



An institutional experience in the management of pediatric mandibular fractures: A study of 74 cases[☆]



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ABSTRACT

Background: In maxillofacial surgery, children represent a special group of patients, as they have significant differences from adults as far as the facial skeleton is concerned. The etiology and epidemiology of pediatric trauma involving the facial skeleton has been reported in a large series of patients. Nevertheless, few of these reports review large numbers of pediatric patients, and little is known about treatment protocols for fractures in children. The aims of this study were to retrospectively analyze the treatment methods and outcomes of pediatric mandibular fractures in children and young adolescents up to the age of 15 years, to discuss the findings, and to propose treatment protocols for maxillofacial fractures in childhood.

Materials and methods: The present study retrospectively analyzed the treatment methods and outcome of the pediatric mandibular fractures in children and young adolescents' up to the age of 15 years over a period of 5 years. All patients were followed up for an average period of 18 months, with a maximum follow-up of 2 years. A total of 74 patients were treated for mandibular and dentoalveolar fractures in children up to the age of 15 years at the Department of Oral and Maxillofacial Surgery at Nair Hospital Dental College, Mumbai from 2007 to 2012.

Results: and **Conclusions:** The treatment methods used at our centre had satisfactory outcomes at the end of a follow-up period of 2 years. Reported complications were minimal. Our results confirm the usefulness of open reduction and plate fixation in older children (>12 years of age) and a conservative approach in younger children (≤12 years of age) in treating mandibular fractures.

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1. Introduction

Trauma, defined as bodily injury resulting from an external force, is the leading health problem that children are facing today.

Children and adults play different social roles and therefore might be susceptible to different variances in clinical features caused by social and economic development (Li and Li, 2008).

Maxillofacial trauma in a pediatric group of patients is particularly challenging, as these patients have significant differences from adults as far as the facial skeleton is concerned. These

differences include their small size of facial bones, limited/low pneumatization of the paranasal sinuses, presence of developing tooth buds in the jaws during the primary or mixed dentition, a rapid healing process, and, frequently, difficulty with compliance and cooperation as compared to that in adults (Iatrou I et al., 2010).

The etiology and epidemiology of pediatric trauma involving the facial skeleton has been reported in a large series of patients. However, few of these reports review large numbers of pediatric patients, and little is known about treatment protocols of fractures in children regarding the previously mentioned problems.

The occurrence of maxillofacial trauma in children is comparatively less when compared to that occurring in the adults. The mandible is the most commonly affected bone in pediatric maxillofacial injuries. The fracture patterns in children also differ from those of adults, because of anatomical variations and the presence of erupting tooth buds in the pediatric mandible. Accordingly, the treatment modalities for management of pediatric fractures also differ.

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The aim of the present study was to retrospectively analyze treatment methods and outcomes of pediatric mandibular fractures in children and young adolescents up to the age of 15 years over a 5-year period, and to discuss our findings based on our experience in managing these fractures. The objective of this study was to establish the fracture patterns, age and gender distribution, etiology, and various treatment modalities used in successful management of pediatric mandibular fractures at XXXX over the past 5 years (January 2007 to December 2012).

2. Material and methods

A 5-year retrospective study evaluated a total of 74 pediatric patients up to 15 years of age who were treated for mandibular fractures at the Department of Oral and Maxillofacial Surgery at XXXX, XXXX, from 2007 to 2012.

Data registered included age and gender, site and type of fracture, method of treatment, outcome, and follow-up to a maximum of 2 years.

Case files showed that the patients were treated either by closed reduction or open reduction, depending on the diagnosis, patient age, and associated clinical findings.

Patients less than 12 years of age were generally managed by observation in cases of mildly displaced fractures and by circummandibular wiring with lateral compression splints under general anesthesia in cases of moderate to grossly displaced fractures of the dentate portion of the mandible.

Patients between 12 and 15 years of age were generally managed by arch bar wiring and intermaxillary fixation whenever the occlusion was deranged. This was done under local or general anesthesia, depending on the patients' cooperation levels, and the remaining patients were taken up for open reduction and internal fixation under general anesthesia.

All patients were followed up for an average period of 18 months with a maximum follow-up of 2 years. Patients were evaluated for occlusion, facial symmetry, temporomandibular joint (TMJ) movements, and complaints, if any.

