Maxillofacial Injuries in Sports

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24.1 Introduction

Trauma due to sports can have a significant impact on unprotected sites of the body such as the maxillofacial region. The commonest sports related maxillofacial injuries are soft tissue lacerations followed by dentoalveolar fractures and minor facial bone fractures (Hill et al. 1998; Tuli et al. 2002). The most frequently recorded maxillofacial bone fractures involve the mandible, the zygomatic and nasal bone (Maladiere et al. 2001).

According to different reports, sports-related facial fractures account for 4%–18% of all sports injuries and 6%–33% of all facial bone fractures (Bayliss and Bedi 1996; Carroll et al. 1995; Mourouzis and Koumoura 2005). This variation in occurrence may reflect the geographic differences in the level of participation in sports activities and the type of popular sports. Which sport is responsible for the majority of injuries varies above all according to the popularity that each sporting activity has in a particular country (Cerulli et al. 2002; Flanders and Bhat 1995; Lim et al. 1993; Tanaka et al. 1996). The majority of facial fractures in Western countries today occur during team sports, such as soccer, basketball and rugby (Cerulli et al. 2002; Maladiere et al. 2001; Mourouzis and Koumoura 2005). Fractures of the maxillofacial region are more frequent in males and between the ages of 20 and 30 years, most likely reflecting the high levels of physical activity in this sex and age group (Mourouzis and Koumoura 2005). Sports are also a primary cause of maxillofacial fractures in the paediatric population, probably because of the learning stages of sports ability and the ignorance of the consequences of taking greater risks (Gassner et al. 2004). A recent study has shown that 26% of paediatric facial fractures were caused by bicycle accidents (Iida and Matsuya 2002).

Various sports committees have adopted specific guidelines for the prevention of dental and cranio-maxillofacial injuries. Sports such as hockey and American football have adopted full facial and cranial protective headgear. Evolution of these protective devices has significantly reduced many types of head and neck injuries in these sports (Greenberg and Haug 2005). Nevertheless, there are an increasing number of people who are engaged in sporting activities and new, high-velocity vehicular and high
altitude activities are introduced. Moreover, amateur athletes often do not use any protective clothing or equipment in sports in which the use of protective gear is recommended.

## 24.2
**Correlation Between Injury Type and Injury Mechanism Among Sports**

There have been few studies that have been directed toward the biomechanics of maxillofacial injuries associated with sports. Perhaps the difficulty of engaging in such a study is the large variety of sports activities that are available today, ranging from those with minimal interpersonal contact to those with high-energy contact. In addition, comparative analysis of these studies is hampered by varied selection criteria and the use of retrospective non-consecutive data.

### 24.2.1
**Dentoalveolar Fractures**

In dentoalveolar fractures, a high-velocity trauma, such as a baseball that takes a bad hop and strikes the maxillary incisors, is more likely to cause a tooth fracture, whereas a low velocity trauma is expected to cause a displacement injury (e.g., an avulsion). Children with a type 2 malocclusion (so-called retrognathism or overbite) in particular will be prone to sports-related dentoalveolar injuries of the upper incisors.

Another mechanism, indirect trauma, occurs when the mandible whiplashes into collision with the maxilla. This trauma can occur from a blow to the chin, such as an uppercut in boxing, a football tackle, or a hockey stick. The concussion is capable of shattering posterior teeth.

Enamel infraction can be caused by acute or chronic trauma such as grinding or clenching (e.g., weightlifting) (Kurtz et al. 2005).

### 24.2.2
**Facial Bone Fractures**

Sporting activities can be grouped into different categories in order to understand better the injury mechanism in sports related facial bone fractures:

- **Team sports**: soccer, rugby, basketball, football, handball
- **Vehicular sports**: bicycling, mountainbiking,