The Temporomandibular Joint disorders

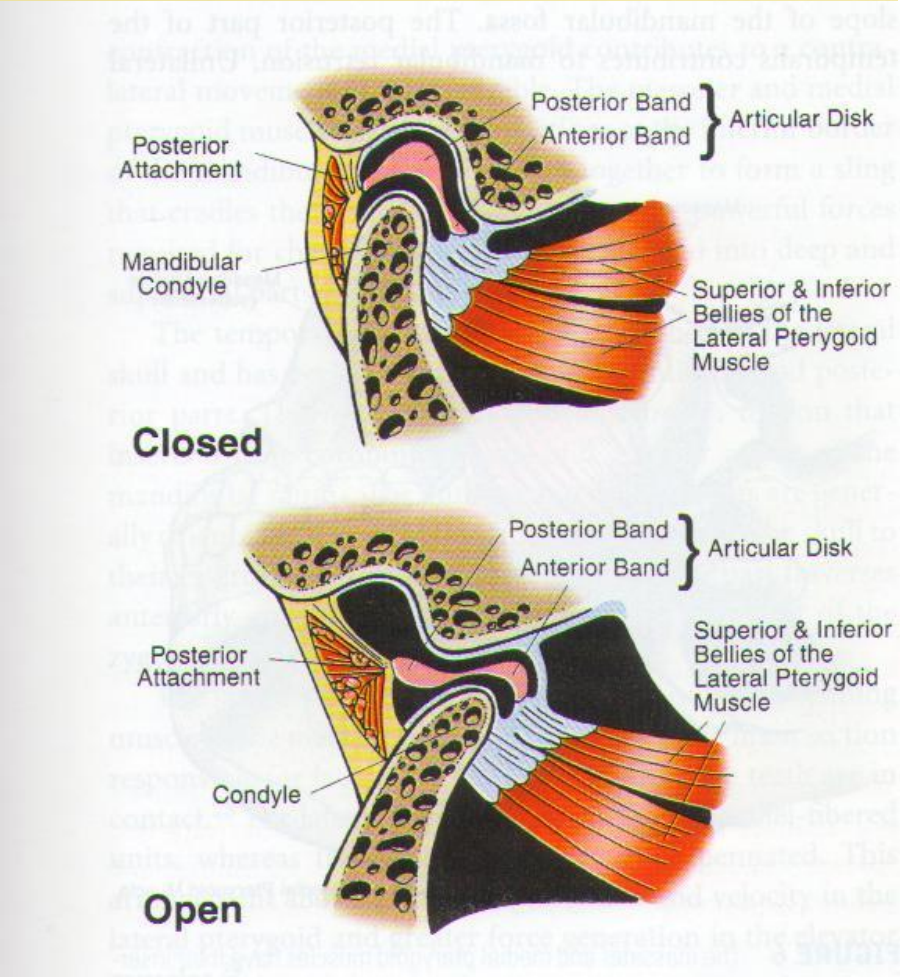
- FUNCTIONAL ANATOMY
- ANATOMY OF CLINICAL INTEREST
- ETIOLOGY, EPIDEMIOLOGY, AND CLASSIFICATION
- ASSESSMENT
- GENERAL PRINCIPLES OF TREATING TEMPOROMANDIBULAR DISORDERS
- SPECIFIC DISORDERS AND THEIR MANAGEMENT

