Fractures of the Mandible

Introduction

Mandibular fractures are among the most common facial fractures encountered in oral and maxillofacial surgery. Because the mandible is a prominent and mobile facial bone, it is highly susceptible to trauma.

The main objectives of treatment are:

1. Restoration of pre-injury occlusion
2. Restoration of normal painless mandibular movement
3. Preservation of airway
4. Prevention of infection
5. Restoration of facial symmetry and function

Etiology

Common causes include:

- Interpersonal violence (most common in adult males)
- Motor vehicle accidents
- Falls
- Sports injuries
- Industrial accidents
- Pathological fractures
- Domestic violence (must always be considered)

Classification of Mandibular Fractures

According to fracture type:

1. Simple fracture

Bone is fractured without communication with the external environment.

2. Compound fracture

Fracture communicates with the oral cavity, skin, or periodontal ligament.

3. Comminuted fracture

Bone is broken into multiple fragments.

According to anatomical site:

- Symphysis
- Parasymphysis
- Body
- Angle
- Ramus
- Condylar process
- Coronoid process
- Alveolar process

According to direction of impact

Direct fracture:

Occurs at the point of force application.

Indirect fracture:

Occurs away from the site of impact due to transmission of force.

Example:

Blow to the chin causing condylar fracture.

According to displacement

Favorable fracture:

Muscle pull minimizes displacement.

Unfavorable fracture:

Muscle pull increases displacement and worsens malalignment.

Clinical Examination

Evaluation of occlusion is the single most important part of diagnosis.

Patients should be asked:

“Does your bite feel normal?”

A complaint of malocclusion must be taken seriously.

Clinical findings include:

- Pain
- Swelling
- Tenderness
- Malocclusion
- Mobility of fracture segments
- Step deformity
- Limited mouth opening
- Dysphagia
- Speech difficulty
- Bleeding
- Facial asymmetry

Important signs:

- Sublingual hematoma (Coleman sign)
- Floor of mouth ecchymosis (highly suggestive)

Teeth in the Fracture Line

Loose teeth are common.

Extraction is indicated if the tooth is:

- Luxated
- Fractured
- Grossly carious
- Has severe periodontal disease
- Associated with cyst or infection

- Preventing fracture reduction

Sometimes teeth are retained because they help reduction and stabilization.

Inferior Alveolar Nerve

Lower lip sensation must always be examined and documented.

Hypoesthesia is common especially in:

- body fractures

- angle fractures

Failure to record this may create medico-legal problems.

Imaging

1. Mandibular Series

Includes:

a. Posteroanterior view

Useful for body, angle, ramus, and symphysis fractures

b. Reverse Towne view

Useful for condylar fractures

c. Lateral oblique view

Useful for angle and body fractures

2. Orthopantomogram (OPG)

Advantages:

- Entire mandible in one film
- Low radiation
- Low cost
- Excellent for follow-up

Limitations:

- Not suitable for unconscious patients
- Not suitable with cervical spine injury

3. CT Scan (Gold Standard)

Best for:

- Multiple fractures
- Condylar fractures
- Comminuted fractures
- Complex facial trauma

CBCT may provide lower radiation with excellent detail.

Management

The main goal is restoration of pre-traumatic occlusion.

Non-displaced fractures without occlusal disturbance may be managed conservatively.

Most fractures require stabilization.

Reduction

Reduction means restoring the normal anatomical and functional relationship of bone fragments.

Methods:

1. Closed reduction

No direct exposure of fracture.

Usually uses IMF.

2. Open reduction and internal fixation (ORIF)

Direct surgical exposure with fixation using plates and screws.

Dentate patients require highly accurate reduction because occlusion is the guide.

Intermaxillary Fixation (IMF)

Teeth are used to:

- Guide reduction
- Confirm occlusion
- Immobilize fracture segments

Methods include:

- Arch bars
- Eyelet wiring
- Ivy loops
- Orthodontic brackets

Pre-existing occlusion must always be respected.

Immobilization

After reduction, immobilization is necessary for healing.

Bone healing occurs by:

1. Primary bone healing

Occurs with rigid fixation and minimal movement.

There is little or no callus formation.

2. Secondary bone healing

Occurs with some mobility and callus formation.

Compression osteosynthesis promotes primary healing.

Duration of IMF

Usually:

3 weeks in healthy young adults

Additional 1–2 weeks if:

- tooth in fracture line
- smoker
- age above 40 years
- comminuted fracture
- mobile fracture

Methods of Fixation

A. Direct fixation (osteosynthesis)

- Miniplates
- Rigid plates
- Compression plates
- Lag screws
- Resorbable plates and screws

B. IMF

- Arch bars

- Orthodontic brackets

- Interdental wiring

C. External fixation

Used in:

- infected fractures

- severe comminution

- gunshot injuries

- major soft tissue loss

Conclusion

Successful management depends on accurate diagnosis, restoration of occlusion, stable fixation, infection prevention, and early return of function.