Sri Aurobindo College of Dentistry

Indore, Madhya Pradesh

INDIA

MODULE PLAN

- TOPIC : TEMPOROMANDIBULAR DISORDERS
- SUBJECT: OMDR
- TARGET GROUP: UNDERGRADUATE DENTISTRY
- MODE: POWERPOINT – WEBINAR
- PLATFORM: INSTITUTIONAL LMS
- PRESENTER: DR.VIHANG NAPHADE

TEMPEROMANDIBULAR JOINT

- The area where the mandible articulates with the temporal bone of the cranium is called temporomandibular joint.
- It provides for hinging movement and therefore it is considered as ginglymoid joint.
- And it also provides for gliding movements, which classifies it as arthrodial joint. Thus, it has been technically considered as ginglymoidarthrodial joint.

Jeffrey P. Okeson, Management of Temporomandibular Disorders and Occlusion, 7th Edition

ANATOMY OF TMJ

BONY COMPONENTS

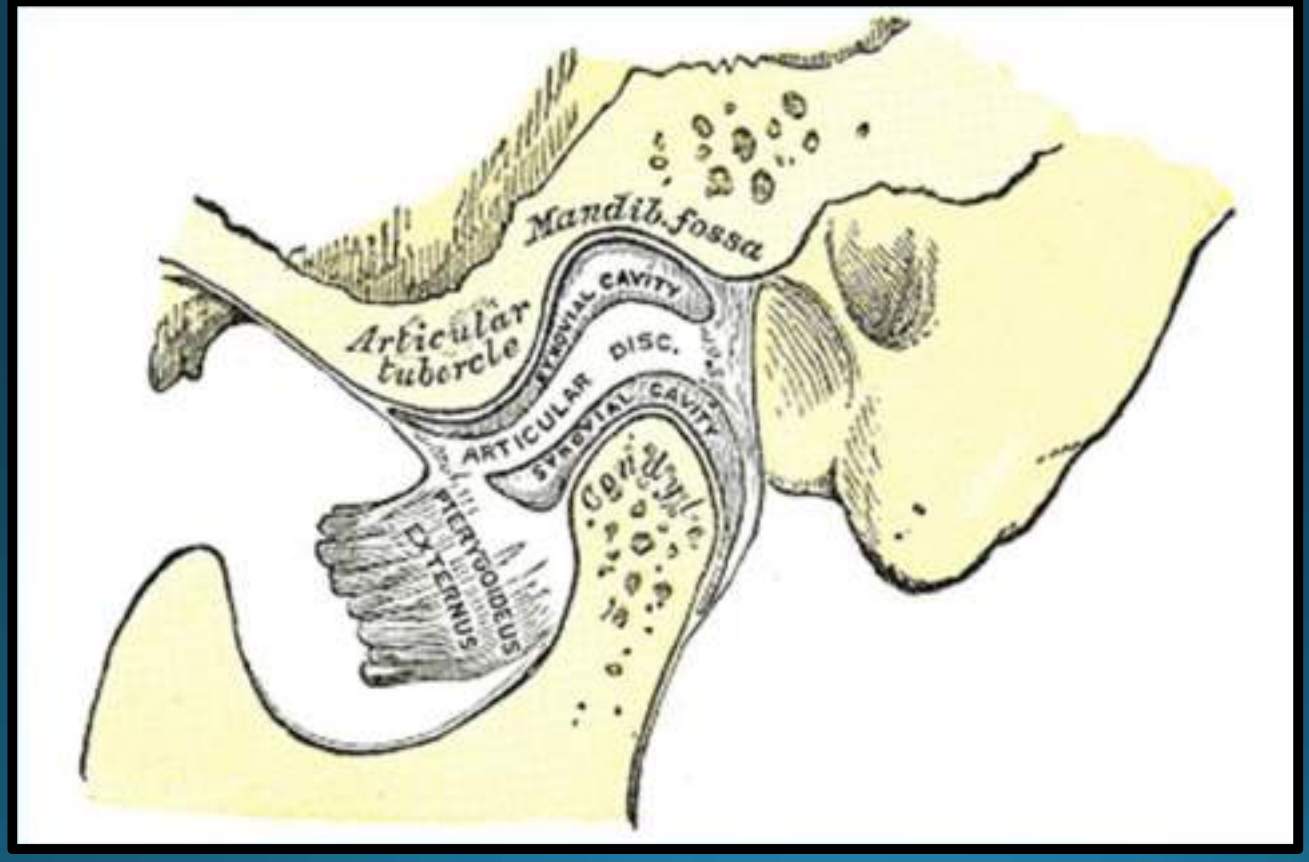
- GLENOID FOSSA
- CONDYLAR HEAD
- ARTICULAR EMINENCE

SOFT-TISSUE COMPONENTS

- ARTICULAR DISC
- JOINT CAPSULE
- LIGAMENTS

Gray's Anatomy, 38th Edition

BONY COMPONENTS



ARTICULAR SURFACES

UPPER ARTICULAR SURFACE

- ARTICULAR EMINENCE
- ANTERIOR PART OF MANDIBULAR FOSSA

INFERIOR ARTICULAR SURFACE

- HEAD OF MANDIBLE

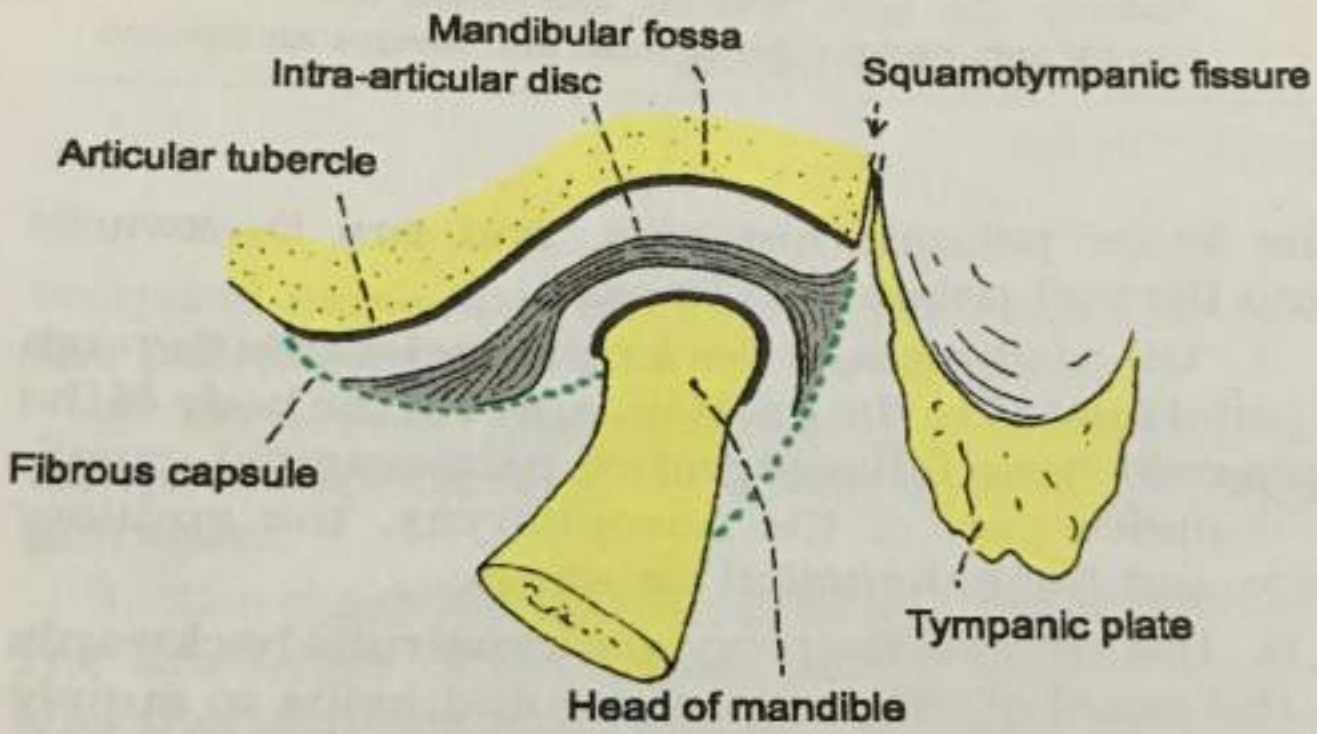
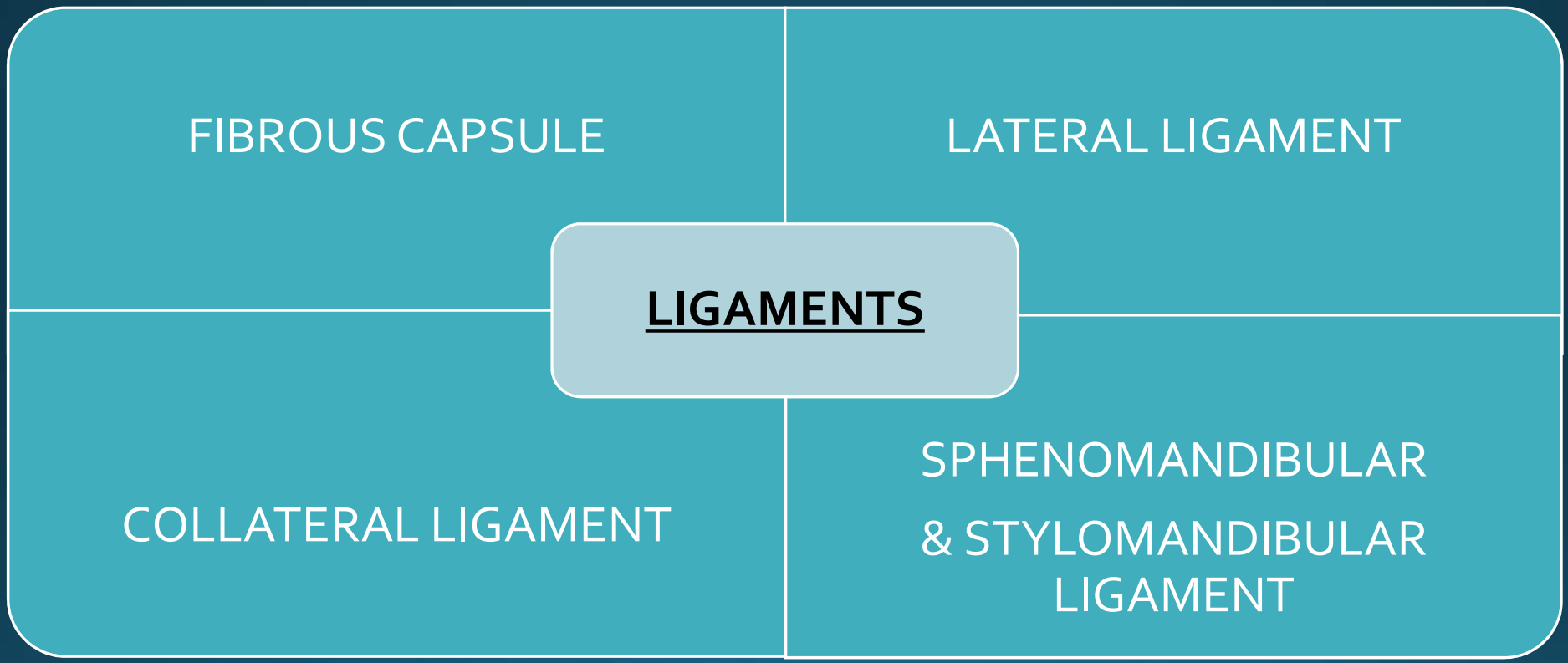


Fig. 10.8: *Articular surfaces of the left temporomandibular joint.*



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COLLATERAL LIGAMENT

- Two types : Medial discal and Lateral discal
- Function:
  - ➢ Hinging movement
  - ➢ They allow the disc to move passively with condyle as it glides antero-posteriorly .

