

SPORTS-RELATED MAXILLOFACIAL INJURIES – A RETROSPECTIVE STUDY OF 51 CASES

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Abstract

Introduction and the aim of the study: Among all the causes of maxillofacial injuries, injuries sustained during sports account for 5.6% to 33.1% of cases. Although sports related injury patterns have been extensively reported, studies dealing exclusively with craniomaxillofacial trauma are still rare.

The aim of the study is to assess the incidence, aetiology and spectrum of maxillofacial injuries sustained during sports.

Material and Methods: A retrospective analysis of 51 case histories of the patients with sports-related maxillofacial injuries treated at the Department of Maxillofacial Surgery of the Medical University of Lublin between January 2007 and December 2009 was done.

Results: Between 2007 and 2009 year 808 maxillofacial fractures were treated at the Department of Maxillofacial Surgery. Of these 6.31% were sports-related. The highest incidence of sports-related maxillofacial injuries was found in the 21-30 years men group. The majority of accidents occurred during cycling, followed by football, skiing and horse riding. The injuries involved mainly mandible followed by middle third of the face.

Conclusions: The results of the study indicate an increase in the total incidence of sports-related maxillofacial injuries in the recent years. These are mainly multiple injuries, which require hospitalisation and surgical intervention. It should be put a stress on the importance of preventive measures like mouth guards and helmets with face protectors to reduce risk of maxillofacial injuries sustained during sports.

Key words: sport, maxillofacial injuries, mouth protectors

Introduction

Annually, 75 million people from all over the world sustain different kinds of injuries. As a result of that 10% of them die or get permanent disability [1]. Injury is the major cause of death among Americans up to 44 years of age. Each year they are responsible for more than 150 000 deaths and 80 000 disabilities and account for more than 12% of short-term hospital stays in the United States. The physical and economic impacts of injuries are enormous, making injuries and their control a major health problem in the United States. Facial trauma, a major contributor to this health problem, frequently results from either automobile accidents or assaults. However, contact sports also play a major role in rising incidence of orofacial injuries [2]. Appearing of new kinds of sports, mass participation in sports, growing popularity of extreme and high-risk sports and intensification of a professional sport result in an increase of multiple injuries, including also trauma of craniofacial region [3-13]. Among all the causes of maxillofacial fractures, injuries sustained during sports account for 5.6% to 33.1% of cases [1-23]. Statistically, the highest risk of sustaining

facial trauma is recorded in football, cycling, skiing, then boxing, hockey and basketball [2]. According to different authors maxillofacial injuries account for 4–18% of all sports-related injuries. Statistically, they involve mainly mandible followed by zygomatic bone with zygomatic arch, alveolar arch, nasal bone and orbital walls [12]. Teeth injuries are seen in over 50% of cases of sports-related maxillofacial injuries and are the most common orofacial trauma sustained during sport training [13]. The anatomy of head and its localization make it especially exposed to all kinds of trauma. Therefore, the most important issue in preventing sports-related craniofacial injuries is using basic preventive measures like helmets and mouth protectors.

Aim of the study

The aim of the study was to assess the incidence, aetiology and spectrum of maxillofacial injuries sustained during sports treated at the Department of Maxillofacial Surgery of the Medical University of Lublin between 2007 and 2009, as well as to suggest protective measures.

Material and Methods

A retrospective analysis of case histories of the patients with maxillofacial injuries sustained during sports treated at the Department of Maxillofacial Surgery of the Medical University of Lublin between January 2007 and December 2009 was done. Data relating to age, sex, type of sport, injury mechanism, trauma site, associated non-maxillofacial injuries and treatment method were collected.

Results

Between January 2007 and December 2009, 808 patients were hospitalized at the Department of Maxillofacial Surgery of the Medical University of Lublin as a result of maxillofacial injuries. Among them, 51 patients (6.31%) sustained maxillofacial injuries during participating in sports. As shown in table 1, the incidence of sports-related maxillofacial injuries

has been increasing since 2007 and reached the peak in 2009.

