

## Case Report

# Conservative approach in the management of Parasymphysis fracture in a child with mixed dentition phase: A case report

Gaurav Shukla<sup>1</sup>, Pratiksha Marathe<sup>2</sup>, Dinesh Rao<sup>3</sup>, Sunil Panwar<sup>4</sup>, Safna Ameen<sup>5</sup>

<sup>1,2</sup>Post Graduate Student, <sup>3</sup>Professor and Head, <sup>4</sup>Professor, <sup>5</sup>Senior Lecturer

Department Pediatric Dentistry, Pacific Dental College & Hospital, Udaipur, Rajasthan

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### ABSTRACT

Mandibular fractures comprises of more than half of the facial fractures in children. The treatment in paediatric patients can get complicated due to the presence of growth centers in mandible along with the smaller size of the jaws and numerous tooth buds present in them. Thus, a conservative management protocol of closed reduction with functional therapies is the treatment of choice for most undisplaced paediatric mandibular fractures. This article discusses the management of left parasymphysis fracture in a 9-year old child, where the reduction of fracture, construction, and fixation of open cap splint with circummandibular wiring was made under deep sedation. This splint limited the discomfort and morbidity and served the purpose of reduction of the fracture.

### INTRODUCTION

Paediatric population comprises of less than 15% of the total facial fractures.<sup>1</sup>The most common site of fracture in the children is the nasal bone. Mandibular fractures are the second most common site in oro-facial fracture with nasal bone being the first. The angle, condyle and the subcondylar region contribute approximately 80% of the mandibular fractures in pediatric patients. Around 15-20% of cases have symphysis and parasymphysis fractures. Fracture of the body of mandible occurs rarely.<sup>2</sup> Several etiological factors for mandibular fractures have been discussed in literature, which include road traffic accidents, traumatic fall sports injuries, or birth injuries.<sup>3,4</sup> The response and result of fracture are by enlarge age dependent phenomenon. Majority of the mandible fractures are undisplaced because of the

elasticity of mandible and the embedded tooth buds that holds the fractures in children together like “glue”.<sup>5,6</sup> In case of displaced fracture closed reduction and immobilization are performed by the stage of skeletal and dental development should be taken in the consideration during operative management and must be carried out with minimal manipulation. Open reduction and rigid internal fixation is indicated for severely displaced fractures. When tooth buds within the mandible do not allow internal fixation with plates and screws, mandibular cap splint or occlusal acrylic splint fixed to the teeth and the mandible with circummandibular wire can be considered.<sup>7</sup>

The goal of treatment of these fractures is to restore the underlying bony architecture to its pre-injury position, in a stable fashion, as non-invasively as possible, with

\* Corresponding author: Dr. Pratiksha Marathe, Postgraduate student, Department of Pediatric Dentistry, Pacific Dental College & Hospital, Udaipur – 313024, Rajasthan State, India. Tel: +919028589790, E-mail: pratikshamarathe22@gmail.com

minimal residual esthetic and functional impairment.<sup>8</sup> Healing and repair of mandibular fractures in children are further facilitated by certain other factors that are assisted by their growth and development potential resulting rapid recovery within short span of time, along with inherent ability to adapt to the changes. Thus, current article presents a case of management of left parasymphysis fracture in a 9-year old child.

### **Clinical report:**

A 9 year old male patient reported to the Department of Paediatric and Preventive Dentistry of Pacific Dental College and Hospital, Debari, Udaipur. The child has apparently suffered an injury to the oral and perioral region due to a road traffic accident. The child's parents had given a history of bleeding from mouth. The child was immediately taken to a nearby medical facility, where all the first aid measures were provided. The patient was apparently conscious and well oriented without any history of vomiting or convulsions. Extra oral examination revealed diffuse facial edema (Figure 1). Left parasymphysis region showed a palpable step defect. The lower border of the mandible over the same area exhibited tenderness. Intra-oral examination revealed that there was restricted mouth opening with a deep wound in the left parasymphysis in between the central and lateral incisor region along with bleeding and mobility of the fractured fragments. Derangement of occlusion was evident (Figure 2). Orthopantomogram was advised to the patient to rule out the fracture line. Radiographic examination showed a fracture extending to the left parasymphysis region of mandible between 31 and 32. (Figure 3)

Treatment plan was initially to take upper and lower alginate impressions under topical anesthesia. Dental casts were prepared. As soon as the fracture line was

identified, the model was sectioned with the help of die cutting saw and filled with modelling wax. These casts were occluded to check for occlusal derangement (Figure 4). The lower model was assembled against maxillary arch in occlusion and seated with sticky wax. The appliance design consisted of a C clasps on the second molars bilaterally with co-axial SS wire to enhance stabilization.

The Splint was constructed using cold cure acrylic resin. It was finished, polished, and isolate in a 2% glutaraldehyde antibacterial solution.

