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CLINICAL STUDY

Pediatric injuries in maxillofacial trauma: a 5 year study

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Abstract Fractures of the facial skeleton in children are less frequent. This clinical retrospective study of 5 year was conducted on 95 patients aged less than 16 years who sustained maxillofacial injuries during the period 2003 to 2008. Age, sex, etiology incidence and type of fracture were studied. The ratio of boys to girls was 1.9:1. The 7–12 year age group was commonly involved and the highest incidence was at age of ten years. Falls were the most common cause of injury accounting for 41%, followed by road traffic accidents (30%). Sports related injuries, assault and child abuse were also the causes of injury in children. Dentoalveolar injuries were found to be highest incidence with 42.1% followed by mandibular fractures. The soft tissue injuries were associated the pediatric maxillofacial trauma were found to be 34.7% of all cases.

Keywords Pediatric injuries · Dentoalveolar fractures

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Introduction

Trauma, defined as bodily injury resulting from an external force, is the leading health problem that children are facing today [1]. Among all causes of pediatric maxillofacial trauma, the majority accounts for dentoalveolar trauma and soft tissue injuries, whereas the frequency of facial bone fractures is considerably low.

The incidence of pediatric facial fractures ranges between the 1% to 14% for the victims under the age of 16 years and 0.87% to 1% for those younger than 5 years. The incidence of pediatric facial fracutre among Indian's is 5.5% [2].

The general management of children after trauma requires special attention independent of the presence of maxillofacial injuries, for several critical differences exist when compared with adults, as follows:

1. Children are more prone to hypothermia due to a larger body surface area-to-overall mass ratio than adults.
2. Children may maintain a normal or borderline blood pressure level despite significant fluid loss and then decompensate rapidly.
3. Abdominal girth and the volume of the peritoneal cavity in infants and young children are relatively small. Significant intra-abdominal bleeding results in a rapid change in girth.
4. Children frequently swallow air when they are injured or frightened, resulting in gastric dilatation. This may be a source of confusion when evaluating the patient to rule out an acute abdomen.
5. The chest wall in children is pliable; major thoracic injuries may exist with fewer than expected signs of external trauma.
6. Infants are obligate nasal breathers. At the same time, their nasal air passages are relatively narrow and easily obstructed [3,4,5].

The child is more difficult to examine both clinically and radiologically. Further, it is more difficult to make use of teeth in children for fixation because the decidious teeth may be either insufficient in number or their roots may be resorbed, and permanent teeth may be incompletely erupted. The shape of the decidious crown being bell shaped with little undercut area is not favorable for the retention of wires and splints [6].

The study was conducted to analyze the data collected pertaining to children below the age of 16 years, who had sustained maxillofacial injuries and reported to Department of Oral and Maxillofacial Surgery, V S Dental College and Hospital, Bangalore from May 2003–April 2008, and evolve methods to minimize the incidence of these injuries in future.

Patients and method

A retrospective study of 95 pediatric patients with maxillofacial injuries was carried out for a period of 5 years (2003–2008). Data was collected for the medical history, signs displayed by the patients, and result of clinical and radiological examination.

Records of these patients were studied for age, gender distribution, etiology and the type of injuries. In injuries they were studied for facial bone fracture, dentoalveolar trauma and associated soft tissue injuries.

Results

From May 2003 to April 2008. 95 children younger than 16 years of age, were treated at the Dept. of Oral and Maxillofacial Surgery, V S Dental College and Hospital, (Rajiv Gandhi University of Health Sciences, Bangalore.

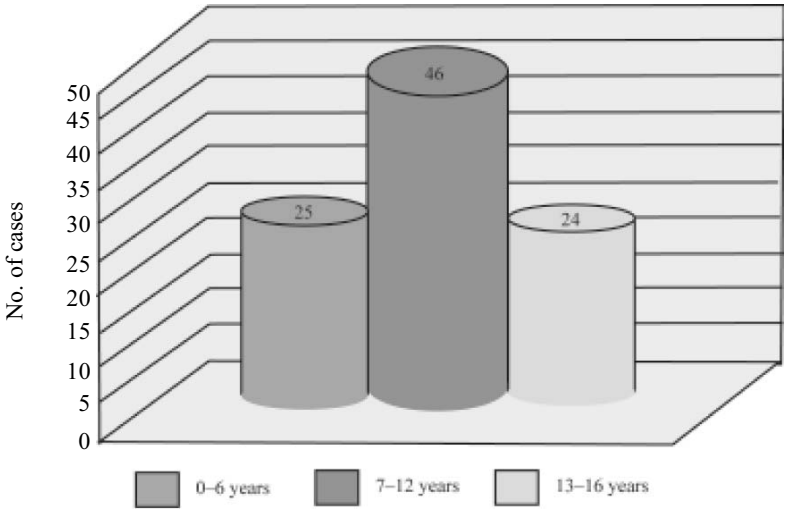
The incidence in relation to age can be seen in Fig. 1. It can be seen that 7–12 years age group is most commonly involved with the peak incidence at the age of the 10 years.

