

Dental Braces as IMF in Pediatric Population or in Children – A Conservative Concept

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Abstract

Mandibular fracture is less common in children. Fracture management is a complex issue in children that needs immediate diagnosis and appropriate treatment to ensure favorable outcome. Intermaxillary fixation (IMF) is an integral part in the management facial bone fractures. Conventional methods have disadvantages, like the risk of transmission of blood-borne diseases, stressful procedures, and mutilation to teeth, tooth buds, and alveolar periodontium. Use of orthodontic bracket and elastics as IMF is an effective and efficient alternative technique in management of mandibular fracture because it removes the disadvantages of standard Intermaxillary fixation and provides a stable occlusal & functional thereafter.



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Conservative management; intermaxillary fixation; pediatric patients or in children.

Introduction

In the pediatric population, trauma to the maxillofacial region affects mental & physical well-being along with the deterioration of esthetic appearance, function, growth, & development. Prevalence of facial fractures is much fewer within pediatric than adult population.¹ In pediatric facial fracture, the commonly involved bone is mandible² and the involved sites are condyle, followed by angle, symphysis, & body. Fall/trauma is main etiological factor for mandibular fracture within the pediatric population.³ Management of facial bone


fractures has always been a degree of debate. Recent management techniques emphasize open reduction & internal fixation (ORIF). Intermaxillary fixation (IMF) is an integral part in the management of facial bone fractures, whether the treatment modality is ORIF or conservative management. IMF is usually done using an arch bar and ligature wire.^{4,5}

In pediatric patients, presence of tooth germs, growing jaws, deciduous tooth anatomy and different wiring techniques used in IMF will not be ideal and the compliance of patients complicates the treatment

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procedure. For these reasons,⁴ ORIF is not indicated as it affects the skeletal and teeth development. Therefore, a conservative approach should be a better alternative to manage mandibular fractures in pediatric patients.⁵ In this article, the conservative management of condylar fracture of the mandible with help of orthodontic brackets & elastics traction has been described.

Technical Report

Orthodontic brackets and elastic traction was preferred to manage mandibular fracture as a closed reduction in the pediatric population. The procedure is straight forward to perform patients are fully cooperative throughout the procedure and might be completed within 30 min. During IMF adequate traction is maintained to immobilize and stabilize the fracture⁶ segments for adequate healing of the bone. This was the plus point of this technique it had been easy to take care of oral hygiene because this technique involves only facial surfaces of teeth. The technique was effective & efficient without the need for a special instrument. For the maintenance of uniform traction, repeated change of the elastics is required which is one of the disadvantages observed

during this procedure. There is a little technicality in this procedure because the wrong direction of traction can cause subluxation of the tooth. This procedure is usually recommended for children up to the age of 10 years. In case of comminuted or severely displaced fractures & fractures within the edentulous region particularly the angle of the mandible, this procedure has little or no applicability.

Example: A Conservative approach with closed reduction was carried out with the utilization of orthodontic brackets together with elastics for stabilization of fracture segments just like IMF. Only multirooted primary molars were deliberated for position of orthodontic brackets to evade subluxation of deciduous teeth. Orthodontic brackets (MBT chrome steel brackets with hooks) were bonded onto chosen teeth which were 54, 55, 64, 65, 74, 75, 84, and 85 to realize an honest IMF (Figure 1), using the quality technique of bracket placement.⁷

Fracture segments were reduced manually, brought into occlusion and then stabilized. Orthodontic traction elastics were accustomed achieve adequate occlusion (Figure 2).



Fig. 1: Bonding of orthodontic brackets on primary molars.⁷



Fig. 2: Intermaxillary fixation using elastics.⁷

IMF has to be done with help of orthodontic elastics engaged from the maxillary bracket hook to the mandibular bracket hook. Elastics were kept in traction for 24 hours. IMF has to be retained in place for 21 days, during this period oral antibiotics and analgesics for a week and mouthwash for the 21 days was given. The patient was discharged with the subsequent instructions of avoiding wide mouth opening, being on a soft diet, keeping the mouth clean, & avoiding any form of fermentation to maxillofacial region. Patient had to be recalled after one week for evaluation. During the first week of follow-up, the site of the injury should be checked for swelling and adequate healing. And all the brackets should be intact. The oral hygiene and the occlusion were good and intact. To keep up adequate traction elastics were changed regularly. Patient was again recalled after 2 weeks for a reassessment. On clinical examination, there should be no mobility and tenderness. The orthodontic bracket was debonded after releasing of the elastics. During this period, oral hygiene should be well maintained for complete healing postoperatively.

