

UNUSUAL MANDIBULAR FRACTURES OF VERY YOUNG CHILDREN AND THEIR MANAGEMENT AT TERTIARY DENTAL CARE CENTERS

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ABSTRACT

The orofacial trauma is common in the world and children are no exception. Fractures of the mandible are commonly seen in adults whereas they are hardly documented in children aged 2 years and below. The very young children had been reported with displaced mandibular chin fractures and in a few accompanied condyles. Patients were difficult to examine and in some cases sedation was used to assess the extent of injury.

All patients were clinically diagnosed as fresh mandibular fractures and postero-anterior (PA) and orthopantomograph (OPG) X-Ray s were utilized to confirm the diagnosis. Treatment with two options was considered;

1 Rigid fixation with 1.5 mm titanium micro-plates with mono-cortical screws in chin fractures only.

2 Acrylic splints with circumo-mandibular wires in associated condyles fractures.

Two patients had only deciduous central incisors present in their mouth and two had relatively erupted deciduous dentition at the time of injury. Patients were on bottle feeding. Three patients had additional condylar fractures. Patients treated with open reduction, healed very well without follow up complications whereas immediately after splint removal, one patient developed local infection which was controlled with a course of broad spectrum antibiotics. The long term results were excellent.

Key words: Trauma, mandible, fracture, splints and rigid fixation.

INTRODUCTION

The maxillofacial trauma is common in the world and the mandible is a common bone to fracture in the pediatric facial trauma. During the first years of life, the size and proportions of the facial skeleton change markedly. The facial skeleton increases in relation to the rest of the head, and the sinuses and dentition develop postnatally. The mandible is relatively small at birth and grows by remodeling.

McLennan 1956 reported that 1% of mandibular fractures occurred in children younger than 6 years¹. Rowe's 1969 stated 1% occurred in patients younger than 5 years². Thoren 1992 described that only 1 to 2% mandibular fractures occur in patients younger than 6 years³. Some authors reported an equal distribution between the gender and others describe 2:1 male predominance for pediatric mandibular fractures^{1,4,6}.

Children aged one year, fractures of the mandible are extremely rare whereas in older children common causes of oro-facial bony fractures are; road traffic accidents (RTA), falls, sports activities, violence and abuse assaults^{5,6,7}. Young patients are more difficult for evaluating occlusion and condyles. The Step-offs and instability of jaw opening may be the only apparent signs of the fracture of the mandible in these children.

The successful management of fractures should result in restoration of occlusion and facial balance. Usually, the deciduous teeth are not completely erupted before the age of 2 years and the children at this stage of development are treated as though edentulous and, if open reduction and fixation protocol is used, an intra-oral approach is preferred with mono-cortical screws at the inferior border of the mandible to avoid damaging the underlying developing teeth^{4,8,9}. The ability of rapid healing and remodeling of the bone decrease the

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duration of immobilization in pediatric patients and they are best treated within five days of the trauma^{10, 11}

The pediatric mandibular fractures are being observed in different parts of Pakistan but younger than 2 years are very uncommon. At our centers, the pediatric facial bony trauma up to age 2 years had been reported and we treated these patients, using two different management modalities, depending on presence of associated condylar fractures.

The purpose of this study was to highlight and treat these extremely uncommon fractures which are usually unnoticed by the parents or general practitioners with minimal postoperative complications.

MATERIALS AND METHODS

Eight patients were seen at Punjab Dental and Children Hospitals, Lahore from September 2003 to July 2005. All patients were evaluated as fresh displaced mandibular fractures at chin (symphysis & parasymphysis). Two patients accompanied bi-condylar and one unilateral condyle fracture on confirmation. The age of the patients ranged from six months to two years with 7:1 male predominance.

Patients were diagnosed clinically by the deciduous teeth alignment and confirmation of fracture was made by postero-anterior (PA) and orthopantomograph (OPG) radiographs. All patients were on bottle feeding and the cause of the trauma was falls (from hands and beds with 3:5 ratios respectively).

