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Bıruni Unıversıtr Varıous Clınıcal

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ABSTRACT

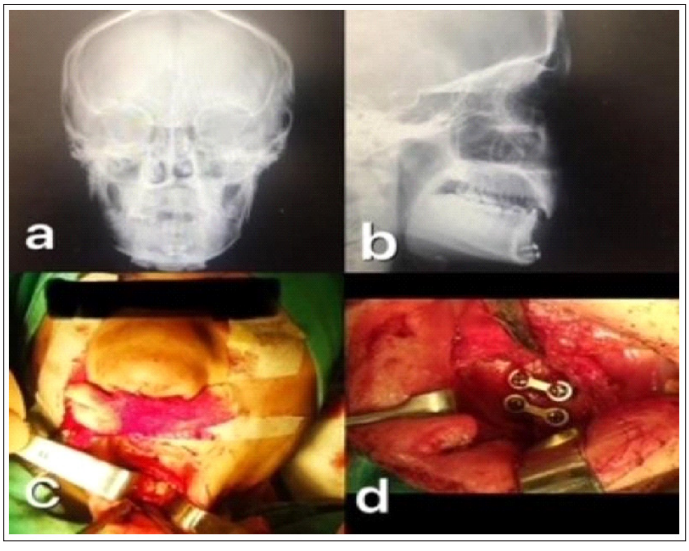
Jaw fractures are a common fact seen in the maxilla facial region. İn our presentation, we checked out 6 cases to eliminate their problems. We used different techniques, such as closed and open reductions. After that, we first had an accurate clinical examination and applied different operations to achieve the best success. Case report I. I. A 30-year-old male involved in a traffic accident was admitted to our institution. The patient was hospitalized for one week with a condyle fracture. There was no dislocation. The patient was treated with closed reduction Case Report II. A 35-year-old female who was beaten was admitted to our institution. ACT of the atlantooccipital joint showed a condyle fracture of the left medial condyle with limited fragment displacement. The patient was hospitalized for one week and treated with closed reduction by bimaxillary fixation—case report III. A 14-year-old male involved in a horseback riding crash was admitted to our institution. ACTof the atlantooccipital joint showed an angulus fracture with inferiorlingual displacement of the fragment and an advanced degree of dislocation in the canine area of the para symphysis fracture. The patient was treated with open reduction, and bimaxillary fixation was performed—case report IV. A 32-year-old male involved in a traffic accident was admitted to our institution. A subcondylar fracture was observed. Treatment was completed by bimaxillary fixation, and treated dislocation was not observed in the fracture line. Case report V. A 36-year-old man in a traffic accident was admitted to our institution. There was a closed reduction angulus fracture. There was no dislocation. Patient Case Report VI.15 years old female who fell from the 5th floor was kept under observation in intensive care.Couse of any brain damage possibilty,we have kept the patient under control in red section of hospital ,when we have eliminate the brain damage possibilty we performed a open reduction and some estetical operation for that patient,there was at least three serious fracture two was condyle region and one was on senfis after complating the plating by mini plate we have let the patient 21 days recovery and later we have perfomed a porselen biridge for the upper anterior region of the mouth.

