

The official weekly holidays in Kuwait are Thursdays and Fridays. Thus, the usual training days are from Saturday to Wednesday, but some athletes in addition train on Thursdays. It was found that 25 of the injuries reported occurred in the athletes who trained the most, i.e. 6 days a week (figure 4.1).

Figure (4.1): The distribution of days of training weekly



Place of training

At the beginning of the season particularly, to develop cardiovascular fitness, athletes may use different places for training and use facilities outside of the stadium. It was found that the highest percentage of injuries occurred in athletes who had been training inside the stadium. Table (4.4) shows that the group who trained inside the stadium accounted for 70 of the 76 injuries. Only small numbers of athletes trained outside the stadium or used different surfaces.

Table (4.4): Place of training

Place of training	Inside the stadium	Outside the stadium	Both places
76 injuries	70 (92.1%)	2 (2.6%)	4 (5.3%)

Surface

There are a variety of different surfaces, which athletes use for training purposes such as tartan track, sand, grass, and road. Table (4.5) shows that there were essentially equal numbers of injuries on sand and tartan surfaces during the season 1997/98. Thirty-four injuries occurred on sand, followed by 32 injuries on tartan.

Table (4.5): Surface

Surface	Sand	Grass	Sand & Grass	Tartan	Road
76 injuries	34 (44.7%)	5 (6.6%)	3 (4.0%)	32 (42.1%)	2 (2.6%)

Occurrence of injury in training or competition

Sports injuries may occur while an athlete is training or competing or during other sports activities e.g. during PE classes. Table (4.6) shows that most injuries occurred during training sessions 45 (59.2%) whereas 19 (25.0%) were during competition. The remainders 12 (15.8%) were found during different activities such as football, PE classes, and camping (Kuwaitis often spend two weeks camping outside the city during the spring holiday).

Table (4.6): Locus of the injury

Occurrence of injury	Training	Competition	Other
76 injuries	45 (59.2 %)	19 (25.0 %)	12 (15.8 %)

Anatomical site of injury

The injuries were split into10 different body regions. Although information from the subjects showed that some had multiple injuries during the season, only one was registered for each athlete. The quantity and regions of injuries recorded are seen in table (4.7). This table shows that the lower extremity sustained 65 (85.5%)

of the 76 injuries whereas the upper extremity sustained only 11 (14.5%) injuries. The hamstring area sustained most injuries 19 (25.0%) followed by the foot 18 (23.7%), followed by the knee 10 (13.6%).

Table (4.7): Regions injured

Regions	76 Injuries
Shoulder	3 (4.0%)
Elbow	1 (1.3%)
Back	7 (9.2%)
Groin	3 (4%)
Quadriceps	4 (5.3%)
Hamstring	19 (25.0%)
Knee	10 (13.6%)
Shin bone	8 (10.5%)
Calf muscle	3 (4.0%)
Foot	18 (23.7%)

Treatment

Table (4.8) shows that two main treatments have been given to injured athletes. Rest with physiotherapy accounted for (39.5%) followed by rest alone (36.8%). Rest treatment means, rest, ice, elevation, and compression (RICE). Injection treatments, which accounted for 2.6% are rarely used for club athletes with athletic injuries in Kuwait but, could be given to those training with the national team.

Table (4.8): Treatment given

	Rest	Physiotherapy	Rest & Physiotherapy	Surgery	Injection
76 injuries	**28 (36.8 %)**	14 (18.4 %)	**30 (39.5 %)**	2 (2.6 %)	2 (2.6 %)

This preliminary observation identified that there is a high incidence of injuries and suggested that further study was required.

4.3. Discussion

This study was a preliminary pilot observation of Kuwait athletic injuries for the season 1997/98. No previous studies have been performed on observing the nature of injuries in Kuwaiti athletes. The study interviewed 110 athletics (track and field) participants. It was found that 76 of them had been injured and 34 had not suffered any injuries during the entire season. The ages were varied from 11 to 36 years old. Some of the competing athletes were not interviewed due to the problem of time constraint (4 days of the final competition).

Participants in this study were chosen using a purposive sampling strategy in order to represent certain characteristics with regard to the study. The researcher was not necessarily looking for statistical representativeness, but was wishing to obtain experience relevant to the topic of the study and insight regarding problems faced in assessing injuries. Most of the sample, which was included in this study was composed of athletes who had experienced injury and the sample was considered to be "information rich". As this population contained a clear, known and easily identifiable group, the sample was easily selected, interviewed and collected. This may have involved a bias in the recruitment process but ensured a better information base obtained from a targeted population.

A limitation of this study is that some injuries may have been missed if forgotten at the time of recall and is limited by the retrospective nature of the enquiry. In addition, although it was thought that all athletes with injuries were identified a few may have been missed in those athletes who were not interviewed due to the problem of time constraint.

The data was collected during the 4 days of the national final competition, which was attended by the majority of athletes. The data were collected by questionnaire and interviews, conducted with 110 athletes representing 8.7% of the 1,262 registered with the KAAF. The number of competitors available for interview at the final competitions was 79 adolescents, 85 young adults and 68 mature adults (232).

A number of 110 (47%) were interviewed of whom 76 had sustained injuries during the season (table 4.3). The exact number of all active athletes competing in other competitions was unknown. But, those competing in the final competitions represent the most active athletes including the elite group.

Observations on each section of the questionnaire were made and conclusions drawn where possible.

Club membership

Although there were 11 registered sports clubs with a total number of 1565 athletes who were registered in the athletic season1997/98, the data was obtained from 7 clubs with 1262 athletes (see table 4.2 in the results section). The Qadsia and Al-Salmiya sporting clubs start their preseason training in July/August and have the largest number of athletes 239 and 232 respectively. They are the most successful athletic clubs with best sports and medical facilities and tend to dominate most of the competitions. Regular training in other athletic teams usually starts in September after the summer vacation.

Al-Salmiya was the most successful club and has tended to dominate the competitions during the last 3 seasons. It is a medium-sized general sports club when compared with the others but has a large number of athletes who usually participate in all athletics events. It also offers the best facilities and is staffed with the highest number of coaches. The recorded injuries showed a relatively high number from the Al-Salmiya club and the Fahaheel club. Although the number of athletes competing from these clubs is unknown, results at least suggest that closer examination of the training techniques and the medical support available to these clubs be examined in more detail. This would be an attempt to reduce the injury occurrence and improve long-term management.

Although a total of 11 clubs with 1565 athletes were registered, members from 4 clubs were not interviewed for several reasons. The Al-Yarmouk club decided not to participate in athletics in that season. Half of the Sulaybikhat athletes were adolescents and the rest were inactive following administration problems. The

majority of Al-Sahel and Al-Naser athletes were adolescents and only a few were young adults and they did not participate actively in significant numbers.

Age groups

In the recent past, there has been a change in the age of the onset of formal participation in athletic events. Until the middle of the 1980's athletes participated from 13 years of age in formal competitions with one of the 14 official sporting clubs. Following decisions of the KAAF in the end of 1980's an opportunity was given to start at a younger age. At the present time athletes can commence at 10 years. Recently, most athletic participants in Kuwait are amateur male athletes aged between 12 to 18 years old. The sample of injured athletes in the present study was all male and age ranged from 11-36 years.

As well as the split into formal competition age groups, the results are expressed in 3 age groups: adolescents (10 - 15 years), young adults (16-19 years) and adults (20 years and over). From the 110 interviewees, most of the subjects who sustained an injury, however, were aged between 16 and 19 years (44.7%). Those subjects in the youngest age group (10 – 15) years sustained (23.7 %) of the injuries. In a study of sports injury clinic among different age groups (7 – 71) years in different sports including athletics, Frontera et al. 1994, found that the majority of the injuries occurred in those (10 – 19) years old group. Tucker AM. 1997 reviewed common soccer injuries and reported that soccer carries a low risk of injury in the preadolescent and adolescent age groups.

When reviewing the number of athletes registered for participation in different age groups, we found that the number of athletes began to decrease after the age of 19. The reason for this decrease may be that they are now looking for jobs, getting married, becoming graduate students either in Kuwait or abroad or entering in one of the military institutions. Another factor which reduces the number of participants in the over 18 age group is the stringent rules and conditions which they have to conform to in order to compete against other top athletes.

Days of training weekly

The results show that increasing hours of training per week are associated with injury incidence. A third of injuries occurred in athletes who regularly trained 6 days a week. Williams et al. 1998, reported that athletes who played sport everyday, sustained more injuries compared with those playing sports on only one to three days a week. Studies showed that sports injuries may occur as a result of intrinsic and extrinsic factors.

Extrinsic factors include sport-specific aspects, faulty technique and training errors such as excessive elevation in the intensity of training and duration (Mechelen et al. 1992). Peterson and Renstrom 2001, declared that overuse injuries are generally due to frequently repeated movements and are influenced by the total duration of activity. Tissues may be made susceptible to the adverse effects of extrinsic factors such as training errors, poor conditions and surfaces.

On the other hand, many injuries in non-contact sports result from intrinsic factors and include muscle strains and ligament sprains (Bird et al. 1998). For instance, the elderly have been reported have an increased incidence of overuse injuries, while young athletes are at increased risk when being exposed to high-intensity training at a very young age (Fredericson M. 1996). Messier et al. 1991, studied the aetiologic factors associated with patellofemoral pain in runners. They concluded that a runner who has the predisposing aetiologic factors may remain asymptomatic by keeping his/her mileage below a given threshold level. If weekly mileage increases above this threshold level, the stresses placed on the musculoskeletal system may manifest themselves as an injury. It is suggested that specific attention should be paid to these factors and discussion with governing bodies to help develop preventative strategies in each individual athlete.

Place of training and surface

Athletes may use different places for training depending on the nature of their event especially in preseason training. For example, most of the athletes particularly at the beginning of the season, develop their cardiovascular fitness

and may train outside the stadium. They may use cross-country, roads, parks, hills, and seaside and desert sands. The running surface varies from smooth to hard such as sand, asphalt and pavement. Athletes may also use cambered roads, which might play a role in injury occurrence. Meantime, it might be difficult for coaches to observe athletes' performances outside the stadia where by increasing their run duration or speed they may lead to overtraining or muscle fatigue. In addition, hot weather and other climatic factors should be considered.

The athletic season in Kuwait starts with cross-country competitions in September or October after the summer holiday. The climate may be important to be considered at this time as it is characterised by hot and dry weather with an average temperature of 40° C or more. Also dust storms occur frequently and there is a rise in humidity during the summer. Many athletes commence their preparation period with endurance training, which is carried out outside the stadia. Some other competitions usually take place in December and January when the average temperature may drop to 0-15° C. All athletic competitions in Kuwait take place within outdoor stadia, however, the use of indoor stadia has increased to avoid the medical problems associated with extremes of temperature. Air pollution can be a problem secondary to dust but emissions from cars is not a significant problem.

In a study of exercise and outdoor ambient air pollution in the UK. Carlisle and Sharp (2001), advised athletes to exercise indoor if it is cold and smoggy as the climate and geographic conditions can result in much higher accumulations of pollutants particularly in the developed countries. Environmental conditions and the weather affect levels of pollution exposure and physiological responses. Also they stated that the length of time spent exercising outdoor is another factor, which may affect on athlete's performance. For example, distance runners and walkers are likely to be most at risk from the negative and harmful effects of pollution (smoggy environments and busy road traffics) exacerbated by exercise.

Most athletic events depend on hard learned skills, utilising special equipment, and developed technique. Therefore, athletes such as sprinters, jumpers and throwers need special facilities to develop their performance and these are usually

found for training purposes inside the stadium. Training may occur inside the stadium and athletes may use track, field, long and triple jump landing pits, and the perform strength training within weight lifting halls. Many athletes e.g. middle and long distance runners continue their training programme in both sites until January.

There are a variety of different surfaces, which athletes use for training purposes such as the tartan track, sand, grass, and road. Enquiry about the different surfaces used showed that, during the season 1997/98, two clubs (Qadsia and Kazma) used a tartan surface and one club (Al-Shabab) used both tartan and sand surfaces. The other 4 clubs used a sand track. The group who trained on sand surfaces accounted for a third of the injured athletes, which was 7% of the total number registered. Also, the other group who trained on tartan surfaces accounted for a third of injuries, which was 5% of their total number registered. All clubs trained in the main stadium once a week in order to become accustomed to the tartan surface.

We looked to see if the surface was an influential factor for those clubs with the highest number of injuries. From the above figures 5% versus 7%, it is not clear from this study whether the tartan or sand surfaces have an influence on injury occurrence. However, the sample was small and this requires a prospective study to establish any significant difference. The kind of footwear used will depend on the training surface. For example, the length of spikes used on sand surfaces are longer than those used on the tartan surfaces. All athletic competitions are undertaken on a tartan surface and may require a change in footwear, which may lead to different stresses on musculoskeletal and other soft tissues.

The surface used may influence the occurrence of injuries. Orienteering is conducted over uneven terrain and this leads to more injuries than are seen in conventional track events (Zuluage et al 1995). Cook et al. (1990), stated that the posterior tibial syndrome is typically caused by running on hard surfaces, while over pronation injury can be caused by running on banked surfaces. Stress fractures of the fibula in athletes most commonly arise from running on hard surfaces.

During each contact of the foot with the ground, the ground acts on the foot with a ground reaction force and the foot acts on the ground with a force of the same magnitude but in an opposite direction. These forces during landing and take-off can be quite different on different surfaces. Running on grass produces forces which look different to forces running on asphalt. The impact force is much higher for running on asphalt than for running on grass or sand. On sand these impact forces disappear completely. However, the active part of the ground reaction force remains about the same when comparing running on grass with running on asphalt. It is speculated that these high impact forces are one of the causes of many injuries in running as well as in other sports (Segesser and Nigg, 1980).

The impaction of the toe onto the anterior aspect of the shoe can lead to subungual haematomas, nail bed injuries or to 'jammed' joints at the distal interphalangeal, proximal interphalangeal or metacarpal phalageal joints. Shoes with a small, tight toe box may be associated with subungual haematomas. In tennis the court surface and shoe design determine traction and the impaction of the toes; synthetic surfaces are associated with greater traction than grass or clay courts and consequently toe impaction is more common with the former surface (Bylack and Hutchinson, 1998).

Further observations were made on more than 2000 subjects playing on different tennis surfaces. The frequency of subjects with pain was significantly lower on the clay-type surfaces than on the synthetic sand surface. This study confirmed that the type of a surface used for some sports activities may have a dominant influence on the occurrence of injury, pain and discomfort (Nigg and Denoth, 1980).

The effective shoe-turf interface torque effect has been studied in soccer using several different types of cleated shoes and multiple types of turf. It was concluded that multi-cleated soccer shoes developed less torque than the traditional football shoe especially on natural grass (Barret and Bilisko, 1995).
It is very important to select an appropriate surface and footwear for both training and competition and should involve the club coach and medical advisor.

Time of injury

In the present study, most of injuries occurred during training (67%). The injuries, which were reported as occurring during competitions, were less than a quarter and a few injuries occurred during other sporting activities. Other groups have found similar results in track and field athletic injuries.

A retrospective study of track and field athletics injuries was undertaken among 147 athletes in the UK. D'Souza 1994, found that (60%) of the injuries were during training, about (20%) seen during competition and 10% occurred during other sporting interests.

Athletes spend more time in training rather than in competition. Training should be monitored by sports medicine specialists to determine the cause of injury so that modification may be made to prevent injuries. Such observations might guide the training required in volume and intensity during different time intervals. The training schedule should be prepared in a guided form to fulfill all training requirements.

Athletic events

Athletics can be divided into the two main categories, track and field events. Results of the present study showed that most injuries occurred during track events (46), 19.8% of the total registered athletes or 36.8% of track participants. The majority of injuries occurred in sprint (short distance) events (15 injuries). Thirty injuries occurred in the field events, which consist of 12.9% of the total registered athletes, but 28% of field event participants. Most injuries occurred in the long and triple jumps (10 injuries). Adeniran and Toriola 1985, in a sports injuries survey among 195 young Nigerian athletes observed, that sprint events listed at the top of other sport groups.

An interesting point revealed in this study was that the number of injuries in some events were few compared with previously reported studies. For example, only one injury was noted in the walking events. This appears to be a reflection of the very small number of participants (usually 3 to 5 athletes only). Also, the long

distance events only reported 3 injuries. In track and field injuries in high school athletes previously reported by Watson et al. 1987. It was found that distance runners ranked highly at third among the athletic events. Further discussion on specific activities and its relationship to injuries are made within the discussion in chapter five.

Kind of injury (anatomical area)

The lower limb injuries were the most commonly involved in many sports. Recognising the pattern of injuries in athletics, different anatomical areas have been found. Acute hamstring injuries are common in explosive sports such as sprinting, but hurdlers and jumpers can also be affected (Servant and Jones 1998). The sprinters and (long and triple) jumpers frequently seemed to injure the middle-third of the hamstring whereas the hurdlers injuries were closer to the muscle origin. Also the back was the most common site of injuries in throwers (Walker A. 1989).

The three most common diagnoses were injuries affecting the hamstring muscles, foot and knee respectively. The hamstring seems to be the region most commonly injured among athletes. These were also the top three sites of injury reported in the sport injuries clinic report of Walker A. 1989, and Adeniran and Toriola 1985, in a survey among 195 young Nigerian athletes. Moreover, Frontera et al 1994, reported in a study on Patterns of injuries in Athletes Evaluated in an Interdisciplinary Clinic. This study distributed the injuries by anatomical area in the (13 to 20) years old group and found that, the hamstring was the most frequently injured area in all age groups.

Treatment

(RICE) is the standard treatment which should be used as a first aid of Rest, Ice, Compression and Elevation. It is therefore appropriate that the most frequent therapeutic measures prescribed in the present study was physiotherapy and rest following first aid treatment. The physiotherapy modalities included ultrasound and stimulation. Returning to training before complete healing and rehabilitation

may lead to a further severe injury. It has been suggested that injury to the hamstring could be predicted at pre-season screening if a discrepancy is present between the hamstring and quadriceps muscle groups (Fried and Lloyd 1992). Conservative treatment includes combinations of rest, exercise, especially eccentric exercise, modalities including ultrasound, heat, and cryotherapy, frictions, biomechanical adjustment and pharmaceutical treatment (Cook and Khan, 2001).

Chapter five

Prospective Study for Athletics in Kuwait 1999/00

A prospective study of Kuwaiti athletic injuries was performed during the season 1999-2000. In this year 1763 athletes were registered with the KAAF, however, only 662 athletes participated in competitions during the season. The survey covered eleven athletic sporting clubs who participate in competitions and was conducted between September 1999 and April 2000. The results were collated during the 8-month athletics season. A total of 103 injuries were reported from eight clubs and no injuries occurred in the other three clubs.

In addition, the survey included a control group of Kuwaiti athletes who had not been injured during the entire season. A cohort of 103 athletes from the eight clubs who reported injuries were identified at the end of the season. These subjects were recruited to give information concerning the demographics of non-injured Kuwaiti athletes and represented 18% of the 559 participants in the all-national athletic competitions (the 103 injured athletes from the total participants 662 were excluded). They completed the questions, which did not concern injury (Appendix 7 and 7 A).

5.1 Results

The Results section is displayed in the same order as the questions appeared on the questionnaire (Appendix 6 and 6 A). The frequency distribution of each variable is presented.

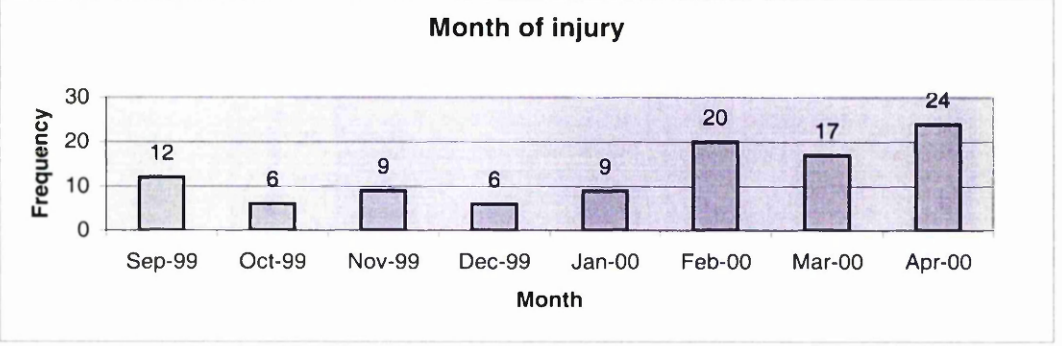
Month of injury

The KAAF organises the athletic season, which starts at the end of September or the beginning of October and ends at the end of April or at the beginning of May.

Figure (5.1) shows the number of injuries occurring in each month of the athletic season from September 1999 to the end of April 2000. The general pattern suggests an early peak in September, associated with the initiation of training after the summer vacation.

