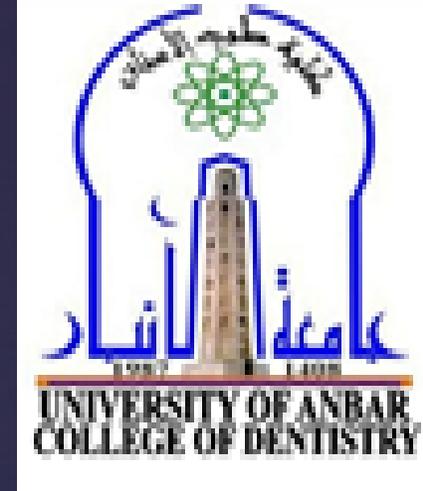


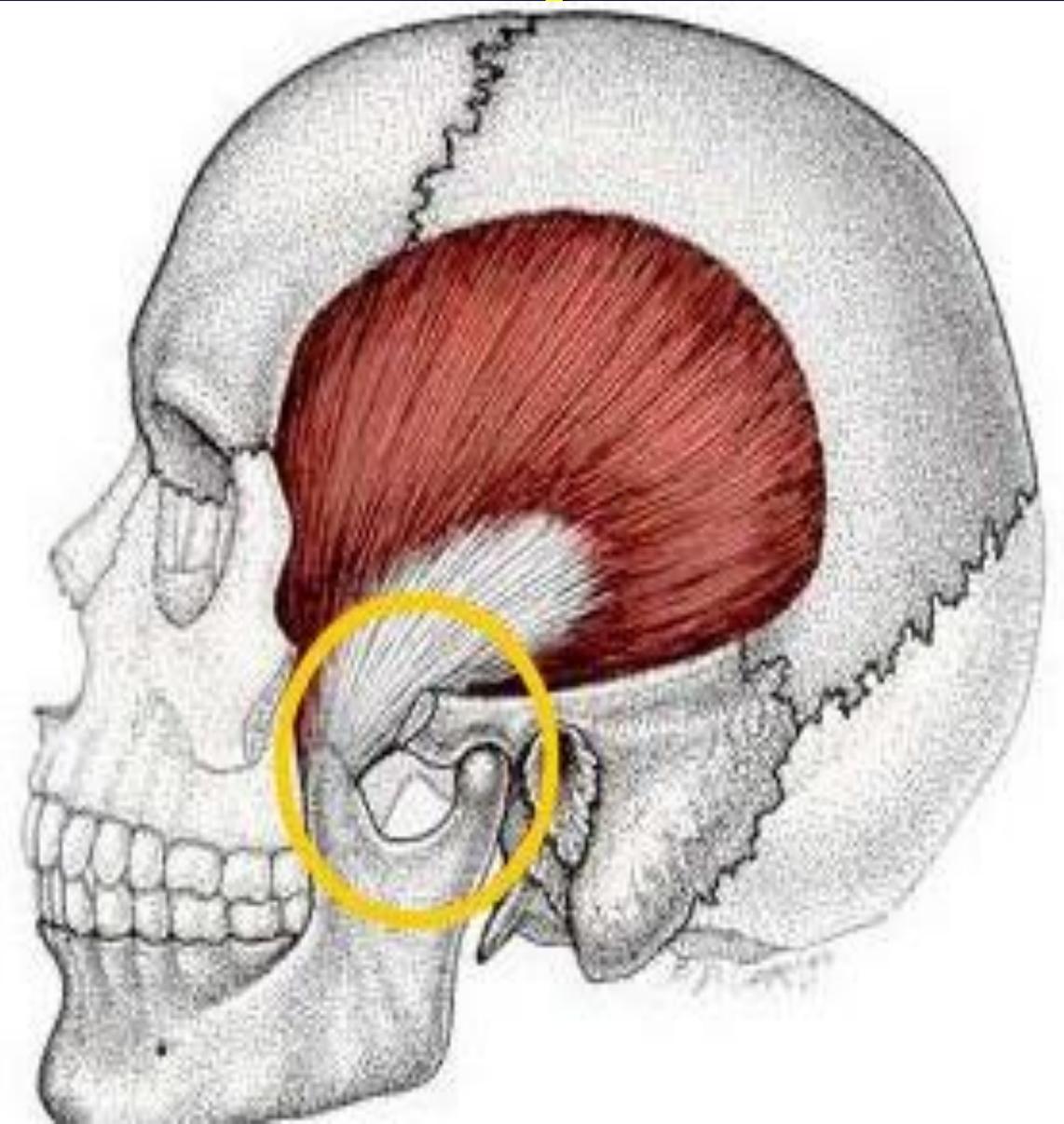
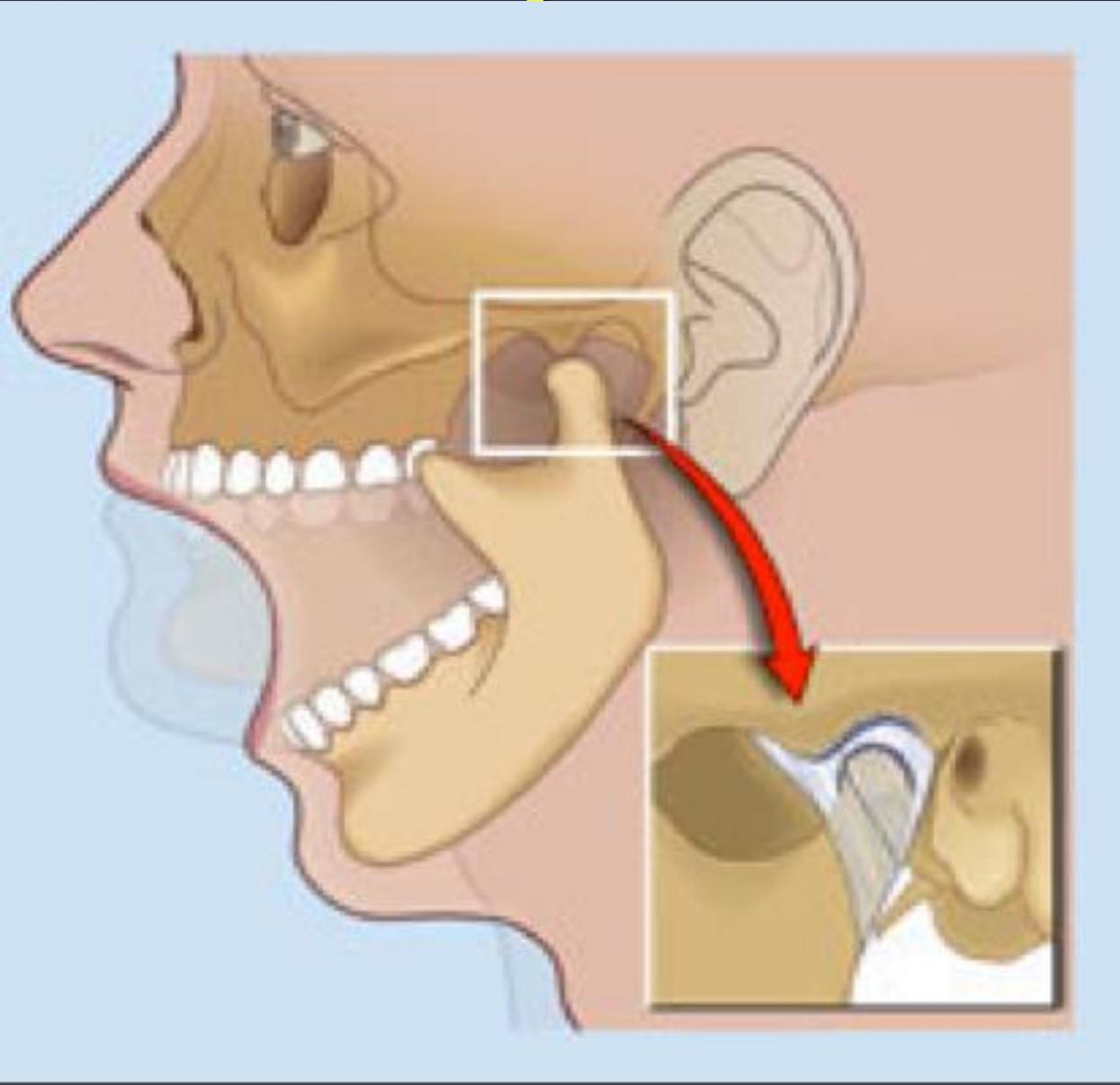
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College of Dentistry



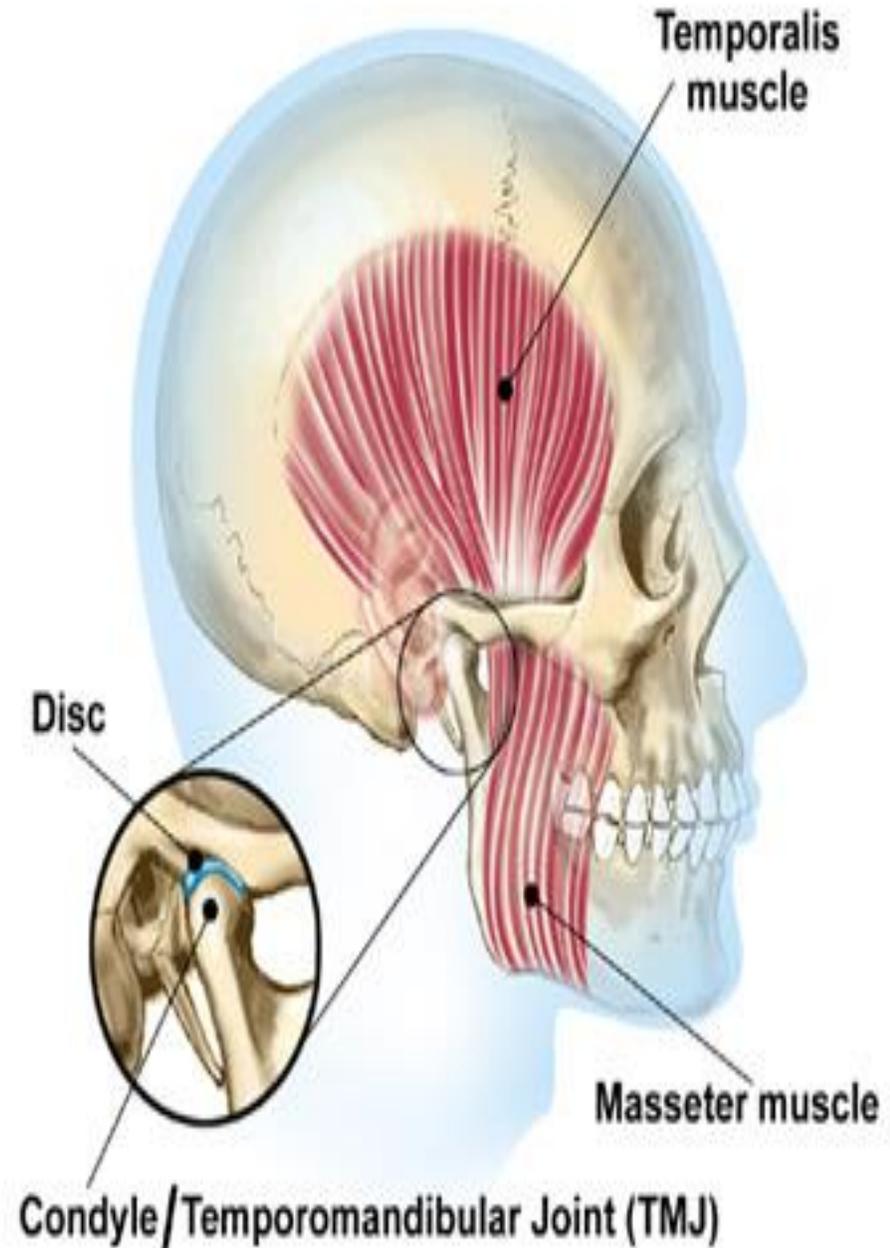
Oral Medicine

Dr. Shaimaa Hamid
PhD of Oral Medicine

Temporomandibular Joint

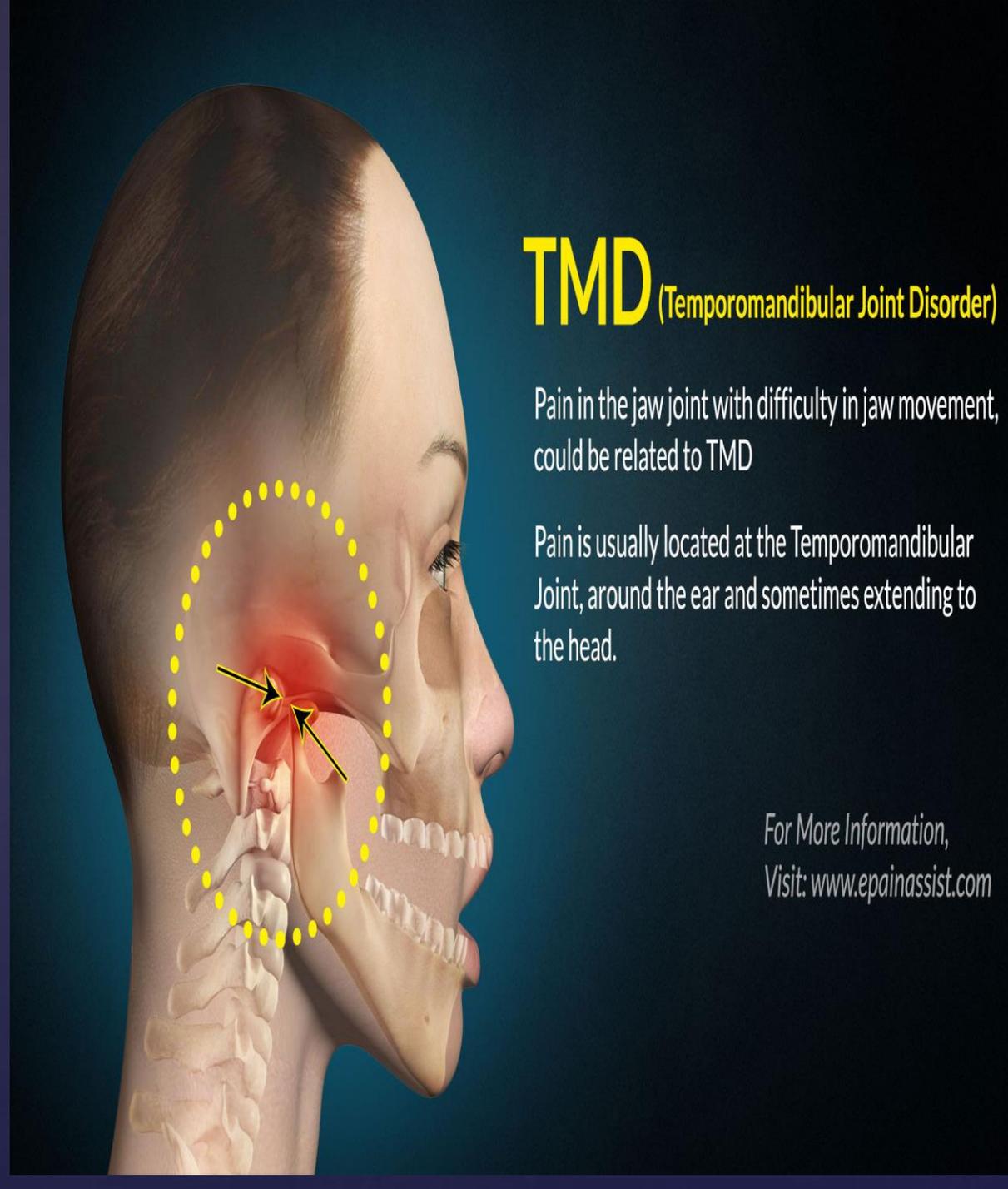


Temporomandibular disorders (TMDs) is a collective term embracing a number of clinical problems that involve **the masticatory muscles,** the temporomandibular joints (TMJs) and associated structures, **or both.**