The management of these fractures was planned with two modalities;

- 1 Rigid fixation by 1.5mm titanium micro-plates adapted intraorally with 4 mm length mono-cortical self tabbing crosshead screws of 1.5diameter

- 2 Acrylic occlusal splints, after model surgery in occlusion, stabilized with circumo-mandibular 0.35 gauge wire in patients with associated condylar fracture

Patients were followed up at intervals for average 3 months. Spoon feeding was recommended only for one week and that was followed by routine bottle feeding. Postoperative X-rays were used to confirm the accuracy of the reduction and success of the surgical procedures. Patients were hospitalized for two days postoperatively and none of them reported infection or any serious complication.

RESULTS

The management of these very young children was planned with surgical intervention. Two patients had only deciduous central incisors in their mouth and two had relatively erupted deciduous dentition. Three condylar fracture patients including the only girl were treated with splints. Acrylic occlusal splints after model surgery were prepared and they were stabilized with 0.35 gauge circumo-mandibular wires in associated condylar fracture patients for two weeks. The purpose of the use of splints was to raise the posterior facial height and thus preventing inevitable complication of temporomandibular joint ankylosis in these patients.

Titanium micro-plates (rigid fixation) of 1.5mm were adapted intraorally with 4 mm long self-tabbing mono-cortical crosshead screws of 1.5mm diameter after open reduction in three chin fracture patients. The plates were fixed at buccal lower borders with care, not to damage the developing permanent tooth buds. The patients were advised spoon feeding for one week and then routine feeding. The statistics of the patients are shown in table 1.

Open reduction patients healed very well. No complication was noted in the follow up period. How-

TABLE 1

Patient	Age	Sex	Etiology	Associated #	Surgical protocol	Follow up
1	6mhs	Male	Hands fall	None	Open reduction rigid fixation	Excellent results
2	9mhs	Male	Bed fall	None	Open reduction rigid fixation	Excellent results
3	9mhs	Female	Hands fall	Bilateral condyles	Acrylic occlusal splint	Satisfactory
4	1	Male	Bed fall	None	Open reduction rigid fixation	Excellent results
5	1.4 yrs	Male	Bed fall	Unilateral condyles	Acrylic occlusal splint	Satisfactory
6	1.8 yrs	Male	Bed fall	None	Open reduction rigid fixation	Excellent results
7	2 yrs	Male	Fall	None	Open reduction rigid fixation	Excellent results
8	2 yrs	Male	Jump fall	Bilateral condyles	Acrylic occlusal splint	Mild anterior open bite/wire infection

