ARTICULATIO TEMPOROMANDIBULARIS

Temporomandibular joint

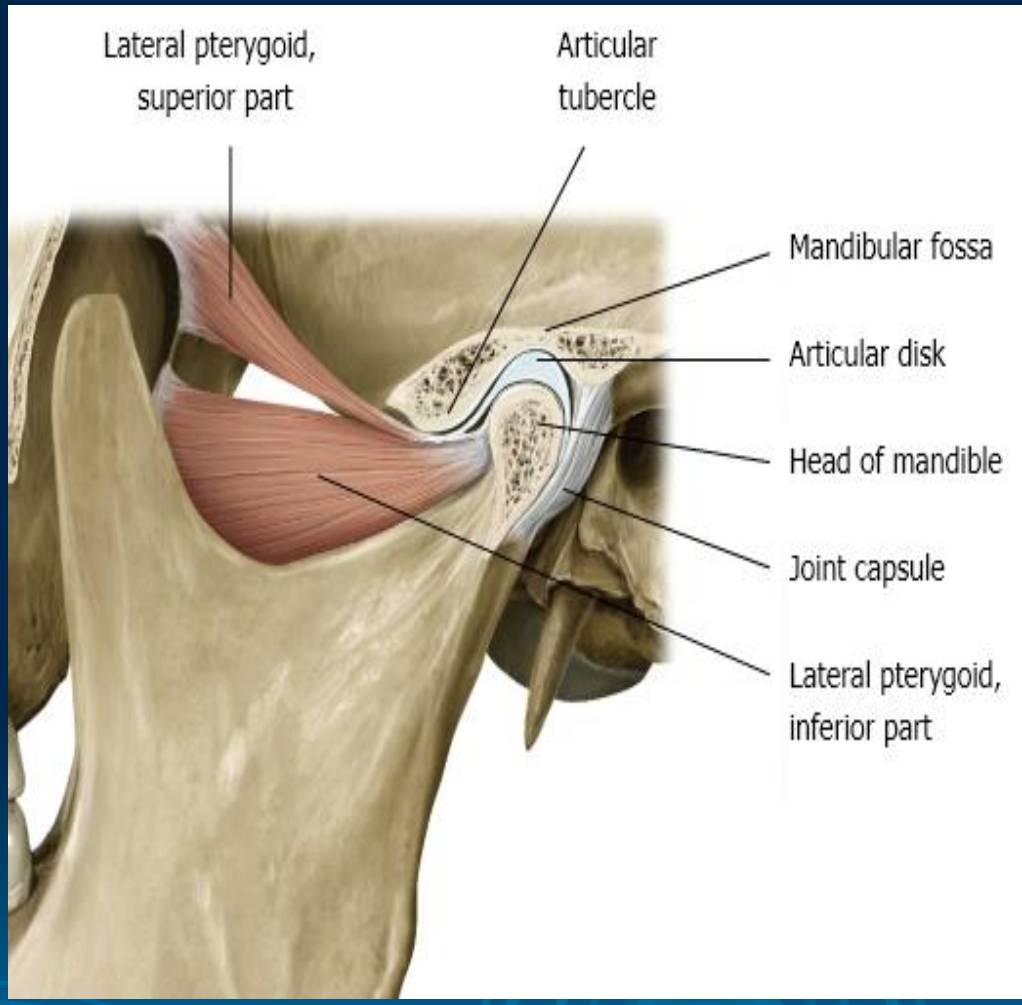
- paired joint, one on each side of the head, in which mandibula connects with the skull basis

- Allows movement of the mandible for speech and mastication

- one of the most frequently used articulation in the body

- Adaptable

- composed joint, complicated mechanism of movement



1. JOINT SURFACES
2. JOINT CAPSULE
3. DISCS OF THE JOINT
4. LIGAMENTS
5. JAW MOVEMENTS
6. EXAMINATION OF THE JOINT
7. TOPOGRAPHY RELATIONSHIP

1. JOINT SURFACES

- **Caput mandibulae,** mand. Condyle head
- **Fossa mandibularis** (articular fossa, joint pit) with sharper ridge posteriorly–**postglenoid proccess**
- **Tuberculum articulare** ossis temporalis – articular eminence

Dorsal part of the joint pit is pars tympanica ossis temporalis – ATM therefore has a very narrow connection to the tympanic cavity and to meatus acusticus externus
Articular surfices are covered by fibrous cartilage

Joint pit – dorsally concave, ventr. convex

Intercondylar angle 150°- 180°

2. JOINT CAPSULE

- Cone-shaped

- **On temporal bone** its attached to the margins of joint surfaces,
on mandibula it reaches to collum mandibulae

- Relatively free,
the medial and lateral walls are reinforced by the medial and lateral ligaments

- two layers – fibrous and synovial

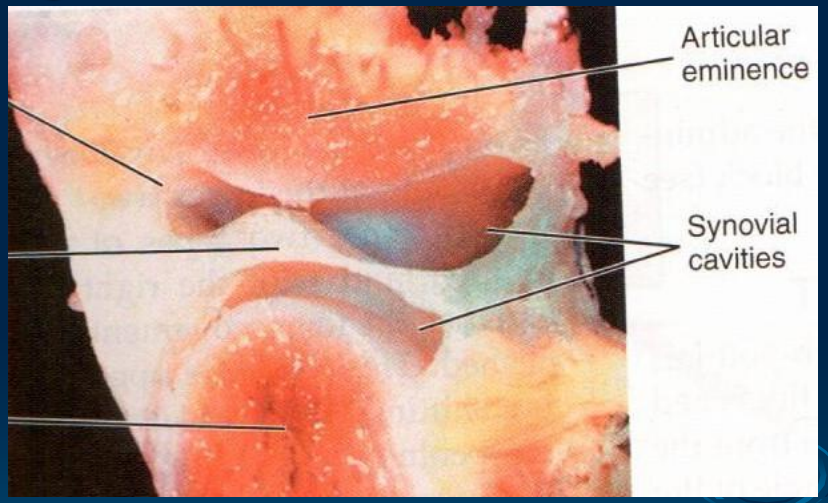
- The superior capsular attachments are relatively loose, it wraps temporal bone´s articular eminence and articular fossa

- The inferior attachments are more tightly bound, to the condyle´s neck

- The inner surfaces are covered by synovial membrane → produces synovial fluid (viscous liquid) → which hepls to lubricate the joint, brings nutrients to avascular cartilage and it reduces a friction during movements

