CASE REPORT

MODIFIED CIRCUMMANDIBULAR WIRING FIXATION USING ACRYLIC SPLINT FOR THE TREATMENT OF DISPLACED MANDIBULAR PARASYMPHYSIS FRACTURE: A CASE REPORT

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ABSTRACT:
Fractures of the mandible are relatively uncommon in children as compared to that of adults. When they occur, the problems associated with their management are complicated due to the presence of the tooth bud and potential growth disturbance. Various management protocols are discussed in the literature. Most authors agree that the ideal method is to use an acrylic splint because it is easy to place and reduces the risk to jaw growth. These splints are secured to the reduced jaw by circummandibular wiring, which is a relatively simple technique. The authors describe their experience with a modified circummandibular wiring technique in the management of displaced parasympysis fracture in a 9- year-old child.

Keywords: Modified circummandibular wiring, cap splint

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INTRODUCTION
Pediatric fractures are rare when compared with fractures in the adult population and is estimated to occur in 5% of all maxillofacial traumas(1). Mandibular fractures are the most common (56%) facial skeletal injury in hospitalize pediatric trauma patient(2). Boys are affected twice as frequently as girls(3). Dentoalveolar injuries are more frequent facial injury (60%) in children (especially under the age of 5) but rarely require hospitalization. In pediatric patients symphysis and parasympysis fractures account for 15%–20% and body fracture rare. The treatment choice of fractures in the pediatric mandible depends on the age and the state of tooth development(4).

Major injuries affecting the face are associated wrt hyperactivity of the child, fall, road traffic accidents (RTA) assault, and child abuses which are the most frequent risks of facial bone fractures in children(5). Majority of the body and symphysis fractures in children are undisplaced because of elasticity of mandible and embedded tooth buds that holds the fragments together “like glue”. If displaced, closed reduction and immobilization are performed(6).

Most fractures have been treated conservatively by dental splints and rubber elastics. An occlusal splint with circummandibular wires is another treatment which is a relatively simple technique for mandibular fractures in children(7). The following paper will review the triage, evaluation, and management of facial trauma in children. It highlights the role of acrylic splint with the use of modified circummandibular wiring technique in the management of displaced parasympysis fracture in a 9- year-old child.
CASE REPORT
A 9-year-old girl was referred to the Department of Oral and Maxillofacial Surgery, Dasmesh Institute of Research and Dental Sciences, Faridkot with a chief complaint of pain in the lower jaw and bleeding about 3 hours back. Patient’s parents also complained of inability to close the mouth. History dated back to 3 hours when the patient met with the road traffic accident. Patient was conscious, well oriented to time, place and person but she was non cooperative. There was no history of convulsions, vomiting and bleeding from ear and nose. The patient’s medical history was noncontributory, and she was not under any medication.

On examination:
Extraoral examination revealed asymmetry due to diffused facial oedema. There was limited mouth opening because of pain and possible muscle spasm. Laceration was present on the left side of the face in front of the tragus of the ear. Step defect and tenderness present with respect to right parasymphysis region. Tenderness also present with respect to left preauricular region.

On Intraoral examination, bleeding was evident within the mouth. Laceration present in labial vestibule with respect to 41 and 42 region. Step defect and tenderness present with respect to right parasymphysis region. Mobility evident wrt the fractured segments in the right parasymphysis region. Occlusion was not altered on either side.

Radiological examination revealed fracture line running wrt right parasymphysis region between 42 and 83. A thin radiolucent fracture line was also evident in the left subcondylar region.

MANAGEMENT
Impressions of both jaws were made with alginate impression material under midazolam and ketamine intravenous conscious sedation. An acrylic cap splint was the constructed on the model of the patient’s arches after reducing the fracture on the models. For reinforcement, metallic mesh was incorporated in the splint for additional strength (fig no. 1).

Under strict aseptic conditions, patient was intubated with nasotracheal tube no. 6 and anaesthesia was achieved. Site was prepared and drapping was done in the usual manner. The dislocated segments were reduced by bidigital pressure and were stabilized using bridle wire between the fractured segments.