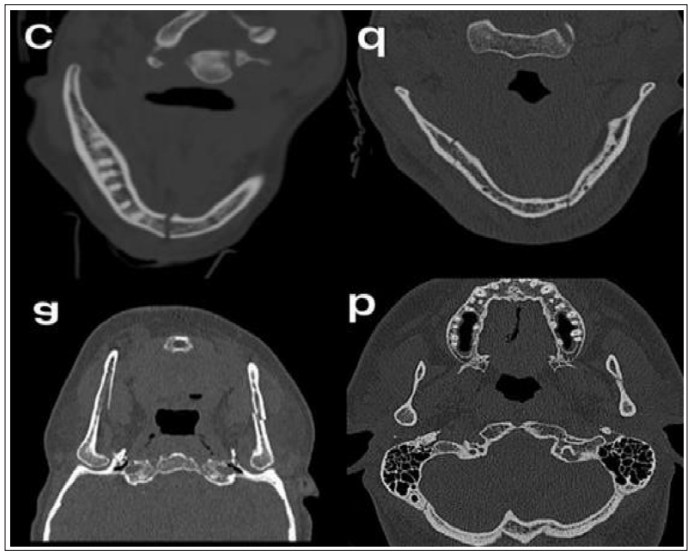
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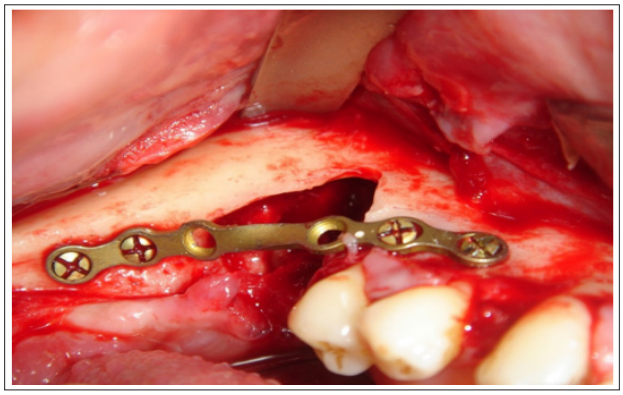
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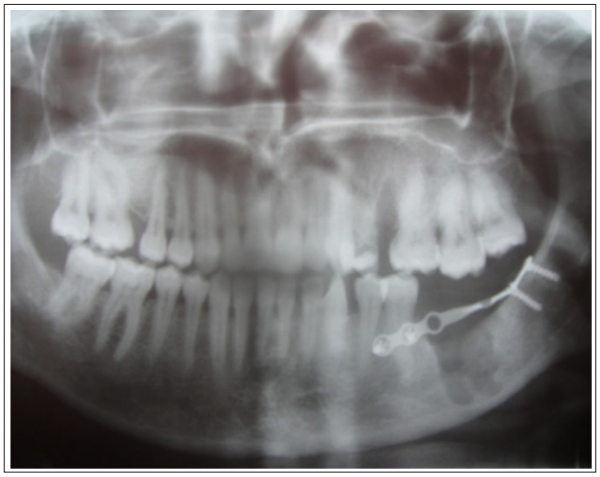


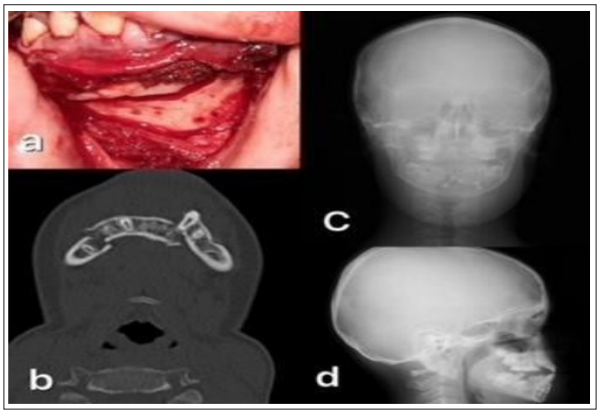


Specialist Oral-Surgeon Dr Tahir Ataözden -Phd Biruni University/ İstanbul-Turkey

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Clinical Examination of Various Jaw Fractures and Evaluation of Open-Closed Reductions

Tahir ATAÖZDEN, Mustafa Mert BAŞARAN, Semanur ÖZÜDOĞRU

Introduction

Jaw fractures are common injuries resulting from trauma. This presentation discusses clinical examination and compares open and closed reduction methods.

Types of Jaw Fractures

- Mandibular fractures: Most common, often involving the condyle, angle, and symphysis.
- Maxillary fractures: Classified by the Le Fort system into three types.
- Zygomatic fractures involve the zygomatic, maxilla, and frontal bone.