3. Results

The male-to-female distribution of the patients was 4:1 (60 males and 14 females). In this study, multiple fractures involving both sides of the mandible were the most frequent, and midline fractures were the least frequent (Fig. 1).

The age distribution of patients is shown in Fig. 2. The mean age of the patients was 9.5 years. The incidence of fractures was maximal in the 11- to 15-year age group (30 patients).

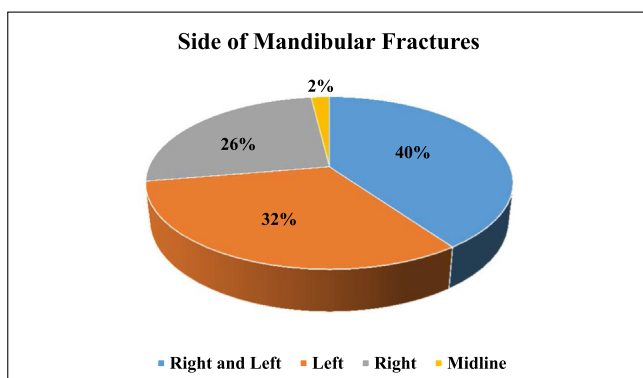


Fig. 1. Side of mandible fracture in study patients.

Injury sustained while playing was found to be the most common cause of fracture, occurring in 30 patients (41%). The next common cause of trauma was fall from height, in 23 cases (31%). Road traffic accidents and injury after being struck by heavy objects were the next most common causes of trauma in 14 (19%) and 4 (5%) cases, respectively (Fig. 3).

Isolated mandibular fractures were found in 48 patients, with the maximal involvement being that of the parasymphysis and symphyseal region (24 cases, 50%) followed by the dentoalveolar region (12 cases, 25%). The least common site for isolated mandibular fracture in children was the angle region (5 cases, 10%). A detailed diagrammatic representation is provided in Fig. 4.

In cases with multiple fractures involving the mandible, the most common site was the parasymphysis, along with the condyle (14 cases, 52%) with the least common being the parasymphysis with the body (1 case, 4%), body with angle (1 case, 4%) and bilateral para-symphysis fractures (1 case, 4%). A diagrammatic representation is presented in Fig. 5.

We found that 19 patients (25.6%) had condylar fractures, with or without associated fractures at other sites. Of these, 9 (12%) were displaced and 7 (9%) were not displaced; 3 patients (4%) had bilateral condylar fracture with displacement on one side. Of these patients with condylar fractures, 13 patients (17.5%) required intermaxillary fixation, the duration of which ranged from 10 days to 2 weeks.

The majority of patients were managed by means of compression plates and circummandibular wiring (29 patients, 39%). Of the patients, 13% (n = 10) required no treatment and 26% patients (n = 19) required stabilization with arch bars and other wiring techniques (Bridle, Risdon). In all, 22% of the patients (n = 16) requiring open reduction and internal fixation were in the age group of 11–12 years. The various treatment modalities used for patients in this study are shown in Fig. 6.

On follow-up, 15 patients (20%) were known to have developed complications. Difficulty in opening the mouth, asymmetry of the face, and malocclusion were the most commonly reported complications. Pain during jaw movements was reported in some patients. Fig. 7 shows the postoperative complications in the follow-up phase, with detailed reference to the number of patients in each type.

All of the fractures healed uneventfully. There were no cases of infection or osteomyelitis. There was no instance of pseudoarthrosis and no requirement for revision operations. Young patients did not complain of neurological disturbances, although this was rather difficult to evaluate in children. Bone healing was achieved at the fracture sites, and growth continued undisturbed until the time at which they were evaluated.

Postoperative evaluation showed occlusion to be satisfactory in most of the cases. More specifically, in condylar fracture cases, no mouth opening disturbances were noted other than a slight deviation of 2–3 mm toward the affected side on maximal mouth opening, which was not identifiable by most of the patients or their parents. No consequences of severe long-term limited mouth opening or TMJ ankylosis was seen. Dentoalveolar trauma healed without complications.

4. Discussion

During the past 35 years, there have been considerable advances in the prevention, diagnosis, and management of craniomaxillofacial injuries in children. This article is a review of the epidemiology, etiology, diagnosis, management, and follow-up of results of mandibular fractures in children.

According to the World Health Organization definition, children are considered to fall in the age range of 0–18 years. Children

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