

Oral Medicine

Temporomandibular Joint TMJ

Lecture 8

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Diagnosis of TMJ disorders

I. Patient history

- ❖ PDH
- ❖ Medical history
- ❖ History of trauma
- ❖ History of stress
- ❖ Anxiety & depression
- ❖ Family history
- ❖ Social history
- ❖ HPI: Pain
 - Spontaneous or when do certain activities
 - Intermittent or constant
 - Gradual or paroxysmal
 - Duration
 - Is the pain sharp –lancinating- dull- throbbing.

II. Examination of TMJ

The dentist should have a sound knowledge of the function anatomy of TMJ and associated structure prior to under taking the examination of the patient.

Inspection

- Observing the degree of symmetry of the mandible and face.
- Checking if there is masseter and temporal muscle hypertrophy
- Observing the path of excursion of the mandible on opening and closing. It is helpful to focus on specific landmark (such as the mesial incisal edge of mandibular central incisor) whilst asking the patient to open and close their mouth in this way any lateral deviation will be noted



Palpation

- In order to examine the joint by palpation the examiner should be in front of the patient so that movement of the mandible may be related to those palpated in the condylar heads.

A single finger is placed over each condylar head while the mandibular movement are carried out. Abnormal tenderness associated with the lateral aspect of joint detected by light pressure over the condyle.

- Measuring the maximum inter-incisal distance during opening (normally 35-40mm).



- Palpation of the muscles of mastication.

The muscles of mastication should be palpated for tenderness.

The masseter and majority of the temporalis muscle can be palpated extraorally.

Intraorally, the medial pterygoid muscle and mandibular attachment of the temporalis can be palpated by inserting the index finger into the posterior maxillary vestibule.

Throughout the physical examination, it is important to ask the patient if they note any particular areas of tenderness or sharp pain areas.

Auscultation :

Type and severity of sound (grinding, popping, clicking).



III. Radiographical examination

Most clinical problem of the TMJ are related to the muscular parafunction (e.g. bruxism), therefore the x-ray is not indicated unless there is any suggestion of bone abnormality like in (R.A & osteoarthritis).

1/ Plain radiograph :

Transorbital, Transcranial, Transpharyngeal & OPG views to show:

- a) Joint during opening & closing.
- b) Shape of condylar head and contour of glenoid fossa.
- c) Relation of condyle to glenoid fossa.

Disadvantage: does not provide articular disc information.

2/ Computed Tomography (CT) & Cone Beam Computed Tomography (CBCT) :

It gives excellent information about osseous structures of joint as well as the position of the disc.

3/ Arthroscopy

A device used by inserting a tube into the joint spaces to visualize the surfaces of the disc, bones, and lesions of the joint.

Disadvantage: it requires anesthesia & technically demanding.

4/ Arthrography:

Radioopaque dye is injected in the lower joint space and take either lateral or anteroposterior radiography or tomography. it used to study:

- a. Displacement or perforation of disc
- b. Irregularities in the posterior attachment of the disc (bilaminar zone).
- c. Adhesion.
- d. Synovial proliferation.

Disadvantages: It is painful & danger of infection.

5/ Magnetic Resonance Imaging (MRI)

- a) MRI does not use ionizing radiation and non invasive.
- b) It is superior to arthrography in demonstrating displacement of disc but does not detect perforation.
- c) Demonstrate osseous changes in TMJ.

Disadvantages: It is expensive & not universally available.

6/ Electromyography (EMG)

Provide an objective means of monitoring changes in muscles activity.

Diseases & disorders of TMJ

Intracapsular disorders

- 1. Developmental anomalies**
- 2. Inflammatory changes**
- 3. Degenerative diseases**
- 4. Infections**
- 5. Traumatic injury**
- 6. Neoplasia**
- 7. Drug- induced**
- 8. Systemic disorders**

Extracapsular disorders

- 1. Infections**
- 2. Trauma**
- 3. Tumors**
- 4. Muscular spasm**

Intracapsular disorders

1. Developmental anomalies

which affect the head of condyle.