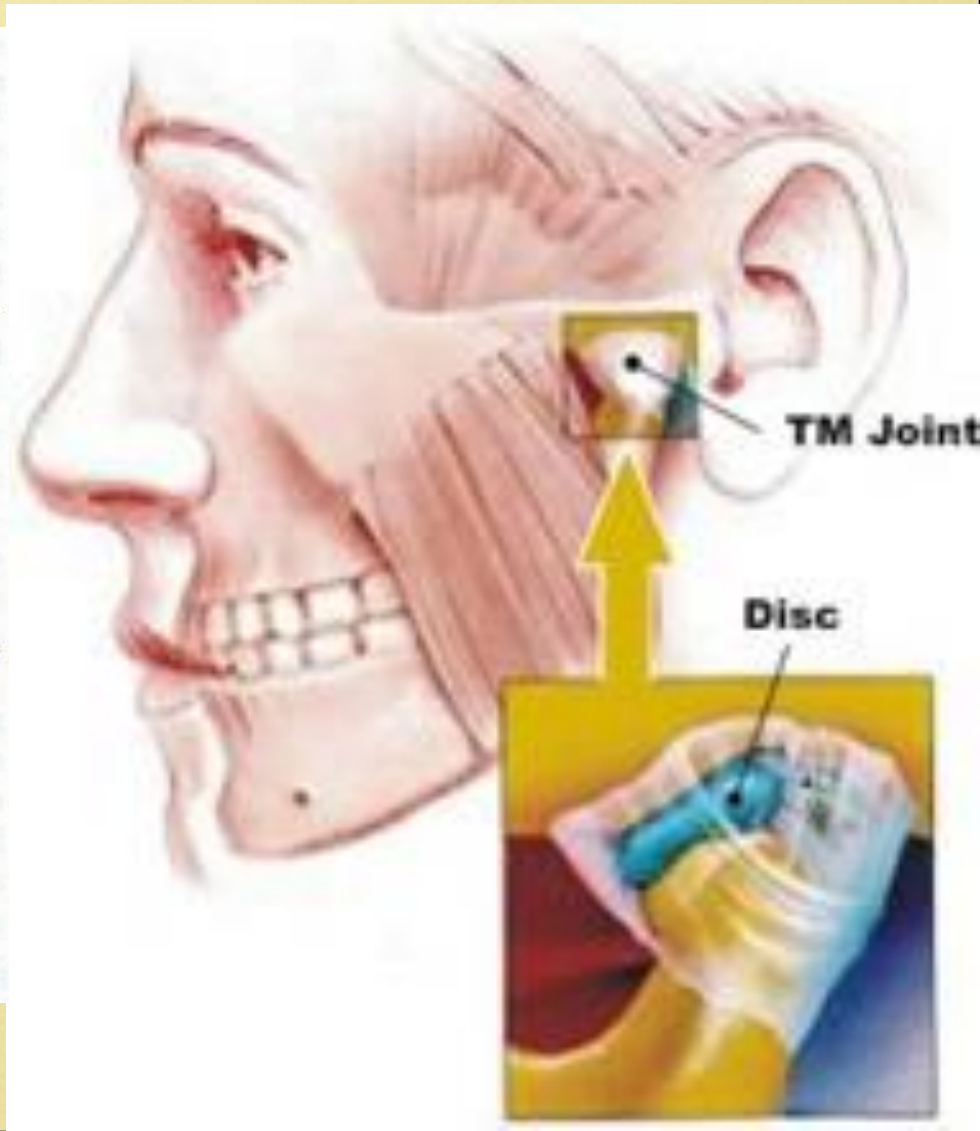
FUNCTIONAL ANATOMY

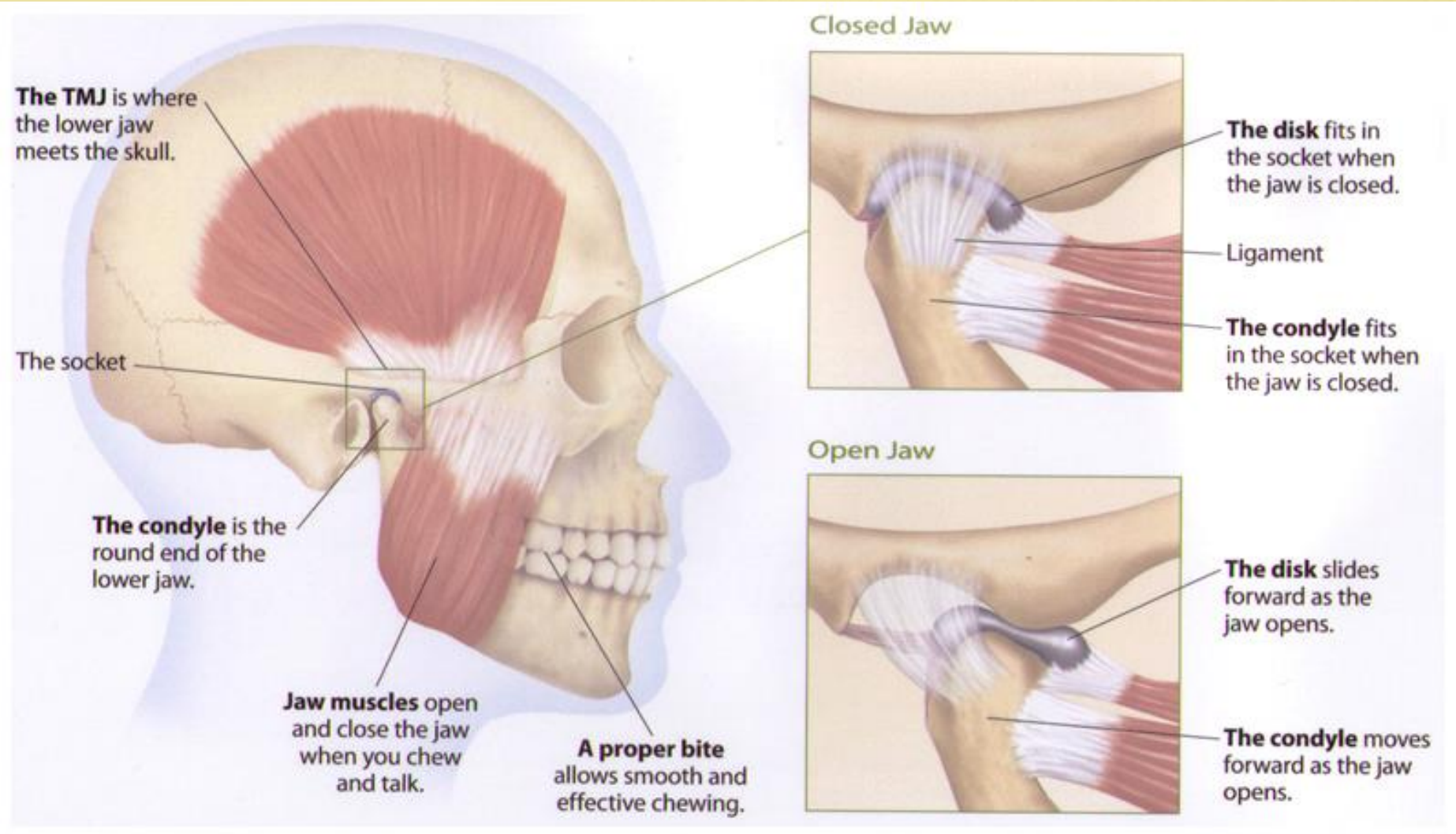
- **The TMJ articulation is a joint that is capable of hinge-type and glidingThe articulation is formed by the mandibular condyle occupying a hollow in the temporal bone**
- Rotation of the condyle contributes more to normal mouth opening than translation
- **The capsule is lined with synovium and the joint cavity is filled with synovial fluid. The synovium is a vascular connective tissue**
- Distinguishing features include a covering of fibrocartilagerather than hyaline cartilage on the articulating surfaces;.

- The synovial membrane consists of macrophage-like type A cells and fibroblast-like type B cells identical to those in other joints
- synovial fluid is a filtrate of plasma with added mucins and proteins .
- its main constituent is hyaluronic acid.
- Decrease friction during joint compression and motion.
  - decreases friction during joint compression and motion
  - weeping lubrication and boundary lubrication

What is the temporomandibular joint?





