

Management of Paediatric Mandibular Parasymphysis Fracture with Open Cap Splint: A Definitive Conservative Treatment Modality

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ABSTRACT

The incidence of paediatric maxillofacial fractures is relatively rare and accounts for approximately 5% of all facial traumas. Mandibular fractures are the most common facial skeletal injury in paediatric trauma patients, accounting for 56% of all such cases. Treatment principles of paediatric mandibular fractures differ from those of the adult population in that a conservative approach is advocated in most of the paediatric cases. The present case report describes successful conservative management of paediatric mandibular parasymphyseal fracture treated with open cap splint.

Keywords: Parasymphysis fracture, cap splint, conservative treatment.

INTRODUCTION

Paediatric fractures in the maxillofacial region are relatively rare when compared to fractures in the adult population and are estimated to occur in 5% of all facial fractures.¹ The incidence of paediatric facial fractures ranges from 1% to 14% for the victims under the age of 16 years and from 0.87% to 1% for those younger than 5 years. Major injuries affecting the face are reported to be a consequence of sports related injuries, falls or due to hyperactivity of the child.²

Mandibular fractures are the most common facial skeletal injury in paediatric trauma patients, accounting for 56% of all such cases. As far as location of fracture is concerned, the condyle is the most commonly fractured site in the mandible, followed by the parasymphysis, angle and body of the mandible.³ Boys are affected twice as frequently as girls.⁴

Treatment principles of paediatric mandibular fractures differ from those of the

adult population in that a conservative approach is advocated in most of the paediatric cases. Not only do the consequences of trauma differ, but the management techniques should also be modified to address the child's particular stage of anatomic, physiologic and psychological development.

Closed reduction is the treatment of choice in most paediatric facial fractures unless the fracture segments are severely displaced. Various techniques of closed reduction for the treatment of paediatric mandibular fractures include cap splints with circum-mandibular wiring, open cap splints, staples, modified orthodontic brackets etc. The use of Cap splints has gained popularity since it provides closed reduction and stabilization of mandibular fracture, at the same time, allowing the maintenance of oral hygiene without disturbing the tooth buds.⁵

The present article reports the management of a paediatric patient with

mandibular parasymphyseal fracture, treated with open cap splint.

CASE PRESENTATION

A 6 year old male patient presented to the Out Patient Department of Paediatric Dentistry at PGIDS Rohtak with an injury to

his lower jaw. The parents gave the history of alleged fall while playing 5 days back with no subsequent loss of consciousness, vomiting or convulsions.

Extra oral examination revealed swelling and erythema on the left side of the chin. The mouth opening was restricted (Fig.1).



Fig. 1: Pre-operative extra-oral view showing restricted mouth opening.

Fig. 2: Pre-operative intra-oral frontal view.

Intraorally, the patient presented with sublingual hematoma and a step deformity between lower left primary lateral incisor and canine region {Fig.3 (a) and (b)}. None of the teeth were found to be mobile.



Fig. 3 (a) and (b): Pre-operative intra-oral occlusal view showing presence of sublingual hematoma.

Given the patients' history and clinical findings, a mandibular fracture was suspected. The Orthopantomogram revealed a radiolucent line between mandibular primary left lateral incisor and canine upto the inferior border of the mandible with minimal (2mm) displacement of the fractured segments, confirming the diagnosis of left parasymphysis fracture (Fig.4).

Maxillary and mandibular alginate impressions were made under bilateral field block local anaesthesia. Casts were fabricated using dental stone. The fractured site was simulated and marked on the mandibular cast and split into two segments using an electric saw. The two segments were rearranged and stabilized using sticky wax and occlusion was established by mounting on an articulator. The occlusal surfaces of all mandibular teeth were blocked with modelling wax.

