

# **Musculoskeletal System**

## **Muscles of mastication & Temporomandibular Joint**

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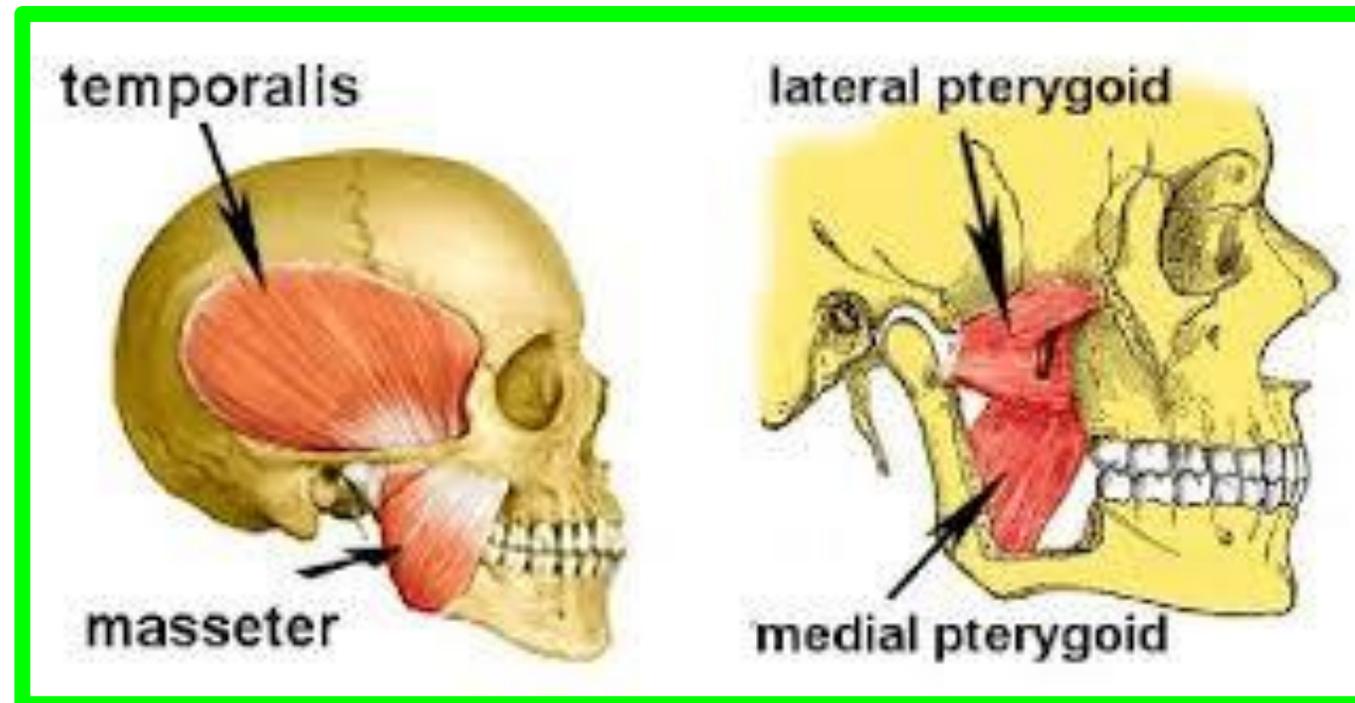
# Muscles of mastication

**\*\* General rules:**

- ❖ **They include 4 muscles** (1) Masseter (2) Temporalis (3) Med. Pterygoid (4) Lat. Pterygoid
- ❖ **Origin:** They arise from temporal & infratemporal fossae
- ❖ **Insertion:** All are inserted into the ramus of mandible
- ❖ **N. Supply:** All are innervated by mandibular branch of trigeminal nerve

❖ **Actions:**

- ✓ All of them elevate the mandible except lat. Pterygoid lowers it
- ✓ All of them protrude the mandible except temporalis retracts it
- ✓ Pterygoid muscles move the mandible from side to side (chewing)



# (1) Masseter muscle

## Muscles of mastication

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**\*\* Its quadrilateral m covering the of ramus of mandible**

**\*\* Origin:**

✓ **Superficial head:** the lower border of zygomatic arch & medial surface of maxillary process of zygomatic bone

