

## Epidemiology of Fractures in Maxillofacial Region Occurring in Children with Mixed Dentition in Dhaka Dental College & Hospital

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### Abstract

**Objective:** This study aims to determine the age, sex, and etiology, pattern of fractures, and methods of management of maxillofacial injuries in children. **Methodology:** This observational study was carried out in the department of Oral and Maxillofacial Surgery of Dhaka Dental College Hospital from July 2013 to March 2014. The sample size was 210 and the age of the study subjects was from 6 years to 13 years in mixed dentition.

**Result:** Among 210 patients 136 (68.0%) were male and 64 (32%) were female with a male-female ratio of 4.25:2. The age range was 6 to 13 years with a mean age of 8.73 years with a standard deviation of 2.17. Among the patients 51% were in the 6-8 years age group, 35% of patients were from 9-11 years and 40% were from age over 11 years. A road traffic accident was the most common cause of fractures in maxillofacial regions in children. Sports related cause increased in the elderly. Road traffic injuries were higher in both males and females. Falls were higher in female children compared to males. Fracture to the body of the mandible (32.8%) was the most common site of fracture in the maxillofacial region in male children.

**Conclusion:** The results of this study indicated that the road traffic accident is the most common cause of maxillofacial injuries in children. Male children of 6 to 8 years age group are more injured than female children. Closed reduction is the most common procedure for the management of this type of injury in children.

**Key words:** Closed Reduction, Epidemiology, Mixed Dentition.

### Introduction

The human face constitutes the first contact point in several human interactions, Thus injuries and or mutilation of the facial structures may have a disastrous influence on the affected person.<sup>1</sup> The complex and specialized anatomical regions of the face have a significant influence on facial appearance and merit unique consideration. The requirement for many secondary soft tissue procedures, which can prove considerably more difficult, can be obviated by good primary surgery. Special considerations are given to injuries of the scalp, forehead and brow, eyelid, nose, lips, and ear as well as the important deeper structures of the facial nerve, lacrimal gland, and parotid duct.<sup>2</sup> Children are distinctive individuals and concerning injury, they demonstrate different patterns of clinical features depending on the stage of their bone maturation. All over the world, maxillofacial injuries in children constitute a significant clinical entity both in incidence and consequence.<sup>3</sup> It is among the most devastating of traumatic injuries and may have long term consequences. This relative severity is due not only to the technical difficulty of repair but also due to subsequent emotional and functional consequences associated with long term disfigurement to patients, as well as the socioeconomic impact of such injuries on the health care system.<sup>4</sup> Published data from different studies on the etiology of pediatric patients

tend to vary from one country to another, perhaps because of the differences in social, cultural, and environmental factors.<sup>5</sup> At birth, the ratio between cranial to facial volumes is 8:1. However, by adulthood, this ratio approximates 2.5:1.<sup>6</sup> The retruded position of the face relative to the skull contributes to a lower incidence of midface and mandibular fractures and a higher incidence of cranial injuries in children less than 5 years of age.<sup>7</sup> Because of a thicker layer of adipose tissue coverage, more elastic bones, and flexible suture lines, facial fractures in children are often minimally displaced. Besides, structural stability is increased by the lack of sinus pneumatization and the presence of tooth buds within the jaws.<sup>8</sup> Despite these advantages of pediatric facial structure, potential growth disturbances must be considered when planning treatment, particularly that of nasal septal and condylar injuries.<sup>9</sup>

### Methodology

This study was an observational (cross-sectional) study in which all the children aged up to 18 years with maxillofacial fracture irrespective of age and sex attending in Oral and Maxillofacial surgery department in Dhaka Dental College and Hospital during the year of July 2013 to June 2014. Children aged regard from 6 years to 14 years have been screened from the study population. The total sample was 210. The convenient sampling technique was used to select the target population. Data was taken from the patients fulfilling inclusion and exclusion criteria by semi-structured questionnaire. Informed written consent was taken from every participant by explaining the nature and objectives of the study. The datasheet was completed and follow up with the patient. Data will be analyzed by SPSS version 20. The age, sex, clinical presentation, etiology, site of the fracture, types of management, the outcome of the procedure, and complications were observed.

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## Result

An observational study from July 2013 to June 2014 was made on children with mixed dentition at Dhaka Dental College and Hospital and other hospitals. Total 210 patients were studied and data were collected.

