

# CONSERVATIVE TREATMENT OF PEDIATRIC MANDIBULAR FRACTURE WITH REMOVABLE ACRYLIC SPLINT

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## Abstract

Traumatic injuries in pediatric patients are the most distressing situation. The use of rigid fixation in treating children with oro-facial trauma is controversial and may cause growth retardation. Intermaxillary fixation for mandibular fractures should be used cautiously as bony ankylosis in the temporomandibular joint (TMJ) and trismus may develop. Any surgical intervention in young children may misguide jaw growth or may cause damage to developing permanent young teeth. The high osteogenic potential of the mandible in children allows non-surgical management to be successful in younger patients with conservative approaches. In this case, successful conservative treatment of mandibular fracture of a 8-year-old patient is presented. The rationale behind the treatment modality has been discussed.

## Key words

Fracture, Removable, Splinting

## INTRODUCTION

A jaw fracture is caused by an injury to the head or face. A direct blow during a fight, physical abuse, or car accident may cause the trauma.

Common signs and symptoms of jaw fracture may include a bump, cut, bruise, swelling, or deformity of the jaw. The chief complaint presented by the patient may be missing or loose teeth or a feeling that the teeth do not fit together. The child may also complain of difficulty in breathing, talking, eating, biting, swallowing, or opening the mouth. An x-ray, magnetic resonance imaging (MRI), or computerized tomography (CT) scan may be used for diagnosis.

A survey showed that fractures of the jaws in children most frequently affect the mandible, while those of the upper jaw and face mainly involve the anterior alveolus and related parts of the maxilla. The most common cause of jaw fracture in children is road traffic accidents and fractures occur more frequently in boys than girls<sup>1</sup>.

Depending upon the rigidity of the splint, they can be described as follows: flexible splint (allow more mobility than a non-injured tooth), semi-rigid splint (allow equal to normal tooth mobility) and rigid splint (allow less than normal tooth mobility)<sup>2</sup>.

The recent discovery suggests rigid and long-term fixation can induce periodontal and pulpal healing problems and also preservation of an otherwise transient ankylosis<sup>3</sup>.

Soft occlusal splints are commonly used for children, because normal growth changes the fit of hard splints. Stabilizing or Michigan-type occlusal splints are generally flat against the opposing teeth, and help jaw muscle relaxation, while repositioning occlusal splints are used to reposition the jaw to improve

occlusion<sup>4</sup>.

In the present case removable open cap splint was used and it appeared to positively affect healing after traumatic injuries, as evidenced by the low number of complications at the regular follow-up period for one and a half year.

## CASE REPORT:

An 8-year old boy reported to the department of Pedodontics & Preventive Dentistry, K.L.E.S's Institute of Dental Sciences, Belgaum, Karnataka with a chief complaint of loose teeth in right lower jaw region. The patient was admitted to K.L.E Hospital for left shoulder injury from last 1 week.

History of trauma: The patient's parents gave history of car accident, in which child's face was hit against car dashboard. Child was brought unconscious to the hospital by his parents, who had also received some minor injuries.

Medical examination: Neurological examination of the patient confirmed absence of any neurological problem. The left shoulder fracture was noticed, which was stabilized with a plaster cast. Patient was given tetanus injection at the time of admission in the hospital. Extra oral examination: (Fig: 1) showed soft tissue lacerations on the chin, which were sutured at the hospital. Face was bilaterally symmetrical. No other abnormality was detected.

Intraoral examination: (Fig: 2, 3, 4) showed gingival laceration seen with 83. Grade I mobility was present with 83, 84. No step deformity in occlusion was seen on either side. Teeth present were 53,54,55,16,63,64,65,26,74,75,36,83,84,85,46 and erupting teeth were:11,21,31,32,41,42.

On palpation: No step deformity or lack of bone continuity in mandible or maxilla was observed.

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Bimanual palpation of the jaws did not reveal presence of any jaw fracture.

Investigations: OPG (Fig: 5) showed a radiolucent line in mid-root region with 83, involving its alveolus, lying coronal to developing underlying 43.

Mandibular Occlusal radiograph (Fig: 6) showed a thin breach in the continuity of the base of the mandible in 42, 83 region.

Intraoral periapical radiograph (Fig: 7) revealed a thin radiolucent line distal to 83, in the mi-root region of the same.

Diagnosis: An Uncomplicated Unilateral (right) Parasymphysis Fracture of the Mandible.

Treatment: Maxillary and mandibular alginate impressions made. Casts were occluded to re-check any derangement of occlusion bilaterally.

