Case report

SURGICAL REPOSITIONING OF DEVELOPING CANINE AND CIRCUMMANDIBULAR WIRING OF PARASYMPHYSIS FRACTURE IN A FOUR-YEAR-OLD CHILD- A 1 -YEAR FOLLOW UP CASE REPORT

ABSTRACT:

Mandibular fractures are the most common (56%) facial skeletal injury with a prevalence of 0.6-1.4% below the age of five. This is attributed to the constant supervision of parents and is seen to increase as child begin school peaking during puberty and adolescence due to increased sport and unsupervised physical activity.

The goal while treating Paediatric fractures is to ensure bony union, normal occlusion, restore normal form and function, and avoid impediments to normal growth. Management of mandibular fractures in paediatric patients depends upon the fracture type, site of fracture & the phase of dental and skeletal development.

The Authors managed to treat a 4-year old Parasymphyseal fracture associated with inversion of permanent canine tooth bud using surgical repositioning and Circummandibular wiring.

Keywords: Facial trauma, Mandibular fracture, Circummandibular-wiring, Displaced tooth bud

INTRODUCTION:

In hospitalised paediatric trauma patients, mandibular fractures are the most common (56%) facial skeletal injury.[1] Their prevalence is low below the age of five (0.6-1.4%) and increases as children begin schooling, with peaks during puberty and adolescence, with a predilection for boys, owing to increased sport and unsupervised physical activity.[2-3] The etiological factors reported are motor accidents, sports injuries, falls and victims of child abuse.[1]

The most concerning aspect for while treating paediatric patients is the effect of trauma/treatment on growth and development, which differs from adults.[4] Other factors affecting growth and development are anatomic and physical factors which are equally significant, and can have diverse effects on management.[5]. Frontal prominence reduces in size making the facial bones to emerge from the shelter of the cranial base.[3,6] Pediatric maxillofacial complex is influenced greatly by cancellous-to-cortical ratio and has higher osteogenic and bone remodeling potential.[7]

This article, presents effective management of Paediatric parasymphysis fractures associated with traumatic inversion of permanent canine tooth bud by circummandibular wiring.

CASE REPORT

A 4-year-old female child reported to the Outpatient Department of Pedodontics and Preventive Dentistry, with a chief complaint of pain in her lower left face. On eliciting history, a fall from travelling autorickshaw was reported following which she sustained injuries to her face.

On extra oral examination, multiple wounds over the left face was noted with a solitary ovoid swelling associated with step deformity at the symphyseal region measuring approximately 2cm in diameter which was tender on palpation. Intraoral

examination revealed deranged occlusion and segmental mobility noted between 71 - 72 region and associated vestibular tenderness.(Figure 1) On radiographic examination, inversion of 33 tooth bud along the fracture line was noted (Figure 2). Based on the above finding, a diagnosis of left para-symphyseal fracture with traumatic inversion of permanent canine tooth bud was made.

Impressions of maxilla and mandible were taken for the fabrication of closed acrylic cap splint. Under general anaesthesia, the fracture segments were carefully exposed and displaced to facilitate for instrumentation of surgical repositioning of the tooth bud in 33.(Figure 3,4) Closure of the wound was done using 3-0 Vicryl suture and fracture segments were later reduced and held in place by means of circummandibular wiring using the cap splints. (Figure5)

Postoperatively, patient was continued on analgesic and antibiotic regimen. Soft diet, avoidance of physical activities, and antibacterial mouth rinse were prescribed. No signs of complications were observed during the healing period. Post operative radiograph shows the successful reposition of the 33 tooth bud and reduction of fracture segments. (Figure 6) 1-year follow-up shows the unhindered eruption pattern of the 33tooth bud. (Figure 7)

DISCUSSION:

Maxillofacial fractures in the pediatric population comprise of less than 15% of all facial fractures. Numerous studies have reported almost similar data of a decreased occurrence of mandibular fractures in children when compared to adults, ranging from 1% to 15%.[2,3,8]

Management of mandibular fractures in pediatric patients depends upon the type of fracture and the phase of dental as well as skeletal development. Main

concerns while treating the pediatric mandible fracture are mandibular growth and development of dentition. Factors that can increase the risk of managing mandibular fractures are small jaw size, the presence of developing permanent tooth buds, and existing active growth centres.[6]

To be noted is that children have a higher osteogenic potential and a rapid healing rate when compared to adults. Thus, anatomic reduction must be achieved earlier and immobilization periods must have a lesser time period (two weeks instead of four–six weeks for adults).[2,3,9] Based on the type of fracture and the patient's stage of development, immobilization and fixation of the fracture segments can be achieved by means of maxillomandibular fixation (MMF) or internal skeletal fixation or a combination of both these methods.[2,3,5]

Intermaxillary fixation (IMF) using the teeth in pediatric facial fracture patient may prove to be more difficult than in adults. This may be due to decreased availability of teeth, resorption of roots of deciduous teeth, surfaces of the teeth not being retentive for etching procedure, and unfavourable form of the crowns of deciduous teeth for the fixation of interdental wires and arch bars.[3,10,11] Posnick stated that approximately 42% of mandibular fractures in his series were managed by closed reduction, specially with the help of maxillomandibular fixation (MMF).[12]