3. DISC OF THE JOINT

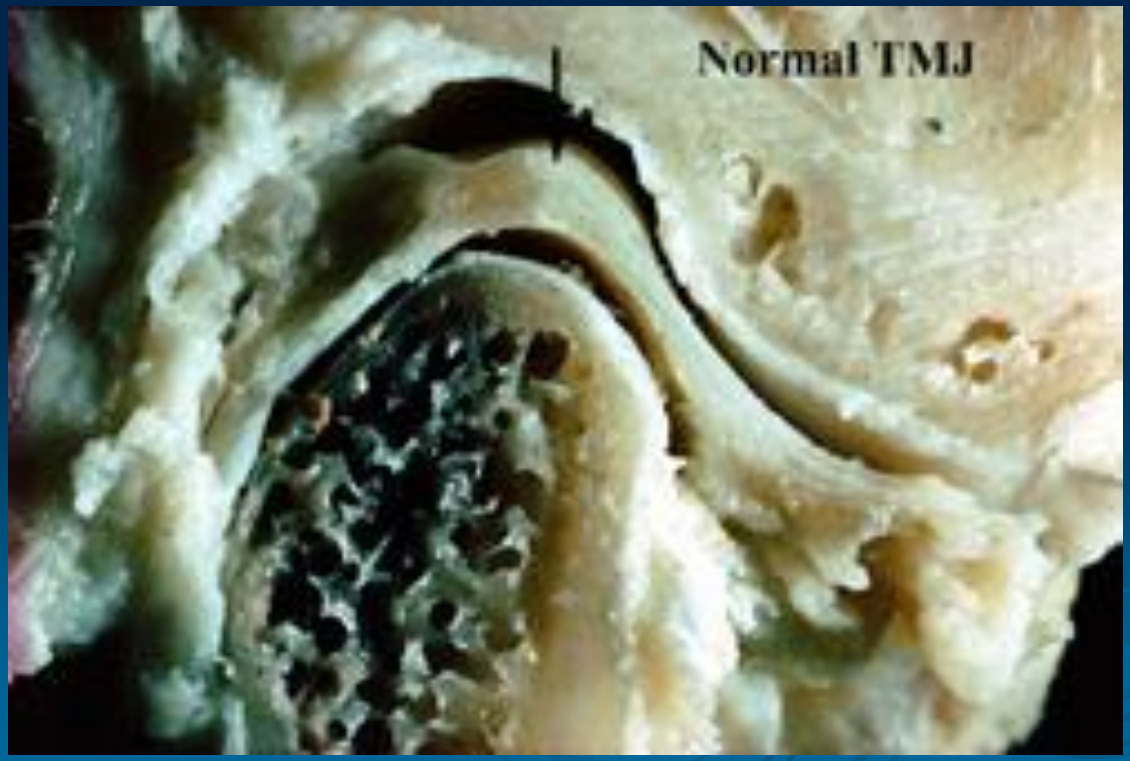
- Discus articularis, inserted between mandibular head, mandibular fossa and articular tubercle
- An oval, firm, plate of fibrous cartilage
- Reduces sliding friction



- Fully separates the joint cavity, capsule is connected to its joint margins, and divides ATM into 2 joints – 2 synovial cavities

Articular surfaces are completely separated by disc to:

1. cranial / upper compartment
   discotemporal joint
2. caudal / lower compartment
   discomandibular joint

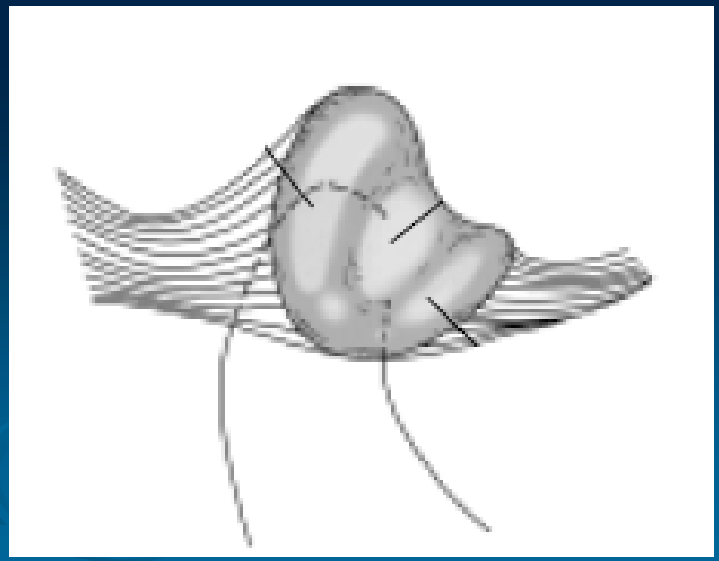


- Disc is biconcave with fibrocartilaginous structure

- Matrix of disc consists primally of colagen and elastic fibres

- In the pars anterior and posterior run transverse collagens fibres

- Based upon the function it is divided into anterior, intermedia and posterior partes



Attachment of articular disc

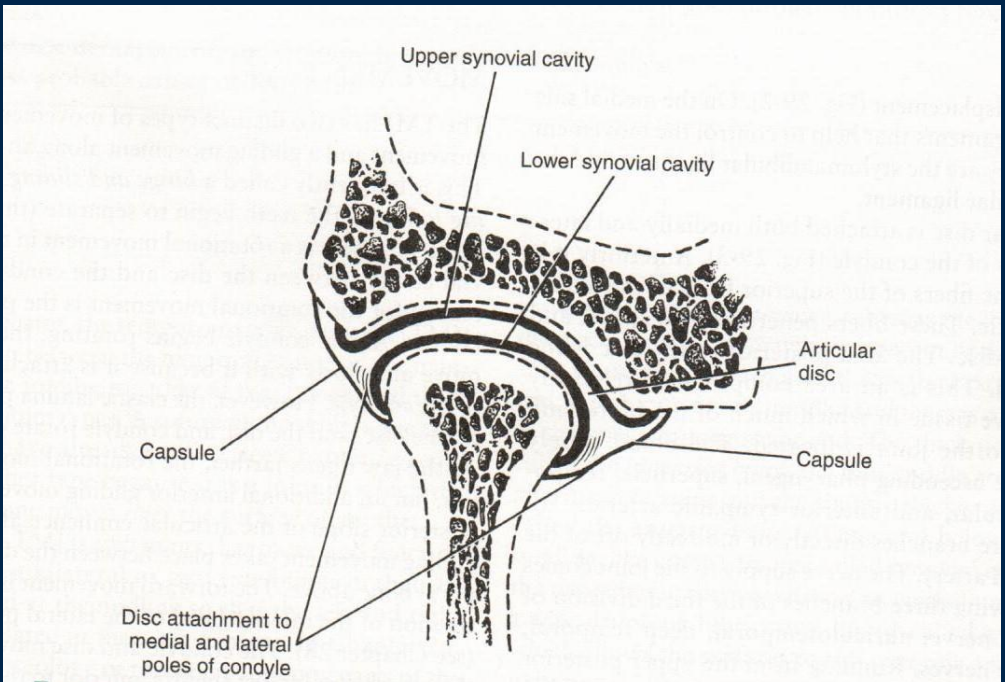


FIG. 29-3. From left to right, a frontal section through the condyle, disc, capsule, and fossa. The disc fibers curve down to insert into the poles of the condyle.