The major incidence occurred, however, in the later stages of the season in February, March and April. In this season there were no club competitions in September/October due to participation in international competitions. The first competition occurred in November. There were no competitions in January because of Ramadan. Most competitions are held between February and April. In 1999/2000 there were 5 competitions in February, 3 in March and 3 in April.

Figure (5.1): the distribution of month of injury



Distribution of injuries by club

There were 11 sports clubs registered and who competed in athletic competitions. These clubs are varied in both their size and number of sportsmen.

Table (5.2) shows the different profile of the number of injuries among the athletes who participated in each club. Only 37.6% of those registered participated in the competitions. The Al-Salmiya club sustained the highest absolute number of injuries (27) but when looked as a percentage of participating members, the Kazma club was the highest sustaining 12 injuries (29.3%) in 41 athletes who participated in competitions. This was followed by the Fahaheel club with 14 (28.0%) injuries.

Table (5.1): the distribution of injuries among the participants in each club

No	Club name	No. of Participants	No. of injuries	Injuries as % of participants
1	Al-Salmiya	120 (18.1%)	27 (26.2%)	22.5 %
2	Qadsia	97 (14.7%)	12 (11.7%)	12.4 %
3	Tadhamon	95 (14.4%)	12 (11.7%)	12.6 %
4	Al-Sahel	60 (9.1%)	15 (14.6%)	25.0 %
5	Fahaheel	50(7.6%)	14 (13.6%)	28.0 %
6	Al-Shabab	71 (10.7%)	9 (8.7%)	12.7 %
7	Khitan	64 (9.7%)	2 (1.9%)	3.2 %
8	Kazma	41(6.2%)	12 (11.7%)	29.3 %
9	Al-Arabi	33 (5.0%)	0	0
10	Al-Jahra	19(2.9%)	0	0
11	Al-Naser	12(1.8%)	0	0
Total		**662**	**103**	

During the season 8 of the 11 sports clubs reported injuries (No. 1 to 8). No injuries were found in the other 3 clubs (No. 9 to 11). These 3 clubs have younger participants with only children involved, a small overall number of participants and their first interest is in other sports other than athletics which is performed only as a secondary activity.

5.1.1.1. The comparison between the injured and control (cohort) groups 1999/00

The summary of comparative data between the injured and control groups is shown in appendix (8). The standard variables are compared including; age, height, weight, hours of daily training, days of weekly training, athletes experience at club and international level, surface, training aids used and warm-up and cool-down activities, tables (5.2) to (5.18).

Age

Tables (5.2 A) and (5.2 B) show the distribution of injuries by age. Injuries were more frequent among mature adult participants (42.9 %). A similar mean age was found in the injured and non-injured cohort groups (19.7) and (18.3) years respectively. No statistical difference (NS) was found between the two groups (injured and control).

Table (5.2 A): the distribution of injured athletes by age.

Age categories	662 participants	103 of the 662	Of the 103 injuries
Adolescents (10 – 15) years	319	21 (3.2%)	21 (6.6%)
Young adults (16 – 19) years	252	43 (6.5%)	43 (17.1%)
Adults 20 years and above	91	39 (5.9%)	39 (42.9%)

Table (5.2 B): the distribution of non-injured athletes by age.

Age categories	559 Participants minus 103 injuries	Of the 559	Of the 103 control
Adolescents (10 – 15) years	298	36 (6.4%)	36 (12.1%)
Young adults (16 – 19) years	209	38 (6.8%)	38 (18.2%)
Adults 20 years and above	52	29 (5.2%)	29 (55.8%)

It was found that there were more adolescents in the control group (36) than those in the injured group (21) and more mature adults in the injured group (39) compared to control group (29). The control group was selected randomly from the uninjured athletes and then was divided into their three age subgroups. Of the 103 controls 36 were adolescents (35% of the total), 38 were young adults (37% of the total) and 29 were mature adults (28% of the total).

The control group had been selected numerically to represent the three age groups. The adolescents were under represented and mature adults over represented in relation to their proportions of the active athletes.

Height

The height range was 154 to 191 cm. The mean height of the injured athletes (176 cm) was greater than the control group (172 cm). Statistical difference was found between the two groups. P value (0.0008).

Table (5.3): the height distribution among injured & control athletes

Height / cm.		Group	
		Injured	Control
150-159	No	2	8
	%	1.9	7.8
160-169	No	17	27
	%	16.5	26.2
170-179	No	48	45
	%	46.6	43.7
180-189	No	34	22
	%	33.0	21.4
190-199	No	2	1
	%	1.9	1.0
Total	No	103	103

Weight

Table (5.4) shows the distribution of weights in the injured and control groups. The weight range was 30 to 125 kg. The mean weight of the injured athletes (70 kg) was greater than the control group (65 kg). Statistical difference was found between the two groups. P value (0.013).

Table (5.4): the weight distribution among injured & control athletes

Weight / kg.		Group	
		Injured	Control
30-39	No	1	1
	%	1.0	1.0
40-49	No	1	6
	%	1.0	5.8
50-59	No	19	25
	%	18.4	24.3
60-69	No	33	35
	%	32.0	34.0
70-79	No	33	23
	%	32.0	22.3
80-89	No	5	9
	%	4.9	8.7
90-99	No	5	2
	%	4.9	1.9
100-109	No	2	2
	%	1.9	1.9
110-119	No	2	0
	%	1.9	0
120-129	No	2	0
	%	1.9	0
Total	No	103	103

Hours of training daily

The distribution of training was variable between 1 hour and 4 hours per day. The mean duration of hours of training per day in the injured group was (2.3) hours, which was greater than the control group (2.1) hours. P value (0.0056).

Table (5.5): the distribution of hours of training / day (injured & control groups)

Hours of training daily		Group	
		Injured	Control
1 hour	No	4	7
	%	3.9	6.8
2 hours	No	82	86
	%	79.6	83.5
3 hours	No	0	8
	%	0	7.8
4 hours	No	17	2
	%	16.5	1.9

Days of training weekly

The distribution of training was variable between 1 day and 7 days per week. The mean duration of days of training per week in the injured group was (5.3 days) showed a higher trend over the control group (5.0 days). However, this did not reach significance.

Table (5.6): days of training / week (injured & control groups)

Days of training weekly		Group	
		Injured	Control
1 day	No	1	0
	%	1.0	0
2 days	No	1	0
	%	1.0	0
3 days	No	6	11
	%	5.8	10.7
4 days	No	7	13
	%	6.8	12.6
5 days	No	35	40
	%	34.0	38.8
6 days	No	52	39
	%	50.5	37.9
7days	No	1	0
	%	1.0	0

Athletes experience at club level

Table (5.7) shows the distribution of athletes' duration of activity or participation in sport at club level. This was variable between 1 and 15 years. The mean duration in the injured athletes was (6.3) years compared with (5.3) years in the control group. p value (0.076). N.S. The distribution is balanced at the lower end of experience, but there were more injured athletes in the very experienced group (15) years.

Table (5.7): injured and control groups among athletes at club level

Club level		Group	
		Injured	Control
1 year	No	8	10
	%	7.8	9.7
2 years	No	14	14
	%	13.6	13.6
3 years	No	18	14
	%	17.5	13.6
4 years	No	8	13
	%	7.8	12.6
5 years	No	7	12
	%	6.8	11.7
6 years	No	6	8
	%	5.8	7.8
7 years	No	7	7
	%	6.8	6.8
8 years	No	7	12
	%	6.8	11.7
9 years	No	4	1
	%	3.9	1.0
10 years	No	7	2
	%	6.8	1.9
11 years	No	2	0
	%	1.9	0
12 years	No	0	3
	%	0	2.9
13 years	No	2	1
	%	1.9	1.0
14 years	No	1	3
	%	1.0	2.9
15 years	No	12	3
	%	11.7	2.9
Total	No	103	103

Athletes experience at international level

Table (5.8) shows the distribution of injuries among the international athletes. The years were variable between 1 to 15 years. The mean duration of activities occurring in athletes who were injured was (3.3) years, which was greater than in the cohort group (1.8) years. P value (0.0021).

The control group contained more inexperienced club members whereas an imbalance appears present of very experienced internationalists in the injured group.

Table (5.8): injured and control groups among the international athletes

International level		Group	
		Injured	Control
0	No	33	50
	%	32.0	48.5
1 year	No	19	12
	%	18.4	11.7
2 years	No	8	11
	%	7.8	10.7
3 years	No	6	9
	%	5.8	8.7
4 years	No	6	9
	%	5.8	8.7
5 years	No	7	3
	%	6.8	2.9
6 years	No	6	4
	%	5.8	3.9
7 years	No	4	0
	%	3.9	0
8 – 15 years	No	14	5
	%	13.6	4.9
Total	No	103	103

Surface

Most athletes varied the surface on which they trained making specific conclusions difficult. Comparing the incidence of injury on different surfaces showed that the highest percentage of injuries occurred in athletes who used a sprung track tartan surface (64) injuries. The group who trained on sand surfaces accounted for (20) of the 103 injuries.

Of the total number of athletes (662) who participated in athletic competitions, by studying the number of athletes in each club and the surface used, 20 of the 298 (45%) who used sand for training and 64 of the 199 (30%) who used a tartan surface were injured according to the number of athletes in each club and club surface. A small number of athletes trained on different surfaces such as grass, road and cement. No injuries occurred in the athletes who trained mainly by road running, however, there were few participants (30 of 662).

Table (5.9): the distribution of the surface

Surface		Group	
		Injured	Control
Tartan	No	64	47
	%	62.1	45.6
Sand	No	20	21
	%	19.4	20.4
Grass	No	4	1
	%	3.9	1.0
Road	No	0	1
	%	0	1.0
All above	No	4	19
	%	3.9	18.4
Cement	No	11	14
	%	10.7	13.6
Total	No	103	103

Training aids

The participants perceptions of the use of training aids used during training sessions and competitions was returned. It can be seen that the vast majority felt that they used appropriate aids and only a few did not.

Table (5.10): the use of training aids during training and competition sessions

Training aids		Group	
		Injured	Control
Yes	No	94	97
	%	91.3	94.2
No	No	9	6
	%	8.7	5.8
Total	No	103	103

Specific comments

Free text comments were recorded regarding inappropriate training aids. The injured group reported four athletes who considered they used inappropriate training shoes, one during competition and three during both training and competition. There was one report of an over heavy T-shirt. The control group reported three athletes who had inappropriate footwear in competition and a further three where this also occurred in both training and competition.

Warm-up & Cool-down

Tables (5.11) to (5.18) show the distribution of warm-up and cool-down exercises in the injured and non-injured control group athletes. The distribution was variable between 0 minutes and 20 minutes.

1. Warm-up

Tables (5.11) to (5.14) show the distribution of warm-up exercises (a to d).

a) Running before training

Table (5.11) shows the distribution of injured and control group athletes and the duration of running before training. When the both groups were assessed the mean of injured athletes was (11.9) minutes, which was less than the control group (15.0) minutes. P value < (0.0001).

Table (5.11): running before training in injured & control groups

Running before training		Group	
		Injured	Control
0 minutes	No	0	0
	%	0	0
5.00 minutes	No	11	6
	%	10.7	5.8
10.00 minutes	No	46	28
	%	44.7	27.2
15.00 minutes	No	41	29
	%	39.8	28.2
20.00 minutes	No	5	40
	%	4.9	38.8
Total	No	103	103

b) Stretching before training

Table (5.12) shows the mean time of stretching before training in both injured and control group athletes was (16.0) minutes. N.S.

Table (5.12): stretching before training in injured & control groups

Stretching before training		Group	
		Injured	Control
0 minutes	No	1	1
	%	1.0	1.0
5.00 minutes	No	3	2
	%	2.9	1.9
10.00 minutes	No	9	13
	%	8.7	12.6
15.00 minutes	No	52	46
	%	50.5	44.7
20.00 minutes	No	38	41
	%	36.9	39.8
Total	No	103	103

c) Running before competition

Table (5.13) shows the mean time of running before competition in the injured athletes was (11.2) minutes, which was less than the control group (12.9) minutes. P value (0.0048).

Table (5.13): running before competition in injured & control groups

Running before competition		Group	
		Injured	Control
0 minutes	No	1	0
	%	1.0	0
5.00 minutes	No	13	12
	%	12.6	11.7
10.00 minutes	No	59	39
	%	57.3	37.9
15.00 minutes	No	21	31
	%	20.4	30.1
20.00 minutes	No	9	21
	%	8.7	20.4
Total	No	103	103

d) Stretching before competition

Table (5.14) shows the mean time of stretching before competition in the injured athletes was (15.7) minutes, which was greater than the control group (14.8) minutes. N.S.

Table (5.14): stretching before competition in injured & control groups

Stretching before competition		Group	
		Injured	Control
0 minutes	No	2	3
	%	1.9	2.9
5.00 minutes	No	2	6
	%	1.9	5.8
10.00 minutes	No	13	18
	%	12.6	17.5
15.00 minutes	No	48	41
	%	46.6	39.8
20.00 minutes	No	38	35
	%	36.9	34.0
Total	No	103	103

2. Cool-down

Tables (5.15) to (5.18) show the distribution of cool-down exercises (e to h).

e) Running after training

Table (5.15) shows the mean time of running after training in the injured athletes was (4.6) minutes, which was less than the control group (5.9) minutes. P value (0.010).

Table (5.15): running after training in injured & control groups

Running after training		Group	
		Injured	Control
0 minutes	No	23	18
	%	22.3	17.5
5.00 minutes	No	67	54
	%	65.0	52.4
10.00 minutes	No	12	25
	%	11.7	24.3
15.00 minutes	No	1	5
	%	1.0	4.9
20.00 minutes	No	0	1
	%	0	1.0
Total	No	103	103

f) Stretching after training

Table (5.16) shows the mean time of stretching after competition in the injured athletes was (2.2) minutes, which was less than the control group (4.3) minutes. P value (0.0004).

Table (5.16): stretching after training in injured & control groups

Stretching after training		Group	
		Injured	Control
0 minutes	No	69	44
	%	67.0	42.7
5.00 minutes	No	25	35
	%	24.3	34.0
10.00 minutes	No	7	17
	%	6.8	16.5
15.00 minutes	No	2	6
	%	1.9	5.8
20.00 minutes	No	0	1
	%	0	1.0
Total	No	103	103

g) Running after competition

Table (5.17) shows the mean time of running after competition in the injured athletes was (2.0) minutes, which was less than the control group (3.3) minutes. P value (0.022).

Table (5.17): running after competition in injured & control groups

Running after competition		Group	
		Injured	Control
0 minutes	No	72	58
	%	69.9	56.3
5.00 minutes	No	21	26
	%	20.4	25.2
10.00 minutes	No	10	14
	%	9.7	13.6
15.00 minutes	No	0	5
	%	0	4.9
20.00 minutes	No	0	0
	%	0	0
Total	No	103	103

h) Stretching after competition

Table (5.18) shows the mean time of stretching after competition in the injured athletes was (1.0) minutes, which was less than the control group (2.2) minutes. P value (0.0055).

Table (5.18): stretching after competition in injured & control groups

Stretching after competition		Group	
		Injured	Control
0 minutes	No	84	68
	%	81.6	66.0
5.00 minutes	No	17	24
	%	16.5	23.3
10.00 minutes	No	2	10
	%	1.9	9.7
15.00 minutes	No	0	1
	%	0	1.0
20.00 minutes	No	0	0
	%	0	0
Total	No	103	103

Time of injury

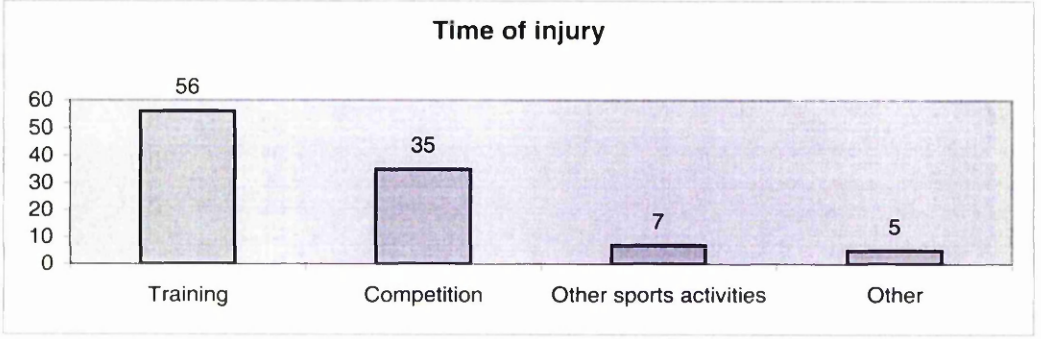
Most injuries occurred during training sessions 56 (54.4%). Of the 103 injuries, 35 (34.0%) occurred during competition. In addition, there were 7 (6.8%) injuries during other sports activities, the other 5 occurred as injury sustained at school, in the family home, or in a car accident, table (5.19). These latter injuries were not specifically cause by sporting activity but prevented the athletes from training and competing.

Table (5.19): Activities at the time of injury

Time of injury	From 103 Injuries
Training	56 (54.4%)
Competition	35 (34.0%)
Other sports activities	7 (6.8%)
Other	5 (4.9%)

The athletic season lasted for 8 months, which is (240) days. Athletes spent (138) days in training and (102) days in competitions. This means that the relative time spent in competition was high.

Figure (5.2): the distribution of time of injury



Athletic events

Injured athletes were asked, in which sporting event they were competing when they were injured. Table (5.20) shows the distribution and percentage of athletes injured within each event. This indicates that sprinters, hurdlers and jumpers sustained more injuries. The majority of injuries in track events were seen in sprinters and hurdlers, whereas the majority in field events were in the long and high jump events. During the entire season, only one competition included a half marathon (25 km), and only 4 athletes participated in this race. Also, there was only one walking race with 3 participants. No injuries occurred in these events.

Table (5.20): Distribution of injuries by events

Athletic events		**103 Injuries**		**Event**	
		No.	%	Total No.	Total %
Track events	Sprint & Relay	28	27.2	56	54.4
	Middle distance	5	4.6		
	Long distance	2	1.9		
	Marathon	0	0		
	Walking	0	0		
	Hurdles	20	19.4		
	Steeple chase	1	1.0		
Field events	Long jump	11	11.0	31	30.9
	Triple jump	6	5.8		
	High jump	9	8.7		
	Pole vault	5	4.9		
	Shot put	4	3.9	16	15.5
	Discus	3	2.9		
	Hammer	5	4.9		
	Javelin	4	3.9		

Diagnosis or Clinical Assessment

Athletes were asked about the primary point of medical contact and indicated that doctors diagnosed the majority of injuries. Of the 103 injuries 67 (65.1%) cases were diagnosed by doctors while physiotherapists diagnosed 28 (27.2%). A few injuries were diagnosed by a first aider 5 (4.9%), and a small number diagnosed by coaches 3 (2.9%).

Investigations or Diagnosis

Enquiry regarding investigations confirmed that 66 (64.1%) of the injuries were investigated by clinical examination alone, X-ray examinations occurred in 35 (34.0%) and a small number were investigated by other methods e.g. ultrasound 2 (1.9%).

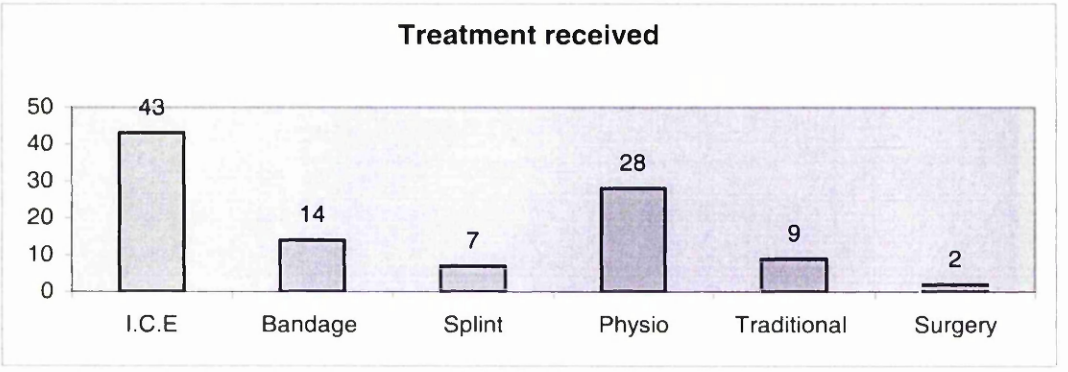
The place of treatment

Enquiry concerning the site of treatment showed that the majority (three quarters) were treated in sports club injury clinics. One quarter were assessed in accident and emergency departments (A&E) of hospitals.

Treatment received or Management

Of the 103 injuries, the treatment received is shown in figure (5.3). This was I.C.E. (ice, compression and elevation) in 43, followed by physiotherapy in 28, and by taping or application of a bandage or strapping 14. Traditional treatments, which consist of the administration of herbs (similar to homeopathy therapy) occurred in 9, whereas only 2 cases required surgery.