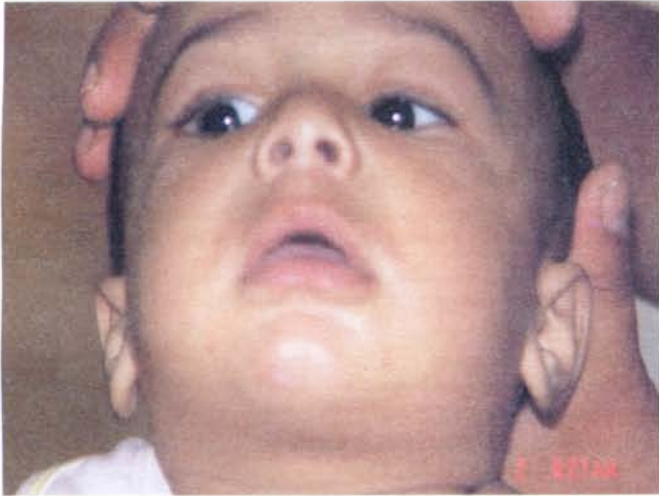


Fig. 1. Fracture Mandible Preoperative

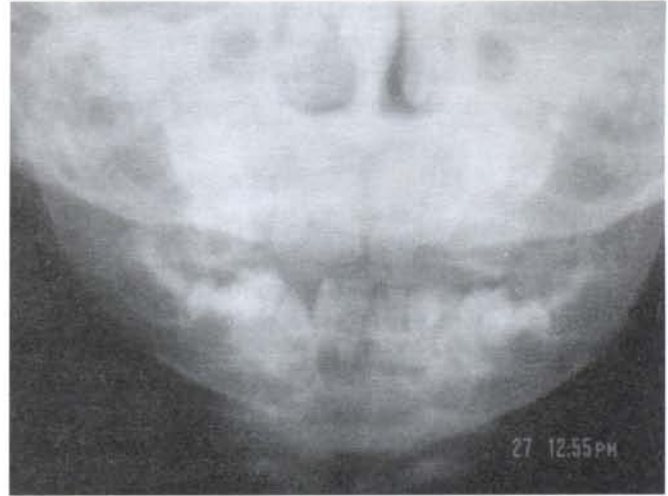


Fig. 2. Fracture Mandible Preoperative X-Rays



Fig. 3. Fracture Mandible Exposed



Fig. 4. Fracture Mandible Micro-plate in Position



Fig. 5. Fracture Mandible Postoperative X-Rays

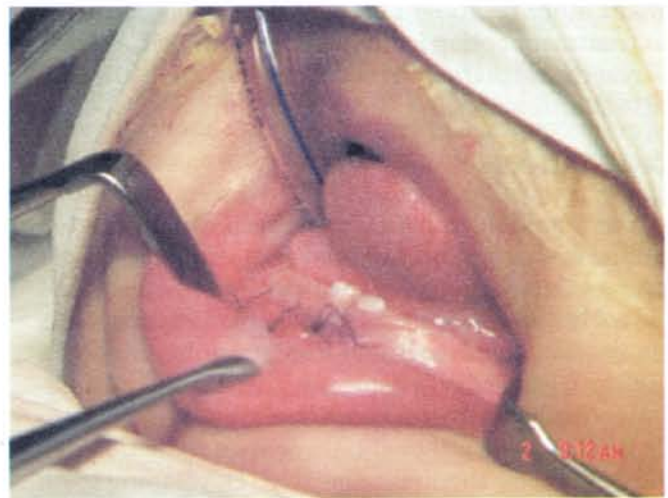


Fig. 6. Fracture Mandible Treated

ever, after the splint removal, one patient developed local infection which was controlled with a course of broad spectrum antibiotics. The overall success and results were excellent as shown in figures 1 to 6.

DISCUSSION

The management of mandibular fractures in children is not much different from adults. It ranges from conservative treatment to open reduction and fixation¹⁶⁻¹⁰⁻¹². Treatment with close reduction is favoured whenever possible as open reduction either limits or interrupts the osteogenic potential of the periosteum which results in scar formation that further restricts the growth in children^{12, 13}. Common complications of childhood facial bone trauma are the post-traumatic temporomandibular joint ankylosis and facial asymmetry^{12, 14}.

Aged 2 years and below, the mandibular fractures are not documented in Pakistan whereas it is 1% in literature^{2, 15}. In Pakistan it is either being ignored by the parents or overlooked by general practitioners. Socioeconomic status of patients and non-availability of trained specialists also contribute to subsequent temporomandibular joint ankylosis^{14, 16}.

During two years, we observed 8 patients up to age 2 years with fracture mandible body. Three out of these had also condylar fractures. The condylar fracture patients had mostly slipped from hands during thriller jumping in the air by relatives whereas one fell from bed. The treatment option in condylar fractures was with transparent acrylic splints to avoid postoperative late complications. Many authors have recommended splint treatment in mandibular fractures to prevent future joint ankylosis¹⁷⁻¹⁹.

Open reduction with rigid fixation was advocated in displaced mandibular fractures and in very young patients as not much primary dentition was present to support other treatment options. The rigid fixation is best treatment option for displaced fresh fractures^{10, 20}. The resorbable plates are recent development, alternative to titanium plates²¹.

CONCLUSION

The mandibular fractures at chin are highly uncommon in children below two years of age. Fractures with associated condyles are difficult to diagnose and need early assessment, and management to avoid late complication of temporomandibular joints ankylosis. Children with incomplete primary dentition, the mandibular displaced fractures are best treated as edentulous jaw and need either splints or open reduction and rigid fixation for their management. Developing tooth buds should be preserved while performing open reduction and rigid fixation.

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