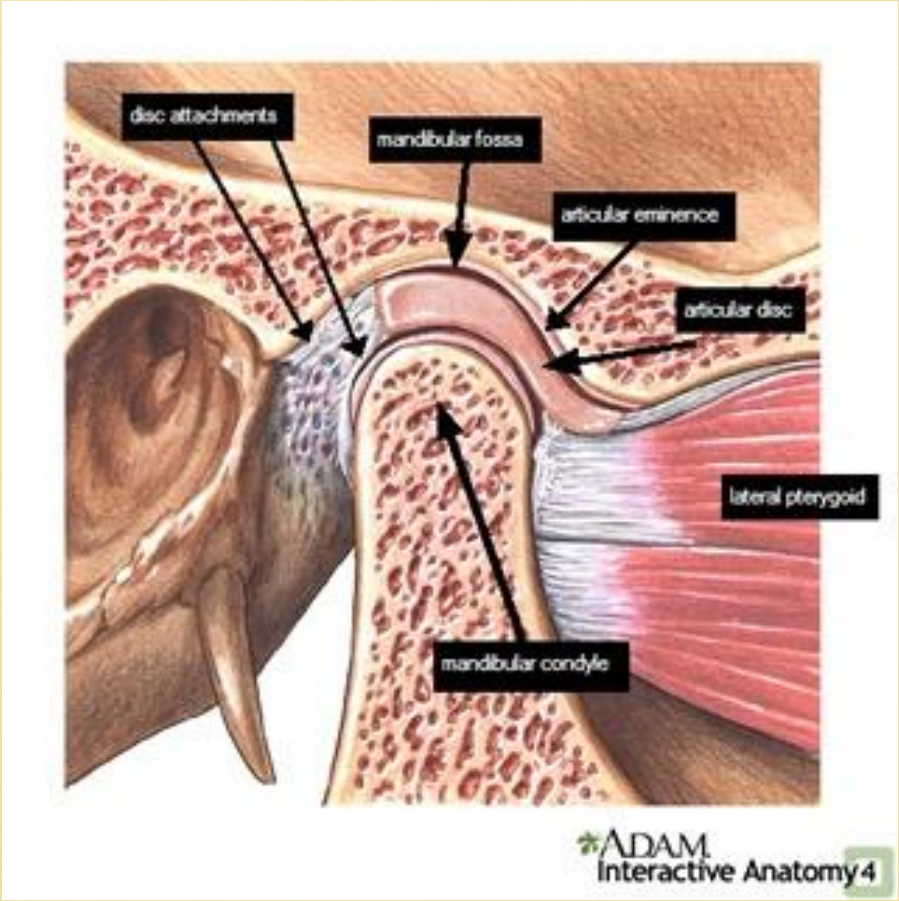

Closed Jaw
The TMJ is where the lower jaw meets the skull.
The socket
The condyle is the round end of the lower jaw.
Jaw muscles open and close the jaw when you chew and talk.
A proper bite allows smooth and effective chewing.
The disk fits in the socket when the jaw is closed.
Ligament
The condyle fits in the socket when the jaw is closed.
Open Jaw
The disk slides forward as the jaw opens.
The condyle moves forward as the jaw opens.

Articular disc

- Consist of:
  - collagen fibers
  - cartilage-like proteoglycans
  - elastic fibers
  - Fibrocytes and fibrochondrocytes
- The disc is attached by ligaments to the lateral and medial poles of the condyle
- The disc is thinnest in its center and thicknes to form anterior and posterior bands → to help stabilize the condyle in the glenoid fossa
- Temporalis muscle and deep masseter muscle →
  - attach on the anterolateral aspect
- lateral pterygoid→ attach on the anteromedial aspect of the disc

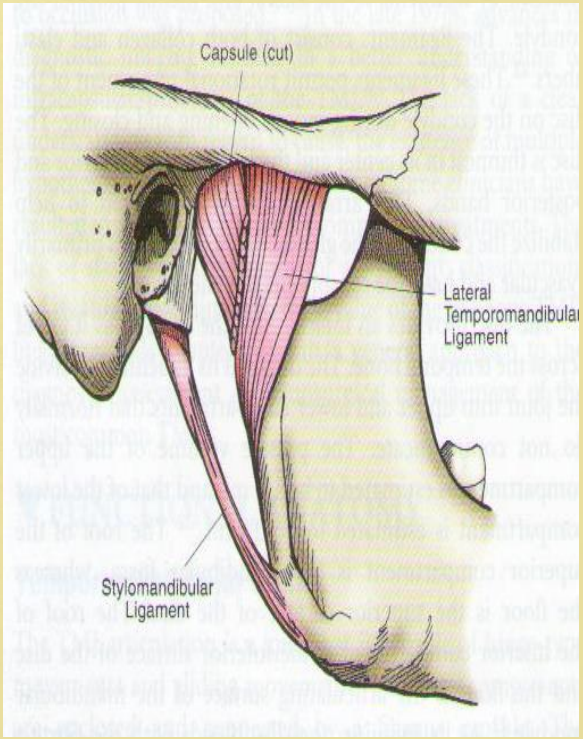
Retrodiscal tissue

- Is loosely organized system of
  - Collagen fibers
  - Fat
  - blood and lymph vessels
  - Nerves