Figure (5.3): the treatment



Rehabilitation

The information concerning directed rehabilitation of the 103 injuries show that virtually equal numbers were directed by coaches (40), while 38 injuries were guided by physiotherapists. Most of the coaches are physical education teachers who also practice athletics. Such experience gives them confidence that they are able to supervise and rehabilitate an injured athlete.

Injury recovery and completion of the treatment

Of the 103 injuries two third (69) of the patients felt that they had fully recovered before restarting training whereas one third (34) did not feel that they had had enough time.

Two thirds (70) of the patients completed the treatment course, whereas one third (33) did not. Of the 70 injuries who completed the treatment course, there were 17 recurrences (24.3%). Of the 33 injured athletes who did not complete the course, there were 12 injury recurrences (36.4%). Most of these recurrences were muscle strains.

All previous injuries and injury recurrence

Half of the injured athletes (51) had sustained previous injuries. This figure includes recurrent injuries in the same site and previous injuries in other anatomical sites.

When looked at specifically of the 103 injuries 29 (28.2%) suffered an injury recurrence. The type of recurrent injuries reflects the initial distribution with 19 of them strains, 4 sprains, 3 dislocations, 2 fractures, and 1 muscle tear.

Days lost from training

The majority 93 (90.3%) of the 103 injured athletes were off training and/or competition and did not practice in full training for several days. But, there were 10 (9.7%) cases who continued their training.

Total duration of the injury

The average duration of injury was 38 days. This varied from minimum of one day to a maximum of 8 months, which occurred in two athletes. One triple jumper sustained recurrent hamstring strains and the other, a shot putter, sustained an Achilles tendon tear.

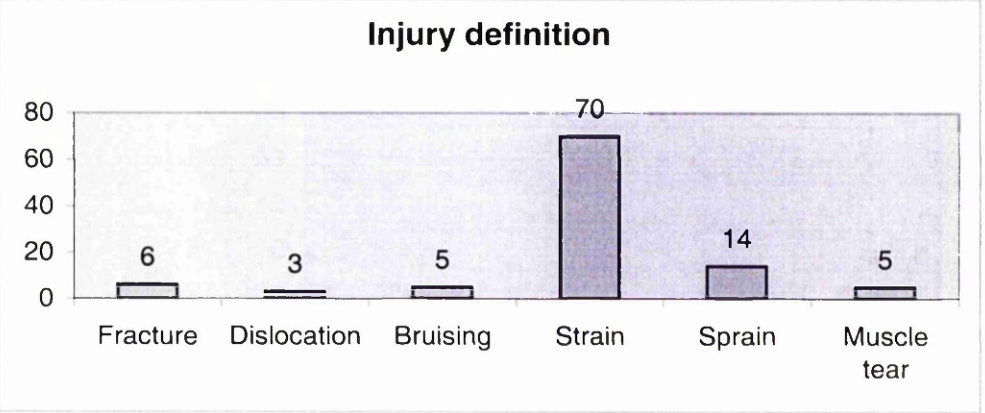
Days lost from training & competition

The average number of days lost from activity including training and competition was 28 days. It can be said that on average, each injury caused athletes to miss about 4 weeks of training. It can be seen with comparison with the total duration of injury (see above) that some athletes continued to train while they were suffering from an injury.

Kind/type of injury

Figure (5.4) shows the distribution of the type of injury. It can be seen that there was a high number of muscle strains 70 (68.1%) which accounted for two thirds of the injuries. Of these strains 26 (37.2%) occurred to the hamstring. The next most frequent injury was ligament sprain 14 (13.6%). It is an interesting result that there were no laceration injuries found among athletic participants.

Figure (5.4): Injury definition



Side of injury

Table (5.21) shows the laterality of injuries. There was a slight difference of injury sustained between the left and right sides 48 (46.6%) versus 40 (38.8%).

Table (5.21): Side of injury

Side of injury	Of 103 Injuries
Right	40 (38.8%)
Left	48 (46.6%)
Bilateral	3 (2.9%)
Medline	12 (11.7%)

Region and body part

The anatomical distribution of injuries is shown in table (5.22). There were very few injuries to the upper limb 22 (21.4 %), whereas the majority occurred in the lower limb 81 (78.6 %). Commonest injuries of the leg were situated at the hamstring 28 (27.2%); with the ankle of being a common site 14 (13.6%).

Table (5.22): Distribution of region and body part

No	**Region/Body part**	Of 103 Injuries
1	Head – Neck - Face	2 (1.9%)
2	Shoulder	4 (3.9%)
3	Arm	3 (2.9%)
4	Elbow– Wrist - Hand	3 (2.9%)
5	Chest - Back	8 (7.8%)
6	Abdomen	2 (1.9%)
7	Groin - Hip	9 (8.7%)
8	Quadriceps	3 (2.9%)
9	Hamstring	28 (27.2%)
10	Knee	7 (6.8%)
11	Calf muscle	3 (2.9%)
12	Shin-Shinbone	7 (6.8%)
13	Achilles tendon	5 (4.9%)
14	Ankle	14 (13.6%)
15	Foot	5 (4.9%)

5.2 Discussion

The results of the retrospective study confirmed a high number of injuries in athletics and stimulated the performance of this prospective study. It was considered that sports injuries represent an important risk in Kuwaiti athletic activities prompting the reported survey. The results of this study confirm a significant incidence of injuries in Kuwaiti athletes. The 103 injuries reported over the 1999/2000 athletic season give some basic information, as there have been no previous studies focusing on Kuwait. The total number of athletes registered with the Kuwait Amateur Athletic Federation (KAAF) was 1,763 but only 662 participated in active competition.

$$\text{Injury incidence} = \frac{(\text{No. of sports injuries/year}) \times 10^4}{(\text{No. of participants}) \times (\text{hours of sports participation/week}) \times (\text{weeks of season/year})}$$

A high incidence (3.78 per 1000 hours) of athletics injuries was found in Kuwait. The incidence of injuries has been expressed by many researchers as the number of injuries per 1000 hours of sports participation e.g. (Ekstrand 1982; Lysholm and Wiklander 1987; Backx et al. 1990; van Mechelen 1991 and van Mechelen et al. 1992).

The equation of Chambers (1979) was adapted by de Loës and Goldie (1988) was be used in our study to calculate the injury incidence taking exposure into account. This is the incidence of sports injuries in the relation to exposure in days and hours of sports events. In our study we have expressed this in the time spent both in training and in competition.

Bennel and Crossley (1996), studied musculoskeletal injuries in track and field in Australia. They found that the injury incidence was 3.9 per 1000 hours of training, which is similar to our findings. The injury incidence for 4 different sports in Western Australia was described by Stevenson et al. (2000). They found that the injury incidence rate was greatest for football (20.3 per 1000 hours), similar for

field hockey and basketball (15.2 and 15.1 per 1000 hours respectively) and lowest for netball (12.1 per 1000 hours) of sports participation. Injury incidence was also reported in team handball at 2.5 injuries per 1000 player-hours (Seil et al.1998).

This study tried to identify the specific risk factors for injuries in this population. The increasing number of participants during the last 6 years has produced an increased exposure, with increasing numbers of injuries.

A comparison between the injured and non-injured (cohort) groups was performed to find out if there are statistical differences between the two groups. Following identification of the risk factors in injured athletes in Kuwait. The same questionnaire was used in the control study where the athletes completed the questions which did not concern injury. This was distributed at the end of the season during April and May 2000 and data were collected from 103 athletes from the eight clubs, which reported injuries. The control group was studied to give information concerning the demographics of non-injured athletes. This sample represents the Kuwaiti athletic population and used as control group randomly selected by the coaches.

The effect of age

Results from this study confirmed that a third of injuries were among adult participants whereas few injuries were reported in adolescents. When the two groups (injured and non-injured) were compared, it was found that there were more adolescents in the control group (36) than those in the injured group (21) and more mature adults in the injured group (39) compared to control group (29). The control group was selected randomly from the uninjured athletes and then was divided into their three age subgroups. Of the 103 controls 36 were adolescents (35% of the total), 38 were young adults (37% of the total) and 29 were mature adults (28% of the total).

Although there were differences in the age groups, the mean age of the injured and non-injured was the same and no statistical difference was found between

them. As seen in the results tables (5.2 A) and (5.2 B) the adolescents in fact were relatively under represented and mature adults over represented in relation to their proportions of the active athletes. The control group had been selected numerically to represent the three age groups. The adolescents were under represented and mature adults over represented in relation to their proportions of the active athletes. Although age may have been a confounding factor, by chance in the present study there was a bias inherent by random inclusion of mature adults in the control group.

The present study categorised the athletes into three groups: 10 to 15 years- adolescents; 17 to 19 years- young adults; 20 + adults. This was similar to the Track and Field Athletics Injuries, one-year survey in the UK by D'Souza 1994, who divided his athletes into three groups: less than 17 years – youth (Y)/intermediate (I); older than 17 years but less than 20 years – junior (J); older than 20 years – senior (S).

As part of efforts to promote sport in Kuwait, the government decided to pay particular attention to the provisions of sport facilities. This has enabled youngsters to engage more in sports clubs and physical exercises. Athletes commence training and competing in athletic events at (10 years) of age. This involvement at an earlier age is similar to that reported in other countries. Bennell and Crossley 1996, in a study of musculoskeletal injuries in track and field, reported that Australian athletes commenced training for track and field at an average of (11 years) of age.

A prospective study of young Danish footballers aged 12 to 18 years showed that the incidence of injury increased with age (Maffulli et al 1996). Most injuries in young tennis players are caused by overuse (chronic) injury of the muscle-tendon bone units (Bylak and Hutchinson 1998). Young athletes are at risk when being exposed to high-intensity training at a very young age. These efforts may result in serious alterations of the weight bearing joint surfaces. For example, Joint laxity is associated with recurrent ligamentous injury, while tightness is strongly correlated with meniscal injuries and ankle, shoulder and wrist sprains (Fried and Lloyd, 1992).

Previous reviews of the literature have reported that increasing age is one of the risk factors for athletic injuries. Nicholl et al. (1995), in a study of the epidemiology of sports and exercise related injury in the UK, D' Souza 1994, in a one-year survey of track and field athletics injuries, in the UK, and Walker A. 1989, in a study of sports injuries clinics, all found that the incidence of injuries is associated with increasing age. A similar finding to the present study in which the incidence of injury increased in the older athletes.

Stanitski C. 1989, reviewed the common injuries in preadolescent athletes and made recommendations for prevention. He reported that in preadolescent organised play, the incidence of injury is extremely low. This article used preadolescent and adolescent terms but did not specify the distribution of age groups. The point was that youngsters are less predisposed to injury than older athletes. This is similar to the present study in which adolescents (10 – 15 years old) who participated in competitions sustained few injuries (6.6%). Tucker AM 1997 reviewed the common soccer injuries and reported that the frequency of injuries rises as the age of participants increases with a low incidence of injury in preadolescent players.

A totally different finding however was found in other studies. For example, Frontera et al. 1994, described 1,750 injuries in a sports injury clinic between April 1988 and 1994. The ages were between 7 and 71 years in different sports including athletics. Also, Chan et al. 1984, surveyed 1714 Chinese university students in Hong Kong in different sports including athletics. These two studies found that the majority of the injuries occurred in those below (19 years) and the injuries decreased with increasing age. These results do not reflect athletics specific injuries.

Research generally shows that "children participate in sport in order to have fun, improve skills, belong to a group, be successful and gain recognition, get fitter, and find excitement" (Martin Lee, 1995). I believe that, competitions for individual young athletes up to age of (14), for example, should be for fun, not strictly like professional athletes and without stress.

Despite the benefits of sports activities, injury has been identified as the second most common barrier to sport participation in older age groups. The elderly have been reported to have an increased incidence of overuse injuries. For instance, tendinitis and stress fractures are associated with increasing age and may reflect reduced strength and flexibility of the lower limb serving to decrease the shock-absorbing capabilities of the foot (Matheson et al 1989).

It has been suggested that athletes taking part in sporting activity for many years may be prone to overuse or degenerative injuries such as osteoarthritis. Matheson et al. (1989) studied musculoskeletal injuries occurring with physical activity in older adults and compared this with injuries in a younger age group. They found that the frequency of osteoarthritis was more common with increasing age. A reduction in muscle strength and joint flexibility occur with aging, but this may be avoided by adequate increasing in the intensity gradually.

Height and Weight

Physical requirements vary widely between different types of activity and any potential predisposition to injury due to anatomical factors may be characteristic for each type of exercise. In our study we found that height and weight were increased in the injured athletic sample compared with the cohort.

Taimela et al. 1990, discussed the risk factors associated with injury proneness. Like the present study they found that increased body weight and height might be more susceptible to injuries as a result of greater intrinsic loading forces. However, other studies have found different results. For instance, in a study of musculoskeletal injuries in track and field. Bennell and Crossley 1996, did not find any relationship between height and weight and injury. Also, Seil et al. 1998, in a study of sports injuries among 16 German handball clubs, did not find any association with height and weight. In the present study, as noted above, older athletes sustained more injuries than younger and would be taller and heavier.

Although age may have been a confounding factor when examining the influence of height and weight, by chance in our study there was a bias inherent by the random inclusion of a higher proportion of mature adults in the control group.

The participating clubs

During the 1999/00 athletic season, eleven clubs (37.6%) of those registered participated in the competitions with (KAAF). Only eight of them reported injuries. These clubs are extremely competitive and seek to collect as many points as possible in competition and concentrate on athlete's performance. Therefore, they sometimes push the athlete to participate in competition without adequate training or preparation. No injuries were found in the other 3 clubs. This may be due to their participation in the young age groups (10 – 15) years only.

In the third study athletes from the eight sports clubs who reported injuries were recruited. These randomly selected athletes had not sustained injuries during the season. The head coaches provided the information from those clubs.

Month of injury

In many sports, preseason training has been associated with an increased incidence of injuries. The athletic season in Kuwait commences with the initiation of training in September after the summer vacation. This is the preseason period during which athletes usually concentrate on general physical fitness such as flexibility, endurance, muscle strength and power. This preparation phase was associated with an early peak of injuries 12 (11.6%) in September. This may be related to training errors or sudden training changes such as increased training intensity or increasing running distances so called "too much too soon". In a review of risk factors and athletic injuries, Taimela et al. 1990, reported that training errors, such as initiating physical activity too suddenly, play a significant role in the outcome of injuries in sports.

Gradually increasing moderate physical fitness training at the beginning of the season is beneficial to help to improve and maintain performance but excessive

training at this time may lead to some injuries. These results have been found in other sports during preseason injuries. For example, in the research report undertaken by Nielson and Knill-Jones 1998, about the use of sports injury centers in Scotland, the authors found that in football and rugby, more injuries occurred at the beginning of the season (September and October).

There were no competitions during Ramadan (the holy month for Moslems), which was in January and many athletes rest during this month. There were still 9 (8.7%) injuries, however, during this period of time, 3 of these injuries occurred during international competition outside the country and 6 injuries occurred during training sessions.

During preseason training, an athlete's performance and physical fitness may be poorly prepared and be unready to cope with a high volume of training. Thus, the intensity of training should be increased gradually according to the athlete's level of fitness, especially in the conditioning period in order to avoid overuse injuries. In a review of risk factors and athletic injuries, Taimela et al. 1990, related lack of general fitness as an important contributing factor for injuries. Also Lysens, et al. 1991, in a review of factors associated with injury proneness, suggested a relationship between a general lack of physical fitness and sports accidents.

The season ends in May and we found that most injuries were sustained between February and April, which includes the main competitive period for the KAAF. These are the most three important months for those who are involved in athletics. Coaches always concentrate on collecting points as much as possible and may not take enough notice of an athlete's previous injuries or present medical history.

Days of training weekly and Hours of training daily

Estimating the hours of training per week by multiplying (the hours of training per day) with (the days of training per week) of athletic training. It was found that the injured athletes in the present study trained more than the athletes in the control group.

The detailed plan for training programmes is varied from sport to sport and from person to person within a sport. Athletics in Kuwait is practiced as an amateur individual sport. It can be said that athletes who are keen to be in a high level competitive should be under a structured training programme.

The present results show that about (85%) of the injured athletes were in training for (10 – 12 hours) per week. This was similar to Watson and DiMartino 1987, who found in high school athletics in the USA that injured athletes trained more than (10 hours) per week. Another study in athletics in Australia by Bennel and Crossley 1996, found that the average weekly training hours was (12.4 hours). We may hypothesise that there is an association between increasing hours of high intensity sports training weekly with a higher percentage of sports related injury.

Bringing performance to peak or optimum levels and preventing injuries is largely related to the type of training programme being used by the athlete. In order to accomplish increased performance with a reduction in injury potential, Stone M. 1990, studied muscle conditioning and muscle injuries. He reported that the training programme should contain an appropriate manipulation of volume and intensity of training designed to reduce overtraining and increase performance as well as the following elements: (1) increased awareness of safety factors, (2) flexibility training, (3) stabilisation of technique (especially important in beginners), (4) reasonable exercise selection, and (5) reasonable selection of exercise speeds.

Athletes level and years of experience in club and international

Athletes' duration of activity or participation in sport at club and international level was variable between (1) and (15) years. The mean duration of the injured athletes in the club level was (6.3 years), whereas in the control group (5.3 years). No statistical difference was found between the two groups. Also, the number of athletes participating in the two groups were almost similar except in those who had (15 years) of experience. It was found that there were more in the injured group (12) than those in the control group (3).

In the international level, statistical difference was found between the two groups. The mean duration of activities occurring in those athletes who were injured was (3.3 years), which was greater than in the cohort group (1.8 years). It was found that there were more internationals in the injured group than those in the control group. For example, there were 14 athletes in the injured group versus 5 in the control group who had experience more than 8 years.

When we categorised the athletes' duration of activity into three groups. We found that half of the injuries occurred in the athletes within the first 5 years of athletic activity. When compared with the other two groups, (6 – 9 and 10 – 15 years), in absolute terms there were more injuries within the inexperienced athletes. This was also the case in those athletes who achieved international selection. This increase may be due to a lack of technical experience within the athletic events. Careful observation on the mechanism of injury during this early period of activity may help an athlete to avoid and/or minimise injury occurrence. On the other hand by developing good technique through experience and exposure for several years, senior athletes may avoid injuries precipitated by poor technique.

In the researcher's point of view, an athlete who has enough experience in his specific athletic event has the opportunity to perform to the best of his ability. The ideal method of learning athletic techniques and skills is by ongoing training which may take a considerable period of time. Experience comes along with participating both in training and in competition. Good technique has an important role in maximising athletic performance in track and field events. Poor technique on the other hand may predispose an individual athlete to injury. The more time an athlete spends in training the better technique can be developed, especially in events which require a high level of skill and experience e.g. hurdles, pole vault, hammer etc.

On the other hand, overuse injuries may be precipitated by injudicial levels of activity leading to accumulated trauma, which may be a problem in veteran athletes.

Surface

Of the eight sports clubs which reported injuries, only two clubs usually train on a tartan (synthetic surface used for track events), two clubs are able to train on both kinds of track (sand and tartan), and the other four train on sand (appendix 3). In addition, athletes who are in the national team usually train on a tartan surface and all competitions are performed in the main stadium on tartan.

It was found that a high percentage of injuries occurred in athletes who used a sprung track tartan surface (64) injuries. Of the 662 active athletes 298 (45%) use sand for training and 199 (30%) use a tartan surface. There was a higher percentage of injuries in those using the tartan, 64 (32% of participants), compared with those training in sand 20 (7% of participants). Injuries might also be caused by sudden changes between different surfaces as athletes move from one surface to another for training and competition. It would be more appropriate if the same surface was used for both training and competitions.

All athletic competitions are performed in outdoor stadia. Field events take place in the centre of the athletics track. The track itself is made of synthetic tartan, however, some parts of the central field are varied with grass and sand and may have pot holes due to poor weather conditions in Kuwait. In addition, athletes run on this part of the field (uneven terrain) during their warm-up and cool-down. Being full of holes, this may play a part in the occurrence of some injuries such as sprains and strains. Furthermore, training on hard surfaces, running on a cambered road or uneven terrain or using one surface consistently and sudden switching to another surface may lead to injuries. There is an exception for some athletes such as the middle, long distance, cross-country and marathon runners. Their formal competitions are usually undertaken on different surfaces e.g. tartan track, sand, and other hard surfaces (pathways and roads). They should be more cautious when they train on these surfaces.

The tartan surface is regular and should not cause problems in terms of inversion or eversion injuries to the ankle. Sand on the other hand may have holes or certain different types it decrease of give or slide. One surface is softer while the other is

much more firm. The tartan surface, which is harder, may need insoles and appropriate shoes to cushion the foot. In this study it was thought that the injuries would be more associated with training on sand while the results have shown the opposite. This suggests that further studies should be performed to see if the incidence of injuries could be reduced by altering footwear or the training schedule in the Kuwaiti athletic population.