The main signs & symptoms are:

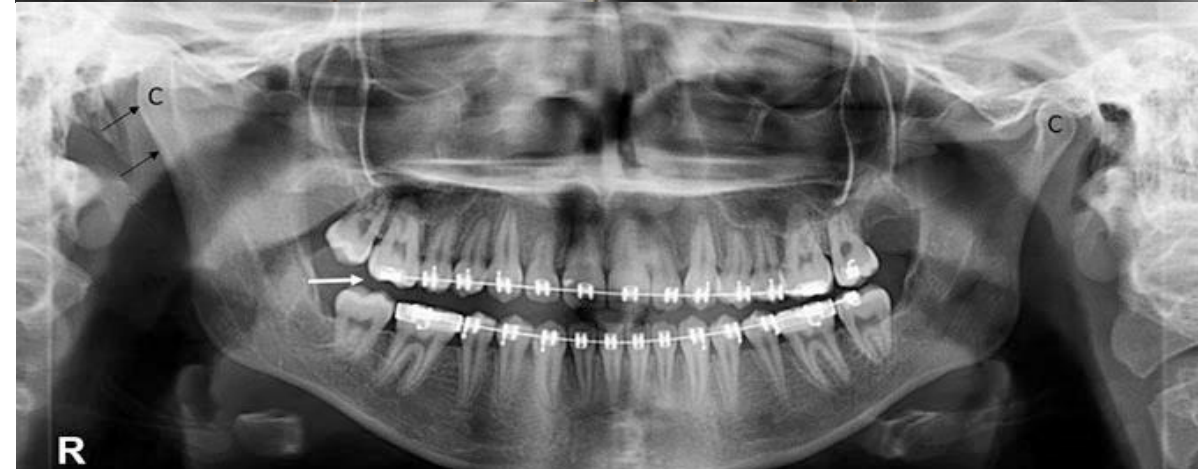
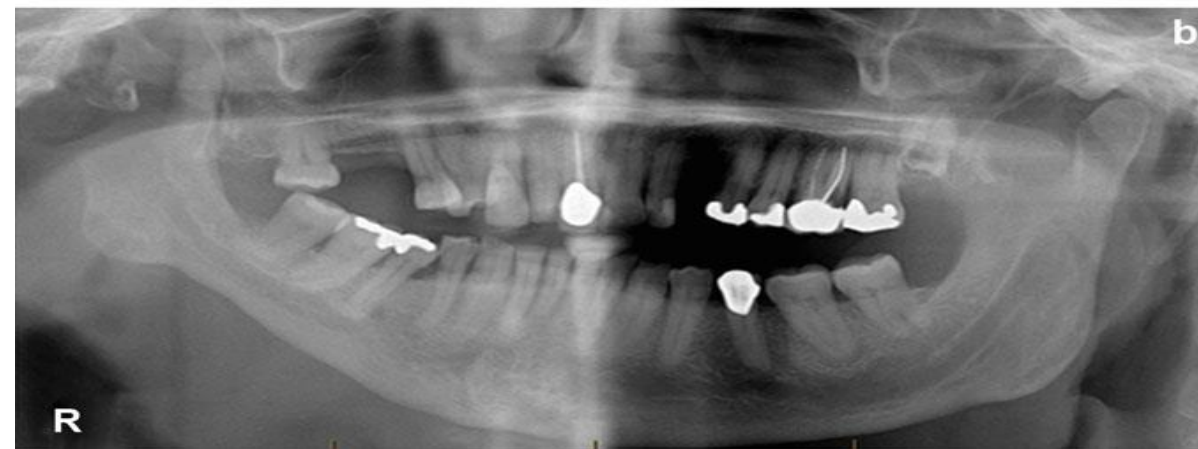
Asymmetry of the face & deviation during opening.

- Hypoplasia of the condyle:
Freedom of eccentric excursions.

- Aplasia or agenesis of the condyle:
Anterior open bite & inability to close repeatedly to fixed retruded position

- Hyperplasia of the condyle:
Limitation in the mandibular opening & pain.

Diagnosis by radiograph & treated by surgery.



2. Inflammatory diseases (Rheumatoid arthritis)

Is an inflammatory disease affecting periarticular tissue & secondarily bone, the disease start as vasculitis of the synovial membrane, it progress to chronic inflammation & subsequent formation of granulation tissue, the cellular infiltration cause erosion of underlying bone.

