ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 8, Issue – 2, March – 2023 , Page No. : 120 – 126

Prevalence of pediatric maxillofacial trauma in patients attending a dental college in Bareilly city - A retrospective study.

[1]Prashant Kumar Manjul, Junior Resident, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly.

[2]Anurag Yadav, Professor, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly.

[3]S. Gokkulakrishnan, Professor & Head, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly

[4]Himanshu P. Singh, Reader, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly.

[5]Archana Chaurasia, Assisstant Professor, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly.

Corresponding Author: Prashant kumar Manjul, Junior Resident, Department of OMFS, Institute of Dental Sciences, Bareilly International University, Bareilly.

Citation this Article: Prashant Kumar Manjul, Anurag Yadav, S. Gokkulakrishnan, Himanshu P. Singh, Archana Chaurasia, " Prevalence of Pediatric maxillofacial trauma in patients attending a dental college in Bareilly city - A retro spective study", IJMSIR- March - 2023, Vol – 8, Issue - 2, P. No. 120 – 126.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Introduction: It is rare for children to sustain facial fractures. Although they make up 1% to 15% of all face fractures in children, pediatric patients differ from adult patients in terms of their clinical characteristics. Acc idents, falls, aggression, and incidents involving sports are the main causes of fractures in children worldwide.

Injuries to the facial growth Centre's brought on by facial trauma in children may cause thereafter aberrant developmental patterns in the area that was harmed.

Patients & Methods: During the course of 12 years, data on pediatric patients (0–17 years old) with a history of trauma have been gathered. Records from the past and radiographic exams were examined. The following cate gories were compiled: age and sex distribution, cause, trauma site, and related soft tissue injuries. Also, the services provided have been stated.

Results: A total of 145 patient records were assessed. Demographic data, etiology, type of fracture, associated injury and treatment rendered were recorded.

It was found that males (73.8%) were more frequently affected than females (26.2%).

Incidence of trauma was more in children belonging to the pre-adolescent age group (49%) and the most common etiology was road traffic accidents (46.9%). Condylar fracture was the most common type (31.7%) of fracture seen in the patients. Most of the patients were managed by open reduction (55.9%) followed by cap splint with circum mandibular wiring (40%) or MMF done with ivy eyelet wiring (4.1%).

Conclusion: This information is thought to be helpful in figuring out the pattern and cause of maxillofacial in juries in young patients in an Indian environment.

Keywords: Pediatric maxillofacial trauma, Circum man dibular wiring, Condylar fracture, Road traffic accidents, Maxillo mandibular fixation, Ivy eyelet wiring.

Introduction

Pediatric maxillofacial trauma has a more severe effect than adult maxillofacial trauma. Considering the patient's growing facial skeleton, permanent teeth, sensitive soft tissue, and the parents' concerns might make it challenging to treat trauma patients. The treatment plan should also take into account elements that might avoid post - traumatic sequelae, such stunted growth or psycho logical damage.[1]

In terms of causation, clinical traits, and treatment, pediatric maxillofacial injuries are different from adult maxillofacial injuries. In the epidemiologic study of trauma, the etiology of maxillofacial trauma varies from nation to nation due to numerous social, cultural, and environmental variables. Despite the fact that the most likely causes of pediatric facial trauma (PFT) include vehicle accidents, assaults, falls, and sports injuries, PFT's has distinct features. In terms of etiology, traffic accidents are not the major cause. In terms of anatomy, children are more prone to "greenstick" fractures than adults are, and they are more resistant to face fractures because of the distinctive features of their bones. Although if the occurrence rate of fracture is very low in the research, pediatric facial wounds may still create psychological distress for both the kids and their parents due to their aesthetic and functional character. The gums, cheek, and lip made up the bulk of soft tissue injuries, whereas the condylar process or mandibular body was the most often fractured part of the face skeleton in cases of mandibular fractures.[2]

Seldom do children sustain facial injuries. Rowe examined 1500 fractures as early as 1968 and found that injuries to children under the age of 12 accounted for less than 5% of all injuries, and those to children below the age of 6 for less than 1%. Indians had a 5.5% rate of juvenile facial fractures, according to Sawhney and Ahuja.[1]

The low frequency of face fractures in children is caused by a number of variables. These include, 1) relative flexibility of the bones, 2) the retruded position of the face relative to the skull (at birth, the ratio between cranial volume and facial volume is approximately 8:1. By the completion of growth, this ratio becomes 2.5:1) , 3) The paranasal sinuses not being pneumatized provides some protection, 4) Children's substantial buccal fat pad serves as a barrier for the malar area, 5) The pediatric facial skeleton is more elastic and stable due to the many tooth buds that are still growing in the mandible & maxilla from both deciduous and permanent dentition. This also aids in keeping shattered bone pieces in their normal or almost normal places after an accident. Furthermore, young children are less likely to be exposed to the major injuries, occupational trauma, or inter personal violence that are the typical feature of adult facial fractures.[1]