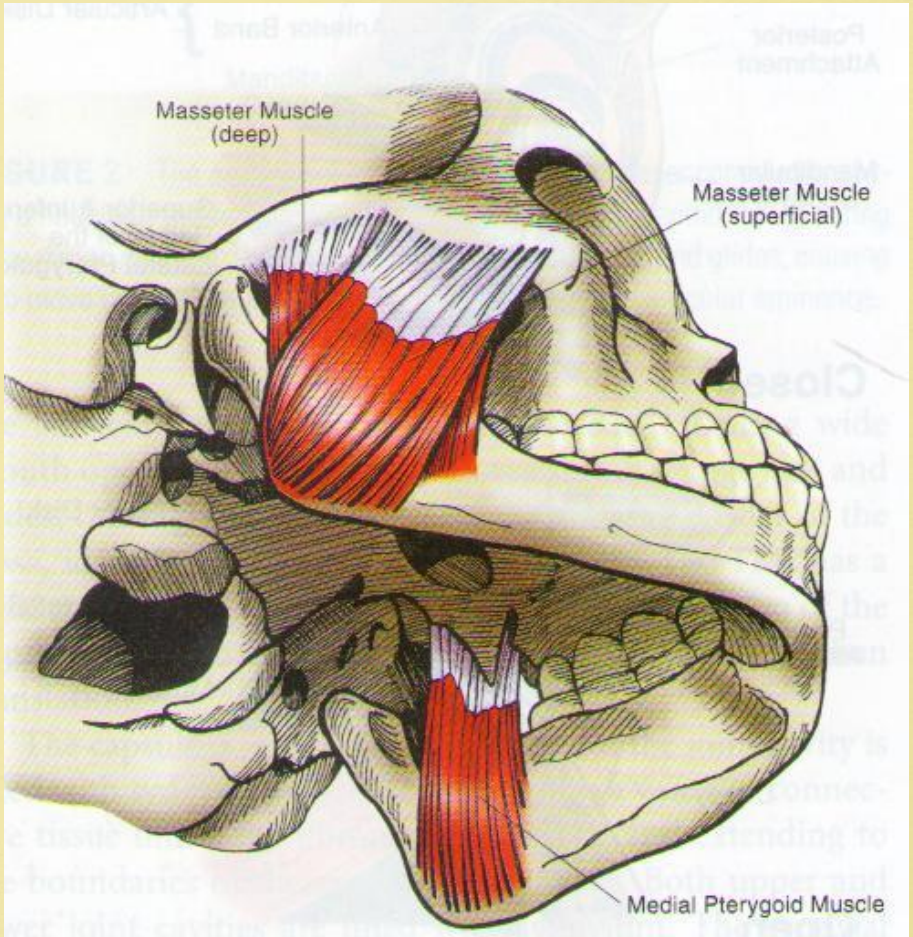
Temporomandibular ligaments

- Capsular ligament
- Lateral temporomandibular ligament
- Accessory ligament
  - Sphenomandibular ligamen
  - Stylomandibular ligament

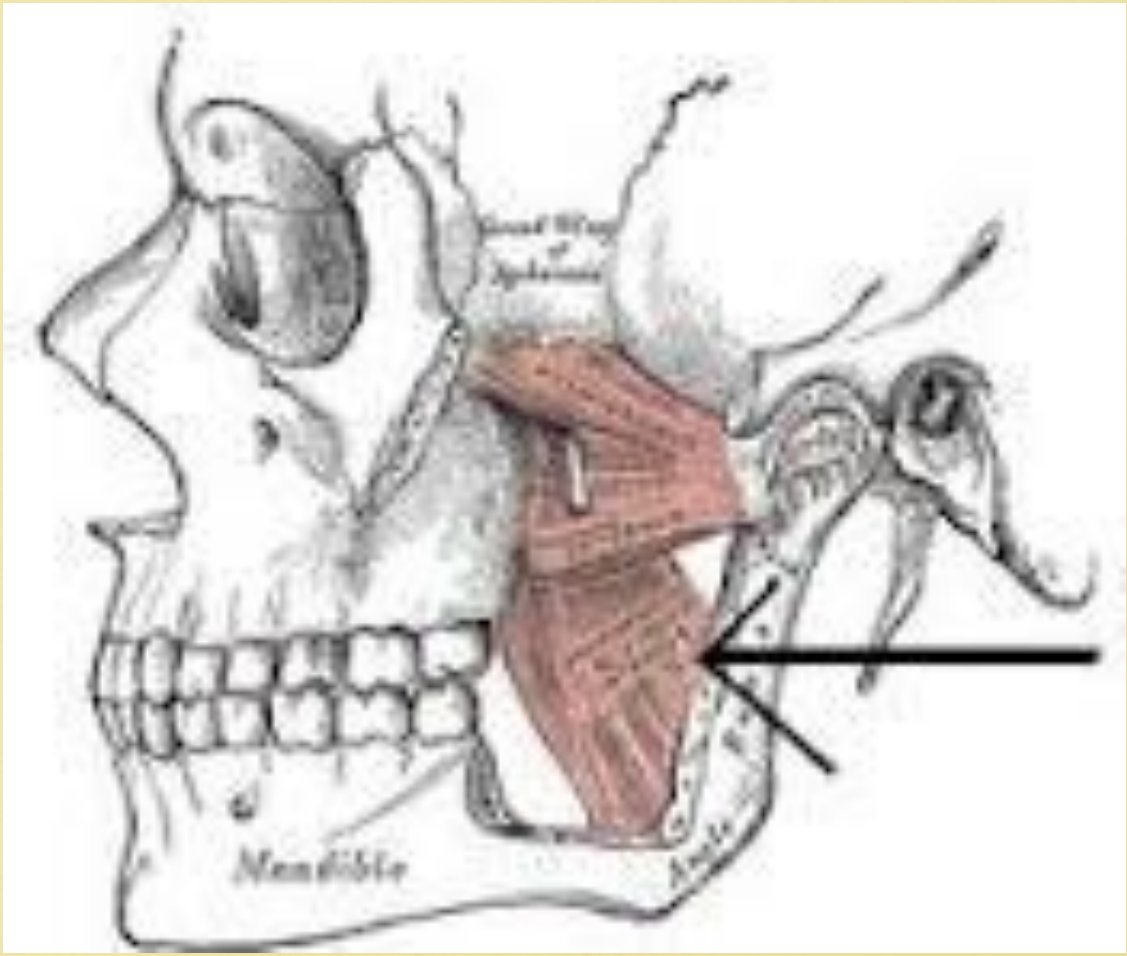


Muscles of mastication

Mandibular movments toward the tooth contact position	• Masseter Muscles • Medial pterigoid Muscles • Temporalis Muscles
Opening and protrusive gmuscle of the mandible	• Lateral pterigoid Muscles