Clinically :

The TMJs in RA are usually involved bilaterally. Pain is usually associated with the early acute phase of the disease but is not a common complaint in later stages.

Other symptoms often noted include morning stiffness, joint sounds, and tenderness and swelling over the joint area.

The symptoms are usually transient in nature, and only a small percentage of patients experience permanent clinically significant disability.

The most consistent clinical findings include pain on joint palpation, limited mouth opening, and crepitus.

Radiographically:

Narrow joint space, little evidence of marginal proliferation.

Treatment:

Anti-inflammatory drugs, occlusal plane, exercise, intra-articular steroid.

3. Degenerative joint disease (Osteoarthritis)

Also referred to as degenerative arthritis, is primarily a disorder of articular cartilage and subchondral bone, with secondary inflammation of the synovial membrane.

It is a localized joint disease without systemic manifestations. The process begins in loaded articular cartilage that thins, clefts (fibrillation), and then fragments.

This leads to sclerosis of underlying bone, subchondral cysts, and osteophyte formation. The articular changes are essentially a response of the joint to chronic microtrauma or pressure.

Microtrauma may be in the form of continuous abrasion of the articular surfaces as in natural wear associated with age or due to increased loading possibly related to chronic parafunctional activity.

Psychological stress leading to parafunctional activities such as tooth clenching or bruxing has been proposed as a factor.

In addition a significant association has been observed between ADD and osteoarthritis.

Clinically:

Many patients with mild to moderate OA of the TMJ have no symptoms, although arthritic changes are observed on radiographs and these degenerative changes of the TMJ detected on radiographic examination may be incidental and may not be responsible for facial pain symptoms or TMJ dysfunction.

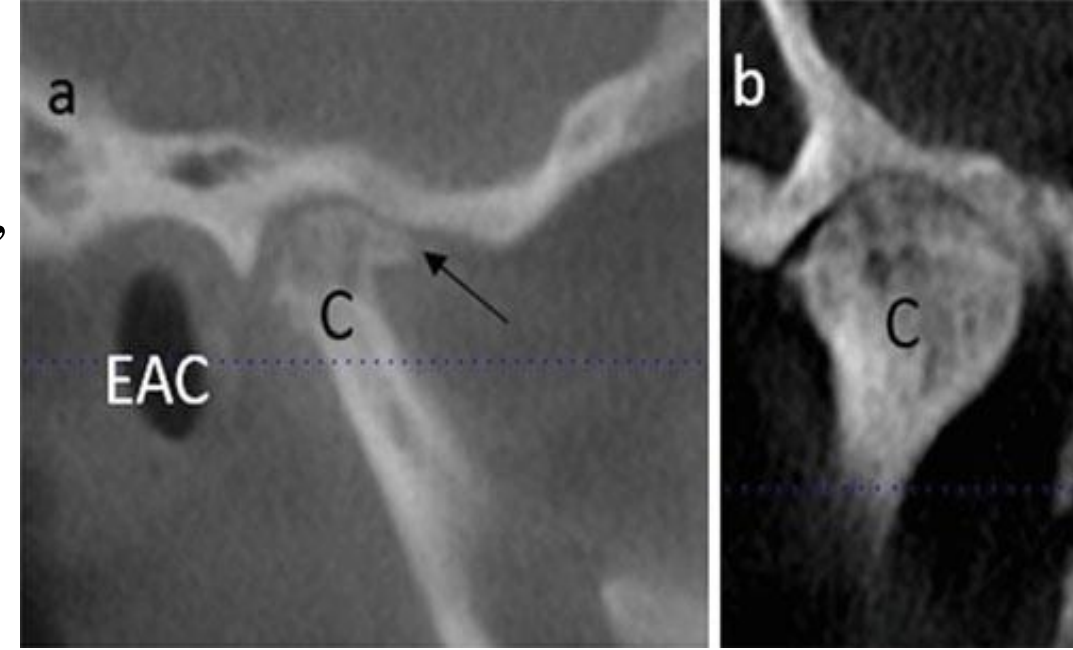
Patients with symptomatic OA of the TMJ experience pain directly unilateral over the affected condyle, limitation of mandibular opening, crepitus, and a feeling of stiffness after a period of inactivity.

