

## Pediatric Maxillofacial Trauma

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### Abstract

**Objective:** The objective of this retrospective study is to analyze the incidence, etiology and distribution pattern of oral and maxillofacial injuries in pediatric patients at King Fahad Specialist Hospital, Buryida ,KSA.

**Methods:** Medical records of 60 pediatric patients were reviewed from January to December 2017. Their data regarding demographics, age, sex, and etiology of injury, type of injury, treatment modality and complications were collected and analyzed.

**Results:** The total number of the patients was 60. 36 males and 24 females (male to female ratio 3:2). 52 Saudi and 8 non Saudi. Soft tissue injuries were 21, dental injuries were 14, dentoalveolar injuries were 13, and skeletal facial fractures were 12.

**Conclusion:** Facial trauma is a relatively common occurrence in young children with a predominance of minor injuries. Special medical care is needed for pediatric patients, parents, teachers and ambulance personnel should have the basic education for the first aid measures in dental and maxillofacial injuries.

**Keywords:** WTrauma; Dentoalveolar; Fracture

### Introduction

The term facial trauma means any injury to the face or upper as well as the lower jaw bones. It includes injuries to the skin , underlying skeleton ,neck , nose and sinuses, eye socket , teeth, tongue and other parts of the mouth .it can be recognized by swelling or lacerations , bruising around the eyes ,abnormal click or movement of the upper jaw when the head is stabilized , abnormal or loss of sensations on the face , bleeding from the mouth , nose and ear . Children are distinctive individuals and in relation to injury, they show different form of clinical features depending on their age, and degree of bone maturation [1]. Pediatric maxillofacial injuries are frequent and trauma can occur either with low velocity (sport, fall, interpersonal violence) or with high velocity (motor vehicle accident, pellet). The occurrence of both hard and soft tissue maxillofacial injuries is often attributed to the children high level of physical activity, tendency towards risk-taking behavior, low supervision and many other contributing factors [2].

Soft tissue injuries are common than bony fractures in children after facial trauma, especially in younger children whose facial skeletons are resistant to fractures. Dentoalveolar and soft tissue injuries account for majority of the pediatric maxillofacial injuries but the frequency of facial fractures is considerably low accounting for 1% to 14% of all facial fractures. They are less common, minimally displaced or more often displaced than in adults [3]. Treatment of maxillofacial trauma in children should be done at the earliest time. Non displaced fractures are managed by observation and soft diet or closed reduction may be more than sufficient. Displaced fractures are treated by open reduction internal fixation. In case of need, primary bone grafting is the first choice, if not then only we can think of secondary grafting which may have complications .pediatric patients are kept under regular follow up as they are growing and there may be potential disturbances and abnormalities in growth [4,5].

The aim of our research was to perform a retrospective study to report the incidence, pattern, and distribution of maxillofacial injuries in pediatric patients referred to oral and maxillofacial surgery department, King Fahd Hospital, buryida, Saudi Arabia.

### Materials and Methods

This retrospective study included 60 pediatric patients (age range from 3 up to 14 years old), 36 males and 24 females diagnosed with oral and maxillofacial injuries at King Fahd specialist hospital, Buryida in the period of 1 year from January to December 2017. This hospital is the tertiary hospital in this region and is considered the reference hospital. There were 52 saudi and 8 non-saudi children. The data obtained were age, sex, etiology of trauma, type of injury (soft tissue laceration, dental, dentoalveolar injury, bony injury), the exclusion criteria were patients with missing data, patients with minimal trauma like minimal soft tissue abrasions and patients who refused treatment at our hospital.

Number of patients in each group in the following Table 1:

Type of injury	Number of patients
Soft tissue injuries	21
Dental trauma	14
Dento-alveolar trauma	13
Skeletal facial fractures	12

**Table 1:** Number of patients in each group (Type of injury)

## Results

Along one year in the oral and maxillofacial department in king fahd specialist hospital, there were 60 pediatric patients with orofacial trauma, 36 males and 24 females with male to female ratio 3:2. Their ages range from 3 to 14 years old with a mean of 8.5. There were many causes of the trauma, falling on the ground was the most common cause (19 patients), sport injuries was the second cause (15 patients), motor vehicle accidents (9 patients) and many other causes such as interpersonal violence, animal bites. Patients were classified into four groups, first group patients with pure soft tissue lacerations 21 patients, second group patients with dental trauma 14 patients, third group patients with dentoalveolar injuries 13 patients, fourth group patients with skeletal facial fractures 12 patients. Most patients were satisfied with the end result of their treatment plan, except one patient with nasoethmoidal fracture, this patient had severe craniofacial trauma with intracranial hemorrhage and was intubated for long period in the ICU, only closed reduction done for the comminuted nasal bone but the results were disappointing and postponed for further evaluation after improvement of his general condition.