TMD characterized by the presence of one or more of the following signs and symptoms:

- (1) facial pain in the region of the TMJs and/or muscles of mastication,
- (2) limitation or deviation in mandibular movements,
- (3) TMJ sounds during jaw movement and function.



TMD (Temporomandibular Joint Disorder)

Pain in the jaw joint with difficulty in jaw movement, could be related to TMD

Pain is usually located at the Temporomandibular Joint, around the ear and sometimes extending to the head.

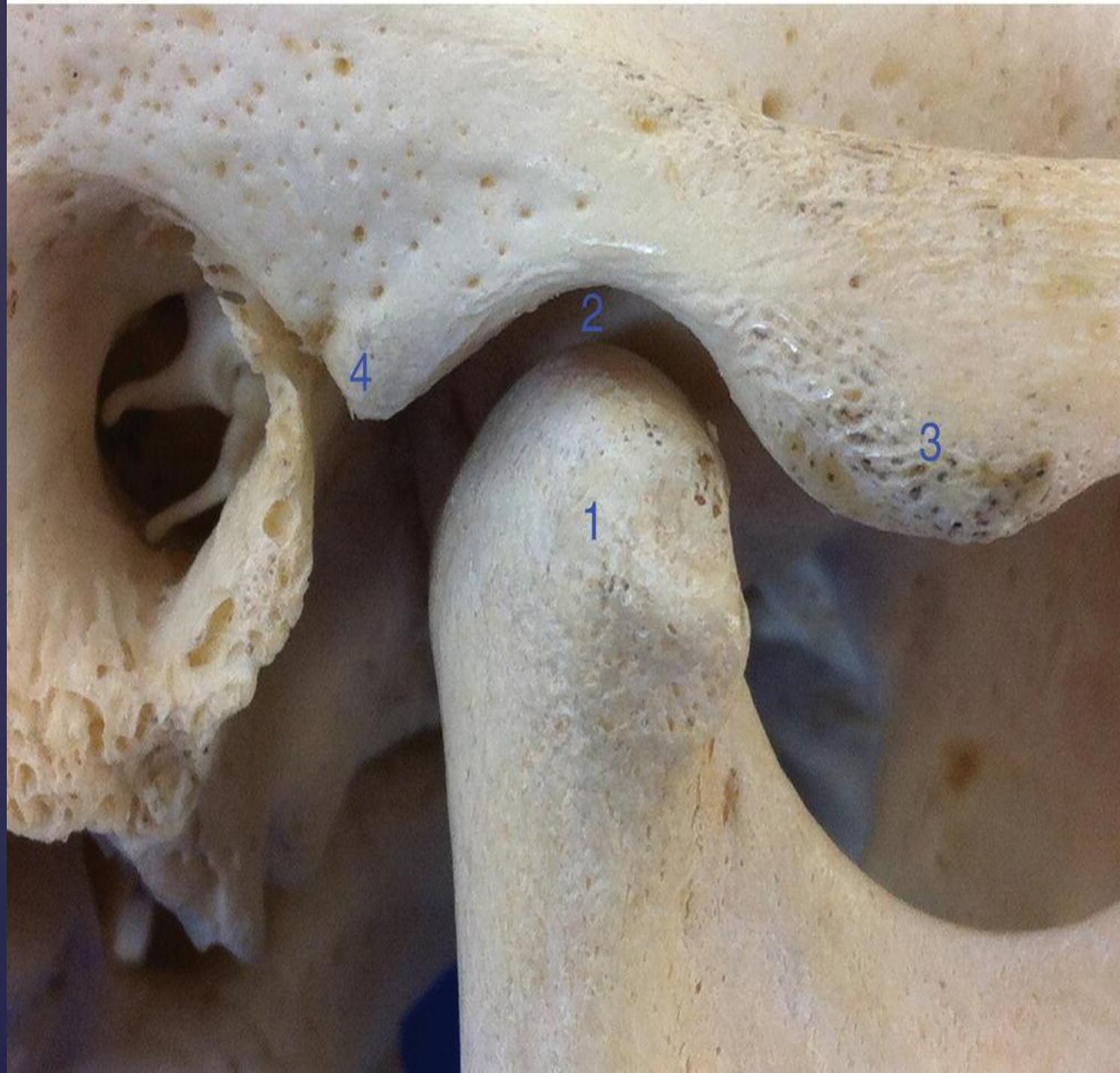
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Functional Anatomy

The TMJ articulation is a joint that is capable of hinge-type movements and gliding movements.



The articulation is formed by the mandibular condyle, which forms the lower part of the bony joint occupying a hollow in the temporal bone (the mandibular or glenoid fossa) which form the upper part of the bony joint.



During wide mouth opening, the condyle rotates around a hinge axis and glides, causing it to move beyond the anterior border of the fossa, identified as the articular eminence.

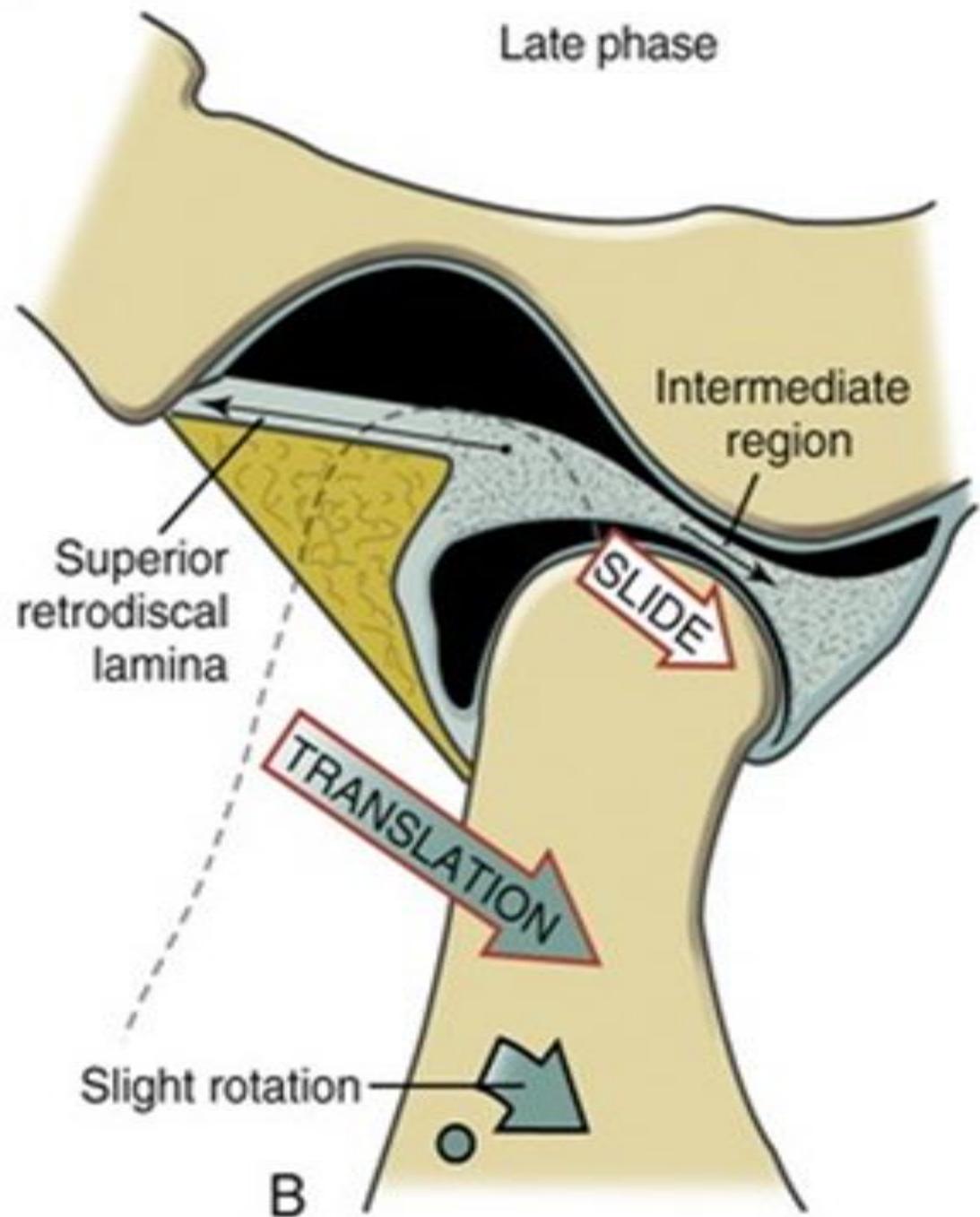
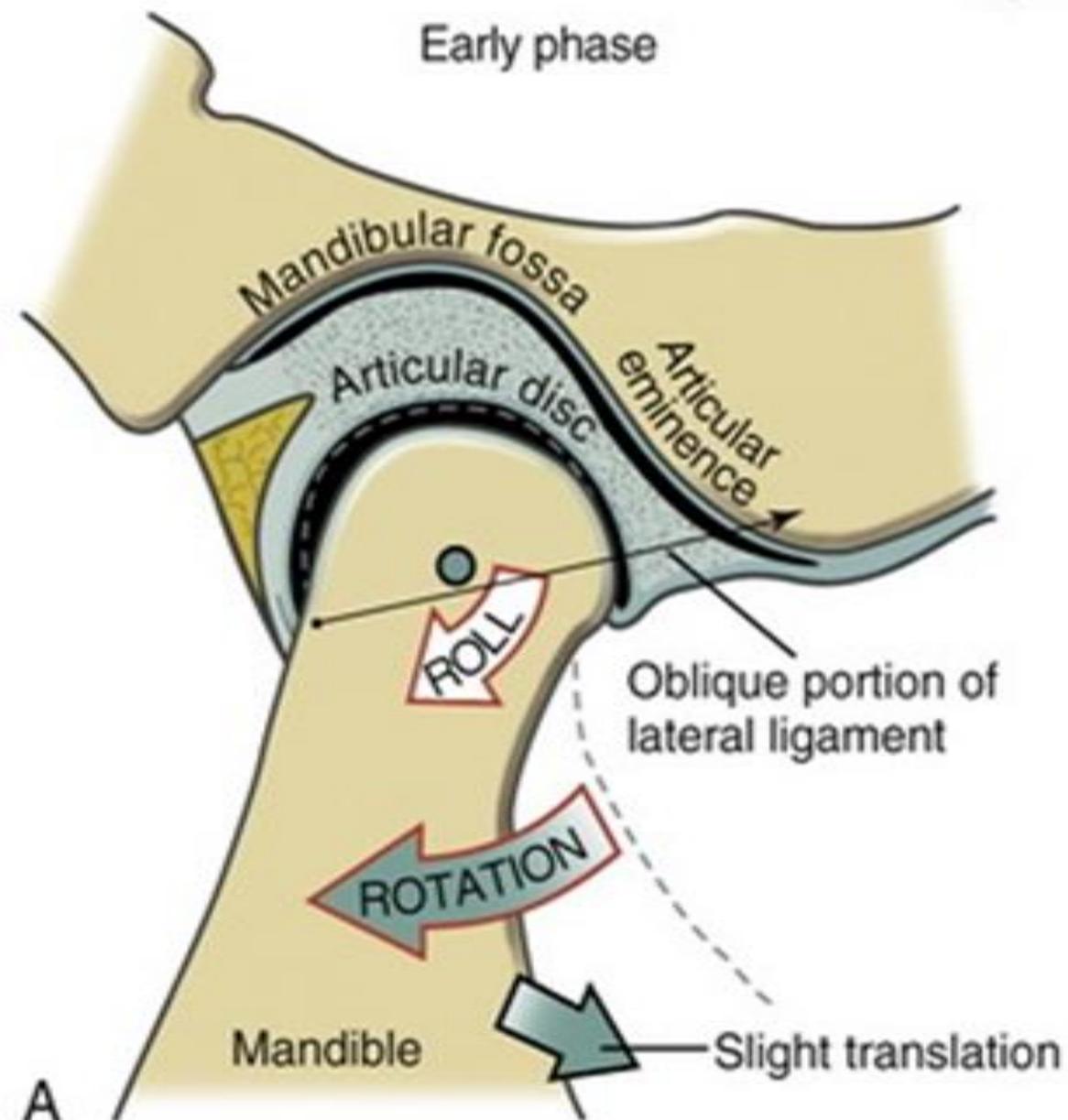
The TMJ has a rigid end point determined by tooth contact.