Medially and laterally is the disc attached to the inner periphery of the articular capsule → tightly bound and to the condyle, causing the disc to translate with the condyle during movements.

Anteriorly, it´s attached to some fibres of superior head of lateral pterygoid muscle.

- Posterior part of the articular disk, so-called bilaminar, separates into upper and lower laminae of collagen fibres both insert into the posterior wall

- Between these laminae and the posterior wall is filled with retroarticular Zenker plastic pad

Retroarticular Zenker plastic pad

- The loose connective tissue filling the retroarticular space, contains a venous plexus and fat lobules

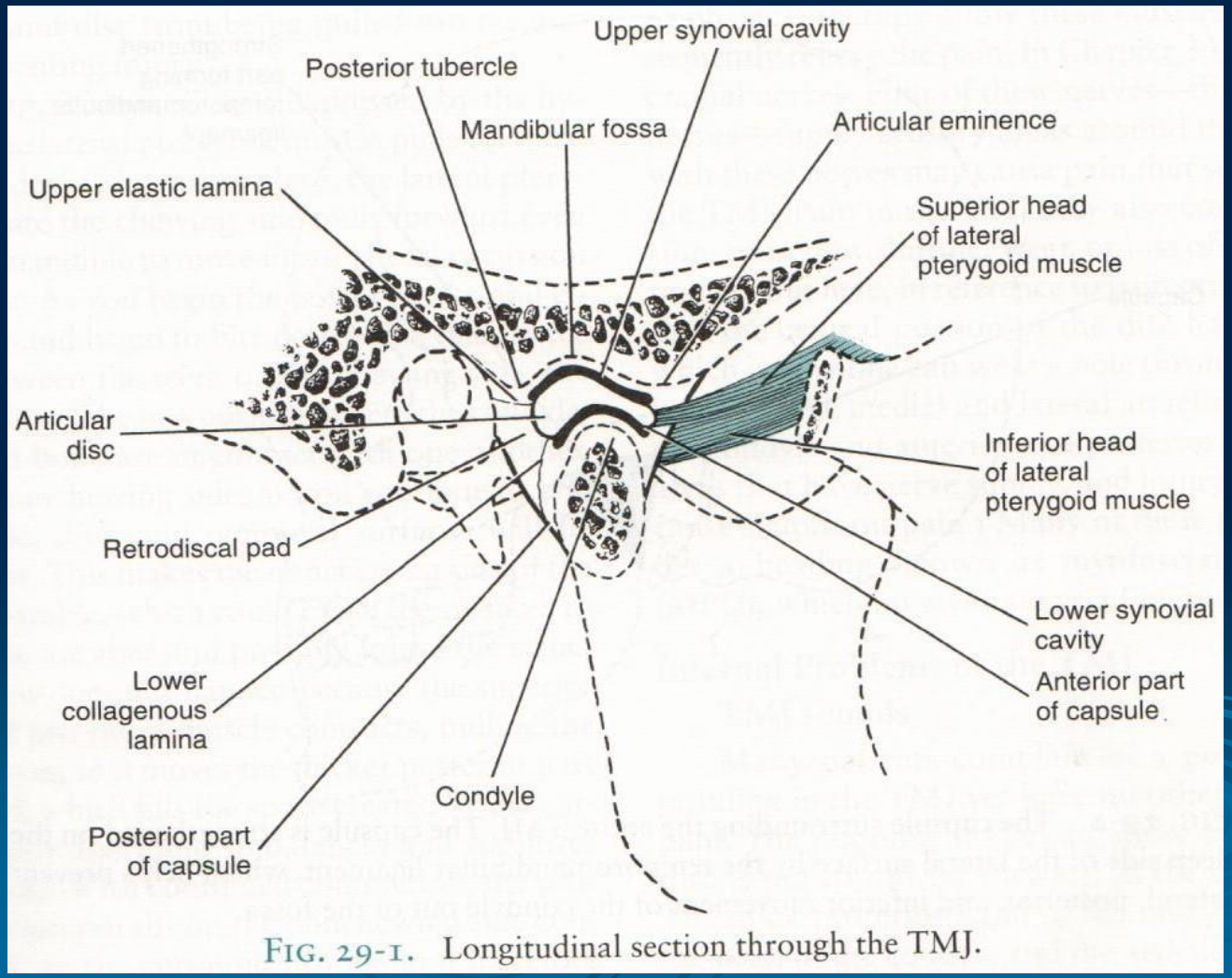
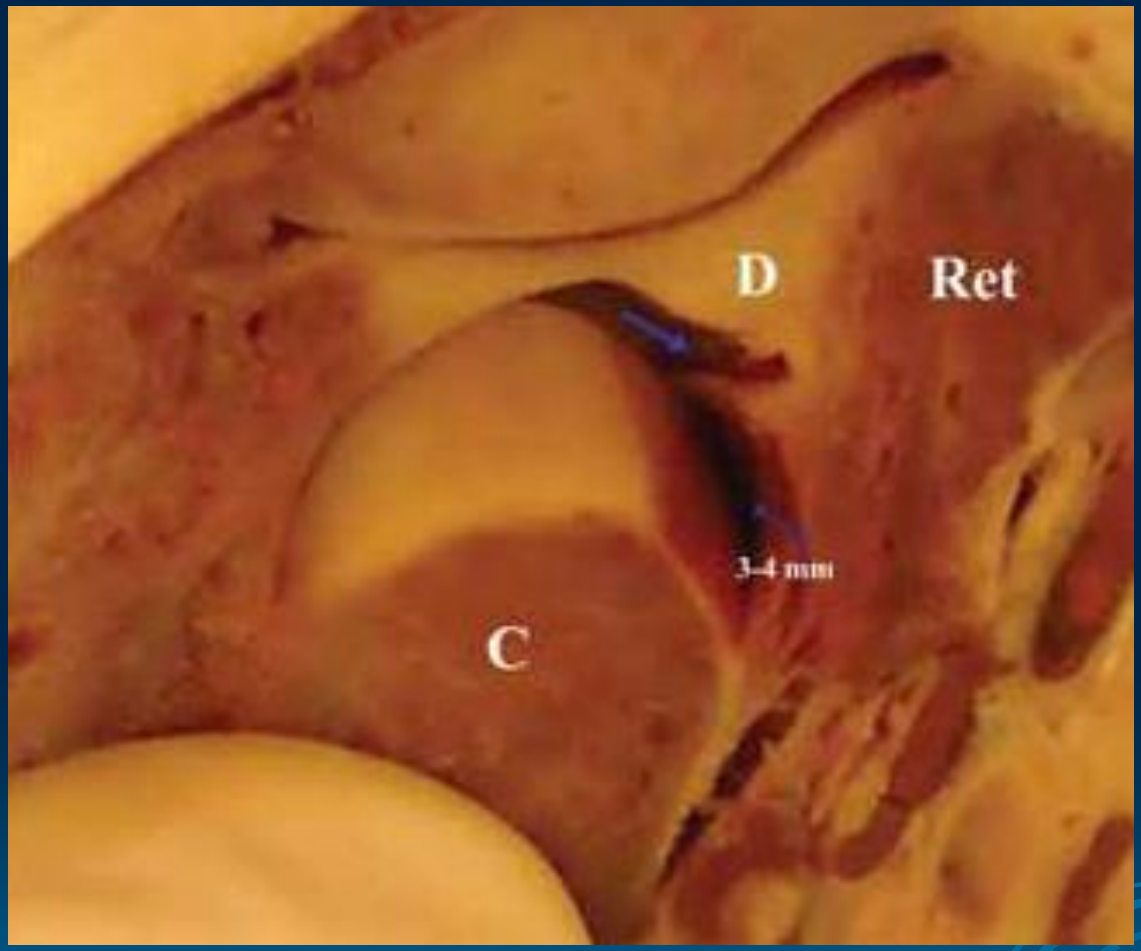