Discussion

Mandibular fractures in the pediatric population are similar in pattern and clinical features as compared to the adult population, but the treatment modalities are different. Because of the enhanced healing capacity, remodeling potential, a high recovery rate of tissues, & enhanced vascularization pediatric population have an advantage over the adult population.

The existence of developing tooth germs, transitional dentition, & developing skeletal structures makes treatment complicated in pediatric patients. Therefore, treatment protocol should employ advantages & minimize disadvantages in managing pediatric fractures. These led to a conservative approach.

According to age, dentition status, pattern of injury, & site of fracture, various management techniques are available. For incomplete fracture, no intervention is required, apart from the soft diet and prescription of antibiotics and analgesics. For moderately displaced fractures: circummandibular wiring is completed together with open or closed cap splints are required. IMF utilizing arch bars & eyelets is employed. Disadvantages of these procedures are

not ideal for the pediatric population, which requires laboratory procedures for the construction of splints, maintenance of oral hygiene is difficult, patients compliance, & psychological effect at an early age.⁶ ORIF is suggested in severely displaced and multiple fractures.

In pediatric patients, Condylar fractures not easily recognized by physicians. Neck of the condyle and intracapsular fractures usually involved in mandibular fracture mostly.⁸ Weaker condyle neck, fractures easily in unilateral cases because of direct impact,⁹ and there is no intracranial displacement. A definitive diagnosis is confirmed only with a radiologic investigation in most of the condylar fractures.¹⁰ Intermaxillary fixation is the only option for such fractures as it employs an arch bar and wire.¹¹⁻¹³ Intermaxillary fixation comprise an higher glove perforation rate, risk of blood-borne pathogen infection, need for general anesthesia, results of arch bar on dental enamel & gingiva, augmented discomfort, prolonged treatment, poor oral hygiene, & also higher risk of gingival & soft tissue injury are few disadvantages of arch bar IMF.^{13,14}

The orthodontic brackets offer an appropriate and non-invasive procedure that result in high patient comfort & acceptance in pediatric patients. Elastics were used for fixation, since there was some functional activity and also the patient can remove the elastics as required. However, the guiding elastics were rigid sufficient to impart stable fixation force for condyles to heal. Most erstwhile reports have focused on treatment of unilateral condylar fracture followed for shorter period (because of compliance problems with follow-up appointments) in the literature.¹⁴⁻¹⁶

In comparison with ORIF or IMF techniques, a conservative technique like orthodontic brackets and elastic traction is easy to handle, cost-effective, and reliable. This conservative technique has less trauma to the patient and provides better stability during the healing time, and is also well-tolerated by young patients.

Intermaxillary fixation is vital fragment in management of facial bone fractures. Fracture of jawbones is managed more commonly with ORIF, thanks to the advancement in surgical techniques and instruments used for osteosynthesis. IMF is used

alone or in combination with ORIF for the treatment of jaw bone fractures. A traditional method of doing IMF is by using an arch bar and wires, which has many drawbacks like trauma to the periodontium, risk of transmission of bloodborne diseases, stressful and painful procedure, need for anesthetic and its related complications, and difficulty in oral hygiene maintenance. These drawbacks led us to use alternative methods for IMF.

The brackets were of the sort routinely used for fixed appliance therapy in orthodontics for the correction of maligned teeth. These brackets are low-cost and easily available. Placement of brackets was easy and also the operator could avoid contact with the intraoral fluids, which may cause transmission of blood-borne diseases. Traction elastic will be used on selected teeth to realize maximum alignment of occlusion. Within 24hrs occlusion was achieved and stable. During this era, patient experiences less or no discomfort. After 21 days Intermaxillary fixation may be removed and therefore the patient

can undergo physiotherapy for two weeks.⁷ This achieves a whole occlusal and functional stability using IMF with orthodontic brackets.

Conclusions

Intermaxillary fixation can be done using orthodontic brackets and intermaxillary elastics which can offer non-invasive technique and can limit all the drawbacks of IMF with arch bar and wire for Children.

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Conflicts of Interest

The authors of this manuscript declare that they have no conflicts of interest.

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