In Kuwait, athletics competitions were formally held in outdoor stadia. However, cold winter weather and hot summer temperatures may have had a harmful impact on athletic performance. Therefore, the use of indoor stadia with controlled climate has been introduced to avoid medical problems associated with these extremes of temperature.

Aids used

In the present study the vast majority of injured athletes (91.3%) felt that they used appropriate aids for training and competition. There were a group (8.7%) of injured athletes who considered their footwear inappropriate for their event. Studies have suggested that footwear may influence the incidence of athletic injuries.

In athletics, shoes are the most important item of equipment and are designed especially for each event. Each athlete needs to wear the correct shoes for their event, for example, Javelin boots (shoes) have long front and back spikes, throwing shoes are flat with very thin heels, pole vaulting shoes have a slightly wedged feel and so on (Blue A. 1988). It is very important that the shoes fit well and feel comfortable. Inappropriately designed footwear may lead to increased injuries, especially from poorly fitting shoes with narrow toes and soft and loosely fitting heels.

Footwear is detailed as causal risk factors. Therefore, running shoes are designed with two primary concepts on mind: the prevention of excessive load, and the enhancement of performance. This is accomplished by the provision of cushioning

in the sole of the shoe to decrease impact loading of foot strike, provide support throughout the mid stance phase and give guidance for the push off phase (Cook et al. 1990).

The use of appropriate equipment may be one of the most important aspects of preventing a participant from sustaining sports injuries. Inappropriate equipment has been suggested as a causative factor in sports injuries. Any special clothing used for a specific sport should be correctly fitted, comfortable and appropriate to the athletic event. Clothing should be windproof, worn in layers and easily adjusted to prevent overheating. Also, they should be large enough to avoid restriction of movement and be generally comfortable.

Barrett and Bilisko 1995, reviewed the biomechanical and clinical literature on ankle sprain prevention as it relates to shoes. In this study the authors observed 297 football players who were allowed to wear either high-top or low-top shoes. The study was retrospective and examined the influence in addition of ankle braces and taping on the incidence of ankle sprains over a 6-year period. The use of braces and taping should increase stability of the ankle against sudden changes in movement. They stressed the secondary preventive effects of proprioceptive input, shoes traction and reduction in subtalar joint mobility may play a role in injury reduction. The application of ankle braces were more protective than tape and low-top shoes were more protective than high-top shoes. Such factors should be further studied with relationship to individual athletic events.

Warm-up and cool-down

It is regarded that it is beneficial to undertake a warm-up before both training and competition. Generally in the present study, athletes applied an average warm-up, which consisted of jogging or running slowly for (11 minutes) and stretching for (15 minutes).

Although the vast majority of the injured athletes conducted an appropriate average time of warm-up and cool-down exercises, significant differences were found between the two groups especially in the cool-down results. The uninjured

cohort group warmed-up and had longer cooling-down periods than the injured athletes. They may have felt uninterested in performing a warm-up as they wished to go immediately to their specialised activity and were also disinclined to "waste" time on cooling-down. This may suggest that the injured group should be advised to spend more time in running and stretching before and after both training and competition. No differences were found between the two groups in stretching before training and competition.

A period of warm-up is regarded to help facilitate an athlete to improve performance and prevent injury by preparing him or her physically and psychologically for activity. In general, warm-up consists of jogging which increases the internal and external temperature leading to light sweating and in increasing blood flow to the muscles and nerves in order to escalate speed of muscle contraction. This is usually followed by stretching exercises of different muscle groups in order to prepare these muscles for vigorous action.

Cool-down activity involves gentle jogging with some stretching at the end of the activity. Zuluage, et al. 1995, suggested that this may help prevent sudden changes from high intensity to rest in the cardiovascular system and also helps to maintain blood supply and oxygen and nutrients to the area which has been exercised and removes waste products from those areas. Surprisingly few studies have been conducted in critical evaluation of cool-down.

Williams et al. 1998, studied sports related injuries in Scottish adolescent. They suggested that the high incidence of strains observed in sports injuries surveys highlights the need for the potential theoretical benefits accrued from warming up, cooling down, and stretching exercises before and after sports and leisure participation. In a study of sports injuries clinics – a five year experience Walker A. 1989 recommended, "stretching should be done with the speed of a glacier".

Time of injury

The 1999/00 athletic season lasted for eight months (240) days. Athletes spent more in the training sessions (138) days than in competitions (102) days. Surprising ratio was observed of competition to training (1.3 to 1). There were (56) injuries in the training versus (34) in the competitions.

A very high number of both national and international competitions occurred during this season. Of all injuries 43 (60.2%) occurred during the last 3 months of the season at a time of the major competitions. Only 42 (40.8%) injuries occurred during the other 5 months. There may be an inherent number of injuries, which will occur during competition when athletes are striving or even over striving to maximize their performance. There is a major role to be played by the medical support team and coaches to ensure that athletes do not take part in such competitions if they have any residual injuries. This requires careful and honest discussion between the athlete, coach and medical support who have obvious different ambitions and aims in terms of their activities.

Training should aim to prepare the athlete for an event and should not introduce a high risk of injury. The competition phase involves concentration on sport-specific skill work and prepares the athlete to peak for the main competitions. Studies showed a higher incidence of injuries during training than competition. For example, Frontera et al. 1994, evaluated patterns of injuries seen in a sports injury clinic involving different sports. They found that most injuries (55.2%) occurred during training sessions. This finding is similar to the present study in which most injuries (54.4%) occurred during training sessions. Better control and advice from the medical support team in coordination with coaches may reduce this problem.

Athletics events

In this study, most injuries occurred during track events. The injuries to sprinters were predominant with (27.2%) of all injuries which occurred during the season with the majority being strains to the hamstring. These were followed by the long

and triple jumpers who were the only field events to have a high percentage of injuries (16.8%). In the present study therefore sprints, hurdles and jumps were the three most common events associated with injury. This is similar to the results of the study of musculoskeletal injuries in track and field in Australia by Bennell and Crossley, 1996. They found that middle distance, running sprinting/hurdling and distance running were the most common events sustaining injuries.

A sports injuries survey was conducted among groups of students regularly involved in recreational sport and in competitions at the Chinese University of Hong Kong by Chan et al. 1984. This study compared the number of participants and the number of injuries reported in each particular sport. The results indicated that non-body-contact racquet type sports e.g. badminton, tennis and table tennis are relatively safe, whereas soccer, basketball, and track and field were associated with a relatively high incidence of injuries (26.1%, 17.8% and 10.8% of all injured sportsmen attending the clinic).

The distribution of injuries by sport and sex in a particular country or city reflects the prevalent popularity of the different sports (Frontera et al. 1994). Studies reported a high risk of traumatic injury in contact sports and a risk of stress injury in running or jogging. Incidence rates are low in individual sports, including running, compared to contact sports. When the exposure is simultaneously taken into account, the ranking order differs (Taimela, et al.1990). Athletics is widely known as one of the most physically demanding among sports activities. Studies have revealed a high incidence of overuse injuries of the lower limb occurring in distance and marathon runners. In the present study, few injuries occurred in the long distance runners and no injuries in the marathon runners. There were however, a very small number of participants in these particular events so that useful comment cannot be made

In the handbook of sports injuries, Charles Bull R. 1999, stated that injuries, which arise suddenly in track and field, represent acute muscle strains. Joint sprains, or fractures, are more common in sprinting and jumping. Conversely, the great majority of distance running injuries reflects overuse and repetitive injuries from training. The predominant injuries in sprint, hurdle and jump events

probably reflect the nature of these events and the explosive use of particular muscle groups in addition to the high forces generated landing during jump events.

Diagnosis or Clinical Assessment

In the present study, consultations were conducted mostly by doctors 67 (65.1%) and this was followed by assessment by physiotherapists who were also consulted frequently 28 (27.2%). The system in Kuwait is influenced by the limited number of physiotherapists. The first call for many people when they develop a health problem is their local doctor, a general practitioner (GP). They offer fast access to health advice and treatment for all minor illnesses and injuries. These doctors usually serve a particular neighbourhood with "primary care". There are also state hospitals in most large towns, and they offer general services for most people's needs, in addition there are private hospitals. In the case of severe and emergency injuries, referral to the local hospital Accident and Emergency (A&E) department is the "secondary care" that provides urgent treatment.

In the case of a sports injury, medical procedure will depend both on the nature and severity. For example, mild and moderate injuries are usually dealt with the doctor in the sports injury clinics within the club. These clinics are varied in size and facilities, where some of them are specialised in sports injuries, staffed by physiotherapists and doctors interested in sports medicine. A small number of these clinics provide immediate access to an accurate diagnosis, treatment, rehabilitation and advice to the injured athlete. Injuries are more often assessed by doctors then referred to physiotherapy units. In terms of the lack of medical staff specialised in sports medicine in Kuwait, it is suggested that students be encouraged to study sports medicine to redress the deficiency and to ease employing non-specialised personnel in these clinics.

However, other clinics are staffed by 'health assistants or nurses' with limited knowledge of sports injuries. Those non-specialised physio assistants help minor injuries. They provide first aid, and supervise treatment and rehabilitation. Complicated sports injuries can be referred to a more technically advanced

specialised centre (Sports Medicine and Health Awareness Centre). All these services are free of charge. But unfortunately, an MRI scanner is not available there. It is recommended that the centre is equipped with this device, which provides clear images of soft tissues, muscles and tendons.

Coaches are usually the first people who are present when an athlete suffers from an injury. An athlete may seek immediate advice. Coaches who are involved in young athlete's sport should be trained in first-aid procedures. While the coach has knowledge of first aid, he should not take on an inappropriate role and should arrange referral to a doctor or physiotherapist. Adequate liaison between the health care support and coaches is required to update the coaches' medical knowledge.

Investigation or Diagnosis

Investigations of the injured athletes confirmed that clinical examination was the main technique undertaken. It was found that two-third of the injuries were investigated by clinical examination alone and one-third by X-ray examinations.

Sporting injuries require particular expertise in their diagnosis and management. Proper diagnosis leads to proper treatment and early diagnosis, followed by accurate treatment and rehabilitation exercises, can prevent minor problems from turning into major ones. In every case, full recovery is the priority (Grisogone V. 1996).

The Kuwaiti government funded clubs in which they provide the essential equipment for sports injury clinics and to pay doctors at the clubs. They have focused on the care of sports injuries by providing doctors and physiotherapists or health assistants who have more expertise in examining injured athletes than general practitioners or doctors staffing general outpatient hospitals clinics.

A significant number of trivial sports injuries however can be managed utilising primary care physicians and physiotherapists, in addition to those directly

provided by the sports governing bodies. Also, athletic trainers and physical therapists have become an integral part in evaluating the severity of the injury at the time of the initial occurrence.

In a sport injuries survey on university students in Hong Kong, Chan et al. 1989, found that (47.5%) of the injuries were self-treated and in only (13.7%) was treatment undertaken by doctors. These results are at variance with the present study, which (65.1%) were treated by doctors and (27.2%) by physiotherapists. This disparity may be related to the traditional Chinese method of treating sports injuries, which includes massage, acupuncture and herbs. While in Kuwait, most injured athletes are diagnosed and treated in hospitals or in sports injuries clinics within the sports club.

Doctors and physiotherapists are responsible for diagnosing and treating injuries followed a carefully history. Medical staff in most sporting clubs however do not concern themselves about the previous medical record of injured athletes. These records can help in revealing the athlete's history including previous injuries. It is recommended that medical staff in the sports injuries clinics in sports clubs should pay more attention and keep appropriate clinical records. Therefore, it is the feeling of coaches that more careful record keeping should be made.

Place of Treatment "Where the athlete is treated"

Treatment was mostly sought in sports club clinics 77 (74.8% of the injuries) and only 24 (23.3%) were attended at a hospital accident and emergency department. There are 15 hospitals and sanatoria, 70 clinics and health complexes, and 21 preventive health centers in Kuwait. In addition to the sports injuries clinics in those sporting clubs and the main sports medicine and health awareness centre in Kuwait. The lack of medical staff specialised in sports medicine increases the need for an accreditation committee to be developed to supervise the sport injuries clinics in Kuwait to ensure the provision of essential medical staff and equipment.

Management or the Treatment Received

It is very important to supply first aid and immediate treatment. Standard treatment was first aid application of rest, ice, compression and elevation in which 43 (41.8%) of the injuries were treated with ICE. An injured athlete should not continue in his sport but appropriate rest should be taken to avoid aggravating the injury.

Physiotherapy has become an integral part for most injured athletes treatment. Twenty-eighth (27.2%) of the injuries were treated by physiotherapy treatment. In a study of the patterns of injuries in athletes evaluated in an interdisciplinary clinic in Puerto Rico reported by Frontera, et al. 1994, the four most commonly prescribed therapeutic interventions were medications, physiotherapy, relative rest, and home exercise programs. In the present study none of the injured athletes was given a home exercise program. This suggests that there should be a more structured treatment schedule given to each athlete developed by the medical attendant or physiotherapist.

Rehabilitation guidance

Rehabilitation aims to minimise and repair local damage to the injured area with proper treatment leading to healing to return the athlete to his previous level of sport. In the present study, rehabilitation guidance was divided between coaches (38%), physiotherapists (36%), and doctors (18%). Coaches act as non-specialised assistants to guide and monitor rehabilitation especially of minor injuries. In the sports environment, the coach assumes an important role, especially in individual activities such as athletics, gymnastics and swimming because of their close relationship and the trust, which the athletes hold. Total rehabilitation is essential in preventing a recurrence by delaying the return to sport. Because of the limited number of medical staff, equipment and space it is important to give the athletes home exercise programmes in order to complete the course.

Injury recovery and completion of the treatment

The main aim of the processes of treatment and rehabilitation following injury is to return the athlete to his previous level of competition as soon as possible. Rarely does one require cessation of all sports activity to allow healing of an overuse injury (Stanitski C. 1989). An injured athlete, even with a mild injury is not able to perform fully. It was found in the present study that a third 34 (33%) of the injuries felt that they had not taken enough time to recover completely from their injury. This emphasises that clear-cut polices and treatment schedules are required. Some training schedules utilising non affected muscle groups and limbs can be undertaken to maintain cardiovascular fitness.

One third (33) of the injured athletes did not complete the treatment course. In these subjects there were (12) recurrent injuries. In the other two thirds it was found that there were (17) recurrent injuries. In the completers and non-completers, muscle strains where the commonest recurrent injury. These results suggest that the completion of a recommended treatment course is of major importance. Many enthusiastic young athletes are anxious to return to sporting activities as soon as possible and appropriate monitoring and care is required particularly in the young.

Previous injuries and injury recurrence

In the present study half of the injured athletes 51 (49.5%) reported having a previous injury in a different anatomical location. Fifteen (14.6%) had injuries recurring at the same site. Of the 51 injuries there were a recurrence of 34 strains and 12 sprains. It is important that each injured athlete is assessed in detail for potential intrinsic and extrinsic causes for their injury so that prophylactic interventions may be introduced.

Studies have shown that a past history of injury is a risk factor predisposing the athlete to another injury. DuRant, et al. 1992, investigated the relationship between the findings from a standardised preparation athletic examination and athletic injuries among high school students in the USA and a study similar to that of Taimela, et al. 1990, who reviewed the intrinsic and extrinsic risk factors.

These two studies reported that previous injuries may not necessarily cause repetitive injury if treated adequately, but certain individuals may be at a higher risk of injury due to injury-prone biological characteristics.

Athletes with a history of previous injuries are generally at a high risk of recurrence and may develop permanent structural damage especially for strains, sprains, and stress injuries. Proprioceptive disturbances and muscle weakness have been highlighted as major risk factors for reinjury (Lysens et al. 1984; Taimela et al. 1990 and Lysens et al. 1991). They also suggested that there may be an underestimation of the severity of the primary injury, an inadequate rehabilitation, and/or a premature return to sports activity (Lysens, et al. 1984).

Williams J. 1990, reported that continued participation while injured may provoke an immediate (but not necessarily related) second injury and stressed that warm-up and flexibility exercises are important during training sessions and competition and also during the rehabilitation period.

Days lost from training and competition

Athletes who suffered from severe injuries are usually off training and this can be determined by the impact of the injury on lost days or weeks training time. Some injuries may require several days or weeks with lost of time from the sport. In the present study 93 (90.3%) of the 103 injured athletes lost training and/or competition time and did not practice in full training for at least several days.

The average days lost from training were (28 days). This finding is quite similar to the results of the study of musculoskeletal injuries in track and field in Australia by Bennell and Crossley 1996, who found on average, each injury caused participants to miss three weeks of training. The long duration of time lost stresses that programmes to maintain general cardiovascular training are required on an individual basis.

Laterality

It was found that there was a slight difference of injury sustained between the left and right sides 48 (46.6%) versus 40 (38.8%). Most athletes use one side as the dominant one to practice a lot of forceful movements during training. As one side is used frequently (stronger), the muscles in the dominant side may predispose to overuse injuries. On the other hand, this may transfer problems to the other side (weaker) and cause more injuries. In this study, the athletes were not asked which side was dominant.

Bennel et al 1996, reported that track and field athletes are at high risk of developing stress fractures which are more likely to occur in the dominant limb, especially in events such as long jump and hurdles where excess loading is likely to occur.

Wang et al. 2000, evaluated the differences in shoulder rotator muscle strength in the dominant and non-dominant shoulders of elite volleyball players in England. They found that the internal rotator in the dominant arm stronger while the external rotator was weaker through specific training. They also stated that if the eccentric strength of the shoulder external rotators affects the capacity to control the agonists during spiking or throwing, weaker eccentric strength may suggested poor control and increase the likelihood of injury. The control of external rotators in the dominant arm in volleyball players is less than in the non-dominant arm.

Region of injury/anatomical location

Previous studies in several countries have confirmed that lower extremity injuries are common in many sports as was found in this study. These included Chan, et al. 1984 in sports injuries survey on university students in Hong Kong, Bennell and Crossley (1996), in musculoskeletal injuries in track and field in Australia and Finch et al. 1998 described sports injuries in the A & E departments in Australia and many other studies. They confirmed that the highest incidence of injuries occurred to the lower limbs. Emphasising the extensive use of the lower limbs in most athletic activities.

The two most common diagnoses were hamstring strain (27.2%), and ankle sprain (13.6%). This is quite similar to the study of athletic injuries in Scotland by Walker A. 1989, who found that (25%) of the injuries were a strain or tear of the hamstring muscles. Agre J. 1985 and Frontera et al. 1994, studied patterns of injuries in sports injuries clinics. They suggested that inadequate warm-up or muscle fatigue was the most probable causative factor in hamstring injuries.

Several authors have discussed the mechanism of injuries to the hamstring muscles. For example, Garrett et al. 1984, proposed that high degrees of tension in the hamstring muscle group, elicited by intrinsic force production and extrinsic stretch, may render it susceptible to injury during periods of intense exercise. In a study of musculoskeletal injuries in track and field, Bennell and Crossley (1996) demonstrated that stress fractures (20.5%) and hamstring injuries (14.2%) were the most common injuries. In a study of the incidence of injuries, Yamamoto T. (1993) and Satterthwait et al. (1998), studied the relationship between hamstring strains and leg muscle strength, suggested that increased intensity of training seems to increase the risk of thigh and hamstring muscle problems. These observations have driven the concept of the importance of warm-up and flexibility exercises as a priority in most sports.

Ankle joint injuries are common in all sports while sprains accounted for 10 to 28 % of all sports injuries (Barker et al 1997). In the present study, these accounted for the second most frequent injury (13%) sustained by the athletes. A comprehensive course of treatment and rehabilitation is required to ensure full recovery. In terms of preventative aids, a brace is widely used by athletes in an attempt to prevent recurrent ankle sprains. Safran et al. (1998), in a comprehensive review of lateral ankle sprains reported that, up to 50% of tape's support is lost after as little as 10 minutes of activity and tape offers no support after an hour of activity.

Frontera et al.1994, however, described the patterns of injuries in a sports injury clinic in Puerto Rico. They found that, the knee was the most frequently injured area (30.4%). This is at variance with our present study for knee injuries were recorded in only 6.8%. Another study by Bennell and Crossley (1996), who

evaluated the incidence, distribution and types of musculoskeletal injuries in athletics in Australia, found that stress fracture/shin-splint injuries were the most frequent (20.5%) injuries. In the present study shin-splint occurred in only a few subjects 7 (6.8%).

Prevention

Prevention of injury should be the concern of everyone involved in sport. The introduction of preventative measures has been shown to reduce contact and overuse injuries in football (Ekstrand J. 1982). Basic principles of prevention should be applied in a "primary" context by general education of all athletes. In addition, after the immediate first aid treatment and rehabilitation of an injury, a consultation with a physician or appropriate health care professional should be undertaken to identify any predisposing factors to prevent recurrence.

