

## Case Report

---

# Lateral compression splint, a guide for stabilization of mandibular arch in case of dentoalveolar fracture of children

\*Sheikh Md. Shahriar Quader<sup>a</sup>, Mohammad Shamsuzzaman<sup>b</sup>, Abdul Gofur<sup>c</sup>, Shakila Fatema<sup>d</sup>, Mohammad Aminur Rahman<sup>e</sup>.

<sup>a</sup>Assistant Professor & Head of the Unit Sher-e-Bangla Medical College, Dental Unit, Barisal

<sup>b</sup>Oral & Dental Surgeon, Z & Z Orthodontic & Dental Clinic, Uttara, Dhaka

<sup>c</sup>Lecturer, Dept. of Dental Pharmacology Dhaka Dental College, Dhaka.

<sup>d</sup>Assistant Professor & Head Dept. of Science of Dental Materials Dental Unit Holy Family Red Crescent Medical College Hospital

<sup>e</sup>Assistant Professor Dept. of Science of Dental Materials Saphena Women's Dental College Malibagh, Dhaka.

---

### ARTICLE INFO

---

#### Article history:

Received : 1 March 2013

Accepted : 17 September 2013

---

#### Keywords:

Mandibular wiring, mandibular body fractures, open occlusal acrylic splint, pediatric dental trauma.

---

### Abstract:

Children (below 13 yrs of age) are usually susceptible to cranio facial trauma because of their greater cranial mass to body ratio. When compared to adults, the pattern of fractures and frequency of associated injuries are similar but the overall incidence is much lower. Treatment is usually performed without delay and can be limited to observation or closed reduction in non-displaced or minimally displaced fractures. Operative management should involve minimal manipulation and may be modified by the stage of skeletal and dental development. 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, this can be achieved with a mandibular compression splint fixed to the teeth, to the mandible with circum-mandibular wire. Children require long-term follow-up to monitor potential growth abnormalities. A case of a 9-year-old boy with fractured body of mandible managed by closed reduction using occlusal acrylic splint and circum mandibular wiring is presented.

---

### Introduction:

Mandibular fractures are relatively less frequent in children when compared to adults, which may be due to the child's protected anatomic features. Treatment principles of mandibular fractures differ from that of adults due to concerns regarding mandibular growth and development of dentition. The term lateral compression splint means a custom made appliance which can be constructed using acrylic material.

It is made for the stabilization of mandibular arch. Mainly used in case of dentoalveolar fracture of children, where there is mixed dentition and presence of developing tooth buds. In this case open reduction and direct fixation is contraindicated.

### Indications- Fracture mandible

- In case of growing children, where mixed dentition is present.
- When number of firm teeth for anchorage are not adequate.
- Where open reduction & direct fixation is contraindicated.

#### Address of Correspondence:

**Dr. Sheikh Md. Shahriar Quader**

BDS, MS(Prosthodontics)

Assistant Professor & Head of the Unit

Sher-e-Bangla Medical College, Dental Unit, Barisal

Cell phone no: +8801711523234

E-mail: shahriar.faisal1971@gmail.com

- When the wiring of the teeth will not provide adequate fixation.
- It can also used in adult mandibular body fracture, where the stability cannot obtained by means of other type of horizontal wiring method.

#### **Fabrication of lateral compression splint-**

##### **Materials:**

- Self curing acrylic resin (quicker & easy)
- Heat curing acrylic resin
- Light polymerized acrylic resin

##### **Methods:**

- Impressions of upper & lower dental arches is taken by alginate, & preparing models by plaster stone.
- Special tray may be needed for accurate impression.
- On the mandibular plaster cast, the fracture line is marked and the cast is cut at the fracture line.
- This wire will reinforced the acrylic splint, as well as it will act as a connector to the lingual & buccal flanges of the splint.
- The acrylic splint is then fabricated from the cast using sprinkle on technique/dough technique/sheet form, by incorporating the previously bent wire in it.
- The occlusal surface of the teeth should be left open, while constructing buccal & lingual flanges.
- On the buccal surface of the splint hooks can be incorporated if required.
- This splint can be fitted to the lower arch by means of interdental wiring or by means of circumferential wiring (circummandibular wiring)

#### **Instruction to the patient:**

- Patient should wear the splint for 3 to 4 weeks.
- liquid & semisolid diet should be advised initially, & hard food should be completely avoided.
- Maintenance of oral hygiene by regular use of mouth rinses containing 0.2% chlorhexidine.
- Patient are trained & advised to irrigate the oral cavity with warm saline in a 10cc disposable syringe following any food intake.

#### **Follow up:**

Following removal of the splint, a careful examination of the teeth & fracture fragment is carried out to confirm satisfactory healing of the fracture. It is also imperative to monitor such cases over a prolong period so that future eruption of the permanent dentition can be closely observed.