The study group comprises 39 males (76.47%) and 12 females (23.53%) and includes 5 children at the age under 18. The patients age ranges from 9 to 59 years and the mean age is 26.2 years. The highest incidence of sports injuries was noted among men in 20-29 years age group. Figure 1 presents the incidence of injuries in respective age categories.

The sport producing the greatest number of maxillofacial injuries was cycling (45%), followed by football (30%), roller skating (10%), skiing and snowboarding (5%), horse riding (5%) and basketball (3%) (figure 2). The principal causes of the injuries were falls (49%), direct bodily contact (31.37%) and impact of another player (19.6%). The highest incidence of sport injuries (45.1%) was registered during summer months when practicing sports is strongly intensified.

Table 1. *Characteristics of patients treated at the Department of Maxillofacial Surgery of the Medical University of Lublin between 2007 and 2009*

Year	2007	2008	2009	total
Total number of patients	832	873	926	2631
Number of patients with maxillofacial injuries	256	280	272	808
Number and percentage of patients with sports-related injuries	135.07%	176.07%	217.72%	516.31%

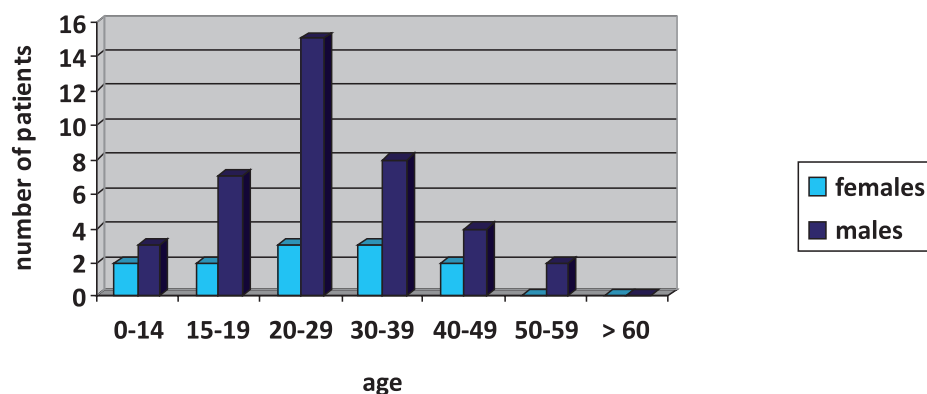


Fig. 1. Age structure of 51 patients with sports-related maxillofacial injuries

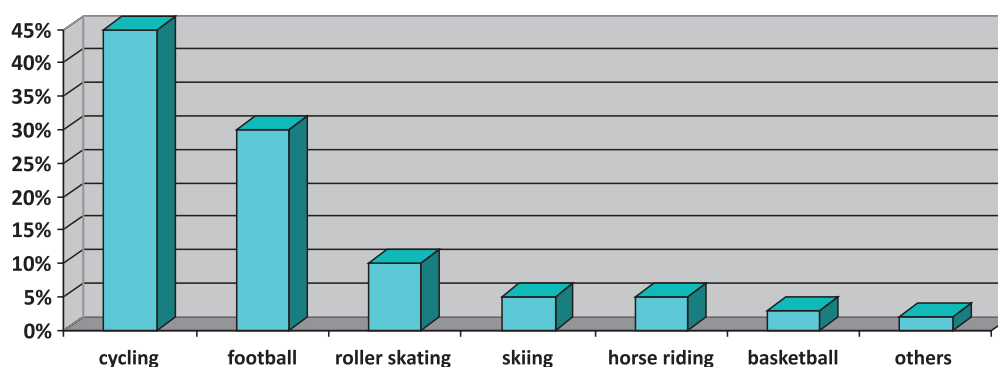


Fig. 2. Aetiology of maxillofacial injuries in 51 patients

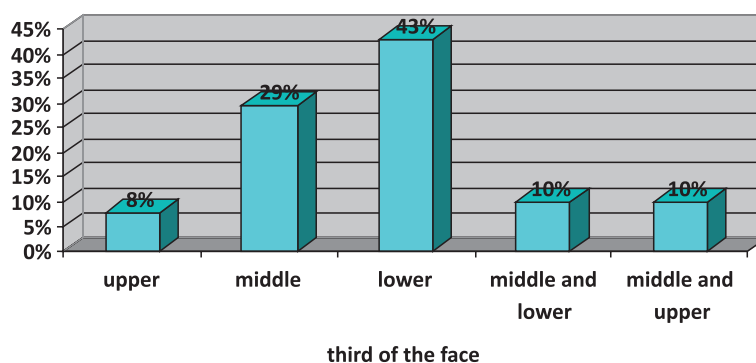


Fig. 3. Location of injuries in 51 patients

In all patients with sports injuries we noted the prevalence of fractures of facial skeleton. A total of 72 fractures were found in 51 patients. As shown in figure 3, injuries were located in the upper, middle and lower third of the face. Fractures of the lower third of the face were dominating. In the analysed material mandibular fractures were found in 27 patients (52.9%). The injuries involved mainly body of the mandible, then condyles, angle of the mandible and median (table 2). Fractures of the middle third of the face were registered in 25 patients (49%). The most affected site was maxillary-zygomatic-orbital complex, followed by zygoma, nasal bone and orbita. Le Fort fractures were found in 5 patients (table 3). Fractures of the upper third of the face were noted in 4 patients (7.8%) and fractures of the frontal bone and frontal sinus were seen predominantly.