Rotation of the condyle contributes more to normal mouth opening than translation.

Opening the mouth

Early phase

Late phase



A

B

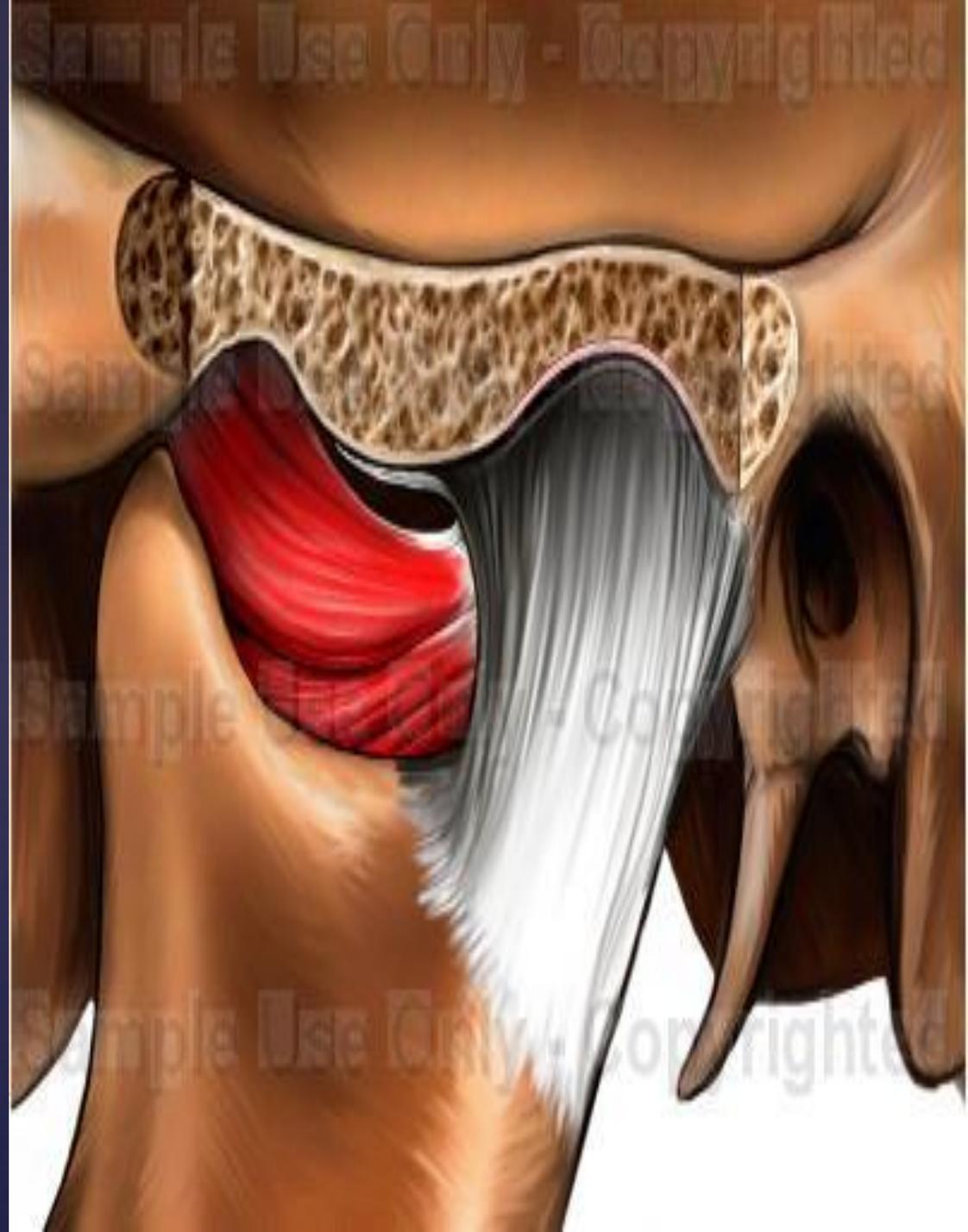


The bony components are enclosed and connected by a **fibrous capsule**.

The capsule is lined with **synovium** and the joint cavity is filled with **synovial fluid**.

The **synovium** is a vascular connective tissue lining the fibrous joint capsule and extending to the boundaries of the articulating surfaces.

Synovial fluid is a filtrate of plasma with added mucins and proteins. Fluid forms on the articulating surfaces and decreases friction during joint compression and motion.

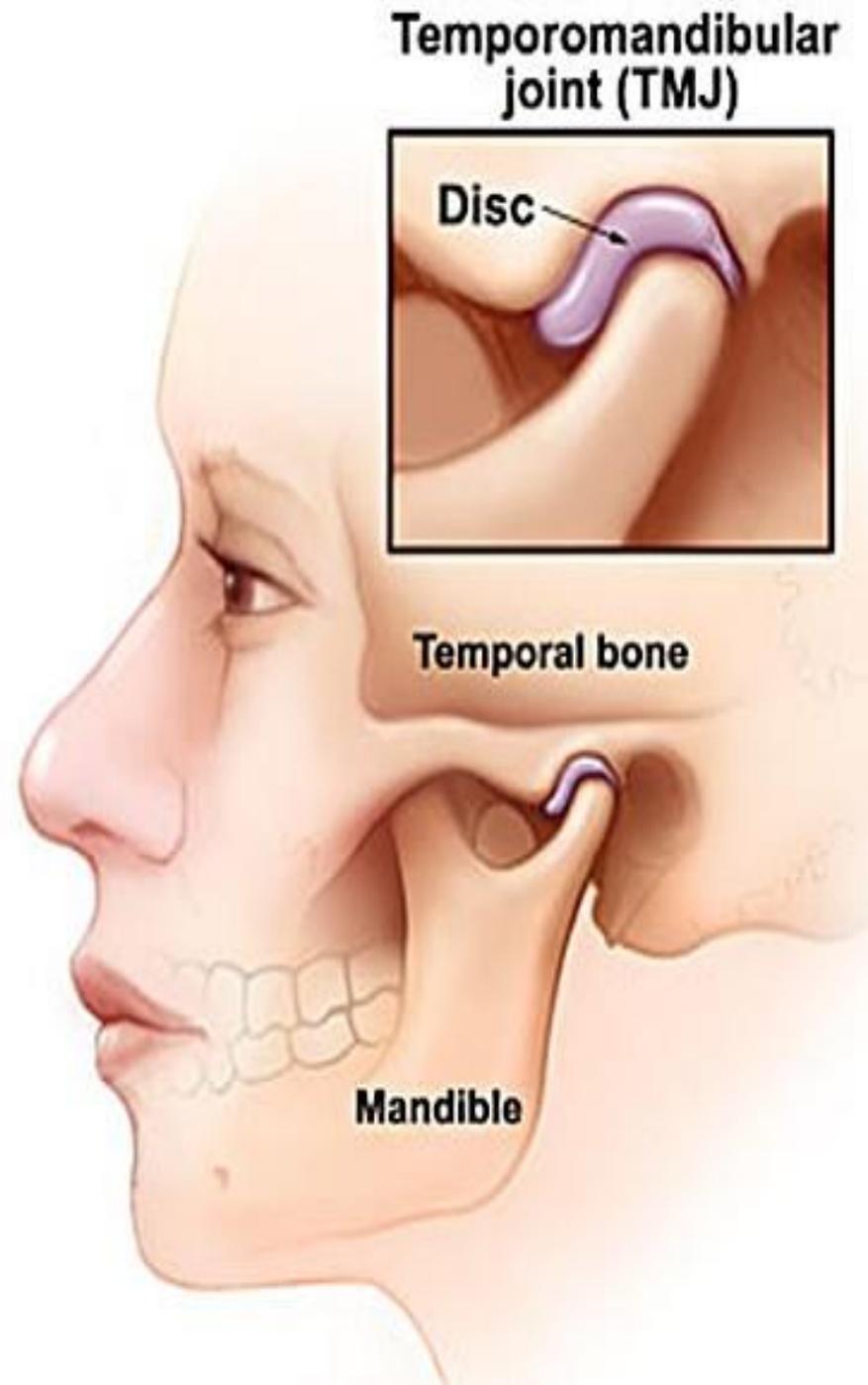


Articular Disc

A fibrocartilage made up primarily of dense collagen of variable thickness and referred to as a disc occupies the space between the condyle and mandibular fossa.

The disc is attached by ligaments to the lateral and medial poles of the condyle.

These ligaments permit rotational movement of the disc on the condyle during mouth opening and closing.

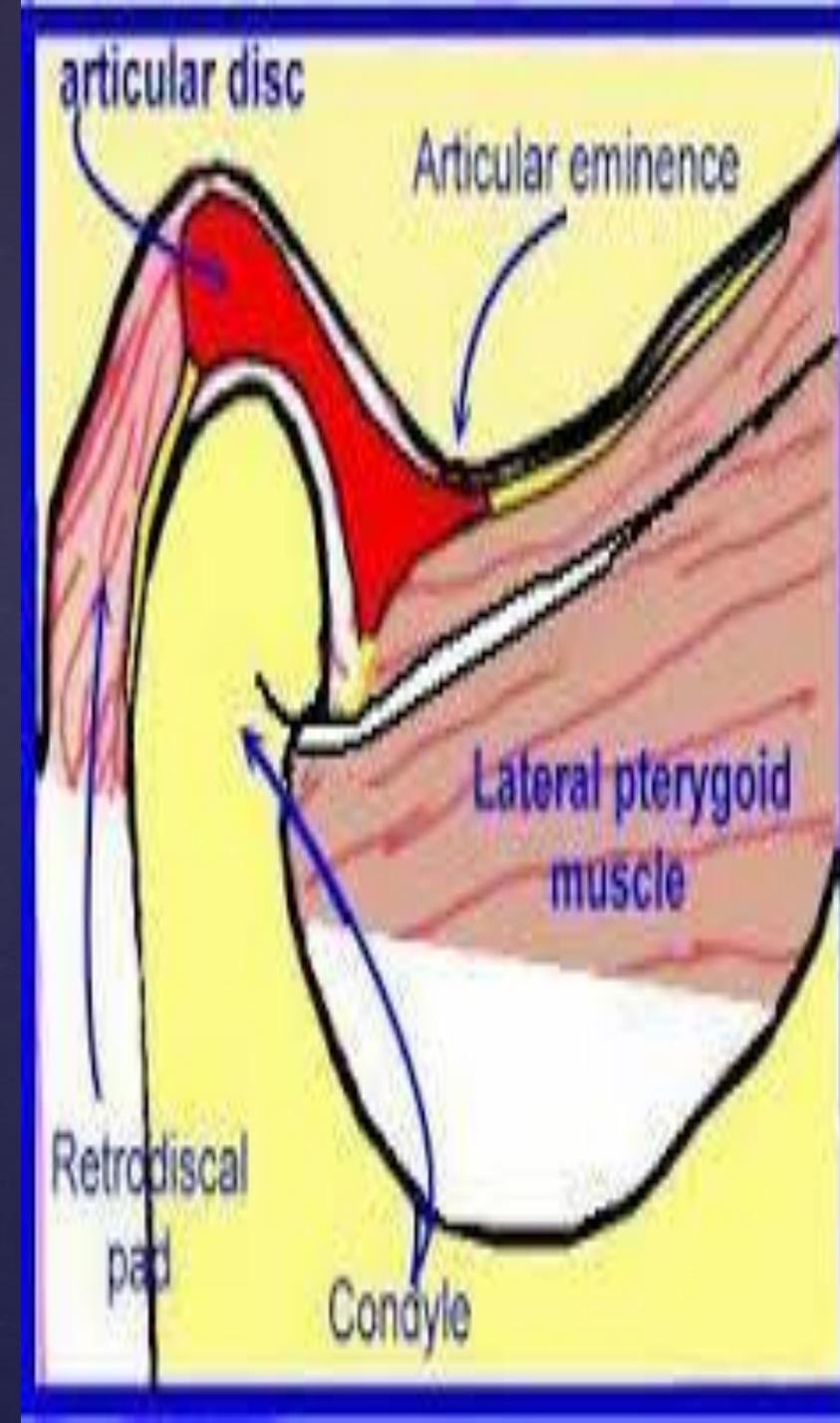


The disc is thinnest in its center and thickens to form anterior and posterior bands.