Adolescents and adults are at risk of sports injuries and therefore preventative action should be addressed in both groups. Those in charge of the training of youngsters must be aware of the particular problems related to changes in body structure in this particular age. Training should be carefully monitored and supervised and specific programmes should be designed for young athletes. Specifically designed training programmes should be planned by coaches to control the volume and intensity of the activities. Participants should be made aware of their own welfare, but the safety of other athletes should be considered as well.

In order to prevent some injuries such as strains, muscles should be kept flexible to allow them to stretch actively with sudden movements during high intensity exercises. In considering hamstring injuries in athletes, it is certainly true to state that prevention is infinitely preferable to treatment and is certainly attainable with a little foresight" (Walker A.1989). It is considered that injuries often occur when the muscles are cold between activity so athletes should avoid long intervals of standing or sitting around.

Teaching preventative measures and first aid treatment may help to reduce the incidence of injuries. For example, preventative taping of the ankle has been shown to be very effective in decreasing the severity and frequency of sprains. However, tape does loosen during participation after its initial application and to maximise its effects it should be reapplied. Also braces are effective in preventing sprains at a cheaper cost compared with the cost of tape over the lifespan of a brace and with comparable efficacy (Zuluage, et al. 1995).

Chapter six

Audit of Client Needs for Sports Injuries Treatment in Scotland

6.1. Introduction

One of the main aims of the project was to assess the incidence and management of sports injuries in Kuwait and Scotland. The questionnaires were trialled in Kuwait and a specific programme to develop a network with athletic clubs in Scotland was commenced. It was noted that medical care for injured athletes in Kuwait was mainly delivered by sports clubs clinics, a source not available in Scotland. This stimulated interest in studying provision for the care of injured athletes within the Scottish health care system with particular reference to the network of specialist sports injuries clinics maintained by SportScotland.

6.1.1. General background of Health service in Scotland

In Scotland, General Practitioners (GPs) form the core of the National Health Service (NHS). Their activities are supported by ancillary health professionals, for example, physiotherapists. The first call for many people when they develop a health problem is their local doctor who generally works at a surgery serving a particular neighbourhood and providing primary care. In terms of mild to moderate injuries in sport, these are largely treated by the GP, but there may be a need for referral to hospital for a specialist opinion and a follow on management plan. Boyce and Quigley (2001), reported that many of people participate in sports in the UK for the physical benefits of exercise and the personal enjoyment that it brings. "When these people are actually injured, their first port of call is their GP or local A&E department".

There is hospital provision in most large towns and cities and they offer general services for the needs of most individuals. In addition, there are some regional or national centres of expertise for more specialised care. Except in the case of

emergencies, hospital treatment is arranged through GPs. This is called a referral where the appointments and treatment are free.

Severe and emergency injuries are usually managed acutely, bypassing the primary care service by attending an Accident and Emergency (A & E) department in the hospital. This allows early investigation and treatment of injuries to maximise the outcomes from severe injuries such as fractures and dislocations.

In the case of sports injury, the further medical procedure will depend on the nature and severity. For example, minor injuries may be dealt with by direct referral from the GP to a local physiotherapist. Williams J. 1990, reported on patients attending clinics for sports injuries and suggested that the substantial majority of problems could be handled either by GPs or by hospital A & E departments.

Hospitals provide "secondary care" providing specialised treatment. A patient who needs urgent treatment can go to the local A&E department. After triage by a nurse, a doctor will assess the condition, and the decision will be made regarding hospital admission or treatment. If a surgical operation is required, this will be arranged by future appointment. Although many doctors are familiar with sport and its basic rules, they may not specialise in sports medicine and this has stimulated the professional development of doctors and physiotherapists interested in sports medicine and the provision of specialised clinics. This is to provide expert treatment to reduce the acute and chronic effects of injuries. Complicated injuries may be referred from such clinics to a more technically advanced centre which may not be local, but require a tertiary referral.

6.1.2. Sports injuries centres

The absolute incidence of sports injuries is unknown, but most severe cases will be identified within hospitals. In terms of the incidence of injuries, some studies reported that sports injuries comprise 1-2 % of all injuries seen in A & E departments, while at present 10 % of all hospital-admitted injuries are

sustained in sports (Harries, et al. 2000). In Scotland, sports related injuries counted for about one-third of all leisure-related injuries and 8% of all attendances arriving at A & E departments (Nielson and Knill-Jones 1998). The management of illnesses and injuries generally provided by GPs and in hospitals is aimed to return the patient to work. In sports injuries clinics the situation is different, the aim is to return the athlete to full health to be able to return to sport following full recovery. Some 10 % of injured athletes attending A & E require further treatment as in-patients. Recognising that the needs of athletes are peculiar the Scottish Sports Council introduced a network of sports injuries clinics identified above to improve the specialist care of injured sports men.

There are 27 Sports Injury Clinics throughout Scotland (Appendix 12). Many of these clinics use local authority facilities and are staffed by physiotherapists and doctors interested in sports medicine. These Clinics aim to provide a diagnostic and treatment centre for sport-related injuries. In addition to providing immediate access to specialist medical treatment, these clinics provide advice to athletes, coaches and others on injury prevention and are available to offer preventive strategies in sports injuries and help prevent the re-occurrence of an injury.

Sports Injury Clinics are open to the public at least two evenings per week. Access is by payment, with a charge being paid prior to completion of the treatment session. Fees vary between £ 5-15 for consultation, and between £ 5-15 for each treatment session. In general the physiotherapy services provided can give a good service in a specialised centre and with appropriate medical back-up. Appointments can be scheduled in advance by telephone or by a written referral from a GP.

Nielson and Knill-Jones 1998, assessed the sports injuries treated at the sports injuries clinics. They found that the mean time of attendance at the clinic from time to injury was 3 to 5 months. This strongly indicates that the clinics were not fulfilling a role for acute management of injuries and further audit was necessary. Our investigations included an assessment of clinic provisions, but in addition it was felt that client or users needs should be assessed and specific questionnaires were developed to ascertain this aspect of care.

6.1.3. Baseline Scottish athletics survey

A list of all 157 athletics clubs in Scotland was obtained and direct communication was made with the contact person designated by the Scottish Athletics Federation.

The nature of the survey was stated to the athletic clubs and they were invited to join the survey. To maximise the response, forms were sent with stamped addressed envelopes on a monthly basis and the information was collected on an anonymous basis to observe client confidentiality. 38 clubs responded initially (Appendix 10) but some felt that their activities were too small or too specific to qualify for the survey and they declined to participate. 16 clubs agreed to participate (Appendix 11) and their geographical distribution was similar to the distribution of the Sports Injuries Clinics (Appendices 12) and further discussions were continued by telephone link or personal interviews by Abdul-Majeed Al-Mousawi and Professor W S Hillis. The questionnaire survey was commenced and sent out to the clubs, who were positive respondents. The initial number of responses was disappointing and we further decided to examine which factors may be playing a role.

In terms of a medical survey it is possible to obtain a response from an interested coach, but more particularly if there is a physiotherapist or doctor attached to the club. It became obvious that there were very few formal arrangements for medical care given to injured athletes. At personal interview it became obvious that some of the coaches had their own local networks, but it was felt that a more detailed examination was required and a study audit of sports injuries clinics was undertaken. Contact with Calum McLeod and Gordon Turner of Sports Scotland revealed that an assessment was previously made of the sports medicine needs and provisions from the doctors and physiotherapists view point. This looked at problems of staffing, resources and equipment. It was felt therefore that there was a need to look from the client viewpoint and the survey was therefore conducted in two groups of athletes.

Group "A" those who had not sustained injuries during the previous year and group "B" those who had sustained an injury. It was felt that perceptions and experience may have been different between these two groups.

6.2 Results of non-injured and injured athletes (form A & B)

Two questionnaires were developed, which were distributed among the respondent athletics clubs in Scotland to collect data from the athletes. The questionnaires were orientated towards the main needs for sports injury treatment to maximise management and to allow a rapid return to their sport. Closed and open-ended questions were used to obtain other responses. The athletes were asked to choose the preferable answer to explain their reason for attending the clinic, referral by whom, cost, and reputation and to supply other details. The sample, which was selected for this study, covered most of the Scottish geographic area covered by the sports injuries clinics. 16 clubs participated from different regions throughout Scotland. The distribution and the numbers of forms returned from the individual 16 respondent clubs are shown (Appendix 11).

6.2.1 Results of non-injured athletes (form A)

Questionnaire 'A' was distributed among non-injured athletes who had no need to seek investigation or treatment for injuries during the previous 12 months. The questionnaire consisted of 10 questions and the results are presented using a similar format.

Who would you first attend?

Table (6.1) confirms that the vast majority of these non-injured athletes would expect to attend their GP or physiotherapist as first contact. A few would choose the A&E department of the local hospital. There was surprising small number (7) of the athletes who suggested that a sports injury clinic would be their first choice.

Table (6.1): First attendance

General Practitioner (GP)	24
Physiotherapist	21
Accident Department in hospital (A&E)	5
Sports injury clinic	7
First Aider	2
Other choices	
Physiotherapist & GP	2
Sports injury clinic & GP	2
(A & E) & Physiotherapist	1
Sports injury clinic & Physiotherapist	1
First Aider, (A & E) & Physiotherapist	1

What investigations should be available?

Table (6.2) shows the responses in terms of the expectations of non-injured athletes concerning which investigative modalities would be expected. It can be seen that the vast majority had low expectation and thought the clinical examination X-rays and standard ultrasound would be adequate. Few expected the highly technical investigation of MRI to be available.

Table (6.2): Investigation

Clinical examination	13
Standard ultrasound	5
X-ray examination	4
M.R.I. Scans	0
Other	2
Other choices	
Clinical examination & X-ray examination	14
Clinical examination & Standard ultrasound	11
All of them	6
Clinical examination, X-ray examination and Standard ultrasound	5
Clinical examination, M.R.I. scans and X-ray examination	2
Clinical examination & M.R.I. Scans	1
X-ray examination & Standard ultrasound	1
N/A	1

Are you aware of the existence of a Specialist Sports Injuries Centre in your area?

Thirty-six of the 66 respondents were unaware of the existence of a specialist sports injuries centre in their area. In the 30 respondents who were aware, only 7 suggested attendance at such a clinic for first line care.

If you are aware of the clinic, what is the reputation of these facilities?

Question (6.3) examined the reputation of the clinic, 40 of the subjects did not respond and this may have been due to a lack of knowledge. Of the 26 respondents many stated that they were satisfied with the clinics reputation and service (16), whereas others (8) were not satisfied for various reasons including a perceived lack of expertise, lack of basic ultrasound, lack of appropriate clinic availability, a limited success rate and cost.

How far would you be willing to travel?

Question (6.3) examined if the locality of the clinic played a major role in its potential use. It can be seen that the vast majority stated that they would be willing to travel more than 10 miles if the service was appropriate. A small number (9) felt that the clinic must be local (0 - 3 miles).

Table (6.3): The traveling distance

0 – 3 mile	3 – 10 mile	More than 10 mile	N/A
9	26	30	1

Do you have your own transport?

Fifty-eight of the 66 respondents confirmed they had their own transport. This obviously reduces the inconvenience of attending a clinic beyond ones own neighbourhood.

What facilities would be essential?

It can be seen from table (6.4) that, the major perceived requirement was the availability of a physiotherapist and investigation techniques. Many however by wishing an overall service preferred to have a doctor in attendance.

Table (6.4): Essential facilities

Availability of a physiotherapist	10
Availability of the investigation techniques	3
Availability of a doctor	1
Comments	0
Other choices	
Availability of a physiotherapist & investigation techniques	21
All of them	18
Availability of a doctor & a physiotherapist	11
Availability of a doctor & investigation techniques	1
No comments	1

If the clinic was convenient, would you be willing to pay for treatment?

Sixty-three of the 66 stated that they would be willing to pay for their treatment.

What would you be willing to pay?

It can be seen from table (6.5) that, a suggested rate of £20 or more was acceptable to the majority.

Table (6.5): Payment

Up to £5 for assessment and treatment	3
£5-20 for assessment and treatment	41
Over £20 for a course of treatment	15
Up to £5 for assessment and treatment + Over £20 for a course of treatment	1
All of them	2
N/A	4

What are your main needs for sports injury treatment to ensure a fast return to your sport? What suggestions do you have?

Question (10) allowed comments to be made, which were not specifically detailed as closed questions and allowed the opinion and other comments from personal experience to be expressed. 21 individuals did not give any responses or comment, but the composite recommendations from the others are as follows:

Contact by phone to be available immediately after an injury, the ability to have early advice and referral to the clinic with appointments within 48 hours at any time during the week.

The presence of specialist personnel experienced in assessing sports injuries to maximise the benefits of the consultation. The ability to give quick accurate and speedy diagnosis and with an understanding of the needs of specific sports so that a speedy return to full fitness can be achieved.

The specialist personnel should have access to appropriate equipment to facilitate diagnosis. Specialist availability should be within one office to enhance the liaison between different multi-disciplinary personnel and to enhance the speed of overall treatment and management. The availability of a good physiotherapist was stressed who could initiate speedy and appropriate treatment and have a system that allowed treatment to be administered with a minimum delay when attending a clinic. The availability of advice concerning rehabilitation exercises also requested.

Follow on advice after treatment is indicated, comments were made seeking access to accurate advice to avoid similar injuries. Specific advice concerning equipment such as training shoes, additional information concerning diet and exercise programmes to continue at home to prevent further injury.

6.2.2 **Results of form "B"** (62 injured athletes)

Questionnaire 'B' was distributed to injured athletes in Scottish athletic clubs. Participants responded to questionnaire consisting of 12 questions relating to their injuries, method of treatment and diagnosis and their preference regarding paths of care as determined by their experience.

Have you sustained an injury during training or competition in the last year?

Sixty athletes who had sustained an injury during training or competition in previous year completed the questionnaire. One filled out form "B" by mistake rather than form "A".

If you had an injury, did you attend anyone for treatment?

Two thirds of the athletes attended one of the medical care services for treatment. Nine out of the 62 injured athletes treated themselves. This would suggest that they had sustained mild or trivial injuries.

Who did you first attend?

It can be seen from table (6.6), that the vast majority of injured athletes either attended a physiotherapist or GP. Similar numbers attended the physiotherapist or GP (22 and 17). It can be seen that small numbers attended the A&E department (4) and only (7) attended a sports medicine clinic.

Table (6.6): Attendance

Physiotherapist	22
GP	17
Accident department in hospital (A&E)	4
Sports injury clinic	7
First aider	1
Other	2
Other choices	
First aider, Physiotherapist, and GP	1
First aider & Physiotherapist	1
No one	1
N/ A	6

What investigations did you require?

Table (6.7) shows that most of the injured athletes required only clinical examination, and only a few required further investigations by standard ultrasound or X-ray. More sophisticated investigations such as MRI did not tend to be undertaken.

Table (6.7): Investigation

Clinical examination	17
Standard ultrasound	7
X-ray examination	4
M.R.I Scans	1
Other	6
Other choices	
Clinical examination & Standard ultrasound	6
Standard ultrasound & Other	4
Clinical examination & X-ray examination	2
Clinical examination, M.R.I. scans and X-ray examination	2
Clinical examination, M.R.I Scans and Standard ultrasound	1
M.R.I. scans & X-ray examination	1
X-ray examination & Standard ultrasound	1
M.R.I. scans, X-ray examination and Standard ultrasound	1
Clinical examination & M.R.I. scans	1
N / A	8

After your experience, if you had another injury whom would you attend?

Table (6.8) confirms that if an athlete had another injury he would attend a physiotherapist. This would suggest that the vast majority felt that their care would be best managed following this care pathway.

There was an obvious reduction in those who felt that attending a GP or A&E department would be their preferred option in a light of their experience. Individual athletes mentioned new options such as a sports injuries consultant and manipulation by an osteopath.

Table (6.8): Next attendance

Physiotherapist	29
Sports injury clinic	15
GP	3
Other	2
A & E	1
First aider	0
Other choices	
Physiotherapist & GP	4
Physiotherapist & (A & E)	1
First Aider + Physiotherapist + Other	1
N/ A	6

Are you aware of the existence of a Specialist Sports Injuries Centre in your area?

A similar number of athletes were aware (29) and unaware (32) of the existence of the sports injuries clinics. Despite (29) of them knowing of the existence only (4) attended with their injury.

If you are aware, and have used this service, what was your experience?

Eighteen injured athletes responded with specific free text comments concerning their experience at the clinics. It can be seen from these selected comments that there was a wide range of opinion on the clinics.

Athletes comments:

1. Personnel: (a) Very good (b) Excellent (c) Accelerated recovery (d) Helpful and caring (e) The physiotherapist knew a lot about sports injuries.
2. General comments: (a) Good, but only available twice per week. (b) Received varying treatments from a variety of physiotherapists (c) Not very good, expensive, I didn't find it useful, all they do is ultrasound (d) Was injured 10 months on and not training. Since then I attended a sports injury clinic at hospital, which I found very useful (e) There is no centre available.

Who referred you to the Sports Injuries Centre?

It can be seen in table (6.9) that most of the injured athletes who attended for treatment of a sports injury did so as a self-referral or were referred in turn by their general practitioner or a club representative. They were unlikely to be referred on by a physiotherapist.

Table (6.9): Referral to sports injuries centre

Self	Physiotherapist	Doctor	Club representative	N / A
14	2	9	7	30

How did you find out about the clinic?

Table (6.10) questions the athletes' source of information concerning sports injury clinics. It can be seen that the majority were aware of the clinic by word of mouth. Although some did see the service advertised in their club or in a sports centre. Among other responses were that the athlete came across it, already knew of its existence or had access through his employer.

Table (6.10): Find out about the clinic

Word of mouth	17
Advertisement in club or sports centre	7
Referred by GP	3
Physiotherapist	1
Sports injuries doctor	0
First aider	0
Other	4
Other choices	
Referred by GP & Advertisement in club or sports centre	1
Word of mouth + Physiotherapist	1
N / A	29

Were you satisfied with the treatment & rehabilitation?

Twenty-four athletes gave the a clear cut "yes" response to this question (6) were dissatisfied, but (32) did not respond making overall interpretation difficult.

If you are aware of the clinic and did not use this, why not?

Free text comments were given by 8 injured athletes.

a) The only sports clinics and physios that you could see within a short interval are private and therefore expensive.
b) The NHS is free but far too slow.
c) The local physiotherapist was able to treat calf muscles within 24 hrs. At the sports injury clinic it was 3 days before I could be seen, this was too late.
d) This injury which was a muscle pull occurred over the holiday period and recovery was proceeding well by the time they reopened
e) I felt I only needed a physiotherapist as I had a simple sprain.
f) Scottish Institute for Sport (SIS) athletes have access to a separate injury service utilising a named physiotherapist.

Convenient hours of opening

In table (6.11), two third of the injured athletes confirmed that evening hours of opening is the most convent time. Relatively few preferred other times e.g. morning or afternoon.

Table (6.11): Convenient hours of opening

Morning	4
Afternoon	2
Evening	45
All of them	3
N/A	6
Do not now	1

How far would you be willing to travel?

Table (6.12) confirmed that only 9 would feel that a local clinic was an absolute requirement. The vast majority would be willing to travel a moderate distance to get appropriate treatment. It seems that the requirement is for good service to allow recovery from an injury even if the clinic is at that significant distance.

Table (6.12): Traveling distance

0 – 3 mile	3 – 10 mile	More than 10 mile	All of them	N/A
9	26	24	1	2

What facilities would be essential?

It can be seen in table (6.13) that most of the injured athletes selected the presence of a physiotherapist and availability of investigation techniques as the essential facilities. No one ranked the availability of a doctor as their first priority in these clinics.

Table (6.13): The essential facilities

Availability of a physiotherapist	13
Availability of all investigation techniques	13
Availability of a doctor	0
Comments	1
Other choices	
Availability of a physiotherapist & all investigation techniques	18
All of them	13
Availability of a doctor & a physiotherapist	3
N/A	2

In free text answers many other options were suggested including additional health care specialists.

a) All necessary equipment required for injury.
b) Availability of basic needs.
c) Investigative service should provide a doctor, physiotherapists, sports masseur, and the sports medicine service should include an osteopath, chiropractor and a podiatrist for foot injuries and to conduct mechanical assessments.
d) Remedial treatment at reasonable cost, club rates, up to date equipment necessary and advice to patients rather than just to undertake total rest.

If the clinic was convenient, would you be willing to pay for treatment?

Sixty of injured athletes responded and stated that they would be willing to pay for treatment.

What would you be willing to pay?

It can be seen from table (6.14) that nearly to two third of the athletes are willing to pay between £5 to 20 for assessment and treatment and the other quarter are willing to pay more than £20 for a course of treatment.