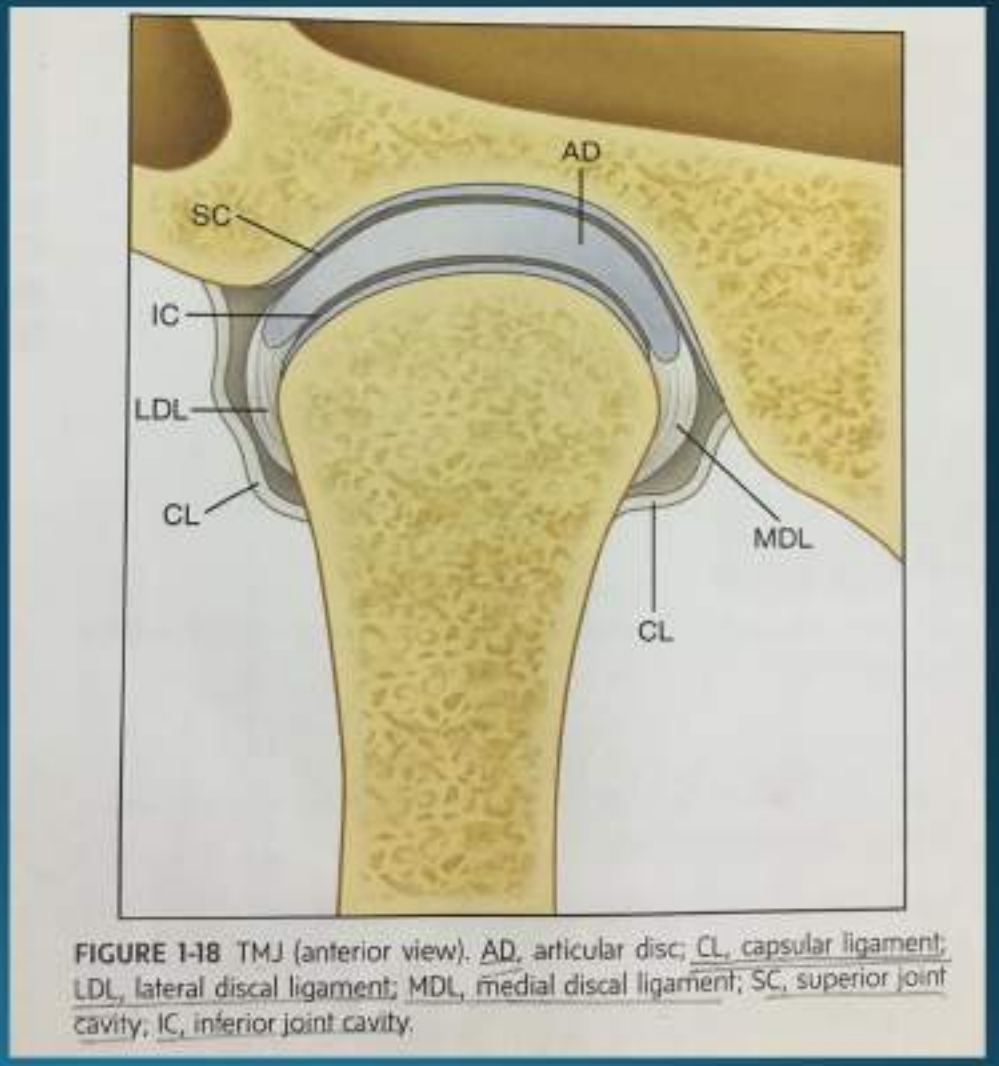

FIGURE 1-18 TMJ (anterior view). AD, articular disc; CL, capsular ligament; LDL, lateral discal ligament; MDL, medial discal ligament; SC, superior joint cavity; IC, inferior joint cavity.

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FIBROUS CAPSULE

- **ATTATCHMENT**
  - Superiorly: to articular surface of mandibular fossa
  - Inferiorly: to the neck of the condyle
- **FUNCTION:**
  - To encompass the joint, thus retaining the synovial fluid.

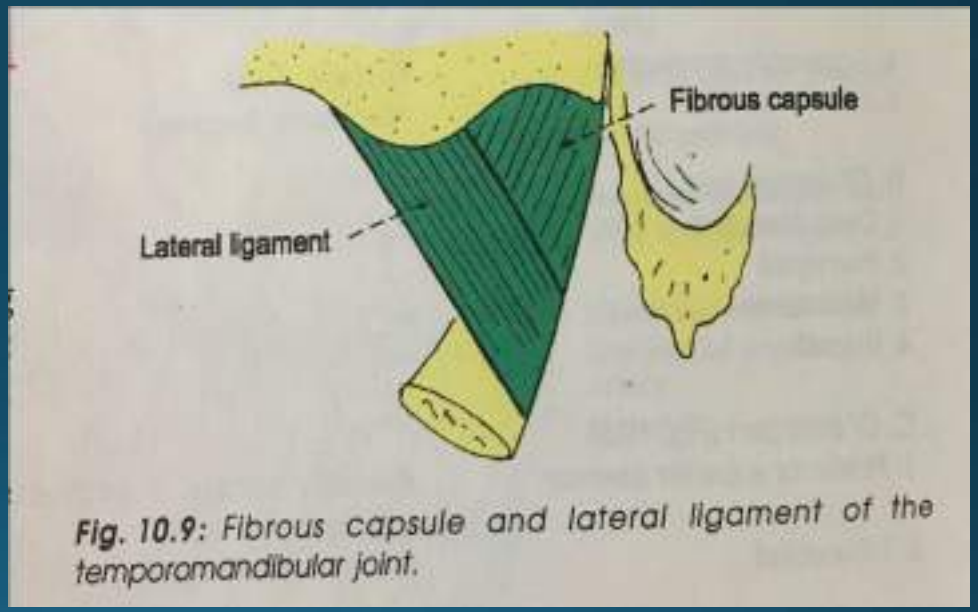

Fig. 10.9: Fibrous capsule and lateral ligament of the temporamandibular joint.

LATERAL LIGAMENT

- ATTATCHMENT
  - Superiorly: to articular tubercle
  - Inferiorly: to the posterolateral aspect of the neck of the condyle
- FUNCTION:
  - It reinforces and strengthens the lateral part of the capsular ligament

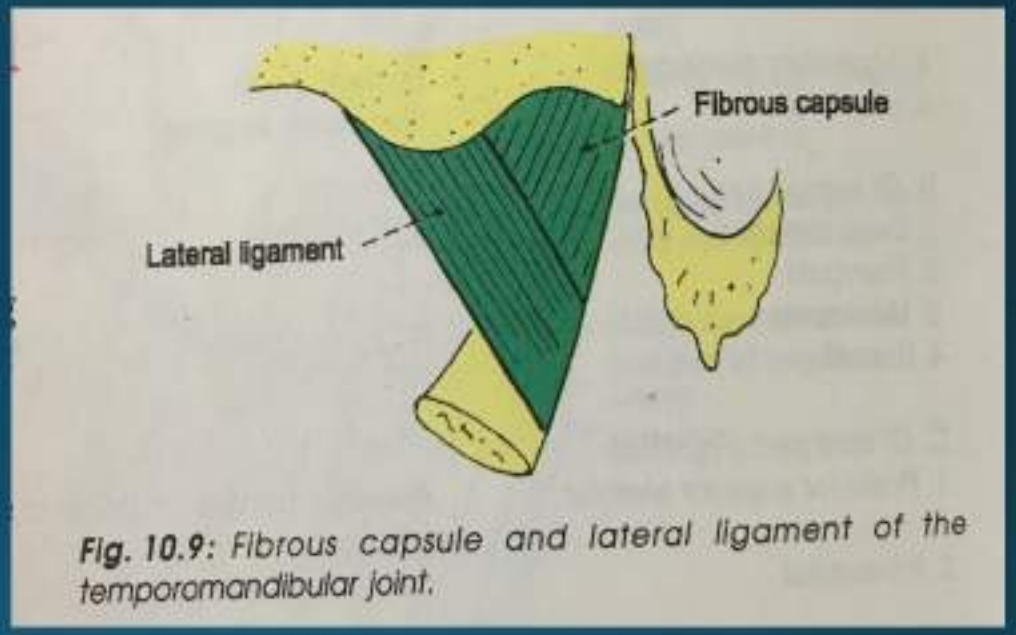

Fig. 10.9: Fibrous capsule and lateral ligament of the temporomandibular joint.

SPHENOMANDIBULAR LIGAMENT

- **ATTATCHMENT**
  - Superiorly: to spine of sphenoid
  - Inferiorly: to the lingula of the mandibular foramen
- **FUNCTION:**
  - To limit distention of mandible in inferior direction.

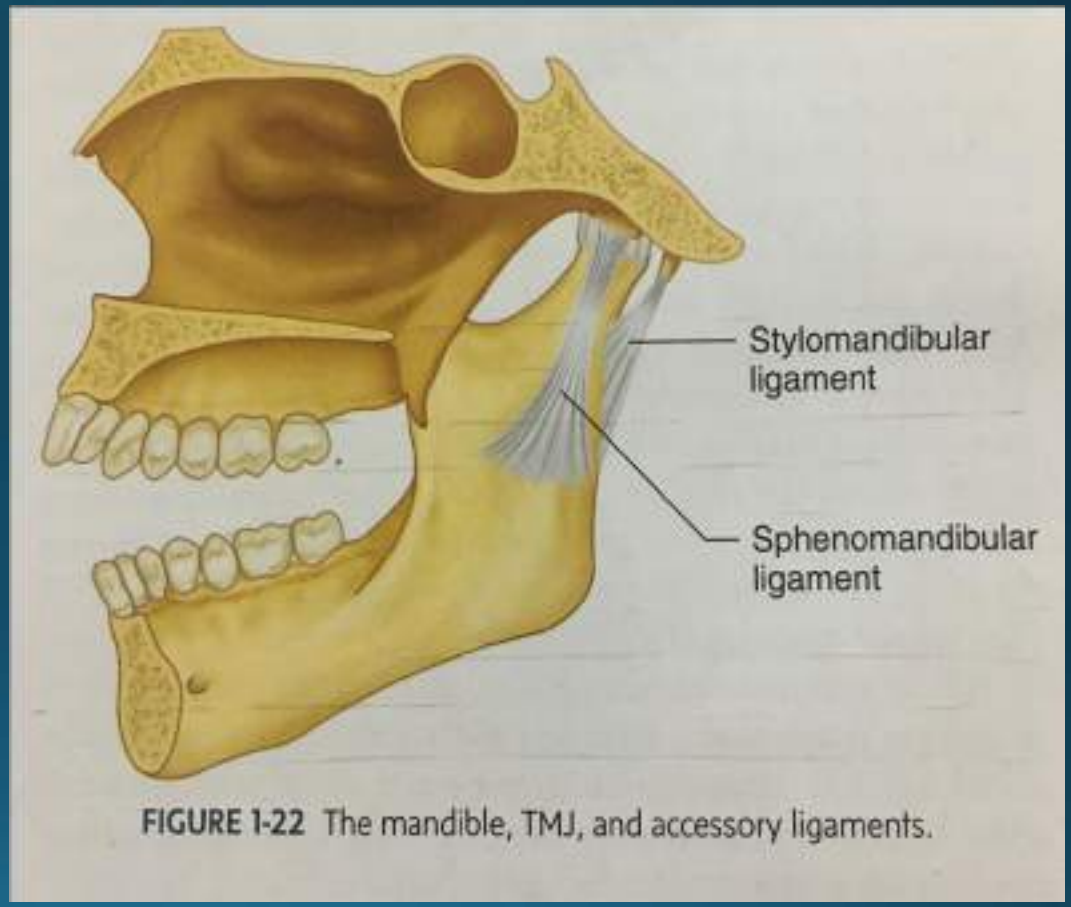

FIGURE 1-22 The mandible, TMJ, and accessory ligaments.

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STYLOMANDIBULAR LIGAMENT

- ATTATCHMENT
  - Superiorly: to lateral surface of styloid process
  - Inferiorly: to the angle and posterior border of the ramus of the mandible
- FUNCTION:
  - Limits the excessive protrusive movements of the mandible.

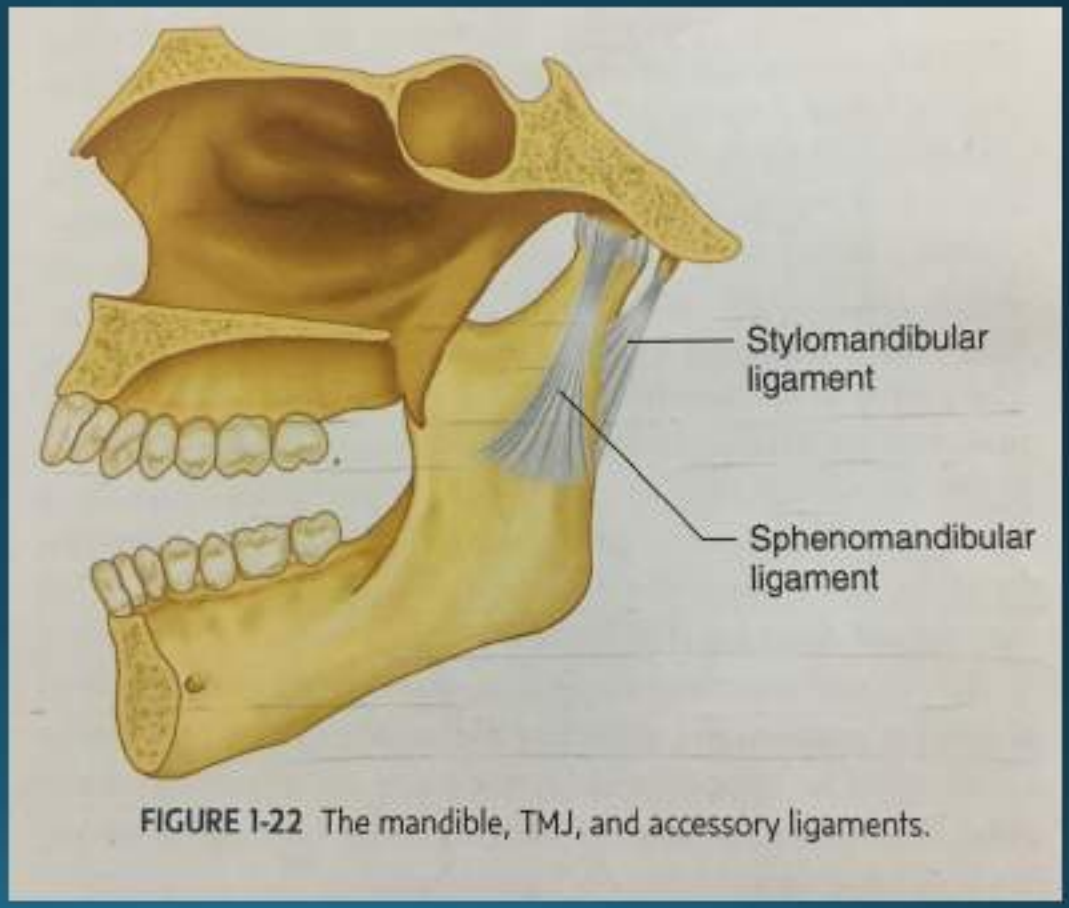

FIGURE 1-22 The mandible, TMJ, and accessory ligaments.

