

Rationale for Treating Mandibular Fractures in Mixed Dentition

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ABSTRACT

The treatment protocol of mandibular fracture reduction and fixation differs from adults to children because young child has dentition development and mandibular growth process. Many concerns like the cooperation of the patient, displacement of fracture, the skeletal and dental age of the patient are the main factors determine the treatment plan. First option is always the conservative approach. If indicated, we can opt for open reduction and stable fixation as inadequate reduction and fixation will lead to malunion and contour deformities.

Keywords: Pediatric, Displaced mandibular fracture, Cap splint, Circum mandibular wiring, Miniplate fixation.

INTRODUCTION

Oral & maxillofacial fractures in the pediatric group are comparatively less common. 1/3rd of facial fractures in children include mandibular fracture. The most common mandibular fractures in children are sub condylar, next the angle region followed by parasymphysis and the body fracture are comparatively rare.¹ Self inflicted trauma, fall from heights, road traffic accidents, child abuse, assault are the causes of mandibular fracture in children.² Facial trauma in children can often be challenging to manage with long-term

consequences involved and the psychological impact.

Management of mandibular fracture in children is controversial and complicated especially at mixed dentition period due to loose deciduous teeth, underlying permanent tooth bud, high osteogenic potential and healing capacity of developing bone.³ The fractures been treated by different methods of fixation. Incomplete or nondisplaced fractures can be managed conservatively or by closed reduction. If sufficient appropriate reduction of facial bone fractures is not achieved by any other means, then rigid fixation should be performed.⁴

Here in this case report, we share our surgical experience of management of severely displaced mandibular body fracture in a 12years old female in mixed dentition period with closed cap splint circum mandibular wiring followed by open reduction and internal fixation under general anaesthesia.

CASE REPORT

A 12years female child came to the oral & maxillofacial surgery department with a chief complaint of severe pain in the right lower back jaw since night. History stated that the patient had alleged to meet with a self-inflicted injury with hand pump last night. On general examination, all her vitals were stable. On extra oral examination, on

inspection, the patient was having difficulty in closing her mouth due to severe sustained pain and there was a small laceration at the inferior border on the right mandibular body. Intra orally, there was a visible step deformity at 84, 85 and 46 regions causing the distal fracture segment to displace lingually and the 85 had superiorly displaced causing the hinderance to completely close her mouth. (Figure.1) On radiographic examination, the fracture was evident with step deformity at the right inferior border of the body of the mandible, causing the severe displacement of the distal fracture fragment. (Figure.2) The diagnosis made as fracture mandible at right body. Initially the case was planned for the closed reduction with manipulation under local anaesthesia. But the patient was very much uncooperative during the procedure. So, the case was planned to operate under general anaesthesia with cap splint circum mandibular wiring. For that the patient's maxillary and mandibular impressions had been taken, casts poured, then slicing, adjusting the mandibular cast into pre-existing near normal occlusion and the closed cap splint was made. (Figure.3)

Under general anaesthesia, 85 got extracted and the fractures got reduced by digital manipulation (figure.4) and the cap splint was secured with circum mandibular wiring. (Figure.5) So, the superior border was stable but still there was a step deformity at the inferior border, so on table decision to open the fracture site, anatomical reduction followed by thin miniplate fixation has been made. An intra oral incision is placed in the vestibular region to expose the fracture site at the inferior border; careful minimal periosteum stripping was done. Anatomical reduction of fracture was achieved followed by the fixation of a 2mm miniplate almost near the inferior border. (Figure.6) The surgical wound closed with 3-0 viacryl after through irrigation. The patient was periodically reviewed postoperative OPG has taken (Figure.7) and in the fourth postoperative week, the circum mandibular wiring and splint was removed. The fracture segments are stable and postoperative recovery was uneventful and occlusion achieved was satisfactory and case has been evaluated regularly, there was no mandibular growth retardation observed.



