

Lateral Compression Open Cap Splint (MacLennan) - A Treatment Modality for Pediatric Mandibular Parasymphysis Fracture: Case Report

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Abstract

Facial injuries are the most disturbing situations in pediatric patients. The treatment options for the traumatic injuries in pediatric group is controversial as any surgical intervention in young children may disturb the jaw growth or may even cause damage to the tooth buds in the jaws. The anatomical complexity and the high osteogenic potential of the bones in growing children allows successful outcome of conservative approaches for facial bone fractures. This case report documents successful conservative management of mandibular parasymphysis fracture using Lateral Compression Open Cap Splint (MacLennan) in 3 year old patient.

Keywords: Splint, Parasymphysis, Mandible, Children, Conservative Management

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Introduction

Facial bone fractures in children are relatively rare. Children are usually prone to craniofacial trauma because of their higher cranial mass to body ratio. The ratio of cranial volume to facial volume is approximately 8:1 at birth. By the completion of growth, this ratio becomes 2.5:11.

The most common site of fracture in the child is the nasal bone. The second most common fracture reported is the mandibular fracture. 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. Body fracture is rare.

The occurrence frequency of the facial fractures in children is less compared to that in adults and more often they are minimally displaced. The reason may be due to presence of thicker layer of adipose tissue covering the elastic bones and the suture lines are more flexible. In addition, presence of tooth buds within the jaws and the scarcity of sinus pneumatization increases stability.

The facial injuries due to mandibular growth centre disturbance can range from small temporary inconvenience to lifelong disfigurement. On-time suitable management of these injuries is important for the successful outcome for the patient. Treatment is usually performed without delay. The treatment can be

observation or closed reduction in non-displaced or slightly displaced fractures.

Case Report

A 3 year old boy was brought to the department of oral and maxillofacial surgery, having history of trauma in the mandibular anterior region while playing 1 day back. The patient was conscious and well oriented. There was no history of convulsions or vomiting. The history of oral bleed was positive.

Extra oral examination revealed that there was a diffuse facial edema. In the left parasymphysis region, step defect was palpable. The lower border of the mandible over the same area was tender. Intra oral examination revealed that there was restricted mouth opening with a deep wound in the left parasymphysis region in between central and lateral incisor along with bleeding and mobility of the fractured fragments. Derangement of occlusion was evident. (Fig. 1 and 2). A fracture line running down on the left parasymphysis region of mandible between 71 and 72. (Fig. 3) was revealed in CT Scan. On the basis of CT scan report and clinical examination, it was diagnose that there was unilateral left parasymphysis fracture of the mandible.

Management

Upper and lower alginate impressions were made under local anesthesia. Casts were prepared. These castswere occluded to check for occlusal derangement.

As soon as the fracture line was identified, the model was sectioned with the help of die cutting saw. The lower model was assembled against maxillary arch in occlusion and seated with sticky wax. Base was made. C clasp were made on the second molars (75 and 85). Splintwas made with cold cure acrylic along with co-axial SS wire which provided added stabilization.

Then the splint was finished and polished and isolated in an antibacterial solution. (Fig. 4)

The patient was administered General Anesthesia by nasal intubation. Digital pressure was used to reduce the mandibular arch. The prefabricated splint was placed in the mandibular arch. With the help of interdental wiring using 28-gauge SS wires. (Fig. 5 and 6), the splint was stabilized.

Patient was advised to be on liquid and soft diet for three weeks. Oral hygiene instructions were given. After three weeks, the patient was recalled for review. On his visit for review, the splint was removed by cutting the 28- gauge SS wires under local anesthesia.



Fig. 1: Staple on CLW on chin



Fig. 2: Step deformity in between 71 and 72

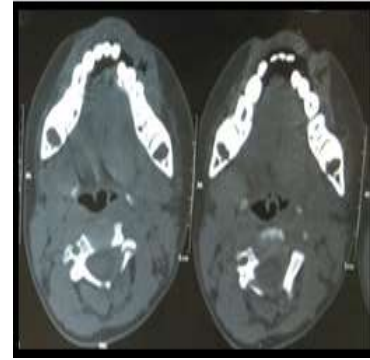


Fig. 3: 3D reconstruction and 2D coronal view showing fracture line passing between 71 and 72



Fig. 4: Fabrication of splint



Fig. 5: Splint fixed with interdental wiring

Discussion

Pediatric maxillofacial fractures are very uncommon. They demonstrate different clinical features when compared with that of adults. Due to the presence of tooth buds in jaw bones and the growth center at the mandibular condyle, the treatment needs to be different. Most of the pediatric fractures are firmly united in 2 and 3 weeks, because of the increased osteogenic potential of periosteum and increased metabolic rate in children.

In children, treatment of mandibular fractures is depicted by the fracture site and the stage of skeletal and dental development. Fracture of mandible limited to the alveolar process are treated by open or closed

reduction and immobilization by splints and arch bars for 2 to 3 weeks.

Mandibular fracture without having any kind of displacement and malocclusion are kept in close observation, a liquid to semisolid diet, avoidance of physical activities and analgesics.

Reduction and immobilization of displaced mandibular fractures are necessary to avoid any functional and esthetic disability. In pediatric patients tooth buds are present within the mandible which do not allow internal fixation with plates and screws. This can be achieved with a mandibular splint fixed to the teeth by interdental wiring, cementation or circummandibular wiring. After the age of six, when the permanent incisors have erupted then displaced symphysis fracture can be treated by open reduction and rigid fixation through an internal incision. In parasymphysis fractures open reduction internal fixation (ORIF) is possible after age the nine, when the buds of canines have moved up from their inferior position at the mandibular border. Similarly, in body fractures, the inferior mandibular border can be plated, when the buds of the permanent premolar and molar have migrated superiorly towards the alveolus.

For the management of pediatric mandibular fractures suggested methods are as follows:

0 - 2 years: Treated as edentulous problems with MacLennan type of splint.

2 to 4 years: If deciduous teeth are well-formed eyelet wiring can be used. Cap splint.

5 to 8 years: MacLennan cap splint

9 to 11 years; Cap splints, arch bars, plating or transosseous wiring at lower border.

Cap splint is preferred because of various advantages like it covers both lingual and buccal cortical plates and hold the mandibular cortices securely.

Other advantages include:

- Occlusion is open
- Function is not impaired
- Smaller adjustment or grinding can be done at the time of insertion
- Functional stresses increases remodeling

A definitive treatment modality with a conservative approach is the use of a cap splint in pediatric parasymphysis mandibular fracture.

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