**Table 1. Socio-demographic characteristics of the respondents.**

Characteristics	Total number	%
Age		
6-10 years	128	60
11- 14 years	82	40
Sex		
Male	135	65
Female	65	35

Among 210 patients 128 patients were in 6-10 years age group and 82 patients were 11- 14 age group which is 60% and 40%. Among 210 patients 135 were male and 65 were female. The male female ratio is 5.4:3. That means in children fracture there is a male preponderance (Table-1).

**Table 2: Mandibular Fractures in the study subject.**

Site	Frequency	Percentage
Dentoalveolar fracture	80	38.09 %
Body	48	22.85 %
Condyle	16	7.61 %
Angle	24	11.42 %
Parasymphysis	24	11.42 %
Symphysis	12	5.71 %
Ramus	4	1.9 %
Coronoid	0	0%
Total	209	99%

There were 80 (38.09 %) Dent alveolar fracture, 48 (22.85 %) Body, 16 (7.61 %) condyle and the para-symphysis and angle 24 (11.42%) (Table-2). The distribution of mid-face fractures was 1 (0.48%) dent-alveolar (Table 3).

**Table 3: Mid-face fractures in the study subject.**

Site	Frequency	Percentage
Dent alveolar fracture	1	0.48 %
Nasal	0	0.0%
Orbital	0	0.0%
Zygomatic	0	0.0%
Total	001	0.5 %

Road traffic accident is the most common cause followed by falls. Physical assault is the next common cause. Road traffic accident was 47% of all the causes of fractures (fig-1). Most of the patients were managed nonsurgical followed by closed reduction with lateral compression splint. 38 % patients were treated nonsurgical and 33% patients were treated with lateral compression splint (Fig-2).

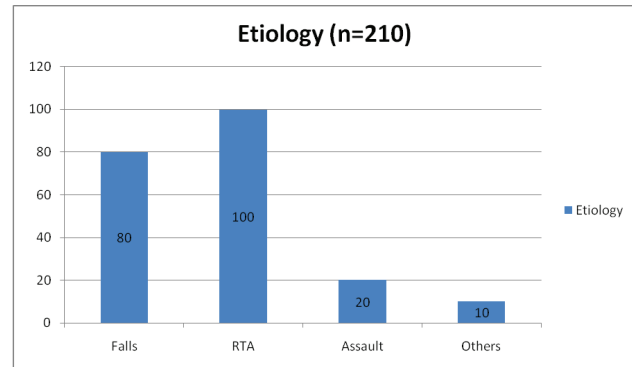


Fig-1: Etiology of fractures

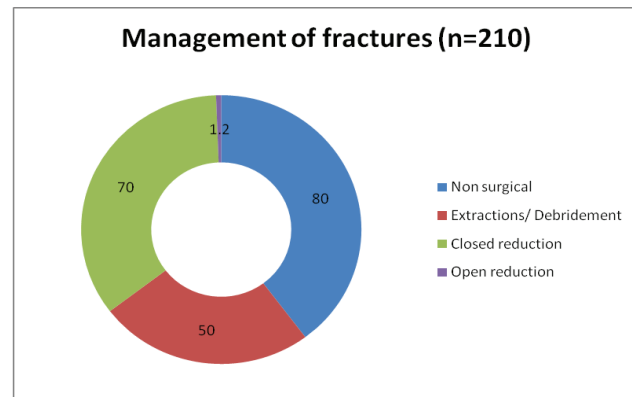


Fig-2: Management of fractures

## Discussion

There is an agreement in the literature that maxillofacial fractures in children are uncommon.<sup>10-14,6</sup> No established criteria are there defining the age groups studied. In this study, the age limit was from 6- 14 yrs. Thoren et al<sup>12</sup> suggested that a decisive limit seems to be 10 years of age since the etiologies of fracture after this age becomes similar to those of young adults. Iida et al<sup>14</sup> found that patterns and etiologies in patients older than 13 years resembled those of adolescents. He suggested that the decisive limit be 13 but cautions that they may vary from country to country and educational and socioeconomic environments. This study found fractures that 30 of the 210 patients who had facial fractures were with the age of 6 years. The majority of fractures in this study occurred in the age group 6-10 years. Posnick JC et al<sup>15</sup> (1993) reported a peak incidence in the age group of 6-12 years. In the South African Study by Bamjee Y et al<sup>16</sup> (1996) the peak reported was in the age group of 12 to 18 , but their findings are more in keeping with an adult population rather than in children sample. Guven O et al<sup>17</sup> (1992) reported a peak incidence in the 6 to 8 year age group. This finding is similar to this study.