The most common injuries other than maxillofacial fractures were: laceration of facial and intraoral soft tissues (88%), then teeth injuries (31.3%), cerebral injuries (19.6%), spine injuries (9.8%) and upper and lower extremities injuries (9.8%). Among teeth injuries

the most common were crown fractures (23.5%), followed by subluxations (3.9%) and luxations (3.9%). The average hospitalization period was 7 days. Surgical treatment by osteosynthesis with the use of mini and micro plates was applied in 71% of the patients.. Orthopaedic treatment with the use of intermaxillary tractions was applied in 24% of the patients. 5% of the patients were treated conservatively having had wounds dressed and fractured teeth restored.

Discussion with conclusions

We have noted that sports-related facial fractures accounted for 6.31% of all facial fractures in the three years period of time. This is comparable to other European countries where the incidence of sports-related facial fractures seems to vary from less than 1% to about 15% depending on geographical region and the socioeconomic status of the area [22]. The results of the study indicate an increase in the total incidence of sports-related maxillofacial fractures in the recent years. Studies conducted by Garlicki et al. and Garon et al. demonstrated that this may result from mass participation in sports as well as growing stress on the development of professional sport in the recent years [1, 15]. In our study injuries during cycling were noted predominantly, followed by injuries during football. Studies conducted by Iida et al. and Thoren et al. demonstrated that accidents during cycling are the leading cause of facial fractures among children. [17, 18]. Chan et al. reported that among all injuries sustained during cycling head injuries are dominating [19]. Whereas studies conducted by Mourouzis et al., Maladiere et al., Rocchia et al. oraz Carroll et al. indicate that the leading cause of facial fractures are injuries sustained in football [12, 20, 21, 24]. Research conducted by Exadaktylos demonstrates that the main cause of maxillofacial injuries are accidents during skiing and snowboarding [22]. As expected, the patients were predominantly men in 20-29 age group. Similar results were obtained by other authors [12, 16, 20, 21, 24]. The study demonstrates that the most common were mandibular fractures, followed by maxillary-zygomatic-orbital complex fractures, zygoma fractures,

Table 2. Location of 31 mandible fractures in 27 patients

	Number of patients (%)
Body of the mandible	14 (27.4%)
Angle of the mandible	6 (11.7%)
Collum /condyle	9 (17.6%)
Median	2 (3.9%)

