ORIGINAL ARTICLE

Severe soccer injuries in amateurs

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Objectives: To ascertain the number and type of severe soccer injuries admitted to King Edward Hospital in South Africa over 42 months.

Methods: This was a retrospective study of all patients admitted for treatment or observation to the orthopaedic unit only. Patients treated as outpatients, irrespective of severity, are also presented for comparison.

Results: Thirty two patients were admitted with severe injuries. The injuries included 18 fractures of the tibial and femoral shaft. Two tibial shaft fractures were compound. Four tibial plateau fractures and five epiphyseal injuries were identified. One patient had a fracture-dislocation of the hip. One patient with a popliteal artery injury presented 48 hours after the injury had occurred. He had an above knee amputation. In the same period 122 patients were treated as outpatients. The types of injury in this group were similar to soccer injuries reported in other countries.

Conclusions: Very serious injuries are sustained by casual soccer players in South Africa. Urgent measures need to be taken to prevent such injuries.

Soccer related injuries are common in amateurs, and a wide variety of injuries can be sustained. These range from minor sprains and fractures, to serious head, eye, and neck injuries.^{1–4} Soft tissue injuries of the knee and ankle are particularly common and have been well documented in the many studies from the developed world.^{2,5} Long bone fractures have been reported but are not common.¹

This study was undertaken to determine the type and number of severe injuries treated in our institution.

METHODS

This is a retrospective study on all soccer injuries admitted to the orthopaedic unit at King Edward VIII Hospital from January 1999 to August 2002. The study material was extracted from the available inpatient hospital notes. Two of the patients (one with a hip and the other with a knee dislocation) were current patients.

Thirty two patients were admitted with severe soccer related skeletal injuries of the lower limb during this period. There were 12 femoral, 15 tibial, and two ankle fractures. One patient had a fracture-dislocation of the hip. Two patients had knee injuries without fractures. One of these patients had an associated vascular injury. The age ranged from 14 to 41 years (mean 22).

In the same period, 122 soccer injuries were treated on an outpatient basis. Soft tissue injuries of the knees and ankles, as well as minor fractures, were commonly encountered. (table 1).

RESULTS

There were 12 femoral fractures. Nine of these were fractures of the femoral shaft and three were fractures involving the distal epiphyseal growth plate (Salter-Harris type II). The right femoral shaft was fractured in five patients, and the left in four patients. These fractures involved the distal one third of the shaft and were either transverse or short oblique in configuration.

There were 15 tibial fractures. Nine were of the tibial shaft, two of which were compound. They were also transverse or short oblique type (fig 1). Four patients had tibial plateau fractures. Three were depressed and displaced. One patient had a Salter-Harris type II fracture of the proximal tibial

Table 1 Soccer injuries treated in the outpatient department from January 1999 to August 2002

Diagnosis	No of patients
Soft tissue knee injury	35
Soft tissue ankle injury	37
Fracture malleolus ankle	9
Soft tissue thigh/hip injury	11
Soft tissue leg injury	13
Dislocation interphalangeal joint big toe	1
Fracture terminal phalanx big toe	3
Soft tissue elbow injury	8
Fracture distal humerus (undisplaced)	1
Fracture distal radius	4
Total	122

Figure 1 Typical tibial shaft fracture.

epiphysis. One had a Salter-Harris type II fracture of distal tibial epiphysis.

Two patients had ankle fractures. One fracture was a Weber C type and the other was a Weber B.

One patient had sustained a fracture-dislocation of the hip (fig 2). Another had received a knee injury while playing soccer; he had delayed presentation for 48 hours. On examination the knee was found to be swollen, and distal limb pulses were absent. The radiograph was normal but a femoral angiogram confirmed occlusion of the popliteal artery (figs 3 and 4). It was presumed that he had a dislocation with spontaneous relocation. The other patient with a knee injury had a torn medial collateral ligament (table 2).

Figure 2 Posterior fracture-dislocation of hip.

Figure 3 Knee radiograph.

Figure 4 Angiogram showing popliteal artery occlusion.

Table 2 Fracture site	
Anatomical site	Number
Femur shaft	9
Growth plate distal femur	3
Tibial shaft	9
Tibial plateau	4
Growth plate proximal tibia	1
Growth plate distal tibia	1
Ankle fractures	2
Hip fracture-dislocation	1
Total	30

There were no professional soccer players in our group. All were amateurs playing in local clubs. All injuries occurred during a game at community level. The games were classed as “friendly” or local club level “competition”. All injuries were the result of contact, and most (75%) were the result of an aggressive tackle.

The players were categorised into four age groups: 19 were below the age of 20; seven were 21–30; four were 31–40; two were above 40.

Of the 19 under the age of 20, 14 had fractures of the shaft of either the femur or tibia. Three of the four tibial plateau fractures occurred in players in the 31–40 year old age group. The fracture-dislocation of the hip and one femoral shaft fracture occurred in players above the age of 41 (table 3). The patient with the knee dislocation and vascular injury was 22 years old.

All femoral shaft and four tibial shaft fractures were treated with an intramedullary nail (fig 5). One compound fracture of the tibia was treated with an external fixator. The three growth plate injuries of the distal femur and the single

Table 3 Fracture site in relation to age									
Age (years)	Femur shaft	Growth plate distal femur	Tibial shaft	Tibial plateau	Growth plate proximal tibia	Growth plate distal tibia	Ankle	Knee	Hip
0–20	7	3	7		1	1			
21–30			2	1			2	2	
31–40	1			3					
>40	1								1

Figure 5 Femoral fracture with an intramedullary rod.

growth plate injury of the proximal tibia were treated by K wire fixation and plaster of Paris cast.