Gender distribution for injuries shows that out of 95 patients, 62 patients (65.1%) were males and 33 patients (35.9%) were females (Fig. 2).

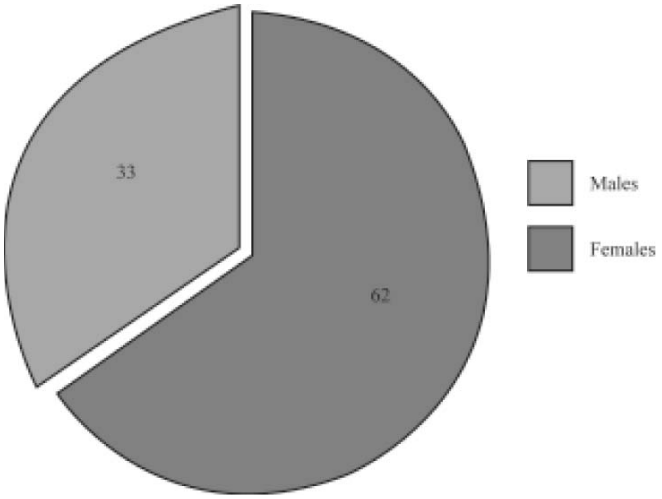
The aetiology of each injury was recorded from the patients case notes and causes are shown in Fig. 3. Falls were the most common cause of injury (41%), this was followed by road traffic accidents recorded in 29 patients (30%), sports related injury were found in 21 cases (22%), assault as a cause of injury account for 4.2% and child abuse by parents seen in only two of the patients (0.8%) (Fig. 3).

Altogether out of 95 patients 77 cases of facial fractures were recorded. Dentoalveolar fractures including maxilla and mandibular alveolus were the most common fractures encountered in our study (42%). This was followed by mandibular fractures observed in 28 of our patients (29.4%). The condylar region is the most common site of fracture in the mandible seen in 14 out of 28 patients with facial fractures. This was followed by fractures of parasymphysis and symphysis region (8 and 2 respectively). Nasal bone fractures were seen in 5 of our cases (5.2%). Maxilla has the least occurrence of injury in 4 cases (4.2%) (Fig. 4).

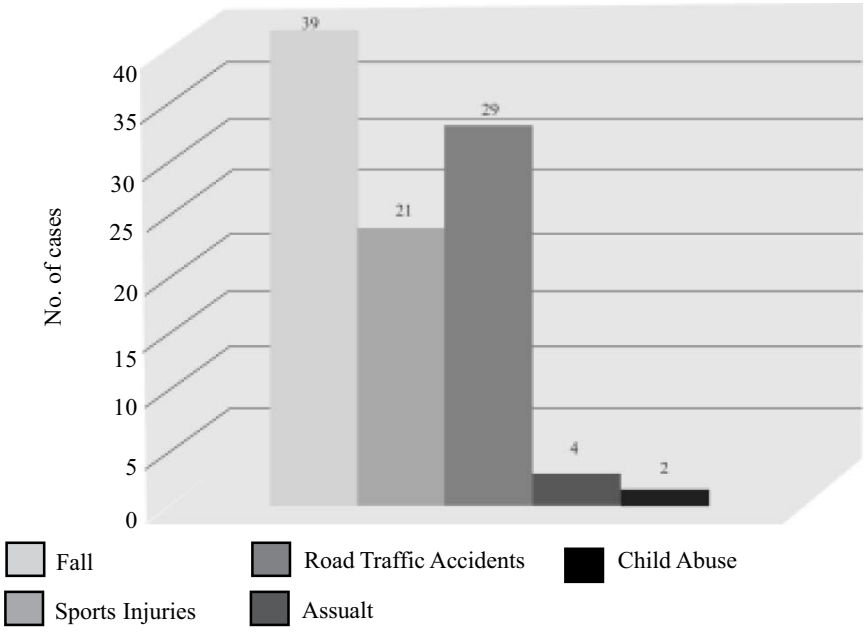
Age group distribution



Gender wise distribution



Aeitology of injuries



Discussion

The results of our study shows that frequency of maxillofacial fractures in children in our population is not high and there by confirms findings from the earlier studies [4].

In this study, common involved age group is 7–12 years with the peak incidence at the age of 10 years, Oji Chama [6] have also reported the peak incidence seen at the age of ten.

The preponderance of males with the pediatric injury (the actual male: female ratio was 1.9: 1 in this study) is in keeping with earlier studies of facial injuries [7]. The reason is that boys are generally more boisterous than girls and spend more time outdoors.