Clinical examination reveals tenderness and crepitus on intra-auricular and pre-auricular palpation, deviation of the mandible to the painful side may be present.

Radiographic findings:

Narrowing of the joint space, irregular joint space, flattening of the articular surfaces, osteophyte formation, anterior lipping of the condyle, and the presence of subchondral cysts.

These changes may be seen best on CT scans.



Treatment of OA:

Nonsurgical management including behavior modification, heat application, soft diet, physical therapy including jaw exercises, NSAID, and oral appliance therapy.

When nonsurgical management is not effective, then direct joint therapy, such as intra-articular corticosteroid injection, is indicated, which is a relatively conservative joint procedure.

If intra-articular steroid injection is ineffective, surgical procedure such as arthroscopy, arthroplasty, and arthrotomy may be indicated depending on the response to more conservative treatment and the severity of pain and disability.

4. Infections:

It is also called as ‘septic arthritis’. It may be acute or chronic. It is caused by microorganisms that spread either via blood or wound or injury in TMJ area, as a consequence to osteomyelitis, pericoronitis, trauma, or extension from contagious sites like gonorrhoea, T.B, syphilis.

Signs & symptoms:

It usually occurs in young. It is always unilateral, in some cases bilateral involvement can occur.

There is severe pain on jaw movement, with an inability to place the teeth in occlusion, due to presence of infection in the joint.

Redness and swelling over the joint. In some cases, swelling may be fluctuant and extend beyond the region of the joint.

Tender cervical lymph nodes on the side of infection. This helps to distinguish septic arthritis from other TMJ disorders.

Treatment: antibiotic, analgesic & soft diet.

5. Traumatic injury

- A. Condylar fracture.
- B. Ankylosis.
- C. Subluxation.
- D. Dislocation.
- E. Disc displacement (internal derangement).

A. Condylar fracture:

It is usually result from a blow to the chin.

It is characterized by pain, asymmetry of the face, swelling, limitation in movement & deviation to the affected side during opening.

Bilateral condylar fractures may result in an anterior open bite.

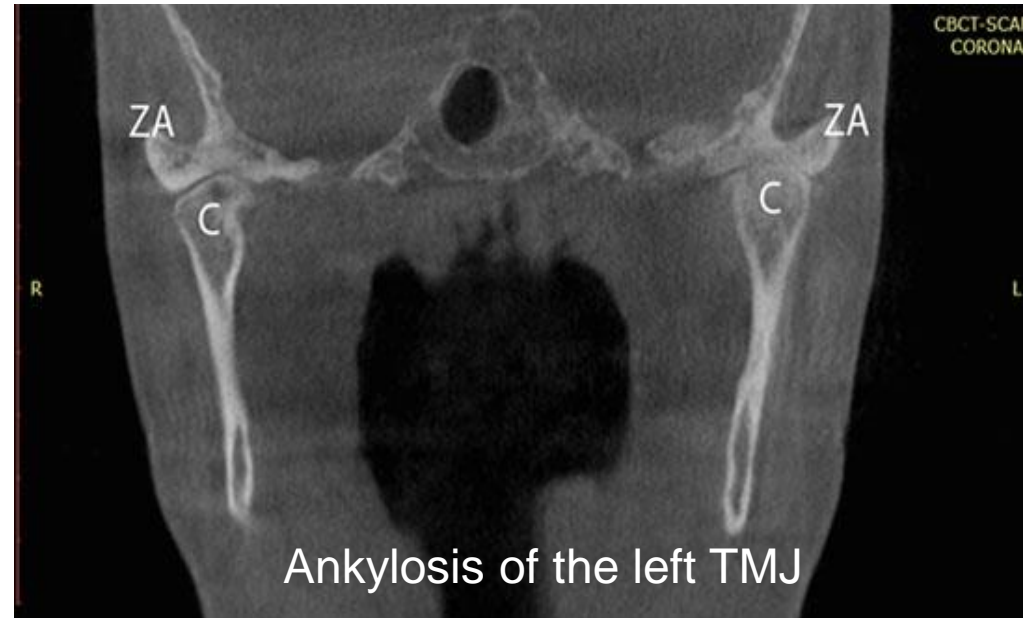
B. Ankylosis

Is a pathologic condition involves fusion of the head of the condyle to the temporal bone either by bony or fibrotic tissues, that may be unilateral or bilateral.

