

FACIAL TRAUMA IN CHILDREN AND ADOLESCENTS OF NEPAL

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Abstract

Aims: Traumatic facial soft tissue injuries are commonly encountered. Although rarely life-threatening, the treatment of these injuries can be complex and may have significant impact on the patient's facial function and aesthetics. The goal of this study was to assess the impact of the main causes of accidents among children resulting in craniomaxillofacial trauma and its management.

Methods: Data of 121 patients younger than 18 years of age who sustained facial injuries were recorded for cause of injury, age and gender distribution, frequency and type of injury, injury mechanisms, localization and frequency of soft tissue injuries, dentoalveolar trauma, facial bone fractures, and concomitant injuries.

Results: The boy to girl ratio was 2.18:1. The most common age group was 7-10 years followed by the age group of 4-6 years. Seventy-five children (61.99%) mostly older children were injured playing outdoor while 46 patients (38.02%) were injured in indoor activity. Forty-nine (40.50%) were injured during sport activities. Accidents involving furniture accounted in 31 children (25.62%). The injury due to fall or dropped from bed or height was seen in 15 children (12.4%). Road traffic accidents and physical assault were the cause of injuries to thirteen (10.75%) and 10 children (8.26%) respectively. Three injuries were due to dog bite. Most common injury was type I. Most of the injuries were simple and they were managed by the simple dressing.

Conclusions: Facial trauma is a relatively common occurrence in young children, with a preponderance of minor injuries. As age increases, the severity of injuries sustained increases.

Keywords: facial trauma, pediatric, adolescents, dental trauma, prospective.

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 and other parts of the mouth. It is often recognized by swelling or lacerations, bruising around the eyes, widening of the distance between the eyes, movement of the upper jaw when the head is

stabilized, abnormal sensations on the face, and bleeding from the nose, mouth, or ear.

Children are distinctive individuals and in relation to injury, they demonstrate different pattern of clinical features depending on their age and the stage of their bone maturation. It is estimated that nearly 22 million children are injured annually worldwide and 12% occurred as a result of trauma.¹ Retrospective reviews reveal that maxillofacial fractures occurred in 1.3-4.9% of children below 11 years of age and 4-9.2% children below the age of 16.^{1,2}

It is recognized that cultural and socio-economic variables, as well as the time of day and location can influence the etiology and pattern of facial trauma.³

The types and causes of trauma in children are thought to be similar to those of adults⁴ but it assumed that facial injuries are much less common in children than in adults, due to the protective environment they experience under parental supervision.⁵ The etiology of trauma is related to the child's independency. Fall while playing or walking is a common cause of injury in the younger age group while motor vehicle accident (MVA), sports and fight are associated with older children.

Soft tissue injuries are more common than fractures in children who have sustained facial trauma, particularly in younger children whose facial skeletons are resistant to fracture.⁶

During initial assessment of any facial injury, it is important to review the mechanism and time of injury and determine whether it was witnessed. Knowing the cause of the injury will be valuable during later exploration and debridement. Every effort should be made to cleanse the wound and remove all foreign material. If there is an open wound, the tetanus status of the child should be assessed and appropriate management should be commenced at the earliest.⁷

Facial injuries in children and adolescents always present a challenge to health care

professionals in respect of their diagnosis and management. This is particularly based on the behavioral and developmental aspects of the child.⁸

The wound healing response is generally more intense and accelerated in children, as they do not usually have compromising systemic disease or indulge in abusive habits such as alcohol or tobacco use.

The objective of this study was to know the incidence and pattern of facial injuries and to access the most feasible method for the management without hampering the facial growth.

Materials and Methods

The present study was conducted on 121 patients aged less than 18 years who reported with facial injuries at the Emergency and Outpatient Department of Otolaryngology and Head and Neck Surgery, Nepal Medical College and Teaching Hospital (NMCTH), Kathmandu, Nepal from October 2011 to September 2015.

Detailed information consisting of age, sex, socioeconomic status, and chief complaint was recorded. History of present illness, past medical history, dental history, etiological factors, duration of injury, and associated injuries were recorded. After recording the history, clinical and investigational examination of the patients was done to detect any, facial lacerations or abrasions, bleeding, soft tissue injuries, facial deformity, ophthalmic involvement, the status of intraoral or extra-oral swelling, degree of mouth opening, injuries to the dentition, deviation of midline, infection, etc. Written consent was taken. Patients were stratified into five age groups for analysis.