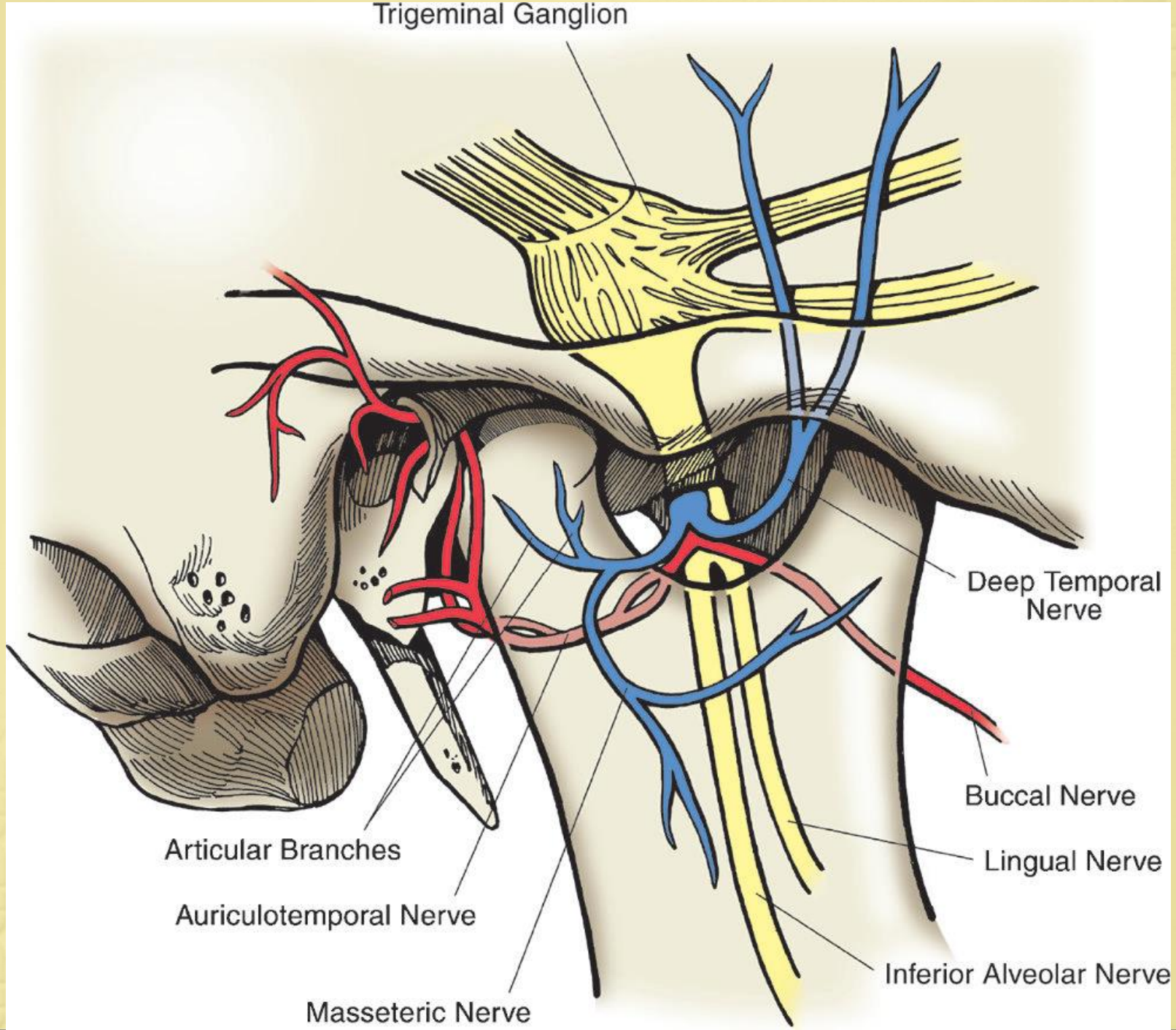
GURE 6 The masseter and medial pterygoid muscles have their inser-


Mandible


masseter
muscle

Nerve Supply of Masticatory System

- The mandibular division of the trigeminal nerve supplies motor innervation to the muscles of mastication and the anterior belly of the digastric muscle
- auriculotemporal nerve supply the sensory innervation of the TMJ
- the masseteric nerve, a branch of the maxillary division of the trigeminal nerve (V2), innervates the anteromedial capsule of the TMJ.

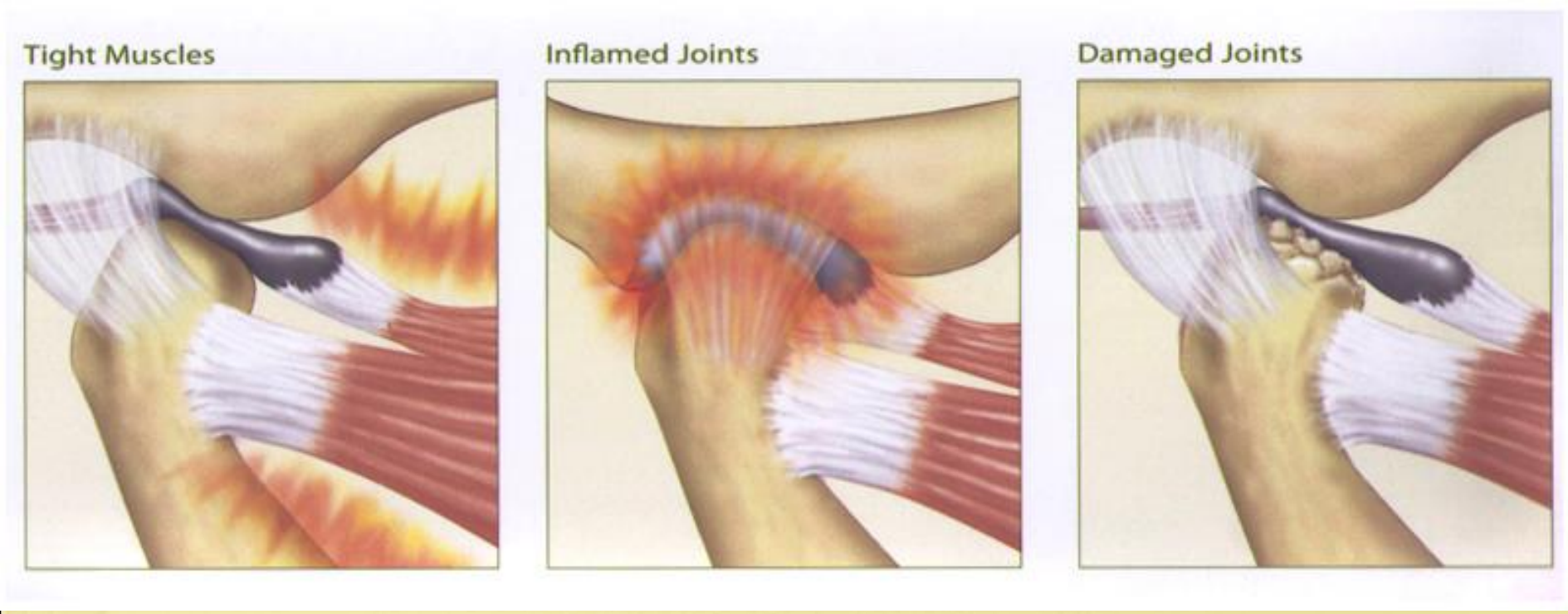

Trigeminal Ganglion
Deep Temporal Nerve
Buccal Nerve
Lingual Nerve
Inferior Alveolar Nerve
Articular Branches
Auriculotemporal Nerve
Masseteric Nerve

Vascular Supply of Masticatory System Structures

- The external carotid artery is the main blood supply for the masticatory system structures.