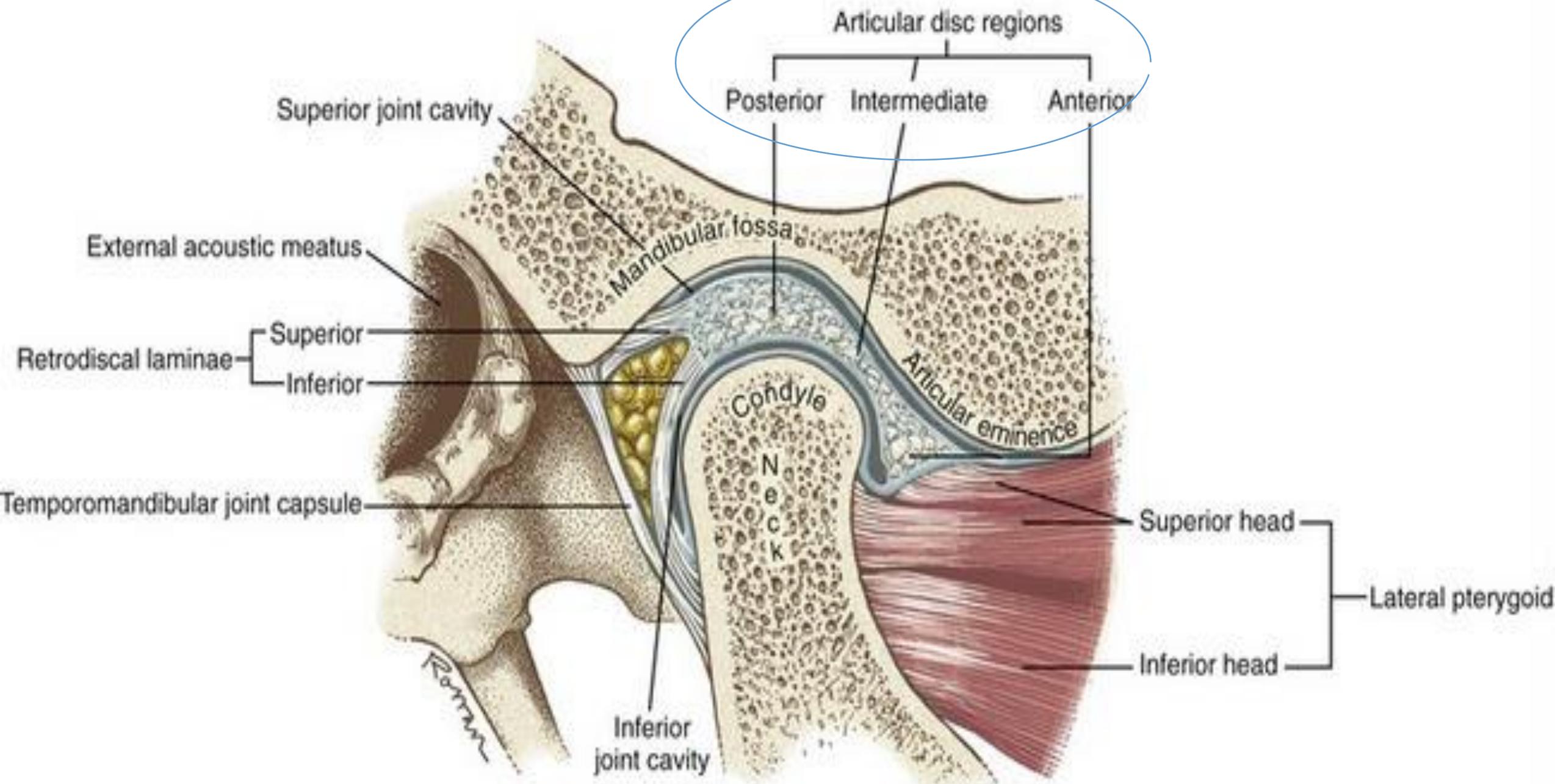
This arrangement is considered to help stabilize the condyle in the glenoid fossa.

The disc is primarily avascular and has little sensory nerve penetration.

The disc provides an interface for the condyle as it glides across the temporal bone.



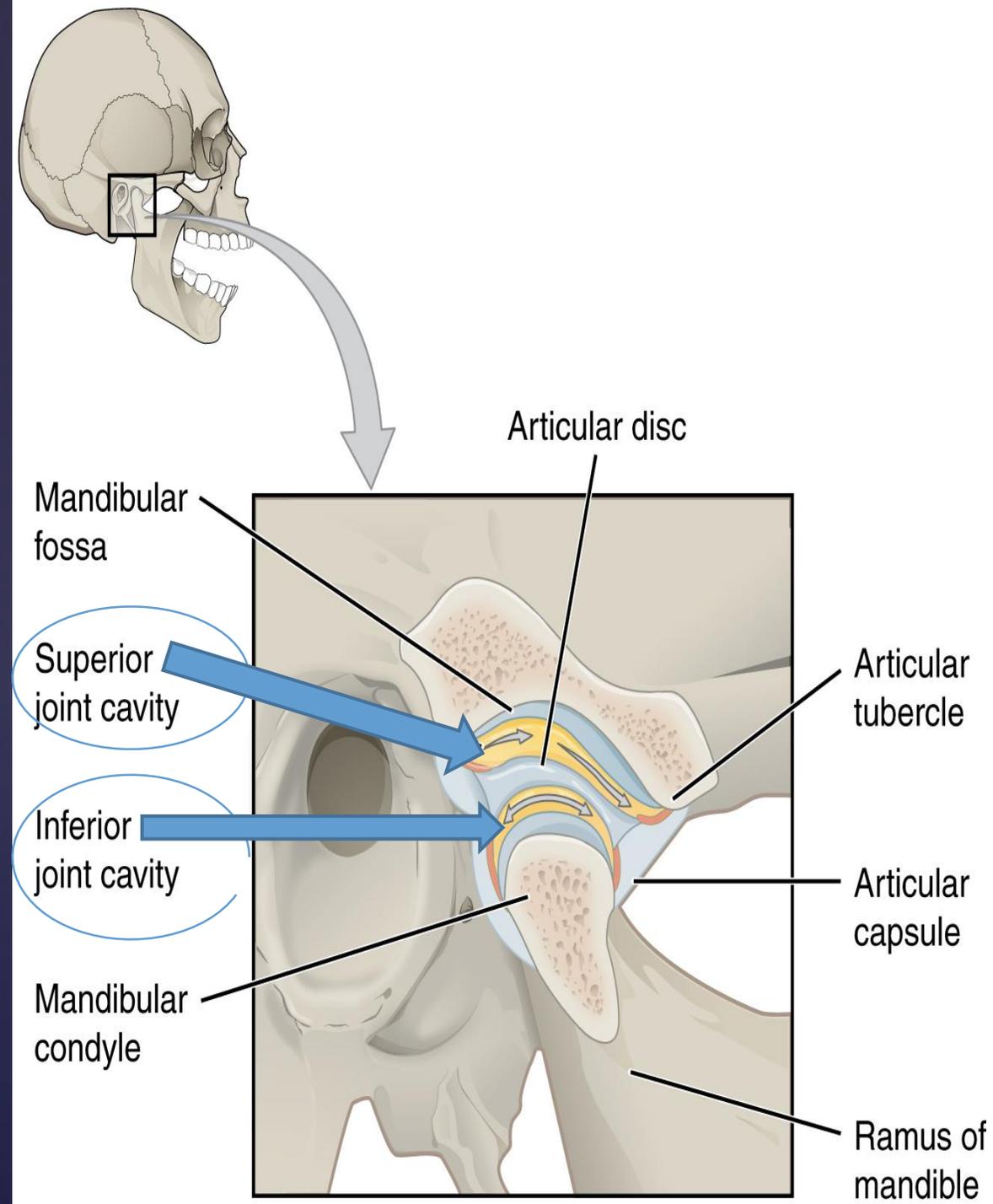
Lateral view



The disc and its attachments divide the joint into **upper and lower compartments** that normally do not communicate.

The roof of the superior compartment is the mandibular fossa, whereas the floor is the superior surface of the disc.

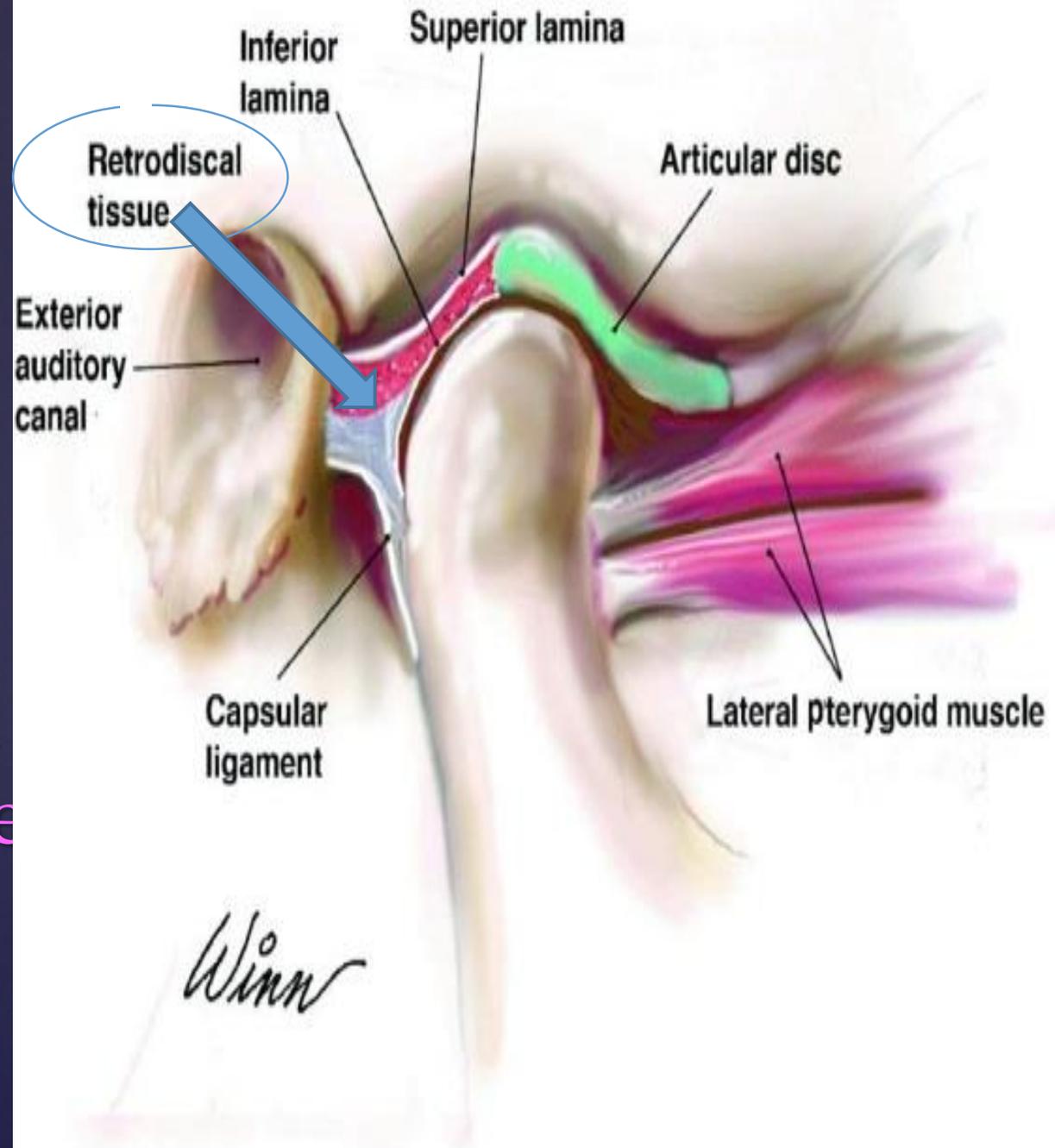
The roof of the inferior compartment is the inferior surface of the disc and the floor is the articulating surface of the mandibular condyle.

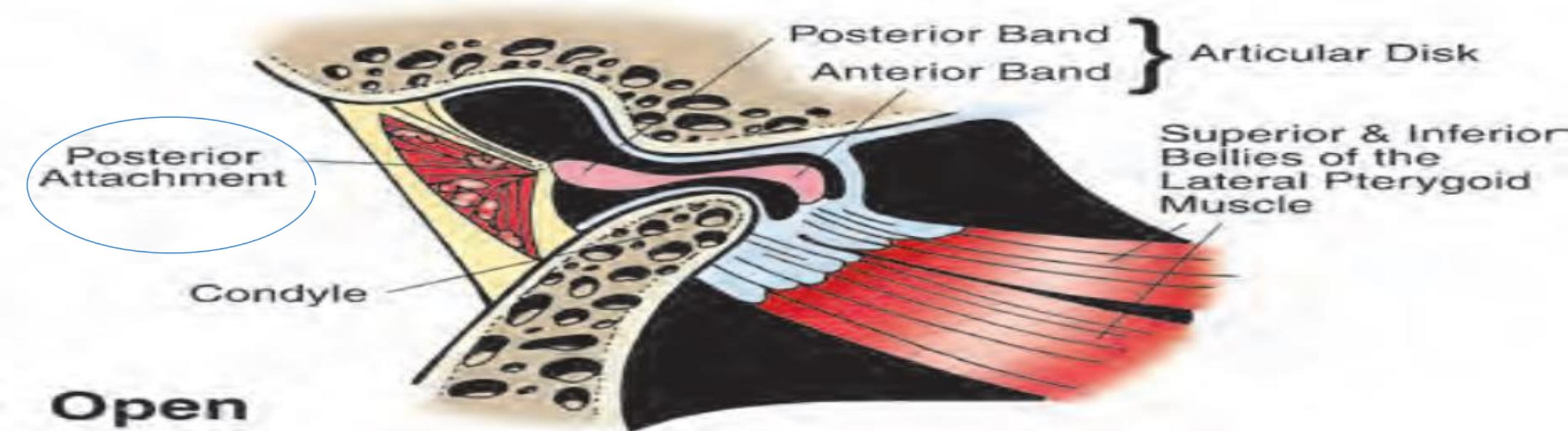
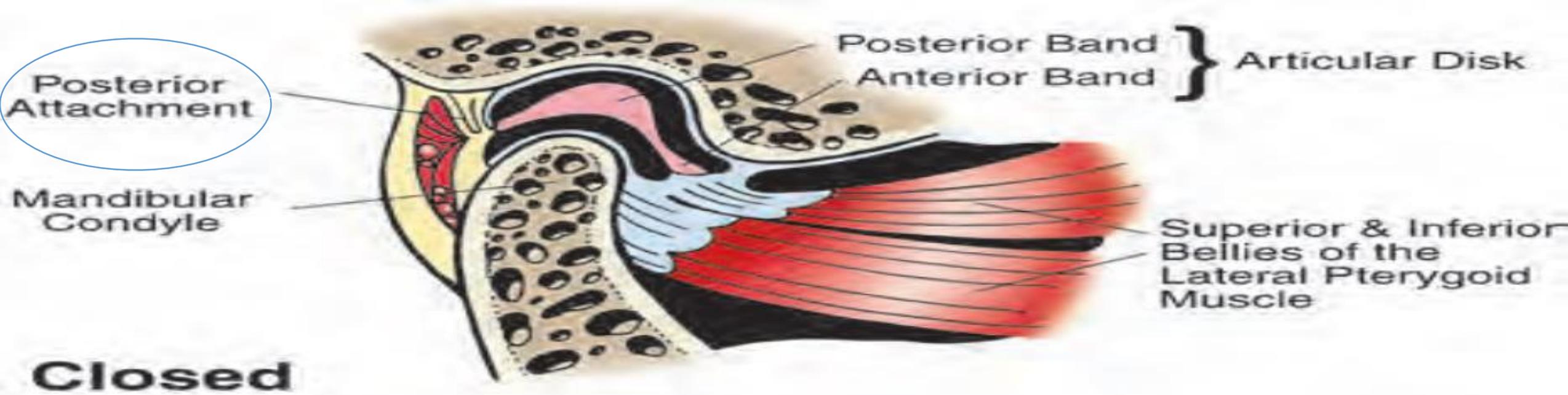


