

Rare Mandibular Ramus Fracture

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Abstract

Mandibular fractures represent approximately two-thirds of all maxillofacial fractures (nearly 70%), out of which fractures of mandibular ramus represent 3.09% which is considered to be a rare fracture site. They occur alone or in combination with other facial bone fractures resulting in loss of function and disfigurement. The pattern of mandibular fractures varies with geographic location, physical activity, social, cultural, and environmental factors. The main causes of mandibular fracture are road traffic accidents, interpersonal violence, falls, sports injuries, industrial trauma, and pathological fractures. In this clinical case, the authors describe a vertical ramal fracture extending from subsigmoid region to inferior border of angle of the mandible combined with symphysis fracture which was surgically operated through open reduction and internal fixation by extraoral approach.

Keywords: Extraoral approach pterygomassteric sling, facial nerve, ramus fracture

INTRODUCTION

The mechanism of injury correlates with the anatomical location of the mandibular fracture with defined anatomic fracture patterns. A motor vehicle crash or fall with an anterior impact results in symphyseal, parasymphyseal, and condylar fractures, whereas a lateral impact will result in angle, body, and contralateral condylar fracture.^[1] Among the various anatomical subsites, the incidence of coronoid, alveolar, and ramal fracture is very low. Ramus fractures rank as the third least common fracture after coronoid and alveolar fracture.^[2] Regardless of geographic location, most fractures occur in men (67%–88%) aged 25–34 years.^[3] As men age, they are less likely to sustain mandible fractures from interpersonal violence or a motor vehicle crash and more likely to do so as a result of a fall. Approximately 25% of mandible fractures in women are attributable to falls. These results should be interpreted with caution because the mechanisms of injury and anatomical locations of the fractures are not always consistent, suggesting a potential underreporting of domestic violence.^[4]

The aim of mandibular fracture treatment is the restoration of anatomic form, function with particular care to reestablishment of occlusion, and facial esthetics, which is often contingent on a precise bony reduction and immobilization. A less precise bony reduction may be

acceptable if there are no opposing teeth or in an edentulous mandible. This can be achieved with maxillomandibular fixation (MMF) alone or in combination with surgical exposure and internal fixation.

CASE REPORT

A 38-year-old male reported to St. Joseph Dental College for correction of fracture after an RTA. History revealed that the patient had an RTA 10 days back with multiple lacerations on the forehead, right upper eyelid, and chin region and was hospitalized. On perusing the records, it was observed that in the immediate trauma period, he had been identified with edema, tender on palpation, malocclusion, sublingual hematoma, and step deformity at the symphysis region [Figure 1]. Furthermore, the patient reported pain, muscle guarding, and trismus with altered sensations. He was identified with ecchymosis, crepitus, and hematoma. Timing of surgery merely depends on the clinical and radiographic features. The three-dimensional computed tomography (CT) mandible reveals a linear fracture line extending from subsigmoid region of the mandible extending downward to the inferior border of the angle

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through ramus of the mandible [Figure 2a and b]. The ramus fracture was in combination with the fracture of symphysis of the mandible. Under local anesthesia, open reduction and internal fixation were performed through Risdon's incision to reduce ramal fracture and intraoral anterior vestibular incision to reduce symphysis fracture [Figure 3]. Internal fixation was done with three 2 mm 2 hole miniplates for ramal fracture

and one 4 hole 2 mm stainless steel plate for symphysis fracture [Figure 4]. Immobilization with MMF was done for a period of 4 weeks.



