

Mandibular Angle Fracture –A Case Report

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Abstract: Mandibular angle fractures are the most common mandibular fracture in developed countries, accounting for 30% of all mandibular fractures¹. The posterior position and biomechanics of the angle has made the treatment of fractures in this region difficult. There is a lot of controversy regarding the angle fracture. In spite of all controversies ORIF by intraoral exposure of fracture site and semi rigid fixation by 2.0 mm miniplate at upper border give good result for patient early recovery and maintenance of normal life.

Date of Submission: 05-07-2019

Date of acceptance: 20-07-2019

I. Introduction

Mandibular fractures are common in the head and neck region; the reported rate of occurrence is 11.5 per 100,000 persons per year. Population between the ages of 16 and 30 years account for 50.2% of these fractures¹⁴. Fractures of the mandibular angle account for about 30% of mandibular fractures. The posterior position and biomechanics of the angle has made the treatment of fractures in this region difficult.³⁴ Because teeth might not be present to prevent the rotation of the proximal segment superiorly, open reduction and internal fixation has routinely been required for mandibular angle fracture. A variety of techniques have been used for internal fixation of MAFs. These techniques have included wire osteosynthesis, a single superior border miniplate (2.0 mm), a single inferior border plate (2.3 or 2.7 mm), 2 plates (1 at the superior border and 1 at the inferior border), geometric plates, or a lag screw.⁵

Definition Of Angle Fracture

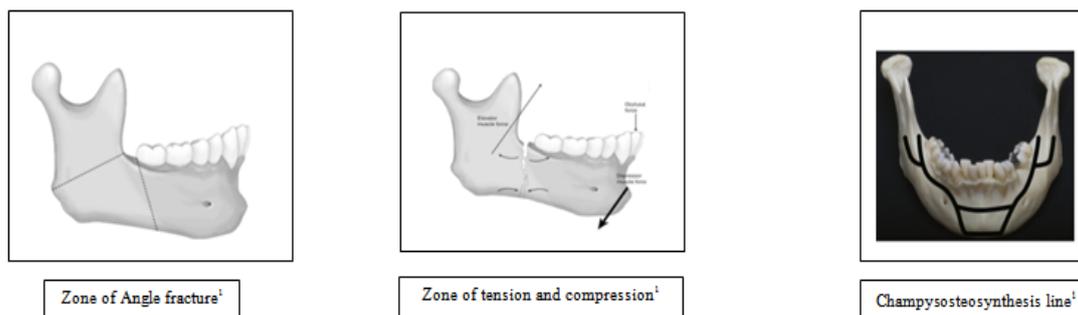
Angle fracture defined as a line that starts in the area where the anterior border of the mandibular ramus meets the body of the mandible, usually in the region of the third molar. It will extend inferiorly through the inferior border or, on occasion, extend posteriorly, through the region of the gonial angle. If the third molar is present, it could be located anywhere along the root of this tooth. Sometimes, the fracture will be along the distal root, with the tooth remaining within the distal segment of the mandible.²

Biomechanics

The muscles attached to the mandible create a tensile force at the superior border and a compressive force at the inferior border. A zone of no tension or compression is found between the superior and inferior borders. This zone is termed, the neutral zone. The anatomic location of the tensile zone corresponds to the mandibular alveolus and external oblique ridge. The compressive zone is located at the inferior border of the mandible.⁵ The neutral zone is found at the level of the inferior alveolar nerve. Separation at the superior border and reduction at the inferior border occur during a mandibular angle fracture under function.

Studies have shown that a single miniplate can be placed at the superior border along the lateral aspect of the mandible to act as a tension band.^{6,7} This has had a relatively low complication rate of 12 to 16%.^{8,9}

The management of Angle fracture has been controversial because of the anatomic relations and complex biomechanical aspects of the mandibular angle, including a thin cross-sectional area, abrupt change in the curvature, attachment of the masticatory muscles, and the presence of third molars. The debate has become even more heated since the evolution of rigid internal fixation and the ability to provide adequate stability of the fractured segments.^{2,5}



The use of noncompression monocortical minipalte fixation for the osteosynthesis of the mandibular fracture was advocated by Michelet and Champy.^{10,11} Champy et al. (1978) reported fixation of the angle fractures on the mandibular superior border by means of a noncompression plate to produce a successful outcome¹². Noncompressive miniplate fixation of angle fractures has gained popularity as a standard treatment approach in different health centers due to its low morbidity and complications.

Most fractures of the mandibular angle are treated by open reduction and internal fixation. Even when the fracture is not displaced, open treatment is usually provided so that internal fixation devices can be placed to maintain the alignment of the fragments and obviate postoperative MMF.

Controversy In Angle Fracture Treatment

Siddiqui and colleague⁹ found that two-plate fixation does not offer advantages over single-plate fixation in general when treating fractures through the angle of the mandible. A second miniplate applied further inferiorly than the first provides rigid fixation of the angle fracture. Rudderman and colleagues⁶ have also offered biomechanical explanations for the success of a single miniplate used to treat fractures of the mandibular angle. Champy and colleagues³ performed several investigations with a “miniplate” system to validate the technique. In their experiments, they determined the “ideal lines of osteosynthesis” in the mandible, or the locations where bone plate fixation should provide the most stable means of fixation. For fractures of the mandibular angle, the most effective plate location was found to be along the superior border of the mandible. It is much more complex to operate when any associated other fracture is there. In practice, the simplest way to manage this combination of fractures is to apply rigid fixation to the most accessible fracture (i.e., the symphysis or body fracture) and then the angle fracture can be treated as an “isolated” fracture with a single miniplate. Rigid fixation of the body or symphysis fracture can be performed with a thicker, stronger plate; two miniplates; lag screws; or a combination of these. Comminuted fracture through the angle of the mandible requires load bearing fixation that can only be provided using a reconstruction bone plate that is secured with at least three screws on each side.



Case History And Surgical Procedure

A 32 years old patient came to our Department at IPGMER Kolkata giving a history of RTA one week back. On normal bone CT of face from supraorbital margin to lower border of mandible with 3D reconstruction reveals Right side mandibular angle fracture. Patient was admitted and ORIF done under LA and 2.0 mm four hole with bar Ti plate fixed with 2.0 mm cross slot Ti screw.

Intraoral approach the incision given over the external oblique ridge that is carried superiorly along the ascending ramus and anteriorly to the first molar. A 3-mm to 5-mm cuff of unattached tissue is left below the mucogingival junction to facilitate closure. This design allows complete access to the lateral and superior aspect of the mandible at the angle. Care must be taken to maintain a sub periosteal dissection to ensure protection of the lingual nerve. Mucosal suture done by 3-0 vicryl.

II. Conclusion

The intraoral approach in the treatment of mandibular angle fractures, as recommended by Champy 1976 with application of a 2mm miniplate and monocortical screws following the external oblique line of the mandible gives a satisfactory result. This plate still allows for easy adaptation but provides an adequate amount of stability to allow for proper healing. This approach in the treatment of mandibular angle fractures under local anesthetic shown very promising, faster and lower cost to the system health.

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Dr. Partha Sundar Biswas ." Mandibular Angle Fracture –A Case Report." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 7, 2019, pp 58-60.