ARTICULAR DISC

- It is an oval fibrous plate.
- It divides the joint into upper and lower compartments.
- UPPER COMPARTMENT: gliding movements

  LOWER COMPARTMENT: gliding & rotating movements.

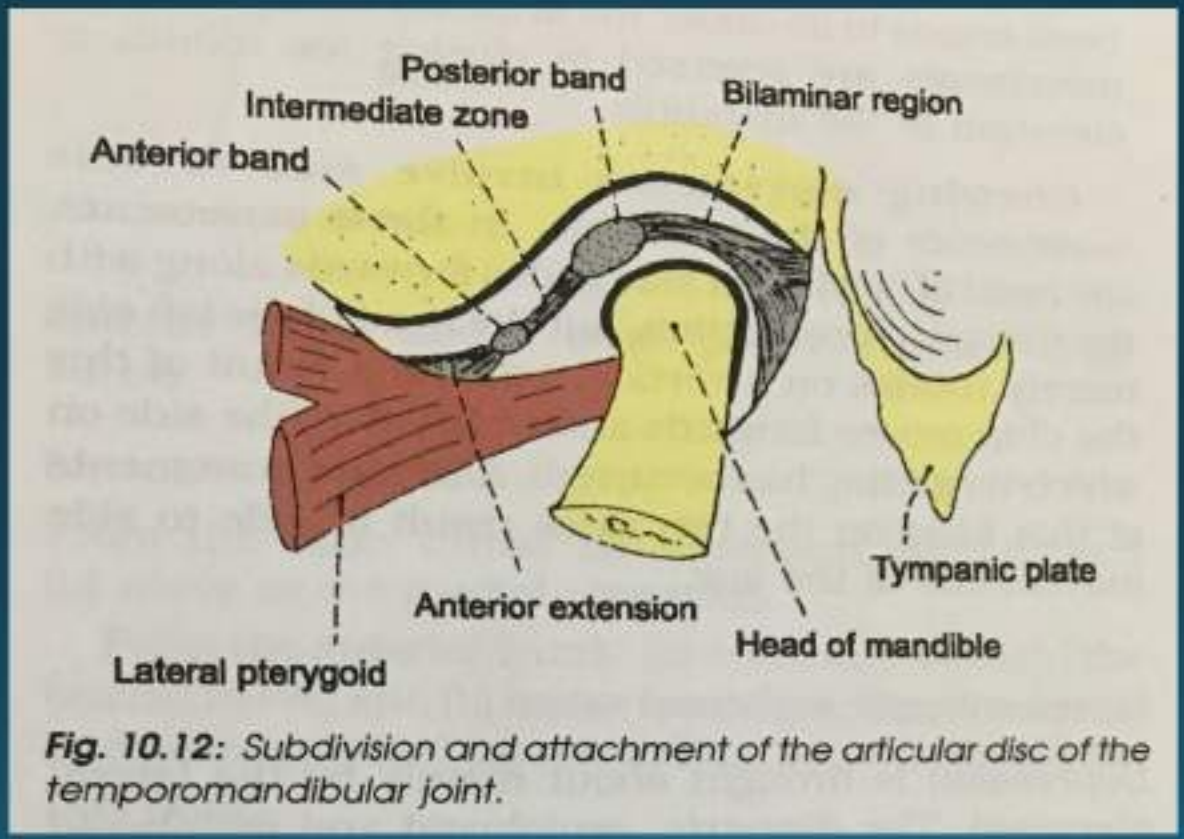

Fig. 10.12: *Subdivision and attachment of the articular disc of the temporomandibular joint.*

RELATIONS

LATERAL	MEDIAL	ANTERIOR	POSTERIOR	SUPERIOR	INFERIOR
SKIN & FASCIA	SPINE OF SPHENOID	LATERAL PTERYGOID	PAROTID GLAND	MIDDLE CRANIAL FOSSA	MAXILLARY ARTERY & VEIN
PAROTID GLAND	AURICULOTEMP-ORAL NERVE	MASSETRIC NERVE & VESSELS	SUPERFICIAL TEMPORAL VESSELS	MIDDLE MENINGEAL VESSELS	
TEMPORAL BRANCHES OF FACIAL NERVE	CHORDA TYMPANI NERVE		AURICULOTEMP-ORAL NERVE		
	MIDDLE MENINGEAL ARTERY				

BLOOD SUPPLY:

- SUPERFICIAL TEMPORAL ARTERY
- MAXILLARY ARTERY

NERVE SUPPLY:

- AURICULOTEMPORAL NERVE
- MASSETRIC NERVE

LYMPH NODES:

- PREAURICULAR LYMPH NODES
- DEEP CERVICAL LYMPH NODES

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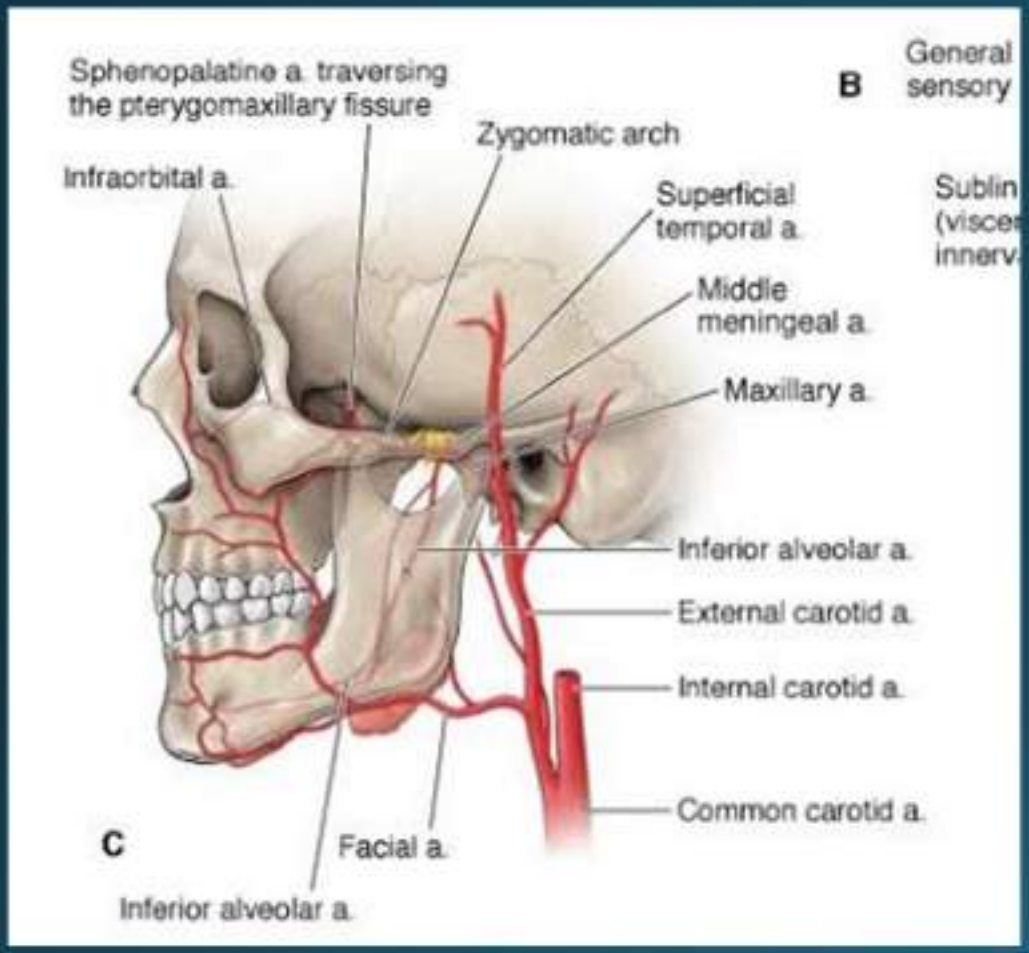
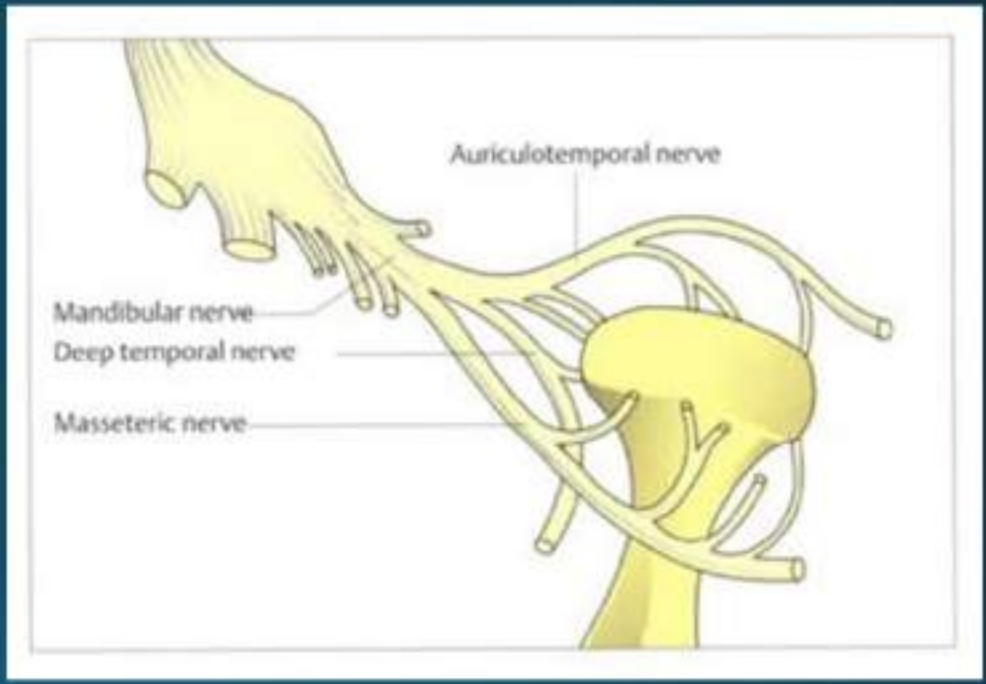


BLOOD SUPPLY OF TMJ

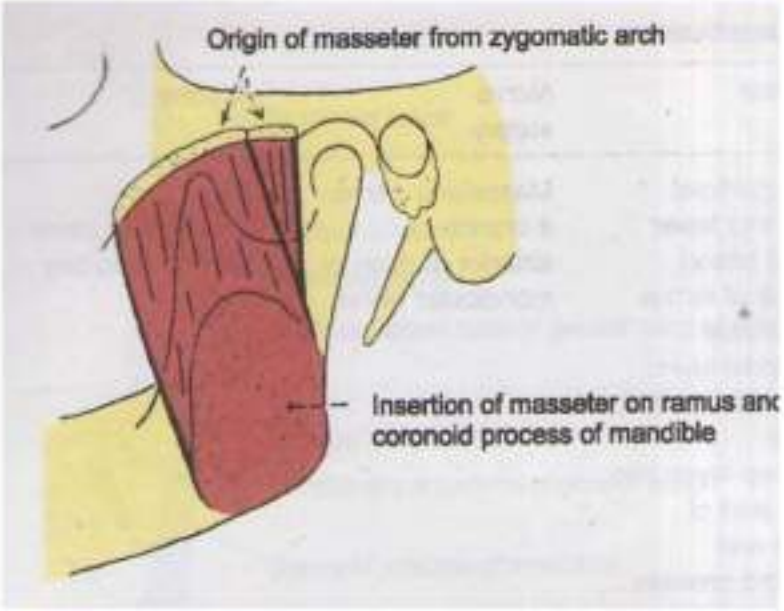


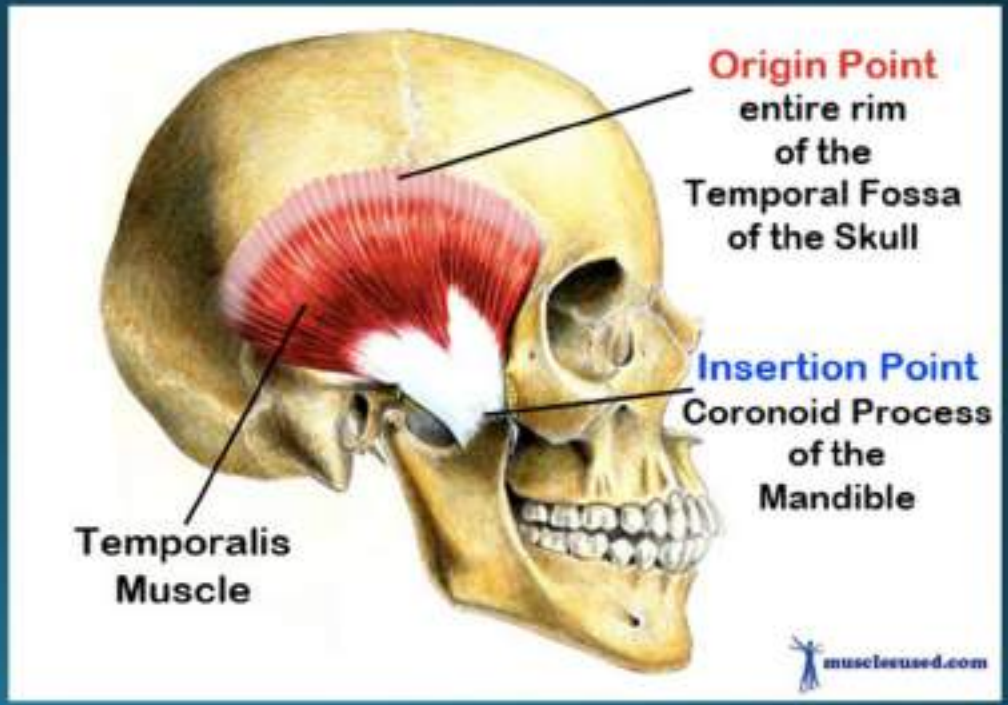
NERVE SUPPLY OF TMJ

MUSCLES OF MASTICATION

Muscle of Mastication	Origin	Insertion	Main Actions
Masseter: superficial head	• Inferior border of the anterior two thirds of the zygomatic arch	• Angle of mandible • Inferior and lateral parts of the mandibular ramus	• Elevates mandible • Protrudes mandible • Aids in lateral excursion of mandible
Masseter: deep head	• Medial border of the zygomatic arch • Inferior border of the posterior one third of the zygomatic arch	• Superolateral mandibular ramus • Coronoid process	
Temporalis	• Temporalis fossa, along the inferior temporal line, including the temporal fascia	• Coronoid process, extending inferiorly on the anterior border of the mandibular ramus	• Elevates mandible • Protrudes mandible • Aids in lateral excursion of mandible