Fig.1- Intra Oral displaced segment



Fig.2- Pre op OPG



Fig.3- Cap splint



Fig.4- Reduction achieved

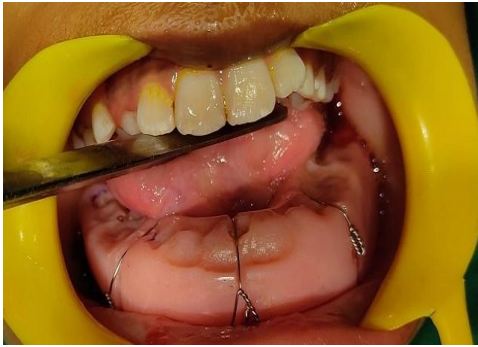


Fig.5- Stabilization of splint with Circum mandibular wiring

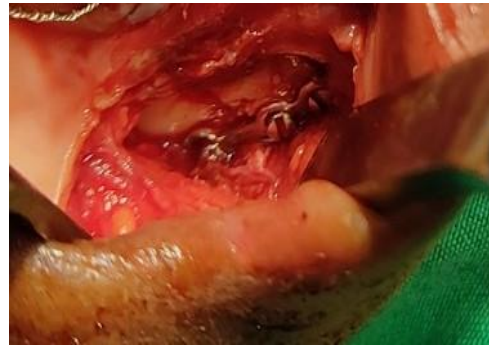


Fig.6- Mini plate fixation done



Fig.7- Post op OPG

DISCUSSION

Till the mid-seventies, closed reduction by means of IMF was used for all types of pediatric fractures.⁵ Depending on the type and pattern of injury, the treating surgeon may choose a conservative approach with soft diet and observation or an operative approach. Closed reduction with maxillomandibular fixation (MMF), splinting techniques, or open reduction and internal fixation come under operative techniques.⁶

The treatment modality for displaced mandibular body fractures in young ages is debatable, between conservative treatment methods (arch-bars, eyelets, splints) which are considered as closed reduction and ORIF.⁷ During mixed dentition between ages 6–12 years, the teeth should be evaluated for stability and strength for MMF. Primary tooth roots are being resorbed during this stage, which may lead to presence of loose teeth that are not amenable to MMF use.⁶

Manual closed reduction of displaced fractures considered when the displacement is minimal and can be achieved with the patient under anesthesia followed by

immobilization in MMF. Closed reduction using prefabricated open/ closed cap splints, modified orthodontic brackets, orthodontic resin and rubber elastics, and modified orthodontic splint appliance.⁸ The advantage of closed reduction over open reduction is its low cost, lesser surgical as well as psychological trauma to the patient and reduced risk of trauma to the developing teeth and other vital anatomical structures.

Today, open reduction and rigid internal fixation (ORIF) has become the standard of care for management of displaced fractures and in the cases where the reduction is not possible by any other methods. ORIF includes micro or miniplates or biodegradable devices.⁷ Indications for ORIF for pediatric mandible trauma are rare, and include complex, multiple fractures of the tooth-bearing regions of mandible, severely displaced fractures, and fractures with an anterior open bite and malocclusion that cannot be reduced and immobilized with MMF alone.⁶

ORIF of mandibular fractures results in a faster bone healing, because of its rigid fixation offers lack of mobility between fracture segments. At the same time, it

carries the risk of interference with growth, plate migration, and stress shielding owing to the placement of the hardware.¹⁰ Open reduction should be performed cautiously, with minimal manipulation of overlying soft tissues to avoid growth retardation and deformity. When performed properly, it is a safe and versatile treatment modality.⁹

CONCLUSION

In treating the pediatric mandibular fractures, first option is always the conservative approach. If indicated, like in the present case, we can opt for open reduction and stable fixation as inadequate reduction and fixation will lead to malunion and contour deformities. Minimal stripping of periosteum should be mandatory. As excessive periosteal stripping can cause scarring and growth retardation. Care must be taken to avoid damage to the developing dentition and vital structures. Case should be periodically evaluated. In case of any mandibular growth retardation, second surgery is mandatory to remove the miniplate after the osteosynthesis of fracture segments.

Declaration by Authors

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