While selecting a course of therapy, it is important to take the risk of detrimental post-injury development abnormalities into account, especially in cases of severe nasal septal and condylar injuries. Contrarily, growth potential may help to enhance long-term outcomes, as in the case of compensatory condylar growth following condylar fractures.[3]

Several variables contribute to a diverse pattern & prevalence of facial injuries in youngsters. The following investigation was carried out to know more about the epidemiology of paediatric& adolescent trauma.[1]

Material and methods

Records of pediatric and adolescent patients (aged 0 - 17 years) reported to the Department of Oral & Maxillofacial Surgery at our institute, with a history of trauma were compiled and included in this retrospective study. From 2008 to 2020, the Department of Oral & Maxillofacial Surgery treated 145 patients with facial trauma. Data such as age, gender, etiology, fracture pattern, and treatment methods were gathered. The data was divided into three categories: pre-school (0-6 years), pre-adolescent (7-12 years), and adolescents (13 - 17 years).

Statistical analysis

The data obtained was compiled using an excel spread sheet. Statistical analysis was done using analysis IBM SPSS version 23.0 for Windows. The data were sum marized using percentages and frequency.

Results

This research included 107 male and 38 female patients out of 145 total, for a male-to-female ratio of 2.8:1. (Table1). The age categories 7-12 and 13-17 years had the greatest occurrence rates, followed by 0-6 years (Table 2). Motor traffic accidents were the most common causative cause, injuring 68 victims (46.9%). Accidental falls caused injury in 59 patients (40.7%), whereas play caused injury in 18 patients (18.2%). (Table 3). Of the 145 patients, 103 fractures in the mandible and 42 fractures in the maxilla were reported (which included the dentoalveolar fractures).

Because most occurrences of trauma are caused by a fall, and the impact is generally on the prominent jaw, most fractures are detected in the mandible. Condylar fractures constituted the most common (46 fractures) among the 103 mandibular fractures, followed by body fractures (28 fractures) and Para symphysis (27 fractures).

There were just two symphysis fractures found. The only fractures detected in the maxilla were zygo matico Maxillary complex fractures (33 fractures) (Table 4). The relative flexibility of bones and the intrinsic growing potential of children typically results in an excellent healing process for both bony and soft tissue injuries. Surgical therapy must be taken into consideration anatomical aspects as well as children's growth patterns.

In the present study, all 145 patients needed active treatment. Patients were prescribed prophylactic anti biotics and special instructions regarding diet. In 64 cases, closed reduction was used, while in 81 individuals, open reduction with internal fixation was used. In this study, cap splints with circum mandibular wiring were used in 58 patients (40%) and ivy eyelet wiring was used in 6 patients (4.1%).

The majority of the patients, 81 (55.9%), required open reduction with osteo synthesis plates (Table5).

Table 1: sex distribution of patients.

Sex	No of Patients	Percentage%
Male	107	73.8%
Female	38	26.2%
Total	145	100.0%

Graph 1:

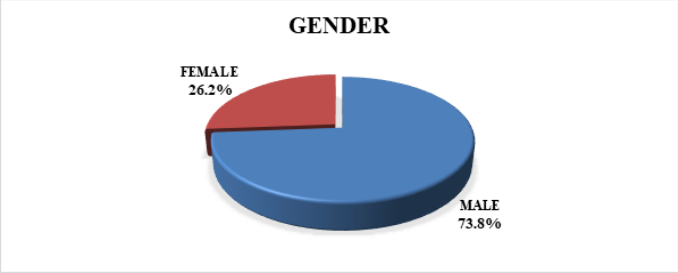


Table 2: age group distribution of patients.

AGE GROUP	No of Patients	Percentage%
0-6	12	8.3%
7-12	71	49.0%
13-17	62	42.7%
TOTAL	145	100.0%

Graph 2:

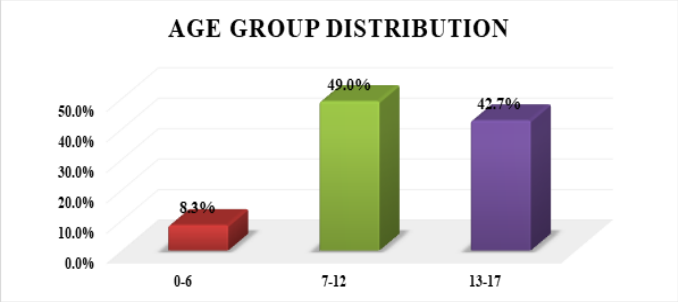


Table 3: etiology of trauma in patients.