The aetiology of maxillofacial trauma in our studies reveals that falls were the main causative factor. This is in agreement with the reports of Anderson [7] and Bamjee et al. [8]. In infants and preschool children (upto age of 6 years), falls in home were most common. With increasing age

and outdoor exposure, falls tends to occur outside the protected area of the home and parental supervision. As the motor skills improve, sporting injuries become more common.

Road Traffic Accidents (RTA) were found to be second known cause of injuries as the age increases. Involvement in RTA as a pedestrian or bicyclist is a common cause of fractures in children of 10 and above [4,5].

Facial fractures seem to be less common in children younger than 5 years of age. It is believed that young children are less active and lighter in weight and, therefore, fall less frequently and less heavily, which may explain the lower incidence in children younger than 5 years of age.

The site and the pattern of the fracture depend upon the inter-relationship between etiology and force of the injury, and the unique anatomic features of child's stage of development [9]. While infants (below age of 2) are more likely to sustain injuries of the frontal region, older children are more prone to injuries of chin and lip region.

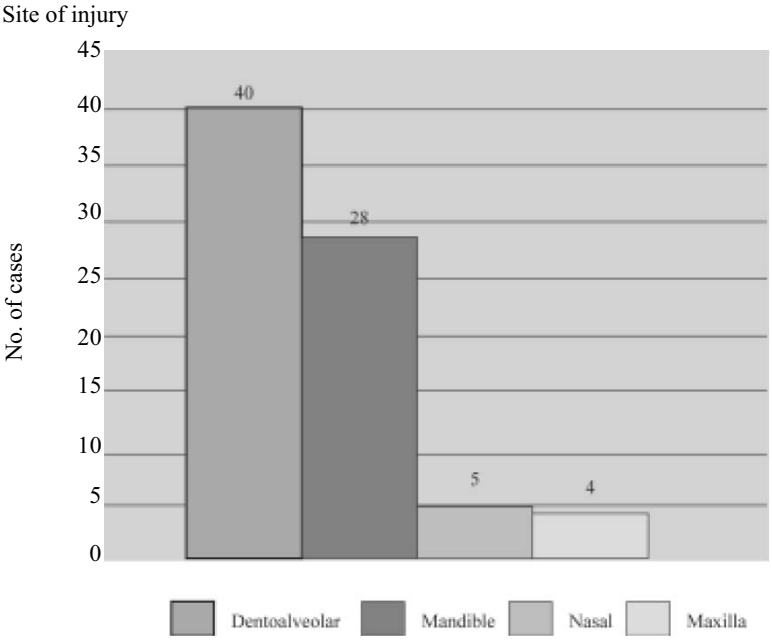
Haug and Foss [5] showed a significant incidence of dentoalvelolar injuries in pediatric population, our study also shows the highest incidence accounting for the 40% of maxillofacial trauma. The goal of treating dentoalveolar fractures includes restoration of a functionally stable tooth or teeth segment and preservation of the aesthetics. Pedodontist are best equipped to manage the specific needs of these patients.

Mandibular fractures are most common injuries in pediatric trauma [4], seen in 28 of our patients (29.4%). Condylar region is the most frequent fractured site, common in children. It is because the highly vascularised pediatric condyle and thin neck are poorly resistant to impact during fall. Mandibular fractures can be treated by acrylic splints with perimandibular wiring-for younger age group, open reduction and internal fixation is advised in older pediatric age and biodegradable plates also can be used in mandibular fracture in children.

Absorbable plates would seem to be the answer for all pediatric fractures. Unfortunately absorbable plates do have limitation. Absorbable plates are relatively bulky, and absorb over a relatively long period of time. Therefore, they may still result in some inhibition of facial growth when placed over across the growth centers. The screws are larger and have larger grooves making their use in comminuted thin bone impossible. Lastly, absorbable plates require additional time for placement due to the technique required to place these plates [10].

Table 1 UC Davis plating protocol

Age in years	
0–6	Absorbable or removable at 4–6 weeks
6–12	Absorbable or removable at 6–8 weeks
12–16	Absorbable or optional removal
16+	Treat as adult



Soft tissue injuries occur in association with the facial fracture in 29%–56% of cases [5]. The management of these injuries includes appropriate cleansing and closure of the wound as soon as is feasible. As with any open wounds, tetanus immunization status should be assessed and prophylaxis should be instituted.

Conclusion

Injuries in Maxillofacial trauma is relatively uncommon in children. As age increases, the severity of injuries sustained also increases. Overall, the vast majority of injuries in children and adolescents are minor to moderate. Falls account for the majority of injuries in younger age group, but with increasing age, road traffic accident become a major factor, and as a result fracture incidence increases with age. Opportunities for prevention are limited when it is considered that little can be done to prevent a fall. Preventable measures such as early correction of malocclusion and the wearing of mouth guard during contact sports have been recommended. Other opportunities are few but it should have been possible for the children to wear a helmet which covers the face during their biking activities and also when doing pillon on a motorcycle.

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