



ORIGINAL ARTICLE

Frequency of mandibular fractures in children presenting with maxillofacial trauma.

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ABSTRACT... Objective: To determine the frequency of mandibular fractures in children presenting with maxillofacial trauma. **Study Design:** Cross Sectional. **Setting:** Department of Oral and Maxillofacial, Ayub Dental Section at Ayub Teaching Hospital, Abbottabad. **Period:** 05 December 2018 to 05 June 2019. **Material & Methods:** A total number of 166 children from both genders between the ages of 1-12 years with a history of trauma to mandible were added to the study through consecutive non-probability sampling. All the particulars of these patients like age, gender, date of trauma, cause of trauma, pattern of trauma, associated injuries were noted down on a format designed for the study and X-rays of all the patients were taken. **Results:** The Mean±SDs of age in this study was 5.34+1.867. Out of these patients 96 (57.8%) were male while 70 (42.2%) were females. The results show that 66 (39.8%) patients had symphysis, 48 (29%) patients had parasymphysis, 32 (19.2%) patients had angle/body, 20 (12%) patients had condyle fractures. Associated injuries were also present in 103 (62%) patients. **Conclusion:** The most common type of mandibular fracture in children was symphysis followed by parasymphysis, angle/body and condyle fractures. Early identification and treatment of such pediatric mandibular fractures will help to minimize hospital stay thus reducing financial burden on patients.

Key words: Child, Mandibular Fractures, Maxillofacial Trauma.

INTRODUCTION

With the increasing pace of life, the use of automobile has significantly increased. In our society, use of motor bikes are most common mode of transportation within the cities due to their low fuel consumption and easy approach to the densely populated areas but this has increased the incidence of injuries and fractures due to unsafe driving and rare use of helmets. Motor bikes are 3 times more likely to cause injury and 16 times more likely to cause death.

During these injuries, the maxillofacial area of the body is mostly unprotected and highly prone to traumatic injury.¹ In addition to high risk of morbidity, this maxillofacial trauma commonly causes functional deficits, facial disfigurement and sometimes to other serious morbidities.

In these injuries dentition and soft tissues are also damaged besides the damage to facial

skeleton.^{2,3} As mentioned above the most common cause of these injuries are road terrific accidents (RTA). Besides RTAs, falls, assaults, injuries during sports and gun shots are other causes of these injuries.⁴ Despite the fact that it is a strong bone in the facial frame, fractures of mandible is commonly observed due to its anatomy in our body. The data shows that it's the 2nd most fractured bone besides the nasal bone in the facial frame.⁵ Mandible is hardly fractured by compressive forces but its fractures mainly happen due to tensile forces. The weak areas of mandible are the condylar neck, the angle of the mandible and the area around the mental foramen.⁶ Examining the site of fracture can help us to evaluate the cause of fractures. Falls and road accidents majorly cause condylar and parasymphysis fractures, interpersonal fighting causes angle fractures while comminution of mandible at several points is because of blasts.⁷ Talking specifically about the children, pediatric

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maxillofacial trauma is among the challenging situations for the surgeons. RTAs are again the most common cause of these fractures followed by falls and child abuse.⁸ The pediatric bones are more resistant to fractures compared to adults because of high elasticity of bones, poor pneumatization of sinuses, thick surrounding adipose tissues and internal stabilization by interrupted teeth in maxilla and mandible. These pediatric fractures are also minimally displaced. The most common sites involved are condyle followed by symphysis and parasymphysis.⁹ Open reduction with rigid fixation is not commonly used in children because of presence of permanent tooth buds. Treatment is aimed to restore the function and aesthetic impairment. Some fractures are treated conservatively by rubber elastics, dental splints, occlusal cap splints, with circum mandibular wire fixation. Pediatric fractures if not managed and treated properly can cause severe problems therefore special attention should be paid in their proper management.¹⁰ For fractures that are minimally displaced conservative treatment in form of diet modification and regular follow up results in better results. For the fractures that cause malocclusion or those that are severely displaced must be treated with proper reduction. However prolonged immobilization of condylar fractures increases the risk of ankylosis in children.¹¹

General considerations for the young injured patient include airway maintenance, fluid and electrolyte balance and rational nutritional intake throughout treatment.⁸ The same as every trauma patients, primary evaluation and resuscitation must pursue the "ABCs" of advanced trauma life support, with a center of attention on the unique differences in pediatric anatomy and physiology.¹¹

