



## Original Research Article

# Mandibular ramus fracture: A rare fracture of maxillofacial region

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### ABSTRACT

**Background:** The fractures of the ramus of the mandible are generally negligibly displaced. This is because of the anatomical situation of the ramus between the masseter and the medial pterygoid muscle. The present study was conducted to assess ramus of mandible fractures in patients.

**Materials and Methods:** Present study was carried out on 125 subjects of both genders with fractures of ramus of mandible. The reason of injury, pretreatment occlusion, treatment protocol (open or closed), period of MMF and post-treatment occlusion was documented. Results obtained were subjected to statistical analysis.

**Results:** Out of 125 patients, 75 were males and 50 females. Prime reason of fracture of ramus was road traffic accident (RTA) in 87 cases, fall in 26 and assault in 12 cases. The difference was statistically significant with p value < 0.05. Open reduction with internal fixation treatment was given in 105 cases and closed treatment in 20 cases.

**Conclusion:** This study revealed that fractures of ramus are not commonly seen. Open reduction and internal fixation of fracture of ramus warrants acceptable functional and anatomic reduction.

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## 1. Introduction

The mandible is impeccable in plan with changing quality of bone in various areas, in relationship with stress appropriation on work. It is a cylindrical V-formed bone that articulates with the skull by means of combined temporomandibular joints. It is the second most regular maxillofacial bone inclined to injury followed by nasal bones. Maxillofacial injury upsets proficient structure, capacity, and esthetics.<sup>1</sup>

The mechanism of injury associates with the anatomical area of the mandibular fracture with characterized anatomic fracture designs. A motor vehicle crash or fall with a front effect results in symphyseal, parasymphyseal, and condylar fractures, though a lateral impact will bring about angle, body, and contralateral condylar fracture.<sup>2</sup> Amongst the different anatomical subsites, the occurrence of coronoid, alveolar, and ramus fracture is extremely low. Ramus

fracture rank as the third least regular fracture after coronoid and alveolar fracture and this has been firmly embraced by others. The reported rate of occurrence of mandibular ramus fracture changes capriciously inside India and other Asian nations. In India, Barde et al. assessed the example of mandibular fractures in central India and detailed a rate of 5.5% of mandibular ramus cracks ascribing RTA as the major etiological factor.<sup>3</sup>

The fractures of the ramus of the mandible are generally negligibly dislodged. This is because of the anatomical situation of the ramus between the masseter and the medial pterygoid muscle. Because of the negligible displacement of these fracture segments, most specialists deal with these breaks by fractures by closed reduction. Although, mandibular fracture managed by open reduction and rigid internal fixation provides numerous advantages.<sup>4</sup>

The present study was conducted to assess ramus of mandible fractures in patients.

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## 2. Materials and Methods

Present study comprised of 125 patients of both genders with mandible fracture. Patients were well informed regarding the study and written consent was also received. Ethical clearance was obtained before the commencement of study. Inclusion criteria was patient's age ranged 18- 60 years of both genders and those willing to participate in the study. Exclusion criteria were patients with both ramus and body fractures and patients not giving consent. The duration of present study was 1 year 2 months.

Patient's demographic characteristics such as name, age, sex etc. was recorded. The etiology behind injury, pretreatment occlusion, treatment given (open or closed), period of MMF and post-treatment occlusion was also documented. Patients were recalled regularly after a period of 1 month for 1 year. Patients were assessed for pain and mobility of fractured segments was recorded. Results were subjected to statistics. P value less than 0.05 was considered significant.

**Table 1:** Distribution of patients

Total- 125		
Gender	Male	Female
Number	75	50

Table 1 demonstrates that out of 125 patients. Males were 75 and females were 50.

**Table 2:** Etiology of fractures

Etiology	Number	P value
Road traffic accident	87	0.02
Fall	26	
Assault	12	

Table 2 revealed that most common cause of ramus fractures was road traffic accident (RTA) in 87 cases, fall in 26 and assault in 12 cases. The difference was significant ( $P < 0.05$ ).

**Table 3:** Treatment given

Treatment	Number	P value
Open reduction internal fixation	105	0.01
Closed treatment	20	

Table 3 shows that in most of the cases (105) open reduction internal fixation was given as treatment whereas closed treatment in 20 cases. The difference was significant ( $P < 0.05$ ).

