

Close Reduction of the Unilateral Angle Fracture of the Mandible: A Case Report

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Abstract

The search for the ideal method of treatment for mandibular fractures has continued for thousands of years. These injuries have unique and problematic features for adequate reliable wound healing. Oral and maxillofacial surgeons must learn and master several techniques for mandibular fracture treatment. The age-old successful management of these injuries using closed reduction techniques always should be considered when mandibular trauma presents. The closed reduction remains a mainstay of mandibular fracture treatment especially in the angle region. An adequate knowledge of anatomy, multiple closed reduction techniques, and the physiology of fracture healing must be adequately understood and technically mastered by the oral and maxillofacial surgical team for the present and future of mandibular fracture management especially in the angle region [1].

Keywords: Mandibular Fracture; Angle Region; Trauma; Arch Bar Wiring; Close Reduction

Introduction

Some of the most severe injuries are caused by automobile accidents but many others result from interpersonal violence, industrial accidents, sports, home accidents and missiles or gun shots. Road traffic accidents (RTA) have been reported as a leading cause of mandible fractures [2]. Being the most prominent mobile bone of the facial skeleton, Mandibular fractures are among the most common injuries to the facial skeleton, with a 6:2 proportion between mandibular and zygomatic fractures [3,4]. Majority of the mandibular fractures occur in young males [5]. In general, incidences of fractures of the mandibular body, condyle, and angle are relatively similar, while fractures of the ramus and coronoid process are rare. The literature suggests the following mean frequency percentages based on location: Body - 29%, Condyle - 26%, Angle - 25%, Symphysis - 17%, Ramus - 4%, Coronoid process - 1% the mandible is involved in 70% of patients with facial fractures. The number of mandible fractures per patient ranges from 1.5 - 1.8. Approximately 50% of patients with a mandible fracture have more than 1 fracture. Angle fractures occur in a triangular region between the anterior border of the masseter and the posterosuperior insertion of the masseter. These fractures are distal to the third molar. Usually an angle fracture on one side is accompanied by a contralateral condylar or parasymphyseal fracture.

This article describe the effectiveness of arch bar wiring in the treatment of unilateral angle fracture of the mandible as a close reduction approach.

Case Report

A 20-year-old patient reported to the department of Oral and Maxillofacial Surgery of Sapporo Dental College and Hospital, Dhaka with a chief complaint of pain in lower right side of jaw for 6 days and difficulty in opening/closing mouth. The patient revealed that he had met with a sports (football) accident. The patient was diagnosed with painful facial swelling localized over The lower right angle of the mouth. His medical history was found to be non-significant. Detailed clinical examination revealed that the patient was unable to close the mouth nor could he chew any food and radiographic examination with orthopantomograph revealed unilateral (right) angle fracture of the mandible (favorable). Limited mouth opening and mandibular deviation during opening and closure were observed, mastication and speech were both affected.

Clinical procedure

Closed reduction (arch bar wiring) and intermaxillary fixation (IMF) chosen as a main treatment method to allow initial fibrous union of the fracture segments and obtain remodeling with normal functional stimulus.

Under all aseptic precaution local anesthesia was given. The arch bar is measured to fit from first molar to first molar. The arch bar is placed in such a way that the hooks face towards the gingival margin. Now 15 cm of 26 gauge wires is taken and starting from distal tooth, the wire is passed from buccal to lingual side below the arch bar and from lingual to buccal above the arch bar and twisted together. This was continued for all teeth and arch bar was secured. There is an important point to consider before starting. The occlusion must be checked. In the case of jaw malformations, such as a deep bite deformity, it may be impossible to use arch bars. One pitfall when using arch bars is the risk of contamination of blood borne infection from patients. Passing the wires to secure the arch bar can result in a puncture or tear in the surgeon's glove and the possibility of disease transmission to the surgeon. Check occlusion before inserting the arch bars. There should be full inter digitations of the teeth with regular contacts. An arch bur was fixed in upper and lower jaw by ligature wire. Then intermaxillary fixation (IMF) was done usually elastic traction given for (48 - 72) hours, then replaced by wire fixation (IMF) for rest of the time (4 - 6) weeks. Soft diet and rest were suggested. Instructions were given to him as for the cleaning of the teeth and arch bur with a soft tooth brush. The patient was advised to attend for follow up 4 week later. After 4 week, the patient was examined clinically and radiologically. Then elastic traction was removed followed by proper irrigation and dressing. Then ask the patient to give the bite and the bite was observed and recorded. It was noticed that the patient has a class I occlusion with anterior crowding. After 48 hour, arch bur was removed from both jaws. Then again ask the patient to give the bite and the bite was observed and recorded. It was noticed that the patient has a similar class I occlusion with anterior crowding which indicate that the patient occlusion was normal and mouth opening was within normal limits.

Preoperative view



Figure 1: Shows facial deformity on right side of the mandible.

Preoperative radiology



Figure 2: Orthopantomogram shows revealed unilateral (right) angle fracture of the mandible (favorable).

Par operative view



Figure 3a: Shows an arch bar was fixed in upper and lower jaw by ligature wire.

Par operative view



Figure 3b: Shows intermaxillary fixation (IMF) was done by elastic traction.

Post-operative view



Figure 4a: shows removal of elastic traction for rest of the time (4 - 6) weeks in open occlusion.



Figure 4b: shows removal of elastic traction for rest of the time (4 - 6) weeks in closed occlusion.

Follow up (After 4th week)



Figure 5: Shows after 4th week, arch bur was removed from both jaws. Then again ask the patient to give the bite and the bite was observed and recorded. It was noticed that the patient has a similar class I occlusion with anterior crowding which indicate that the patient occlusion was normal and mouth opening was within normal limits.

Discussion

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 [6,7]. Reasons for this may include a thin cross-sectional area relative to the body, symphysis and parasymphysis anteriorly, the presence of the third molars and abrupt change in direction between the body and ascending ramus in two planes [8,9]. Treatment of angle fractures is plagued by the highest complication rates among mandible fractures, and no consensus exists regarding optimal treatment [10-13]. Although there are many treatment options available for the angle fractures, unilateral angle fracture poses a unique challenge to the surgeon because fixation according to Champ’s lines would just be insufficient to achieve a good stable occlusion. Through this case report we have put simple and effective line of treatment with which we were successful in obtaining a good occlusion and adequate mouth opening.

Conclusion

Perhaps the collective experience of the many surgeons who treat these fractures can best be characterized as follows:

- Unilateral angle fractures of the mandible are best treated by closed reduction.
- Fractures in children are best treated closed reduction except when the fracture itself anatomically prohibits jaw function. Most fractures in adults can be treated by closed reduction.

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