Trauma to the chin is the most common cause of TMJ ankylosis, although infections also may be involved.

Children are more prone to ankylosis because of greater osteogenic potential and an incompletely formed disc.

Ankylosis frequently results from prolonged immobilization following condylar fracture.



Clinically

Unilateral ankylosis: limited mandibular movement, deviation of the mandible to the affected side on opening, and facial asymmetry may be observed.

Bilateral ankylosis: the face is symmetrical with micrognathia (bird face appearance). In addition, atrophy or fibrosis of muscles of mastication may result.

Diagnosis of ankylosis by radiograph (absence of joint space).

Treatment

Ankylosis has been treated by several surgical procedures. Gap arthroplasty using interpositional materials between the cut segments is the technique most commonly performed.



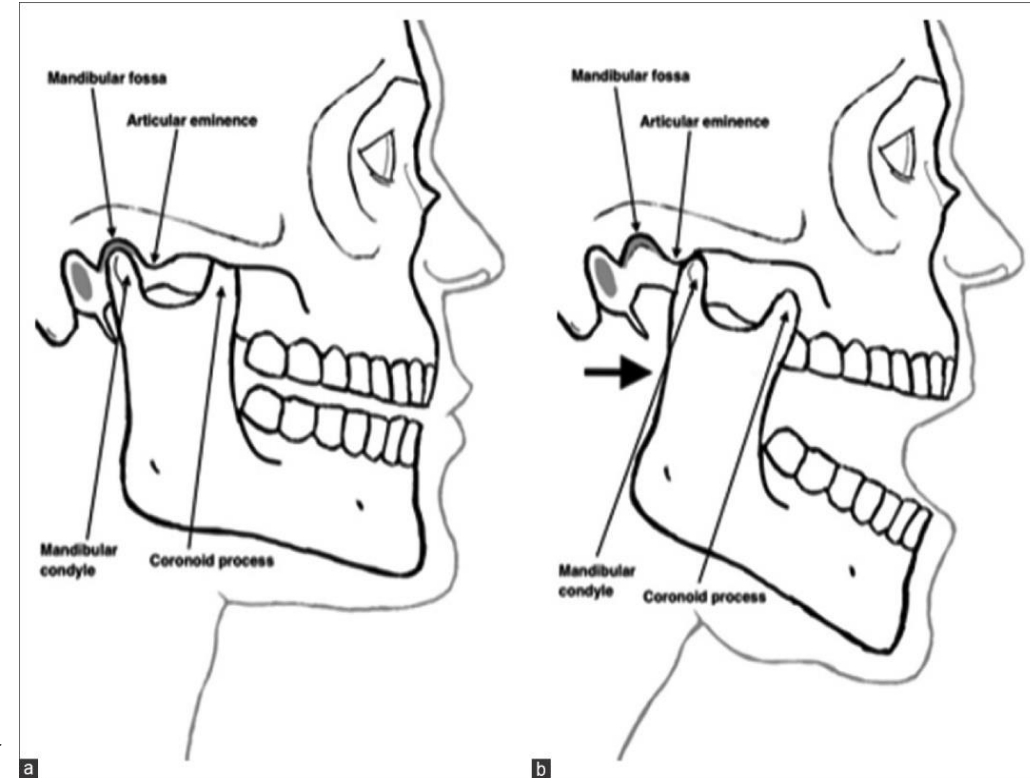
C. Subluxation:

Is a condition in which the head of condyle moves anterior to the articular eminence during wide opening and yawning, but the patient himself is able to return it to the normal resting position.

It has been demonstrated that in subluxation the normal range of movement of the condyle is not limited to the fossa.

The clinical features:

Condyle may get locked when the mouth is opened widely and upon closing, accompanied by a sound caused by movement of the condyle over the articular eminence.



D. Luxation (complete dislocation):

Is a condition in which the head of condyle is in front of articular eminence, and cannot return to its normal position without assistance.

It is usually a result from muscular incoordination in wide opening during eating or yawning and less commonly from trauma; they may be unilateral or bilateral.