Three tibial plateau fractures were treated with percutaneous screw fixation. Two of these required bone grafting. One undisplaced tibial plateau fracture was treated non-surgically with a plaster of Paris cast. The two ankle fractures were treated with open reduction and internal fixation. The growth plate injury of the distal tibia was treated with K wire fixation and a plaster of Paris cast. The fracture-dislocation of the hip was initially manipulated and reduced. A computed tomography scan showed a very comminuted fracture of the posterior acetabular wall. The hip was stable on examination under anaesthetic, and the patient was treated non-operatively in traction for 12 weeks.

The presumed dislocation of the knee and associated vascular injury had a reversed saphenous vein graft initially. This failed and the patient had an above knee amputation.

The latter two patients were still in the ward and in fact prompted the study.

DISCUSSION

The severity of a soccer related injury has been measured in previous studies using the length of absence from the game or training as the reference criteria.^{2 6 7} Injuries were also classified into mild, moderate, and severe. For mild injuries the players were absent from the game or training for one week. For moderate injuries the symptoms lasted 2–4 weeks, and absence from the game or training was less than four weeks. For severe injuries the symptoms lasted for more than four weeks or absence from competition or training was for four or more weeks. These are associated with serious damage to the musculoskeletal system, such as fracture or dislocation of joints, or serious damage to the visceral system. By this definition, all injuries in this study group were classified as severe. None of the players would have been able to return to training or actively participate in a game before 8–12 weeks.

Risk factors of soccer injury have been identified as personal (intrinsic) and/or environmental (extrinsic).² Personal risk factors include physical and psychological characteristics of the individual—for example, ligamentous laxity, pre-existing pathological condition of musculoskeletal system, previous injuries, and inadequate rehabilitation. Environmental factors include condition of playing field (uneven, dry, wet), equipment (skin guard, shoes, etc), rules of the game, and foul play. Players with previous injuries and incomplete rehabilitation have a higher incidence of injury.

No major intrinsic risk factors were identified in the inpatient notes. Extrinsic factors appear to be important factors in this patient group. The single patient with a fracture-dislocation of the hip was running and “hit a high ground” unexpectedly and sustained his injury. We were able to confirm that, at least in the case of this patient, the playing field was not level. Injuries sustained during a direct tackle predominate, especially shaft and epiphyseal injuries. The fact that 75% of the shaft fractures were related to a direct tackle is disturbing. Uncontrolled aggression on the field and poor football skills appear to be important factors. We therefore conclude that the most important factors contributing to severe injuries in South African community soccer players are psychological attitude to the game and opponents, foul play, poor training, and poor physical facilities such as the playing surface.

Correlation of skill level with incidence of injury has yielded different results in previous studies.^{8–10} Inklaar *et al*⁸ reported a significantly higher incidence of injury in the high level player, whereas Blaser and Aeschlmann⁹ reported a higher incidence in the low level players. Poulsen *et al*¹⁰ found no difference in incidence related to skill level. In our study all players were amateur or played in local clubs. We do not have injury statistics for professional footballers in South Africa. However, severe injuries in professional players, especially major fractures, would be public knowledge in this soccer loving community. This has not been evident.

The incidence of injury has been shown to be higher in younger players, especially below the age of 16. Players over 18 have fewer injuries.² Our results show a significantly higher incidence of injuries in players below the age of 17. Almost 60% of injuries were to players below the age of 20. Five of 32 injuries were to the growth plate of the femur or tibia.

Soccer injuries may be traumatic or from overuse. Most (up to 75%) are traumatic. All injuries in this study were traumatic. The severity of injuries undoubtedly reflects the aggressiveness of the player. More than 75% of players claimed that they were subject to foul play or were badly tackled.

Previous authors have shown that injuries of the knee and ankle are the most common soccer injuries.² Most knee and ankle injuries including many fractures are treated non-operatively in our hospital and the patients were not admitted. The review of the outpatient records confirms that we also have a large volume of predominantly knee and ankle soft tissue injuries. One patient with knee injury was admitted because of a vascular problem and presented 48 hours after the injury. The second patient with a knee injury had a severe medial collateral injury. There are probably many more severe ligamentous injuries that are treated conservatively as outpatients. Undoubtedly we have a higher than average number of severe skeletal trauma.

Chomiak *et al*¹ reported 113 (16.5%) severe injuries out of 686 injuries. They did not report any long bone fractures. We are reporting 32 severe injuries, with 18 long bone fractures. Two of the tibial fractures were open. We are also reporting a case of an above knee amputation after a popliteal artery occlusion presenting 48 hours after a soccer injury. A case of fracture-dislocation of the hip is also presented.

CONCLUSION

This study has shown that very serious injuries are being sustained in amateur soccer players in South Africa. A prospective study of all soccer related injuries is necessary to determine the true extent of the problem. Intrinsic and extrinsic risk factors must be evaluated, as the severity of the injuries is unacceptable. Severe skeletal trauma as reported

Take home message

Lower limb fractures are common in South African amateur soccer players.

here is unacceptable in any society, and measures to eliminate such injuries must be initiated as soon as possible. Proper education and training, awareness of the rules of the game, fair play, improvement of skills, and the provision of suitable playing fields may reduce the incidence of such severe injuries.

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