While managing the children with mandibular fractures mandibular growth, phase of skeletal development, dental development and type of fracture becomes very important.^{8,10,11}

Hence in these patients existing active growth centers, developing permanent tooth buds and small jaw size are the factors for mandatory consideration while managing mandible

fracture.¹²

Therefore, the purpose of our study was to identify the frequency of various patterns of mandibular traumas in children at a tertiary care hospital. The results will help the maxillofacial surgeons in early identification and treatment of various types of pediatric mandibular traumas. These results will also help the patients in their better treatment, short hospital stay and will reduce their financial burden. It will also help the health regulatory authorities to take necessary steps to counter the problem.

MATERIAL & METHODS

This was a Cross Sectional study conducted at the department of Oral and Maxillofacial Department, Ayub Dental Section at Ayub Teaching Hospital, Abbottabad over a period of 6 months from 05 December 2018 to 05 June 2019. A total number of 166 children from both genders between the ages of 1-12 years with a history of trauma to mandible were added to the study through consecutive non-probability sampling. All the particulars of these patients like age, gender, date of trauma, cause of trauma, pattern of trauma and associated injuries were noted down on a format designed for the study. X-rays of all the patients were arranged and report was prepared by a fellow of CPSP with at least 05years of experience. Exclusion criteria were those patients in whom mandibular fractures have been previously treated.

Approval was taken from ethical committee Ayub Teaching Hospital, Abbottabad, Pakistan.

A written consent was taken from all patients or their care takers.

Data was analyzed by using SPSS version 19.0. Quantitative variables like age were described in terms of Means+ Standard Deviation. Categorical data like gender, reason of trauma and pattern of trauma was described in the terms of frequencies and percentages.

RESULTS

Age range in this study was from 1-12 years

with mean age of 5.34 ± 1.86 years, as shown in Table-I.

Demographics	Mean \pm SD
Age (years)	5.34 ± 1.86

Table-I. Mean \pm SD of patients according to age n=166

Out of these 166 patients, male gender was dominant. The gender wise details are as shown in Table-II.

Gender	Frequency	%age
Male	96	57.8%
Female	70	42.2%
Total	166	100%

Table-II. Frequency and percentage of patients as per gender n=166

Majority of patients belonged to age group of 7 years or less as shown in Table-III.

Age Group	Frequency	Percentage
< 7 Years	137	82.5%
> 7 Years	29	17.5%
Total	166	100%

Table-III. Patients population as per their age groups. n=166

Most of these fractures were result of road traffic accidents followed by falls and assaults as shown in Table-IV.

Reasons of Trauma	Frequency	Percent
RTA	78	47.0%
Falls	57	34.3%
Assault	31	18.7%
Total	166	100%

Table-IV. Frequencies and percentages of reason of trauma n=166

Majority of traumas belonged to symphysis and parasymphysis as shown in Table-V.

Pattern of Trauma	Frequency	Percent
Symphysis	66	39.8%
Parasymphysis	48	29%
Angle/Body	32	19.2%
Condyle	20	12%
Total	166	100%

Table-V. Frequencies and percentages for pattern of trauma n=166

DISCUSSION

Children facing the incidence of maxillofacial trauma are at a high risk of morbidity as well as mortality. The children having mandibular fractures may suffer from functional impairment and even risk of disfigurement. Cultural characteristics, socioeconomics and regional locations also signify the etiologies and patterns of mandibular fractures. Treatment protocols are also dependent on the age, region and type of fracture therefore understanding of patterns of mandibular fractures in children becomes more important.¹²

The results of our study report a Mean \pm SD for age of patients as 5.34 ± 1.86 while 137 (82.5%) patients were of 7 years or below. A similar mean age of the patients was reported as 6.50 ± 3.72 years in a study to determine the frequency of various patterns of pediatric facial trauma conducted at Multan, Pakistan.¹² Similar results regarding age and age group were reported in a study done by Mukhopadhyay S in India published in 2018 with mean patient age 7.73 ± 3.02 years, while 64% patients were below the age of 9 years.¹³ Ghosh R reported the mean age of patients with pediatric facial fractures as 8 years while percentage of patients under 10 years was 35.29 %.¹⁴