The typical complaints of the patient with dislocation are an inability to close the jaws and pain related to muscle spasm.

On clinical examination, a deep depression may be observed in the preauricular region corresponding to the condyle being positioned anterior to the eminence.

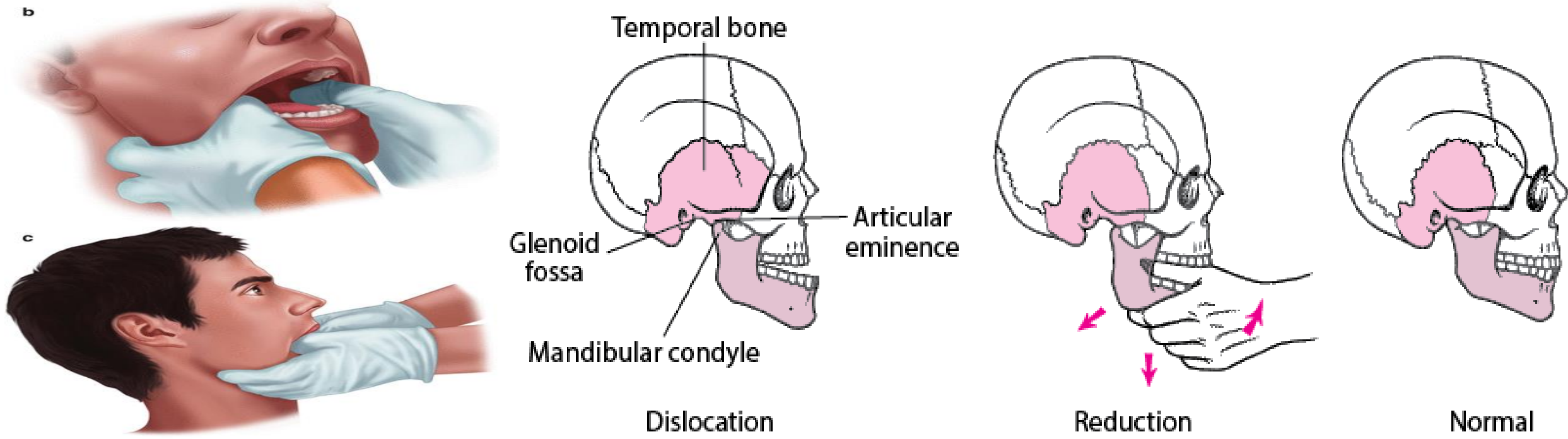


Management:

Dentist should stand in front of the seated patient and place his thumbs on occlusal surface of mandibular molars teeth on both sides and rest of fingers on lower border of mandible and push downward, backward and upward, this should be done immediately or within short time. Otherwise, it done under GA.

Post-reduction recommendations consist of limiting mandibular movement and the use of NSAIDs to reduce inflammation.

The patient should be cautioned not to open wide when eating or yawning because recurrence is common.



Treatment

Chronic recurring dislocations have been treated with nonsurgical and surgical approaches. Injections of sclerosing solutions have been used but are not used as often now because of difficulty in controlling the extent of fibrosis and condylar limitation.

Various surgical procedures have been advocated for treating recurrent dislocations of the mandible; such as bone grafting.

E. Disc displacement (internal derangement)

An abnormal relationship between the disc, the mandibular condyle, and the articular eminence, resulting from the elongation or tearing of the attachment of the disc to the condyle and glenoid fossa.

ADD may result in abnormal joint sounds, limitation and deviation of mandibular motion, & pain.

A specific etiology in the majority of cases of disc displacement is poorly understood. Some cases result from direct trauma to the joint from a blow to the mandible.

It is also generally believed that chronic low-grade microtrauma resulting from long-term bruxism or clenching of the teeth is a major cause of ADD.

Disc displacement is divided into stages based on signs and symptoms combined with the results of diagnostic imaging.

1. Anterior disc displacement with reduction (clicking joint)
2. Anterior disc displacement with reduction with intermittent locking
3. Anterior disc displacement without reduction (closed lock).

