

Management Of Mandibular Fractures: A Case Report And Review Of Techniques

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INTRODUCTION : Accidents are a major cause of serious injuries, but many more are caused by interpersonal aggression, industrial disasters, sporting activities, household accidents, and instances involving missiles or gunfire.¹ Road traffic accidents (RTAs) are a particularly common cause of mandibular fractures. The mandible, as the most conspicuous and movable bone in the facial skeleton, is very prone to fracture, making it one of the most common facial skeleton injuries. These occur in a 6:2 ratio as compared to zygomatic fractures.^{2,3} Mandible is the second part of the maxillofacial skeleton most frequently affected by fractures, due to its anterior projection, second only to fractures of the nasal bones. Mandibular fractures are injuries that can affect any mandibular segment, invariably involving the teeth or occlusion, and are one of the most common facial fractures.⁴ Depending on the type of injury, direction and strength of the impact, mandibular fractures can occur in different locations, with angle fractures being the most prevalent, followed by the symphysis and mandibular body.⁵

Case report

A 20-year-old male patient reported to the Department of Oral Medicine and Maxillofacial Radiology with a chief complaint of pain in the lower right posterior region of the jaw for the past 6 days, along with difficulty in opening and closing the mouth.

The patient gave a history of a road traffic accident (RTA) that occurred 6 days ago. He was apparently asymptomatic prior to the accident. According to the patient, he fell forward and struck his chin on the road during the accident, which resulted in swelling and a laceration over the anterior mandibular region.

There was no history of bleeding from the ears or nose, and no episodes of epistaxis were reported. The patient remained conscious and cooperative during and after the accident and received first aid treatment at a government hospital.

Following discharge, the patient presented to our department with persistent pain in both the left and right anterior mandibular regions. He also reported

severe pain during jaw movements. Intraoral examination revealed active intraoral bleeding.

Extraoral examination

Extraoral examination revealed the presence of step deformity caused by fracture in mandibular parasymphysis and angle of mandible. Active bleeding from the fractured sites during mandibular movements and noticed disturbed occlusion. There was also laceration on vermilion border of lip and swelling present on mandibular anterior region. On TMJ examination history of no deviation, clicking, popping and crepitus sound heard. On palpating muscle of mastication masseter muscle was tender. On intra oral examination, there was step present in relation to left mandible canine region with premature occlusion present in right region.

Radiographic examination

Radiographic examination with orthopantomograph revealed unilateral (right) mandibular parasymphysis fracture and angle of the mandible (favorable) fracture showing fracture line starting

from distal to 48 passing inferior and backward direction involving basal bone suggestive of simple fracture. Based on the clinical findings patient was plan for surgery.

Treatment

The fracture was immobilized with stainless steel circumdental wires to reduce pain and bleeding from the fractures. Surgery was performed under Local anesthesia. After local infiltration with 2% of lidocaine with vasoconstrictor, a transoral vestibular approach below the mucogingival junction was performed. Intra oral vestibular incision was taken extending from left 1st premolar to right second premolar exposing the parasymphysis fracture site. After access, mandibulomaxillary fixation was performed to ensure satisfactory occlusion after adequate fragment reduction. Open reduction and internal fixation (ORIF) done with 2 mm miniplate with screw diameter 2 * 8 mm. 3rd molar extraction was done during the surgery as it involves with fracture line. After reduction and fixation, the surgical wound was clean with hydrogen peroxide and betadine and then with saline. The wound was closed with absorbable 3-0 Vicryl suture. After surgery, patient evolved with good oxygen saturation and no difficulty breathing. After surgery followed by antibiotics and analgesic medication for 5 days.

Patient recall after 10 days for the postoperative follow-up. The surgical wound was maintained, without dehiscence, with good appearance and good oral hygiene. The occlusion obtained during surgery remained satisfactory. Postoperative panoramic radiography revealed adequate reduction of the fractured fragments.



Fig no 1: - Radiographic examination with OPG revealed unilateral (right) mandibular parasymphysis fracture and angle of the mandible (favourable) fracture.



Fig no 2: - Intraoral vestibular incision extending from left 1st premolar to right second premolar exposing the parasymphysis fracture

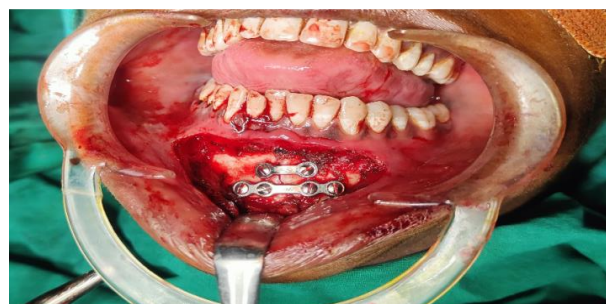


Fig no 3: - Parasymphysis fracture was fixed using two 2.0mm plate and screw system



Fig no 4: - Intra oral vestibular incision given extending from right 1st molar to angle of mandible region for exposing the fracture site.



Fig no 5: - The fractures were properly fixed with two 2.0-mm plate and screw systems each fractured site.

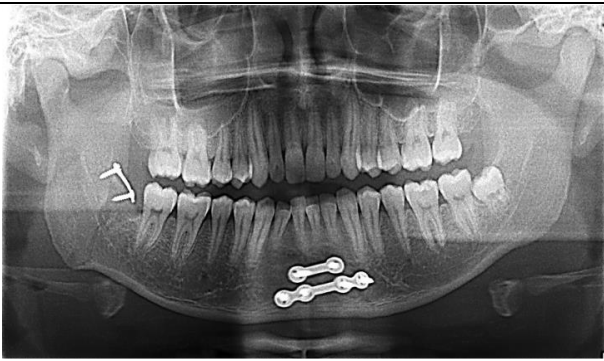


Fig no 6: - Postoperative panoramic radiograph showing a satisfactory surgical treatment.