Table 3. Location of 29 fractures of midface in 25 patients
Number of patients (%)

Maxillary-zygomatic-orbital complex	8 (15.7%)
Zygoma	6 (11.7%)
Nasal bone	5 (9.8%)
Orbita	5 (9.8%)
Le Fort I	2 (3.9%)
Le Fort II	2 (3.9%)
Le Fort III	1 (1.9%)

orbital and nasal fractures. Studies conducted by other authors indicate that sports injuries mainly involved mandible followed by zygoma and nasal bone [12, 20]. In our study teeth injuries were recorded in 31.3% cases of maxillofacial injuries. Research conducted by Camp et al. demonstrates that among all teeth injuries, from 13 to 39% are sports-related [23].

Orofacial injuries that occur during sports are largely preventable. According to the American Dental Association, the use of faceguards and mouth protectors prevent more than 200 000 orofacial injuries in football annually. The sports community has not fully accepted of an universal use of protective equipment and their acceptance in sports other than football, hockey and boxing has been slow [2]. In the sport like baseball, it is estimated that helmets with face guards may reduce the severity of nearly 4 000 facial injuries. US Centers For Disease Control and Prevention estimates that universal helmet use could save one life per day and prevent one head injury every four minutes. The National Youth Sports Foundation for the Prevention of Athletic Injuries in the United States estimates that, during any sports season, athletes have a 10% chance of sustaining injury to the face or mouth. However, because of the mandatory use of mouth guards and helmets, this chance is only 0.45 percent for American football [22]. We are sure that if mouth protectors had been used by the patients we treated, some of the orofacial injuries reported in our study could have been prevented. A study conducted by Flanders et al. demonstrated that in basketball male and female orofacial injuries accounted for 34 percent of total injuries, whereas orofacial injuries in football, where using helmets and mouthguards is mandatory, account for only 0.07 percent of the total football injuries [2]. Mouthguards can cushion a blow and provide protection against injuries to the orofacial area, including the teeth, lips, cheeks and tongue, thereby reducing the incidence and severity of injuries that occur during sports practice and competition. They also have been shown to prevent head and neck injuries, concussions and jaw fractures. Depending on the use and the sport, three types of mouth protectors are available to the public: stock (ready to go), boil and bite, and custom fitted [1, 4, 13]. The American Academy for Sports Dentistry lists 40 sports for which recommends the use of mouth guards. Many athletes are not aware of the potential for incurring severe head and orofacial injuries while playing. Therefore, dental professionals can play an important role in informing their patients about the importance of helmets and mouthguards in preventing these injuries in sports [2]. Whatever the sport - from skateboarding to rollerblading, baseball to volleyball, karate to gymnastics, skiing to bicycling - we advocate the use of helmets, mouth guards or any other protective gear that may allow athletes to save

their heads and faces. There is a need for further studies in Poland to provide research data on the incidence and risk factors of sports-related orofacial injuries. These data are needed to demonstrate the need for mouthguards and helmets programs and other preventive strategies in these sports to minimize the physical and economic impact of these injuries. The results of the study lead to the following conclusions:

1. The results of the study indicate an increase in the total incidence of sports-related maxillofacial injuries in the recent years. These are mainly multiple injuries, which require hospitalisation and surgical intervention.
2. The majority of accidents occurred during cycling, followed by football, skiing and horse riding.
3. The most common were mandibular fractures, followed by maxillary-zygomatic-orbital complex fractures, zygoma fractures, orbital and nasal fractures.
4. The highest incidence of sports-related maxillofacial injuries was noted in the 21-30 years old men group.
5. The commonest associated non-maxillofacial injuries were soft-tissue injuries, teeth injuries and cerebral injuries.
6. It should be put a stress on the importance of preventive measures like mouth guards and helmets with face protectors to reduce risk of maxillofacial injuries sustained during sports.

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