



Management of Mandibular Fracture in Pediatric Patient

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Abstract

A pediatric mandibular fracture can cause a child severe pain and the parent or caregiver extreme worry. While the pattern of fractures in children is similar to adults, however, due to a number of factors, including the anatomical complexity of the developing mandible, management of such fractures differs from that of adults and can greatly challenge the pediatric dentist. Various treatment modalities of managing mandibular fracture are available, such as closed/open acrylic splint with circummandibular wiring, arch-bar fixation, and cementation of the cap splint. We showed an interesting case of a 10-year-old male, that we treated with acrylic splint as a mandibular fracture treatment with satisfactory results.

Keywords: *splint, mandible fracture, pediatric trauma.*

Introduction

Pediatric fractures are rare when compared with fractures in the adult population and are estimated to occur in 5% of all maxillofacial traumas.[1] Mandibular fractures are the most common (56%) facial skeletal injury in hospitalized pediatric trauma patients.[2] Boys are affected twice as frequently as girls.[3] Major injuries affecting the face are associated with respect to hyperactivity of the child, fall, road traffic accidents, assault, and child abuse, which are the most frequent risks of facial bone fractures in children.[4] However, due to the elasticity of the mandible, embedded tooth buds that hold the fragments together “like glue” and a short thick condylar neck which tends to resist fracture,[5] thus the majority of the body and symphysis fractures in children are undisplaced. If displaced, closed reduction and immobilization are performed.[6] Most fractures have been treated conservatively by dental splints and rubber elastics and acrylic splint with circummandibular wires.

Acrylic splint provides close reduction and stabilization of mandibular fracture and allows hygiene maintenance without disturbing tooth buds.[7] A long-term follow-up is necessary to monitor the growth of tooth buds and related abnormalities. This paper reports the management of mandibular fracture in a pediatric patient with cap splint.

The purpose of this article is to provide an insight on mandibular injuries in a pediatric patient and to assist the clinician in the management of mandibular fracture in children, also highlighting the role of acrylic splint with the use of circummandibular wiring technique in the management of displaced right premolar area fracture in a 10-year-old child.

Case Report

A 10-year-old boy reported to the Maxillofacial Department, Princess Marina Hospital with a history of fall while playing 2 days ago. After the fall from a tree, the child did not lose consciousness, had no history of vomiting or convulsions. There was a history of bleeding from gums, difficulty in the closing mouth and chewing food.

Clinical examination revealed a diffuse extra oral swelling in the right lower one-third of the face causing a asymmetry of the face, difficulty in opening and closing the mouth, and a cut on the chin. Intraoral examination revealed a vertical fracture line between right mandibular first and second premolar, dentoalveolar segment with step deformity and altered occlusion leading to an open mouth appearance [Figure 1]. Preoperative antero-posterior Mandible x ray was taken [Figure 2], which confirmed right premolar area fracture. Patient was evaluate by pediatrician and orthopedic specialist, but not others injuries or fractures.



Figure 1. Bone step on the right premolar area



Figure 2. Mandibular Antero-posterior X-ray showing fracture on the right premolar area

After being admitted to the Pediatric Surgical Ward (PSW) and starting treatment with analgesic, antibiotic and anti-inflammatory medication, upper and lower arch alginate impressions were taken by orthodontics specialist, and working cast were poured. An acrylic splint was fabricated; [Figure 3] in order to subsequently perform the surgery on the cast and help to fabricate the acrylic splint used for the reduction and fixation of the fracture. Mandibular fracture was immobilized, fixed with the acrylic splint that was retained by circummandibular wiring. Circummandibular wiring was done under general anesthesia by placing a small-stab incision on the inferior border of mandible on the right and left area. The mandibular bone awl was used to enter lingually along the body of the mandible and piercing lingual mucosa the wire was fed and passed onto buccal sulcus along the body of the mandible. Wire held together and stent stabilized by winding wire in a clockwise direction at right molar region. The same procedure was repeated on the left side another circummandibular wire was placed at the left body region to stabilize the fractured fragment at the lower border of mandible [Figure 4]. Postoperative x-rays were taken with circummandibular wires in place [Figure 5]. The patient was reviewed every week and on the fourth postoperative week, the circummandibular wiring and splint was removed under ketamine sedation]. No mobility was present at the fracture site. Postoperative recovery was uneventful and occlusion achieved was satisfactory after 6 months occlusion was normal and patient and family were happy with the result [Figure 6].



