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FIXATION OF ALVEOLAR FRACTURE OF MANDIBLE USING MODIFIED WIRE COMPOSITE SPLINT 3 (WCS 3): NONINVASIVE ALTERNATIVE IN MIXED DENTITION PERIOD

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ABSTRACT
Injuries of the tooth bearing portion of the mandible (alveolus) are common and can even result after a relatively low impact trauma. The conservative treatment is in most cases advocated before the use of more complex invasive treatment that have a negative effect on skeletal growth and unerupted teeth. Knowledge of conservative and less invasive treatment options is essential in order to minimize these potential risks. The purpose of this case report is to describe the management of a trauma-induced mandibular alveolar fracture in an 10 year old boy using a modified wire composite splinting type 3(WCS 3) that proved to be less invasive successful alternative in mixed dentition period.

INTRODUCTION

Dentoalveolar fractures are relatively common and defined as fractures in which displacement, subluxation, avulsion or fracture of the teeth occurs in association with fracture of the alveolus [1]. Pediatric population present with less than 15% of overall facial fractures in the general population, mandibular fractures are among the most common in pediatric patients. The incidence of these fracture in children ranges from 0.6% to 1.2% [2]. The reasons presumed for this lower incidence are the larger craniofacial ratio of 8:1, lack of pneumatisation of sinuses, large tooth to bone ratio, larger fat pad, and decreased bone mass [3].

Management of alveolar fractures is a challenge, considering the age and the anatomic variation of the child. The goal for treatment of these fractures is to restore the underlying bone architecture to pre-injury position, in a stable fashion, as non-invasively as possible, with minimal residual esthetical and functional impairment. Treatment involves reduction and immobilization of the involved segment and stabilization for at least 2 to 4 weeks. Arch bars may be used for stabilization in adults, but in the pediatric population it is not feasible due to the size of the teeth and mixed dentition [4].

Splinting teeth to each other allows weakened teeth to gain support from neighboring ones. More of problems are faced when there are insufficient teeth to take support for splinting, where rigidity of splint required for reunion of bone. A little modification in stainless steel wire to be splinted can add up a lot and that is what described in present case report.

CASE REPORT

A 10 year old boy reported to the department of Pedodontics and preventive dentistry, PGIDS, Rohtak, with chief complaint of bleeding from mouth associated with pain after falling on a wood log while playing. Patient was otherwise healthy with no medical history, well nourished, oriented and was of moderate built. On extra-oral examination, laceration along with oedema on base of lower lip was noted. No step deformity or tenderness was there on palpation of mandible. Intraoral examination revealed continuation of outer laceration wound up-to

lingual vestibule. A piece of wood was still tucked in the wound. There was lingual displacement of 31 and 32 (fig.1) and had extruded appearance (fig.2), whereas 41 and 42 showed no mobility and firm. Lower permanent canines were unerupted bilaterally, whereas 34 and 44 were in initial stage of eruption. Segmental mobility elicited manually in the concerned area suggestive of alveolar bone involvement. Orthopantamogram showed extrusion of 31 and 32 with no clear information about status of alveolar bone (fig.3). Diagnosis of alveolar bone fracture in relation to 31 and 32 was made on clinical basis. Debridement of wound followed by irrigation and suturing was done. The idea of using acrylic splint was dropped due to underlying wound that need to be sutured and kept clean. It was decided to use support of unaffected 41 and 42 to fix 31 and 32, as other teeth in the arch are primary or still erupting permanent teeth. Stainless steel (030 SS) wire secured with light cured composite was chosen for splinting. SS was adapted using a plier intraorally to labial middle third of lower incisor and distal ends of both sides curved like a hook along lateral incisors up-to middle of lingual surface of same teeth, so that bracing effect could be obtained. The tooth bearing alveolus was then repositioned with combined labial and lingual digital pressure until its normal position had been re-established, indicated by alignment of the dental arch in occlusion(fig.4). Wire was fixed using acid etching technique on to the selected teeth while maintaining teeth in reduced position using digital pressure. Panoramic radiograph confirmed the correct positioning of teeth and alveolus (fig.5). Following splint placement and during the entire period of the splint in situ, strict instructions for diet and maintenance of oral hygiene were given along with medications. Sutures were removed after 1 week and splinting was removed after 3 weeks. Following removal of the splint, a careful examination of the teeth and the fractured fragment is carried out that confirmed satisfactory healing of the alveolar fracture along with adequate occlusion (fig.6 and fig.7).

Figure 1. preoperative picture showing lingual displacement of 31 and 32

Figure 2. preoperative picture showing extruded appearance of 31 and 32

Figure 3. Preoperative orthopantamogram showing extrusion of 31 and 32

Figure 4. Postoperative picture showing WCS3 along with suturing

Figure 5. Postoperative orthopantamogram showing correct positioning of teeth and alveolus.