Etiology of trauma	No of Patients	Percentage%
FALL	59	40.7%
PLAY	18	12.4%
RTA	68	46.9%
Total	145	100.0%

Graph 3:

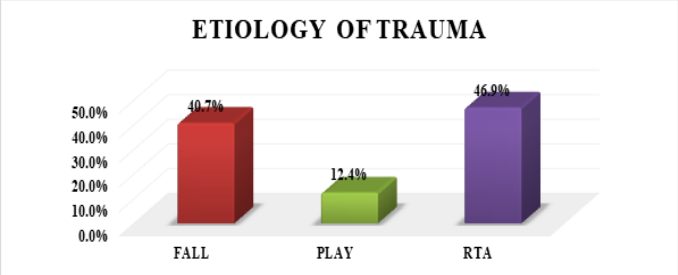


Table 4: pattern of trauma based on location

Pattern of trauma	No of Patients	Percentage%
Zmc	33	22.8%
Condylar	46	31.7%
Dentoalveolar	9	6.2%
Mandibular body	28	19.3%
Symphysis	2	1.4%
Para symphysis	27	18.6%
Total	145	100.0%

Graph 4:

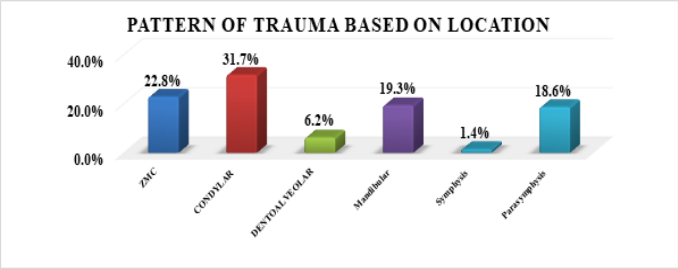
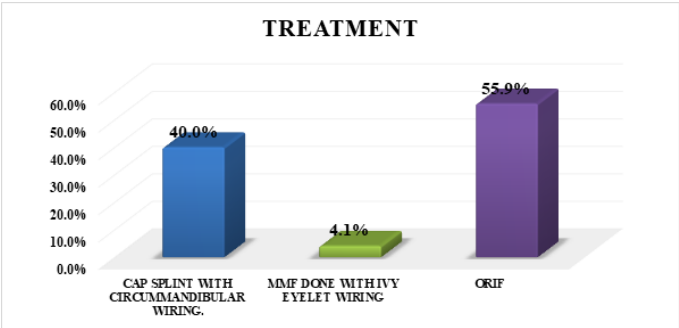


Table 5: Treatment distribution of patients.

Treatment	No of patients	Percentage%
Cap splint with circum mandibular wiring.	58	40.0%
Mmf done with ivy eyelet wiring	6	4.1%
Orif	81	55.9%
Total	145	100.0%

Graph 5:



Discussion

From 2008 to 2020, we conducted a 12-year retrospective analysis on the epidemiology of paediatric maxillofacial traumas (PMT's) at our hospital. Even though paediatric trauma is uncommon, it is critical to assess and prepare proper treatment. Because there is no expected trauma pattern, therapy techniques likewise vary. Furthermore, as industrialization and Urbanisation develop, children are being exposed to new surroundings, which may contribute to a rise in the prevalence of pediatric trauma.[1] In our study, incidence of trauma was found to be more in boys than in girls (male to female ratio of 2.8:1), which is universal to all literature on pediatric trauma. Boys indulge more frequently in outdoor sports and activities as compared to girls. The results of a comparable research by Qing-Bin et al, were consistent with a male/female ratio of 2.48:1. Similar findings were achieved by Kazi N et al, and Zimmermann CE et al,.[1,3]. Albeshir H et al, reported comparable results, with the male to female ratio ranging from 1.1:1 to 8.5:1,

depending on the series.[4] According to a study conducted by Bhardwaj Y et al, Males were afflicted at a higher rate (60%) than girls (40%).[5] In a comparable research, Khan SR et al,. Found that the total male: female ratio was 2:1 with 369 male (69%) and 166 female (31%).[9]

