http://doi.org/10.33279/jkcd.v15i02.919

**Orginal Article**

# PATTERNS OF ORAL & MAXILLOFACIAL INJURIES IN PEDIATRIC PATIENTS: A RETROSPECTIVE CHART REVIEW

**Riaz Khan[1], Salman Ashraf[2], Muhammad Irfan Khan[3], Jahangir Khan[4], Eruj Shuja[5], Amna Muzaffar[6], Muhammad Ilyas[7], Manzoor Khan[7]**

[1]Consultant Oral & Maxillofacial Surgeon, Al-Khidmat Hospital Dabgari Garden, Peshawar
[2]Department of Oral & Maxillofacial Surgery, Quaid-e-Azam Medical College, Bahawalpur
[3]Department of Oral & Maxillofacial Surgery, Lady Reading Hospital, Peshawar
[4]Consultant Oral & Maxillofacial Surgeon, Shiekh Khalifa Bin Zayyed Al Nahyan Medical Complex Quetta
[5]Department of Oral & Maxillofacial Surgery, Watim Medical & Dental College
[6]Dental Section, Rawal Institute of Health Sciences, Rawalpindi
[7]Oral & Dental Surgeon, Health Department, KPK

## ABSTRACT

***Objectives:*** *To determine the frequency distribution of patterns of maxillofacial injuries in pediatric patients.*

***Materials and Methods:*** *A retrospective study was carried out in the department of Oral & Maxillofacial Surgery, Lady Reading hospital Peshawar from June 2023 to June 2024. A total of 178 patients were selected in this study of both genders. And two groups were allocated from 0-6 years and 7-12 years aged group. Panorama or Computed tomographic scan was used for diagnosis of facial fractures. Data was analyzed using SPSS version 23.0. The level of significance was kept at p<0.05.*

***Results:*** *The age presentation was 6.35 (5.82-6.87) years. Males were predominant than female with ratio 1.4:1. Overall the dentoalveolar fracture was the most common injury seen in pediatric patients with 81(42.1%).Mandible was the most common facial bone fracture 30(16.85%) in 0-6 years aged group and 36(20.22%) in 7-12 years aged group. Perioral area was seen most frequent in these patients, 20(11.23%) in 0-6 years aged group and 29(16.29%) in 7-12 years aged group. The most common etiology of maxillofacial injuries seen were fall, 50(67.57%) in 0-6 years aged group and 41(39.42%) in 7-12 years aged group.*

***Conclusion:*** *The most common cause of maxillofacial injury was fall, injury was dentoalevolar and site of facial fracture was mandible with male predominance.*

***Key words:*** *Maxillofacial injuries, pediatric, patterns*

**Cite as:** Khan R, Ashraf S, Khan MI, Khan J, Shuja E, Muzaffar A, Ilyas M, Khan M. Patterns of Oral & Maxillofacial Injuries in Pediatric Patients: A Retrospective chart review. Journal of Khyber College of Dentistry Jun 2025, Vol. 15, No. 2. http://doi.org/10.33279/jkcd.v15i02.919

## INTRODUCTION

Maxillofacial fractures are very uncommon in the pediatric patient counting only from 1.5% to 8.0% in those aged 12 years. Only 1% of maxillofacial injuries occur in aged less than 5 years[1,2]. The reason for low maxillofacial injuries in children has been ascribed to thicker layer of adipose tissue, lack of pneumatization of paranasal sinuses, greater cranium to face ratio, elasticity of facial bones and conservation of malar area by buccal fat in younger children. Furthermore, the younger children receive more parental care than the adults[3,4].

The incidence and etiology of maxillofacial

**Correspondence:**
**Dr. Muhammad Irfan Khan**
Assistant Professor
Department Oral & Maxillofacial Surgery, Lady Reading Hospital, Peshawar
Email: drirfankahn@gmail.com

Date Submitted: February 2025
Date Revised: April 2025
Date Accepted: May 2025

injuries varies from country to country due to differences in cultural, socioeconomic and environmental factors[5,6]. According to literature the most frequent causes of maxillofacial injuries in pediatric patients are motor vehicle accidents, road traffic accidents, falls, sports related injuries, bicycle related injuries and child abuse[3,7,8,9]. The rare cause of pediatric maxillofacial injuries is interpersonal violence. The cause of facial trauma varies with age[2,10]. The site and pattern of maxillofacial trauma varies from 10% to 75% relying on the type of fracture. According to the study conducted in Chine the maxillofacial trauma seen in pediatric population is 23% while that of adult population is 77%[11]. In Pakistan the prevalence of maxillofacial trauma in pediatric patient is 34%[3]. The data of maxillofacial injuries is essential for improving patient management, development of preventive measures and clinical auditing[7]. Literature search revealed a little study about the pediatric maxillofacial trauma, their incidence, patterns and etiology as well as management.