1. All patients up to the age of 3 years (infant and toddler stage),
2. 3 to 6 years (pre-school age),
3. 7 to 10 years (early school age),
4. 11 to 14 years (pubescence) and
5. 15 to 18 years of age (adolescence).

Depending on the extent of the injury the diagnosis was categorized as

- (1) Type I- Soft tissue injury;
- (2) Type II- Dental trauma; or
- (3) Type III- Fracture of facial bones

And the patients were divided accordingly. All the injuries were registered separately to permit analysis as to diagnosis.

The simple radiograph and computerized tomography was ordered for complicated injuries. On the basis of examination and investigations a suitable management approach was carried out.

Results

A total of 121 patients, who reported the ER or ENT OPD of NMCTH with facial trauma,

were included in this study over a period of 4 years. All the patients’ data were analyzed using SPSS 11.5 version.

Out of the total patients it was observed that the male children (68.6%) were injured more frequently than the females (31.4%) in all age groups.

The most common age group was 7-10 years where 45 children (i.e. 37.2%) were injured. followed by age group of 4-6 years which comprised 31 children (25.62%). Twenty-five patients (20.66%) were of age group 11 to 14 years followed by thirteen patients (10.75%) of three years of age and the least affected group was 15-18 years group, which comprised 7 patients (5.79%).

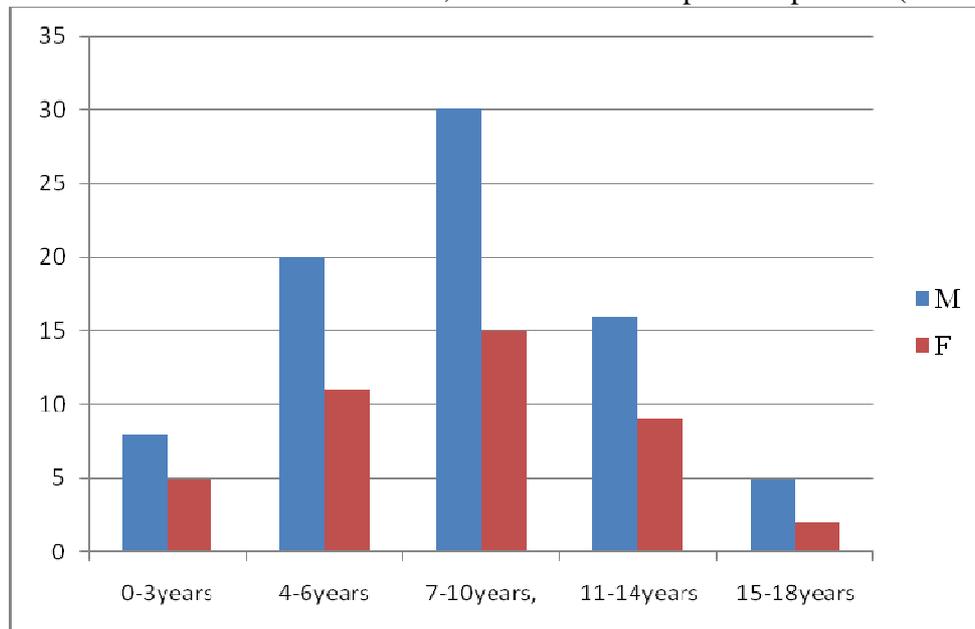


Figure 1: Chart showing age group and sex of child.

Place and cause of injury

Seventy-five children (61.99%) were injured while playing outdoors. Among them, most i.e. 31 children (25.62%) were from age group 7-10 years, followed by 21 (17.36%) and 17 children (14.05%) from age group of 11-14 and 4-6 years respectively. Forty-

six children (38.01%) were injured while playing indoors. Among them, most, i.e. 14 children (11.57%) were from each age group of 4-6 and 7-11 years, followed by 13 (10.74%), 4(3.31%) and one children (0.83%) were from 0-3, 11-14 and 15-18 years age group respectively.

Table I: Showing relationship between number of children according to age groups and place of injury.