Table (6.14): Payment

Up to £5 for assessment and treatment	£5-20 for assessment and treatment	Over £20 for a course of treatment	£5-20 for assessment and treatment or Over £20 for a course of treatment
5	41	15	1

6.3 Discussion of A & B forms

This study examined the needs and suggestions of Scottish athletes in regard to sports injury management in clinics. Questionnaires were sent to 38 athletic clubs who expressed interest. Clubs from 16 different areas in Scotland participated in this study (see Appendix 11). Two questionnaires were distributed among the clubs. Form "A" (Appendix 9) related to non-injured athletes and 66 returns were received. Form "B" (Appendix 9A) related to athletes who had been injured during the previous year and there were 62 returns. The answers from the two forms were very similar with little variance.

There were 39 sports injuries clinics in 1995 and this is reduced to 27 in 2001. It is important to identify the reason for this reduction. This study focused on athletes needs in relationship to these centers. This may help to provide answers concerning the use of the clinics. These centres were established to provide the best care in diagnosis, treatment, rehabilitation and advice for sport-related injuries and with the provision of essential diagnostic and treatment facilities. Their main aim is to return an injured athlete to his/her sport as quickly as possible. The long-term health benefits of participation in sport are considered and the health service does not solely concentrate on the short-term injury risk (Cooke et al. 1999).

In Scotland, an injured athlete would previously have attended an A & E department or GP, and the resulting medical procedure would depend on the nature and severity of the injury. Patients would be referred to a specialist for specific diagnostic tests and a course of treatment including surgery if necessary. It was found in the present study that, most athletes whether previously injured and not, indicated that a GP or physiotherapist would be the first point of contact.

It is of great interest that amongst those injured athletes in view of their experiences that the physiotherapist would be the first point of contact if they had a further injury. Within the study about half of both groups knew of the existence of a local sports injury clinic. Very few however injured or not felt that this would be their first point of contact. 9 injured athletes did not attend anywhere for

treatment. This self-treated group presumably had mild injuries and they tried to deal with this by themselves. "If physiotherapy is required, there is often a lengthy waiting period. For chronic or overuse injuries, the GP may not have the time, inclination, or qualifications to deal competently with their management" (Boyce and Quigley 2001).

The lack of use of the sports injuries clinic as first attendance may have been due to the availability of GPs and physiotherapists most of the time throughout the week. The athletes had confidence in consulting them knowing that they had the assurance that they could get the right treatment and advice on appropriate referral. This may reflect the GPs' role in the local health care provision. On the other hand, the awareness of sports injury clinics appeared to be lacking and this may have reflected a lack of knowledge about facilities and services, which are available there. In order to increase attendance, awareness should be increased among all athletes and clubs regarding the sites, times of opening and services being offered.

Many physiotherapists run independent sports medicine clinics. They perform primary assessments of injuries, but are associated with doctors to undertake other investigations including X-rays. Physiotherapists have a wider remit than the treatment of sports injuries and deal with a wide range of soft tissue problems treating a wider range of patients such as the elderly who have had a stroke or patients with other limiting musculoskeletal conditions. In general, physiotherapists are not trained to make a specific medical diagnosis and this may lead to medical legal problems if inappropriate treatment is given from a faulty assessment. It is suggested that for best care attendance should be to a doctor specialised in sports medicine.

Injured athletes were asked if they had another injury whom may they attend. Their responses suggested a change in attitude with more indicating that they would make use of a sports injuries clinic if injured again. This may have reflected their own exposure or the experience of others. Alternatively they may have become more aware of the existence of sports injuries clinics. Regardless of the mechanism of change there is a need to provide better awareness of the

services of sports injuries clinics so that there will be an increasing attendance to increase the generation of funding to improve facilities and to develop a critical mass of patients and equipment.

In terms of the perceived needs of athletes for sports injuries facilities. This can be divided into personnel and equipment. Doctors and physiotherapists trained in the diagnosis and management of sports injuries are obviously a key element. The levels of equipment in any individual clinic will depend on the volume of patients and a numbers of resulting investigations. In general terms, examination and investigation would follow in series with clinical examination, ultrasound, or X-rays, and then MRI scans. The requirement of the latter is seldom required but it is occasionally vital and pathways for access are needed.

Clinical examination is the basic investigation to ascertain in clinical terms the extent of a presenting injury. Ultrasound uses high-frequency sound waves to produce high- quality images of soft tissue and they are the modality used to diagnose muscle and tendon injuries. Ultrasound is also used in other body systems utilizing motion scans to diagnose cardiac function and to measure blood flow. X-rays are the most commonly expected form of visualization utilizing electromagnetic radiation of very short wavelength, which is used to produce photographic images of the body structures including bone imaging and visualization of fractures. The MRI is a computer technology, which allows the production of clear images of internal soft tissues, muscles, and tendons. This is an inherently expensive technique. Visualization of structures within joints usually requires use of arthroscopic techniques, which would complement MRI visualization, and also allows minimally invasive surgery to be performed. Due to the cost implications and level of expertise required, these latter investigations are generally within a hospital setting (Kent M. 1998).

Results from this study confirmed that Clinical examination was the main technique required and most athletes emphasised the competence of the doctor or physio in their requirements. The request of athletes did not mandate the presence of X-rays and ultrasounds, and only one indeed asked for the availability of MRI scans.

From these results it is assumed that athletes wish early consultation and rapid triage at the site where first seen and investigations undertaken after this early assessment.

The injured athletes responses confirmed that the clinical examination was vital as a first step, but also suggested that use of ultrasound services in diagnosis and ultrasound therapies seemed the minimal additional equipment, which was acceptable. They perceived that ultrasound was non-invasive, easily performed and able to confirm a diagnosis in a high percentage.

Athletes were asked of their awareness of the existence of a specialist sports injury clinic in their area. The results showed that half of them were not aware of the clinics and even if they were very few used them. It is disappointing that, at a time when the specialty of sports and exercise medicine is being developed in the UK, that there is a short fall of doctors interested and the experience in this area. Recent study suggests that the majority of doctors working with professional footballers have no qualifications or little experience in the specialty. However, this is not confined to football clubs and probably applies to many other sporting associations. It was apparent in the present study that most athletic clubs do not have physiotherapists nor doctors in attendance. Boyce S. (2001), has emphasizes the importance of doctors undertaking training leading to appropriate qualifications within a specialty of sports medicine.

These services are being provided by SportScotland. Review of the staffing and equipment has been undertaken, but our study is the first to examine customer expectation and experience. Most of injured athletes did not state why they did not use the sports injuries service, but some specific criticisms were made linked to cost, the time to first appointment and mentioned that local access to a physiotherapist reduced the clinical need for attendance at a sports injury clinic.

The results of the present study indicate that the presence of a physiotherapist is the most essential element in the eyes of athletes whether they have sustained an injury or not. These comments may be related to the availability of a physiotherapist in sports clinics. It appears that the presence of a doctor did not

rate as highly. This may reflect the role of the physiotherapist in administering treatments and directing the rehabilitation programme for the athlete. Most sporting injuries are self-limiting and only a relatively small proportion need detailed investigation, which is generally only performed by referral by the GP.

Other athletes presented some different points of view and included in addition to a good consultation and investigation, the availability of a doctor and physiotherapist. There are additional requests for the availability of other health care professionals such as a masseur, osteopath, chiropractor, or specialist podiatrist for foot injuries to conduct mechanical assessments and the presence of remedial treatment at reasonable cost, manipulation where required, and good general advice.

In Scotland, the first medical contact of patient with illnesses and injuries is usually the GP. Thereafter patients can be referred to a specialist for specific investigations and treatment. In the present study, half of the injured athletes did not specified by whom they had been referred for the treatment of the sports injury, but follow up contact confirmed that most of the injured athletes were self-referrals. Where others mentioned referrals by the club representative usually the coach, GPs and very few by the first contact physiotherapists. Nielson and Knill-Jones (1998), studied the usage of sports medicine centres in Scotland. They found that more than half of the patients were self-referrals. If specialist sports injury clinics are to be more utilised self-referral could save both time and effort and reduce the GP load for what are often trivial injuries.

The lack of knowledge of athletes concerning sports injuries clinics suggest that a campaign or advertisement is needed which should occur at sports venues, at GP surgeries and that other local authority sites. The advertisement should declare the profile of services available including staffing and investigative facilities. Such information would give injured athletes options concerning their best route of acquisition of medical services.

The issue of the provision of free services or a payment for item of service has been a major economic and political stumbling block in terms of the development

of sports injuries clinics in Scotland. At present payment for assessment and treatment is requested at the time of attendance. The present results suggest that athletes would use the service and pay more if they felt that the facilities were convenient and appropriate to their needs. The vast majority accepts the principle of paying a fee for treatment. Two thirds seem willing to pay up to £ 20 for assessment and treatment with the other quarter willing to pay more than £ 20. The ideal situation however would be to make these clinics available and similar to other medical services i.e. free at the point of contact.

The majority of the athletes who responded to the questionnaires had their own transport and close proximity of sports clinic centres was not an absolute requirement except for a small number. Results of the present study suggested that very few were not able to travel more than 3 miles and the majority were happy to travel up to 10 miles. It can be assumed that the athletes are looking for good service even if the clinic is a considerable distance from their home. Nevertheless the distribution of these services needs to be considered according to each community and accessibility using public transport so that individuals who are less affluent and do not own their transport are not discriminated against.

Most of the sports medicine clinics are provided by part time staff supported by Sports Scotland. The majority of athletes are students or are in employment and required convenient times to access investigation and treatment for sports injuries. Clinics are usually open to the public 2 to 4 evenings per week for some 2 to 4 hours. It appeared that the clinics have developed a service which is suitable to the client base. Two third of the injured athletes suggested that evening opening is a convenient time and few preferred the morning or afternoons.

In response to a question concerning their perceived needs and suggestions regarding imprudent of services. A third of non-injured athletes did not suggest any changes. Two third of the athletes did provide opinions and these are summarised:

1. Early open referral and appointment available within 24 to 48 hours.

2. Specialist personnel in attendance with specific skills in treating sports injuries to give good consultation, quick accurate and speedy diagnosis and a knowledge of particular sports to return individuals to full fitness in the shortest time.

3. Access to appropriate equipment and presence of other specialist personnel within one area to enhance the speed of treatment and create a good liaison between the different multi disciplinary personnel, initiate speedy access to appropriate treatment to have treatment as quickly as possible when attending the clinic to minimise delay in a presence of a good physiotherapist who can give appropriate rehabilitation exercises and advice to continue at home.

4. A system to provide accurate advice to avoid similar injury, advice on equipment including training shoes, diet, treatment prevention and suggestion for continue the exercises after the period of intense treatment.

6.3.1 Recommendations

It can be seen from the above that the present provision of sports injury clinics fulfills the aspirations and needs for many athletes. The most important issue appears to be athletes' knowledge of the existence and facilities available at the clinics. In general, recommendations can be made to help improve the provision and uptake of services.

The present study has supplied information from the users perspective and received recommendations from the athletes following their personal experience. It is suggested that some of the communication problems might be averted by the use of a phone answering service to be available even when the centre was not open. The injured athlete could be leave his/her name and phone number with some information concerning the injury and a response made within 24 hours with advice or an arrangement for immediate consultation from a sports medicine specialist.

It is recommended that athletes should be able to access information concerning the sports injuries centres within an attractive web page through the Internet. The sports injuries clinics require continuous audit and resourcing to provide sufficient space for staff and patients, the provision of appropriate diagnostic and therapeutic equipment to provide therapy during sufficient and convenient hours each day.

Chapter seven

Limitations and Conclusion

7.1. Limitations

The studies were performed using two different populations, Kuwaiti and Scottish athletes. Information was obtained on either a retrospective or prospective method. Several issues are seen as limitations to these studies.

In the pilot study the researcher's main aim was to observe the frequency, type of injuries and their management in athletics in Kuwait for the season 1997/98. This data was collected during the 4 days of the national final competition, which was attended by the majority of athletes. The data were collected by questionnaire and interviews, conducted with 110 athletes representing 8.7% of the 1,262 registered with the KAAF.

The number of competitors available for interview at the final competitions was 79 adolescents, 85 young adults and 68 mature adults (232). A number of 110 (47%) were interviewed of whom 76 had sustained injuries during the season (table 4.3). The exact number of all active athletes competing in other competitions was unknown. But, those competing in the final competitions represent the most active athletes including the elite group.

They were chosen using a purposive sampling strategy in order to represent certain characteristics with regard to the study. The researcher was not necessarily looking for statistical representativeness, but was wishing to obtain experience relevant to the topic of the study and insight regarding problems faced in assessing injuries.

Most of the sample, which was included in this study, was composed of athletes who had experienced injury and the sample was therefore considered to be "information rich". As this population contained a clear, known and easily identifiable group, the sample was easily selected, interviewed and collected. This may have involved a bias in the recruitment process but ensured a good information base obtained from a targeted population.

Data collection occurred through interviews using a simple questionnaire, which could be filled out using a minimum of specialised medical terms after discussion with a specific focus group of coaches in Kuwait. The simple questionnaire was developed in Arabic. The data collected in general terms was qualitative and that as such may be difficult to analyse. All the age groups were not represented in the senior finals, which excluded the 10 to 15 year olds as it is felt that they are too young to participate at this level of strenuous competition, but they had their own competition.

The time constraint of the duration of the finals did not allow the researcher to interview the total number of participants. They did, however, target those athletes who were known to have injuries identified by the coaches and medical personnel. In addition, they identified those athletes in the age groups 10 to 15 who had sustained injuries during the season. This study identified a high number of injuries in athletics. A small number may have been missed and hence specific calculation of the incidence has not been made. In addition, some injuries sustained during the season may have been missed if forgotten at the time of recall. This is an inherent limitation of all retrospective studies.

Ideally this study should have been performed as a prospective study with all active athletes being logged and information obtained from all. At least all those who participated in the finals should have been interviewed and the information gained would have been more representative. As noted, the validity of questions was assessed after discussion with the coaches, but the reproducibility should have been assessed by getting some individuals to fill in the questionnaire on two occasions.

Study two was the first prospective study of sports-related injuries in Kuwait. Ideally all registered and active athletes should have been logged and returns sent each month for all subjects. However, gathering the data from the clubs on a monthly basis with a changing number of athletes being actively involved was difficult. Accordingly, it was difficult to assess the injury rate for each club on a monthly basis. A crude rate was assessed by using the number of registered athletes as the denominator and in addition the number of active athletes participating during the 1999/00 in both training and competition.

This study reflects on the nature and frequency of sports-related injury in Kuwait. The coaches at the athletic clubs may have been inhibited in returning an accurate number of injuries as this may have affected their continued employment in their clubs if a large number was identified. A monthly encouragement was needed to obtain information on all of the injuries.

The questionnaire was developed using a basic format used in several studies performed within the division of cardiovascular and exercise medicine including the study of the prevalence of football injuries in the adolescent, mature and elite females within Scotland. Kirsty Stewart 1997/98 and injuries in Scottish female football clubs questionnaire survey Mandy E Martin BSc 1997/98. These questionnaires were trialled and validated in these two studies following a focus group discussion with 19 football coaches. The questionnaire was applied to the study of osteoarthritis in football and rugby players and the reproducibility was examined in footballers using this basic questionnaire on two occasions.

Differences in responses could not be elicited. The reproducibility of the final questionnaire for the present study should have been the subject of further studies. The questionnaire did not contain the athlete's identification to maintain confidentiality. It was difficult to distinguish between a new injury and the recurrent injury. Several athletes indicated that they had more than one injury during the season and the information about recurrence was obtained from the athletes' replies.

The control group in the second study was collected at the end of the season. The researcher aimed to collect the same number of control (non-injured) athletes to match the numbers of injured athletes. Accordingly non-injured athletes were chosen randomly from the clubs based on the registration lists provided to the researcher by the athletic federation and excluded the injured athletes. The number of the control group selected from each club was based on the club size and the number of its participants. As noted above, it would have been better if all athletes had been logged and returns obtained for both injured and non-injured athletes at the end of each month.

Cooperation for a long-term injuries survey was difficult to obtain from the Scottish athletics clubs. Of 157 contacted, and 38 who expressed an interest, 16 completed injury forms. This occurred despite initial and follow up letters and visits being made in person to encourage them to engage in the survey and telephone communication being continued. Overall there is a lack of administrative support in this amateur sport. To maximise the return in an injuries survey contact with a doctor or physiotherapist involved in the club would be preferable. The study emphasised that few clubs have a formal relationship with medical personnel. The difficulty with the Scottish clubs emphasises the problems met by independent researchers not previously involved on a week-to-week basis wishing to initiate studies. The overall lack of returns occurred despite making contact through the formal athletics governing body in Scotland.

The questionnaire in the audit study was developed following discussion with the representative of SportScotland and the questions addressed their anxiety concerning the early up take by athletes of the services developed at the sports injuries clinics. This addresses client perception regarding their needs in response to personnel, facility, hours of opening and investigative equipment.

The club represented by responses shows a good geographic spread in the areas where the sports injuries clinics are available. Specific recommendation can be made concerning publicity to promote the services and further studies should be performed to assess client satisfaction in those attending the sports injuries clinics.

Despite these limitations, this project provided valuable information that can be used to help sporting bodies reducing sports injuries, prevention, meet athletes needs and provide best services in sports injuries clinics.

7.2. Conclusion

The first study

The preliminary results identified the nature of sports injuries presenting in Kuwaiti athletes. In view of selection of those athletes, without knowing the total number of participants, means that the absolute incidence of injuries cannot be estimated. The number of participants in the 4 days of the competitions was 232 athletes. This gives a rough guide of a denominator from whom the 76 injuries were recorded (32.8%). This was not an incidence study; this was a study that determined what the injuries were and their impact, also what was thought to have an influence on injury occurrence and treatment.

Regarding the training surface, we looked at all surfaces and we could not find a clear pattern whether the tartan surface has an influence on injury occurrence. However, the sample was small and this may require further a research project to look at the difference between tartan and other surfaces. In general, the results of this study showed that, the typical injury occurred in 16 to 19 years old males in athletic events. Most of injuries occurred inside the stadium during the training sessions. The injuries to the lower limb dominated while the hamstring and the foot were the most frequently injured anatomical areas.

The second study

The second study was a prospective study of Kuwaiti athletic injuries which was performed during the season 1999-2000. A high number of injuries was reported from 8 clubs (103 injuries). In addition, the comparison between the injured and non-injured groups identified statistical differences in the height, weight, hours of training daily, athletes in the international level and warm-up and cool-down exercises.

A high incidence (3.78 per 1000 hours) of athletics injuries in Kuwait was found. In general terms, a third of injuries were found among adult participants with an early peak of injuries at the beginning of the season. However, most of the injuries

were sustained during the last 3 months of the season at a time of the major competitions and more occurred in inexperienced athletes.

A high percentage of injuries occurred in athletes who used a track tartan surface while about the half used the sand surface for training. More injuries were in training than in competitions while the sprinters, hurdlers and jumpers were the three most common athletic groups associated with injury among the track events.

Regarding the medical results doctors mostly (65%) conducted consultations where the limited number of physiotherapists influences the system in Kuwait. Clinical examination was the most (64%) common simple investigative technique used. Treatment was mostly (three quarters) sought in sports club clinics. Rehabilitation guidance was divided between coaches and physiotherapists and none of the injured athletes was given a home exercise program.

A third of the athletes did not complete the treatment course or had not taken enough time to recover completely from their injury. Previous injuries were reported in half of the injured athletes with recurrences of strains and sprains. The two most common diagnoses were hamstring strain (27.2%) and ankle sprain (13.6%) while the knee injuries were very few. On average, each injury caused participants to miss about 28 days from activity.

The third study

This third study focused on athletes needs and suggestions of Scottish athletes in 2000/01 with regard to sports injury management in clinics. Clubs from 16 different areas in Scotland participated in this study. Non-injured athletes and athletes who had been injured during the previous year were studied.

In terms of the perceived needs of athletes for sports injuries facilities. This can be divided into personnel and equipment. A physiotherapist would be the preferred first point of contact if the athletes had a further injury. Also, the presence of a physiotherapist is the most essential element in the eyes of athletes while the presence of a doctor did not rate as highly. Other athletes presented some different

points of view i.e. the availability of a masseur, osteopath and chiropractor, or specialist podiatrist.

Within the study about half of both groups knew of the existence of a local sports injury clinic and very few felt that this would be their first point of contact. The awareness of sports injury clinics appeared to be lacking and even if they were very few used them. A change in the attitude of injured athletes indicated that they would use a sports injuries clinic if they were injured again. Clinical examination was the main technique required and the request of athletes did not mandate the present of X-rays and ultrasounds.

Most of the injured athletes did not state why they did not use the sports injuries service, but some specific criticisms were made linked to cost, the time to first appointment and mentioned that local access to a physiotherapist reduced the clinical need for attendance at a sports injury clinic. Most of the injured athletes appeared to be self-referrals, although half of the athletes did not mention by whom they had been referred for the treatment of their injury.