✓ **Deep head:** Inner surface of the zygomatic arch

**\*\* Insertion:** Angle and lateral surface of ramus of mandible

**\*\* N. supply:** Masseteric nerve {Anterior trunk of mandibular nerve (CN V<sub>3</sub>)}

**\*\* Action:**

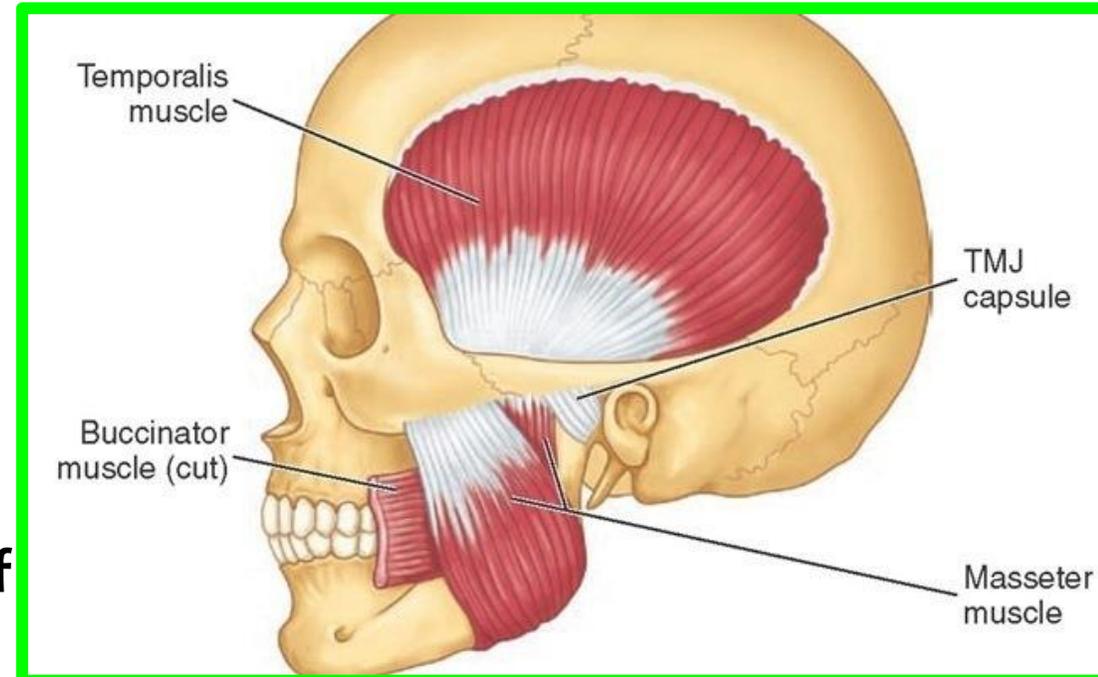
✓ Strong Elevator of mandible (closing jaws)

✓ Protrusion of mandible

**\*\* Relations:**

✓ **Deep:** Buccinator m, Buccal pad of fat, Buccal n.

✓ **Superficial:** Parotid gland & its duct, branches of facial a, & Transvers facial a



## (2) Temporalis muscle

## Muscles of mastication

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\*\* Its fan shaped m. filling the temporal fossa

\*\* **Origin:** floor of temporal fossa and deep surface of temporal fascia

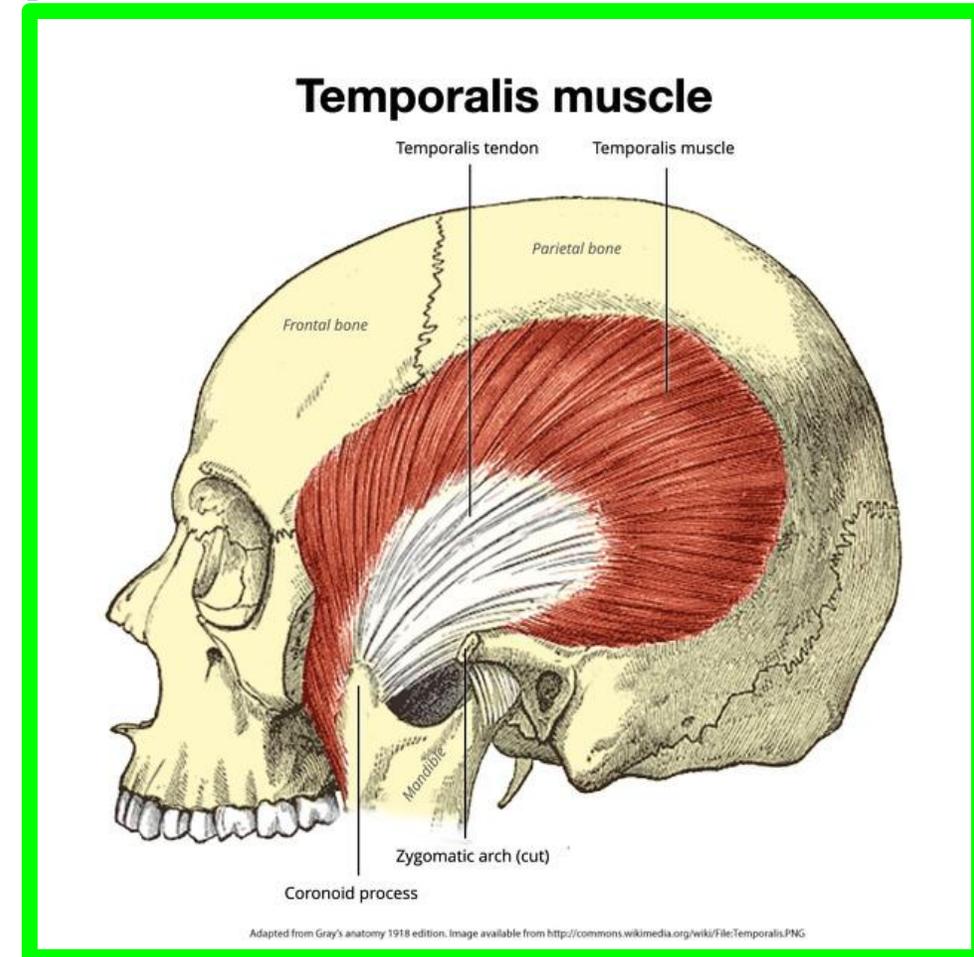
\*\* **Insertion:** tip and medial surface of coronoid process and anterior border of ramus of mandible