Age groups(yrs)	Indoor	Percent	Outdoor	Percent	Total
0-3	13	10.74	0	0	13
4-6	14	11.57	17	14.05	31
7-10	14	11.57	31	25.62	45
11-14	4	3.31	21	17.36	25
15-18	1	0.83	6	4.96	7
Total	46	38.01	75	61.99	121

Forty-nine children (40.50%) mostly older, injured while playing outdoor sport like football or cricket or while playing or running outdoors on the ground. Among them, most common, sixteen children were from each age group of 7-11 and 11-14 years, while 13 and 4 children were from age group of 4-6 and 15-18 years respectively.

Accidents involving furniture accounted for injuries in 31 children (25.62%). Among them, 11 children were from age group of 7-11 years, followed by 10, 7 and 3 children from age group of 4-6, 0-3 and 11-14 years respectively.

It was seen that 15 children (12.4%) had sustained injury due to fall or dropped from bed. Most common age group affected was 0-3 years (40%). Road traffic accidents and physical assault were the cause of injuries to

13 (10.75%) and 10 (7.44%) children respectively. Among the road traffic accident cases, seven children (53.85%) were from age group of 7-10 years, three and two children were from age group of 4-6 years and 11-14 years respectively and single children was from age group 15-18 years. Physical assaults were seen in 10 cases (8.26%). Among them, six were from the 7-10 years age group, two cases were from 11-14 years age group and one each from age group 4-6 years and 15-18 years. There were three injuries (2.48%) reported due to dog bite, two were from age group of 7-10 years and one children was from age group of 11-14 years. There was a single case of homicidal cut injury in physical assault group, where the nose of the 12 years old child was chopped by his uncle.

Table II: Showing relationship between number of children according to age groups and causes of injury

Causes of Injuries	Different Age groups					Total no. of Children	%
	0-3yrs	4-6yrs	7-10yrs	11-14yrs	15-18yrs		
During sports activities.	0	13	16	16	4	49	40.50
Involving furniture	7	10	11	3	0	31	25.62
Fall/ dropped from bed	6	4	3	1	1	15	12.40
Road Traffic Accident	0	3	7	2	1	13	10.74
Physical Assault	0	1	6	2	1	10	8.26
Dog bite	0	0	2	1	0	3	2.48

Total	13	31	45	25	7	121	100
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Types of Injuries

Type I injuries was seen in the most of the younger patients, i.e. 88 patients (72.73%). All patients of 0-3, 4-6 and most of the patients of 7-10 years age groups sustained this type of injuries. Twenty-eight patients

(23.14%) presented with the type II injuries whereas only five children of older age presented with the more severe type III injuries where mandible or other bones were involved.

Table III: Showing relationship between number of children according to age groups and types of injuries.

Age groups	Types of Injuries			
	Type 1	Type 11	Type 111	Total
0-3	13	0	0	13
4-6	31	0	0	31
7-10	37	8	0	45
11-14	7	17	1	25
15-18	0	3	4	7
Total	88	28	5	121
Percentage	72.73	23.14	4.13	100

Time of injury

In the 0–3 age group, the peak incidence of injury was around 17:00 hours. More than 31% of all injuries in this group occurred around this time. There was a bimodal pattern for peak injury time in the 4–6 age groups. The first peak occurred at 13:00 hours and accounted for 22% of lacerations. A second peak occurred at 17:00 hours, and represented 12% of lacerations in this group. In the 7–10 age groups, a total of 35% of injuries were found to occur in this time. The majority of the injuries in the 11–14 years age group occurred around 15:00 hours. The timing for most of the injuries appeared to occur between 15:00 and 18:00hours.

Management of injury

Plain X-rays were obtained only in 15 children. Only five children had CT scan done. Four of these were in age group 15-18years and one patient was from age group of 11-14years.

All the eighty-eight patients who sustained type one injury, treated mainly by simple dressing. Most of the children (75%) of age group 0-3 and 4-6 who sustained minor lacerations were managed by antiseptic dressing using tissue adhesives or adhesive strips without any anesthesia.

The children who sustained type II injuries were treated mainly by suturing of the wound performed under general anesthesia (16%).Among type II injured children, those who had dental trauma were managed by exodontist. Children, who had sustained type II and III injuries were managed under general anesthesia. Type III injuries with naso-facial trauma was seen in three cases, in age group of 15-18years and treated by the close reduction under general anesthesia. Two patients who had mandible fractures were treated with open reduction and plating. One patient, 12years old male child who had cut injuries over the nose was

treated by fixation of the nose and suturing of the wound.

