

Management of Mandibular Fracture Followed by Aesthetic Rehabilitation in a Four-year-old Child: A Case Report

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Abstract

Mandibular fractures are the most common fracture in pediatric population which has a frequency twice more in boys as compared to girls. 15–20% of mandibular fractures in children are symphyseal and parasymphiseal fracture with rare body fracture. Various techniques for closed reduction of mandibular fracture include cap splints with circum-mandibular wiring, open cap splints, staples, modified orthodontic brackets, etc. As Cap splints provide closed reduction and stabilization of mandibular fracture at a time it has gained popularity. In case of early loss of deciduous maxillary anterior different types of appliance have been developed to manage the space which may be removable or fixed, functional or non-functional. Thus, this case represents the management of Symphyseal mandibular fracture with Modified closed cap-splint followed by esthetic Fixed functional space maintainer in a pediatric patient.

Keywords: Symphyseal fracture, Modified closed cap-splint, Aesthetic anterior fixed functional space maintainer.

INTRODUCTION

Injuries to the maxillofacial region are more in children population as compared to adults. The pediatric mandible is a vigorous anatomy, which is changing constantly with growth and development. In hospitalized pediatric trauma patient, mandibular fractures are the most common i.e., 56% of facial skeletal injury. Its frequency is 2 times more in boys than girls.^[1-3] About 15–20% of pediatric mandibular fractures are symphyseal and parasymphiseal fracture with a rare body fracture.^[4] The incidence of mandibular fracture in children ranges from 0.6% to 1.2%.^[5] The most typical causes of fracture in children were fall (64%), road traffic accidents (22%), and sports-related accidents (9%).^[1] About 39.6% of dental injuries are caused by mandibular fractures.^[2] For the treatment of pediatric mandibular fractures, various techniques for closed reduction include cap splints with circum-mandibular wiring, open cap splints, staples, modified orthodontic brackets, etc. As Cap splints provide closed reduction and stabilization of mandibular fracture at a time it has gained popularity allowing proper maintenance of oral hygiene without disturbing the tooth buds.

Many parents look for esthetic solution when there is premature loss of primary incisors which may be due to trauma or early childhood caries. Esthetic anterior fixed functional space maintainer is the space maintainer used for children who

have lost their primary anteriors. As the loss of anterior teeth in children affects the child psychologically all the functions of teeth such as speech, mastication and esthetics should be attained while managing such patients.

This paper reports the management of Symphyseal mandibular fracture with Modified closed cap-splint followed by Esthetic anterior fixed functional space maintainer in the pediatric patient.

CASE REPORT

A 4-year-old boy came to the Department of Pediatric and Preventive Dentistry with a chief complaint of pain in his lower front teeth region for 10 days. The patient had a history of fall while playing and maxillary anterior teeth were avulsed at that time. Pain was continuous, severe, aggravates on chewing food, and relieves only after taking medication. On intra-oral examination missing teeth with respect to 51, 61, 62, 63, 71 and 81 was seen [Figure 1a]. Space loss was seen between 71 and

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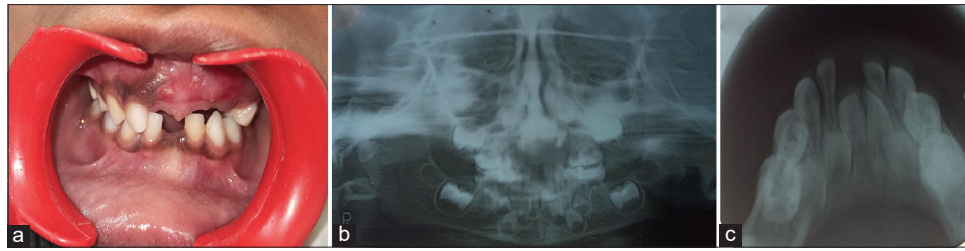


Figure 1: (a) Pre-operative frontal; (b) Preoperative orthopantomogram; (c) Pre-operative mandibular occlusal radiograph

81. Orthopantomogram [Figure 1b] and mandibular occlusal radiograph [Figure 1c] revealed a radiolucent line extending between the mandibular central incisors with no displacement confirming the diagnosis of symphyseal mandibular fracture. Hence, cementation of Modified close cap splint was planned for the treatment of symphyseal fracture followed by replacement of missing teeth with esthetic anterior fixed functional space maintainer in the maxilla and fibre-reinforced composite resin bridge in mandible.

Clinical procedure

Maxillary and mandibular alginate impressions were taken after selecting a proper size stock tray. Cast were poured with the help of Type III dental stone. Modeling wax was used to block the occlusal surfaces of mandibular teeth. A modified closed cap splint was fabricated which was reinforced with 19 Gauge stainless steel wire with the help of self cure acrylic resin [Figure 2a]. It was then finished, polished, and tried in the patient's mouth. Occlusal adjustment was done intraorally using articulating paper and excess materials were trimmed off. Finally, the modified closed cap splint was cemented using luting Glass Ionomer Cement (GIC, GC- Gold Label, Tokyo, Japan) under proper isolation [Figure 2b]. Post-operatively, patient was asked to be on soft, liquid diet until the cap splint was removed. Antibiotics and analgesics were prescribed for a period of 1 week. Oral hygiene instructions were also given. Follow-up was done at regular intervals.