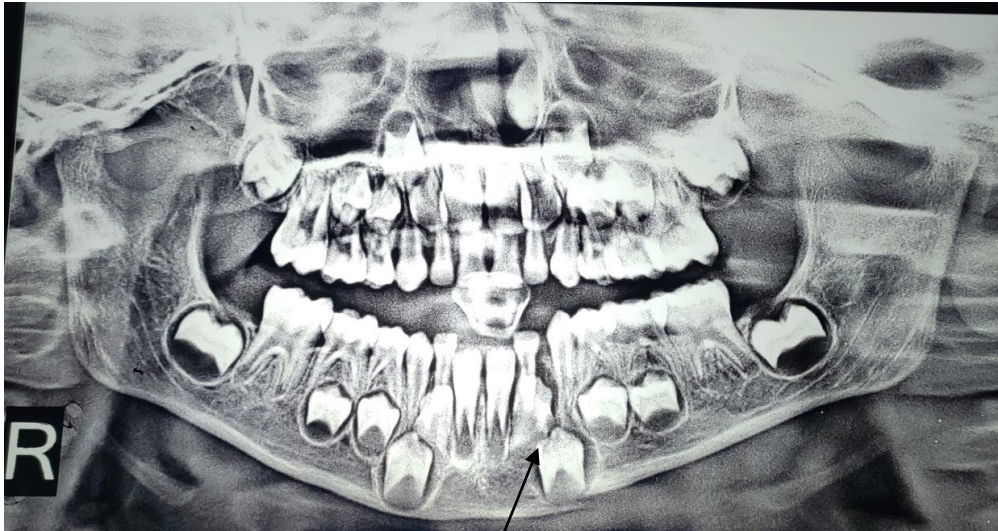


Fig. 4: Pre-operative orthopantomogram showing a radiolucent line between mandibular primary left lateral incisor and canine upto the inferior border of the mandible with minimal (2mm) displacement of the fractured segments, confirming the diagnosis of left parasymphysis fracture.

An open cap splint reinforced with 19G stainless steel wire was fabricated using self-cure acrylic. The cap splint was then finished, polished and tried in the patient's mouth. Occlusion was checked intraorally and the required adjustments were done using articulating paper. Under proper isolation, the open cap splint was cemented on the mandibular teeth using glass ionomer cement (Fig.5). The patient was advised to be on liquid and soft diet and prescribed antibiotics and analgesics for one week. Oral hygiene instructions were given which included supervised brushing and oral rinsing after every meal. The patient was followed at regular intervals. At the end of six weeks, the splint was removed. On clinical examination, occlusion was found to

be stable, with no mobility of the fractured segments (Fig.6).



Fig. 5: An open cap splint reinforced with 19G stainless steel wire was fabricated using self-cure acrylic and cemented on the mandibular teeth using glass ionomer cement.



Fig. 6 (a): Frontal view.



Fig. 6 (b): Right side view.



Fig. 6 (c): Left side view.



Fig. 6 (d): Occlusal view.

The occlusion was found to be stable with no mobility of the fractured segments.

DISCUSSION

Paediatric maxillofacial fractures are uncommon and the management needs several considerations owing to the unique characteristics and anatomy of the developing immature face and the potential growth implications from traumatized facial structures. The well vascularized tissues of the face in the paediatric patient offer accelerated ability to heal in a short duration with minimal complications.⁶

During treatment planning in paediatric patients a number of factors must be taken into consideration. These include the age of the patient; the degree of compliance; the anatomic site of the fracture; the particular stage of growth and development (anatomic, physiologic, and psychologic); the complexity of the injury; the presence of concomitant injury; the time elapsed since injury; and the surgical approach being contemplated (closed vs open).⁷

The treatment of jaw fractures usually involves surgical intervention. There are various techniques which were utilized in management of paediatric fractures like Tape Muzzles, circumferential wiring, acrylic splint, percutaneous skeletal fixation, open reduction, resorbable plates, orthodontic resin, modified orthodontic brackets, rubber elastics in combination with orthodontics brackets, nickel titanium staples depending upon the minimally/severely displaced fractures.⁸ But in children, due to incomplete ossification

of jaw bones and proximity to underlying permanent tooth buds, surgical intervention is not a usual consideration for management of paediatric jaw fractures. Mandibular fractures which occur during deciduous or mixed dentition can be associated with subsequent failed eruption of permanent teeth when the fracture line is reduced using an open surgical approach.¹ Therefore simple splinting methods hold importance in trauma management in children. The osteogenic potential and healing rates are faster in children than in adults. Therefore, anatomic reduction in children must be accomplished earlier and immobilization times should be shorter.⁹