In our study, three groups were formed: preschool (0 - 6 years), pre-adolescent (7 - 12 years), and adolescent (13 - 17 years). This divide represents the child's progression through several stages of development. The highest incidence rates were seen in the pre-adolescent (7-12 years) age group, followed by adolescent (13-17 years) and preschool (0-6 years) age groups. This might be because many Indian youngsters are encouraged to play outside from a young age. Most studies demonstrate an increase in trauma in the pre-adolescent age group, representing the beginning of school life and exposure to playground injuries. In study by Kazi N, et al., also noted an increased incidence of trauma in the preschool age group.[1]Albeshir H, et al. identified a first peak in the prevalence of PMT's at 6-7 years, which was connected with school attendance, and a second peak at 12-14 years, which was associated with increasing physical activity and engagement in sports during puberty and adolescence.[4]Khan et al. reported facial fractures in patients age ranges from 1 to 12 years (mean (SD) age, 7.3 years), and oddly, 46% of their affected patients were below the age of 4, which is an unusual age for facial trauma considering that at this age, the majority of children were under their parent's supervision. This is completely different with the findings of other similar studies (including ours).[9]

In our study road traffic accidents were the leading etiologic factor, leading to the injury of 68 patients (46.9%) followed by accidental falls led injury in 59 patients (40.7%) and playground or sports led injury in 18 patients (18.2%). This may be due to the fact that children are being exposed to new environments and increasing industrialization and urbanization. Singh AK, et al, also noted that majority of pediatric maxillofacial trauma is due to motor vehicle accidents (42.8%).[13]According to research by Khan SR, et al., falls were the major source of trauma (39%), followed by automobile accidents (31%), and sports-related injuries (25%).[9]In research by Zafar KJ, et al., the aetiology for PMTs was established. Fall injuries had a very high rate of 83 (61.5%) followed by RTA injuries 40 (29.6%), sports injuries 8 (5.9%), assault injuries 2 (1.5%), gunshot injuries 1 (0.7%), and animal-related injuries 1 (0.7%).[10] In a study by Alcala-Galiano A, et al,. noted that the motor vehicle accident was the most common cause; it accounted for 36.4% of fractures in their case series (5%–80.2%, in the literature). Sports-related injury was the next most common cause, at 26.2% (4.4%–42%). It was followed by accidental causes, such as a fall, at 23.1% (7.8%–48%); violence, at 9.3% (3.7%–61.1%); and other causes, at 6.2% (9.3%).[12] In a study by Kenawy A, et al., the most likely cause of PMT's was falling from a height (FFH), which affected 37 (58.73%) patients. This was followed by motor vehicle accidents (MVA), which affected 20 (31.75%), animal kicks, which affected three patients (4.76%), sports-related injuries, which affected two patients (3.17%), and assault by others, which affected one patient (1.59%).[14]

In our study among the 145 patients, 103 fractures were reported in the mandible and 42 fractures in the maxilla, (which included the dentoalveolar fractures). This is due to the fact that falls and auto accidents account for the majority of trauma cases, the prominent mandible is typically the site of the impact and hence, the mandible sustains the majority of fractures. Condylar fractures accounted for the majority (46 fractures) of the 103 mandibular fractures because the condyle is highly

vascularized in pediatric patients and the neck is thin, making it less resistant to impact forces during falls, followed by fractures of the body (28 fractures) and Para symphysis (27 fractures). Only 2 symphysis fractures were seen. In maxilla Zygomaticomaxillary complex fractures (33fractures) along with dentoalveolar fracture (9 fractures) were seen. Maxillary fractures are less common due to the underdeveloped sinuses which offer rigidity and there is also a well-developed layer of fat protecting the maxillary region in children.[1]In a study by Qing-Bin Z, et al, reported that the pediatric fractures were mainly seen in mandible, maxilla, and zygoma with a decreasing trend. Mandible fracture accounted for 41.7% of all facial fractures, and symphysis was most involved, followed by condylar process.[2]Kazi N, et al,. Documented a predilection towards the dentoalveolar fractures in the pediatric population followed by mandibular fractures.[1]According to Kenawy A, et al, mandibular fractures were the most common fractures with 27 subjects sustaining 40 (49.38%) mandibular fractures, followed by 20 (24.69%) midfacial fractures, 14 (17.28%) fronto-orbital fractures and the least common fractures were Dento-alveolar fractures by only 7 (8.64%) fractures.[14]

