

Management Of Mandibular Fractures – Review Article

Dr. Vigildev Asir¹, Dr. Sri Rama Krishnan.J²

1. Reader, Dept. Of Oral And Maxillofacial Sugery, Sreebalaji Dental College And Hospital, Bharath Institute Of Higher Education and Research, Chennai.
2. Undergraduate Student, Sreebalaji Dental College And Hospital, Chennai.

Corresponding Author

Dr. Vigildevasir

Reader, Dept. Of Oral And Maxillofacial Sugery, Sreebalaji Dental College And Hospital, Bharath Institute Of Higher Education and Research, Chennai.

Mail Id: Vigils100@Yahoo.Co.In

Phone No: 9884448218

ABSTRACT

Mandible fractures account for a significant portion of maxillofacial injuries and the evaluation, diagnosis, and management of these fractures remain challenging despite improved imaging technology and fixation techniques. Understanding appropriate surgical management can prevent complications such as malocclusion, pain, and revision procedures. Depending on the type and location of the fractures, various open and closed surgical reduction techniques can be utilized.

Keywords Mandibular fractures, Condylar fracture, Management.

INTRODUCTION

Mandible fractures occupy the second most frequent incidence of facial bone fractures. The mandible is a resistant bone and it takes a relatively heavy impact to fracture. Since the mandible is the mobile facial bone, a fracture is generally never left unnoticed because it is very painful, worsening with mastication and speech movements and if left untreated may cause facial asymmetry. Mandible fractures may lead to deformities, either due to displacement of fracture fragments or non-restored bone losses, with a disturbed dental occlusion with or without temporomandibular joint disorders. Consequences of untreated or inappropriately treated mandibular fractures may be severe, both cosmetically and functionally [1].

CLASSIFICATION OF MANDIBULAR FRACTURE

FRACTURES OF SYMPHYSIS AND PARASYMPHYSIS

RAMUS FRACTURES

ANGLE FRACTURES

BODY FRACTURE

CONDYLAR FRACTURES [2].

SYMPHYSIS AND PARASYMPHYSIS FRACTURE:

A fracture that occurs in the central mandible with the lateral extent not past the gap between the lateral incisors and canines [3].

RAMUS FRACTURE:

A fracture that involves the mandibular ramus, excluding subcondylar fractures and including those that are oriented vertically in the ramus [3].

ANGLE FRACTURE:

A fracture that involves the angle and can include extent into the third molar socket [3].

A fracture of the mandibular body, of which the anterior margin is the interspace between the lateral incisor and the canine and the posterior margin is the interspace between the second and third molars [3].

CONDYLAR FRACTURE:

A fracture which involves the condylar head or neck [3].

AO CLASSIFICATION:

FLOSA was introduced by Spiessl to feed the numerous features into a single concise formula.

F: Fracture category

L: Localization/Fracture site

O: Occlusion

S: Soft tissue involvement

A: Associated fractures [7].

CLASSIFICATION OF MANDIBULAR CONDYLE FRACTURE

According to fracture position

- (a) Condyle head fracture
- (b) Condyle neck fracture
- (c) Subcondyle fracture

According to degree of fracture fragments displaced

- (a) Non-displaced
- (b) Displaced [4].

MANAGEMENT OF CONDYLAR FRACTURE

CLOSED REDUCTION AND FUNCTIONAL THERAPY

METHOD:

For closed reduction, intermaxillary fixation is conducted using arch bar and wire, followed by maintaining of the fixation of the maxilla and mandible for 2 to 4 weeks. After achieving stable union of the fractured site, a wire for intermaxillary fixation is removed. Then, normal occlusion is induced after fixation using rubber, and soft diet is maintained for 2 weeks.

Functional therapy that consists of passive mandibular movement exercise and mouth opening exercise is conducted and then clinical outcomes are observed. For mouth opening exercise, the physician holds the molar and mandibular border of the fracture side after standing behind the patient, and includes normal occlusion and normal mandibular movement by traction to the anterior inner inferior several times. At the same time, the patient opens his/her mouth for him/herself, and applies counter-force using hands to avoid mandibular deviation [5].

ADVANTAGE:

Closed reduction with functional therapy is a relatively safe treatment. No injury of nerve and blood vessels occur during the treatment, and no postoperative complications such as infection or scar [5].

DISADVANTAGE:

Long-term intermaxillary fixation has disadvantages of the injury of the periodontal tissues and buccal mucosa, poor oral hygiene, pronunciation disorder, imbalanced nutrition, mouth open disorder and respiratory disorder [5].

OPEN REDUCTION

METHOD:

There are various operation methods of open reduction for mandibular condyle fracture depending on fracture site and degree of bone fragment displacement. In general, they include preauricular approach, postauricular approach, submandibular approach, Risdon approach, combined approach and retromandibular approach. Treatment type should be selected considering patient's age, preference, fracture type, fracture of other sites, and teeth status [4].

ADVANTAGE:

Open reduction has advantages of the reduction of the displaced bony fragments to the most ideal anatomical site by a direct approach to the fracture site. In addition, it can prevent complications such as respiration disorder, pronunciation disorder and serve nutritional imbalance by shortening intermaxillary fixation period via rigid fixation [5].