FIG. 29-1. Longitudinal section through the TMJ.


D
Ret
3-4 mm
C

The pad is responsible for stabilizing the disk on the condyle and supplying the joint

On opening of the oral cavity – depresion of mandible a Zenker plastic pad of retrodiscal tissue is filled with blood to the veins in the space between the posterior thick part of the disc and the condyle as a result of negative pressure

On closing

the blood is pushed out to the retromandibular vein

Physiologic disc position

- Pars posterior of the disc lies on the superior portion of the condyle

- In the centric condylar position the pars intermedia is located between anterosuperior convexity of the condyle and the articular protuberance

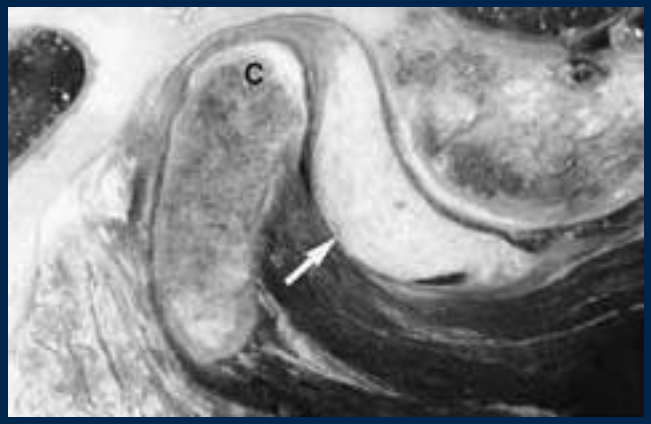
- Pars anterior lies in front of condyle

Dislocation of the articular disc

- Displacements of the disk in the anterior anteromedial, or anterolateral direction
- Posterior disk displacement - on rare occasions
- The combination of ant. and lat. or medial displacement is called rotational displacement
- Pure lateral or pure medial displacement is called sideways displacement

- Chronic displacement is resulting in deformity of the disc

- In approximately 10% of patients presenting with pain and dysfunction



Trauma of the articular disc

Mikrotrauma

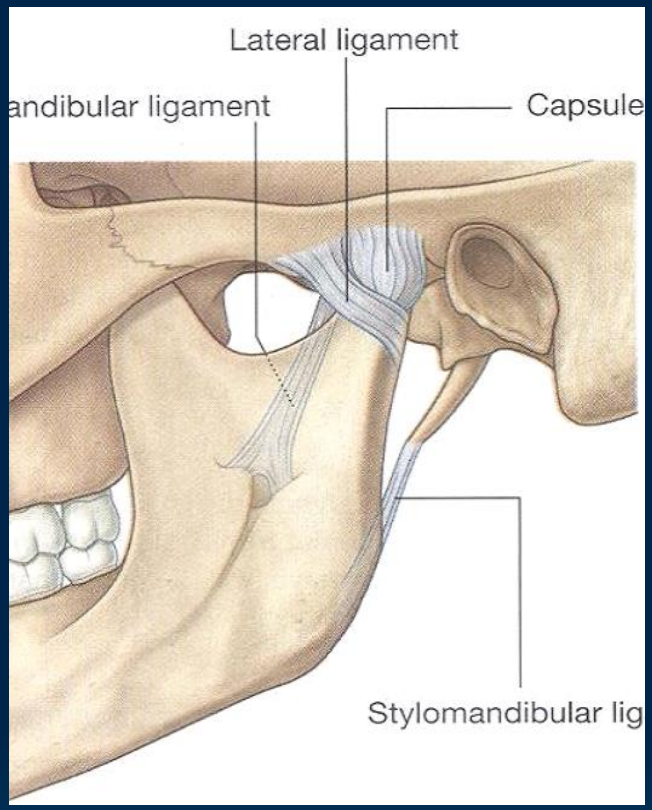
bruxism, stress, malocclusion, bad habits, chewing gum

Macrotrauma

an injury - either directly to the joint or to the head and neck intubation, lengthy dental work

4. LIGAMENTS OF THE TMJ

Ligaments have three main functions:
a) stabilization
b) guidance of movement
c) limitation of movement