Minimally displaced paediatric mandibular fractures can be treated by soft diet, analgesic use, and antibiotic prophylaxis. However, in very young children, healing might be prolonged because of insufficient cooperation in following postoperative instructions. In such cases, fabrication of a splint and cementing onto the arch can be used to overcome this hindrances.¹⁰ Circumferential wiring with acrylic splints is a definitive treatment modality for management of minimal to moderately displaced parasymphyseal fractures.¹¹ The acrylic cap splint may be intermaxillary, lingual, labiolingual, and a cap type that covers the dental arch. The intermaxillary type is indicated for the loss of multiple teeth, the lingual type for the predicted intraversion of bone fragments,

and the labiolingual as well as cap types for the deciduous and mixed dentition.^{11,8}

An open cap splint is an effective closed reduction method in a minimally displaced parasymphysis fracture. It offers several advantages of being simple and reliable, provides adequate stability of the fractured segments and avoids intermaxillary fixation. By virtue of its design, an open cap splint eliminates the need for occlusal coverage thereby reducing dependency on repeated radiographic evaluation as occlusion is clearly visible, providing better masticatory efficiency and thus better patient compliance. The ease of application and removal, less time consumption, cost effectiveness, good stability during healing period and minimal trauma to surrounding tissues provide an open cap splint a conservative and effective treatment modality for the management of paediatric mandibular fractures.

CONCLUSION

The paediatric mandibular fractures in parasymphysis region tend to be minimally displaced and can be treated conservatively in majority of cases. The clinical outcome in the present case indicates that an open cap splint is an effective and reliable treatment method in the management of paediatric mandibular parasymphysis fracture with regard to occlusion guided fracture reduction, wide age group safe usage, ease of maintenance of oral hygiene, and comfort for young patients.

REFERENCES

1. Aizenbud, D, Hazan-Molina H, Emodi O, Rachmiel A. The management of mandibular body fractures in young children. *Dent Traumatol.* 2009;25:565-70.

2. Magennis P, Craven P. Modification of orthodontic brackets for use in intermaxillary fixation. *Br J Oral Maxillofac Surg.* 1990;28:136-7.
3. Iida S, Matsuya T. Paediatric maxillofacial fractures: their aetiological characters and fracture patterns. *J Craniomaxillofac Surg.* 2002;30:237-41.
4. Posnick JC, Wells M, Pron GE. Pediatric facial fractures: evolving patterns of treatment. *J Oral Maxillofac Surg.* 1993; 51:836-44.
5. Saoji S, Agrawal S, Bhojar A, Shrivastava S, Mishra A, Bhusari BK et al. Management of mandibular fracture in pediatric patient with cap splint: a case report. *Int J Dent Clin.* 2015;7:33-4.
6. Eppley BL. Use of resorbable plates and screws in pediatric facial fractures. *J Oral Maxillofac Surg.* 2005;63(3):385-91.
7. Kaban LB. Facial trauma I: mid face fractures. In: Kaban LB, ed. *Pediatric Oral and Maxillofacial Surgery.* Philadelphia, PA: W.B. Saunders; 1990:209-232.
8. Madan, N., Bajaj, N. Conservative treatment of pediatric mandibular fracture with removable acrylic splint. *Indian J Dent Sci.* 2010;2(4):22-4.
9. Zimmermann C, Troulis MJ, Kaban LB. Pediatric facial fractures: recent advances in prevention, diagnosis and management. *Int J Oral Maxillofac Surg.* 2005;34:823-33.
10. Agrawal RM, Yeluri R, Singh C, Chaudhry K, Munshi AK. Management of pediatric mandibular fracture: a case series. *Compend Contin Educ Dent* 2014;35(8):578-82.
11. Baumann A, Troulis MJ, Kaban LB. Facial trauma II: Dentoalveolar injuries and mandibular fractures. *Pediatric Oral and Maxillofacial Surgery.* Philadelphia: Saunders; 2004. p. 441, 445-61.

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