Clinical Examination

History and physical examination help identify pain, swelling, and malocclusion symptoms.

Open and Closed Reduction

- Open Reduction: Involves surgical exposure and alignment using plates or wires.
- Closed Reduction: Used for less severe fractures, involves non-invasive immobilization methods.

Conclusion

Proper clinical evaluation is essential for diagnosing and managing jaw fractures effectively.

Results

Of six cases, two were angle fractures, one was symphysis, and three were condyle fractures. Two were treated with mixed methods (open and closed), while four were treated with closed reduction only.

Observations

The dislocation was observed in two cases: medial condyle and symphysis fractures. No dislocation was observed in subcondylar, angle, and other symphysis fractures.

Treatment

Internal fixation was performed using mini plates or screws. Bimaxillary fixation was achieved using arch bars and splints.
Conclusion (Condyle Fractures)
Open reduction and internal fixation in condylar fractures are safe and effective with appropriate indications. Bimaxillary fixation ensures proper healing.

Epidemiology and Literature

While traffic accidents are commonly cited as the cause of condyle fractures, regional differences exist. Our study's causes included traffic accidents, horse kicks, assaults, and falls.

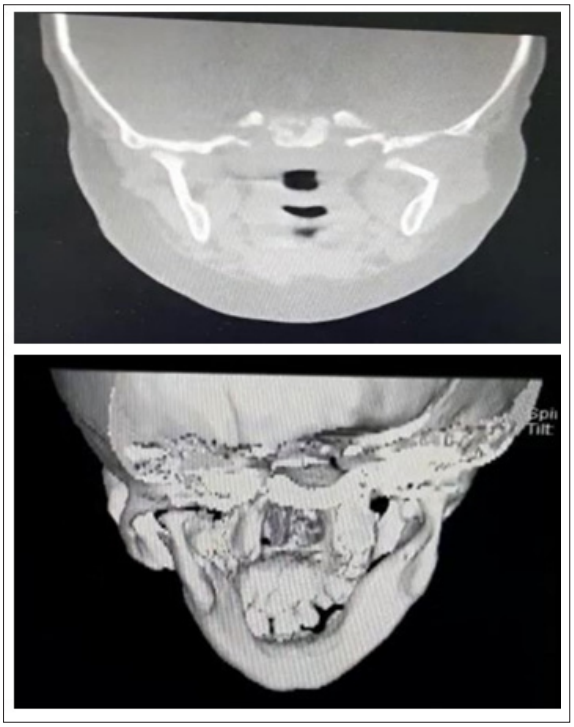
The pictures down you have seen a baby boy who felt down on the play-room and have got a condyle green branch(stick) fracture,almost one week i.v-anti enflamatuar treatment applied,later he have started suck the mum again and so feeding process started regulerly.

We conteniu mechona therapy during 6 month and by the way of masseter and buccinator jaw musseles condyle turn the old shape again



After Trauma

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6-months-After-Trauma



Healed-Bone-Stracture-And-It-has-ben-seen-that-the-proper-condyle-margine-as-a-result-of—MECHANO TRAPHİE



Mechonatraphia

Clinical Examination and Management of Mandibular Fractures

Chapter Sections:

1. Introduction to Maxillofacial Trauma
2. Anatomy and Biomechanics of the Mandible
3. Etiology and Epidemiology of Mandibular Fractures
4. Classification of Mandibular Fractures

Introduction to Maxillofacial Trauma

Maxillofacial trauma refers to injuries involving the facial skeleton, including the mandible, maxilla, zygomatic complex, and associated soft tissues. Among these, mandibular fractures are the most commonly encountered due to the prominence and mobility of the lower jaw. Although the mandible is the strongest bone of the face, its position and structure make it vulnerable to various external forces such as blunt trauma, vehicular accidents, falls, and physical assault [6].