Fabrication of removable cap splint: 19-gauge wire was adapted on the interproximal surface of 75 and 36 on left side and between 85 and 46 on right side. The same wire was adapted on labial surface of the anterior teeth on the cast for strengthening the acrylic splint. Removable cap splint was fabricated with cold cure acrylic by sprinkle-on method. After setting, it was finished, polishing and tried in the patient's mouth. It was then trimmed and adjusted and placed into the patient's mouth (Fig: 8).

#### INSTRUCTIONS:

1. The patient must take proper rest.
2. Do not play any contact sports.
3. He may not be able to eat solid food for a period of time. Therefore only have soft diet and drink liquids to give rest to the mandible, e.g. bananas, cooked cereal, cottage cheese, eggs, pudding, and yogurt.
4. Don't try to move mandible forcibly.
5. Analgesics prescribed.
6. Use only chlorhexidine mouth wash as oral hygiene aid.
7. Clean the appliance intermittently with a soft brush and chlorhexidine solution.
8. Come for regular check up.
9. In case of breakage of the appliance, do not swallow the broken parts.

**Recall:** patient was recalled after 2 days to check for any sore areas and the ease of wearing of the appliance. After 4 days, due to increased mobility with 83 and 84 extraction was done.

Removal of the splint: done after 4 weeks. Removable functional space maintainer was given for 83, 84 (Fig. No. 9)

Later Recall: after 6 months, mandibular occlusal radiograph (Fig No. 10) was taken, which showed initial signs of healing of fracture sight. Regular check ups were done intermittently.

Mandibular occlusal radiograph taken after one and a half year (Fig No. 11) showed complete healing of the fracture sight. In between no complications were observed and patient stayed completely asymptomatic.

#### DISCUSSION

Various techniques can be utilized in the management of jaw fractures. Adherence to basic principles of jaw fracture management can help provide a successful outcome regardless of the technique utilized. These basic principles include the following: (1) restoration of occlusion and anatomic reduction of the fracture, (2) neutralization of forces on the fracture line and stable fixation, (3) avoidance of further dental trauma, (4) proper assessment of tissue viability, (5) removal of diseased teeth within the fracture, (6) avoidance of excessive elevation of soft tissue from the surface of the bone and covering of exposed bone with soft tissue, and (7) rapid restoration of function<sup>5,6</sup>. So as to reduce further irritation to the fracture site, extraction of 83 and 84 was done, which lied along the line of fracture.

To restore the function removable functional space maintainer was given.

Numerous techniques for reduction of mandibular and maxillary fractures have been described previously. Techniques frequently utilized in the management of jaw fractures include: (1) tape muzzles, (2) circumferential wiring, (3) acrylic splints, (4) percutaneous skeletal fixation, (5) bone plating, and (6) partial mandibulectomy<sup>6</sup>.

The treatment of jaw fracture usually involves surgical intervention. But in children, due to incomplete ossification of jaw bones and the presence of underlying erupting teeth, surgical intervention for management of jaw fractures is not a usual consideration. Therefore simple splinting methods hold importance in trauma management in young children<sup>2</sup>.

In the present case, due to the uncomplicated nature of the fracture, as well as, due to the non-disturbed occlusion, such a treatment modality could be used more effectively and efficiently.

The application of acrylic splints in the treatment of various types of maxillofacial fractures mainly depends upon the number of remaining teeth that are important for the restoration of occlusion. The acrylic splints studied consisted of intermaxillary, lingual and labiolingual types that hold a dental arch and a cap type that covers a dental arch. It was found that the intermaxillary type was best indicated for the loss of multiple teeth, the lingual type for the predicted intraversion of bone fragments and the labiolingual as well as cap types for the deciduous or mixed dentition<sup>6</sup>.

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The cap splint is suggested to be cemented only on non traumatised teeth, leaving the injured teeth free within the splint in order not to damage them when the splint is removed<sup>8, 9</sup>.

The treatment period with a removable splint averaged 3 weeks in subluxated teeth, 3-5 weeks in luxated teeth, 4-6 weeks in apical third root fracture injuries, and more than 5 weeks in middle third root fracture injuries<sup>9</sup>. Initially slight surface resorption appeared which was found to be self-limiting and did not threaten the retention of the tooth. Inflammatory resorption was observed in teeth with pulp necrosis, but in all cases this was reversed with endodontic treatment<sup>10</sup>.

#### The common instructions given to the patient to avoid further jaw fracture includes:

- Always put your child in a car safety seat in the back seat. The child's seat belt should be fastened properly and tightly.
- Do not leave your young child alone in the bed, on the changing table, or couch.
- Do not let your child dive in a shallow pool area or in water where the depth is not known.
- Make sure your child wears proper padding and protective gear when playing sports. These include wrist guards, helmets, kneepads, and mouth guards that meet safety standards. Teach your child about following safety regulations.

The present treatment modality proved out to be a success due to the cooperativeness of the patient to wear the removable appliance and remotivation by his parents.

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