Figure 1: Preoperative frontal view

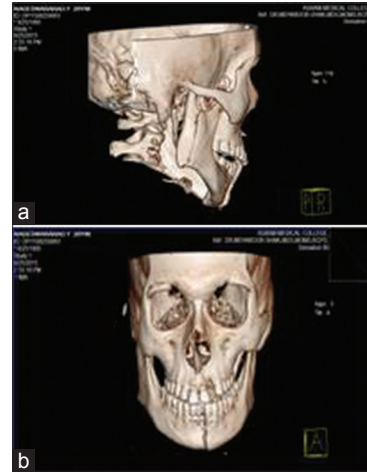


Figure 2: (a) Three-dimensional computed tomography mandible view showing right ramus fracture. (b) Symphysis fracture



Figure 3: Risdon's incision

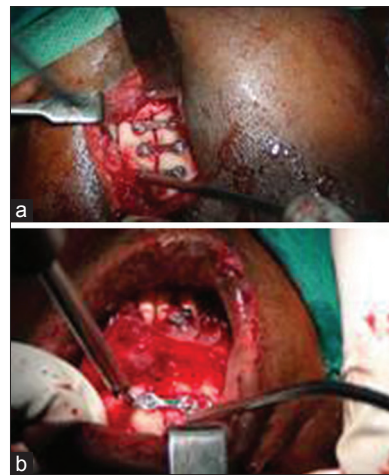


Figure 4: Open reduction and internal fixation of (a) ramus and (b) symphysis



Figure 5: Postoperative radiograph



Figure 6: Suturing with Prolene 4-0

The extraoral incision was closed with 4-0 Prolene suture [Figures 5 and 6]. After the operation, he had been prescribed wide-spectrum antibiotics, nonsteroidal anti-inflammatory drugs, and serratiopeptidase. The patient was observed periodically and recuperated well. All the clinical signs subsided slowly within a period of 1 month.

DISCUSSION

Anatomically, ramus is draped by masseter buccally, medial pterygoid muscle lingually, and pterygomasseteric sling at lower border, which facilitates minimum displacement of ramus after it gets fractured. Because of this obvious reason, most of surgeons manage this fracture by closed treatment. However, there are certain hostile limitations of closed reduction such as prolonged MMF, nonmaintenance of oral hygiene, risk of airway compromise, noncompliance of patient, deprivation of nutrition and delayed recovery.^[5] Structurally, the area between the subcondyle and angle of the mandible is considered as ramus of the mandible. Essentially, fracture lines pass through these areas, for instance, line either running obliquely from sigmoid notch to the posterior border of the mandible, running horizontally from anterior border to posterior border of the mandible, or running from coronoid process to posterior border of the mandible. Furthermore, fractures extending vertically downward from sigmoid notch to the lower border of the mandible were included as a ramus fracture. The primary outcome variables were the treatment given, period of MMF, and posttreatment occlusion, while the secondary outcome variables were age, sex, and the cause of injury. Mandibular ramus is located between dentate (angle/body) and nondentate (condyle and coronoid) part of the mandible. There are no clear indications and contraindications about open or closed treatment of these fractures.

Management of these fractures is still an enigma; however, certain aspects of treatment remain amenable to personal opinions and clinical impression. As this fracture seldom causes occlusion derangement and due to difficulty in access to fracture, they are conventionally managed by closed treatment.^[6] Surgeons hesitantly opt for open reduction internal fixation (ORIF) treatments mainly because of troublesome surgical exposure, particularly by the proximity of facial nerve branches. Inevitable scars caused by cutaneous incision, risks of facial palsy, and difficulty of incorporating technological innovations, with long-term learning curves and extended operating time, account for some of the drawbacks related to operative interventions.

An alternative to extraoral approach is the use of “transbuccal” approach, wherein exposure of fracture site and reduction of

fracture are done predominantly through intraoral approach, and a percutaneous stab incision is given extraorally in the cheek to facilitate the insertion of transbuccal trocar achieving lateral plating for which screws are fixed through the transbuccal cannula. The primary advantage of this technique is minimal scar; however, despite this esthetic advantage, it has some inherent disadvantages such as requirement of specialized armamentarium and the long learning curve as it is a technique-sensitive procedure. Furthermore, its clinical applicability in ramus fracture still remains to be investigated.

CONCLUSION

We conclude that ramus is a relatively rare site to get fractured among mandible fractures. ORIF of ramal fractures by three noncompression miniplates confers adequate anatomical, functional reduction comprising length, alignment, and rotational axis of adjacent fracture fragments and immobilization with good outcomes and relatively early return to function.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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