In our study all 145 patients needed active treatment. Injury kind, pattern, patient age, and course of treatment all affect how pediatric patients are treated. Treatment methods were separated into two groups for convenience: closed reduction (under local or general anesthesia) and open reduction (under general anesthesia). Closed reduction was done in 64 patients and open reduction and internal fixation was done in 81 patients. In this study closed reduction using cap splint with circum mandibular wiring was done in 58 patients (40%) and with ivy eyelet wiring in 6 patients (4.1%). Open reduction with osteosynthesis plates were done in most of the patient's i. e. 81 patients (55.9%). Kazi N, et al, in his study documented 340 patients out of which 163 patients (48%) had closed reduction, which involved placing arch bars or dental splints. 29 patients (8.5%) who had closed reduction undergone general anesthesia. In 27 patients (7.9%), open reduction with osteosynthesis plates was required. Some patients (82 patients, 24.1%) solely needed dental care for damaged teeth.[1]In a similar study by Zafar KJ, et al**,** noted that the majority of pediatric maxillofacial trauma were treated by open reduction and internal fixation especially mandibular fractures because the displacement of the fractures on the horizontal and vertical x-ray planes was a need for ORIF.[10]

Conclusion

An expanding area of maxillofacial surgery is pediatric trauma. Happily, increased parental knowledge has resulted in early diagnosis and management in many centers. In many portions of the nation, especially the outlying regions, this understanding is inadequate. To avoid the unfavorable effects of trauma, a patient should undergo comprehensive diagnostic and therapy planning after experiencing trauma.

Based on the many considerations mentioned above, the surgeon must evaluate each situation and choose the best course of action. To allow for proper diagnosis and treatment, differences between the pattern of maxillofacial fractures in children and adults must be understood.

References

1. Kazi N, Ranadive P, Rajurkar S, Sharma A, Deshpande M, Ingole S. Epidemiology of Maxillofacial Trauma in Pediatric and Adolescent Population: An Institutional Experience of 6 Years. Open Journal of Orthopedics. 2022 Jun 10;12(6):277-87.

2. Qing-Bin Z, Zhao-Qiang Z, Dan C, Yan Z. Epidemiology of maxillofacial injury in children under

15 years of age in southern China. Oral surgery, oral medicine, oral pathology and oral radiology. 2013 Apr 1; 115 (4):436-41.

3. Zimmermann CE, Troulis MJ, Kaban LB. Pediatric facial fractures: recent advances in prevention, diagnosis and management. International journal of oral and maxillofacial surgery. 2005 Dec 1;34(8):823-33.

4. Albeshir H, Ahmed S, Awaji M, Alb Alawi S, Samman M, Alahmadi H. Pediatric maxillofacial injuries in Madinah—a retrospective study. J Public Health Policy Plan. 2018;2(1):73-80.

5. Haug RH, Foss J. Maxillofacial injuries in the Pediatric patient. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2000 Aug 1;90(2):126-34.

6. Bhardwaj Y, Kumar D. Pediatric maxillofacial trauma outcomes based on a survey of 65 patients: a pro spective study of etiology, incidence and methods of treatment. Journal of maxillofacial and oral surgery. 2015 Sep;14:687-92.

7. Joachim M, Tuizer M, Araidy S, Abu El-Naaj I. Pediatric maxillofacial trauma: Epidemiologic study between the years 2012 and 2015 in an Israeli medical Center. Dental Traumatology. 2018 Aug;34(4):221-8.

8. Al-Hassani A, Ahmad K, El-Menyar A, Abu Taka A, Mekkodathil A, Peralta R, Al Khalil M, Al-Thani H. Prevalence and patterns of maxillofacial trauma: a retrospective descriptive study. European journal of trauma and emergency surgery. 2019 Jun 1:1-7.

9. Khan SR, Khan ZA, Hanif S, Riaz N, Warraich RA. Patterns of facial fractures in children. British Journal of Oral and Maxillofacial Surgery. 2019 Dec 1; 57 (10): 100 9-13.

10. Zafar KJ, Janjua OS, Khurram M. Pediatric Maxillo facial Trauma Management Experience at Tertiary Care Hospital-A Retrospective Study. respiration.;4:6.

11. Tent PA, Jun car RI, Lung T, Jun car M. Midfacial fractures: A retrospective etiological study over a 10-year period in Western Romanian population. Nigerian Journal of Clinical Practice. 2018;21(12):1570-5.

12. Alcala-Galiano A, Arribas-García IJ, Martín-Pérez MA, Romance A, Montalvo-Moreno JJ, Juncos JM. Pediatric facial fractures: children are not just small adults. Radio graphics. 2008 Mar;28(2):441-61.

13. Singh AK, Singh P, Mishra R. Retrospective Study on the Incidence of Pediatric Fractures and its Associated Complications. Journal of Advanced Medical and Dental Sciences Research. 2015 Apr;3(2).

14. Kenawy A, Amer I, Gafar A, El-Sharkawy K. Pediatric maxillofacial trauma in Upper Egypt, a pro spective study. Sohag Medical Journal. 2019 Jan 1; 23 (1):50-6.