Retrodiscal Tissue

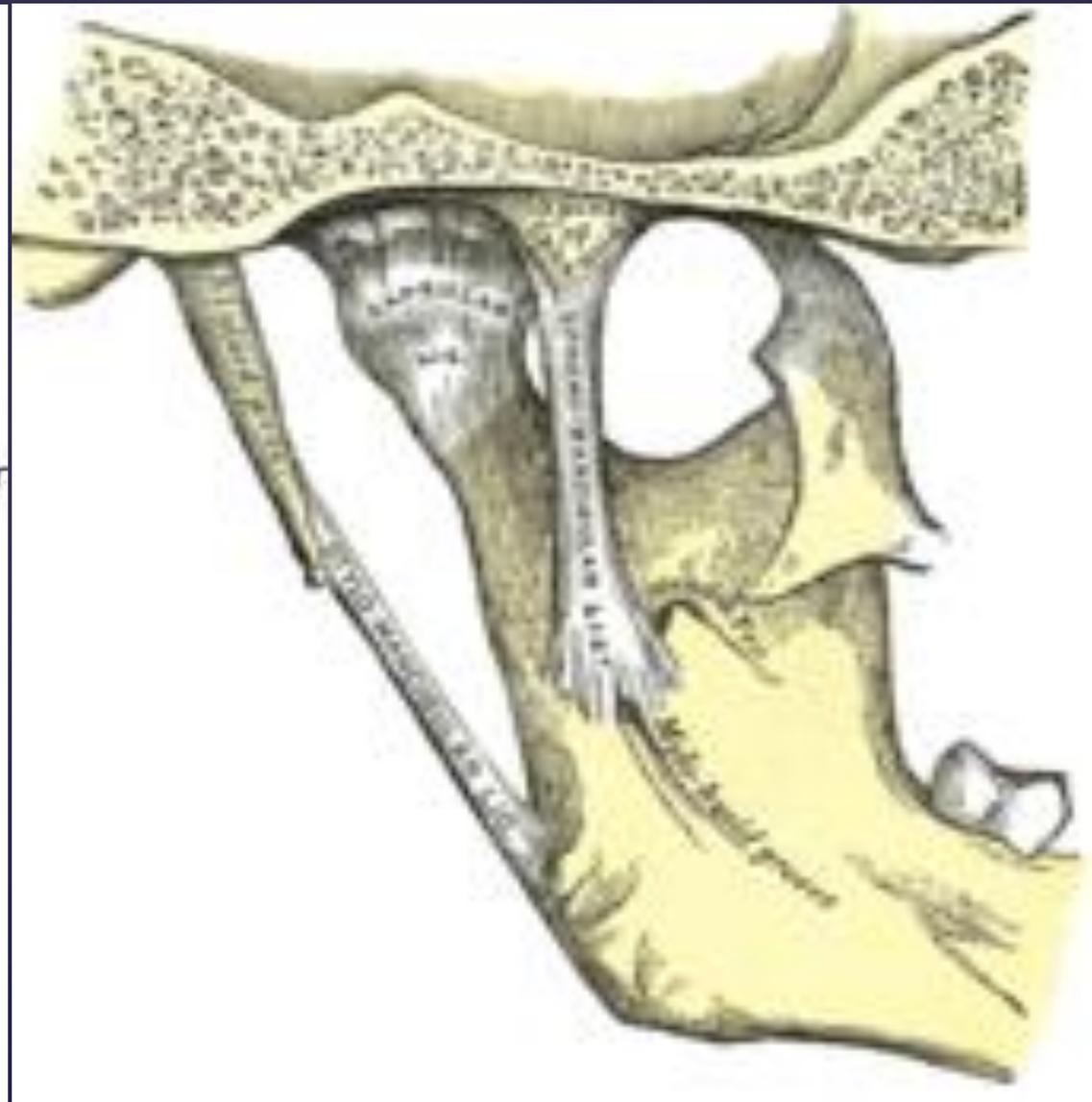
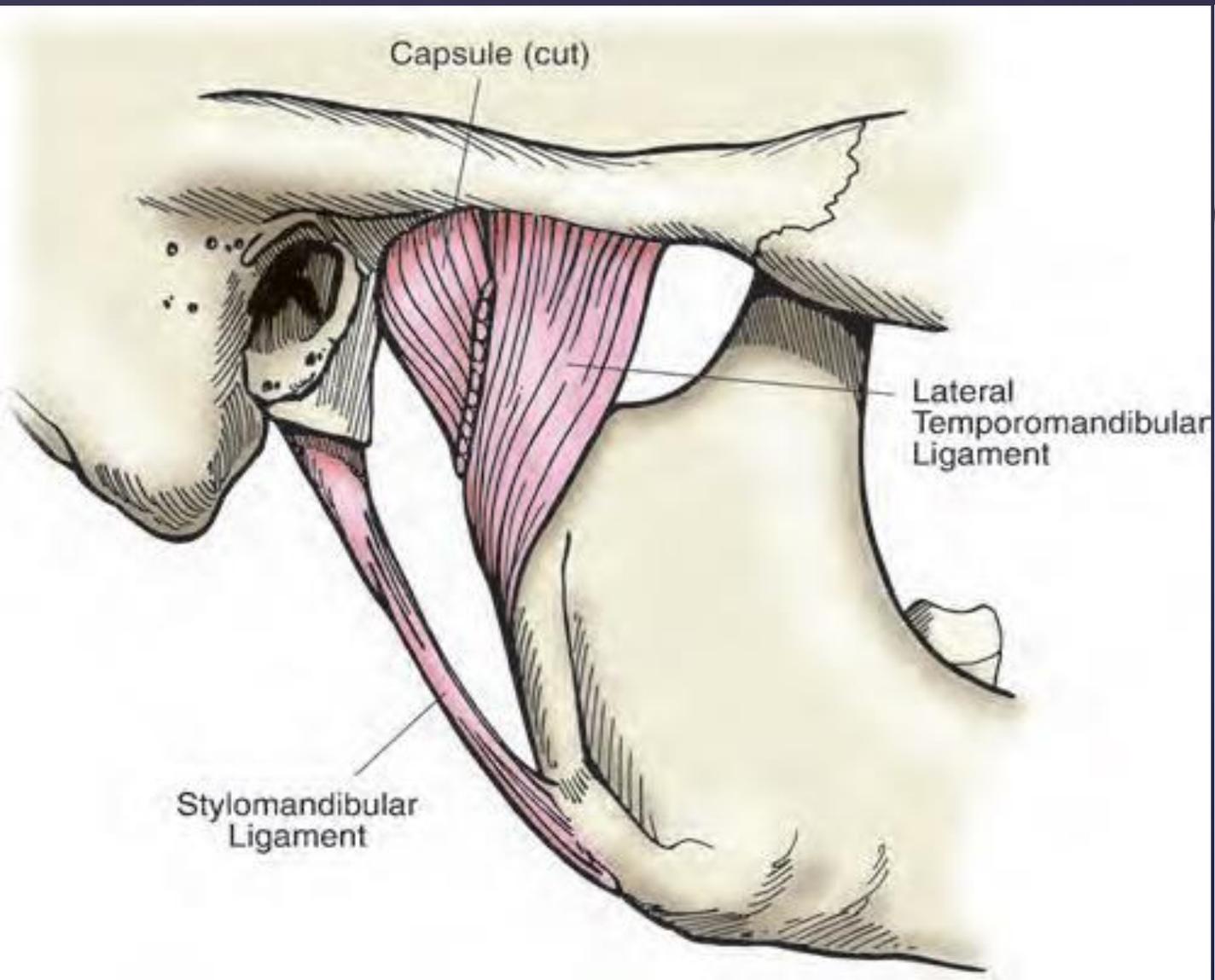
A mass of soft tissue occupies the space behind the disc and condyle. It is often referred to as the posterior attachment.

The attachment has been described as being arranged in two lamina of dense connective tissue (superior and inferior lamina).