ORIGIN & INSERTION OF MASSETER MUSCLE





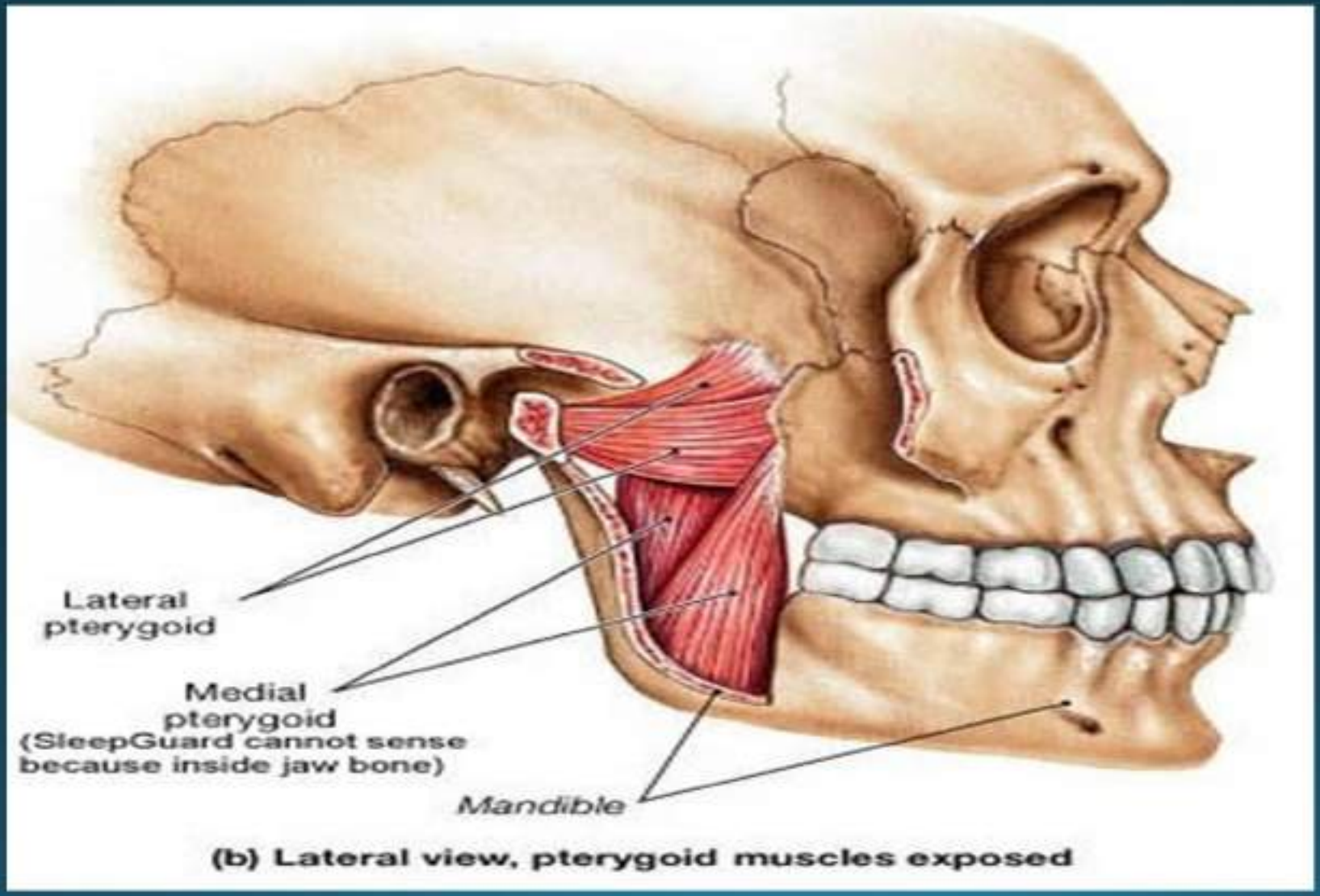
Masseter Muscle

Anterior superior portion

Posterior inferior portion

PALPATION OF TEMPORALIS MUSCLE

Muscle of Mastication	Origin	Insertion	Main Actions
Medial pterygoid: deep head	• Medial surface of the lateral pterygoid plate	• Medial surface of the ramus and the angle of the mandible	• Elevates mandible • Protrudes mandible • Lateral excursion of mandible
Medial pterygoid: superficial head	• Maxillary tuberosity	• Medial surface of the ramus and the angle of the mandible	• Elevates mandible • Protrudes mandible • Lateral excursion of mandible
Lateral pterygoid: upper head	• Greater wing of the sphenoid • Infratemporal crest	• Articular discs and the capsule of the temporomandibular joint	• Depresses mandible • Protrudes mandible • Lateral excursion of mandible
Lateral pterygoid: lower head	• Lateral surface of the lateral pterygoid plate	• Pterygoid fovea on the neck of the condyle	• Depresses mandible • Protrudes mandible • Lateral excursion of mandible



(b) Lateral view, pterygoid muscles exposed

Palpation of lateral pterygoid-

1. It can be palpated by using the index or little finger and placing it lateral to the maxillary tuberosity and medial to the coronoid process.

2. The finger presses upward and inward .

Palpation of medial pterygoid –

- The anterior part of the insertion can be palpated by placing finger at a 45^0 angle in the floor of patient's mouth.
- The opposite hand can be used extra-orally to palpate the posterior and inferior portions of the insertion.
- The body of the muscle can be palpated by rotating the index finger upward near to its origin to tuberosity.

EXAMINATION OF TMJ

HISTORY

- The detailed examination of TMJ should start with a carefully recorded history from the patient.

- A screening history, as part of the health history, may include questions such as:
- Do you have difficulty opening your mouth?
- Do you hear noises within your jaw joint?
- Do you have pain in or around your ears or your cheeks?
- Do you have pain when chewing, talking, or using your jaws?
- Do you have pain when opening your mouth wide or when yawning?
- Has your bite felt uncomfortable or unusual?
- Does your jaw ever lock or go out?
- Have you ever had an injury to your jaw, head, or neck? If so, when? How was it treated?
- Have you previously been treated for a temporomandibular disorder? If so, when? How was it treated?

PHYSICAL ASSESSMENT SHOULD INCLUDE THE FOLLOWING:

1. Palpation of the muscles of mastication.
2. Palpation and auscultation for TMJ sounds.
3. Range of mandibular movement.

PALPATION OF TMJ

TENDERNESS ON PALPATION

- Patient may complain of pain in or in front of ear.
- The index finger should be placed in the immediate preauricular area; gently applying pressure on the lateral pole/head of the condyle while the jaw is opened and closed.
- The level of pain and discomfort on each side should be assessed and compared.

JOINT SOUNDS

- There are two types of joint sounds to look out for:

- **Click:** single explosive noise
- **Crepitus:** continuous 'grating' noise.

- It is the continuous noise heard during jaw opening and closing movement of joint, often caused by the worn articulatory surfaces of the joint. This occurs commonly in patients with degenerative joint disease.

RANGE OF MOTION

- Range of motion is the only truly measurable parameter, of jaw movements since the others are more subjective.
- It is important to record jaw movement as means to assess rate and degree of movement, as it is to determine the severity of symptoms.

MOVEMENTS TO BE MEASURED ARE:

- Incisal opening: pain free limit, maximum forced.
- Mandibular deviation on pathway of opening.

Radiographic Examination

Radiographs provide information regarding the morphologic characteristics of the bony components of the joint. Certain functional relationship between the condyle and the fossa.

1. Panoramic view (OPG)
2. Transcranial view
3. Transpharyngeal projection
4. Transorbital projection
5. Tomography (CT SCAN)
6. Arthrography
7. Computed tomography
8. M.R.I.
9. Bone Scanning
10. CBCT

CLASSIFICATION OF TMJ DISORDERS

Classification Weldon E. Bell (1986)

- **Derangements of the condyle-disc complex**

a) Disc displacement
b) Disc dislocation with Reduction
c) Disc dislocation without Reduction

- **Structural Incompatibilities**

a) Adhesions/Adherences
b) Deviation in form
c) Subluxation
d) Spontaneous Dislocation

- **Inflammatory Disorders**

a) Synovitis/Capsulitis
b) Retrodiscitis
c) Arthritides
d) Inflammatory disorders of the associated structures

➢ Temporal tendonitis
➢ Stylomandibular ligament inflammation

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Table 7 Original Axis I RDC/TMD and validated Axis I DC/TMD with sensitivity (Sens.) and specificity (Spec.) values (Dworkin and LeResche 1992; Schiffman et al. 2014)

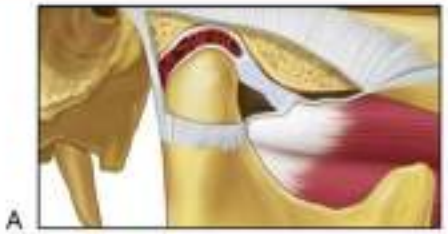
RDC/TMD (1992)	DC/TMD (2014)
I. Muscle disorders A. Myofascial pain B. Myofascial pain with limitation **II. Disk displacement disorders** A. Disk displacement with reduction B. Disk displacement without reduction with limited opening C. Disk displacement without reduction without limited opening **III. Arthralgia and other joint disorders** A. Arthralgia B. Osteoarthritis C. Osteoarthrosis	**I. Pain-related temporomandibular disorders** A. Myalgia (Sens. 0.90/Spec. 0.99) 1. Local myalgia 2. Myofascial pain 3. Myofascial pain with referral (Sens. 0.86/Spec. 0.98) B. Arthralgia (Sens. 0.89/Spec. 0.98) C. Headache attributed to TMD (Sens. 0.89/Spec. 0.87) **II.Intra-articular temporomandibular disorders** A. Disk displacement with reduction (Sens. 0.34/Spec. 0.92) B. Disk displacement with reduction with intermittent locking (Sens. 0.38 Spec. 0.98) C. Disk displacement without reduction with limited opening (Sens. 0.80/Spec. 0.97) D. Disk displacement without reduction without limited opening (Sens. 0.54/Spec. 0.79) E. Degenerative joint disease (Sens. 0.55/Spec. 0.61) F. Subluxation (Sens. 0.98/Spec. 1.00)

Derangements of the condyle-disc complex:

➢ **ETIOLOGY:**

- Elongation of the collateral ligaments
- Thinning of the posterior border of the disc
- Trauma

		CLINICAL FEATURES
Disc Displacement	• Elongation of collateral ligament • Thinning of posterior border of disc	• Joint sounds during opening and closing. • It is characterized by normal range of jaw movement.
Disc Dislocation with Reduction	• If the patient can so manipulate the jaw as to reposition the condyle onto the posterior border of the disc, the disc is said to be reduced.	• When opening reduces the disc, there is noticeable deviation in the opening pathway. • In some instances, a sudden loud pop can be heard during recapturing of the disc. • After the disc is reduced, a normal range of mandibular movement is present.
Disc Dislocation without Reduction	• When the disc is not reduced, the forward translation of the condyle merely forces the disc in front of the condyle.	• The maximum range of mandibular opening is 25-30 mm and when the patient attempts to open wide the mandible often deflects to the side of the involved joint. • This is common when condition is acute. When the condition is chronic, clinical picture is less clear.