One patient with mandibular fracture (left parasymphiseal and right condylar neck fracture), treated by ORIF of the parasymphiseal fracture and postoperative physiotherapy, after 6 months follow up he started to develop mandibular asymmetry and managed conservatively. All patients with dental or dentoalveolar trauma managed both conservatively or by closed reduction with RCT of the involved traumatized teeth and improved but two patients with dental trauma lost their involved permanent teeth.

## Discussion

Pediatric oral and maxillofacial injuries can occur due to a variety of causes such as fall, sports, motor vehicle accidents, animal bites and many other causes [6]. In this study the main cause was falling on the ground, the second main cause was sport injuries. The most common type of maxillofacial injuries were soft tissue injuries including lacerations, bruises, Contusions and abrasions followed by dental and dentoalveolar injuries and the least common was the facial skeletal fractures, in this we agree with a study conducted by Sorede et al in Norway [7]. Mandible is the most commonly involved bone, especially condylar fractures, then symphysis, body and mandibular angle. Mismanagement of mandibular fractures can lead to asymmetry and ankylosis of the temporomandibular joint [8]. In our study we had 14 cases with mandibular fracture (7 of them mandibular dentoalveolar fracture). Three cases treated by ORIF, two cases by closed reduction, two cases treated conservatively, the mandibular dentoalveolar fractures treated by closed reduction.

In very young children nasal fractures aren't common because of underdeveloped nasal bones and due to projection of the soft part of the nose with relative compliant cartilaginous part that can bend during trauma [9], but in older children nasal fractures are considered of the relatively common facial skeletal fractures in children as they are less resistant and have prominent position in the face [10], but in this study only one case diagnosed with nasal bone fracture and managed conservatively. May be due presence of other private hospitals in the city that could receive these cases. Low incidence of fractures of the midface in children may be due to more prominent anatomical position of the mandible and cranium, also these bones are more elastic, this gives protection to the midfacial bones in children [11]. In this study three cases diagnosed with zygomatico maxillary complex fracture. All were undisplaced and managed conservatively without complications.

The indications for closed reduction include non-displaced fracture, conditions where open reduction is best avoided due to the risk of tooth buds injury, condylar fractures, except in cases of bilateral condyle fractures, where closed reduction alone can lead to decreased mandibular height [12,13]. Absorbable plates and screws can be an advantage in pediatric patients. These materials provide temporary rigid fixation to allow bone healing to occur and gradually degrade over time as the reconstructed bone regains strength. These features prove particularly ideal for pediatric patients, in which bone growth and turnover creates potential problems for nonresorbable permanent plates. Variable chemical compositions of these plates attempt to balance an expedient degradation process while minimizing local foreign body inflammatory process. Typically their strength holds for 4 to 6 weeks while the complete degradation process may take 1 to 2 years. Resorbable plates are not available in our hospital so, in this study no cases treated by resorbable plates, we used only titanium miniplates and screws.

Titanium miniplates are still widely used despite the possible benefits of restorable ones. Titanium plates demonstrate good long-term biocompatibility, have favorable physical properties, can be easily manipulated intraoperatively to treat the fracture, and have the benefit of several decades of predictable use in the fixation of facial fractures [14,15]. As a rule fewer complications could be encountered following management of maxillofacial trauma in children compared to adults. Moreover preferred conservative

treatment options, closed reduction favorable wound healing and responses to treatment are all factors that minimize rate of complications in children than adults. The complications could be infection, malocclusion, nonunion, malunion, and disturbance of facial bone growth, facial asymmetry, permanent teeth loss and ankylosis of the temporomandibular joint [16].

Two patients in this study had complications, one patient with mandibular fracture (parasymphseal and condyle), this patient during follow up started to develop facial asymmetry due to poor growth on the condylar fracture side, his deformity was mild and managed conservatively, the second patient was a child with severe craniofacial trauma, intracranial hemorrhage, comminuted nasoethmoidal fracture, his general condition was so critical, so only closed reduction done using cast, but he had telecanthus, later on after improvement of his general condition, we transferred him to higher center for possible further management. Also two patients lost their permanent traumatized teeth and sent to prosthodontist for evaluation. The data of oral and maxillofacial injuries and their consequences are so vital, and can help in improving systems of health care as well as in implementation of public health laws, so that reduce or prevent these injuries and their complications [17].

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