Temporomandibular Ligaments



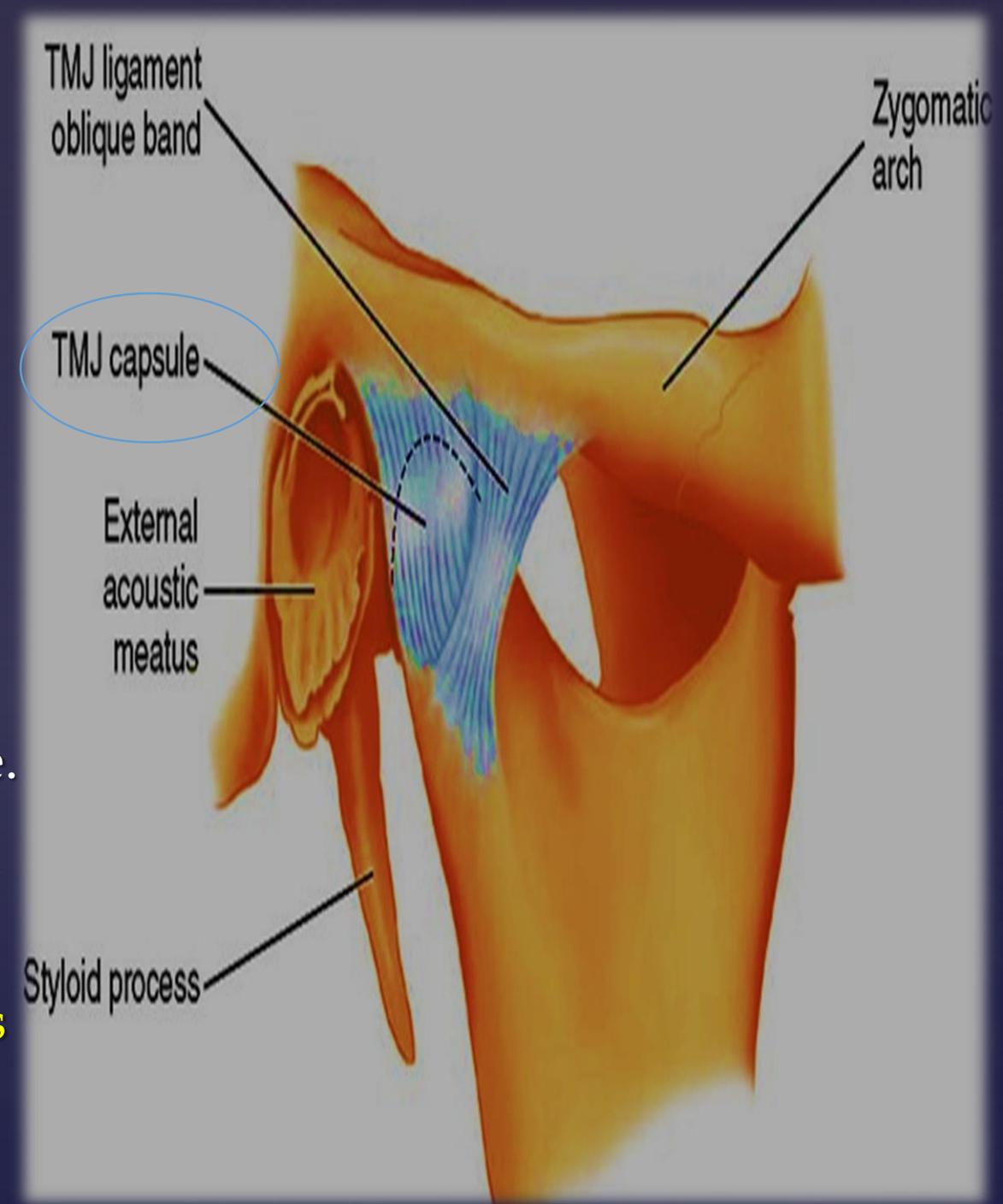
Capsular Ligament

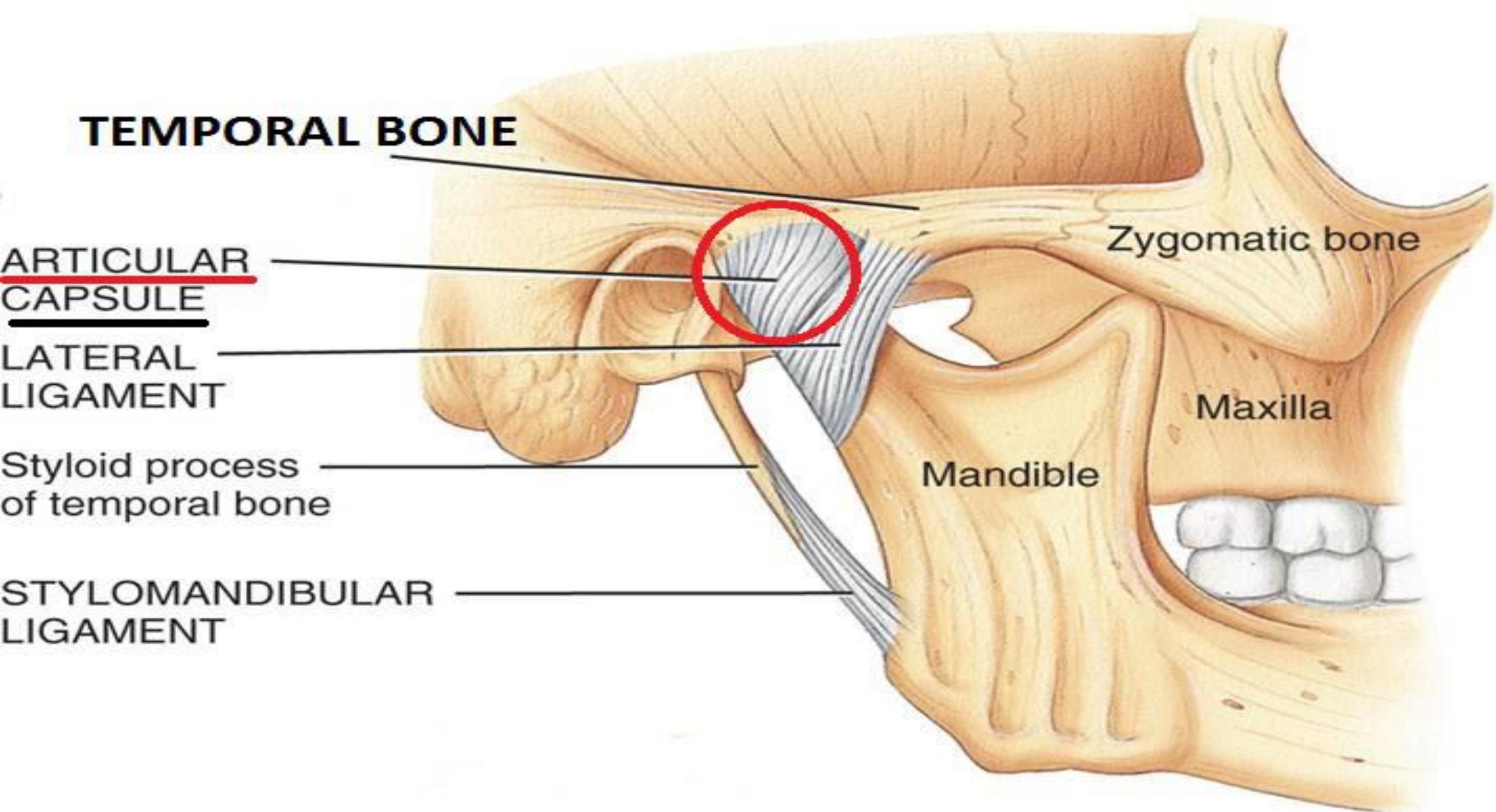
the entire TMJ is surrounded and encompassed by the capsular ligament.

The fibers of the capsular ligament are attached **superiorly** to the temporal bone and **inferiorly**, the fibers are attached to the neck of the condyle.

It acts to resist any medial, lateral or inferior forces that tend to separate or dislocate the articular surface.

Another function is to encompass the joint, thus retaining the synovial fluid.





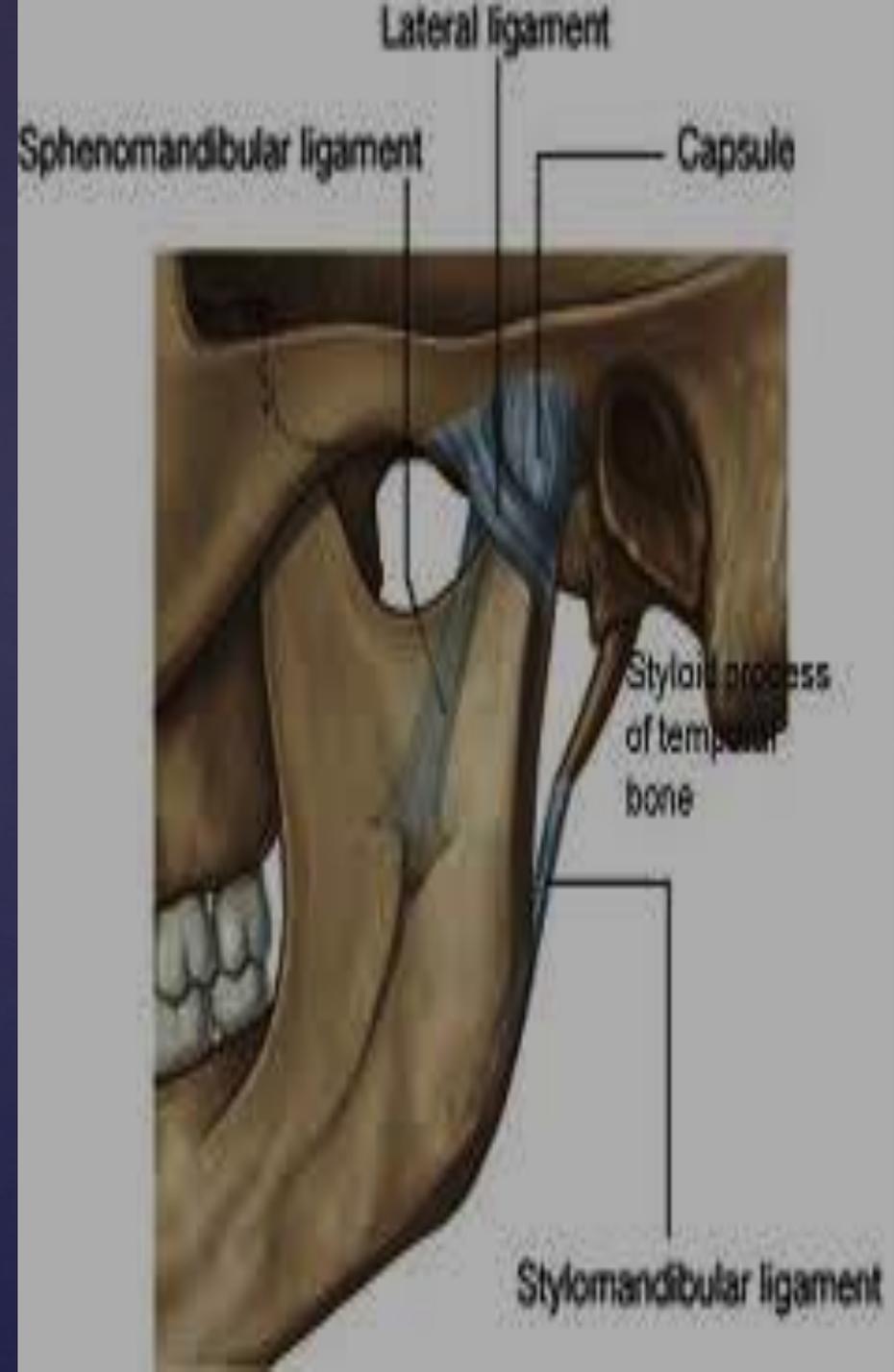
(a) Right lateral view

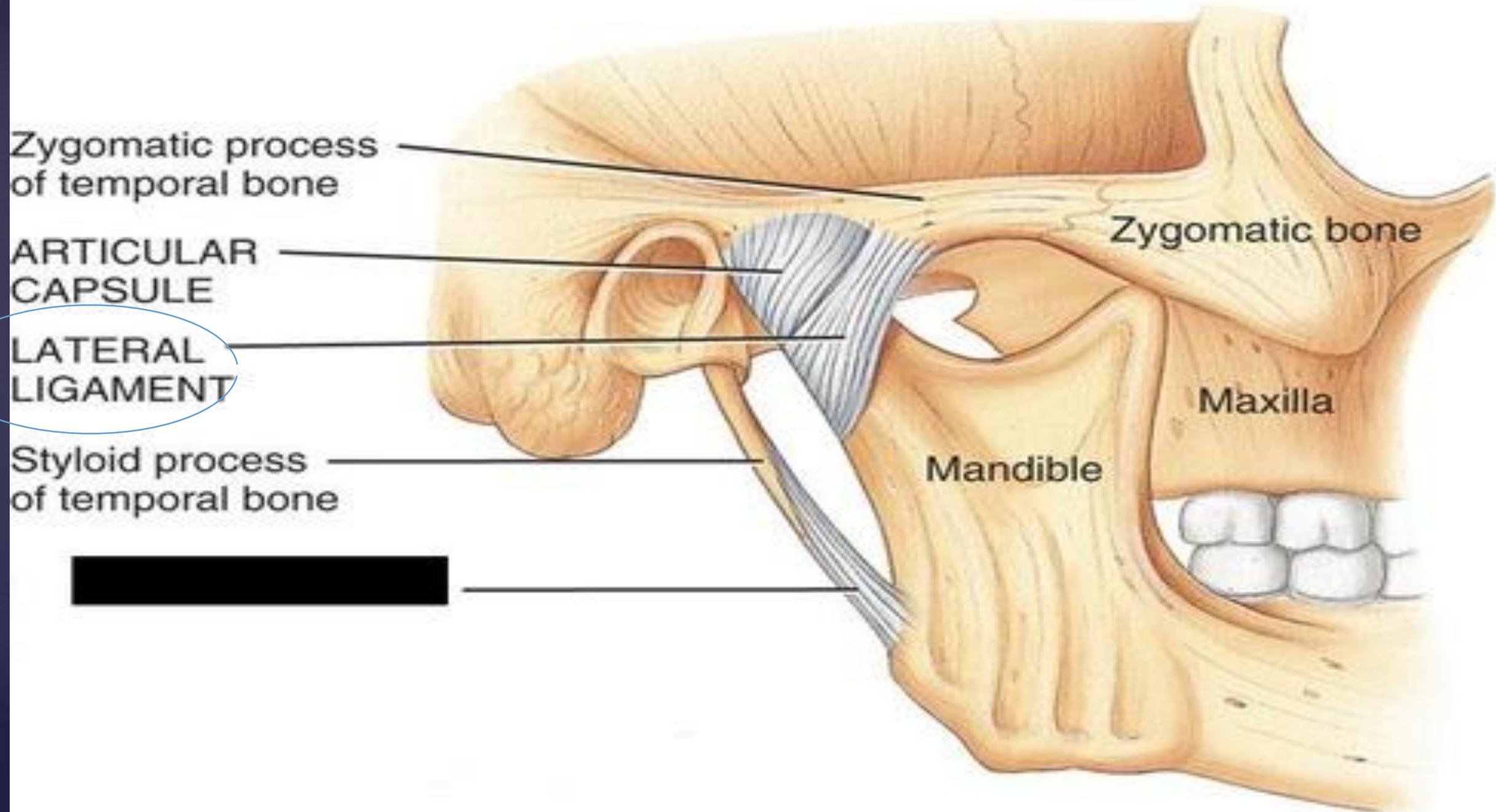
Lateral Temporomandibular Ligament

Is the main ligament of the joint, lateral to the capsule but not easily separated from it by dissection.

It is composed of two parts, an outer oblique portion and an inner horizontal portion.

The oblique portion of the ligament resists excessive dropping of the condyle and therefore acts to limit the extent of mouth opening.

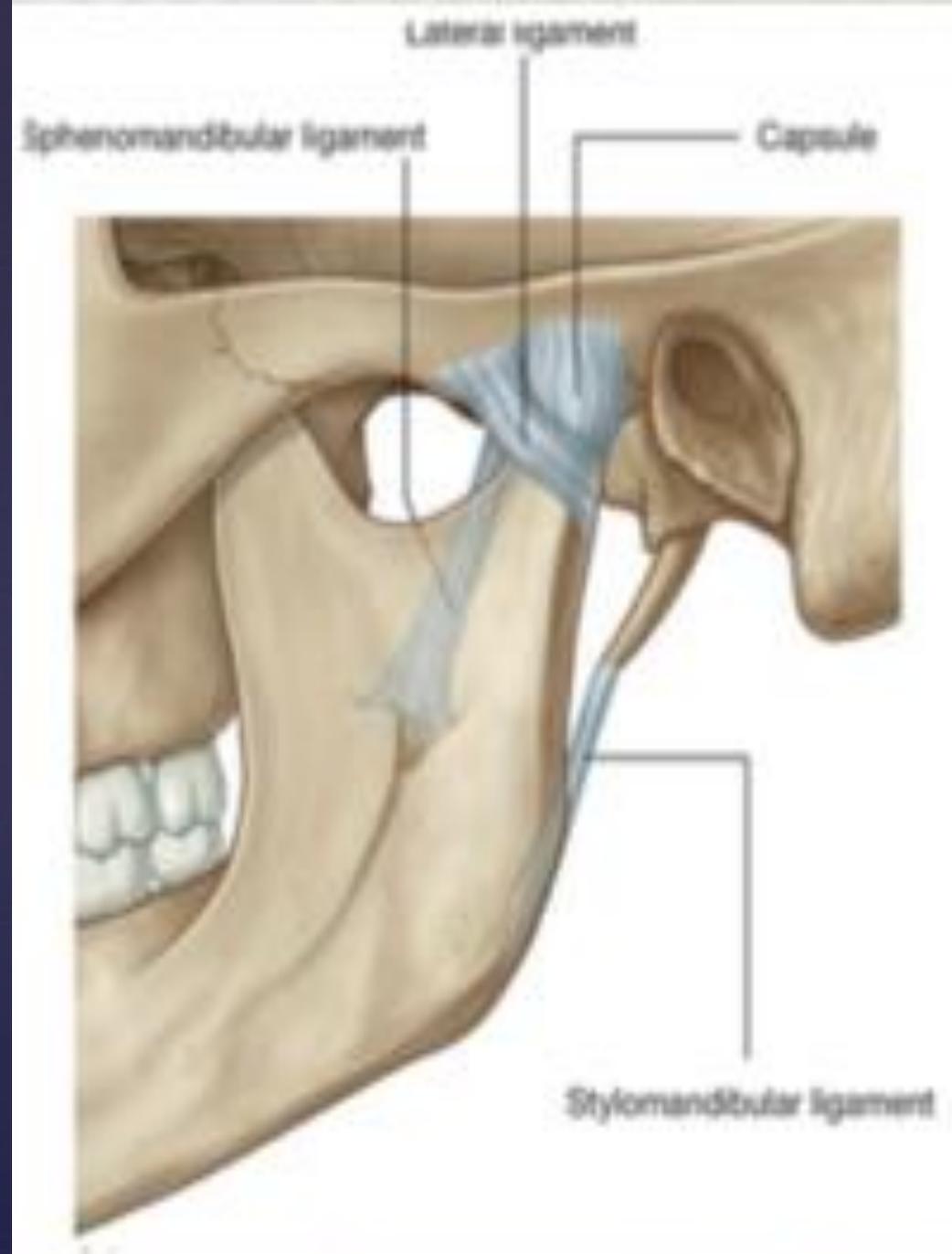




(a) Right lateral view

Accessory Ligaments

- The **sphenomandibular ligament** arises from the sphenoid bone and inserts on the medial aspect of the mandible at the lingula. It is not considered to limit or affect mandibular movement.
- The **stylomandibular ligament** extends from the styloid process to the deep fascia of the medial pterygoid muscle. It is thought to become tense during protrusive movement of the mandible and may contribute to limiting protrusive movement.