Discussion

This study was carried out in the tertiary center of Nepal that has a catchment area encompassing cities, several towns and rural areas, thereby providing a sample that reflects the general population as closely as possible.

Facial laceration in the pediatric patient is a common injury. It has been suggested that lacerations account for 3–4.4% of all pediatric attendances and 30–40% of all pediatric injuries.⁽⁹⁻¹²⁾ The lip and peri-oral region is the most common site of soft tissue injury in the head and neck region.⁽¹³⁾ In a survey by the British Association of Oral and Maxillofacial Surgery (BAOMS) have shown that children below the age of 15 sustained 39% of all facial injuries attending A&E departments in the UK⁽¹⁴⁾

Our data shows that the sex distribution of facial lacerations supports the findings of other studies broadly addressing maxillofacial trauma^(6, 13, and 14). This was true in all age groups.

It has been suggested that facial trauma is less frequent in early life up to approximately 5 years of life.⁽¹⁵⁾ The incidence of injury in our survey does not reflect this as 36.36 % of all facial injuries occurred in the 0–6 year groups. This finding is in agreement with several studies.^(14,16)

A bi-modal occurrence of injury was seen in the 4– 6 year age group. The initial peak time in this age group was 13:00hours. This would appear to coincide with school playtime. This could highlight the role of schools and teachers in injury prevention, in particular to ensure there is adequate supervision and to provide a safe environment for the children. The 0–3 year’s age group sustains the highest number of injuries at around 17:00 hours. This was also the second peak noted in the 4– 6 year age group. This may relate to less parental supervision at this time, especially by

working parents. It may be that the parents are unable to devote as much attention to the child at this time, because they are either fatigued, or pre-occupied with household duties.

As less than 3years start to gain independent mobility and begin to explore their environment, this potentially puts them at increased risk of injury. In our study, all the lacerations in children less than 3years of age, occurred indoors in the home environment (100%). This is in agreement with the BAOMSUK survey of facial injuries.⁽¹⁴⁾ In contrast, children above the age of 4 years sustained their laceration outdoors. The majority of soft tissue injuries in all groups occurred whilst the child was playing outside. This is supported by similar studies.^(15,17)

Lacerations which resulted from impact against furniture appeared to be particularly significant in the 0–3 year age group. In this group, all the injuries occurred as a result of either collision with furniture or falling down from furniture or from bed.

Three cases (2.48%) were of lacerations that resulted from a dog bite. Two dog bite cases were in 7–10years group and one case from the age group of 11-14years. All the dog bite cases resulted from being attacked by the pet dog. In this study, the cheek and lip were the two most common sites, but previous studies have found differing patterns ranging from nasal to auricular injuries with no comparable pattern of site.^(18,19)

This has clear implications regarding prevention strategies. This could include increasing parental diligence in keeping children away from dogs, and also perhaps, statutory legislation imposed on controlling ‘high risk’ breeds.⁽¹⁸⁾

Controlled trials have shown that educational programme appreciably increases the precautionary behavior of young children around strange dogs.⁽²⁰⁾

Though, some recent studies from developed countries have noted a significant reduction in facial injuries resulting from road traffic

accidents^(13,21) but, in our study, this accounted for injuries in thirteen cases (10.74%).

Physical assaults were seen in 10 cases (8.26%). A study in South Africa reported that almost half of all facial injuries in less than 18 year olds were as a consequence of violence.⁽²²⁾

Iida and Matsuya⁽²³⁾ identified an increase in maxillofacial injuries, especially fractures, in children who approach 13–14 years of age. They noted that the incidence of fall-related facial injury decreased in children older than 10 years, while assaults became a common cause in children older than 12 years. This observation may relate to social development as the child approaches adolescence, and other psycho-social issues, such as increased risk taking behavior or the development of anti-social traits, especially as children enter their early teens.

The management of these children was done considering the growth and development of the facial tissues.

Conclusion

The etiological and demographic findings associated with the presentation of facial soft tissue lacerations in our study are generally consistent with those reported in the literature. Facial trauma is a relatively common occurrence in young children, with a preponderance of minor injuries. As age increases, the severity of injuries sustained increases.

Overall, the vast majority of injuries in children and adolescents are minor to moderate. We feel that strategies are needed to improve parental awareness, and targeted programs should be developed with the aim to reduce the incidence of facial soft tissue injuries. Trauma prevention measures remain the most successful approach to reduce the incidence of some childhood injuries.