- Articular: lateral
  medial … to reinforce the capsule

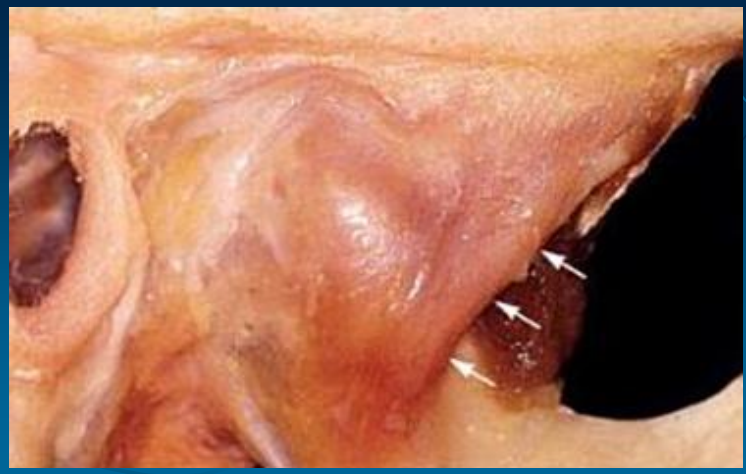
- Extraarticular stylomandibular
  sphenomandibular

Lateral ligament

From processus zygomaticus and tuberc. articulare
→ collum mandibulae

- A superficial, more vertically oriented part limits jaw opening

- A deep, more horizontal part limits retrusion and laterotrusion



Stylomandibular ligament

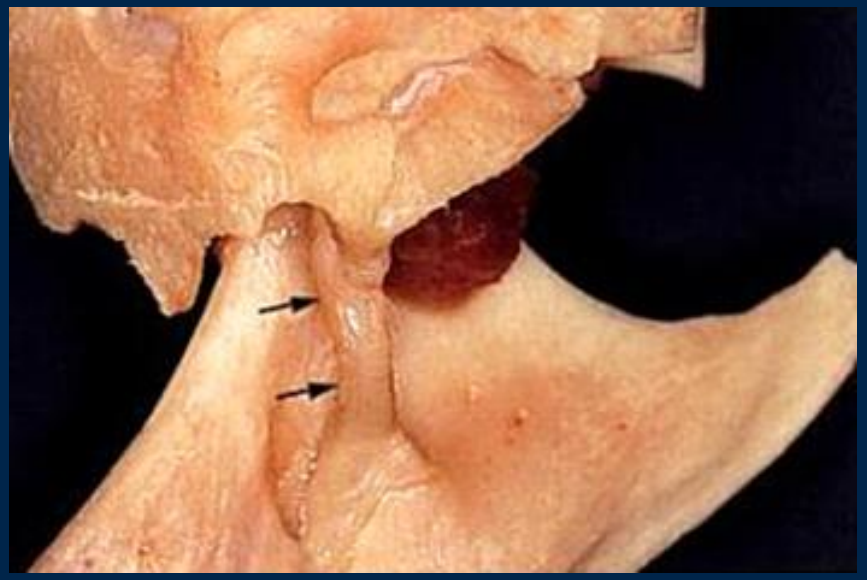
From styloid process → the posterior edge of the angle of the mandible

- Restricts protrusive and mediotrusive movements + prevent excessive upward rotation

Sphenomandibular ligament

From sphenoidal spine
→ lingula of the mandible

- Limits protrusive and mediotrusive movement
+ passive jaw opening

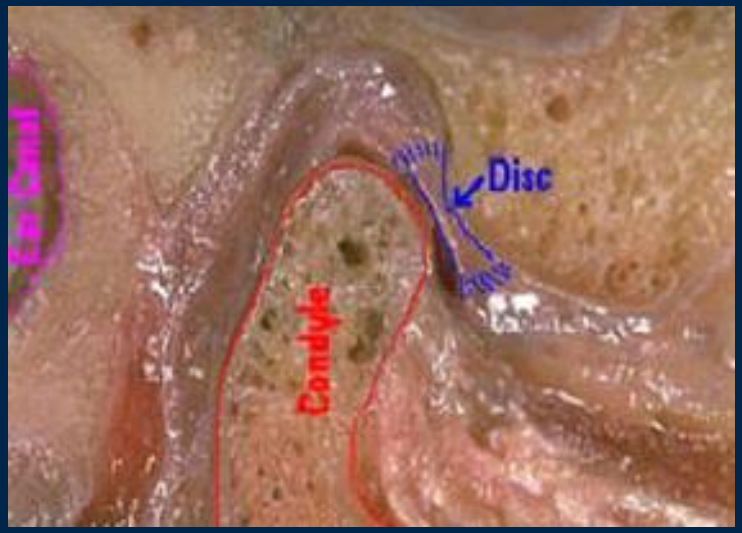


5. MOVEMENTS OF THE TMJ

- ATM is **composed and paired** joint, therefore it has complicated mechanism of movements
- Functionally **translation** (gliding) movements occur in the discotemporal joint (discus articularis is shifting forwards and backwards)

  Rotational (hinge) movements are in discomandibular part (caput mandibulae is rotating along the transversal axis)
- Both run **simultaneously, bilaterally**
- Movements of the jaw involve the **combination** of gliding and rotational movements

5. MOVEMENTS OF THE TMJ



Rotational movement - takes place in the lower compartment between the stationary disc and the moving condyle, the axis is transverse, movements accomplished are depression and elevation of mandible

Gliding movement - takes place in the upper compartment between the superior surface of the disc, which is moving, and mandib. fossa, movements forward or backward – up and down the articular eminence