Medial view

Capsule of temporomandibular joint

Spine of the sphenoid bone

Sphenomandibular ligament

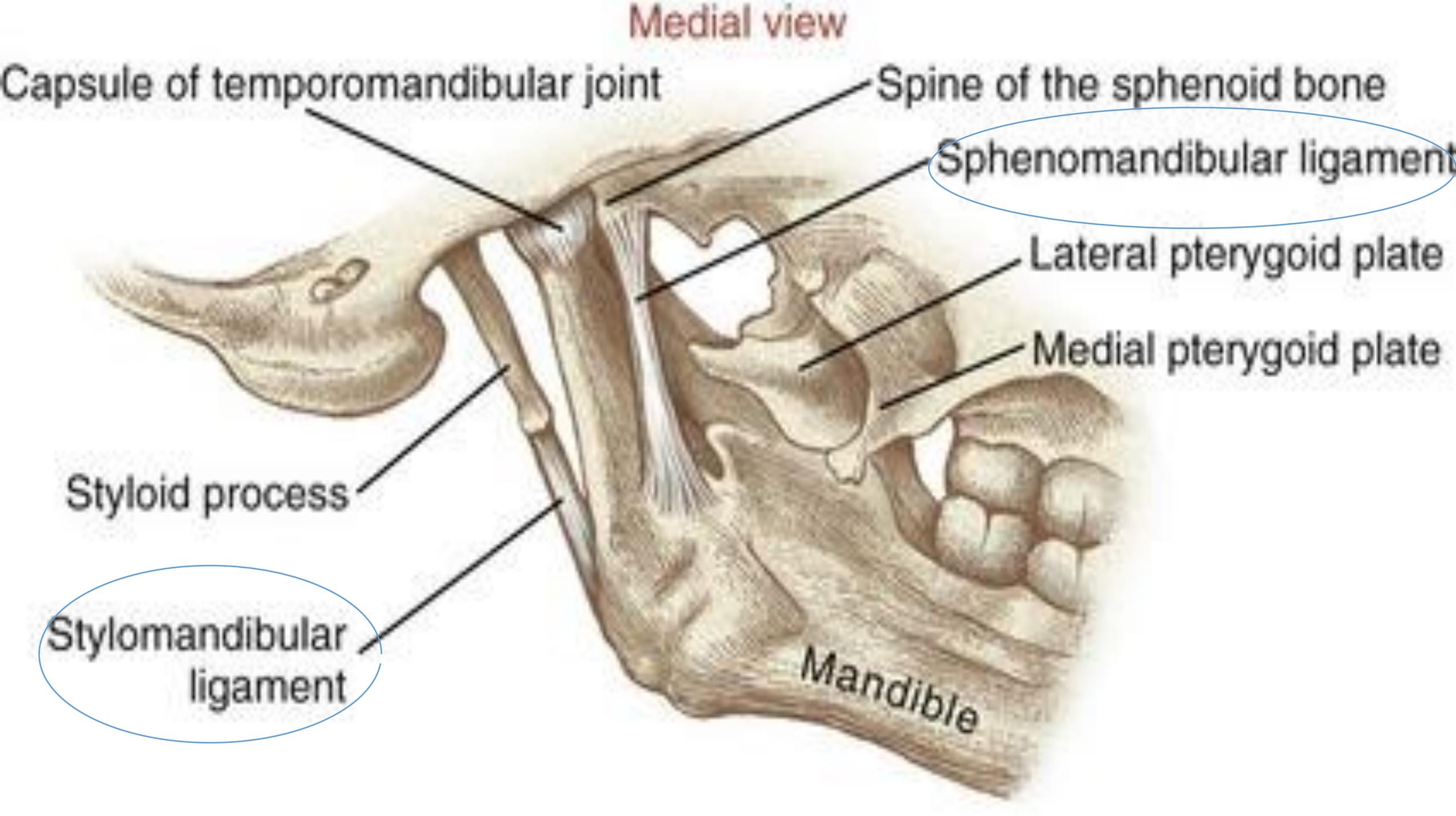
Lateral pterygoid plate

Medial pterygoid plate

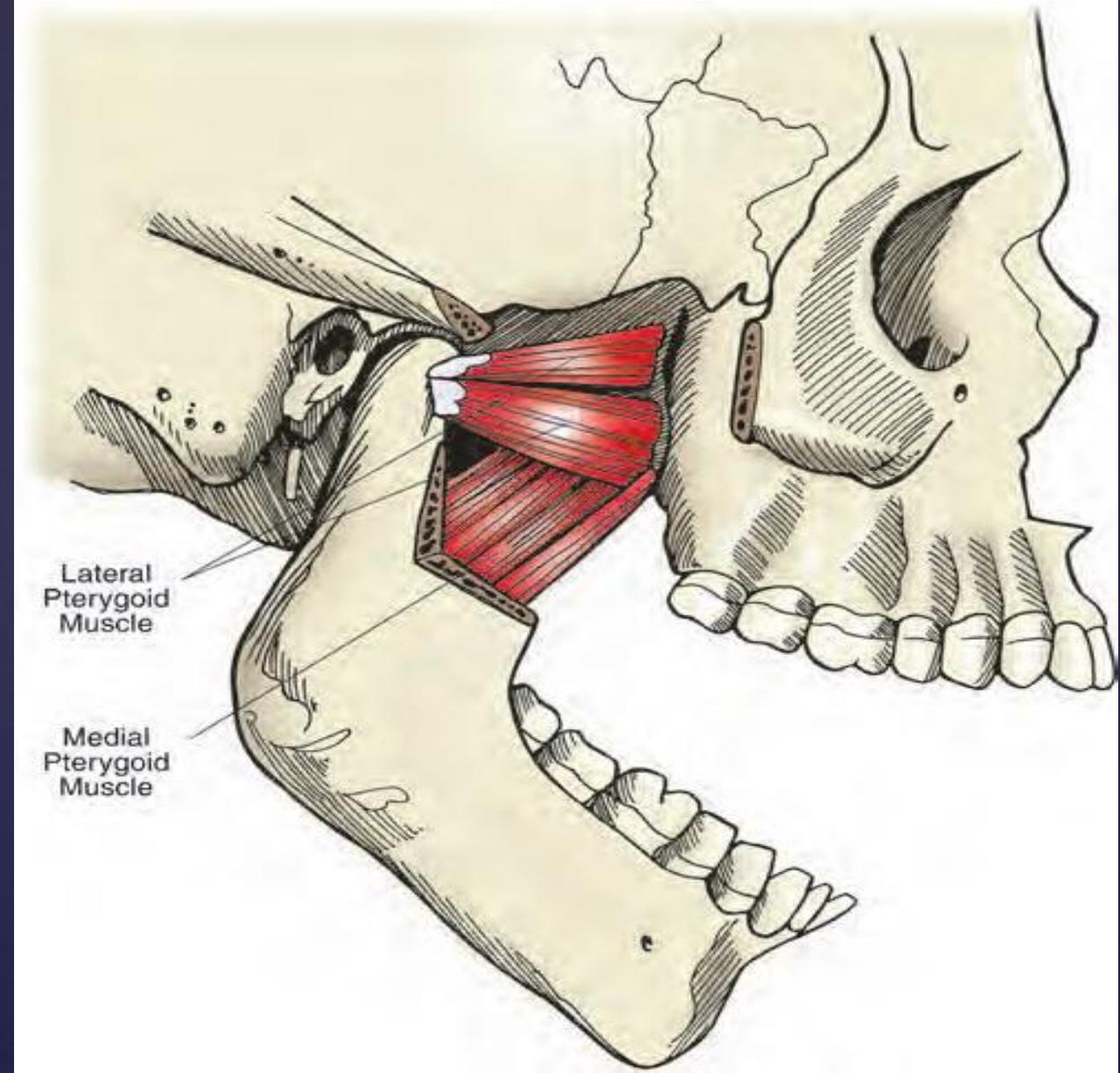
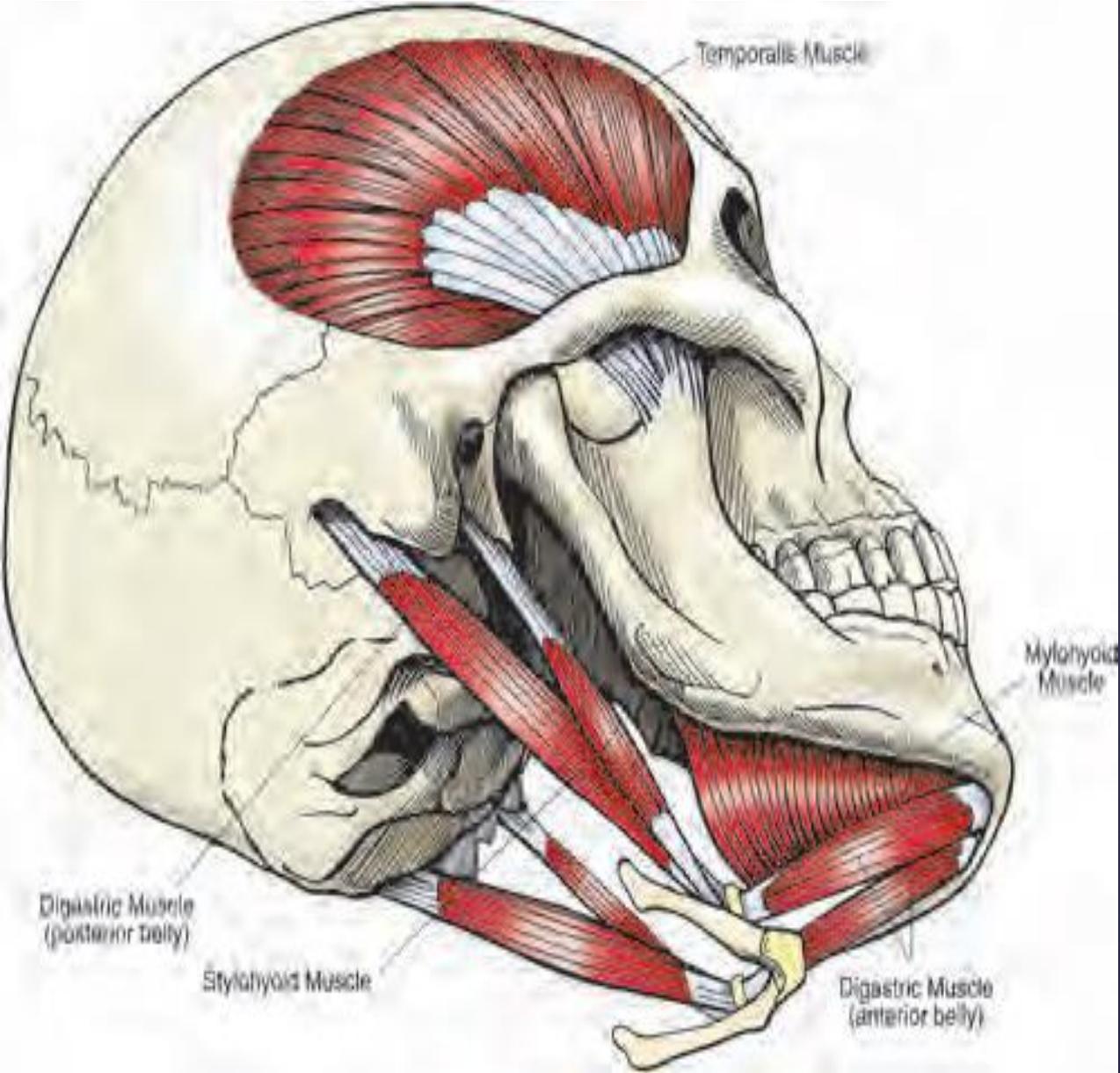
Styloid process