According to epidemiological data, mandibular fractures account for a significant portion of facial injuries, with incidence rates varying by geographic region, population demographics, and cause of trauma [14].

These fractures may occur in isolation or in combination with other maxillofacial or bodily injuries. Over 60% of maxillofacial trauma cases involve simultaneous fractures in other body regions, highlighting the need for a multidisciplinary approach in trauma management [15].

Management of mandibular fractures requires prompt assessment, accurate diagnosis, and an individualized treatment plan that considers patient age, general health status, dental condition, fracture site and displacement, and surgeon experience. Treatment aims to restore function and aesthetics by achieving stable occlusion, bone healing, and minimizing complications such as malunion or temporomandibular joint dysfunction [16].

This chapter explores the **clinical examination**, **classification, radiographic evaluation**, and **treatment options** for mandibular fractures, with a focus on both **open and closed reduction techniques**. It also includes a presentation of six clinical cases that illustrate the decision-making and outcomes associated with different treatment modalities [17-8].

Anatomy and Biomechanics of the Mandible

The mandible, or lower jawbone, is the **largest and strongest bone of the face**, playing a critical role in mastication, speech, and facial aesthetics. It articulates with the temporal bone at the **temporomandibular joint (TMJ)** and supports the lower dentition through the alveolar process. Due to its functional and structural complexity, a thorough understanding of mandibular anatomy is essential for the proper diagnosis and treatment of fractures [9-13].

Key Anatomical Components of the Mandible

- **Body (Corpus):** The horizontal portion that houses the lower teeth and includes the symphysis, parasymphysis, and mental foramen.
- **Ramus:** The vertical extension of the mandible which connects to the body at the angle (angulus) and leads upward to the condylar process and coronoid process.
- **Condylar Process:** Articulates with the temporal bone to form the TMJ; frequently involved in trauma.
- **Coronoid Process:** Serves as the insertion point for the **temporalis muscle**.

Alveolar Process: The upper part of the mandibular body, supporting the teeth. These structural regions represent both strong and weak zones based on cortical thickness, shape, muscle attachments, and biomechanical [11-14].

Biomechanical Considerations

The mandible is subjected to a variety of forces including tension, compression, torsion, and bending. These biomechanical forces influence **fracture patterns**, especially when impacted directly or indirectly by trauma. For example:

- **Direct trauma** to the symphysis may result in a contralateral condylar fracture due to transmitted forces.
- **Lateral impacts** often cause fractures at weak anatomical sites such as the angle, condyle, or mental foramen.
- The third molar region is considered an anatomical weak point, especially if the tooth is impacted [8-15].
- Muscle attachments also play a role in **fracture displacement**. The **masseter, temporalis**, **medial**, and **lateral pterygoid muscles** contribute to mandibular motion and can cause or resist fragment displacement depending on the direction of the force. For instance:These biomechanical forces explain why certain fracture configurations are "favorable" or "unfavorable" depending on whether muscular pull approximates or separates the fragments [9-13].
- The **lateral pterygoid** tends to pull the condylar fragment anteromedially.
- The **temporalis** and **masseter** help elevate and stabilize the mandible.

Vulnerability of the Mandible

Despite its strength, the mandible's curved shape, tooth-bearing role, and exposed position make it susceptible to injury. Common fracture sites correspond to areas of anatomical weakness and stress concentration, such as:

- **Symphysis and Parasymphysis** (anterior region)
- **Angle of the mandible**

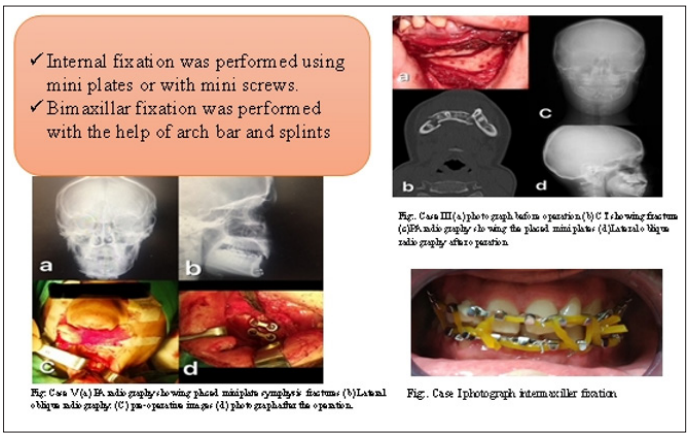


Fig: Case V(a) Radiography showing placed miniplate symphysis fracture (b)Lateral oblique radiography (C) pre-operative image (d) photographafter the operation.

Fig. Case Iphotograph intermaxiller fixation

- Condylar neck
- Body (Corpus) especially near the mental foramen

Understanding these anatomical and biomechanical principles is fundamental for selecting appropriate surgical or conservative treatment strategies, minimizing complications, optimizing, and achieving optimal functional outcomes [14-8].

Etiology and Epidemiology of Mandibular Fractures

Mandibular fractures are among the most prevalent facial injuries encountered in clinical practice, second only to nasal fractures in many studies. The **etiology** and **epidemiology** of these fractures vary widely depending on geographic, cultural, and socioeconomic factors, but a few common trends are universally observed [5-15].

Etiological Factors

Mandibular fractures are typically caused by **traumatic events**, which may be classified as:

Traumatic Causes

Motor vehicle accidents: Frequently cited as the leading cause of mandibular fractures in global studies[9].

- **Physical assault:** In some populations, interpersonal violence (e.g., punches, kicks) accounts for a substantial portion of cases.
  Falls: Especially common among children and the elderly, often resulting in symphysis or condylar fractures[15].
- **Sports injuries:** Contact sports (e.g., boxing, football) contribute to mandibular trauma, particularly in the condylar region.
- **Animal-related incidents:** Less common, but noted in case series such as trauma due to horse kicks.

Non-Traumatic Causes

- **Pathologic conditions:** Cysts, tumors, or infections that weaken bone integrity.
- **Bruxism and temporomandibular joint disorders (TMJDs):** Though not direct causes, they may predispose to condylar stress fractures.

Epidemiological Patterns

Children and the elderly form secondary vulnerable populations, each with unique fracture patterns and management challenges.

- **Children:** Often present with **greenstick fractures** due to the elastic nature of their bones. These typically occur in the condyle or symphysis regions.

Elderly: Show increased susceptibility due to decreased bone density and higher fall risk[14].

- Edentulism and atrophic mandibles also contribute to altered fracture mechanics.

Fracture Distribution by Site

The anatomical location of mandibular fractures follows identifiable trends:

- **Corpus (Body):** ~29%
- **Condyle:** ~26%
- **Angle:** ~25%
- **Symphysis/Parasymphysis:** ~17%
- **Ramus:** ~4%
- **Coronoid Process:** ~1%

These percentages may vary, but they highlight the **condylar region** as a key site of concern due to its functional implications and treatment complexity [5].

Bilateral and Multiple Fractures

Due to the mandible's ring structure, a fracture in one area often results in a **second fracture** elsewhere (e.g., symphysis and contralateral condyle). As a result, careful imaging and clinical evaluation are critical to avoid missing secondary fracture lines [9].

Special Considerations in Pediatrics

Pediatric fractures, particularly in the condylar area, often require **non-surgical (closed reduction)** due to concerns about disrupting growth centers. Functional therapy and physiotherapy are emphasized unless dislocation or significant malalignment is present.Condylar fractures in children typically respond well to functional therapy rather than open reduction, unless severe displacement or ankylosis risk is present [5-9].

Classification of Mandibular Fractures

Classifying mandibular fractures is essential for effective diagnosis, treatment planning, and communication among clinicians.