Mandibular depression - the opening, the lowering of the lower jaw

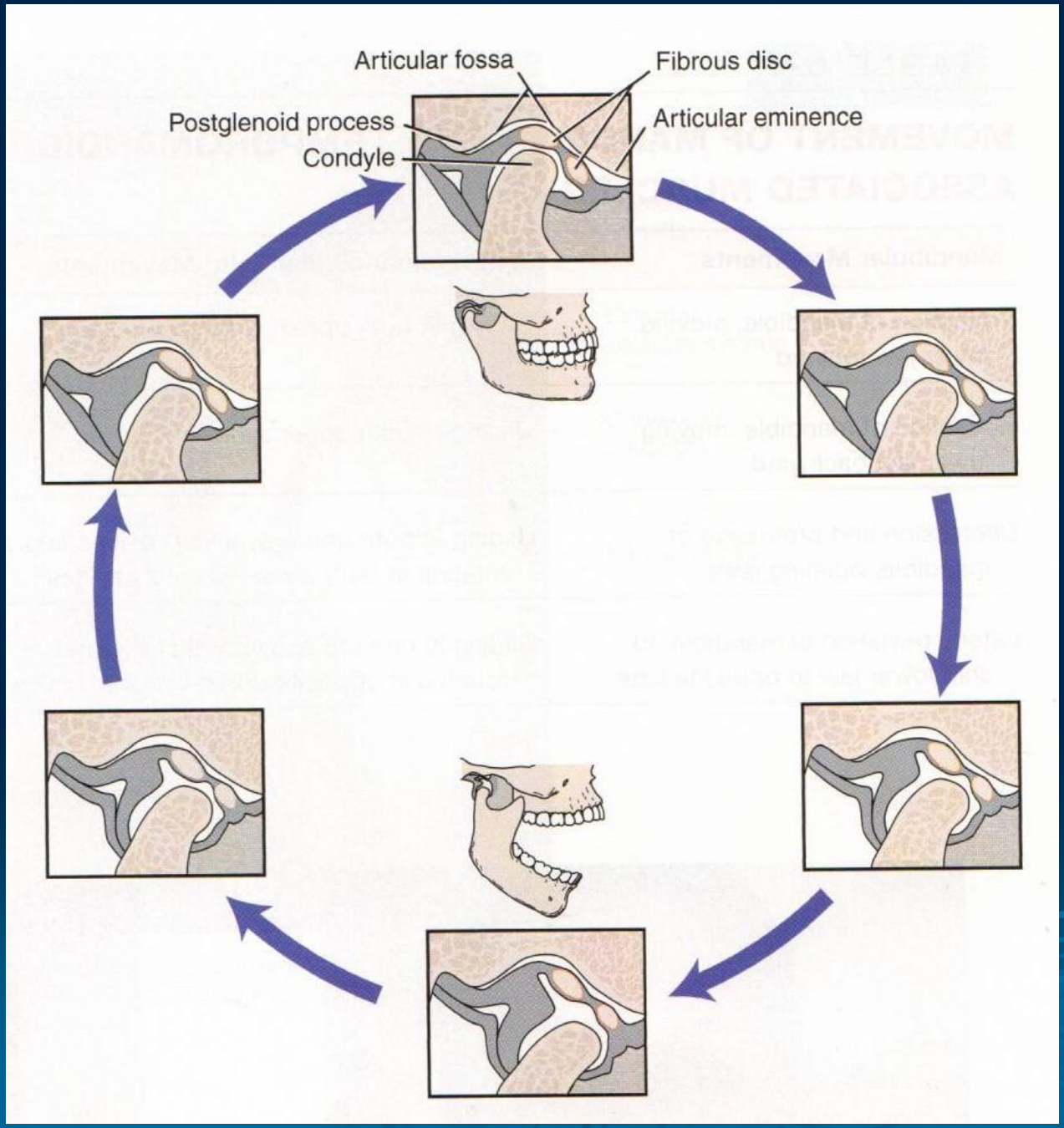
Lateral pterygoid + suprahyoid m.

- With simple rotation at the joint can be achieved 15 - 20mm interincisor distance
- During translation, the disc and condyle move under the articular eminence

Mand. elevation - the closing of the mouth, the raising of the lower jaw

Temporal + masseter + medial pterygoid m.

- Translation - the condyles move backward and upward along the articular eminence
- Rotation upward to attain centric position


Articular fossa
Fibrous disc
Postglenoid process
Articular eminence
Condyle

Mand. protrusion – shifting the entire jaw forwards

Lateral et medial pterygoid + masseter m.

- Slide the mandible forward
- Maximal protrusion results in the lower (mandibular) incisors being a few mm anterior to the maxillary incisors

Mand. retraction

Temporal + masseter m.

- Move the mandible posteriorly
- Condyles move backward and upward and reoccupy the mandibular fossa

Laterotrusion, lateral deviation

Lateral et medial pterygoid + masseter + temporal m.

The condyle move to the right or to the left side

During lateral movements,

the each of condyle moves **differently**:

on the working side - rotates around a vertical axis and moves lat. and ant.

on the nonworking side - ant., inf. and med.

Hyper mobility

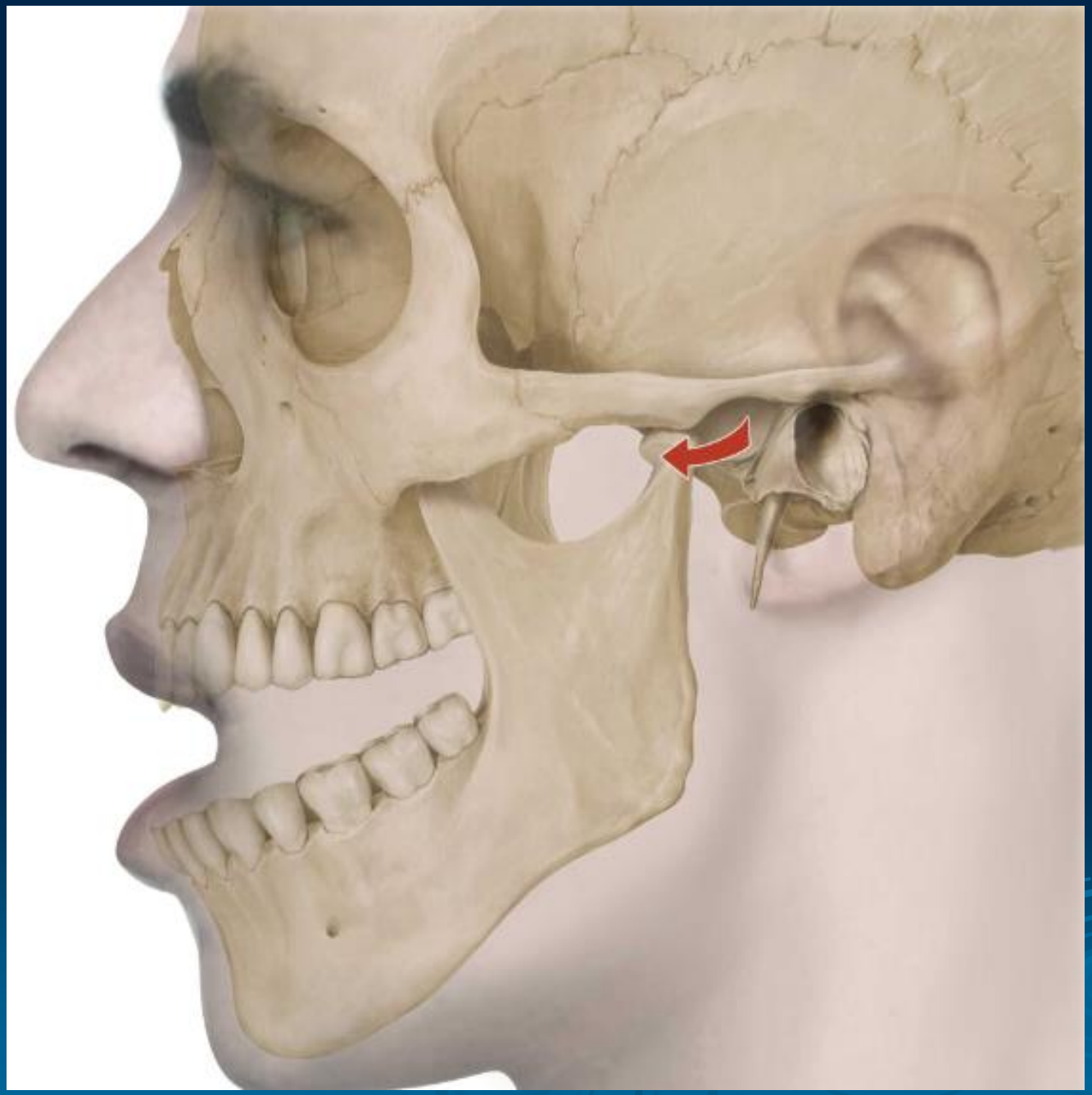
Discus articul. with caput mandibulae could slide in front of tuberculum articulare into fossa infratemporalis