Stylomandibular ligament

Mandible



Muscles of mastication



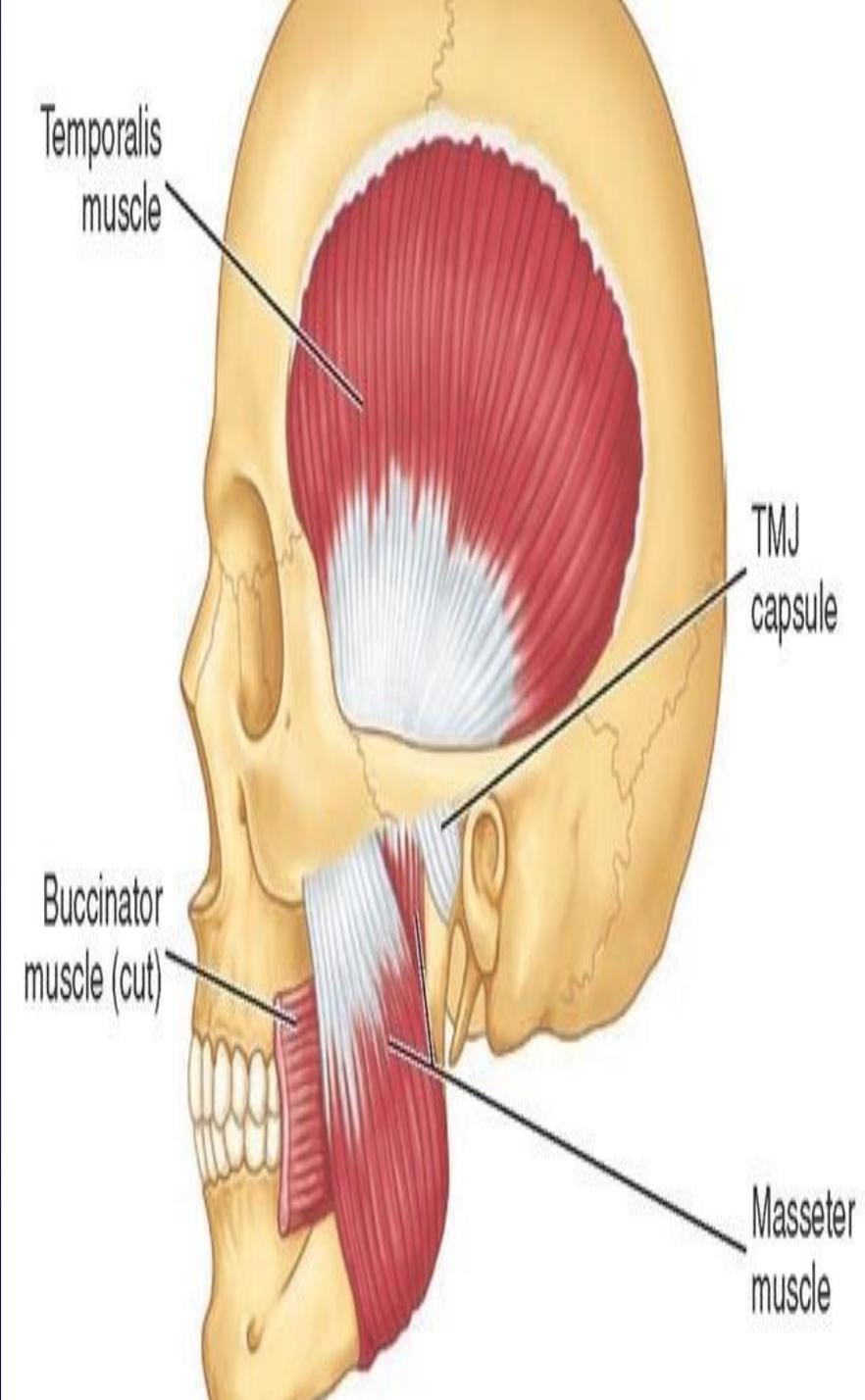
Masseter

It is the most powerful muscle of mastication. It is quadrangular in shape, and can be split into two parts; deep and superficial.

Attachments: The superficial part originates from maxillary process of the zygomatic bone. The deep part originates from the zygomatic arch of the temporal bone. Both parts attach to the ramus of the mandible.

Actions: Elevates the mandible, closing the mouth and retraction of the mandible.

Innervation: Mandibular nerve (V3).





Primary Muscles

- Masseter Muscle
- Temporalis Muscle
- Lateral Pterygoid Muscle
- Medial Pterygoid Muscle

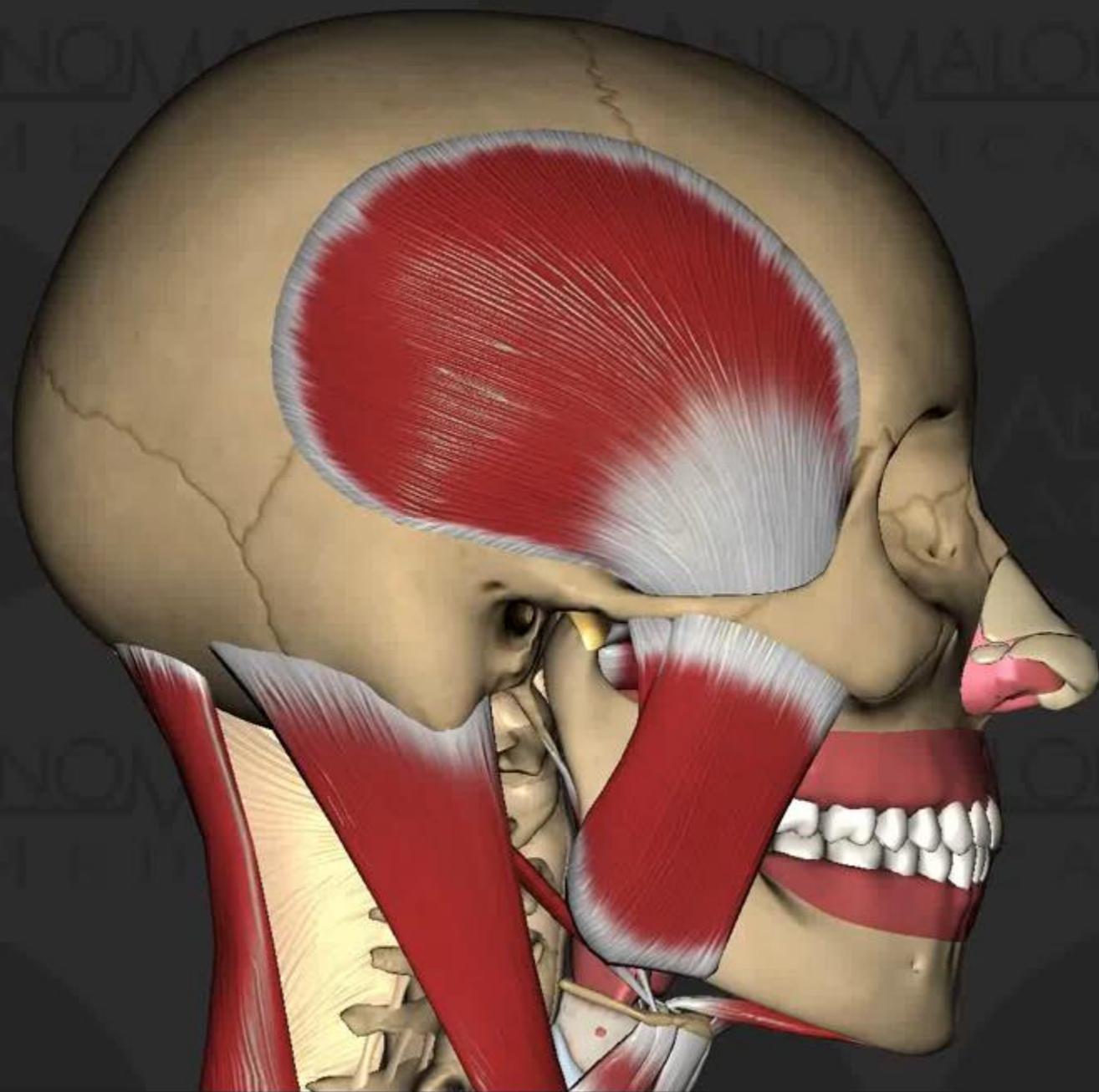
Accessory Muscles

Suprahyoid Muscles

- Digastric Muscle
- Stylohyoid Muscle
- Mylohyoid Muscle
- Geniohyoid Muscle

Infrahyoid Muscles

- Sternohyoid Muscle
- Thyrohyoid Muscle
- Omohyoid Muscle



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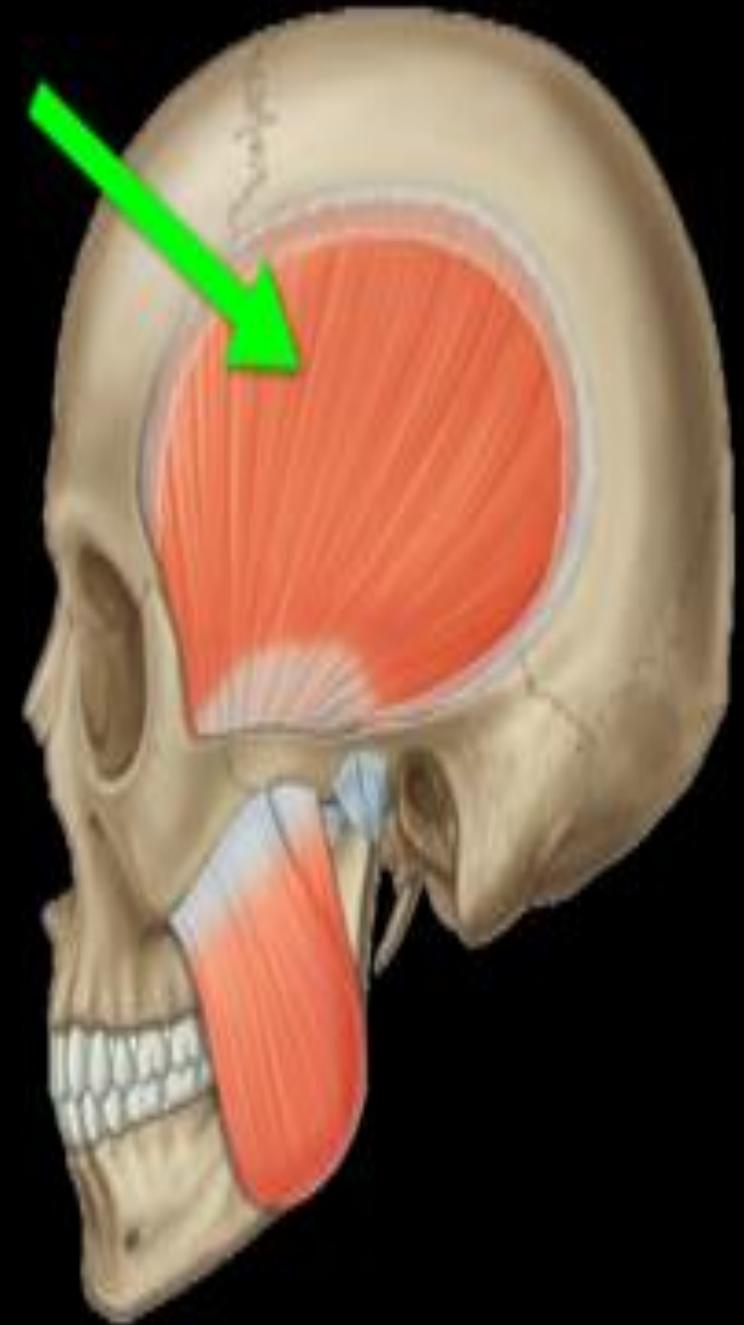
Temporalis

It is broadly attached to the lateral skull and has been divided into anterior, middle, and posterior parts.

Attachments: Originates from the temporal fossa. It condenses into a tendon, which inserts onto the coronoid process of the mandible.

Actions: Elevates the mandible, closing the mouth. Also retracts the mandible, pulling the jaw posteriorly.

Innervation: Mandibular nerve (V3).



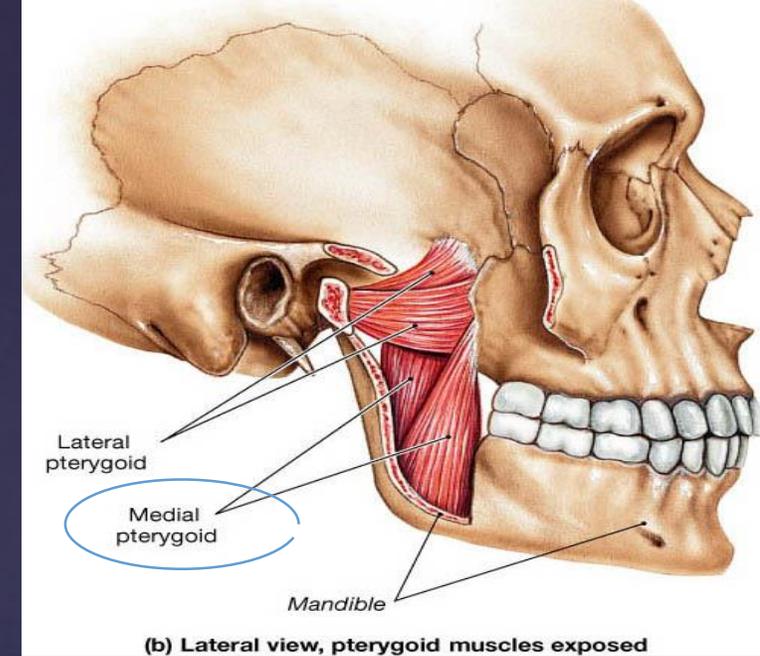
Medial Pterygoid

It has a quadrangular shape, with two heads; deep and superficial. It is located inferiorly to the lateral pterygoid.

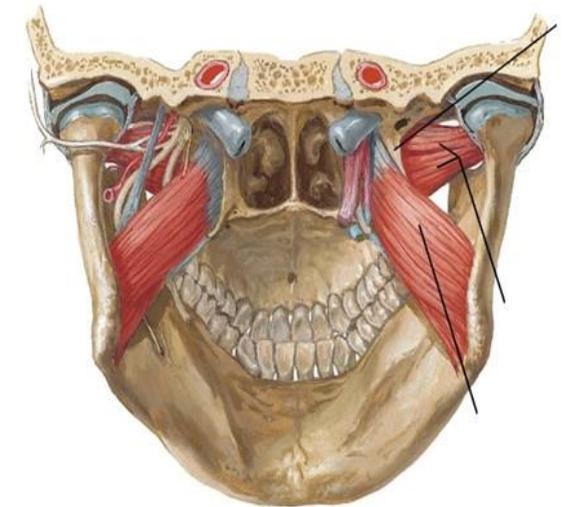
Attachments: The superficial head originates from the maxilla. The deep head originates from the lateral pterygoid plate of the sphenoid bone. Both parts attach to the ramus of the mandible, near the angle of mandible.

Actions: Elevates the mandible, closing the mouth, protrusion of the mandible and lateral deviation of the mandible.

Innervation: Mandibular nerve (V3).



Muscles Involved in Mastication (Deep)
Posterior View



Lateral Pterygoid

It has a triangular shape, with two heads; superior and inferior. It has horizontally orientated muscle fibres, and thus is the major protractor of the mandible.

Attachments: The superior head originates from the greater wing of the sphenoid. The inferior head originates from the lateral pterygoid plate of the sphenoid. The two heads converge into a tendon, which attaches to the neck of the mandible.

Actions: Acting bilaterally, the lateral pterygoids protract the mandible, pushing the jaw forwards. Unilateral action produces the 'side to side' movement of the jaw.

Innervation: Mandibular nerve (V3).