DISADVANTAGE:

Open reduction is an invasive treatment, which may cause injury of nerves or blood vessels during operation, and postoperative complications including infection. In addition, it has permanent scar through the surgery is conducted after designing the incision line considering aesthesis [5].

OPERATIVE PROCEDURE:

(a) PREAURICULAR APPROACH

Preauricular approach reduces condyle fracture by incising 3 to 4 cm from the inferior border of the tragus towards external auditory canal along the skin crease of the anterior part of the external ear. It provides an easier approach to high condylar fracture such as intercapsular fracture, easy reduction of the injured soft tissues of the TMJ, and reduction via a direct inspection of the appropriate relationship among the condyle, disc, and joint with eyes [5].

(b) POSTAURICULAR APPROACH:

The postauricular approach is a method that reduces the condyle fracture by incising from a site 3mm posterior to the postauricular curved region along the curved region, and by incising the mastoid process inferiorly and the upper ear-attached region superiorly. It can be used for reduction of high condyle fracture. This method has advantages of excellent aesthesis [5].

(c) SUBMANDIBULAR APPROACH:

The submandibular approach reduces condyle fracture by conducting incision from a site 2 to 3 cm inferior to the mandibular inferior border, parallelly to the mandibular inferior border or along with the skin crease. Due to its easier approach to the mandibular ramus, inferior mandible condyle and coronoid notch, it is commonly used for mandibular condyle fracture [5].

(d) RISDON APPROACH:

Risdon approach is a method similar to submandibular approach. It can easily approach to the inferior region, ramus, gonial angle and posterior body of the mandibular condyle. If the upper flap is intensively retracted, even mandibular condyle inferior and neck fractures can be exposed. Reduction of bone fragments can be easily conducted by traction the mandibular gonial angle inferiorly. Meanwhile, like submandibular approach, Risdon approach requires excessive traction for high condyle fracture [5].

(e) COMBINED APPROACH:

This method reduces both inferior and superior fractures of the mandibular condyle by applying preauricular approach and submandibular approach simultaneously. This method is very useful as mandibular subcondyle fracture is reduced using submandibular approach, and the superior fractures of the TMJ or mandibular condylar neck is approached via preauricular approach and bone fragments are reduced while putting in traction the mandible inferiorly [5].

(f) INTRAORAL APPROACH:

The incision line is formed along the anterior mandibular ramus and buccalsulcus. For the achievement of surgery field and device approach, the temporalis muscle attached to the mandibular ramus and the periosteum of the buccinator located at the body should be completely dissected to elevate them. This method has advantages of no scar formation and minimum injury of facial nerves [5].

(g) **RETROMANDIBULAR APPROACH**

Retromandibular approach reduces condyle fracture by dissecting the skin and subcutaneous tissue vertically to the mandibular angle using the 3cm incision line to the 5mm inferior to the auricular lobe. This method provides easy reduction and rigid fixation for mandibular subcondyle fracture [5].

RIGID FIXATION:

(a) **MICROPLATES**

- a. Less palpable, more malleable, easily applied, and adaptable, to fracture site.
- b. Can be used in combination with miniplates for mandibular fractures.
- c. Microplates have high holding power and were efficacious for internal fixation of simple, minimally displaced, isolated mandibular fractures [8].

(b) **RECONSTRUCTION PLATES**

- a. Used in segmental and comminuted fractures, traumatic bone loss, bone loss secondary to infection, and repair of non-union, atrophic bone and tumor defects.
- b. These are load bearing plates hence can be used in immediate restoration of function provided with the absence of postoperative intermaxillary fixation.
- c. Application of reconstruction plates requires careful adaptation of the plate to the contour of the mandible using proper bending instrumentation, templates, and pre-bent plates [9].

(c) **THORP – Titanium Hollow Screw Reconstruction Plate**

- a. This system helps in reconstruction of lower jaw defects.
- b. It provides a functional stable fixation and also used as a long term or permanent implant in tumor surgery and traumatology.
- c. The major advantage of this system is the rigid fixation of the head of the screw to the plate, avoiding unphysiologic loads to the bone underneath the plate, and the titanium plasma-coated perforated hollow screws, enabling the development of direct bone-titanium contact as well as the ingrowth of bone into lumen and perforations [10].

(d) **MINI PLATES**

- a. Mini plate osteosynthesis helps in anatomic reduction, rigid fixation, and immediate function.
- b. Intraoral plates placement eliminates facial scars and the potential for injury to the marginal mandibular branch of the facial nerve.
- c. It allows simultaneous reduction, fixation, and occlusion adjustment [11].

CONCLUSION:

Early and painfree mobilization should be the aim of all mandibular fracture treatment. Except for undisplaced fractures, open reduction and internal fixation should be the method of choice for every case unless contraindicated. Tooth in the line of fracture, except of third molars, should be preserved. Monocortical fixation should be encouraged due to better patient compliance, ease of applicability and less technique sensitivity [6].

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