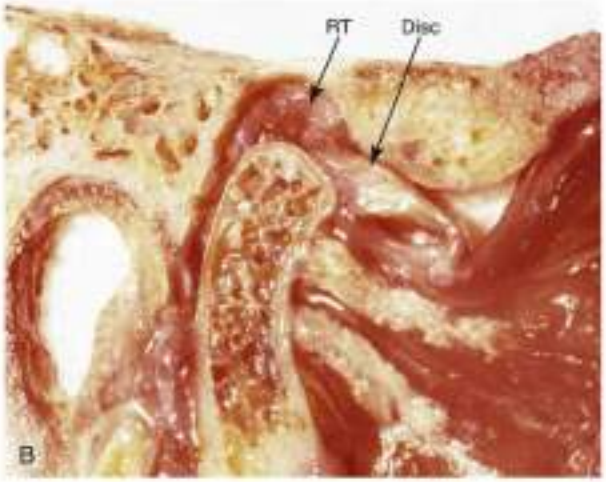
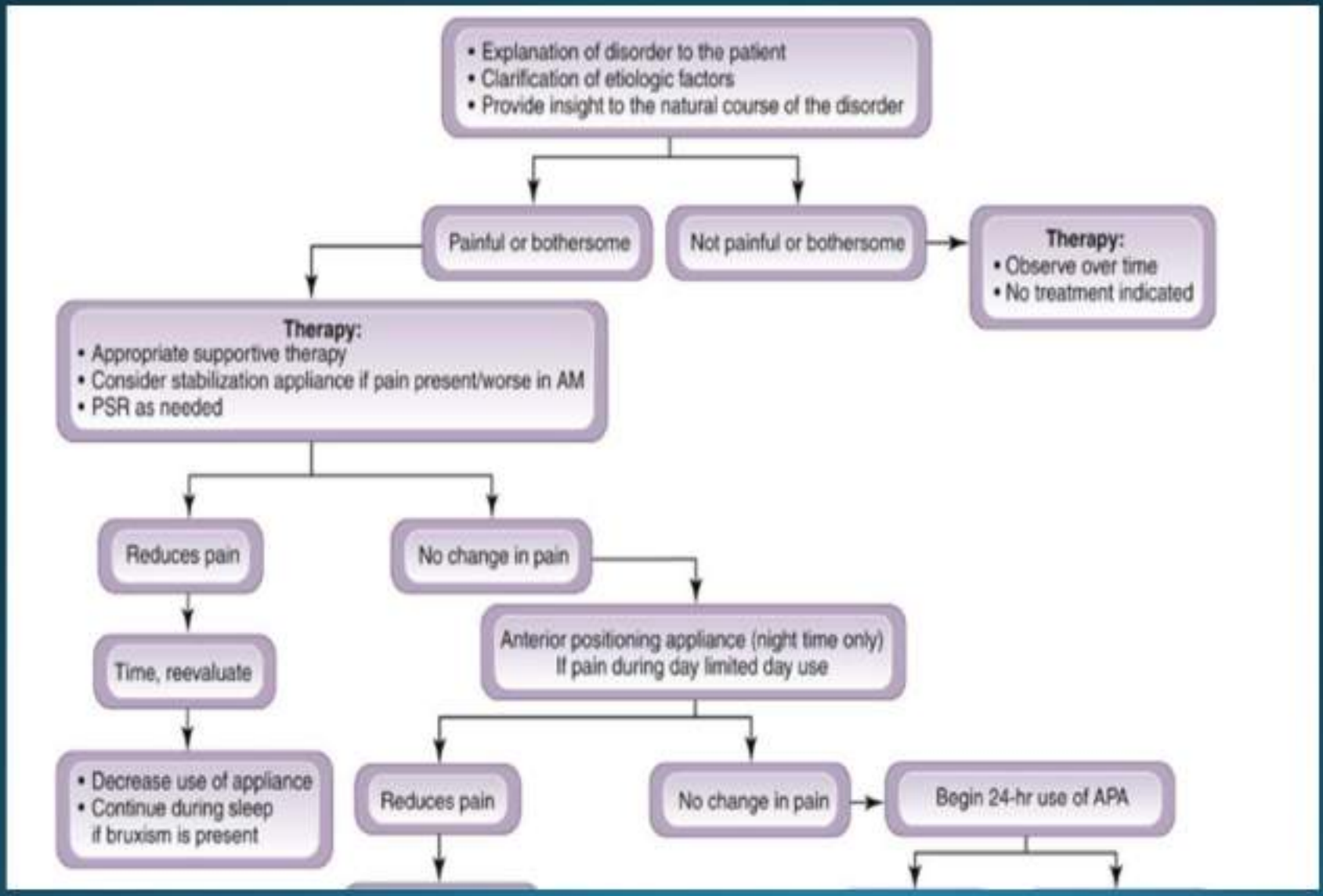
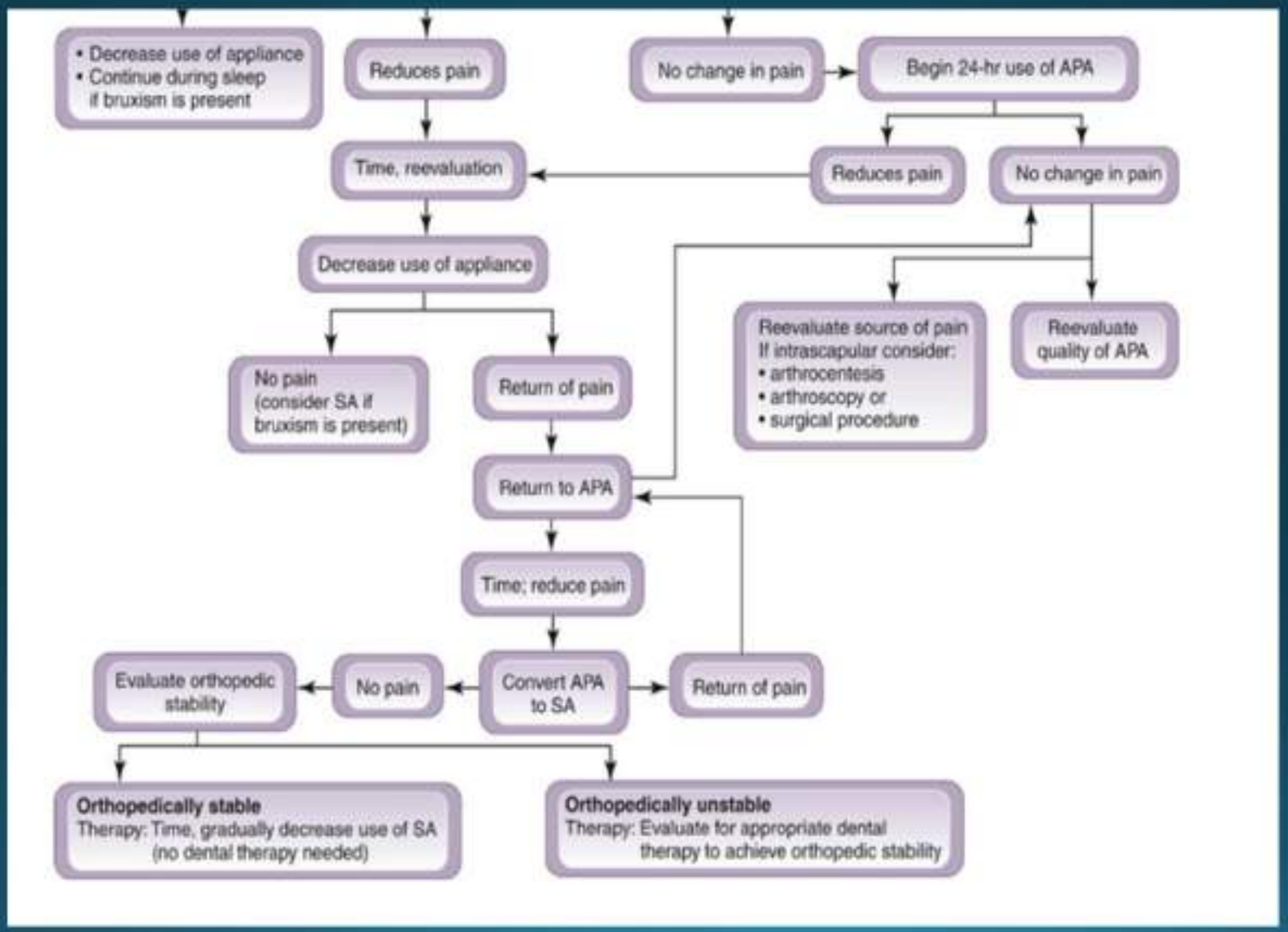


FIGURE 13-2 **A,** Anteriorly dislocated disc. The posterior border of the disc has been thinned and ligaments have been elongated allowing the disc to be dislocated through the discal space. The condyle now articulates on the retrodiscal tissues. **B,** This specimen depicts an anteriorly dislocated disc. (Courtesy of Dr. Terry Tanaka, Chula Vista, CA.)

TREATMENT FOR DISC DISPLACEMENT AND DISC DISLOCATION WITH REDUCTION


• Explanation of disorder to the patient
• Clarification of etiologic factors
• Provide insight to the natural course of the disorder
Painful or bothersome
Not painful or bothersome
Therapy:
• Observe over time
• No treatment indicated
Therapy:
• Appropriate supportive therapy
• Consider stabilization appliance if pain present/worse in AM
• PSR as needed
Reduces pain
No change in pain
Time, reevaluate
Anterior positioning appliance (night time only)
If pain during day limited day use
• Decrease use of appliance
• Continue during sleep
if bruxism is present
Reduces pain
No change in pain
Begin 24-hr use of APA


• Decrease use of appliance
• Continue during sleep if bruxism is present
Reduces pain
No change in pain
Begin 24-hr use of APA
Time, reevaluation
Reduces pain
No change in pain
Decrease use of appliance
Reevaluate source of pain If intrascapular consider:
• arthrocentesis
• arthroscopy or
• surgical procedure
Reevaluate quality of APA
No pain (consider SA if bruxism is present)
Return of pain
Return to APA
Time; reduce pain
Evaluate orthopedic stability
No pain
Convert APA to SA
Return of pain
Orthopedically stable
Therapy: Time, gradually decrease use of SA (no dental therapy needed)
Orthopedically unstable
Therapy: Evaluate for appropriate dental therapy to achieve orthopedic stability

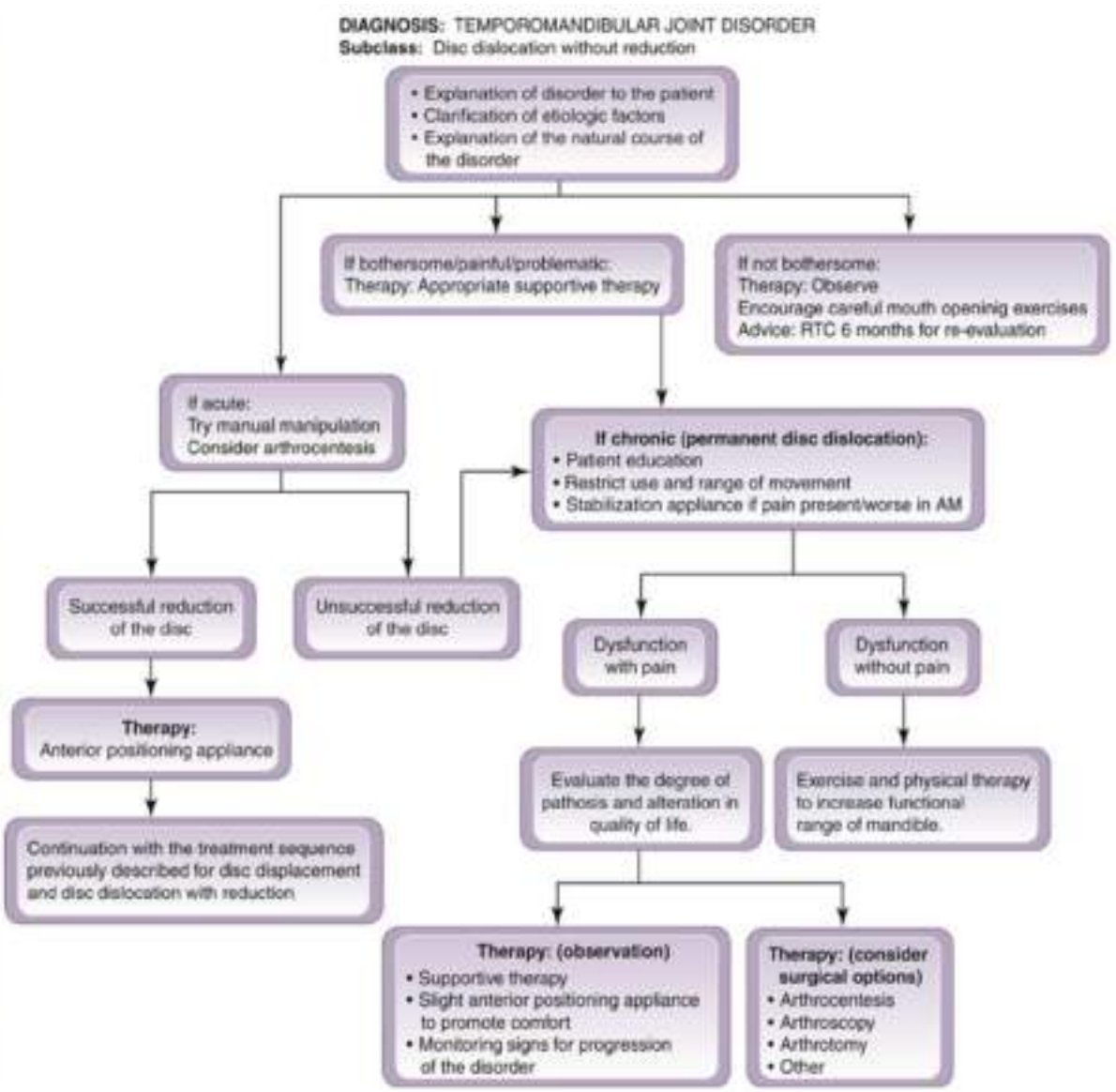


FIGURE 13-13 Diagnostic algorithm of temporomandibular joint disorders (subclass: derangement of the condyle-disc complex—disc dislocation without reduction).