## 3. Discussion

Anatomically, ramus of mandible is a bone bounded by masseter buccally, medial pterygoid muscle lingually, and pterygomasseteric sling at lower border. These muscles facilitate minimal dislodgement of ramus after it gets fractured.<sup>5</sup> Due of this apparent reason, most of surgeons

manage this fracture by closed treatment. Nonetheless, there are certain hostile limitations of closed reduction like prolonged maxilla-mandibular fixation (MMF), non-maintenance of oral hygiene, risk of airway compromise, noncompliance of a patient, destitute nutrition, and delayed recovery.<sup>6</sup>

The incidence and reasons of maxillofacial injuries revealed that patterns of maxillofacial fractures have changed over the decades and continue to do so. Mandible being a U shaped bone, its fractures are often multiple.<sup>7</sup> Most surveys show that just fewer than 50% are isolated, the same amounts are doubly fractured, and a small percentage has more than 2 fractures. There happens a geographic disparity in the configuration of mandible fractures. Prime etiologic factors are traffic accidents, assaults, falls, sports-related injuries, and civil warfare.<sup>8</sup>

The ramus of the mandible is situated between the condyle and the angle of mandible. The angle of the mandible is considered in association with the dentate portion of the mandible and henceforth most fractures of the angle are managed by open reduction & internal fixation. On contrary, the mandibular condyle is not considered as part of dentate segment and henceforth are managed by closed reduction.<sup>9</sup>

Meanwhile, the ramus of the mandible located in between the angle and the condyle, there is ambiguity as to whether it should be considered in dentate segment or edentate segment. Ramus fractures are conventionally treated by closed reduction because of the trouble in access to these fractures and also because these fractures seldom cause instability of occlusion.<sup>10</sup> Nonetheless, treatment by open reduction and Rigid Internal fixation provides a number of advantages like early return to function, easier maintenance of oral hygiene, improved nutrition, and reduced risk of airway compromise.<sup>11</sup> Also ORIF results in a functional as well as anatomical reduction of the fracture. Ramus fractures are seldom seen alone.<sup>12</sup> The present study was carried out to evaluate fractures of ramus of mandible in trauma patients.

In present study, out of 125 patients, males were 75 and females were 50. Etiology of fracture of ramus was road traffic accident (RTA) in 87 cases, fall in 26 and assault in 12 cases. Subhashraj et al.<sup>13</sup> found that 298 number of mandibular fractures. Ramus fractures were 10 in number which accounted for 3.3% of fractures. The age range of these 10 patients was observed between 20 to 80 years with the mean age 35.6 years. Of these 10 patients, 9 were male and 1 was female and 7 patients were treated by open reduction and internal fixation and the remaining 3 by closed reduction. The average period of MMF was 3 days for the patients who underwent open reduction and internal fixation. There was improvement in occlusion in all 10 patients post-treatment and there was no complication reported in any of the cases.

Present study found that treatment given was open reduction internal fixation in 105 cases and closed treatment in 20 cases.

Qamachi et al.<sup>14</sup> in the present retrospective analysis of mandibular fracture patients, assessed age, gender, cause of injury, pretreatment occlusion, treatment given, period of maxillo-mandibular fixation (MMF), and post-treatment occlusion. Out of 388 mandibular fractures treated, ramus fractures were 12 (3.09%). Predominant cause of mandibular ramus fracture was road traffic accident (RTA) (58.33%) followed by fall (33.33%) and assault (8.33%). The mean age was 35.9 years with a male predominance. Nine patients were managed by ORIF while remaining 3 by closed treatment. There was significant improvement in occlusion of all 12 patients post-treatment. No major complications except for reduced mouth opening was observed in cases treated with ORIF which latter recovered with muscle relaxants and physiotherapy.

Jadav et al<sup>15</sup> found that out of 388 mandibular fractures treated, ramus fractures were 12 (3.09%). The predominant cause of mandibular ramus fracture was road traffic accident (RTA) n = 07 (58.33%) followed by fall n = 04 (33.33%) and assault n = 1 (8.33%). The average age was 35.9 years with a male predilection.

#### 4. Conclusion

Authors found that ramus fractures are not commonly encountered. Open reduction and internal fixation of ramus fractures warrants acceptable functional and anatomic reduction.

#### 5. Source of Funding

None.

#### 6. Conflict of Interest

None.

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