After a period of 3 weeks, the cap-splint was removed. All the symptoms had disappeared and the mandibular occlusal radiograph revealed healed fracture line [Figure 3a].

For the replacement of missing teeth, first of all, banding was done in relation to 55 and 65 and then alginate impression was taken. Cast was then poured with Type III dental stone. With the help of 0.9 mm diameter stainless steel wire a multiple U-loop bend was made on the anterior rugae area of the palate. This design extended from the palatal surface of the banding of on the first primary molar i.e., 55 to the palatal surface of the opposing first primary molar, i.e., 65. Wire components were stabilized and the wire was soldered the band material in both the molars. Acrylic teeth were then adjusted on self-cure acrylic resin taking retention from the palatally formed U-loop wire. The appliance was then removed and finishing and polishing was done. Then try in was done and then cemented with luting GIC [Figure 4].

For the mandibular partially edentulous region, as there was a presence of space loss only one tooth can be fitted in

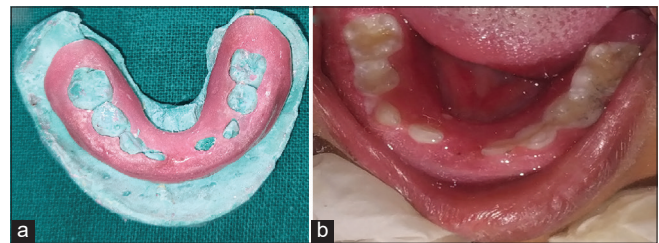


Figure 2: (a) Fabricated modified closed cap splint; (b) Cementation of cap-splint

the region of two teeth. As the parent was concerned only about the aesthetics, an acrylic incisor was fitted with fiber reinforced composite resin bridge. Mandibular incisal acrylic teeth were selected first and then recess grooves were made on the lingual side of the pontic. 37% Orthophosphoric acid (Smart etch, Safe Endo, India) was used as an etchant and etched for 20 s, and then washed and dried on the abutment teeth. Bonding agent (Solare Universal Bond, GC, India) was applied and cured for 20 s. The required length of fibre strip (Everstick crown and bridge material, Stick Tech Ltd., Finland) was measured and cut. A thin layer of flowable composite (Te-Econom Flow, Ivoclar vivadent, Schaan, Liechtenstein) was placed across the grooves and abutment teeth. Fibre strip was placed in position into the abutment teeth pressed and then cured [Figure 3b]. The pontic is then placed and further, a layer of composite was applied on the fiber surface and cured covering all the exposed fiber surface by composite [Figure 3c]. All the excess composite resins were removed and occlusion was checked.

DISCUSSION

Among hospitalized pediatric trauma patients, the most common facial skeletal injury is the mandibular fracture. Pediatric dentist faced a unique challenge because of anatomic difference and changes in mandibular growth in pediatric patients. The face of pediatric patient consist of well-vascularised tissues, thus their ability to heal is accelerated and healing of any injury including mandibular fracture takes place in a short period of time with minimal complications.^[6] Its treatment also depends on the child's cooperation as healing in a very young child might be prolonged due to insufficient co-operation.

In jaw fractures, treatment usually involves surgical intervention. Depending upon the state of fracture, i.e., minimally or severely

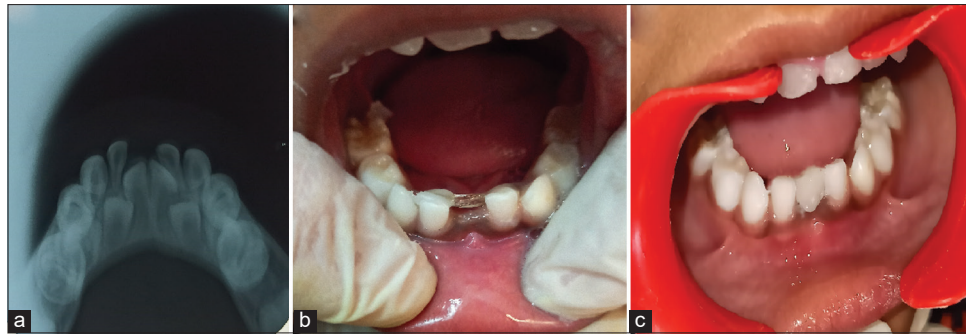


Figure 3: (a) Post-operative mandibular occlusal radiograph; (b) Fibre reinforced composite bridge; (c) Post-operative mandibular view