Structural incompatibilities of the articular surfaces

	ETIOLOGY	CLINICAL FEATURES
Deviation in Form	• Caused by actual changes in the articular surfaces. • This may include flattening of the condyle or fossa or bony protuberance of the condyle. • Changes in the form of disc includes both thinning of the borders and perforations.	• Most deviations in form cause dysfunction at a particular point of movement. • During opening dysfunction is observed during mandibular separation.

	ETIOLOGY	CLINICAL FEATURES	TREATMENT
Adherences/Adhesions	• Adherence refers to the temporary sticking of the articular surfaces and commonly results from prolonged static loading of the joint structures. • If the adherence is not freed, the condition may become permanent and is described as adhesions. • These are produced by the development of fibrotic connective tissue between the articular surfaces.	• Adherences present with temporary restriction in mouth opening until the click occurs while adhesions present with a more permanent limitation in mouth opening • It may or may not be associated with pain. • Pain may be present when an attempt is made to open the mouth beyond the limit.	➢ **DEFINITIVE TREATMENT:** • patient awareness and physical self-regulation techniques. • Stabilization appliance for decreasing the muscle hyperactivity. • When adhesions are present, surgical procedures like arthroscopic surgery can be performed. ➢ **SUPPORTIVE TREATMENT:** • Passive stretching of the joint. • Patient education • Limit the mouth opening

FIGURE 13-16 **A-C,** Posterior dislocation of the disc secondary to an adhesion between the superior surface of the disc and the fossa.

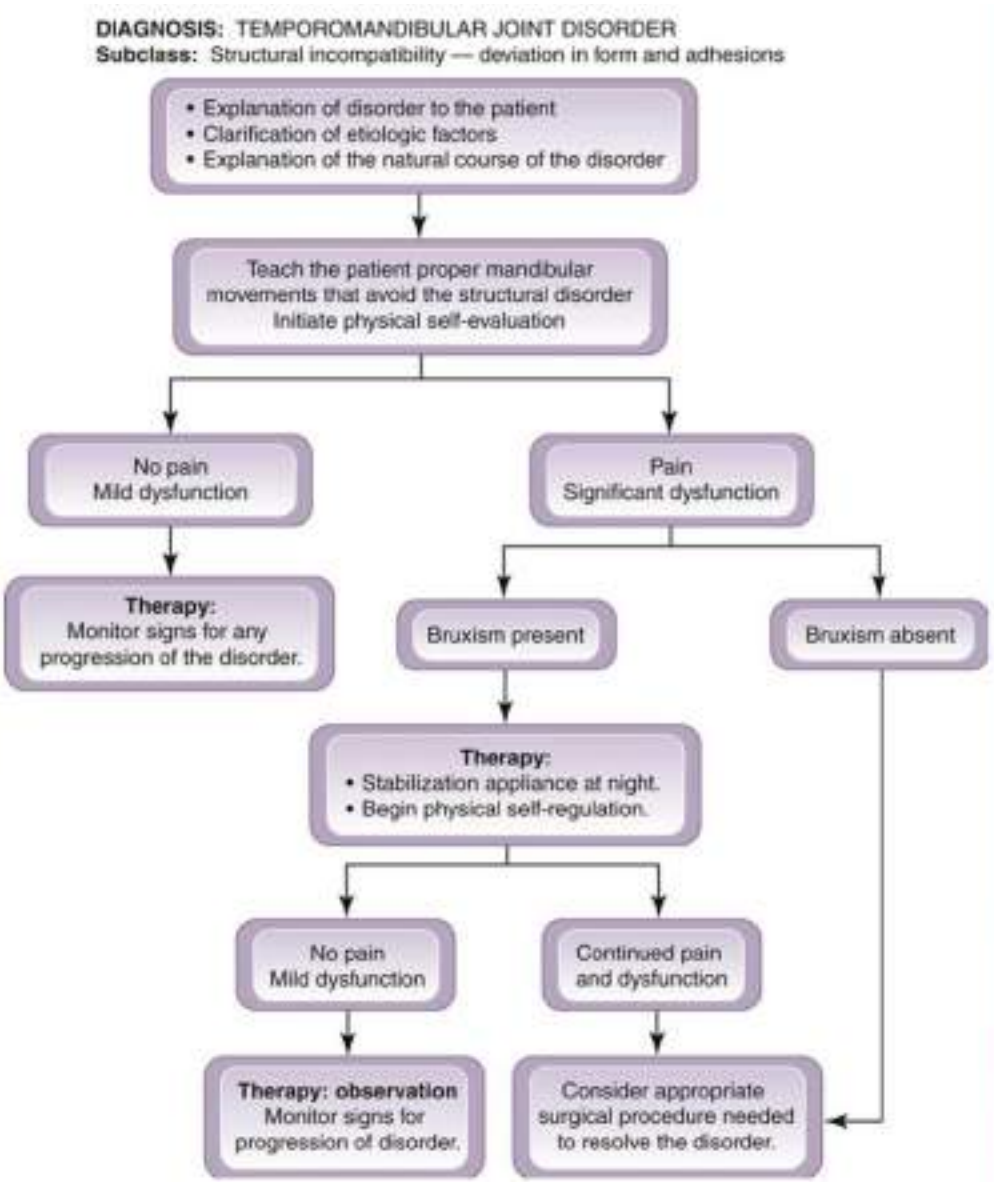


FIGURE 13-15 Diagnostic algorithm of temporomandibular joint disorders (subclass: structural incompatibility—deviation in form and adhesions).

	ETIOLOGY	CLINICAL FEATURES	TREATMENT
Subluxation (hypermobility) It represents a sudden forward movement of condyle as the condyle moves beyond the crest of the eminence, it appears to jump forward to the wide-open position.	• Steep short posterior slope of the articular eminence. • It results when the disc is maximally rotated on the condyle before full translation of the condyle-disc complex occurs.	• During the opening of mouth, the condyle can be seen to suddenly jump forward. • It is reported as thud sensation.	➢ **DEFINITIVE TREATMENT:** • Surgical alteration of the joint by eminectomy, which reduces the steepness of the articular eminence. ➢ **SUPPORTIVE THERAPY:** • Patient education • Use of intra-oral device to limit the mouth opening for 2 months.

	ETIOLOGY	CLINICAL FEATURES	TREATMENT
Spontaneous Dislocation (open lock)	• Prolonged wide open mouth procedures. • When the mouth opens to its full extent, the condyle is translated to its anterior limit. • If the condyle moves beyond this limit, the disc can be forced through the disc space and trapped in this anterior position.	• The patient remains in a wide-open mouth condition. • Pain is commonly present in an attempt to close the mouth.	• Place the thumbs on the occlusal surface of posterior teeth and with the index fingers on the inferior border of the mandible, pushing down while at the same time guiding the jaw slowly back into its posterior position.

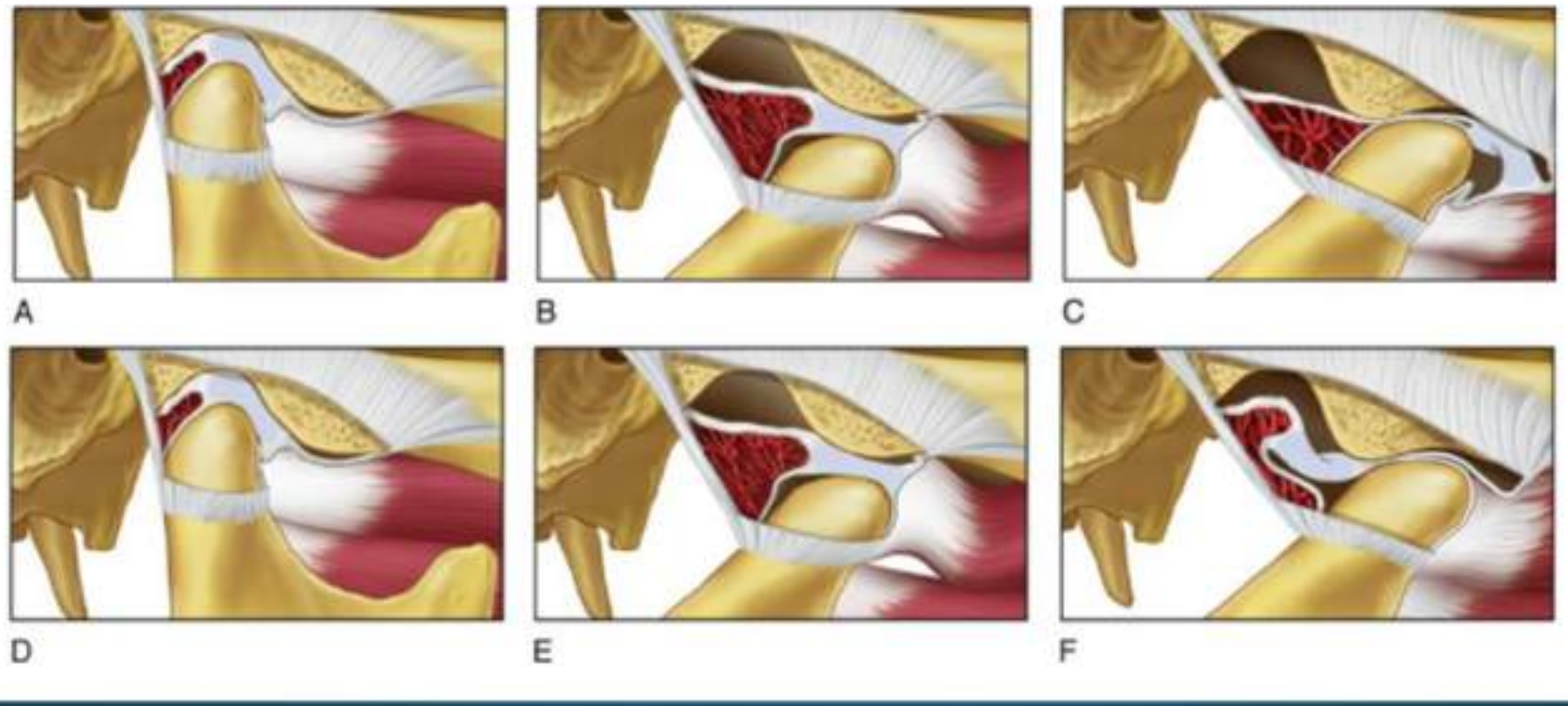
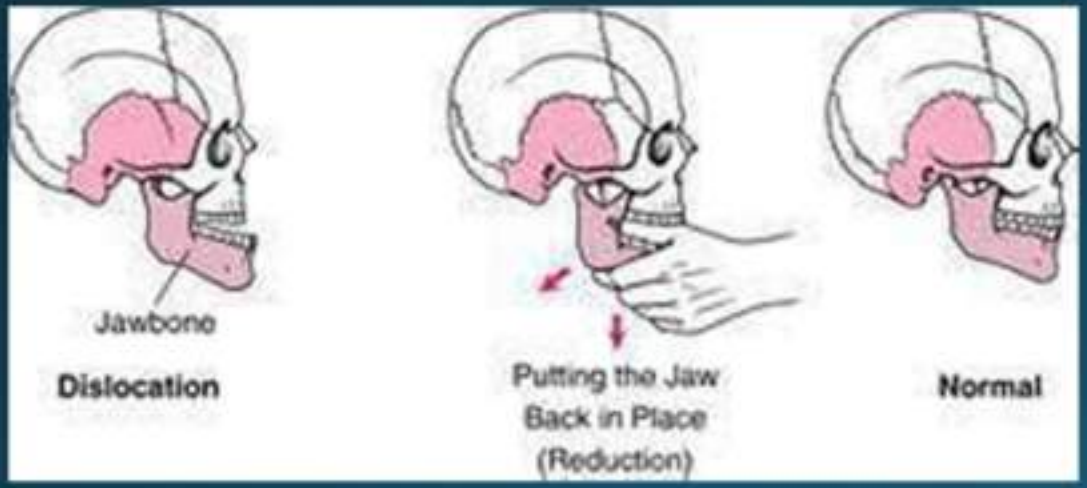
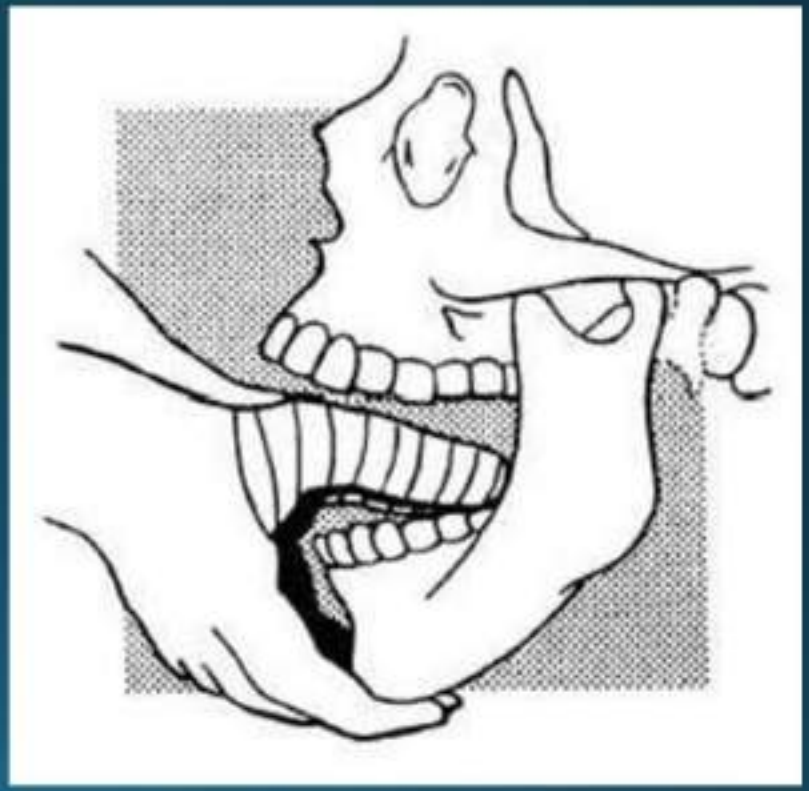


FIGURE 13-21 **A-C,** Spontaneous dislocation of the TMJ results in an "open lock," with the disc dislocated anterior to the condyle. **D-F,** This represents a spontaneous dislocation with the disc dislocated posterior to the condyle.