(A) anterior disc displacement with reduction (clicking joint) ADDWR

An alteration in the form or shape of the disc has also been proposed as a possible factor, with thinning of the posterior band presumably allowing the disc to migrate anteriorly over time.

Clinically

It is characterized by a clicking with or without pain that may occur during opening, closing, lateral movements, protrusive movement, or any combination of these movements.

To confirm diagnosis, the MRI of TMJ shows the following:

- In closed mouth with maximum intercuspal position, the posterior band and the intermediate zone of the disc is located anterior to the condylar head
- On full opening, the intermediate zone of the disc is located between the condylar head and the articular eminence.

2. Anterior disc displacement with reduction with intermittent locking

In the closed mouth position, the disc is in an anterior position relative to the condylar head, and the disc intermittently reduces with opening of the mouth.

When the disc does not reduce with opening of the mouth, intermittent limited mandibular opening occurs. When limited opening occurs, a maneuver may be needed to unlock the TMJ.

Clicking, popping, or snapping noises may occur intermittently when disc reduces with opening of the mouth.

When the disc does not reduce with opening of the mouth, intermittent momentarily (seconds to minutes) limited mandibular opening occurs.

When limited opening occurs, a maneuver may be needed to unlock the TMJ.

3. Anterior disc displacement without reduction (closed lock) ADDWOR

In the closed mouth position, the disc is in an anterior relative the condylar head and the disc does not reduce with opening of the mouth.

The disc will deform with permanent anterior displacement of the disc exposes the posterior attachment to compression by the condyle.

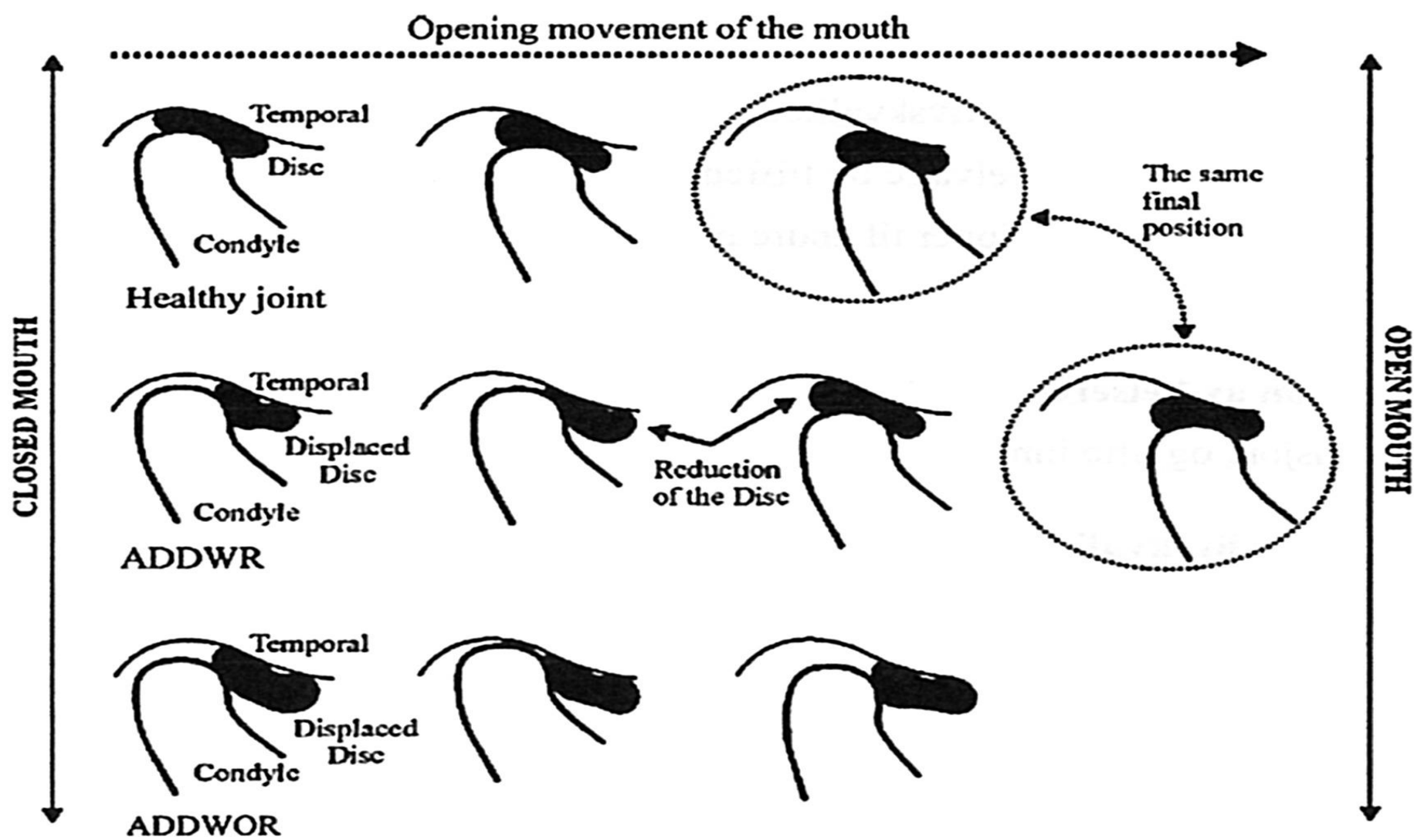
The posterior attachment has been shown to react to the change by depositing hyaline in the connective tissue and has been called a “pseudomeniscus.”