#### **ADVANTAGES:**

- Can be used in case of mixed dentition.
- Treatment can be done without open reduction & direct fixation.
- Can avoid general anesthetics hazard.
- Close reduction can be done under local anesthesia.
- Economical.
- Patient compliance is good.
- Construction is quicker & easy.
- The splint not only get support from the adjacent teeth, but also from bone.
- Facilitating adequate stabilization of the fracture segment.
- Minimize delayed or no treatment effect i-e malunion, deranged occlusion, dentofacial deformity.

#### **DISADVANTAGES:**

- Minimum invasion may required for circumferential wiring.
- Required 14 days of continuous wearing can detroit oral hygiene.
- Difficulty of feeding.
- Foreign body present in the mouth may irritate the patient.

#### **COMPLICATIONS:**

Rare but may arise-

- Malunion
- Malocclusion
- Osteomyelitis
- Dentoalveolar abscess
- Tempromandibular joint ankylosis

#### **Alternative devices for closed reduction:**

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 with regard to cost effectiveness, ease of application and removal, reduced operating time, maximum stability during healing period, minimal trauma for adjacent anatomical structures and comfort for young patients<sup>7</sup>.

for maxillomandibular fixation (MMF)<sup>8</sup>.

- Orthodontic resin has been used for fixation of mandibular fractures in children<sup>9</sup>.
- Orthodontic rubber elastics in combination with fixed orthodontic brackets were used to create compressive horizontal force marginally over the mandibular fracture site from one side to the other<sup>9</sup>.
- A modified orthodontic splint appliance has been applied to fractures where two orthodontic bands are fit on the primary second molars with rounded stainless steel arch wires soldered to them on the buccal and lingual side<sup>10</sup>.

**REPORT OF CASES:**

A 09 years old boy (Araj Ali), Madrasa student reported with a chief complains of pain & swelling on the right lower jaw for last one week. He gave a history of traumatic injury. He also reported taking several medicaments for last 7-8 days, according to his report the medicines given by some local doctors but he didn't remember their name.

Clinical examination revealed bruise on the chin, open mouth appearance and derangement of occlusion [Fig 1(A&B)]. Step deformity with tenderness and mobility was elicited along the lower border of the mandible on the right side canine region. Preoperative orthopantomogram (OPG) and Bite-wing radiograph was taken [Fig: 2 (A&B)].

Under sedation, upper and lower arch alginate impressions were taken [Fig: 3 (A&B) ]and stone casts were poured and Mock surgery was done and rejoined the cast [Fig: 4 (A&B)]. Proper articulation was made and occlusion was checked [Fig: 5 (A&B)]. An open occlusal acrylic splint was fabricated [Figure 6,7 &8] and under general anesthesia, the mandibular body fracture was immobilized, fixed with the acrylic splint which was retained by circum mandibular wiring . Patient was reviewed every week [Fig: 9], and on the third postoperative week, the circum-mandibular wiring and splint was removed under local anesthesia. No mobility was present at the fracture site. Postoperative recovery was uneventful and occlusion achieved was satisfactory. Patient was reviewed monthly for 6 months. On 2 months follow-up, the child

occlusion and good masticatory efficiency.

**Inta oral examination:**

Fracture between lateral incisor & canine region  
Fig: 1 (A&B)



Fig-1(A&B)

**Radiographic Examination:**

**On radiological examination** by orthopantomogram (OPG), tooth buds are present within the mandible which do not allow internal fixation with plates and screws [Fig 2 (A)]. Bite-wing radiograph shows fracture line between lateral incisor & canine region. No peri-apical pathology was found [Fig: 2 (B)].

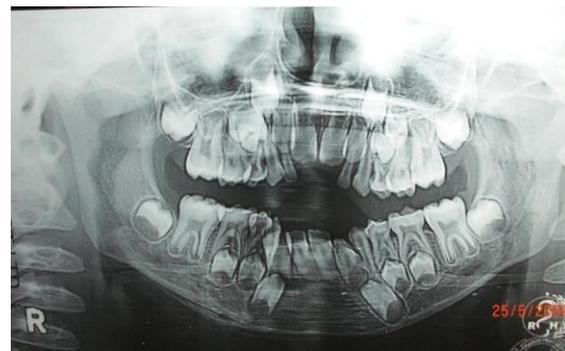


Fig: 2 (A)



Fig: 2 (B)