In present times, open reduction and internal fixation (ORIF) have become the gold standard for the treatment of displaced pediatric mandible fractures.[3,4,10,11] This procedure uses fixation with miniplates, microplates, or bio-degradable plates. Although ORIF provides three-dimensional stability, promotes primary healing, and shortens the treatment time, several risks are associated with the ORIF for the management of the pediatric mandibular fracture such as damage to the developing

tooth buds; however, in a specific age group, plate fixation is possible at the inferior border of the mandible away from the developing tooth germs.[10,13] In addition this also carries the risk of interference with growth, plate migration and stress shielding owing to the placement of the plates. Allergic reaction to the metal leads to inflammatory sequelae, which necessitates further elimination of the plating hardware. Corrosion and freeing of metal ions can also be a cause to avoid the internal fixation devices.[10]

At the same time this case shows, surgical repositioning is a treatment option for displaced developing teeth germ to avoid dilacerations with subsequent impaction. Other methods for the treatment of an impacted permanent tooth are surgical exposure followed by orthodontic extrusion or the extraction of the impacted tooth.[14,15] Kuroe et al. reported that an early time of operation favors a better ability to mobilize the tooth, and the risk of damaging the developing root is smaller.[16] Any damage to the periodontal ligament during the operation can result in root resorption and/or ankylosis or in arresting of further root development. As this case shows, a repositioning is also possible even if root development has not started. Therefore the risk of damaging the root is even more reduced.[16,17]

Surgical repositioning is a fast and cost effective treatment alternative for displaced permanent tooth germs and can be successful in avoiding later malformation of the permanent teeth.[18]

Complications such as postoperative infection, non-union, and malunion are less common when closed reduction is done properly, due to the higher osteogenic potential, rapid healing rate, and less common necessity for open reduction and rigid internal fixation. In addition, a large number of fractures are minimally displaced to

undisplaced. However, TMJ dysfunction, restricted condylar translation, deviation upon mouth opening and growth disturbances like hypoplasia of mandible or asymmetry, and secondary midface deformity usually occur with severe comminuted fractures in pediatric patients.[3,10]

CONCLUSION:

In conclusion close reduction is preferred in mandibular fractures in a young child, whenever intervention is needed. In a younger pediatric patient, an acrylic splint fixed to the mandible with the help of circummandibular wiring can successfully eliminate the need of IMF.

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LEGENDS:

Figure 1: Fracture seen in between in 71-72 region.

Figure 2: Preoperative panoramic radiograph

Figure 3: The site of fracture was expanded to gain access to 33 tooth bud.

Figure 4 : The displaced tooth bud (33) was repositioned

Figure 5 : Repositioned and the site of fracture was reduced to normal anatomical site and tied stainless steel wire.

Figure 6 : One year follow up clinical photo

Figure 7 : One year follow up OPG

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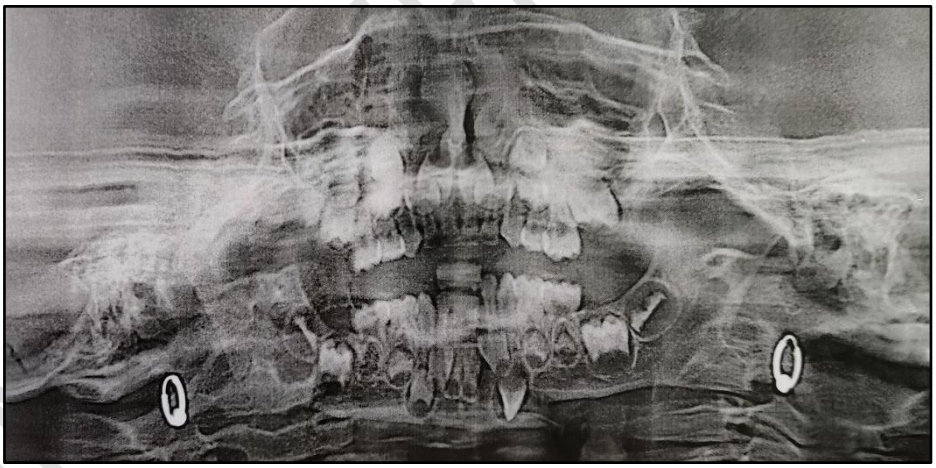
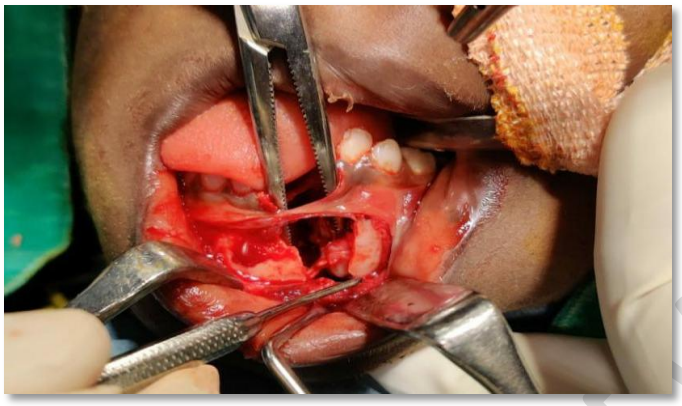


Figure 2 :Preoperative panoramic radiograph



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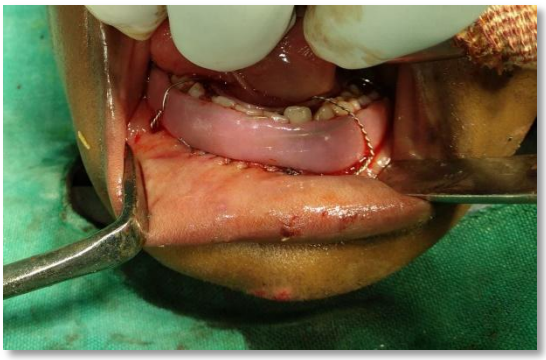

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