Under deep sedation, digital pressure was used to reduce the mandibular arch. The pre-fabricated splint was stabilized in the mandibular arch with the help of interdental wiring using 28-gauge SS wires. Post-operative radiographic evaluation was done on the same day. (Figure 5) The patient was prescribed with analgesics, antibiotics and anti-inflammatory drugs and was kept on soft diet. The patient was recalled after 3 weeks the follow up examination showed that healing and function were uneventful except for an ulcer in the lower anterior region for which an anesthetic gel was prescribed. (Figure 6)

### **Discussion**

Treatment planning in paediatric patients considers a number of factors including the age of the patient, degree of compliance, the anatomic site of the fracture, the particular stage of growth and development (anatomic, physiologic, and psychologic), complexity of the injury, presence of concomitant injury, time elapsed since injury, and the surgical approach being contemplated (closed vs open).<sup>9</sup>

The treatment of jaw fractures usually treated surgically. There are various techniques which were utilized in management of paediatric fractures like Tape Muzzles,



**Figure 1:** Pre-operative extraoral photograph of a child with healing bruises and facial edema



**Figure 2:** Step deformity along with restricted mouth opening

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 or severely displaced fractures.<sup>10</sup> Paediatric jaw fractures are usually not managed surgically, owing to incomplete ossification of jaw bones and proximity to the underlying permanent tooth buds.<sup>11</sup>

Thus, the objective of the treatment of the current case was to restore the underlying bony structure to its anatomical position with minimal invasion and impairment. Clinical features of mandibular fracture in both children and adults share few common features like pain, swelling, trismus, derangement of occlusion, sublingual ecchymosis, step deformity, midline shift, bleeding, temporomandibular joint problems, loss of sensation and restriction of movement. It must be noted that clinical examination of craniofacial trauma in pediatric patients is more difficult taking the degree of their co-operation into consideration. 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.<sup>3</sup> 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.<sup>1</sup>

The presence of tooth buds within the mandible restricts the use of internal fixation using plates and screws, hence, cap splints fixed to the teeth bite interdental wiring can be either cemented or stabilized with the help of circummandibular wiring. After the age of six, when the permanent incisors have erupted, displaced symphysis fractures can be treated by open reduction and rigid fixation through an internal incision.<sup>2</sup> In



Figure 3: Pre-operative OPG showing left parasymphysis fracture



Figure 4: Articulation of the upper and lower cast

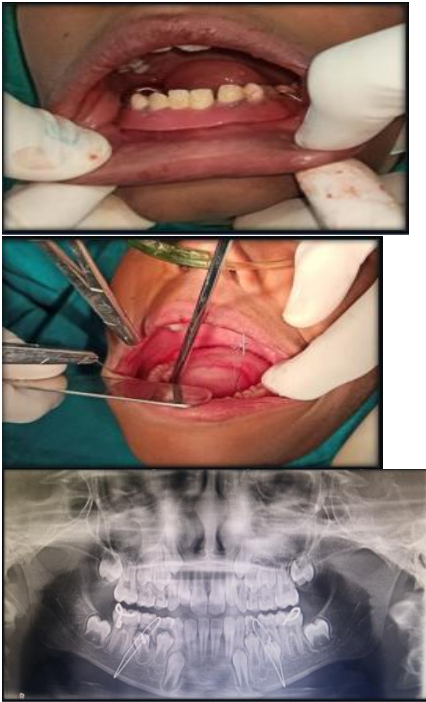
parasymphysis fractures, open reduction internal fixation (ORIF) is possible only after age the nine, when the buds of canines have moved up from their inferior position at

the mandibular border. Similarly, in mandibular fractures, the inferior border can be plated, when the buds of the permanent premolar and molar have migrated superiorly towards the alveolus.<sup>2</sup> Thus, a few methods have been suggested for the management of pediatric mandibular fractures based on the age of the child. An edentulous child between can be treated using MacLennan type of splint 0 - 2 years: Treated as edentulous problems with MacLennan type of splint. In child between 2 to 4 years with well-formed deciduous teeth, eyelet wiring can be done. While MacLennan type of splint can be used for children between 5 to 8 years.

Mandibular fractures in a child between 9 to 11 years should be managed using cap splint, arch bars plating or trans-osseous wiring at lower border.<sup>2</sup> Thus an open cap splint was used to treat the current patient. A cap splint was preferred as it covers both the buccal and lingual cortical plates and holds them in a secured position with the occlusion kept open, the function is unimpaired, the functional stresses enhances remodeling. It also has certain advantages including ease of application and removal, ease of fabrication, and cost-effectiveness.<sup>2,13</sup> Thus, the use of a cap splint in pediatric parasymphysis mandibular fracture is a definitive treatment modality that has a very conservative approach is the use of a cap splint in pediatric parasymphysis mandibular fracture.<sup>2</sup>

#### Summary:

“Facial fracture in children is a common type of injury suffered by pediatric patients. Causes and patterns of facial fractures vary with age. Knowledge of the association of dental injuries and maxillofacial fractures is a basic tool for their prevention. The majority of these fractures can be managed conservatively. The results of



**Figure 5:** Insertion of splint along with circummandibular wiring and immediate postoperative OPG



**Figure 6:** Intraoral post-operative photograph of the patient

the fracture treatment presented here verified the usefulness of open cap splint in cases of mandibular body, parasymphysis and symphysis fracture.”

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