**Impression taking –**

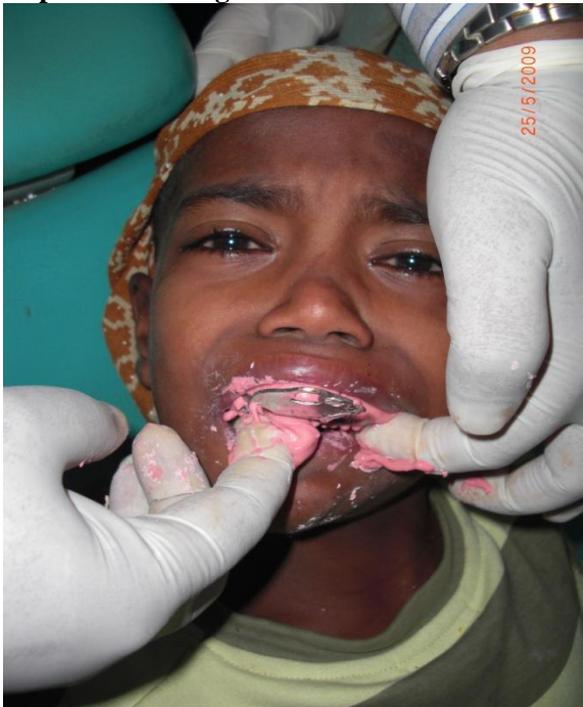


Fig: 3 (A)

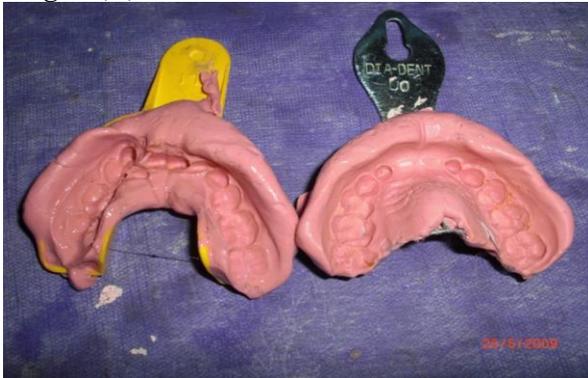


Fig: 3 (B)

**Model preparation & mock surgery-**



Fig: 4 (A)



Fig: 4 (B)

**Occlusion correction & articulation-**

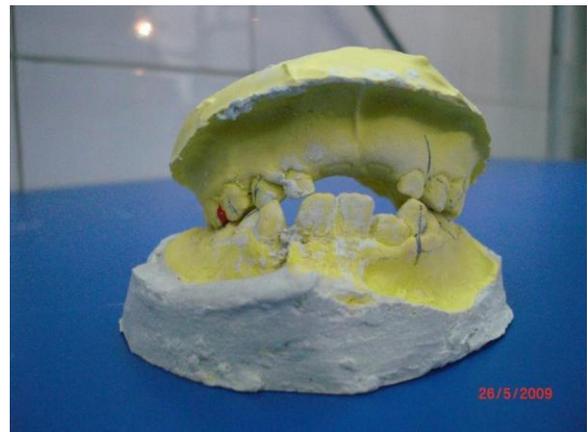


Fig: 5 (A)



**Fig: 5 (B)**

**Preparation of acrylic plate incorporating with wire –**



**Fig: 6**

**Finishing, Polishing & Ready for intraoral setting –**



**Fig: 7**

**Finished Lateral Compression Plate**



**Fig: 8**

**Post-operative photograph showing circum mandibular wiring**



**Fig: 9**

**CONCLUSION:**

Lateral compression splints for treatment of pediatric mandibular symphysis/parasymphysis/body fractures are reliable treatment modalities with regard to occlusion-guided fracture reduction. And we can manage the child dentoalveolar fracture with minimum invasion & with minimum cost by this splint.

**References:**

1. Neelima Anil Malik, Textbook of Oral and Maxillofacial Surgery; 3<sup>rd</sup> edition, Page-433.

2. Dr. Vinod Kapoor , Textbook of Oral and Maxillofacial Surgery; 2<sup>nd</sup> edition, Page-259.
3. Souza ML, Bastos JLD, Peres MA, Journal of Dentistry for Children 2006; 73(2).
4. A. O. Fasola, Fractures of the Mandible in Children, East African Medical Journal; Vol-78, No-1, November 2001.
5. Carroll M J, Hill C M, Mason D A, Facial fracture in children. Br. Dent J 1987; 163:23-26.
6. J Oral Maxillofacial Surgery 1993; 51, 836-844.
7. Kocabay C, Atac MS, Oner B, Gungor N. The conservative approach of pediatric mandibular fractures with prefabricated surgical splint: A case report. Dent Traumatol 2007;23:247-50.
8. Magennis P, Craven P. Modification of orthodontic brackets for use in intermaxillary fixation. Br J Oral Maxillofac Surg 1990;28:136-7.
9. Aizenbud D, Hazan-Molina H, Emodi O, Rachmiel A. The management of mandibular body fractures in young children. Dental Traumatol 2009;25:565- 70.
10. Aizenbud D, Emodi O, Rachmiel A. Nonsurgical orthodontic splinting of mandibular fracture in a young child: 10-year follow-up. J Oral Maxillofac Surg 2008;66:575-7.