Subluxation

incomplete dislocation of a joint in which the patient is able to close his or her mouth without assistance

Luxation (true dislocation)

Joint is displaced from its articulations and requires manipulation by another individual to return to its normal position (cannot spontaneously return into its physiological position)



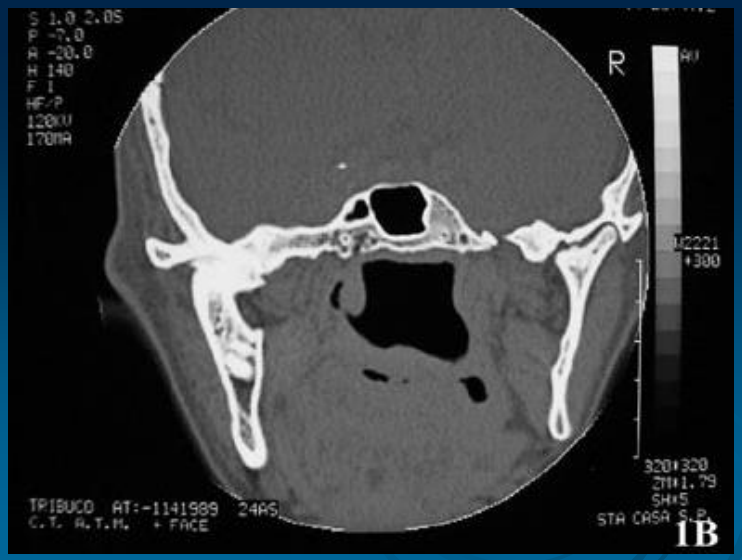
Hypo mobility

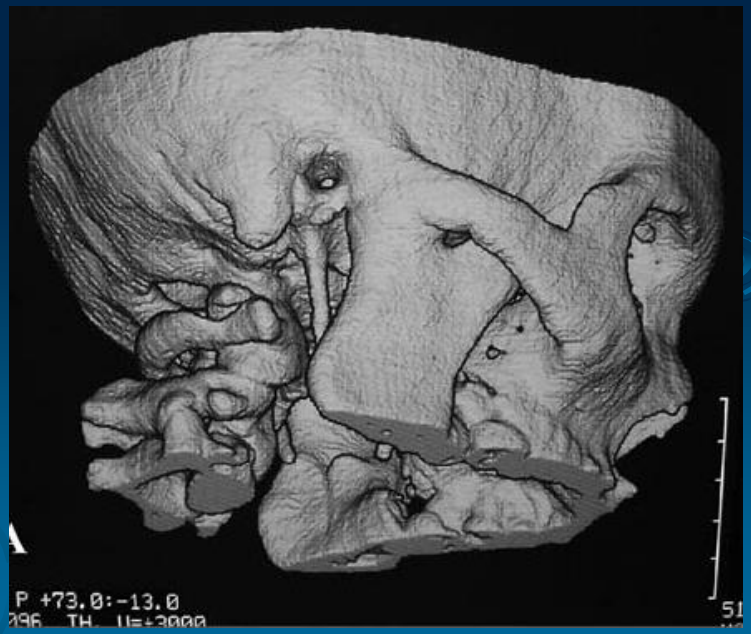
Ankylosis (intracapsular)

The fibrous adhesions or bony fusion between condyle, disc, glenoid fossa, and eminence

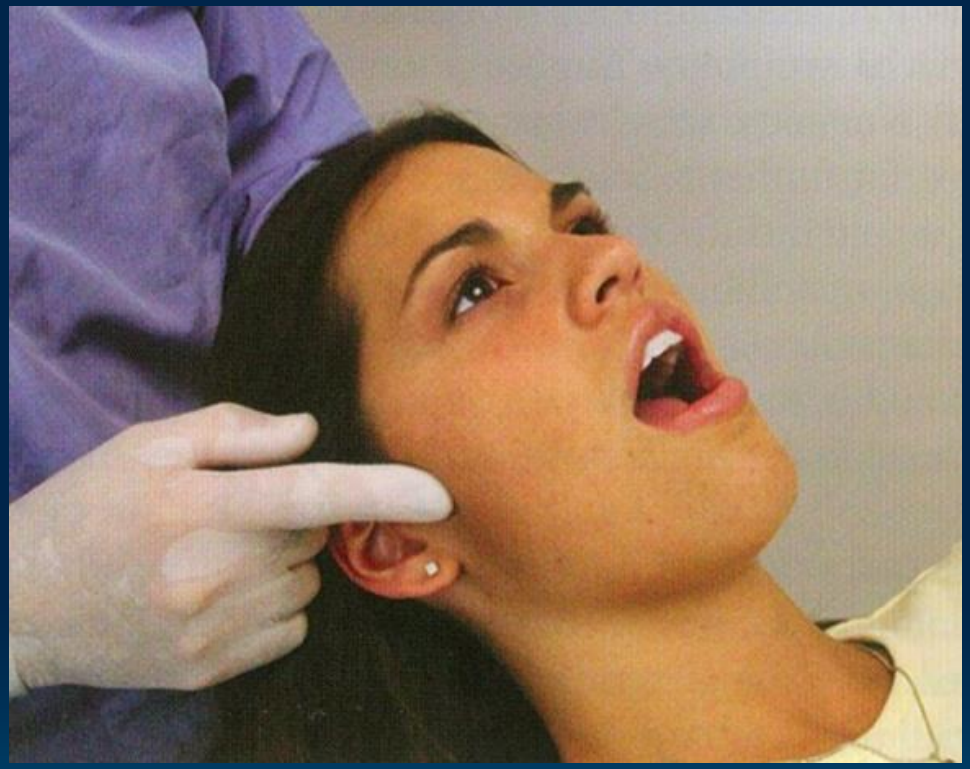
Pseudoankylosis (extracapsular)