- Articulator covering
  - Fibrocartilage
    - More freedom of movement than hyaline cartilage

- TMD patients similar to headache and back pain patients (disability ,psychosocial profile , pain intensity chronicity , and frequency)
- Between the ages 20-40 years
- More frequently effect women


Tight Muscles
Inflamed Joints
Damaged Joints

Disc displacement

- Some anterior disc displacement may be related to lateral pterygoid muscle dysfunction
- The angle or steepness of the mandibular fossa has been considered a contributing factor in intra-articular disorder
- Adhesion occurs when hyaluronic acid and associated phospholipid are degraded

Nerve entrapment

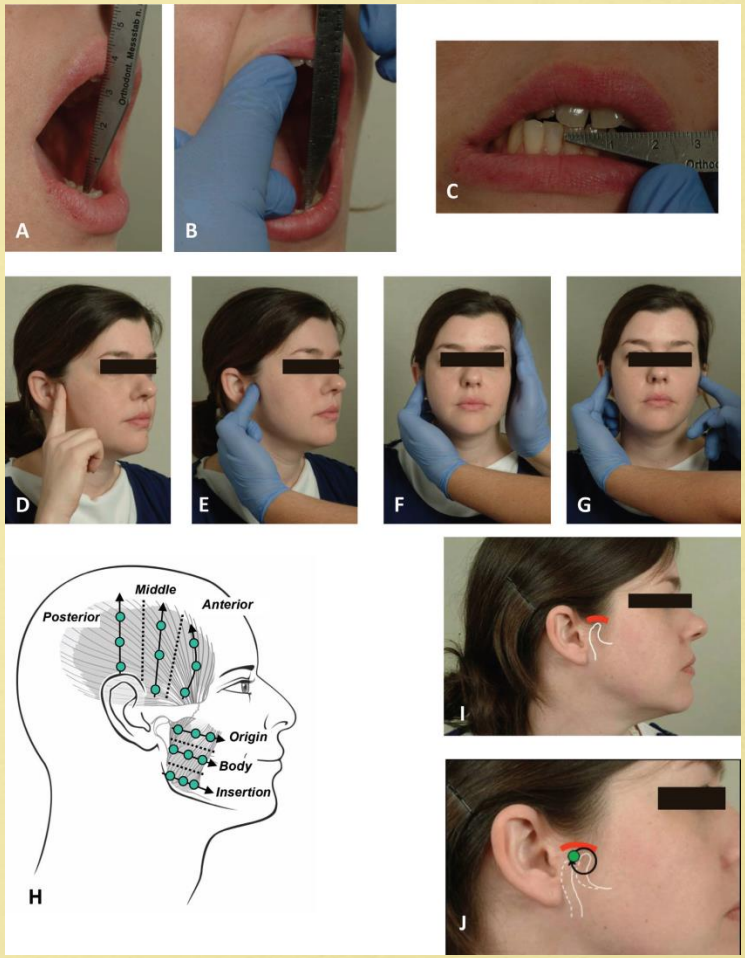
- Compression of nerves due to decrease occlusal vertical dimension
- Medial displacement of the articular disc exposing the auriculotemporal nerve to mechanical irritation

Ear symptoms associted with TMDs

- In patients with TMD
  - Earache,
  - Tinnitus
  - Fullness
  - Loss of hearing

Etiology of TMD

- The etiology of the most common TMDs is unknown occlusal disharmony, muscle hyperactivity, central pain mechanisms, psychological distress, and trauma
- Relationship between severe overbite and TMD
- Relationship between orthodontic treatment and TMD

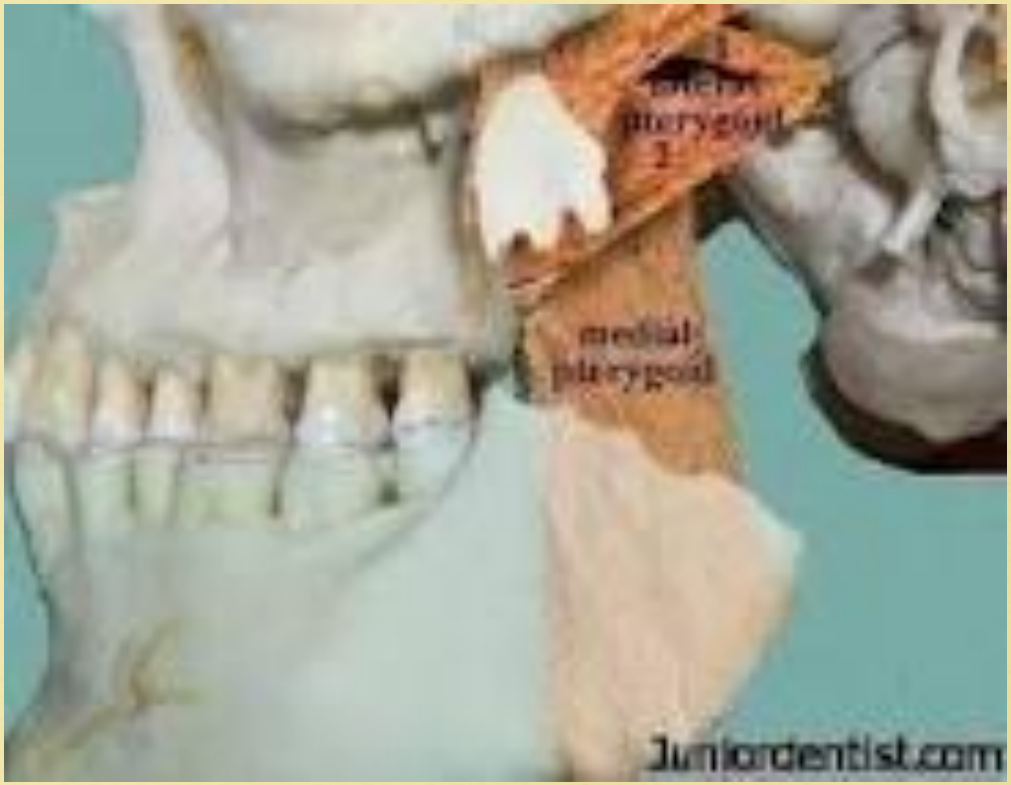

A
B
C
D
E
F
G
Middle
Posterior
Anterior
Origin
Body
Insertion
H
I
J

Palpate the masticatory and cervical muscles

Palpate the masseter

Palpate the temporal

Palpate medial pterygoid


lateral
pterygoid
medial
pterygoid
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Palpate lateral pterygoid

