

Sports related fractures: A review of 113 cases

Wan Hazmy Che Hon and Shong Hing Kock

Department of Orthopaedic & Traumatology, Seremban Hospital, Malaysia

ABSTRACT

To establish a profile of fractures related to sporting activities, to determine the extent to which these injuries resulted in morbidity, and to find suitable target areas for injury prevention, a one-year study was undertaken at Seremban Hospital, Negeri Sembilan, Malaysia, from July 15, 1998 to July 14, 1999. All patients presenting to the Department of Orthopaedic & Traumatology with fractures sustained during sporting activities were enrolled. Fractures related to sporting activities are increasing and an entity to be recognized despite the good function outcome of the treatment. Suitable target areas for injury prevention were found to be football (for males), netball (for females), the second decade of life and competitive sporting events.

Key words: fracture, sports, football

study in order to establish a profile of fractures related to sporting activities, to determine the extent to which these injuries resulted in morbidity and to identify suitable target areas for injury prevention.

MATERIALS AND METHODS

This was a one-year prospective observational study done at the Seremban Hospital, a level 1 hospital in Negeri Sembilan, Malaysia. All patients presenting to the Department of Orthopaedic & Traumatology between July 15, 1998 and July 14, 1999 with fractures sustained during sporting activities were enrolled, in total 113. These included both competitive and non-competitive (recreational) sporting activities.

Following appropriate initial management of the fractures, the patients were given a questionnaire in order to identify the demographic characteristics of the patients and the types and levels of sporting activities. We have divided the sporting activities into two levels, competitive and non-competitive (recreational). The competitive sports are played either by professionals or by amateurs at schools, colleges or local clubs. The non-competitive sports are also divided into two groups: regular players and weekend players.

The injuries were classified into contact or non-contact injuries. Contact injuries were defined as injuries sustained following collision with other players or caused by sporting equipment, for example, being hit by a hockey stick or collision with the goalpost. Non-contact injuries were mainly due to falls. Further information, for example, of fracture

INTRODUCTION

Injuries sustained during sporting activities are common, the majority being soft-tissue injuries involving ligaments, tendons or muscles. However, with increasing competitiveness in sports even at the recreational level, there are increasing numbers of sports-related fractures noted. We have conducted this

characteristics, whether closed or open fractures, and the clinical diagnosis, was taken, and associated injuries were also noted.

Management of the fractures does not differ from other trauma cases. Surgical treatment was indicated in cases of open fractures, articular disruption and failure of conservative treatment. Patients were followed-up until discharge from the Orthopaedic Sports Clinic. The healing process was monitored by subsequent radiograph and clinical assessment. Any complication was recorded. On the last consultation, the functional status of the patient was assessed based on clinical assessment and return to the pre-morbid sporting activities.

RESULTS

Of the 113 cases enrolled in the study, males sustained 92% of the fractures, and 62.5% of these occurred during football games. Netball caused 33.3% of the female fractures. The median age was 18 years (range 7 to 59) with 70% of the patients in the second decade of life. Malays constituted 62% of the study population followed by Indians (18.6%), Chinese (14.1%) and other ethnic groups (5.3%).

Football contributed 57.5% of the fractures followed by basketball (5.3%) and high jump (4.4%) (Table 1). Sixty-nine cases (61%) occurred during competitive sports and this mainly involving amateur

Table 1
Distribution of patients with sports-related fractures

Type of sports	Number of patients
Football	65
Basketball	6
High Jump	5
Rugby	4
Martial Arts	4
Takraw	3
Hockey	3
Athletics	3
Volleyball	3
Netball	3
Skateboarding	3
Motorcross	2
Cycling	2
Jet-skiing	2
Roller-skating	1
Tennis	1
Diving	1
Gymnastics	1
Fishing	1
Total	113

players (98.6%). Only one professional player sustained a fracture during this study. Out of the 44 patients who sustained fractures during recreational sporting activities, 84% were regular players while another 16% were weekend players.

Fifty-seven fractures (50.4%) were due to contact injuries. Of these, 54.4% were caused by collision with other players, while 45.6% were injured by related sporting equipment. Non-contact injuries occurred in 56 of the cases (49.6%).

There were 96.5% closed fractures. Only 4 patients had an open fracture, 2 during football and one each during running and jet-skiing. Seventy-six fractures (67.3%) involved the upper limbs with isolated radius fractures constituting 34.2% of the cases followed by fractures of both radius and ulna (16.8%) and humeral fracture (18.4%).

Fractures of the lower limb occurred in 29.2%, mainly involving the tibia alone (42.4%) and both the tibia and fibula (24.2%) (Table 2). Three cases involved the spine while one had an acetabular fracture. Only four cases were associated with other injuries.

Table 2
Anatomical distribution of fracture sites

Upper limb	
Radius alone	26
Radius and ulna	19
Humerus	14
Ulna alone	6
Phalanges	7
Metacarpal	2
Clavicle	1
Scapula	1
Lower limb	
Tibia alone	14
Tibia and fibula	8
Fibula alone	4
Femur	2
Patella	1
Calcaneum	1
Talus	1
Metatarsal	1
Phalanges	1
Others	
Spine	3
Pelvic	1

Ninety fractures (79.6%) were treated conservatively while 23 patients needed operative management. There was straightforward healing in 85% of the fractures. Seventeen cases were complicated by malunion (17.6%), delayed union (17.6%), stiffness of the adjacent joint (52.9%) and chronic limb pain

(11.9%). The mean hospital stay was 3.6 days (range 2 to 14 days). The mean period of follow-up was 13.3 weeks (range 6 to 32 weeks).