The aim of this study was to determine the etiology and incidence of maxillofacial injuries in pediatric patients.

## MATERIALS AND METHODS

This was a retrospective chart review scarried out in the Department of Oral and Maxillofacial Surgery, Lady Reading hospital, Peshawar from June 2023 to June 2024. After approval from the ethical committee of the hospital the data was taken from the previous record of the department. Clinical record of age 12 year and younger than 12 years. 200 patients were examined over period of one year. Among 200, 22 were excluded due to unavailable of radiographic findings, pathology and severe head injury. The final clinical records of 178 patients of both genders were investigated. These patients were divided into two age groups: 0-6years aged group and 7-12 years aged group. The data collected from records consist of age, gender, cause and type of injury, site of fracture and etiology of injury.

In this retrospective analysis, radiographic records were reviewed to confirm the diagnosis and location o9f maxillofacial injuries. The selection of imaging modality was based on clinical suspicion, patient age and the type of injury. Orthopantomogram (OPG) was commonly used to assess dentoalveolar and mandibular fractures and in those children above 6 years who could cooperate during imaging. Computed tomography (CT) scans were preferred for suspected midface fractures, multiple fractures due to their superior ability to visualize complex structures. For soft tissue injuries without signs of radiographic fractures, radiographs were unnecessary. The diagnostic findings from imaging were correlated with clinical signs and operative records where applicable, to ensure accuracy in classification and analysis.

Statistical analysis was carried out using SPSS version 23.0. Descriptive statistics were obtained and Chi-Square statistics were carried out for categorical values and level of significance was kept at $<0.05$.

All collected data were carefully checked for mistakes or missing information. To ensure data accuracy, a random 10% of entries underwent double checking against the source of record. The records were reviewed to make sure values like age were in correct range (0-12 years) and that all entries were filled correctly. If any important information like age, gender, cause of injury, type of injury or radiographic finding was missing, those patient records were left out of the final analysis. Listwise deletion was carried out to make sure the results are accurate and based only on complete data. No guessing or filling in of missing values was done, since only 22 records were incomplete.

## RESULT

In this study the age presentation was 6.35 (5.82-6.87) years. The total male patients were 104(58.43%) and female were 74(41.57%). The male to female ratio was 1.4:1. There were 74(41.57%) recorded in 0-6 aged group and 104(58.43%) were in 7-12 years aged group. The percentage of male and female patients in each group is given in figure 1. The most frequent facial bone fracture was mandible in both groups, 30(16.85%) in 0-6 years aged group and 36(20.22%) in 7-12 years aged group followed by maxilla, 13(7.30) in 0-6 years aged group and 16(8.98%) in 7-12 years aged group. In soft tissue injuries the most dominant area involved in both groups was perioral, 20(11.23%) in 0-6 years aged group and 29(16.29%) in 7-12 years aged group followed by mental or chin area, 11(6.18%) in 0-6 years aged group and 13(7.30%) in 7-12 years aged group. In 0-6 years aged group 38(21.34%) patients were having dentoalveolar fractures while 43(24.15%) having dentoalveolar fractures in 7-12 years aged

group. The detail of patterns of maxillofacial injuries in pediatric patients is given in table 1.

Fall was the most prominent cause of trauma in both groups, 50(67.57%) in 0-6 years aged group and 41(39.42%) in 7-12 years aged group followed by motor vehicle accident, 09(12.16%) in 0-6 years aged group and 17(16.35%) in 7-12 years aged group. Play or sports was the third most common cause in both groups, 07(9.45%) in 0-6 years aged group and 15(14.42%) in 7-12 years aged group followed by bicycle, 03(4.05%) in 0-6 years aged group and

**Table 1: Patterns of Maxillofacial Injuries in Pediatric patients**

| Type of Injuries | 0-6 years aged group | | 7-12 years aged group | | P value <0.05 |
|---|---|---|---|---|---|
| | Number | Percentage | Number | Percentage | |
| Facial Bone Fractures | | | | | |
| Mandible | 30 | 16.85 | 36 | 20.22 | 0.000* |
| Maxilla | 13 | 7.30 | 16 | 8.98 | |
| Nasal | 10 | 5.62 | 13 | 7.30 | |
| Zygomatic | 7 | 3.93 | 15 | 8.42 | |
| Orbital | 5 | 2.80 | 11 | 6.18 | |
| NOE | 7 | 3.93 | 12 | 6.74 | |
| Frontal | 2 | 1.12 | 1 | 0.56 | |
| Soft Tissue Injuries | | | | | |
| Perioral | 20 | 11.23 | 29 | 16.29 | 0.000* |
| Mental/Chin | 11 | 6.18 | 13 | 7.30 | |
| Tongue | 9 | 5.05 | 15 | 8.42 | |
| Soft/hard Palate | 1 | 0.56 | 4 | 2.24 | |
| Labial & Buccal Mucosa | 2 | 1.12 | 6 | 3.37 | |
| Gingiva | 3 | 1.68 | 4 | 2.24 | |
| Circumorbital | 5 | 2.80 | 7 | 3.93 | |
| Frontal | 10 | 5.62 | 11 | 6.18 | |
| Cheek | 6 | 3.37 | 7 | 3.93 | |
| Nose | 3 | 1.68 | 4 | 2.24 | |
| Temporal region | 1 | 0.56 | 1 | 0.56 | |
| Ear | 1 | 0.56 | 1 | 0.56 | |
| Submandibular region | 2 | 1.12 | 2 | 1.12 | |
| Dentoalveolar | 38 | 21.34 | 43 | 24.15 | 0.025* |
| Combination | 31 | 17.41 | 39 | 21.91 | 0.035* |