Jawbone
Dislocation
Putting the Jaw
Back in Place
(Reduction)
Normal



Inflammatory joint disorders:

	ETIOLOGY	CLINICAL FEATURES
Osteoarthritis : It represents a destructive process by which the bony articular surfaces of the condyle and fossa become altered.	• It is considered as a body's response to increased loading of the joint. • Acute trauma. • Loss of normal lubrication within the joint.	• Limited mandibular opening • Joint pain. • Crepitation • The diagnosis can be confirmed by radiographs.

DEFINITIVE TREATMENT

- Anterior repositioning appliance: to correct the condyle-disc relationship
- Stabilization appliance: when muscle hyperactivity is suspected, it is indicated to decrease the loading force

Jeffrey P. Okeson, Management of Temporomandibular Disorders and Occlusion, 7th Edition

Kalladka, M., Quek, S., Heir, G., Eliav, E., Mupparapu, M., & Viswanath, A. (2014). Temporomandibular joint osteoarthritis: diagnosis and long-term conservative management: a topic review. *The Journal of Indian Prosthodontic Society*, *14*(1), 6-15.

	ETIOLOGY	CLINICAL FEATURES	TREATMENT
Rheumatoid Arthritis	• Autoimmune disorder with a strong genetic factor	• Usually bilateral • Pain in early acute phase • Morning stiffness • Joint sounds • Limited mouth opening	• Since, etiology is unknown so there is no definitive treatment for RA. • But for supportive therapy stabilization appliance can be given to the patient to decrease the forces on the articular surfaces.

	ETIOLOGY	CLINICAL FEATURES	TREATMENT
Disease associated with crystal deposits in joints	• Gout: includes deposition of uric acid crystals in synovial joint • Pseudogout: deposition of calcium pyrophosphate in synovial joint	• TMJ is less commonly affected • Pain may or may not increase with movement	➢ **DEFINITIVE TREATMENT:** uric acid level must be lowered in the serum. This can be done by making changes in the diet. ➢ **SUPPORTIVE TREATMENT:** there is no supportive therapy for gout.

Developmental defects

APLASIA OF CONDYLE

Failure of development of condyle

Unilateral/ bilateral

Related defects : absent external ear, underdeveloped mandibular ramus or macrostomia.

If the condylar aplasia is unilateral there is obvious facial asymmetry, both occlusion and mastication may be altered.

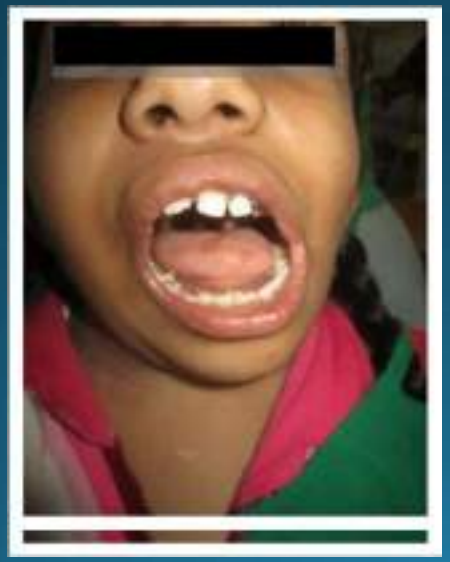
A shift of mandible may occur during opening.

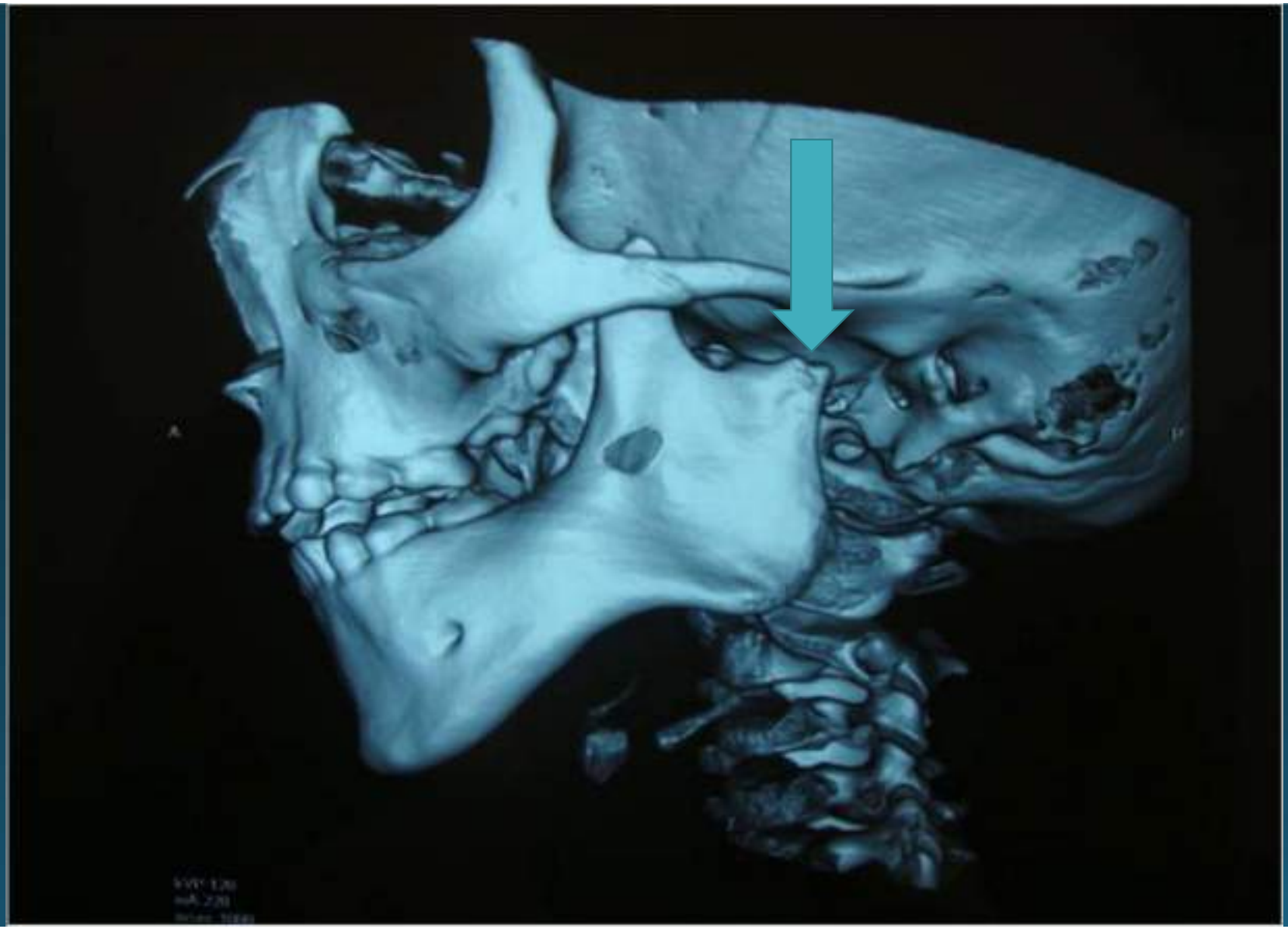
Bilateral: shift is not present.

TREATMENT:

Osteoplasty, if the de-arrangement is severe and correction of malocclusion by orthodontic appliances.

If the patient exhibits little difficulty, surgical intervention is not warranted, although cosmetic surgery may aid in correcting facial deformity.



HYPOPLASIA OF CONDYLE

ETIOLOGY:

- May be due to interference with the normal development of the condyle.
- Forceps deliveries that cause traumatic birth injury.
- External trauma to the condylar area in young children.
- X- ray radiation over the TMJ area for local treatment of skin lesions.

Infection spreading locally form the dental area or by the hematogenous route from a distant site.

Inflammation or circulatory disorders in proximity to an epiphysis may result in a severe disturbance in growth.

Endocrine and vitamin derangements.

CLINICAL FEATURES:

- Depends upon weather the disturbance has affected one or both the condyles and upon the degree of the malformation.
- Directly related to the age of the patient and the time the involvement occurred.
- Unilateral involvement is most common clinical type.

- Facial asymmetry, with limited lateral excursion, exaggeration of the antigonial notch of the mandible on the involved side.
- Lack of downward forward growth of body of mandible.
- Growth frequently persist in the condyle until the age of 20 years.

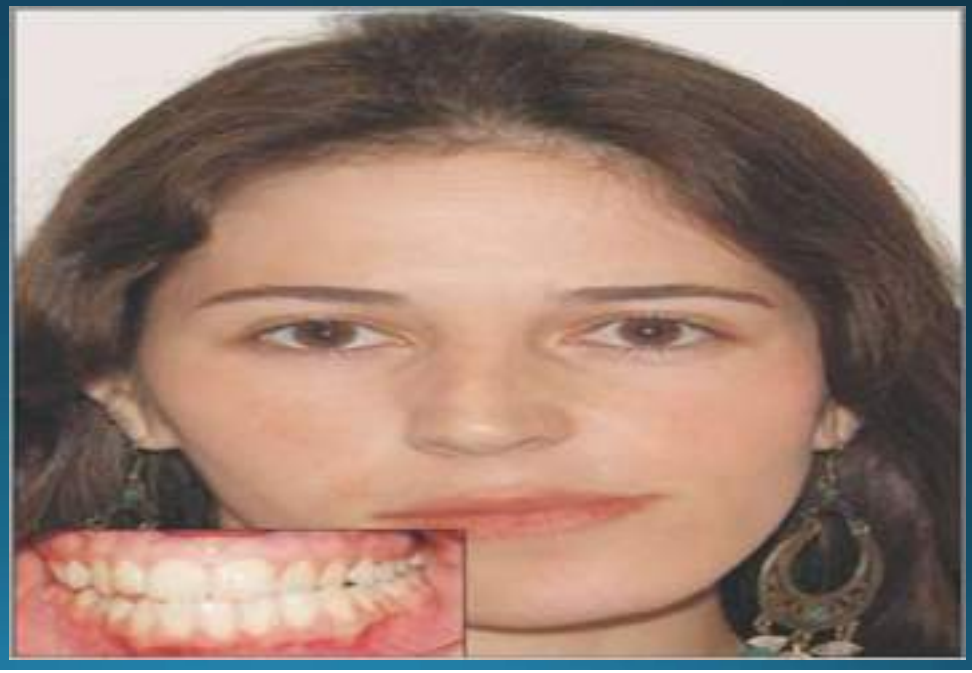
TREATMENT AND PROGNOSIS:

- Condylar hypoplasia is a difficult problem since there are no available means of stimulating its growth locally or compensating for its failure.
- Cartilage or bone transplant have been used to build up the underdeveloped parts.
- Unilateral/ bilateral sliding osteotomy, to improve the appearance of the patient.

HYPERPLASIA OF CONDYLE

- Unilateral elongation of condyle.
- Deviation of face.
- During opening TMJ produce mild to moderate sound which increases as the age advances.

Fig. 1. Facial asymmetry due to left cheek swelling.



Clinical Features:

- Unilateral, slowly progressive elongation of the face with deviation of the chin away from the affected side.
- Enlarged condyle may be clinically evident or palpated and presents a striking roentgenographic appearance.
- Joint may or may not be painful.
- A severe malocclusion is usual sequel of the condition.

Treatment:

- Resection of the condyle.
- Growth arresting procedures
- high condylectomy.

This is generally sufficient to restore normal occlusion, although complete correction of the facial asymmetry may not be accomplished by this procedure.

- Bimaxillary orthognathic surgeries can be the final resort.

FRACTURE

- Fractures of the condylar head and neck often result from a blow to the chin.
- The patient with a condylar fracture usually presents with pain and edema over the joint.
- There is limitation and deviation of the mandible to the injured side on opening.
- The diagnosis can be confirmed by diagnostic imaging.

TREATMENT:

- conservative
- closed reduction
  - intermaxillary fixation
  - splints
- open reduction

Early mobilization of the mandible is emphasized to prevent bony or fibrous ankylosis.

In cases of ankylosis treatment surgical correction for ankylosed joint is required.

CHRONIC MANDIBULAR HYPOMOBILITY

ANKYLOSIS

Sometimes the intracapsular surfaces of the joint develop adhesions that prohibit the normal movement. This is called as ANKYLOSIS.