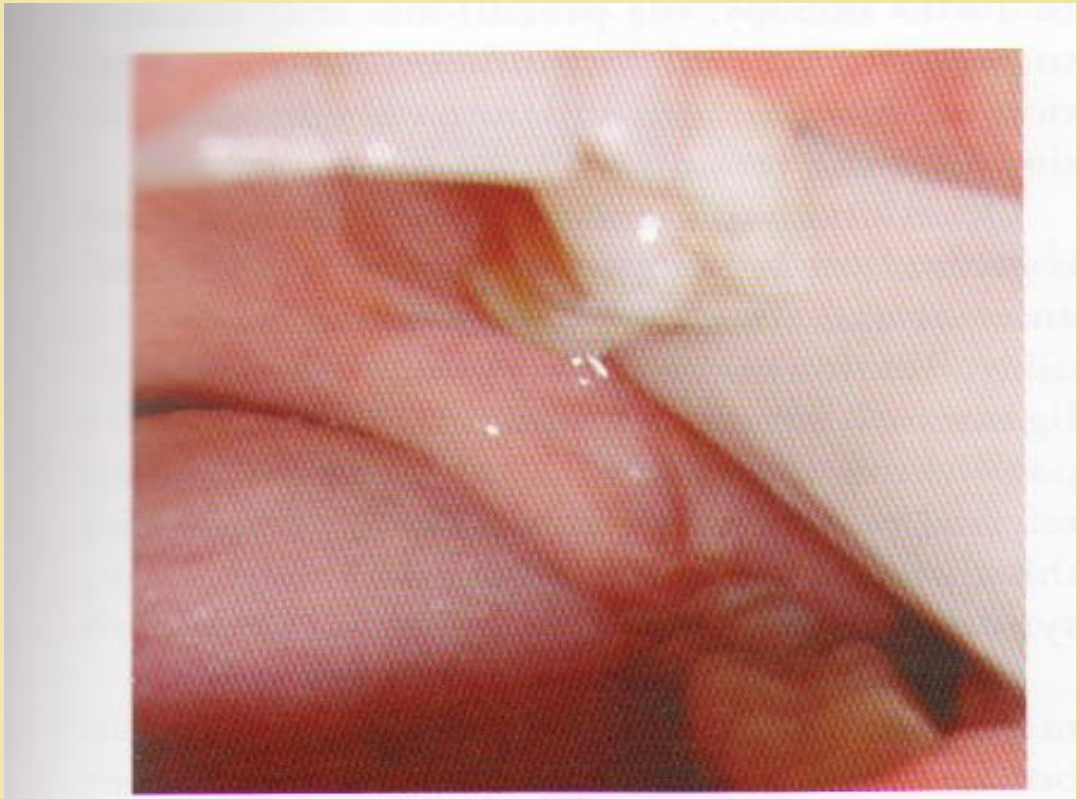
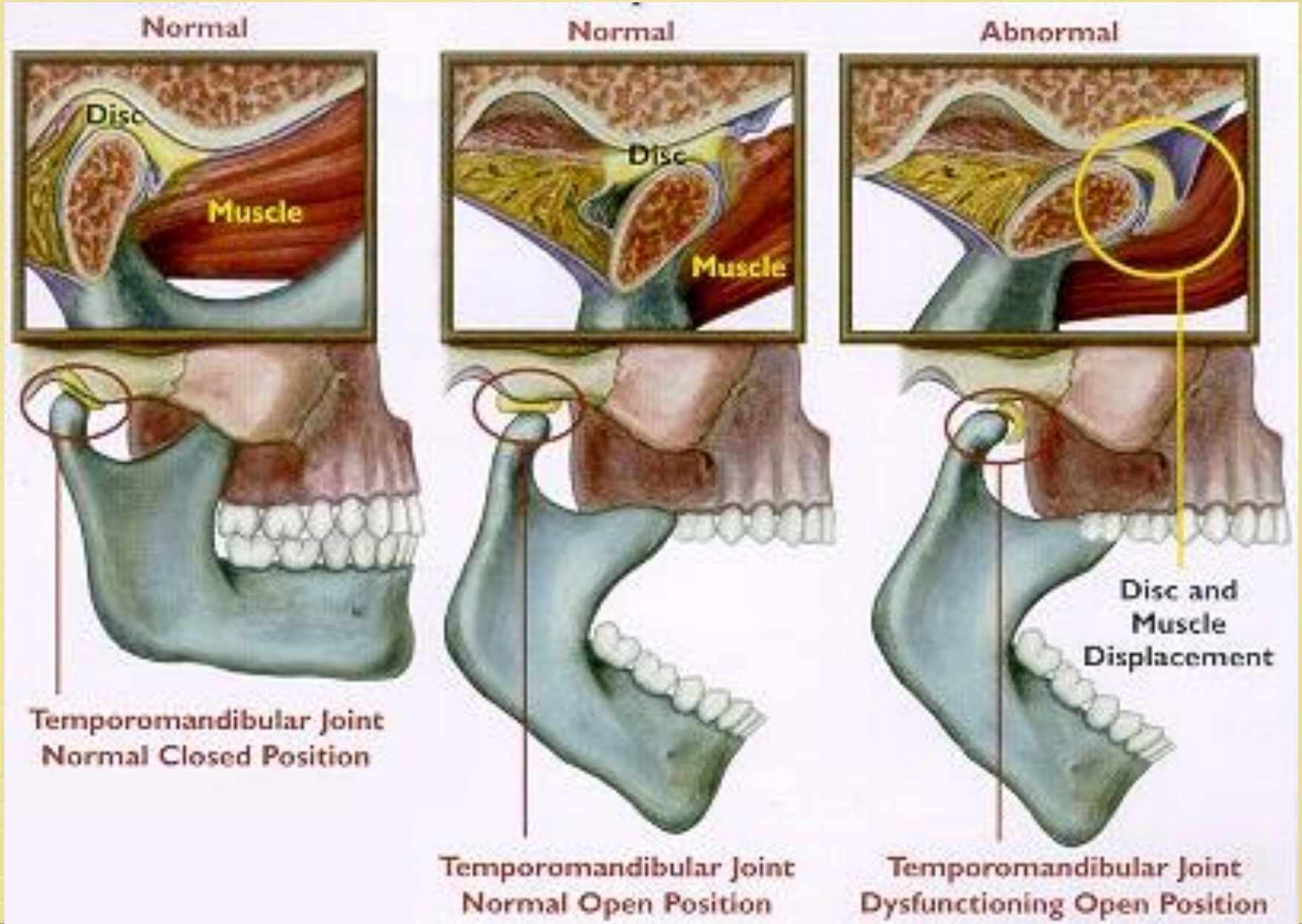


Figure 3.23. Palpation of the lateral pterygoid area.

