

Vacuum Formed Closed Cap Splint as Treatment Modality for Paediatric Mandibular Fracture – A Case Report

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ABSTRACT

In children mandibular fracture are less frequent when compared to adults, which may be due to child's protected anatomic features. Though the general principle of treating mandibular fracture in children and adult are same the techniques in children are mandatorily modified by certain anatomical, physiological and psychological factors. This case report documents conservative treatment of mandibular parasymphysis and body fracture close to the angle of mandible using a vacuum formed closed cap splint in a five year old patient.

Keywords:- Paediatric Trauma, Mandible Fracture, Vacuum Formed Closed Cap Splint.

CHAPTER ONE

INTRODUCTION

In children though facial injury are less common, major facial injury are associated commonly with respect to hyperactivity of child, fall, road traffic accidents, assaults and child abuses¹. Incidence of maxillofacial trauma is 3.3% in children aged 15 years or younger. Amongst all facial fractures mandibular fractures accounts for 36% in pediatric patient. Condylar fracture followed by symphysis/parasymphysis is most common type of fracture in children¹.

Management of mandibular fracture varies in children due to underlying permanent tooth bud, high osteogenic potential and healing capacity of developing bone³. Closed reduction is generally preferred and stabilization can be done by conservative modalities like cap splint, rubber elastics, gunning splints, circummandibular wires. Thus present article emphasizes on conservative management and presents case report of parasymphysis and mandibular body fracture close to angle of mandible treated by vacuum formed closed cap splint.

CHAPTER TWO CASE REPORT

A five year old boy reported with the history of trauma due to road traffic accident a day ago associated with pain, swelling in right side of the face and followed by restricted mouth opening. Patient gave positive history of bleeding at the time of injury and there was no loss of consciousness, convulsion and vomiting following trauma. Patient had reported to casualty immediately following trauma where interdental wiring was done under sedation on right parasymphysis region in order to hold fracture fragment and left mandibular body fracture was untreated which was the main concern.

Clinical examination revealed diffuse extra oral swelling on the right side of the face causing facial asymmetry. Swelling was soft, tender on palpation with bruising of overlying skin. On palpation Step deformity was perceived on lower border of mandible on right parasymphysis and left mandibular body region. Tenderness was elicited on the same area. Intraoral examination revealed interosseous wiring between lower right primary lateral incisor (82) and primary canine (83) with slight occlusally displaced mesial right parasymphysis segment [figure 1 and 2].



Fig 1



Fig 2

Occlusion was normal on left side. Preoperative orthopantomogram (OPG) revealed vertical fracture on right parasymphysis region involving developing canine tooth bud and an associated fracture on left mandibular body region close to angle of mandible involving developing permanent tooth bud (37) [figure 3].



Fig. 3

For further confirmation Computed Tomography revealed vertical fracture between 83 and 82 on Right parasymphysis region and vertical fracture on left body of mandible close to the angle with minimal displacement was confirmed. Under conscious sedation upper and lower primary impressions were made. Special tray was fabricated and secondary impression was made with photosil soft putty impression material under sedation. Thermoplastic hydrocolloid sheet of 1.5mm thickness (3A MEDES EASY VAC GASKET) was used for the fabrication of the cap splint. Modified vacuum cap splint was fabricated extending posteriorly beyond the deciduous second molar along the mandibular ridge on left side [figure 4]. Cap splint was cemented to the fractured jaw with the help of luting glass ionomer cement (GC Fuji I) [figure 5]. Oral hygiene instructions were given to the patient and analgesics and antibiotics was prescribed for 5 days. Patient was reviewed every week.



Fig 4



Fig. 5

Patient was asymptomatic after 3 weeks. Transdental wiring and cap splint was removed after 3 weeks. Postoperative OPG revealed healing fracture site [figure 6]. Step deformity was completely reduced in parasymphysis site whereas remarked reduction noticed at left body of_mandible. Patient was completely asymptomatic after two, three and six months of review. Functional adaptability was established and occlusal stability was maintained. Postoperative OPG revealed completely reduced and healed fracture fragments [figure 7].



Fig. 6



Fig. 7

CHAPTER THREE

DISCUSSION

Children have a greater osteogenic potential than adults, which allows rapid union within three weeks and non-union or fibrous union are less common⁶. In adults, absolute reduction and fixation of fracture is indicated, whereas in children closed reduction and minimal manipulation of the facial skeleton is mandated. Open reduction is not recommended in pediatric patients because of existing active bony growth centers, presence of permanent tooth buds, anatomical variations like smaller crown size, bulbous shape with marked cervical constriction make fixation procedures complicated⁷ and tooth buds present within the fracture line in mandible do not allow internal fixation with plates and screws.³ The osteogenic potential of the periosteum in the developing craniofacial skeleton is very high and will lead to rapid and easier healing which occurs under the influence of masticatory stress even when there is imperfect apposition of bone surfaces^{7,4}. Thus, there is a greater degree of tolerance permissible in the alignment of fragments and restoration of occlusion, which will subsequently be corrected by alveolar bone growth at the time of eruption of permanent teeth⁷. For minimally displaced fractures, conservative closed reduction is the most recommended treatment.

In Present case Vacuum formed cap splint was used and additional retention was achieved by chemical bonding using glass ionomer cement. Vacuum-formed splints have advantages of less laboratory time, non-invasive and maximum preservation from injury to mandible and the developing tooth buds⁶. It simulates the occlusal morphology and thus aid in maintaining occlusion along with the stabilization of the fractured segments, less or no chewing difficulty for the patient unlike acrylic cap splint and sufficient postoperative co-operation can be obtained by the patients.⁴ Material used in the present study is Thermoplastic hydrocolloid sheet of 1.5mm thickness (3A MEDES EASY VAC GASKET) commonly used as orthodontic retainer material, which is firm and rigid and provides better retention for reduction of fraction fragments.

Thus the clinical success achieved in the present case of parasymphysis and body fracture using vacuum formed closed cap splints signifies that it is an effective technique. But long term follow up is necessary to evaluate for developmental disturbances in the developing permanent tooth bud involved in the fracture site and also to evaluate the facial growth of patient.

CHAPTER FOUR

CONCLUSION

Minimally displaced fractures can be managed conservatively by the vacuum formed closed cap splint compared to the severely displaced fracture which may require open reduction and rigid internal fixation. In pediatric patients vacuum formed closed cap splint can be recommended in mandibular symphysis/parasymphysis and body fracture.

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