Several classification systems exist based on **anatomical location, direction of force, fragment displacement, dental involvement**, and **soft tissue condition**. These systems help predict complications, choose appropriate reduction methods, and determine prognosis and select appropriate treatment modalities [14-9].

Classification by Anatomical Location

1. **Midline Fracture:** Between central incisors.
2. **Symphysis Fracture:** Between the canine roots.
3. **Parasymphysis Fracture:** Lateral to the symphysis, extending from the canine to the premolar region.
4. **Body (Corpus) Fracture:** Between the parasymphysis and the angle, often near the molars.
5. **Angle (Angulus) Fracture:** Between the posterior third molar and the ascending ramus.
6. **RamusFracture:** Between the angle and the sigmoid notch.



7. **Condylar Fracture:** Involving the condylar neck or head, affecting the temporomandibular joint [21]
8. **Coronoid Process Fracture:** Rare; may result from excessive muscle pull.
9. **Alveolar Process Fracture:** Limited to the tooth-bearing portion of the mandible .These localization-based classifications help establish appropriate surgical or conservative strategies [11].

Classification by Fragment Position and Displacement

- **Favorable Fracture:** Muscle pull approximates the fragments, promoting stability.
- **Unfavorable Fracture:** Muscle forces displace fragments, complicating healing.

Displaced vs. Non-Displaced: Displacement occurs due to force and muscular action; non-displaced fractures show anatomical continuity.Ellis emphasized that displacement patterns strongly influence treatment selection, particularly in angle and condylar fractures

Classification by Force Direction

- Direct Fracture: Occurs at the point of impact.

Indirect Fracture: Occurs at a distant site due to transmitted force. For example, a direct blow to the chin can cause a contralateral condylar fracture.Understanding force vectors is crucial for diagnosing secondary or "paired" fractures[9]

Classification by Fracture Integrity

- **Greenstick Fracture:** Incomplete break, common in children due to bone elasticity.
- **Simple (Closed) Fracture:** Bone is broken but overlying mucosa/skin is intact.

Classification by Dentition Involvement

- **Class I:** Teeth present on both fracture fragments.
- **Class II:** Teeth present on only one fragment.

Class III: Edentulous mandible (no teeth on either fragment).This affects fixation choices—arch bars, MMF screws, or splints may or may not be feasible depending on dentition [15].

Classification by Dentition Stage

- **Primary Dentition:** Seen in children under 6 years.
- **Mixed Dentition:** Transitional stage in children aged 6–12.

Permanent Dentition: Fully erupted adult teeth.Pediatric dentition stages influence treatment because developing tooth buds must be protected [13].

Classification by Basal Bone Involvement

- **Alveolar-Only Fractures:** Do not affect the basal bone.
- **Basal Bone Fractures:** Involve major structural components, more prone to displacement and require rigid fixation.

Understanding these categories enables the clinician to select the most appropriate management strategy—conservative or surgical—and anticipate potential challenges such as malocclusion, nerve involvement, or TMJ dys Basal involvement is associated with greater displacement risk and longer healing times[14].

Clinical and Radiographic Examination

A thorough clinical and radiographic examination is vital for diagnosing mandibular fractures, determining their severity, and formulating a treatment plan. The examination process is systematic and includes patient history, visual inspection, palpation, functional tests, and also imaging.evaluation, and selection of proper imaging modalities [9-13]

Down side images are belong to a patıent which is 14 months old baby boy who got a trauma to left condyle region (Condyle Green Branch Fracture)





A. Clinical History and Anamnesis

The first step is obtaining a comprehensive history from the patient or a witness. Key questions include:

- Who is the patient? (Name, age, occupation, contact)

- When and where did the trauma occur?
- How did the trauma occur? (e.g., fall, traffic accident, assault)
- Was there any treatment applied before presentation?
- Was there any loss of consciousness, nausea, vomiting, or neurological symptoms?