Figure 6. Postoperative photograph showing satisfactory healing of the alveolar fracture.

Figure 7. Postoperative photograph showing adequate occlusion achieved.

DISCUSSION

Management principles of mandibular alveolar fractures in children vary from that of adults due to concerns regarding mandibular growth and development of dentition. Several studies have recommended the use of pre-fabricated acrylic splints as a treatment for pediatric mandibular fractures. These splints are more reliable than open reduction or IMF techniques due to cost effectiveness, ease of application and removal, reduced operating time, minimal trauma for adjacent anatomical structures and avoidance of general anesthesia hazards to young patients [5].

Lateral compression splint is used for the fracture stabilization mainly in mixed dentition where there is presence of developing tooth buds. Its disadvantages include: invasion required for circumferential wiring, deterioration of oral hygiene due to 14 days of continuous wearing, difficulty of feeding and foreign body present in the mouth may be an irritation factor for the child [6].

In addition to above hurdles, in our case there was associated soft tissue injury that needed to be sutured and must had cause problem in recording impression as well as in placement of acrylic splint in that area. Other methods of stabilizing dentoalveolar fractures involve the application of arch bars or acid etch techniques. Arch bars are frequently used for stabilization in adults, but it is not feasible in pediatric population due to the size of the teeth and mixed dentition. The heights of contour of deciduous crowns are below the gingival level, and circumdental wiring may result in extrusion of deciduous teeth [4]. According to the current guidelines, rigid splints such as wire-composite splint 3 (WCS3-030 stainless steel wire, composite) and the titanium ring splint can be used to treat alveolar process fractures [7].

Filippi A *et al*. compared comfort and discomfort associated with four dental trauma splints included a wire-composite splint (WCS), a button-bracket splint (BS), aresin splint (RS) and titanium trauma splint (TTS) in 10 volunteers. They particularly recommended WCS and TTS for splinting as both splints only minimally irritate the soft tissues and well tolerated by patients [8].

The length of the wire should be adjusted so that it extends one to two teeth on either side of repositioned tooth, but in our case teeth for support available only on right side whereas on left side permanent were in erupting stage and primary teeth were well below in position. Because of this scenario, we modified the wire adaptation to get a bracing effect. Patient came up with good dental alignment. According to the extensive literature search, there is a limited number of articles regarding treatment of pediatric mandibular alveolar fracture with fixation of the splint by WCS. As this treatment involved minimal operative manipulation, the technique should be applied wherever it can be.

CONCLUSION

While the basic principles for alveolar fracture treatment are the same as for the adult, certain anatomical features of the pediatric mandible warrant special attention. For the proper treatment, mixed dentition, unerupted teeth, the shapes of teeth and ongoing growth in the mandible should be carefully considered. Although there is no clear consensus about the optimal method for fixation of alveolar fractures; effective, simplest and less invasive method is the best method.

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CONFLICT OF INTEREST:
The authors declare that they have no conflict of interest.

STATEMENT OF HUMAN AND ANIMAL RIGHTS

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

REFERENCES

1. Bank P, Brown A (2001). Treatment of dentoalveolar injuries. In: Fractures of facial skeleton. *Oxford: Reed Educational and professional Publishing Ltd*, 5, 72-80.
2. Singh DJ, Barlett SP (2004). Pediatric craniofacial fractures: long term consequences. *Clin Plastic Surg*, 31, 18-49.

3. Ferriera P, Marques M, Pinho C, Rodrigues J, Reis J, Amrante J. (2004). Midfacial fractures in children and adolescents: a review of 492 cases. *Br J Oral Maxillofac Surg*, 42, 501-505.
4. Prabhakar AR, Tauro DP, Shubha AB. (2006). Management of an Unusual Maxillary Dentoalveolar Fracture: A Case Report. *Journal of Dentistry for Children*, 73(2), 112-115.
5. Kocabay C, Atac MS, Oner B, Gungor N. (2007). The conservative approach of pediatric mandibular fractures with prefabricated surgical splint: A case report. *Dent Traumatol*, 23, 247-50.
6. Quadera SS, Shamsuzzamanb M, Gofurc A, Fatemad S, Rahmane MA. (2013). Lateral compression splint, a guide for stabilization of mandibular arch in case of dentoalveolar fracture of children. *Updat Dent. Coll* J, 3(2), 55-60.
7. Abu Samra FM. (2014). Dentoalveolar Injuries Classification-Management-Biological Consequences. *J Dent Health Oral Disord Ther*, 1(4), 00025.
8. Filippi A, VonArx T, Lussi A. (2002). Comfort and discomfort of dental trauma splints a comparison of a new device (TTS) with three commonly used splinting techniques. *Dent Traumatol*, 18, 275-280.