Clinically

1. Severe pain on opening of mouth & there is no clicking
2. Lock joint
3. Restriction of mouth opening (maximum assisted opening of <40 mm)
4. Deviation of the mandible.

On MRI:

- In closed mouth with the maximum intercuspal position, the posterior band and the intermediate zone of the disc is anterior to the condylar head.
- On full opening, the intermediate zone of the disc is located anterior to the condylar head.



Treatment of ADD :

- Splint therapy (bite plane), physical therapy including manual manipulation, anti-inflammatory drugs
- Arthroscopic surgery and open reconstructive artheroplasty.

- 6. Neoplasia:** chondrosarcoma, osteoma, osteosarcoma.
- 7. Drug- induced:** steroid cause osteoporosis.
- 8. Systemic disorders:** like lupus erythromatosis, Gout, paget's disease, fibrous dysplasia, hyperthyroidism.

Extracapsular disorders

- 1. Infection:** parotid gland, pericoronitis, tetanus.
- 2. Trauma:** fracture of mandible and zygomatic arch that press on coronoid process.
- 3. Tumors:** parotid gland tumors.
- 4. Muscular spasm:** (Myofacial Pain Dysfunction Syndrome).

Myofacial Pain Dysfunction Syndrome

Refers to the clinical condition characterized by pain, fatigue and spasm of the muscles of mastication.

Tenderness to palpation in one or more of these muscles is the most reliable diagnostic feature of MPDS.

Muscle tenderness is generally most pronounced near the origin or insertion of an affected muscle, but the belly is often at least mildly tender.

This tenderness is most easily demonstrated for the temporalis and masseter muscles by applying fingertip pressure during extreme opening and closing movement of the mandible.

The patient are usually young to middle aged females who experience constant or episodic emotional stress.

The symptoms of MPDS tend to occur in cycles with asymptomatic periods interposed between acute bouts associated with demanding emotional situations.

Occlusal disharmony may be a contributory factor.

The signs & symptoms of the MPDS includes :

1. Unilateral or bilateral preauricular pain during palpation.
2. Spasm of one or more of the muscles of mastication.
3. Tenderness to palpation of one or more muscles of mastication.
4. Diffuse head pain that similar to tension headache and is usually most severe in the morning.
5. Pain on jaw opening.
6. Limitation of opening measured to be less than 35- 40mm.
7. Lateral deviation during jaw opening.
8. Joint sounds such as clicking, popping and crepitus during opening.

Treatment

1. Elimination of contributory factors, if possible.
2. Palliative treatment during acute periods of discomfort, include: analgesics and application of moisture heat to the spastic muscles is generally adequate in mild cases.
3. Elimination of occlusal disharmony by removal of isolated interference and comprehensive orthodontic treatment of complex malocclusion may be appropriate.
4. Using of bite plane .
5. Counseling to promote better adaptation by the patient to stress and dramatic emotional episodes may help some individuals.

Combination of these approaches may be necessary to achieve relief in a specific case.