In this study, the predominant cause of facial fractures was road traffic accidents. Falls were the second most common cause. Bamjee Y et al<sup>16</sup> (1996) reported a similar trend in their study

but also reported violence as a common cause in their teenage group. In this study, violence was reported in 20 cases. Of these 20 cases reported due to assault, the perpetrators were older children striking younger children with slaps and punches. There was no report of children struck by abusive parents and certainly, no paper trail existed in the documentation suggesting a definitive course of action against a suspected case of abuse. Studies show that the most common causes of facial fractures in children are falls and traffic accidents,<sup>17,12,14</sup> which are similar to this study. Socio-economic conditions must surely play a role in the etiology and the lack of proper recreation facilities in the lower socio-economic communities, encourage many children to play in the streets. Lack of parental supervision in many instances may also be responsible for injury to children. Iida S et al<sup>14</sup> (2002) reported that bicycle accidents were the most common cause of fractures in children in his sample. He suggests that the etiology of facial fractures in children will change. He postulates that with the popularity of television and computer games Japanese children spend more time indoors than before and so do the children of urban areas of our country.

Kaban B. (1993)<sup>18</sup> claims that midface fractures in children including nasal, zygomatic complex, Lefort type, and nasoethmoidal fractures have recently been reported more frequently but do not offer a reason for this. In the study of Aniruth S et al<sup>19</sup> (2005) midface fractures were far more common in the patients between the ages of 1-5 and as the ages increased mandibular fractures began to predominate. The study group of this study was from 6 to 14 years which may be a reason for this different finding. But it is similar to the studies<sup>16,17</sup> of in that midface fractures was more common than mandibular fractures with increasing ages. This finding was not evident in this study where dentoalveolar fractures predominated, followed by the body, angle, para-symphysis, symphysis, and then by condylar fractures. Further differences existed concerning the relationship between condyle fractures and other sites. Whereas their experience was that condylar fractures occurred together with symphyseal fractures, none of the condylar fractures in the current study had an associated symphyseal fracture. The symphyseal fractures were single. Admittedly these numbers are small and in a large series, it could well be similar to the previously published experiences. Haug HR et al<sup>6</sup> (2000) review of midface fractures suggested that the maxilla is the least frequently injured pediatric facial bone.

The management of maxillofacial fractures at the Dhaka Dental College Hospital follows the universally accepted range of non-surgical and surgical treatment options. Non-surgical management is the term referred to as the term conservative management, as this latter seems to be finding increasing disfavor within the profession. Non-surgical management ranges from no treatment to treatment of the patients with medication, diet counseling, and (often) reassurance. The

medication prescribed or administered are usually antibiotics, analgesia, and oral rinse. Surgical intervention involves extractions and debridement, closed reduction, or open reduction. Great care is always taken to prevent excessive tissue loss. Closed reductions are performed with the use of either eyelet interdental wires or with arch bars on the dentition.<sup>20</sup> Shorter fixation periods were used for the condylar fractures as early mobilization and function are encouraged in these patients. Removal of the arch bars and eyelet wires is performed under local anesthetic on an outpatient basis.<sup>21</sup> In our department, most of the patients are managed with lateral compression splints and after 2-3 months, the plate is removed under local anesthesia. Titanium plates, biodegradable plates have rarely been used in this department. Patients are followed up every week.<sup>22</sup> They are discharged from maxillofacial care upon removal of compression plates and if the fracture has been successfully treated. This follows up period is between 4 to 6 weeks. Kaban B et al<sup>18</sup> (1993) reports that with the rigid internal fixation on the facial skeleton, infection, ankylosis, and abnormal growth effects remain significant these need to be assessed and managed. Even after closed reduction with lateral compression splint infection is a common postoperative complication. Long term post-operative complications like ankylosis and abnormal growth effects could not be assessed due to the short period of study.

### Conclusion

The findings of this study have shown that the pediatric facial fractures in KTDH constitute 14.1 % of the total facial fractures. RTA and assault are the rising cause of pediatric fractures. Mandibular fractures are predominating, and in particular condylar fractures with all its morbidity.

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