*Chi-square test, p value <0.05, NOE; Naso-Orbital Ethmoid Bone

**Table 2: Etiology of Maxillofacial injuries in Pediatric patients.**

| Etiology | 0-6 years aged group | | 7-12 years aged group | | P value <0.05 |
|---|---|---|---|---|---|
| | Number | Percentage | Number | Percentage | |
| Fall | 50 | 67.57 | 41 | 39.42 | 0.000* |
| MVA | 09 | 12.16 | 17 | 16.35 | |
| Play/Sports injury | 07 | 9.45 | 15 | 14.42 | |
| Assaults | 02 | 2.70 | 09 | 8.65 | |
| Bicycle | 03 | 4.05 | 14 | 13.46 | |
| Gunshot injury | 02 | 2.70 | 03 | 2.88 | |
| Animal related injury | 01 | 1.36 | 05 | 4.81 | |
| Total | 74 | 100% | 104 | 100% | |

*Chi-square test, p value <0.05, MVA; Motor Vehicle Accident

14(13.46%) in 7-12 years aged group. The causes of pediatric maxillofacial injuries are given in table 2.

## DISCUSSION

Maxillofacial trauma in pediatric patients are rare but when occur it results in functional impairment and esthetically unacceptable. In this study the age selected was 0-12 years. The mean age presentation in our study was 6.35 ± 3.58 years comparable with other study conducted in India & Pakistan[12,3].

In this study there was a male predominance than female which is in consistent with study done by Mukhopadhyay et al[12]. Khalifa et al[13] also showed the male dominancy in their study and proposed that boys are more prone to outdoor activities that girls. Karim et al[14] suggested that boys are more aggressive than girls resulting in more injuries than girls.

The most dominant facial fracture in this study was mandible in both groups followed by maxilla. Lower incidence is seen in 0-6 aged group and incidence increases in 7-12 years aged group. This study is consistent with study carried out by Mukhopadhyay et al[12] & Rowe et al[15]. Some studies showed that nasal bone fracture was the most common site of maxillofacial fractures[16,17]. Other studies suggested that the trauma in children increases as the start going to school[18,19]. Other research demonstrated that high frequency of fractures are seen in preschool children than school going children which contradict this study[20,21]. Our study include soft tissue injuries in which perioral area was the most dominant area involved in the soft tissue injuries which is comparable with study by Mukhopadhyay et al[12]. The incidence of dentoalveolar injury in our study was 45.5% which is in agreement with study by Kumaraswamy et al[22](42.1%) and is greater than those found by Cavalcanti et al[17] (25.8%).

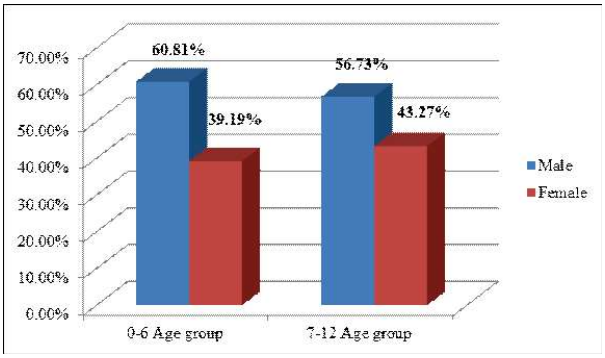


**Fig 1: Percentage of male and female in both groups.**

Fall was the most common cause of maxillofacial injuries in this study accounting 51.12%. This finding is in agreement with the results acquired by Mukhopadhyay et al[12], Karim et al[14], Alcalá-Galiano et al[16] and Kumaraswamy et al[22]. Posnick et al[18] in their study demonstrated that motor vehicle accident was the most common cause of maxillofacial injuries which opposes this study. The reason could be they include adolescence in their study.