DISCUSSION

Mandibular fracture is the second most frequent fracture of facial bones, standing out among etiologic agents and motorcycle and automatic accidents after physical attacks. They can extend over regions (branch, angle, body, parasymphysis and symphysis), involving unusual regions and neighboring structures. They can be classified depending on the tissue impairments that have been affected, the action of the masticatory muscles and their anatomical location. The most affected region is the angle and parasymphysis.⁸

Mandibular fractures are mostly described by anatomic location in the mandible and whether they are displaced, comminuted, or “greenstick”. They may also be classified as either favorable or unfavorable, based on the location and configuration. Favorable fractures are those that are not displaced. Angle fractures that extend posteriorly and downward are horizontally unfavorable and tend to be displaced by the muscles of mastication. Angle fractures are often unfavorable because of the actions of the masseter, temporalis, and medial pterygoid muscles, which distract the proximal segment superomedially. Fractures of mandibular angle are common.^{9,10}

On physical examination, one should inspect the maxillofacial area for deformity, including ecchymosis and edema. A careful intraoral examination should be performed; sublingual hematoma is suggestive of an occult mandibular fracture. One should also look for any malocclusion, trismus, or facial asymmetry. The tongue-blade bite test is a quick and inexpensive diagnostic tool for predicting mandibular fractures. It can be performed

by asking the patient to bite down firmly on a tongue depressor and keep the tongue depressor clenched between the teeth.¹¹

Diagnosis of mandibular fractures requires radiographic imaging studies, including mandibular series, panorex, and computed tomography (CT) scan. A mandibular series includes an anteroposterior view, bilateral oblique views, and a Towne view. They are best for evaluating the condyles and neck of the mandible. Dental panoramic view, or panorex, is best for evaluating the symphysis and the body of the mandible. CT scan is indicated if associated facial fractures are suspected. A chest radiograph is necessary for an unconscious patient with missing teeth to rule out aspiration.¹²

Mandibular fractures with mucosal, gingival, or tooth socket disruption are considered open fractures, and antibiotics with intraoral anaerobic pathogen coverage should be administered to reduce the risk of infection. Pain control should be achieved with acetaminophen, NSAIDs, and/or opioids. Steroids and ice packs are useful for reducing edema.¹³

Patients with linear, nondisplaced, or greenstick fractures can be treated as outpatients with soft diet, analgesics, and urgent follow up with the oral and maxillofacial surgeon for elective operative repair that can be performed as an outpatient procedure in 3 to 5 days, leaving time for some of the edema to subside and facilitate surgery. A Barton dressing, an ace wrap over the top of the head and underneath the mandible, may be used to stabilize the fracture and help relieve pain. These comparatively uncomplicated fractures are often treated with maxillomandibular fixation (MMF), in which the upper and lower jaw are wired together for a period of time in order to stabilize the fracture during the healing process. MMF can be achieved in several ways, with one of the most common being Erich arch bars and wires, although bridle wires, Ivy loops, intermaxillary fixation screws, and hybrid arch bars are also used. Wire loops are also useful for alveolar ridge fractures, providing interdental fixation to stabilize the fracture segments.

Historically, MMF would last for 6-8 weeks; nowadays, many surgeons will only use rigid MMF with steel wires for 2 weeks or less and then replace the wires with elastic bands, or even do away with rigid MMF altogether. The advantage to MMF is that it avoids the risks of placing plates and screws, but requires a compliant patient to follow a prolonged regimen that often results in weight loss and may cause ankylosis of the temporomandibular joint. MMF is also a poor choice for malnourished patients, such as alcoholics, and patients likely to vomit, such as pregnant women and patients with seizure disorders, because they could aspirate.

Patients who are likely to be noncompliant and cut the MMF wires in the absence of vomiting or who are liable to not follow up as directed should undergo open reduction and internal fixation (ORIF) instead.¹⁴

Advanced Treatment Modalities

ORIF with plates and screws is often employed when it is not practical to leave a patient in MMF for a prolonged period of time, if there are comminuted fractures, if some of the bony fragments are edentulous and therefore not reduced with MMF, or if MMF otherwise does not provide sufficient reduction. the arch bar used for MMF functions as a tension band along the alveolar ridge, but compressive forces are needed along the inferior margin of the mandible for stability, and a robust plate is known as a “recon bar” is often required in that location. Two to three lag screws can also be used to fixate fractures of the parasymphysal region, which will avoid the use of palpable plates. In contrast, angle fractures that traverse the oblique ridge of the mandible can often be fixated using only a single thin Champy plate that takes advantage of the muscles of mastication to keep the fractured segments stabilized.

The absolute indications for ORIF include: displacement of the condyle into the middle cranial fossa, inadequate reduction with MMF, lateral extracapsular displacement of the condyle, and foreign body in the temporomandibular joint. The relative indications include: bilateral condylar

fractures with a comminuted midface, bilateral fractures with history of malocclusion, bilateral fractures in an edentulous patient, and when splinting is not recommended.¹⁵

CONCLUSION

Mandibular fractures are the most common fractures of facial region due to their prominent position. Treatment options depend upon the type of fracture of mandible according to the anatomic variations. Skilled work of the surgeon decides the pros and cons associated with the treatment plan and outcomes.

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