The vast majority seem willing to pay up to £ 20 for assessment and treatment and pay more if they felt that the facilities were convenient and appropriate to their needs. The majority of the athletes had their own transport and were happy to travel up to 10 miles. Two thirds of the athletes did offer opinions and these are summarised their main requirements as; (1) Early referral and appointment; (2) Specialist personnel in treating sports injuries at reasonable cost; (3) Access to appropriate equipment and a good physiotherapist who can give appropriate rehabilitation exercises and advice to continue at home; (4) Advice to avoid similar injury including training shoes, diet, and suggestion for continue the exercises after the period of intense treatment.

7. Appendices

Appendix 1: Risk Factors adapted from (Mechelen, et al. 1992 and Lysens, et al.1991)

Intrinsic Risk Factors	Extrinsic Risk Factors
Physical characteristics Age Height Weight B M I (Body Mass Index) Gender Body fat Joint mobility Muscle tightness Ligamentous laxity Malalignment of the lower extremities Joint stability Physical fitness Aerobic endurance Strength Speed Flexibility of muscles Sporting skill/coordination Psychological& psychosocial characteristics Previous injury Predisposing disease	Sports-related factors Type of sport Level of competition Nature of event Exposure Playing time Rules Venue Lighting Safety measures Equipment Tools/ Protective equipment Environment Type and condition of playing surface Altitude Weather conditions Time of the day/season Training programme Excessive distance Fast progression High intensity Hill work Poor technique Fatigue

Appendix 2: Definitions of athletic events

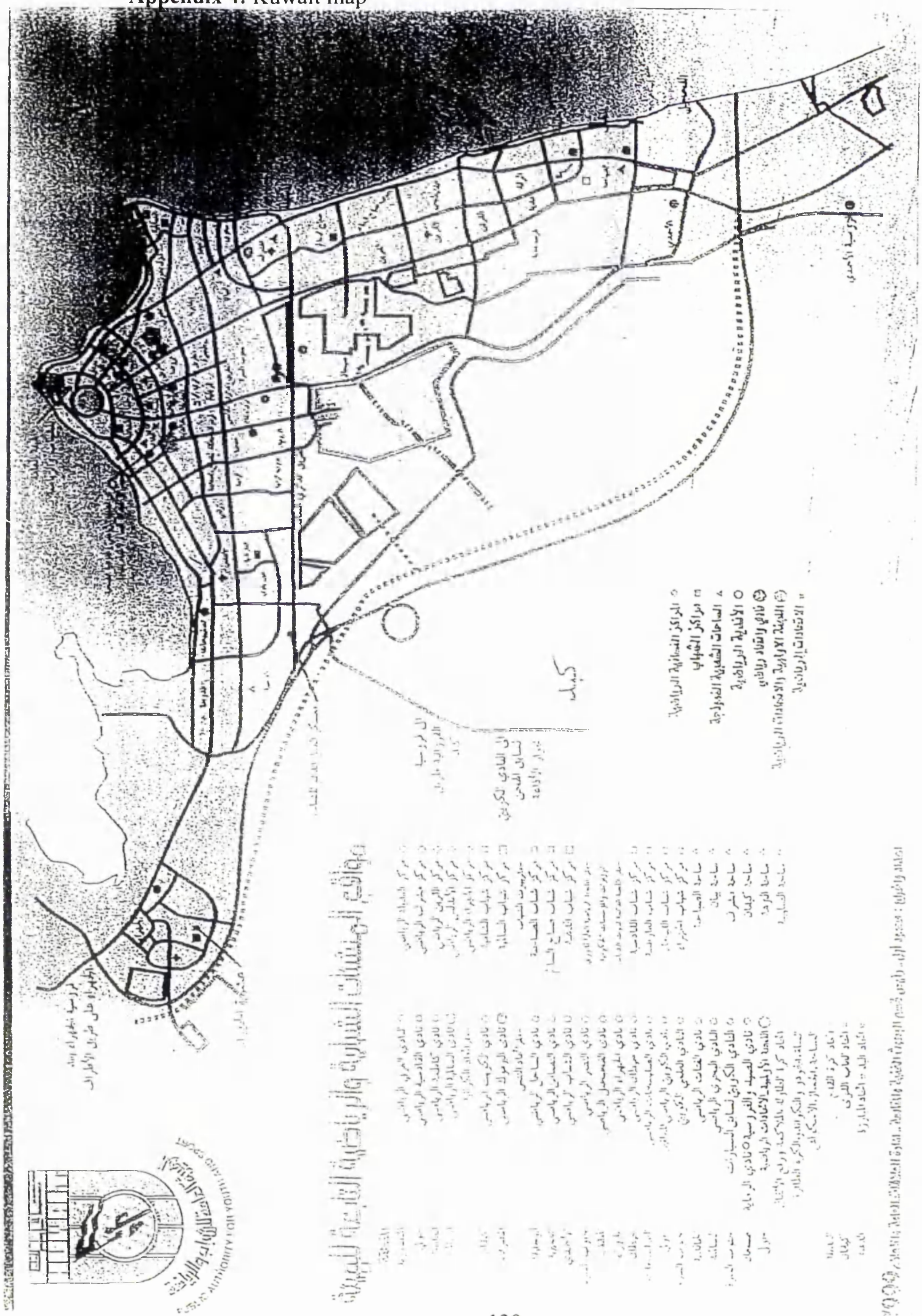
Athletics events		Definition
Track events	Sprints	Running at or close to top speed for the length of a race, events up to 400 m. are considered sprints events.
	Middle distance	Events run from 800 m. up to 3,000 m.
	Long distance	Events run from 5,000 m. up to 10,000 m.
	Hurdles	The races are 100 m, 110 m and 400 m events. The sprinter must clear 10 hurdles with both legs and must not deliberately knock down a hurdle.
	Steeple chase	A 3000 m event which the runners have to clear solid hurdles and a water jump faced by hurdles.
	Walks	These races are track events exceeding 20 km in which progression is by steps so taken that unbroken contact with the ground is maintained.
	Cross country running	A race over natural terrain including obstacles, races may be held on race courses with man-made hurdles, principally a winter pursuit it comprises team and individual courses, distances vary.
	Marathon	A road race standardized for championship purposes at 42.195 km (26 miles and 385 yards).
	Relay events	For four-man teams over 400 m and 1600 m, runners carry a baton, which is transferred from the incoming runner to the outgoing runner in the take-over zone.
Field events	Long jump	The approach is by sprinting to jump from a take off board into a sand-landing area.
	Triple jump	The athlete after a sprint approach to the take off board performs a hop, steps off the other foot and then jumps into the sand-landing area.
	High jump	The jumper jumps over a bar supported between two uprights, the take off must be from one foot only.
	Pole vault	The athlete uses a flexible pole to help him vault over a high crossbar supported between two uprights.
	Shot put	A metal ball of about 7 kg that the competitor must "put" within the confines of a circle to land within a marked sector.
	Discus	A thick round metal disc of about 2 kg, thrown from the confines of a caged circle to land within a marked sector.
	Hammer	A round metal ball of about 7 kg, attached to a wire (metal chain) for throwing within the confines of a caged circle to land within a marked sector.
	Javelin	A long pointed spear thrown from behind an arc at the end of runway to land point within a marked sector.

Appendix 3: The distances between Kuwait City and Sports Clubs

No.	Clubs participating in multiple sports activities	Distance from Kuwait City	The surfaces
1.	Qadsia Sport Club	7 km	Tartan
2.	Al-Salmiya Sport Club	14 km	Sand & Tartan
3.	Tadamon Sport Club	11 km	Sand
4.	Al-Shabab Sport Club	35 km	Sand & Tartan
5.	Al-Sahel Sport Club	29 km	Sand
6.	Khitan Sport Club	12 km	Sand
7.	Kazma Sport Club	6.5 km	Tartan
8.	Fahaheel Sport Club	33 km	Sand
9.	Al-Naser Sport Club	18 km	Sand
10.	Al-Arabi Sport Club	4.5 km	Tartan
11.	Al-Jahra Sport Club	31 km	Sand
12.	Sulaybikhat Sport Club	16 km	Sand
13.	Al-Kuwait Sport Club	6 km	Tartan
14.	Al-Yarmook Sport Club	14 km	Sand

No	Clubs specialised in one or two sports activities only	Distance from Kuwait City
15	Disabled Sport Club	7 km
16	Al-Fatat Sport Club (Girls)	7.5 km
17	Sea Sport Club	13 km
18	Hunting and Equestrian Club	19 km
19	Camel sport Club	45 km
20	Shooting Sport Club	19 km
21	Motor Sports Club	16 km

Appendix 4: Kuwait map



استبيان حول إصابات العاب القوى للموسم الرياضي١٩٩٨/٩٧

١-الاسم:..... ٢-العمر:.....

٣-النادي:..... ٤-المسابقة:.....

٥-عدد أيام التدريب: ١ ٢ ٣ ٤ ٥ ٦ ٧ بطولات فقط

٦-مكان التدريب: داخل الملعب خارج الملعب

٧-أرضية التدريب: تراب/رمل تارتان أرضية زراعية طرق/شارع

٨-الإصابة حدثت أثناء: التدريب البطولة مكان آخر

٩-نوع الإصابة:.....

١٠-نوع العلاج: راحة علاج طبيعي عملية جراحية اخر.....

وشكرا عبد المجيد الموسوي

Athletic Sports Injuries for the season 1997/98 in Kuwait

1.Name:..... 2.Age:.....years

3.Club name:..... 4.Athletic event:.....

5.Days of training per week:.....

6.Place of training: a) Inside the stadium b) Outside the stadium

7. Training surface: a) Sand b) Tartan
c) Grass d) Road

8. The injury occurred during: a) Training b) Tartan c) Other.....

9. Kind of injury:.....

10. Treatment: a) Rest b) Physiotherapy
c) Surgery d) Other: .....

Thank you: Abdul-Majeed Al-Mousawi

Appendix 6

استبيان عن إصابات العاب القوى

المصاب هو اللاعب الذي تعرض للإصابة داخل الملعب أو خارجه وهذه الإصابة أدت إلى منعه من مزاولة التدريبات اليومية أو المشاركة بالبطولات على الأقل يوم واحد.

أسئلة الاستبيان

الإصابة حدثت في شهر: ----------

١- اسم النادي: --------

٢- العمر: ------ سنة

٣- الطول بالتقريب: ------ سم

٤- الوزن بالتقريب: ------كجم

٥ - ما هو معدل عدد الساعات التي تتدرب فيها باليوم تقريبا ؟ ------ ساعة

٦- ما هو معدل عدد الأيام التي تتدرب فيها بالأسبوع تقريبا ؟ ------ يوم

٧- ما هي عدد سنوات الخبرة والمشاركة ؟ أ - بالنادي : -------- سنة ب - بالمنتخب : -------- سنة

٨- ما هي المسابقة التي أصبت بها ؟ ---------- (في حالة المسابقات المركبة كالعشاري أو الثلاثية مثلا يرجى تحديد المسابقة التي أصبت بها)

٩- ما هي الأرضية التي تمارس عليها تدريباتك اليومية ؟ ---------- (ترتان - رمل - زراعة - طريق - أرضيات متنوعة - دائرة الرمي)

١٠- هل الملابس/ الأدوات المساعدة على التدريب تتناسب مع مسابقتك ؟ ( ) نعم ( ) لا

١١- إن كان جواب السؤال السابق " لا " فما هي الأداة ؟ (حذاء التدريب - حذاء البطولة - قفازات - أخرى اذكرها: -------)

١٢- الإحماء العام والتسخين قبل البدء بالتدريب :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٣- الإحماء العام والتسخين قبل البطولة :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٤- التهدئة / الجري الخفيف بعد الانتهاء من التدريب :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٥- التهدئة / الجري الخفيف بعد الانتهاء من البطولة :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٦- الإصابة حدثت أثناء: ---------- (التدريب - البطولة - نشاط آخر ، اذكره)

١٧- من الذي قام بعملية تشخيص الإصابة ؟ ---------- (الدكتور - الأخصائي - المدرب - آخر ، اذكره)

١٨- كيف تمت عملية التشخيص والإجراءات الطبية ؟ ---------- (بالكشف والفحص اليدوي - بالأشعة - الاثنين معا - أخرى اذكرها)

١٩- ما هو المكان الذي تم فيه علاجك ؟ ---------- (مستشفى - عيادة رياضية - مكان آخر ، أذكره)

٢٠ - العلاج الذي تلقيته أثناء فترة الإصابة : ---------- (راحة - ثلج - لفاف ضاغط - جبس - جلسات كهربائية - آخر أذكره)

٢١- من الذي قام بالتأهيل الرياضي بعد الانتهاء من العلاج ؟ ---------- (الدكتور - الأخصائي - المدرب - اللاعب - آخر اذكره)

٢٢- هل أخذت الفترة الكافية للعلاج من الإصابة ؟ ..... ( ) نعم ( ) لا

١

٢٣- هل أكملت الجلسات العلاجية ؟ .... ( ) نعم ( ) لا

٢٤- هل كنت تعاني من أي إصابة سابقة خلال الموسم الحالي ؟ .... ( ) نعم ( ) لا

٢٥- هل الإصابة التي تعاني منها حاليا هي نفسها الإصابة السابقة ؟..... ( ) نعم ( ) لا

٢٦- هل انقطعت عن التدريبات اليومية بسبب هذه الإصابة ؟... .... ( ) نعم ( ) لا

٢٧- ما هي الفترة التي استغرقتها الإصابة (من بدايتها حتى الانتهاء من العلاج) ؟ ---------- يوم

٢٨- كم يوم فقدت من التدريب بسبب هذه الإصابة ؟ ---------- يوم

٢٩- كم يوم فقدت من البطولة بسبب هذه الإصابة ؟ ---------- يوم

م	المنطقة المصابة		نوع الإصابة						
			كسر	خلع	ورم / كدمة	تمزق / شد عضلي	التواء المفصل	قطع / تمزق كامل بالعضلة	قطع بالمفصل	خدش
١	الرأس/ الرقبة / الوجه									
٢	الكتف	يمين								
		يسار								
٣	الذراع	يمين								
		يسار								
٤	المرفق/ الرسغ / اليد	يمين								
		يسار								
٥	الصدر / الظهر									
٦	البطن									
٧	الحوض/ مفصل الفخذ	يمين								
		يسار								
٨	عضلات الفخذ الأمامية	يمين								
		يسار								
٩	عضلات الفخذ الخلفية	يمين								
		يسار								
١٠	الركبة	يمين								
		يسار								
١١	عضلة الساق الخلفية	يمين								
		يسار								
١٢	عظم الساق	يمين								
		يسار								
١٣	الوتر أشيل (خلف القدم)	يمين								
		يسار								
١٤	مفصل القدم	يمين								
		يسار								
١٥	(أصابع/ باطن/ ظهر) القدم	يمين								
		يسار								
١٦	أخرى أذكرها ----------									

ملاحظاتك :

عبدالمجيد الموسوي

Appendix 6 A:

Questionnaire 1999/00

NB: Please circle option(s) as appropriate:

 # Date of injury: .....

1. Club: .....

2. Age: ..... years.

3. Height: ..... cm.

4. Weight: ..... kg.

5. Hours of training daily: ..... hrs.

6. Days of training weekly: ..... days.

7. Athletes level & years of experience: **a) Club:** ..... years. **b) International:** ..... years.

8. Training surface: ..... (e.g. Tartan – Sand – Grass – Road – Mix – Cement – Other specify)

9. Are the training aids used suitable for your event? **Yes ( )** **No ( )**

10. If no, what is it? ..... (e.g. Training shoes – Competition shoes – Gloves – Other specify)

11. Warm-up Before Training:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

12. Warm-up Before Competition:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

13. Cool-down After Training:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

14. Cool-down After Competition:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

15. The injury occurred during:. (e.g. Training – Competition – Duration of activity – Other)

16. During which athletics event have you been injured? .....(e.g. 100m)

17. Who made the diagnosis? ..... (e.g. Doctor – Physio – Trainer – Other specify)

18. What investigations? ..... (e.g. Clinical exam – X-ray – M.R.I. scan – Other specify)

19. Where were you treated? ..... (e.g. Hospital – Sport clinic – GP – Other specify)

20. What treatment did you receive? (e.g. I.C.E. – Physical therapy – P.O.P. Splint – Other specify)

21. Who guided the rehabilitation? ..... (e.g. Doctor – Physio – Trainer - Other specify)

22. Did you take enough time to recover from the injury? ..... **Yes ( )** **No ( )**

23. Did you complete the treatment course?..... Yes ( ) No ( )

24. Did you suffer from any previous injury?..... Yes ( ) No ( )

25. Was this a recurrence?.....Yes ( ) No ( )

26. Were you off training because of this injury? .....Yes ( ) No ( )

27. What was the total duration of the injury? ..... Days.

28. How many days were lost from training? ..... Days.

29. How many days were lost from competition? ..... Days.

30. How was the injury defined?

	Region		**Kind of injury**						
			Fracture	Dislocation	Bruising	Strain	Sprain	Muscle tear	Laceration
1	Head – Neck - Face								
2	Shoulder	R							
		L							
3	Arm	R							
		L							
4	Elbow – Wrist -Hand	R							
		L							
5	Chest - Back								
6	Stomach								
7	Groin - Hip	R							
		L							
8	Quadriceps (front thigh)	R							
		L							
9	Hamstring (back thigh)	R							
		L							
10	Knee	R							
		L							
11	Calf muscle	R							
		L							
12	Shin-Shinbone	R							
		L							
13	Achilles tendon	R							
		L							
14	Rest of ankle	R							
		L							
15	Foot	R							
		L							
16	Other, specify								

R = Right, **L** = Left **I.C.E** → **I** = ice, **C** = compression, **E** = elevation

Appendix 7

استبيان اللاعبين الغير مصابين

أسئلة الاستبيان

١- اسم النادي: --------

٢- العمر: ------ سنة

٣- الطول بالتقريب: ------ سم

٤- الوزن بالتقريب: ------كجم

٥ – ما هو معدل عدد الساعات التي تتدرب فيها باليوم تقريبا ؟ ------ ساعة

٦- ما هو معدل عدد الأيام التي تتدرب فيها بالأسبوع تقريبا ؟ ------ يوم

٧- ما هي عدد سنوات الخبرة والمشاركة ؟ أ – بالنادي : -------- سنة

ب – بالمنتخب : -------- سنة

٨ – ما هي الأرضية التي تمارس عليها تدريباتك اليومية ؟ ---------- (ترتان – رمل – زراعة – طريق – أرضيات متنوعة – دائرة الرمي) –

٩- هل الملابس/ الأدوات المساعدة على التدريب تتناسب مع مسابقتك ؟ ( ) نعم ( ) لا

١٠- إن كان جواب السؤال السابق " لا " فما هي الأداة ؟ (حذاء التدريب – حذاء البطولة – قفازات – أخرى اذكرها: --------)

١١- الإحماء العام والتسخين قبل البدء بالتدريب :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٢- الإحماء العام والتسخين قبل البطولة :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٣- التهدئة / الجري الخفيف بعد الانتهاء من التدريب :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٤- التهدئة / الجري الخفيف بعد الانتهاء من البطولة :-

الجري لمدة (دقيقة)	صفر	٥	١٠	١٥	٢٠
تدريبات الإطالة العضلية	صفر	٥	١٠	١٥	٢٠

١٥- ما هي المسابقة التي تشارك بها ؟ ---------- (يرجى تحديد المسابقة)

١- مسافات قصيرة

٢- مسافات متوسطة

٣- مسافات طويلة

٤- اختراق الضاحية و الماراثون

٥- المشي

٦- الحواجز

٧- الموانع

٨- الوثب الطويل

٩- الوثب الثلاثي

١٠- الوثب العالي

١١- القفز بالزانة

١٢- دفع الجلة

١٣- قذف القرص

١٤- اطاحة المطرقة

١٥- رمي الرمح

و شكرا

عبدالمجيد الموسوي

Appendix 7 A: The questionnaire of the control study 1999/00

The questionnaire

NB: Please circle option(s) as appropriate:

1. **Club:** .....

2. **Age:** ..... years.

3. **Height:** ..... cm.

4. **Weight:** ..... kg.

5. **Hours of training daily: ..... hrs.**

6. **Days of training weekly: .....days.**

7. Athletes level & years of experience:

a) Club: ..... years.

b) International: ..... years.

8. Training surface: ... (e.g. Tartan – Sand – Grass – Road – Mix – Cement – Other specify)

9. Are the training aids used suitable for your event? **Yes ( )** **No ( )**

10. If no, what is it? ..... (e.g. Training shoes – Competition shoes – Gloves – Other specify)

11. Warm-up Before Training:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

12. Warm-up Before Competition:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

13. Cool-down After Training:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

14. Cool-down After Competition:

1-	Running (minutes)	0	5	10	15	20 ≥
2-	Stretching (minutes)	0	5	10	15	20 ≥
3-	Other (specify)					

15. Athletic event:

(1) Sprinting & Relay events: up to 400 m.

(2) Middle distance running: 800 m. up to 3,000 m.