The limitation of this study was sample size and retrospective nature of the study. As records have the referral patients as well as having those coming through outpatient department. Furthermore treatment outcome was not studied. A prospective study with treatment outcomes may be carried out to remove possible bias in this study.

## CONCLUSION

Overall dentoalveolar fracture was the most dominant injury. The most common facial bone fracture was mandible and the most common soft tissue injury was perioral. Fall was the most common cause of maxillofacial injuries. There was male predominance than female. The trauma increases as the age increases.

## REFERENCES

1. Muñante-Cárdenas JL, Olate S, Asprino L, de Albergaria Barbosa JR, de Moraes M, Moreira RW. Pattern and treatment of facial trauma in pediatric and adolescent patients. J Craniofac Surg 2011;22:1251-5.
2. Thorén H, Iso-Kunguas P, Lizuka T, Lindqvist C, Töarnwall J. Changing Trends in causes and patterns of facial fractures in children. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;107:318-24.
3. Khan MA, Ishfaq M, Akhtar M, Rana SA, Kashif M. Frequency of paediatric facial trauma in a tertiary care dental hospital. Int Surg J. 2017;5:310-4.
4. Pandey RK, Mishra A. The incidence of facial injuries in children in Indian population: A retrospective study. J Oral Biol Craniofac Res. 2018;8:82-5.
5. Haug RH, Foss J. Maxillofacial injuries in the pediatric patient. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2000; 90:126–34.
6. Iida S, Matsuya T. Paediatric maxillofacial fractures: their aetiological characters and fracture patterns. J Craniomaxillofac Surg. 2002; 30:237–41.
7. Almahdi HM, Higzi MA. Maxillofacial fractures among Sudanese children at Khartoum Dental Teaching Hospital. BMC Res Notes. 2016; 9:120.

8. Goth S, Sawatari Y, Peleg M. Management of pediatric mandible fractures. J Craniofac Surg. Jan 2012;23(1):47-56.

9. Taylor LB, Walker J. A review of selected micostomia prevention appliances. Pediatr Dent 1997;19:413.

10. Imahara SD, Hopper RA, Wang J, Rivara FP, Klein MB. Pattern and outcomes data bank. J Am Coll Surg. 2008;207:710-6.

11. 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 Surg, Oral Medi, Oral Pathol Oral Radiol. 2013;115:436-41.

12. Mukhopadhyay S, Galui S, Biswas R, Saha S, Sarkar S. Oral and maxillofacial injuries in children: a retrospective study. J Korean Assoc Oral Maxillofac Surg. 2020 Jun 30;46(3):183-190.

13. Khalifa GA, El-Kilani NS, Nasr TA. Clinical outcomes of pediatric maxillofacial fractures management in three hospital series in Egypt. J Oral Maxillofac Surg Med Pathol. 2017; 29:511–7.

14. Karim T, Khan AH, Ahmed SS. Trauma of facial skeleton in children: an Indian perspective. Indian J Surg. 2010;72:232–5.

15. Rowe NL. Fractures of the facial skeleton in children. J Oral Surg. 1968;26:505–15.

16. Alcalá-Galiano A, Arribas-García IJ, Martín-Pérez MA, Romance A, Montalvo-Moreno JJ, Juncos JM. Pediatric facial fractures: children are not just small adults. Radiographics. 2008;28:441–61.

17. Cavalcanti AL, Melo TR. Facial and oral injuries in Brazilian children aged 5-17 years: 5-year review. Eur Arch Paediatr Dent. 2008;9:102–4.

18. Posnick JC, Wells M, Pron GE. Pediatric facial fractures: evolving patterns of treatment. J Oral Maxillofac Surg. 1993;51:836–44.

19. Zimmermann CE, Troulis MJ, Kaban LB. Pediatric facial fractures: recent advances in prevention, diagnosis and management. Int J Oral Maxillofac Surg. 2006;35:2–13.

20. Gassner R, Tuli T, Hächl O, Moreira R, Ulmer H. Craniomaxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. J Oral Maxillofac Surg. 2004;62:399–407.

21. Kotecha S, Scannell J, Monaghan A, Williams RW. A four year retrospective study of 1,062 patients presenting with maxillofacial emergencies at a specialist paediatric hospital. Br J Oral Maxillofac Surg. 2008;46:293–6.

22. Kumaraswamy SV, Madan N, Keerthi R, Singh DS. Pediatric injuries in maxillofacial trauma: a 5 year study. J Maxillofac Oral Surg. 2009;8:150–3.

CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

## AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

| | |
|---|---|
| Conception or Design: | RK, SA, MIK, JK, ES, AM, MI, MK |
| Acquisition, Analysis or Interpretation of Data: | RK, SA, MIK, JK, ES, AM, MI, MK |
| Manuscript Writing & Approval: | RK, SA, MIK, JK, ES, AM, MI, MK |

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.