On the last follow-up it was found that 90 (79.6%) of the patients were back to their pre-injury sporting level. Twenty-three patients had residual disabilities, which prevented them from performing to their pre-morbid activity level. Residual disabilities were seen in 43.5% of the patient treated surgically, compared to only 14.4% in patients treated conservatively. The main components of the residual disabilities were stiffness of the adjacent joint (52.1%) and recurrent pain (43.5%). One patient had loss of one phalanx of the finger.

DISCUSSION

The increasing awareness of the value of regular exercise has resulted in millions of individuals participating in sporting activities. The tremendous development of sports has led to an increasing number of sports-related injuries. Even though soft-tissue injuries constitute the major component of the injuries (80% according to Mc Latchie, 1982), some sports have a higher vulnerability for fractures. Some (Choyce MQ et al. 1998) found that fractures constituted 68% of the sports hand injuries admitted to the Accident and Emergency Departments. Others (Emshoff R et al. 1997) found that sports were the most common cause of mandibular fractures, accounting for 31.5% of the entire sample in their study, followed by road traffic accidents (27.2%) and falls (20.8%). The major causative factor in sports-related mandibular fractures was skiing (55.3%) whereas cycling and soccer accounted for 25.4% and 8.9% respectively. Our study highlighted the fact that fractures during sporting activities are not uncommon in Malaysia. As it is fully understood that football and netball are the most commonly played sports, the intensity of fracture occurrences (62.5% in football for males and 33.3% in netball for females) needs further attention. Furthermore, 70% of the cases occurred in the second decade of life, which is an important age group as far as further planning and development of sports in this country is concerned.

As world records continue to be broken and competition assumes ever-increasing intensity, athletes both at the competitive and recreational levels push themselves to the limits of their endurance and performance parameters. This situation may lead to many injuries in elite athletes. This was also obvious in our study where 61% of the fractures occurred

during competitive sports, mainly involving amateur players. It should be noted that we do not directly manage professional players since most of them are referred either to private hospitals or to the National Sports Center. Contrary to common belief, weekend players constitute only 16% of fractures sustained during recreational sporting activities.

Detailed analysis and knowledge of the mechanisms of injury allow an understanding of the injury patterns and factors that lead to the risk of fractures. Among the common mechanism of injuries are overuse injuries, collision with other players, collision with objects, infringement of rules, dangerous techniques and vehicular accidents. In ice hockey, for instance, more than 80% of head and neck injuries are due to fighting and high-sticking. This source of injury is unacceptable and could be radically altered.

Some maneuvers used in sport may leave a specific body part vulnerable, such as the low tackle in football. This information enables coaching and medical staffs to modify training and competition situations in order to reduce the risk factors. In our study, we found almost equal risks of fractures due to contact and non-contact injuries. Even though the more disabling injuries caused by collisions and falls are often the most difficult to control by changes in rules or introduction of protective equipment, greater efforts must be taken to minimize the injuries.

The majority of our patients sustained closed fractures, which indicated the low velocity of the injury and explained the conservative management in 79.6% of the cases. The predisposition to radio-ulna and tibia-fibula fractures might need special consideration of the use of protective equipment. Even though there were only 4 cases of open fractures and 3 cases involving the spine, the possible morbidity following these injuries needs serious attention and preventive measurements.

The majority of our patients resumed their pre-injury activity level. The most common residual disabilities were joint stiffness and pain. Joint stiffness needs special consideration and signifies the importance of intensive physiotherapy and well-planned post-injury rehabilitation programs. On the other hand, reaction to pain is individualistic, and some athletes are stoic whereas others seem to feel the slightest change in their physiology. The former may hide their injury and their pain, and the latter may complain at the smallest setback. Functional assessment using both objective and functional tests plays an important role as a guide to safe re-integration of the athlete into training and competition.

CONCLUSION

Sports related fractures are increasing. Suitable target areas for injury prevention are football (for males), netball (for females), the second decade of life and

competitive sporting events. Medical input into rule changes, pressure to enforce existing regulations and further research into the injury profiles of different sports in order to develop preventive strategies are valuable contributions to make sports safer.

REFERENCES

1. **Choyce MQ, Potts M, Maitra AK.** A profile of sports hand injuries in an accident and emergency department. *J. Accident Emergency Med* 1998. Jan 15; 1:35–38.
2. **Emshoff R, Schoning H., Rothler G, Waldhart E.** Trends in the incidence and cause of sport related mandibular fractures: A retrospective analysis. *J. Oral Maxillofac Surg* 1997 Jun 55:6, 585–92.
3. **Mc Latchie GR.** Risk factors in sport. Proceedings of Royal Medico-Chirurgical Society. *Scottish Medical Journal* 1982, 27:189.
4. **Reid DC.** Sports injury assessment & rehabilitation. *Sports Medicine and Therapy*. 1st Edition 1992. Churchill Livingstone Publication:1–12.