Articular Disc Disorders of the TMJ

- Joint sounds
- Limitation and deviation of mandibular motion
- Pain
- Majority of cases of ADD occur without pain or dysfunction
- ADD of the TMJ does not appear to affect children below the age of 5 years

- Most common disc displacement is anterior
- Posterior disc displacement is rare
- Pain or dysfunction When accompanied by capsulitis and synovitis


Normal
Disc
Muscle
Temporomandibular Joint
Normal Closed Position
Normal
Disc
Muscle
Temporomandibular Joint
Normal Open Position
Abnormal
Disc and
Muscle
Displacement
Temporomandibular Joint
Dysfunctioning Open Position

Etiology

- unknown
- Direct trauma to the joint
- Chronic low-grade microtrauma(Bruxism , Clenching)
- Laxity of joint
- Indirect trauma
  - Cervical flexion extension
  - Malocclusion
- Anatomy of the joint,……

Clinical manifestions

- Anterior disc displacement with reduction
  - Elongation or tearing of the restraining ligaments
  - Alteration in the form of the disc
- Clicking or popping joint(during both opening and closing) reciprocal click
- Pain
- Loss of function
- Intermittent locking

- Anterior disc displacement without reduction(closed lock)
  - After trauma or long-term nocturnal bruxism
    - Pain directly over the joint
    - Limited lateral movement to the side away from the affected joint
    - Mandible will deviate toward the affected side
    - Disc will deform and max mouth opening will gradually improve

- posterior disc displacement
  - A sudden inability to bring the upper and lower teeth together in max occlusion
  - Pain in the affected joint
  - Limited lateral movement to the affected side
  - No Limited of mouth opening

management

- Most symptoms resolve over time without traetment or with minimal conservation
- For symptomatic ADD :
  - Splint therapy
  - Physical therapy
  - Anti-inflammatory drugs
  - Arthrocentesis
  - Arthroplasty,……

Temporomandibular joint arthritis

- Degenerative joint disease (DJD)
- osteoarthritis
- osteoarthrosis
- Degenerative arthritis

- Primary DJD
  - Genetic factors:important role
  - Asymptomatic
  - Above the aga of 50 years
- secondary DJD
  - Trauma
  - Congenital dysplasia
  - Metabolic disease

Risk factors

- Gender → estrogen receptors :on TMJ
- Daiet :hard or chewy foods → ↑loads on the TMJ
- Genetics
- Psychological stress → parafunctional activites (bruxism or clenching)

Clinical manifestions

- Pain directly over the affected condyle
- Limitation of mandibular opening
- Crepitus
- Feeling of stiffness after a period of inactivity

Radiogaphic finding

- Narrowing of the joint space
- Irregular joint space
- Flattening of the articular surfaces
- Osteophyte formation
- Presence of subchondral cyst

Rheumatoid arthritis

- Affected periarticular tissue and secondarily bone
- Vasculitis of synovial membrane → chronic inflammation → granulation tissue
- The TMJ involved bilaterally
- Pain :the early acute phase
- Morning stiffness
- Joint sounds
- Tenderness and swelling over the joint area

- Anterior open bite are commonly in juvenile idiopathic arthritis
- In radiography:Narrowing of the joint space
- Destructive lesions of the condyle
- erosions of the condyle and glenoid fossa

treatment

- Anti-inflmmatory drugs + therapy For the systemic disease
- Flat- plane occlusal appliance
- Intra-articular steroid
- Orthognatic surgery

Seronegative spondyloarthropethies

- Rheumatoid factor → negative
- Include:
  - Ankylosing Spondylitis
  - Psoriatic arthritis
  - reiter's syndrom
- Joint Pain with function
- Limitation of mandibular opening
- erosions of the condyle

Ankylosing Spondylitis

- Involved spine
- inflammation→ new bon formation→
  - fuse , reduction mobility
- TMJ was Involved :15%-20%→
  - Limitation of mandibular opening
  - Pain
  - crepitus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Connective tissue disease

- Systemic lupus
- Systemic sclerosis
- Diseases with Crystal deposits in joint
  - Gout

Treatment

- therapy For the systemic disease
- Physiotherapy
- Oral appliance therapy
- NSAID
- Intra-articular steroid

Synovial chondromatosis

- Uncommon benign
- Multiple cartilaginus nodules
  - Slow progressive swelling in the pretragus
  - Pain
  - Limitation of mandibular movement
- Mistaken for a chondrosarcoma
- Intracranial extension → facial nerve paralysis

Septic arthritis

- Infection may result:
  - Bloodborn bacterial (gonococccci)
  - Extention of infection from adjacent sites
    - Middle ear , maxillary molars , parotid gland

Clinical manifestions

- Trismus
- Deviation of the mandible to the affected side
- Severe pain on movement
- Inability to occlude the teeth
- Redness and swelling over the involved joint
- Large cervical lymph nods

sequelae

- Osteomyelitis of the temporal
- Brain abscess
- Ankylosis

- **Teatment:**
  - Surgical drainage
  - Joint irrigation
  - Antibiotics(4-6 weeks)

Developmental defects

- Hyoerplasia (coronoid process,condyle)
- Hypoplasia
- Agenesis
- Bifid condyle
- Facial asymmetry

Dislocation

- Result eating or yawning and less commonly trauma
- Contrast subluxation cannot return to its normal position without assistance
- Subluxation is variation of normal function

ankylosis

- Most common cause : trauma
- Prolonged immobilization following condylar fracture
- Treatment: gap arthroplasty

broxism

- Occlusal appliances
- SSRIs
- Buspiron
- Botulinum toxin