Conflict of Interest: None

References

1. Hogg NJ, Stewart T.C, Armstrong JE, Girotti MJ (2000) Epidemiology of

- maxillofacial injuries at trauma hospitals in Ontario, Canada, between 1992 and 1997. *J. Trauma*, 49 (3) :425—432
2. Lee KF, Wagner LK, Lee YE, Suh JH, Lee SR. (1987) The impact absorbing effects of facial fractures in closed head injuries: analysis of 210 patients. *J Neurosurg*. 66:542—547
3. Brown RD, Cowpe JG (1985) Patterns of maxillofacial trauma in two different cultures, A comparison between Riyadh and Tayside. *J R Coll Surg Edinb*, 30(5):299–302
4. Posnick JC, Wells M, Pron GE (1993) Pediatric facial fractures: evolving patterns of treatment. *J Oral Maxillofac Surg* 51:836–844
5. Fortunato MA, Fielding AF, Guernsey LH (1982) Facial bone fractures in children. *Oral Surg* 53:225–229
6. Gassner R, Tuli T, Hachl O, Moreira R, Ulmer H (2004) Craniomaxillofacial trauma in children: a review of 3,385 cases with 6,060 injuries in 10 years. *J Oral Maxillofac Surg* 62(4):399–407
7. Stefanopoulos PK, Tarantzopoulou AD (2005) Facial bite wounds: management update. *Int J Oral Maxillofac Surg*; 34(5):464–72
8. Islam S, Ansell M., Mellor TK., Hoffman GR (2006) A prospective study into the demographics and treatment of paediatric facial lacerations. *Pediatr Surg Int*, 22:797–802
9. Sibert JR, Maddocks GB, Brown BM (1981) Childhood accidents—an endemic of epidemic proportion. *Arch Dis Child* 56(3):225–227
10. Baker MD, Lanuti M (1990) The management and outcome of lacerations in urban children. *Ann Emerg Med* 19(9):1001–1005
11. Rivara FP, Bergman AB, LoGerfo JP, Weiss NS (1982) Epidemiology of childhood injuries II. Sex differences in injury rates. *Am J Dis Child* 136(6):502–506

12. Liebelt EL (1997) Current concepts in laceration repair. *Curr Opin Pediatr* 9(5):459–464
13. Shaikh ZS, Worrall SF (2002) Epidemiology of facial trauma in a sample of patients aged 1–18 years. *Injury* 33:669–671
14. Hutchison IL, Magennis P, Shepherd JP, Brown AE (1998) The BAOMS United Kingdom survey of facial injuries part 1: aetiology and the association with alcohol consumption. *British Association of Oral and Maxillofacial Surgeons, Br J Oral Maxillofac Surg* 36(1):3–13
15. McGraw BL, Cole RR (1990) Pediatric maxillofacial trauma. Age-related variations in injury. *Arch Otolaryngol Head Neck Surg* 116(1):41–45
16. Zerfowski M, Bremerich A (1998) Facial trauma in children and adolescents. *Clin Oral Invest*, 2:120–4
17. Baker MD, Selbst SM, Lanuti M (1990) Lacerations in urban children, A prospective 12-January study. *Am J Dis Child* 144(1):87–92
18. Karlson TA (1984) The incidence of facial injuries from dogbites. *JAMA* 251(24):3265–3267
19. Mcheik JN, Vergnes P, Bondonny JM (2000) Treatment of facial dog bite injuries in children, a retrospective study. *J Pediatr Surg* 35(4):580–3
20. Chapman S, Cornwall J, Righetti J, Sung L (2000) Preventing dog bites in children: randomised controlled trial of an educational intervention. *Br Med J*, 320(7248):1512–1513
21. Ong TK, Dudley M (1999) Craniofacial trauma presenting at an adult accident and emergency department with an emphasis on soft tissue injuries. *Injury* 30:357–363
22. Bamjee Y, Lownie JF, Cleaton-Jones PE, Lownie MA (1996) Maxillofacial injuries in a group of South Africans under 18 years of age. *Br J Oral Maxillofac Surg* 34(4):298–302.
23. Iida S, Matsuya T (2002) Paediatric maxillofacial fractures, their aetiological characters and fracture patterns. *J Craniomaxillofac Surg* 30(4):237–241