Cap splint was then
positioned wrt the lower arch. 18 gauze spinal needle was passed extraorally from below the lower border of the mandible wrt 73 and 74 region on to the lingual side of the oral cavity. From cannula of spinal needle 26 gauze stainless steel wire was passed and cannula was then removed. Now one end of 26 gauze wire was outside and another lingually. Then the spinal needle was reinserted intraorally through the buccal vestibule and taken out through the same point extraorally. Then the wire end already present extraorally was reinserted into the spinal needle and taken out on to the buccal side (Fig no. 2).

The free ends of the 26 gauze wires were held together and ironing was done to adapt the wire in close approximation to the bone to prevent soft tissue injury and an unaesthetic scar. The acrylic cap splint was then stabilized on the left side by winding the wire in a clockwise direction. The same procedure was followed on the right side wrt 83 and 84 region (Fig no. 3). Then both the right and left twisted ends of the wires were pulled against each other and were tightened again in a clockwise direction to achieve additional horizontal stabilization of fractured segments (Fig no. 4). Care was taken to avoid pulling the wire through the mandible since the child was young and at this stage the mandibular cortex is thin and relatively less dense. OPG was taken postoperatively to check if the wires were properly secured to bone. Postoperative antibiotic treatment was started for 1 week. Soft diet, avoidance of physical activities, and antibacterial mouth rinse were prescribed. Postoperative monitoring was performed on a weekly basis and was favourable in both healing and function. No signs of complications were observed during the healing period.

DISCUSSION
Fractures of the pediatric facial skeleton have special characteristics, and specific knowledge is necessary for their diagnosis, management, and follow-up. To understand the differences between pediatric and adult facial fracture patterns, a familiarity with the processes of facial growth and development is essential. Facial growth, paranasal sinus development, dentition, and bone structure all affect the pattern of facial fractures in children. The areas of pediatric mandible that are most frequently fractured are in condyles, subcondylar, and angle regions (80%), and the symphysis/parasymphyseal area (15% to 20%) fractures of the body of the mandible are rare in pediatric population. Factors to be considered in the definitive treatment of the dentoalveolar injury include (1) age and cooperation of the patient; (2) duration between trauma and treatment; (3) location or extent of the injury; (4) injury to primary or permanent dentition; (5) stages of root development; (6) presence of fracture of supporting bone; and (7) periodontal health of remaining teeth. Among the commonly used treatment options, acrylic cap splints are ideal. They avail support not only from the adjacent teeth but also from bone. They are easy to fabricate and are economical. Routinely, they are used in stabilising mandibular fractures, as they can be stabilised by the use of circum-mandibular wire. Conventionally, circummandibular wiring is performed with a mandibular awl, but the wound created when using a spinal needle is inconspicuous compared with that.
created when using an awl. When the awl travels through the tissue, with the wire crimped, the twisted end of the wire causes trauma to the surrounding soft tissue because of its sharpness and thickness. Repeated use of an awl causes it to lose its sharpness. When using an awl, the crimped wire, which is potentially contaminated by oral fluids, is made to pass around the mandible. Using spinal needle the section of wire exposed to the oral cavity never touches the tissue, but the tip of the needle is exposed to the oral cavity and enters the tissue. Fracture healing was uneventful and complications such as postoperative swelling and haematoma were not observed\(^\text{[11]}\). This was a displaced fracture rarely seen in children with both the fracture segments separated and mobility in both the fracture segments on bimanual manipulation. We therefore decided to fix the fractured segments further tightening by right and left circummandibular wires horizontally. This technique provided efficient stability and patient tolerated the treatment well. According to the extensive literature search, there is a limited number of articles regarding treatment of pediatric mandibular fracture with fixation of the splint by circummandibular wires. Although this treatment involved minimal operative manipulation, the technique should be applied by an experienced surgeon only.

**CONCLUSION**

“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. While the basic principles for mandibular fracture treatment are the same as for the adult, certain anatomical features of the pediatric mandible warrant special attention. For the proper treatment, mixed dentition, unerupted teeth, the shapes of teeth and ongoing growth in the mandible should be carefully considered. Although there is no clear consensus about the optimal method for fixation of mandibular fractures; effective, simplest and less invasive method is the best method. The results of the fractured treatment presented in this case report verified the usefulness of modified technique of horizontal stabilization along with circummandibular wiring using cap splint in case of parasymphyssis fracture.

**REFERENCES**