Figure 3. Working cast /Acrylic splint



Figure 4. Circummandibular wiring done bilaterally

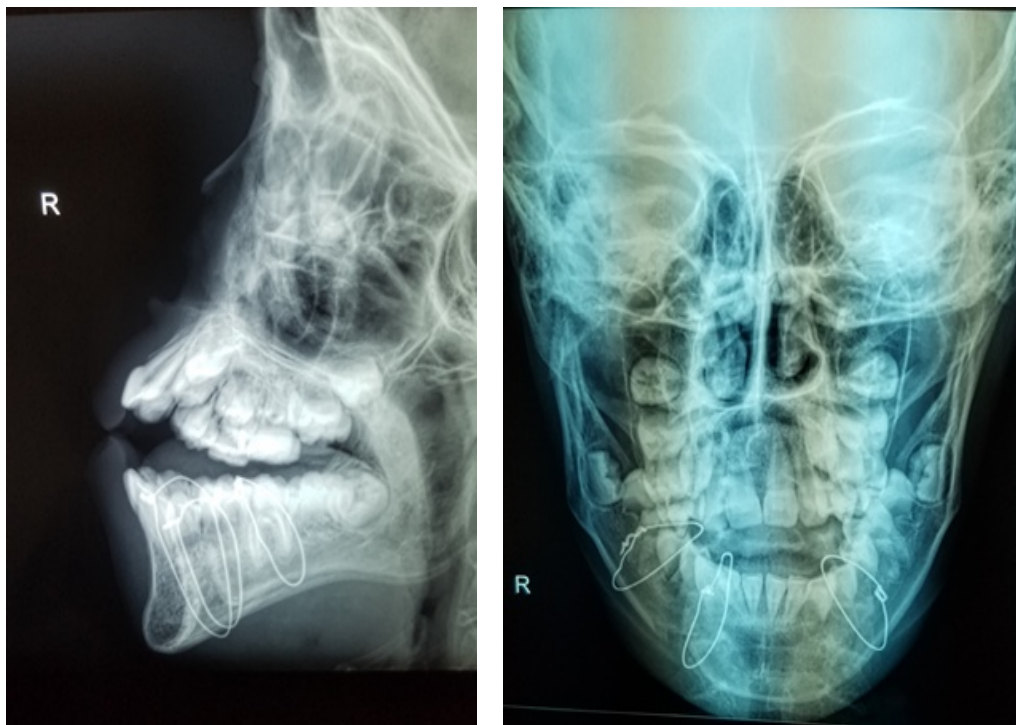


Figure 5. X-ray showing circummandibular wiring is done bilaterally

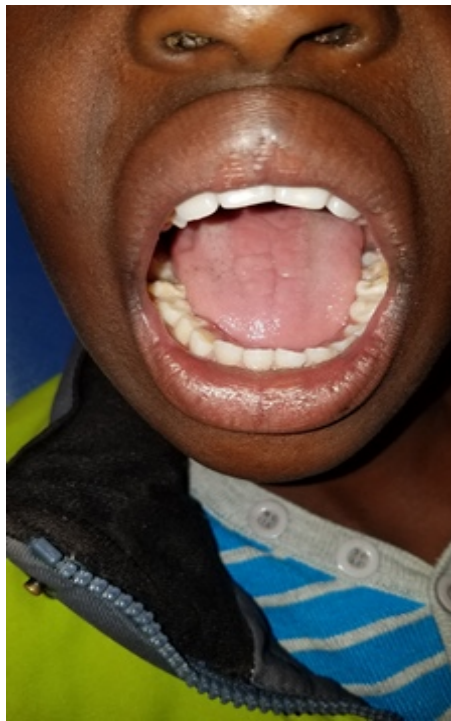


Figure 6. Post-operative evaluation after 6 months

Discussion

Mandibular fractures are very rare in children; however, still, mandibular fracture is the most common form of facial injury occurring in pediatric age group.[8]

The management of mandibular fractures in children differs somewhat from that of adults mainly because of the concern for possible disruption of growth. In children, the final result is determined not merely by initial treatment but by the effect that growth has on form and function.[9] The shape and shortness of deciduous crowns may make the placement of circummandibular wires and arch bar slightly more difficult in children. While doing open reduction and fixation, the presence of tooth buds throughout the body of mandible must be a consideration as trauma to developing tooth buds may result in failure of eruption of permanent teeth and hence narrow alveolar ridge.[10] Several studies have recommended the use of prefabricated acrylic splints as a treatment for pediatric mandibular fractures. These splints are more reliable than open reduction or Intermaxillary fixation (IMF) techniques with regard to cost-effectiveness, ease of application and removal, reduced operating time, maximum stability during healing period, minimal trauma for adjacent anatomical structures, and comfort for young patients.[11]

The patient in the present case was treated with closed reduction using acrylic splint and circummandibular wiring. Various other methods have been suggested for closed reduction using prefabricated open cap splints,

modified orthodontic brackets, orthodontic resin and rubber elastics, and modified orthodontic splint appliance.[12] The advantage of closed reduction over open reduction is its cost-effectiveness, lesser surgical trauma to the patient and reduced risk of any iatrogenic trauma to the developing teeth and other anatomical structures. Furthermore, the rate of associated complications is less in cases of closed reduction compared to open reduction.[13]

Conclusion

The anatomical complexity of the developing mandible and teeth and concerns regarding biocompatibility of implanted hardware often mandate the use of surgical techniques that differ markedly from those used in adults. In cases of mandibular fractures of a young child, disruption of periosteal envelope may have unpredictable effects on growth. Thus, if intervention is required, closed reduction is favored. Due to the technical difficulties of IMF, acrylic splints with circumferential wiring are recommended and remains the treatment of choice in young children.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient and parents' consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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