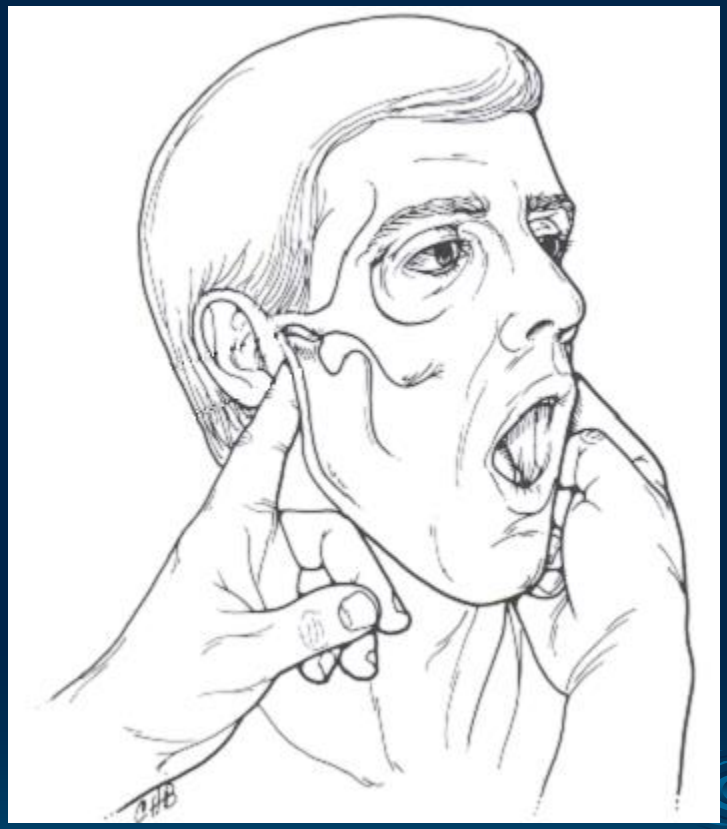
Pathology extrinsic to the joint



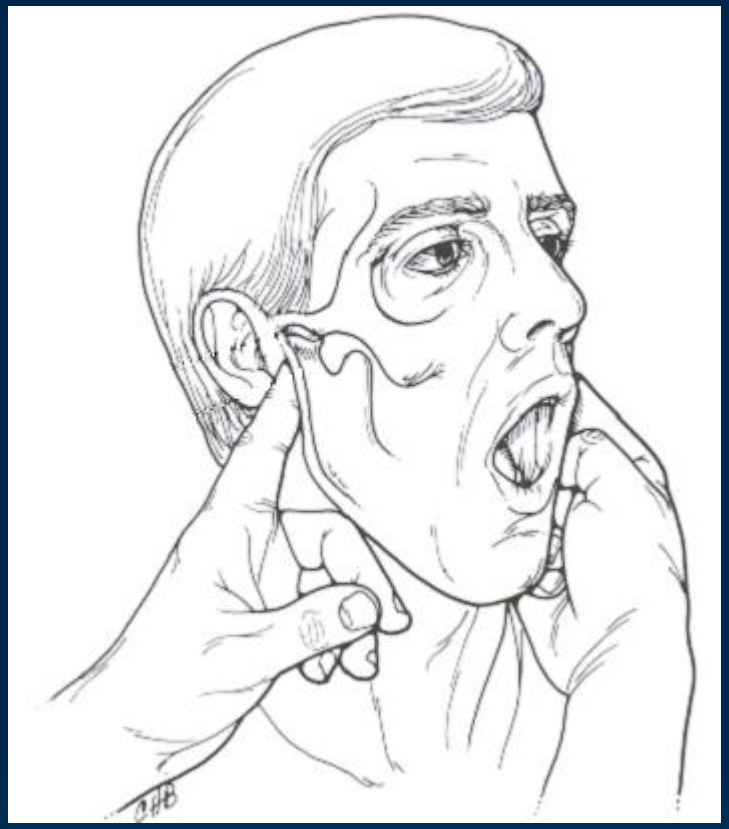


6. EXAMINATION OF TMJ





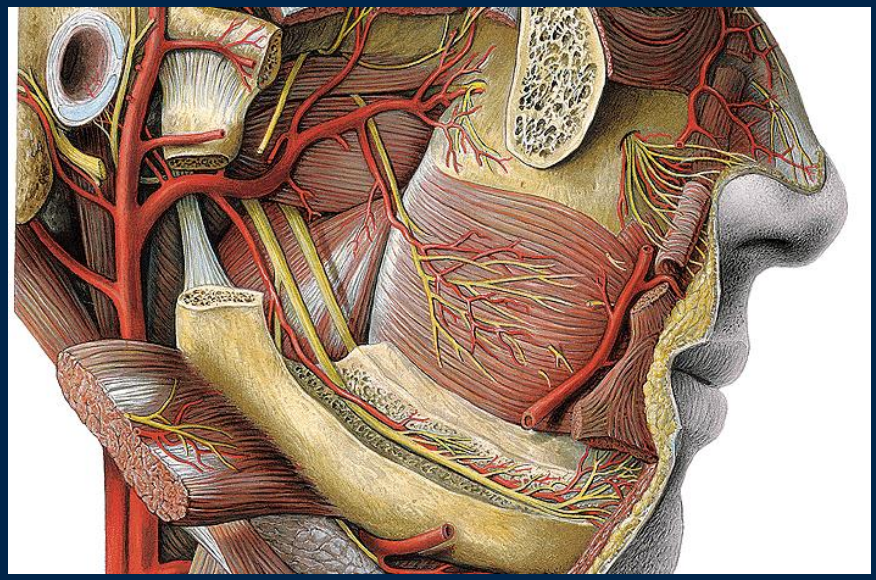
Palpation of the preaurikular area



Intraauricular. examination

Auscultation

7. TOPOGRAPHY RELATIONSHIP



Cranially
medial cranial fossa

Dorsally
external auditory tube

Laterally
glandula parotis , n.VII.
superficial temp. a.,v.
auriculotemporal n.

Medially
chorda tympani, a. tympanica ant.