Among 166 children in our study male gender ratio was dominant with 96 (57.8%) patients compared to female patients 70 (42.2%). Khan MA reported a dominant percentage of male gender in his study by 58.63% in children with pediatric facial trauma.¹² This ratio among male:female genders is mentioned as 1.02:1 by Mukhopadhyay S and 3.25:1 by Ghosh R.^{13,14} Most of the previous studies have also reported that males suffered more from maxillofacial trauma and fractures compared to females with a reported ratio of 2:1 respectively. However at very younger age, this sex related difference is less significant as the etiology remains the same for both sexes.¹⁵

In our study 78 (47.0%) patients got fractures from road traffic accidents, 57 (34.3%) patients got fractures from falls while 31 (18.73%) patients got fractures from assaults. UI Haq ME also reported a

similar data and mentioned that among pediatric facial fractures traffic accidents contributed to approximately one third of total (37.26%) followed by fall injuries. They also mentioned that pre-school children faced fall injuries more commonly as compared to other types of injuries.¹⁰ In the study conducted by Gosh the fractures from road traffic accidents were 29.41 % while from falls it was 58.82%.¹⁴ Mukhopadhyay S also mentioned the falls and road traffic accidents as major causes of mandibular fractures among children of 9 years or below.¹³

Ul-Haq ME reported that among pediatric facial fractures 46% of all fractures were the mandibular fractures.¹⁰ Khan MA reported that mandible bone was fractured in 30.36% of the patients.¹²

Mukhopadhyay S reported the mandibular fractures as 38.9% in the condylar region, 20.6% parasymphysis, 15.3% body while 5.3% symphysis. He reported multiple fractures in parasymphysis and condylar regions.¹³ Ghosh R reported that commonest facial bone fracture was mandible reported in 83.82 %. Discussing the mandible, 80.70% fractures were in parasymphysis region, 17.54% both in condyle region and angle while symphysis and body fractures followed these. They also reported that in combination fractures, mostly were angle with parasymphysis or condyles with parasymphysis.^{14,15} Pickrell BB also reported parasymphysis fractures by 18.7% and body of the mandible by 15.1%.¹⁶

Our study reported the patterns of trauma as 66 (39.8%) patients had symphysis, 48 (29%) patients had parasymphysis, 32 (19.2%) patients had angle/body fractures while 20 (12%) patients had condyle fractures. Associated injuries were present in 103 patients (62%).

In short, although there is difference in the patterns of fracture, various studies reported almost a similar data of occurrence of mandibular fractures in children which is lower than adults, ranging from 1% to 15%. Gender allocation exhibited a prominence of boys in all age groups. The incidence also rises from birth to 16 years of age.

Concomitant injuries are observed in variation of 25–75% of the children with maxillofacial fractures.^{8,10}

Facial trauma in children is different from adults even if they have similar injuries. Children have a higher osteogenic potential and a rapid healing rate when compared to adults with minimal chances of complications especially true for the tissues of face having good vascularization. The factors to be kept in consideration the anatomy of a child's immature face, facial injury pattern and the possible effects of the injury on future growth. Anatomic reduction must be achieved earlier and immobilization periods must be lesser (two weeks instead of four–six weeks for adults) yet follow up over long period is mandatory.^{8,17} A major limitation of this study is that it has been carried out in a hospital in hilly area where traffic accidents are quite common hence a specific type of trauma was more commonly reported. The other studies carried out in different areas of the country will be helpful in extracting a more comprehensive data in this regards.

CONCLUSION

The most common type of mandibular fracture in children was symphysis followed by parasymphysis, angle/body and condyle fractures. Early identification and treatment of such pediatric mandibular fractures will help to minimize hospital stay thus reducing financial burden on patients. Moreover, as these incidents are attributed to the hilly terrain of the area with pedestrian paths through the hills, low socio-economic status, parental neglect, and poor compliance to traffic rules therefore emphasizing upon the health regulatory authorities for carrying out remedial measure by bringing awareness through print and electronic media in countering this problem.






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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Zainab Jadoon	Study concept, Planning, Manuscript writing.	
2	Hassan Khan Jadoon	Study concept, Planning, Manuscript writing.	
3	Memoona Bibi	Planning, Collection of references.	
4	Jaweria Islam	Planning, Critical review.	
5	Shair Baz Khan	Collection of data and references.	
6	Sobia Kanwal	Planning, Final checking of the manuscript.	