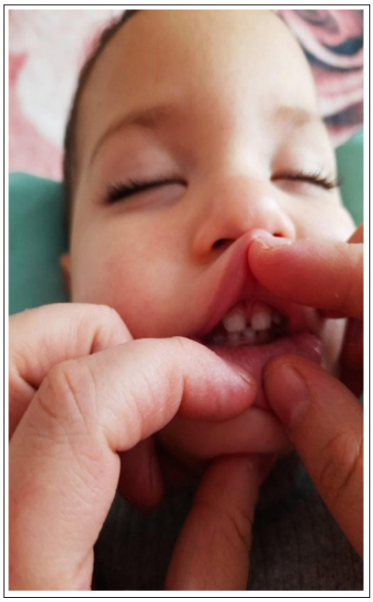
A detailed history helps assess the likelihood of additional injuries (e.g., intracranial damage, cervical spine trauma) and guides appropriate multidisciplinary care and management [6].

Down side you are seeing that baby boy 14 months old patient all ready treated by mechona trapie and he had be came healed in six months completely





Here you will see that mid.line swift up to left side nearly 2-3 mm .



Extraoral Examination

The face is visually and palpably examined for:

- **Swelling, bruising (ecchymosis), hematoma**
- **Facial asymmetry or deformity**
- **Lacerations, abrasions, or contusions**
- **Trismus** (restricted jaw movement)
- **Palpable step-offs** in the mandible or zygoma
- **Subcutaneous crepitus** (grating of bone fragments)
- **Deviation of jaw during opening**, indicating condylar or ramus involvement
- **Cranial nerve function** should be assessed, particularly:
- **V (Trigeminal):** Sensation of chin and lower lip (inferior alveolar nerve)
- **VII (Facial):** Motor function, symmetry in facial expressions

Intraoral Examination

The mouth is inspected for

- **Malocclusion:** Premature or altered contact between upper and lower teeth
- **Tooth mobility or loss**
- **Laceration of gingiva or mucosa**
- **Sublingual hematoma:** Suggestive of anterior mandible fracture

Exposure of bone or fracture line

Palpation is performed intraorally with fingers along the dental arch and mandible to detect mobility or step deformities.

Functional Testing

The patient is asked to

- **Open and close the mouth** – checking for deviation, pain, or limitation
- **Move the jaw laterally** – restricted motion may indicate condylar or coronoid fracture

Clench teeth – pain may localize the fracture Functional limitations are particularly important in diagnosing condylar injuries [10].

Radiographic Evaluation

Radiologic imaging is essential to confirm and classify the fracture. Common modalities include:

Conventional X-rays

- **Orthopantomogram (OPG):** Best overview of mandibular fractures
- **Lateral oblique views:** Good for angle and body fractures
- **Towne's view:** Best for condylar fractures
- **Submentovertex (SMV):** Highlights zygomatic arch and base of skull

Waters' view: For midface and maxilla

Conventional radiographs remain useful in many clinical settings but may miss subtle condylar fractures [9].

Advanced Imaging

- **CT Scan (axial and coronal):** Gold standard for complex, multiple, or condylar fractures
- **MRI:** Used selectively to assess soft tissue or TMJ disc dislocation

Multiple views are often required due to overlapping structures and the complex 3D anatomy of the mandible [13] .

Proper İmaging Allows İdentification of

- Fracture location
- Degree of displacement
- Number of fragments
- Involvement of dental roots or nerves

Diagnostic Summary

Combining **clinical findings** with **radiologic evidence** helps determine:

- Fracture type (displaced vs. non-displaced)
- Need for open vs. closed reduction

Fixation approach and duration. Accurate assessment minimizes errors in diagnosing subtle but clinically significant injuries, especially in condylar and subcondylar fractures [9]

A careful and complete examination ensures a high likelihood of functional and aesthetic restoration and helps avoid missed diagnoses, especially in **condylar and subcondylar** fractures, which can be subtle but functionally
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