(3) Long distance running: 5,000 m. up to 10,000 m.

(4) Cross country running & Marathon

(5) Race walking

(6) Hurdles: events up to 400 m.

(7) Steeplechase: events up to 3000 m.

(8) Long jump (9) Triple jump

(10) High jump (11) Pole vault

(12) Shot put (13) Discus

(14) Hammer (15) Javelin.

Appendix 8: Comparison between injured & cohort groups

Injured & non-injured (Cohort) groups							
		N	Mean	St Dev	SE mean	95% CI	P Value
Age	Cohort	103	18.3	5.45	0.54	-2.91, 0.13	0.074
	Injured	103	19.7	5.63	0.55		
Height	Cohort	103	172	8.81	0.87	-6.18, -1.64	0.0008
	Injured	103	176	7.68	0.76		
Weight	Cohort	103	65	12.4	1.2	-8.6, -1.0	0.013
	Injured	103	70	15.1	1.5		
Days/week	Cohort	103	5.0	1.0	1.0	-0.505, 0.04	0.093
	Injured	103	5.3	1.0	0.1		
Hours/day	Cohort	103	2.0	0.5	0.05	-0.430, -0.075	0.0056
	Injured	103	2.3	0.79	0.08		
Club level	Cohort	103	5.3	3.59	0.35	-2.10, 0.10	0.076
	Injured	103	6.3	4.41	0.43		
International level	Cohort	103	1.8	2.74	0.27	-2.44, -0.55	0.0021
	Injured	103	3.3	4.03	0.40		
Running before training	Cohort	103	15.0	4.75	0.47	1.89, 4.23	0.0000
	Injured	103	11.9	3.72	0.37		
Stretching before training	Cohort	103	16.0	4.03	0.40	-1.10, 1.10	1.0
	Injured	103	16.0	3.96	0.39		
Running before competition	Cohort	103	12.9	4.67	0.46	0.54, 2.95	0.0048
	Injured	103	11.2	4.09	0.40		
Stretching before competition	Cohort	103	14.8	5.02	0.49	-2.25, 0.31	0.14
	Injured	103	15.7	4.28	0.42		
Running after training	Cohort	103	5.9	4.11	0.40	0.31, 2.31	0.010
	Injured	103	4.6	3.06	0.30		
Stretching after training	Cohort	103	4.3	4.80	0.47	0.98, 3.30	0.0004
	Injured	103	2.2	3.55	0.35		
Running after competition	Cohort	103	3.3	4.47	0.44	0.18, 2.34	0.022
	Injured	103	2.0	3.31	0.33		
Stretching after competition	Cohort	103	2.2	3.55	0.35	0.35, 1.98	0.0055
	Injured	103	1.0	2.25	0.22		

Appendix 9:

Audit of Sport Injuries Clinic *(non-injured athlete)* "A"

There are various systems in local areas to provide health care access. We are interested in the experience of coaches and athletes in regard to the treatment of sports injuries. We should be grateful if you would complete the undernoted form, if you sustained an injury now.

Club name:.....

1. Who would you first attend?

(a) First Aider.
(b) Accident Department in hospital.
(c) Physiotherapist.
(d) Sports injury clinic.
(e) General practitioner.
(f) Other, specify.....

2. What investigations should be available?

(a) Clinical examination.
(b) M.R.I. scans.
(c) X-ray examination.
(d) Standard ultrasound.
(e) Other, specify. .....

3. Are you aware of the existence of a Specialist Sports Injuries Centre in your area?
(a) Yes (b) N0

4. If you are aware of the clinic, what is the reputation of these facilities?
Comments:.....
.....

- If a Sports Injuries Clinic was being set up in your area, what factors would influence you to use it?

5. How far would you be willing to travel?

(a) 0 – 3 mile.
(b) 3 – 10 mile.
(c) More than 10 mile.

6. Do you have your own transport? (a) Yes (b) No

7. What facilities would be essential?

(a) Availability of a doctor.
(b) Availability of a physiotherapist.
(c) Availability of the investigation techniques.
(d) Comments:
.....

8. If the clinic was convenient, would you be willing to pay for treatment? (a) Yes
(b) No

9. What would you be willing to pay?

(a) Up to £5 for assessment and treatment.
(b) £5-20 for assessment and treatment.
(c) Over £20 for a course of treatment.

10. What are your main needs for sports injury treatment to ensure a fast return to your sport?

What suggestions do you have?
.....
.....

Appendix 9 A:

Audit of Sport Injuries Clinic *(injured athlete)* "B"

There are various systems in local areas to provide health care access. We are interested in the experience of coaches and athletes in regard to the treatment of sports injuries. We should be grateful if you would complete the undernoted form.

Club name:.....

1. Have you sustained an injury during training or competition in the last year?
(a) Yes (b) No

2. If you had an injury, did you attend anyone for treatment?
(a) Yes (b) No

3. Who did you first attend?
(a) First Aider. (b) Accident Department in hospital.
(c) Physiotherapist. (d) Sports injury clinic.
(e) General practitioner. (f) Other, specify.....

4. What investigations did you require?
(a) Clinical examination. (b) M.R.I. scans.
(c) X-ray examination. (d) Standard ultrasound.
(e) Other, specify: .....

5. After your experience, if you had another injury whom would you attend?
(a) First Aider. (b) Accident Department in hospital.
(c) Physiotherapist. (d) Sports injury clinic.
(e) General practitioner. (f) Other, specify.....

6. Are you aware of the existence of a Specialist Sports Injuries Centre in your area?
(a) Yes (b) No

- If you are aware, and have used this service, what was your experience?
  ....

(a) Who referred you to the Sports Injuries Centre?
(1) Self. (2) Physio. (3) Doctor. (4) Club representative .....

(b) How did you find out about the clinic?
(1) Referred by GP. (2) Sports injuries doctor.
(3) First aider. (4) Advertisement in club or sports centre.
(5) Word of mouth. (6) Physio.
(7) Other, specify:
.....

(C) Were you satisfied with the treatment & rehabilitation? (a) Yes (b) No
Specify: .....

7. If you are aware of the clinic and did not use this, why not?.....
.....

- If a Sports Injuries Clinic was being set up in your area, what factors would influence you to use it?

8. Convenient hours of opening:.....(**a**) Morning. (**b**) Afternoon. (**c**) Evening.

9. How far would you be willing to travel? (**a**) 0 – 3 mile (**b**) 3 – 10 mile (**c**) More than 10 m.

10. What facilities would be essential? (**a**) Availability of a doctor.
(**b**) Availability of a physiotherapist.
(**c**) Availability of all investigation techniques.
(**d**) Comments: .....

11. If the clinic was convenient, would you be willing to pay for treatment?
(**a**) Yes (**b**) No

12. What would you be willing to pay? (**a**) Up to £5 for assessment and treatment.
(**b**) £5-20 for assessment and treatment.
(**c**) Over £20 for a course of treatment.

Appendix 10: The 38 Scottish athletic clubs

No.	Club name	Address
1.	Arbroath Footers Running Club	10 Douglas Avenue, Arbroath, Angus, DD11 4JQ
2.	Athletic Club Eyemouth	7 Saint Clairs, Eyemouth, Berwickshire, TD14 5AJ
3.	Ayr Seaforth AAC	4 Blackburn Drive, Ayr, KA7 2XW
4.	Ayrodynamic triathlon Club	10 Gailes Road, Barrassie, Troon, KA10 6TA
5.	Badenoch AAA	70 Clune Terrace, Newtonmore, Inverness-shire, PH20 1DY
6.	Dumfries Running Club	2 Corberry Avenue, Dumfries, DG2 7QQ
7.	Dunbartonshire AAA	13 Kintyre Gardens, Kirkintilloch, G66 2PJ
8.	Dundee Road Runners AC	17 Riverside Place, Dundee, DD2 1QE
9.	Edinburgh University Hare & Hounds	38/2 Malbet Park, Lasswade Road, Edinburgh, EH16 6SY
10.	Elgin AAC	9 Elsher Road, Lhanbryde, Elgin, IV30 3QJ
11.	Ellon AAC	First Cottage, Milton of Ardiethen, Ellon, Aberdeenshire, AB41 8PE
12.	Ferranti AAC	23 West Field Road, Edinburgh, EH15 1RS
13.	Forfar Road Runners	30 Prior Road, Forfar, Angus, DD8 3DQ
14.	Fraserburgh Running Club	6 St. Magnus Road, Sandhaven by Fraserburgh, Aberdeenshire, AB43 7EG
15.	Gala Harriers	52 Church Square, Galashiels, TD1 3JJ
16.	Galloway Harriers AAC	High Currochtrie, Drummore, Dumfries & Galloway, DG9 9HE
17.	Gates (P.T.R.C.)	18 Undercraigs Road, Calside, Dumfries, DG1 4YA
18.	Harmeny Athletic Club	5 Highlea Grove, Balerno, Midlothian, Edinburgh, EH14 7HQ
19.	Helensburgh AAC	Helensburgh, 83 E, Princes St.
20.	Inverness Harriers AAC	57 Towerhill Crescent, Inverness, IV2 5GZ
21.	Irvine Athletic Club	High Smithstown, Kilwinning, Ayrshire, KA13 6RG
22.	Larkhall YMCA Harriers	12 Lismore Ave, Motherwell, ML1 3RA

23.	Law & District AAC	12 Lismore Avenue Motherwell, ML1 3RA
24.	Liz McColgan Racing Club	Liz McColgan Health & Physiotherapy Centre, Panbride House, Carnoustie, Angus, DD7 6JR
25.	Lomond Hill Runners AAC	36 Main Street, Kingskettle, Fife, KY15 7PN
26.	Maryhill Harriers	62 Wyndford Road, Maryhill, Glasgow, G20 8ES
27.	Red Star AC	4 Balmoral Drive, Cambuslang, Glasgow, G72 8BG
28.	Ronhill Cambuslang	17 Gloucester Avenue, Burnside, Rutherglen, G73 5AT
29.	Shettleston Harriers	24 Strowan Crescent, Sandyhills, Glasgow, G32
30.	South Lanarkshire Council	Council Athletics Squad, Atholl House, South Lanarkshire Council, East Kilbride, G74 1LU
31.	Springburn Harriers	17 Colston Drive, Bishopbriggs, Glasgow, G64 2AZ
32.	Sri Chinmoy AC (Scotland)	48 Silverknowes Crescent, Edinburgh, EH4 5JB
33.	Standard Life AC	Marketing Operations, 30 Lothian road, Edinburgh, EH1 20H
34.	Stewartry Athletic Club	Howgate, Carmichael, Biggar, Lanarkshire, ML12 6HQ
35.	Strathaven Striders	3 South Field Cres, Strathaven, Lanarkshire, ML10 6EZ
36.	Strathclyde Fire Brigade AC	16 Springhill Road, Garrowhill, Glasgow, G69 6HH
37.	Stromness Athletic Club	8 Quilco, Dounby, Orkney, KW17 2HW
38.	Troon Tortoises AC	6 Solway Place, Troon, KA10 7EJ

Appendix 11: Proportion of injured & non-injured questionnaires received from responding Scottish athletics clubs

No	Club name	Form **A**	Form **B**	Total	Area	
1	Arbroath Footers Running Club	1	1	**2**	Arbroath	34
2	Athletic Club Eyemouth	6	3	**9**	Eyemouth	21
3	Ayr Seaforth AAC	8	5	**13**	Ayr	174
4	Ferranti AAC	0	1	**1**	Edinburgh	16
5	Forfar Road Runners	5	5	**10**	Forfar	18
6	Galloway Harriers AAC	4	1	**5**	Dumfries	10
7	Gates Power Transmission Running Club	7	10	**17**	Dumfries	- - -
8	Harmeny Athletic Club	0	1	**1**	Edinburgh	50
9	Irvine Athletic Club	8	3	**11**	Kilwinning	94
10	Larkhall YMCA Harriers	7	8	**15**	Hamilton	58
11	Maryhill Harriers	4	4	**8**	Glasgow	40
12	Red Star AC	0	1	**1**	Glasgow	60
13	Ronhill Cambuslang	3	13	**16**	Glasgow	87
14	Shettleston Harriers	1	0	**1**	Glasgow	156
15	Standard Life AC	2	3	**5**	Edinburgh	32
16	Stewartry Athletic Club	10	3	**13**	Biggar	19
Total		**66**	**62**	**128**		**869**

Appendix 12: The 27 Scottish Sports Injuries Centres

1. **Aberdeen Sports Injury Clinic,** Aberdeen Racquets Club, Cranford Road, Aberdeen, AB10 7ND - Tel 01224 316502

2. **Angus Sports Medicine Centre,** Montrose Sports Centre, Marine Avenue, Montrose, DD10 8TR - Tel 01674 676211

3. **Ayr Sports Medicine Centre**, Ayr Hospital, Physiotherapy Department, Dalmellington Road, Ayr, KA 6DX - Tel 01292 610555 ext: 4233

4. **Barrhead Sports Medicine Centre**, Barrhead Sports Centre, Main Street, Barrhead, East Renfrewshire - Tel 0141 580 1175

5. **Bon-Accord Sports Medicine Centre**, Keith Park, Don Street, Aberdeen, AB2 1XR Tel 01224 488588

6. **Care for Sport Ltd**, 189 Bruntsfield Place, Edinburgh, EH10 4DQ Tel 0131 221 1044

7. **Cumbernauld Sports Medicine Centre**, Sport and Recreation Development Officer, Unit 5, Buchanan Business Park, Stepps, Glasgow, G33 6HR - Tel 01236 728138

8. **Dundee Sports Medicine Centre**, Physiotherapy Dept, Level 5, Ninewells Hospital, Dundee, DD1 9SY - Tel 01382 632924

9. **East Fife Sports Medicine Centre**, St Andrews Memorial Hospital, Abbey Walk, St Andrews, KY16 9LG - Tel 01334 462180

10. **Ellon Sports Medicine Centre**, The Meadows Clubhouse, Peterhead Road, AB41 9QN - Tel 01358 723704

11. **FASIC Crammond / FASIC Pleasance**, Centre for Sport and Exercise, The University of Edinburgh, 46 Pleasance Edinburgh, EH8 9TJ - Tel 0131 650 2578

12. **FASIC Meadowbank**, Meadowbank Stadium, London Road, Edinburgh , EH7 6AE Tel 0131 650 2578

13. **Glasgow Caledonian University Sports Med**, Occupational Health & Welfare Unit, City Campus, Glasgow Caledonian University, Cowcaddens Road, Glasgow Tel0141 3313704

14. **Glasgow Sports Medicine Centre**, Community Recreation Manager, Kelvin Hall, International Sports Arena, 1443 Argyle Street, Glasgow, G3 8AW Tel 0141 357 2525

15. **Sportscotland National Centre Glenmore Lodge** , Sports Medicine Centre, Gordon Turner, Co-ordinator, Aviemore, PH22 1QU - Tel 01479 861256

16. **Grampian Sports Injury Clinic**, Craigton Road Practice, 25 Craigton Road, Aberdeen, AB15 7US - Tel 01224 209877

17. **Heriot-Watt Sports Medicine Clinic**, Heriot-Watt University, Centre for Sport and Exercise, Edinburgh, EH14 4AS - Tel 0131 449 4118

18. **Sport**scotland **National Centre Inverclyde**, Sports Medicine Centre, Margarete Paschke, Co-ordinator, Burnside Road, Largs , KA30 8RW - Tel 01475 674666

19. **Inverurie Sports Medicine Centre**, Education and Recreation Department, Gordon House, Blackhall Road, Inverurie, AB51 3WA - Tel 01467 620981

20. **Kilmarnock Sports Medicine Centre**, Leisure Services, East Ayrshire Council, Community Services Department, Recreation Section, John Finnie Street, Kilmarnock, KA1 1BS - Tel01563 576000

21. **Moray Sports Medicine Centre**, Physiotherapy Department, Dr Gray's Hospital Elgin, IV30 1SM - Tel 01343 543131 ext 77431

22. **Murrayfield Sports Medicine Centre**, Physiotherapy Manager, BUPA , Murrayfield Hospital , 122 Corstorphine Road, Edinburgh, EH12 6UD - Tel 0131 316 2526

23. **Nairn Sports Medicine Centre**, Nairn Sports Club, ViewfieldNairn, IV12 4HW Tel 01667 454523

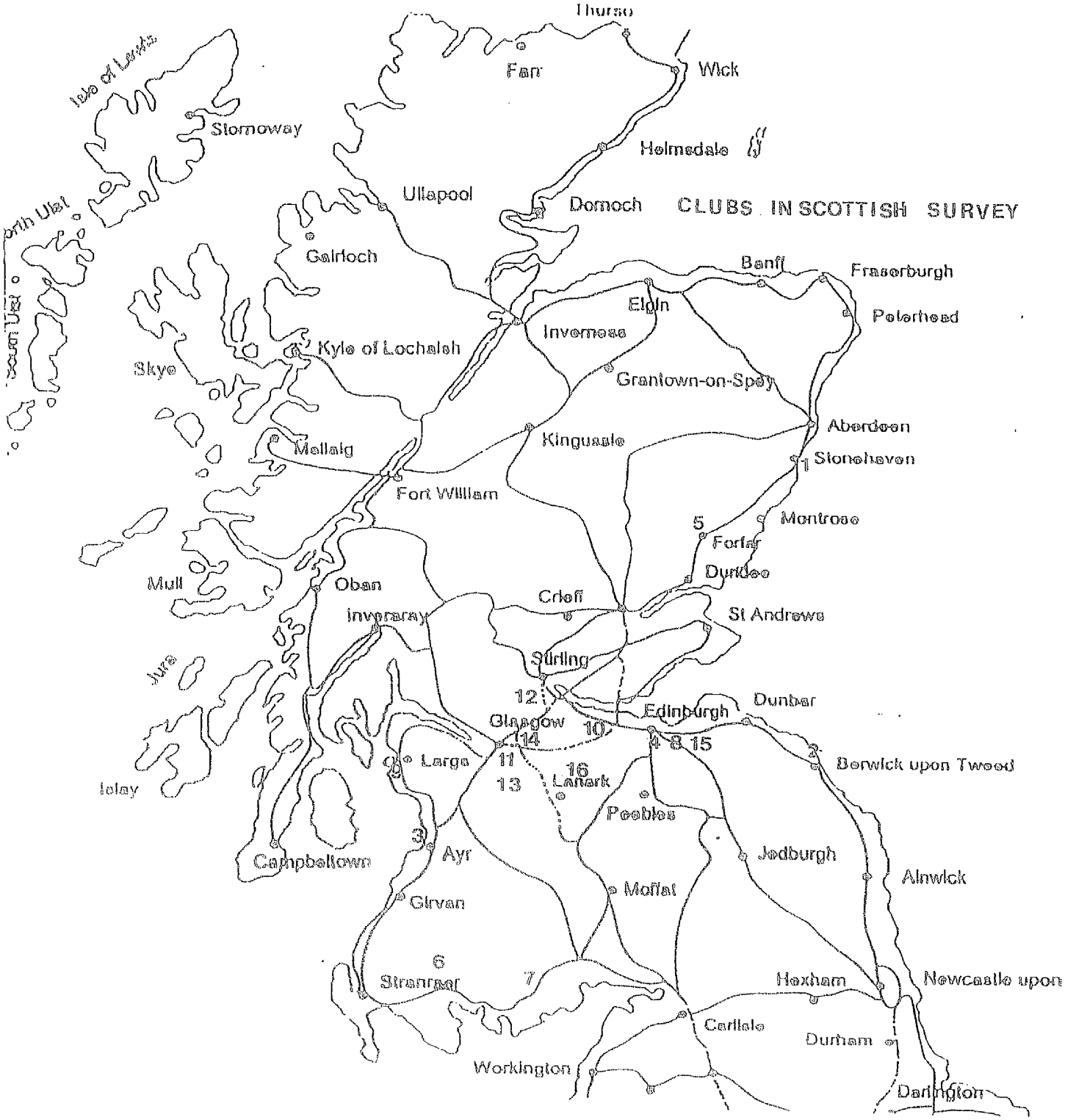
24. **Ross Hall Sports Medicine Centre**, Physiotherapy Department, Ross Hall Hospital, 221 Crookston Road, Glasgow, G52 3NQ - Tel 0141 801 3151 ext 428

25. **St John's Sports Medicine Centre**, West Lothian NHS Trust, St John's Hospital at, Howden, Howden Road, WestLivingston, EH54 6PP Tel01506 419666 ext 2299

26. **Stirling Sports Medicine Centre**, Sports Development Team, Stirling Council, 13 Corn Exchange Road, Stirling, FK8 2HX - Tel 01786 432267

27. **Strathclyde University Sports Medicine Centre**, Jordanhill Campus, 76 Southbrae Drive, Glasgow, G13 1PP - Tel 0141 950 3711

Appendix 13: Clubs in Scottish Survey



Appendix 14: Sports Injuries Clinics

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