ETIOLOGY
• **Trauma**: At birth, blow to the chin, condylar fracture • **Infections & Inflammatory**: Rheumatoid arthritis, osteoarthritis • **Systemic disease**: Typhoid, syphilis • **Others**: Malignancies, post surgery, post radiation therapy

CLINICAL FEATURES

- Facial deformity
- Inability to open the jaws
- Flatness or fullness on affected side
- In unilateral ankylosis, the lower jaws shifts towards the affected side on opening of the mouth

UNILATERAL ANKYLOSIS

BILATERAL ANKYLOSIS

CLASSIFICATION OF ANKYLOSIS

- LOCATION
  - Intra-articular
  - Extra-articular
- TYPES OF TISSUES INVLOVED
  - Bony
  - Fibrous
  - Fibro-osseous
- EXTENT OF FUSION
  - Complete
  - Incomplete
- SIDES INVOLVED
  - Unilateral
  - **B**ilateral

DEFINITIVE TREATMENT

- If some movement is present, then no definitive treatment is required.
- But if restriction is intolerable then surgery is indicated.

SUPPORTIVE TREATMENT

- If pain and inflammation is present, voluntarily restricting movement within painless limits is indicated along with analgesics and deep heat therapy.

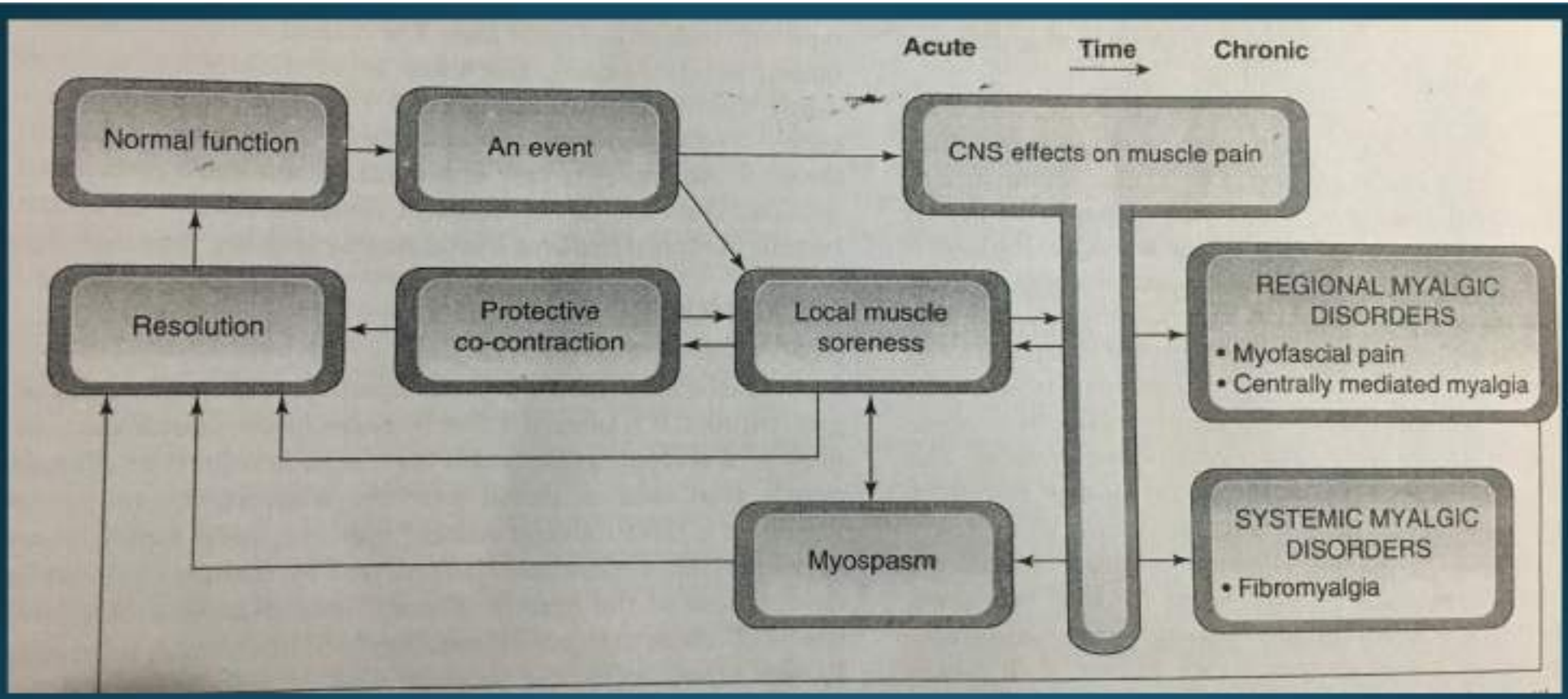
SEQUELAE OF UNTREATED ANKYLOSIS

- Normal facial growth and development affected
- Speech impairment
- Nutritional impairment
- Malocclusion
- Poor oral hygiene
- Multiple carious and impacted teeth

MASTICATORY MUSCLE DISORDERS :

- The most frequent of patients with functional disturbances of the masticatory system is muscle pain.
- Patient most commonly report that the pain is associated with the functional activity such as, chewing, swallowing, and speaking.
- Various masticatory muscle disorders:

1. Protective co-contraction
2. Local muscle soreness
3. Myofascial pain
4. Myospasm
5. Myofascial pain dysfunction syndrome



A MASTICATORY MUSCLE DISORDER

Protective co-contraction(muscle splinting)

- The first response of the masticatory muscles is protective co-contraction.
- This is the CNS response to injury or threat of injury.
- When protective co-contraction occurs, the CNS increases the activity of the antagonist muscle during contraction of the agonist muscles.
- One should remember that protective co-contraction is not a pathologic condition but a normal physiologic response of the musculoskeletal system.

- ETIOLOGY: The following events are responsible for protective co-contraction.

1. Aleterd sensory input.
2. The presence of constant deep pain input.
3. Increased emotional stress.

- HISTORY:
- The key to identifying protective co-contraction is that it immediately follows an event; therefore the history is very important.

- Protective co-contraction remains for only few days. If it is not resolved , local muscle soreness is likely to occur.

- The history will reveal one of the following:

1. A recent alteration in ;local structures.
2. A recent source of constant pain.
3. A recent increase in emotional stress.

- CLINICAL CHARACTERSTICS:

1. Structural dysfunction
2. No pain at rest
3. Increased pain with function
4. Feeling of muscle weakness

TREATMENT:

- Definitive Treatment -
- It is important for the clinician to remember that co-contraction is normal CNS response.
- The treatment should be directed toward the reason for contraction.
- When co-contraction results from trauma, definitive treatment is not indicated, since the etiological factor is no longer present.

- When co-contraction occurs from the introduction of a poorly fitting restoration, the treatment consists of altering the restoration.

- Supportive Treatment-
- Restrict use of mandible(within painless limits)
- A soft diet
- Analgesics

Local Muscle Soreness

- This is primary noninflammatory myogenous pain disorder.
- It is often a first response of muscle tissue to continued co-contraction.
- This acute muscle disorder is the most common muscle pain condition.
- This condition represents a change in local environment of the muscle tissues.

- ETIOLOGY:

1. Protracted co-contraction
2. Deep pain input
3. Trauma
4. Increased emotional stress

- HISTORY:

1. The pain began several hours/days following an event associated with protective co-contraction.
2. The pain began secondary to another source of deep pain.
3. The pain began associated with tissue injury.
4. A recent episode of increased emotional stress.

- CLINICAL CHARACTERISTICS:

1. Structural dysfunction
2. There is minimal pain at rest.
3. The pain increases with function.
4. Actual muscle wealness present.
5. There local tenderness when the involved muscles are palpated.

TREATMENT

- Definitve Treatment-
- Since local muscle soreness produces deep pain, which often creates secondary protective co-contraction, cyclic muscle pain may develop over time.

- Therefore, primary goal of treating this condition is to decrease sensory input to CNS.

- Decrease in sensory input is achieved by the following steps:

1. Eliminate any ongoing altered sensory input.
2. Eliminate any ongoing source of deep pain input.
3. Provide patient education and information on self management.
4. If the therapies fail to resolve the pain, then clinician may consider the use of analgesics.

Supportive Therapy:

- Supportive therapy for local muscle soreness is directed towards reducing pain and restoring normal function.
- When analgesics are used, the patient should be warned(No automobile driving).
- Gentle massage may also be helpful.
- Relaxation therapy may also be helpful.

Myospasm

- It is an involuntary CNS induced tonic muscle contraction.

- Muscle sapsm in muscle spasm in muscle of mastication, this condition is not common.

- ETIOLOGY:

1. Local muscle condition
2. Idiopathic myospasm mechanism
3. Deep pain input

- HISTORY:
- The reported a sudden onset of restricted jaw movement usually accompanied by muscle rigidity.

- CLINICAL CHARACTERSTICS:

The following characteristics are associated with myospasms:

1. Structural dysfunction
2. Pain at rest
3. Pain is increased with function
4. Affected muscle is firm and painful to palpation.
5. Generalized feeling of significant muscle tightness.

TREATMENT

- Two treatments are suggested for acute myospasm:

✓The first is directed immediately toward reducing the spasm.

✓The second addresses the etiology.

- Myospasm are best treated by reducing the pain.

- Reduction of pain can be achieved by manual massage, ice, or even ana injection of local anesthetic into muscle.

- Supportive Therapy-

✓Physical therapy techniques are the key to managing myospasms.

✓Soft tissue mobilization such as deep massage is an important immediate treatment.

MPDS
(myofacial pain dysfunction syndrome)

- Painful condition of the skeletal muscles.
- The muscles of mastication are primarily involved, and condition is characterized by a unilateral dull, aching pain which increases with muscular use.
- Common complaints associated with referred pain include headache, otalgia, tinnitus, burning tongue, decreased hearing.
- MPDS is characterized by the development of trigger points.

- Factors which cause trigger points to activate are as follows:

1. Sudden trauma to musculoskeletal tissues(muscles, ligaments, tendons)
2. Excessive exercise
3. Chilling of areas of the body
4. Injury to intervertebral discs
5. Systemic conditions (e.g., gall bladder inflammation, heart attack, appendicitis, stomach irritation)
6. Lack of activity (e.g., a broken arm in a sling)
7. Muscle strain due to over activity and generalized fatigue

TABLE 10 Initial Treatment of Myofascial Pain

Treatment Component	Description
Education	Explanation of the diagnosis and treatment Reassurance about the generally good prognosis for recovery and natural course Explanation of patient's and doctor's roles in therapy Information to enable patient to perform self-care
Self-care	Eliminate oral habits (eg, tooth clenching, chewing gum) Provide information on jaw care associated with daily activities
Physical therapy	Education regarding biomechanics of jaw, neck, and head posture Passive modalities (heat and cold therapy, ultrasound, laser, and TENS) Range of motion exercises (active and passive) Posture therapy Passive stretching, general exercise and conditioning program

Intraoral appliance therapy	Cover all the teeth on the arch the appliance is seated on Adjust to achieve simultaneous contact against opposing teeth Adjust to a stable comfortable mandibular posture Avoid changing mandibular position Avoid long-term continuous use
Pharmacotherapy	NSAIDs, acetaminophen, muscle relaxants, antianxiety agents, tricyclic antidepressants
Behavioral/relaxation techniques	Relaxation therapy Hypnosis Biofeedback Cognitive-behavioral therapy

NSAIDs = nonsteroidal anti-inflammatory drugs; TENS = transcutaneous electrical nerve stimulation.

➢ TREATMENT

definitive treatment:

- Spray and stretching of the muscles involved
- Injections of local anesthetic directly into the trigger points.
- Physical therapy
- Exercise (swimming and walking are excellent)

Supportive therapy:

- Improvement of nutrition
- Non-steroidal anti-inflammatory drugs
- Muscle relaxants
- Biofeedback
- Counseling

Centrally mediated myalagia (Chronic Myositis)

- It is a chronic, continuous muscle pain disorder originating predominantly from CNS effects that are felt in the muscle tissues.

➢ **Etiology:**

- Continued source of deep pain input
- Chronic upregulation of the autonomic nervous system
- Chronic exposure to emotional stress

➢ **History:**

- The patient reports of constant myogenous pain condition usually associated with a prolonged history of muscle complaints (for months and even years).

➢ **Clinical characteristics:**

- Structural dysfunction.
- Significant pain at rest .
- Pain is increased with function.
- There is generalized feeling of muscle tenderness.
- Significant pain to muscle palpation.
- Lack of use of muscle owing to pain may induce muscle atrophy or myostatic / myofibrotic contracture.

TREATMENT

definitive treatment:

- Restrict use of the mandible within painless limits.
- Avoid exercise and/or injections.
- Disengage the teeth.
- Begin using an anti-inflammatory medication.
- Consider management of sleep.
- For treatment of central sensitization, anticonvulsant medications such as gabapentin or pregabalin can be prescribed.

Supportive treatment:

- Moist heat, ice seems to be helpful for some patients.
- Ultrasound therapy.
- Gentle isometric exercises.
- Passive stretching.

Centrally generated motor disorders

➢**SLEEP BRUXISM:**

- Bruxism is a parafunctional activity which involves gnashing or grinding of teeth, usually in repeated eccentric positions.

❑Management considerations:

- Occlusal appliances
- Low dose of tricyclic depressants

➢**DAY CLENCHING:**

- It is a parafunctional activity associated with loading of the teeth in static relationship and often occurs during the waking hours.

❑Management considerations:

- Cognitive awareness and after self realization is achieved, postural position where the tongue is resting in the floor of mouth and teeth separated.


THANK
YOU