Figure 4: Post-operative frontal view

displaced, various techniques such as circumferential wiring, Tape Muzzles, percutaneous skeletal fixation, acrylic splint, open reduction, resorbable plates, modified orthodontic brackets, orthodontic resin, rubber elastics in combination with orthodontics brackets, nickeltitanium staples were used for the management of pediatric fractures.^[7] Conservative treatment by advising patient soft diet, analgesics, and antibiotic prophylaxis can be done in minimally displaced fractures. But the capacity to heal might be extended due to un-cooperation of very young patients while following post-operative instructions. In order to overcome this situation fabrication of modified close cap splint can be done and maintain its stability by cementing with luting GIC cement as done in the present case. After a period of 3 weeks, proper healing of the fracture lines can be seen radiographically. It is simple, reliable, ease of application and removal, less time consumption, and cost-effectiveness as compared to circum-mandibular wiring with cap-splint, open reduction, or intermaxillary fixation. However, it can only be used in minimally displaced fractures. Qadri and Mokhtar^[8] stated that pediatric mandible has a low complication rate as they have high osteogenic capacity and also the adjustive capability of the alveolar bone and the substitution of deciduous teeth by permanent teeth can bring self-correction in various degrees. Thus, for the treatment of minimally displaced mandibular fracture, the modified closed cap splint is a reliable method amongst all.

In case of early loss of deciduous maxillary anterior different types of the appliance have been developed to manage the

space which can be either a removable/fixed or functional/non-functional. Fixed space maintainer is the best suitable space maintainer for a child patient as they are easily acceptable.^[9] Frese et al.^[10] stated that after a median follow-up period of 4.5 years, Fiber-reinforced composite bridges manifested a favorable survival rate and good quality. Thus, signifying that FRC bridges are a good treatment option for the replacement of single missing teeth in the anterior region. Some of the reasons for replacing the edentulous upper anterior span with an aesthetic appliance are parental desire, space maintenance, esthetic restoration, and function maintenance.^[11] If there is loss of maxillary anteriors at an early age, pronunciations of certain words of tongue-tip consonants (“t,” “d,” “s,” “sh,” and “ch”) and labial sounds (“f” and “v”) are affected.^[12] Thus, esthetic fixed functional space maintainer was given in this case.

In the present case, mandibular edentulous space was managed with Fiber-reinforced composite resin, i.e., EverStick crown and bridge fiber and it consists of individual silane glass fibers which shows rigidity and flexural strength seven times that of composite resin alone.^[13-15] Thus, with this crown and bridge fibers it was possible to produce a thin but strong, composite resin-bonded bridge in a single visit.

CONCLUSION

Conservative management of minimally displaced mandibular fracture with modified closed cap splint has certain advantages such as cost-effectiveness, good stability, cause minimal trauma to surrounding tissues, less time consumption and easy to apply and remove. Therefore, it is a reliable method in minimally displaced mandibular fracture.

Furthermore, the restoration of anterior esthetics and function with esthetic anterior fixed functional space maintainer gave a huge psychological boost for the child.

REFERENCES

1. Dodson TB. Mandibular fractures in children. OMS Know Update 1995;1:95-107.
2. Lida S, Matsuya T. Paediatric maxillofacial fractures: Their aetiological characters and fracture patterns. J Craniomaxillofac Surg 2002;30:237-41.
3. Posnick JC, Wells M, Pron GE, Alpert B. Pediatric facial fractures: Evolving patterns of treatment. J Oral Maxillofac Surg 1993;51:836-45.
4. Bataineh AB. Etiology and incidence of maxillofacial fractures in the

- north of Jordan. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1998;86:31-5.
5. Rowe NL. Fractures of the jaws in children. *J Oral Surg* 1969;27:497-507.
 6. Eppley BL. Use of resorbable plates and screws in pediatric facial fractures. *J Oral Maxillofac Surg* 2005;63:385-91.
 7. Madan N, Bajaj N. Conservative treatment of pediatric mandibular fracture with removable acrylic splint. *Indian J Dent Sci* 2010;2:22-4.
 8. Qadri GW, Mokhtar SM. Paediatric mandibular fracture: Report of case. *Dent Traumatol* 2008;24:e67-70.
 9. Garai D, Ghosh C, Mandal PK, Kar S. Esthetic anterior fixed functional space maintainer. *Int J Pedod Rehabil* 2017;2:90-2.
 10. Frese C, Schiller P, Staehle HJ, Wolff D. Fiber-reinforced composite fixed dental prostheses in the anterior area: A 4.5-year follow-up. *J Prosthet Dent* 2014;112:143-9.
 11. Sharma MP, Srivastava B, Gupta N, Gambhir N, Singh R. Esthetic and functional rehabilitation in a four year old pediatric patient with modified groper's appliance-a case report. *J Clin Dent Health Dent* 2021;7:65-68.
 12. Metha D, Gulati A, Basappa N, Raju OS. Esthetic rehabilitation of severely decayed primary incisors using glass fiber reinforced composite: A case report. *J Dent Child (Chic)* 2012;79:22-5.
 13. Goldberg AJ, Freilich MA. An innovative Pre-impregnated glass fiber for reinforcing composites. *Dent Clin North Am* 1999;43:127-33.
 14. Vaghani K, Nadig P, Shah M, Dave D. Natural tooth pontic: An interim restoration for compromised aesthetic conditions. *Adv Hum Biol.* 2019;9:173.
 15. Alroomy R. Methods of maintaining compromised teeth in adults: A literature review. *Adv Hum Biol.* 2021;11:211.