\*\* **N. supply:** 2 Deep temporal branches {Anterior trunk of mandibular nerve (CN V<sub>3</sub>)}

\*\* **Action:**

✓ Elevator of mandible (closing jaws)

✓ Protruded & retracted the mandible



## (3) Medial pterygoid

## Muscles of mastication

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**\*\* Quadrangular two headed muscle**

**\*\* Origin:**

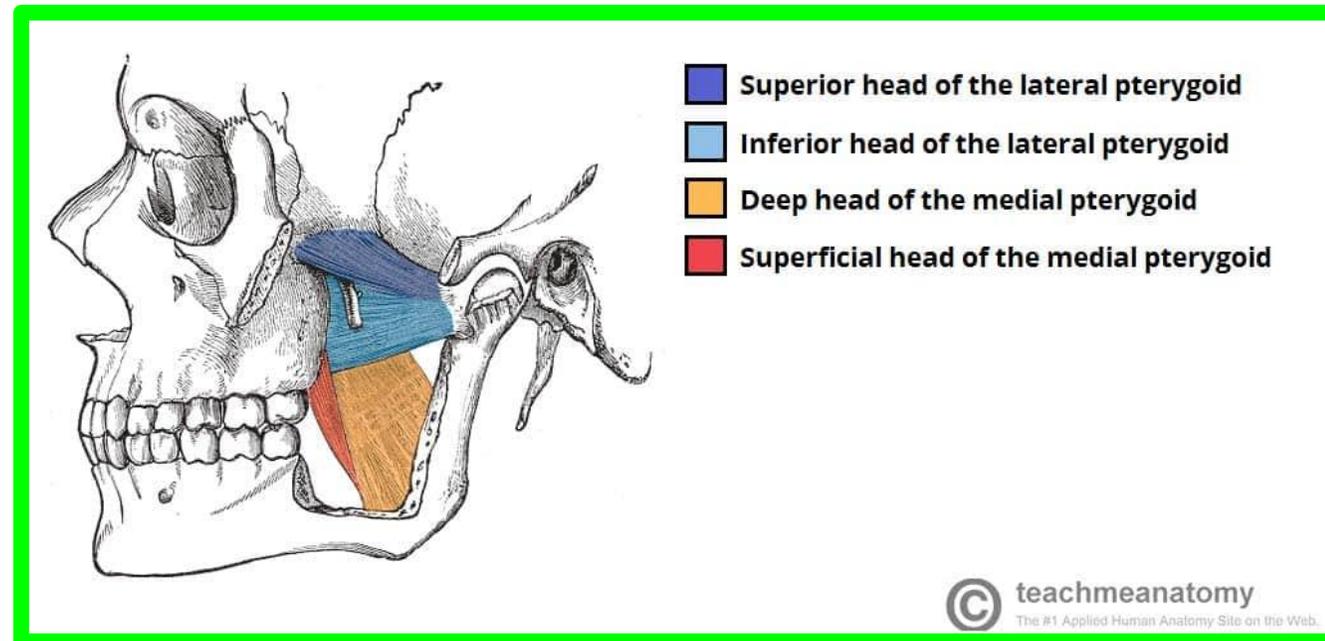
- ✓ Deep head: medial surface of lateral pterygoid plate
- ✓ Superficial head: tuberosity of maxilla

**\*\* Insertion:** medial surface of angle of mandible

**\*\* N. supply:** Main trunk of mandibular nerve (CN V3)

**\*\* Action:**

- ✓ Move from side to side of the mandible
- ✓ Protrusion of mandible
- ✓ Elevate the mandible



## (4) Lateral pterygoid

# Muscles of mastication

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**\*\* Short conical two-headed muscle**

**\*\* Origin:**

- ✓ Upper head: infratemporal surface and crest of greater wing of sphenoid
- ✓ Lower head: lateral surface of lateral pterygoid plate

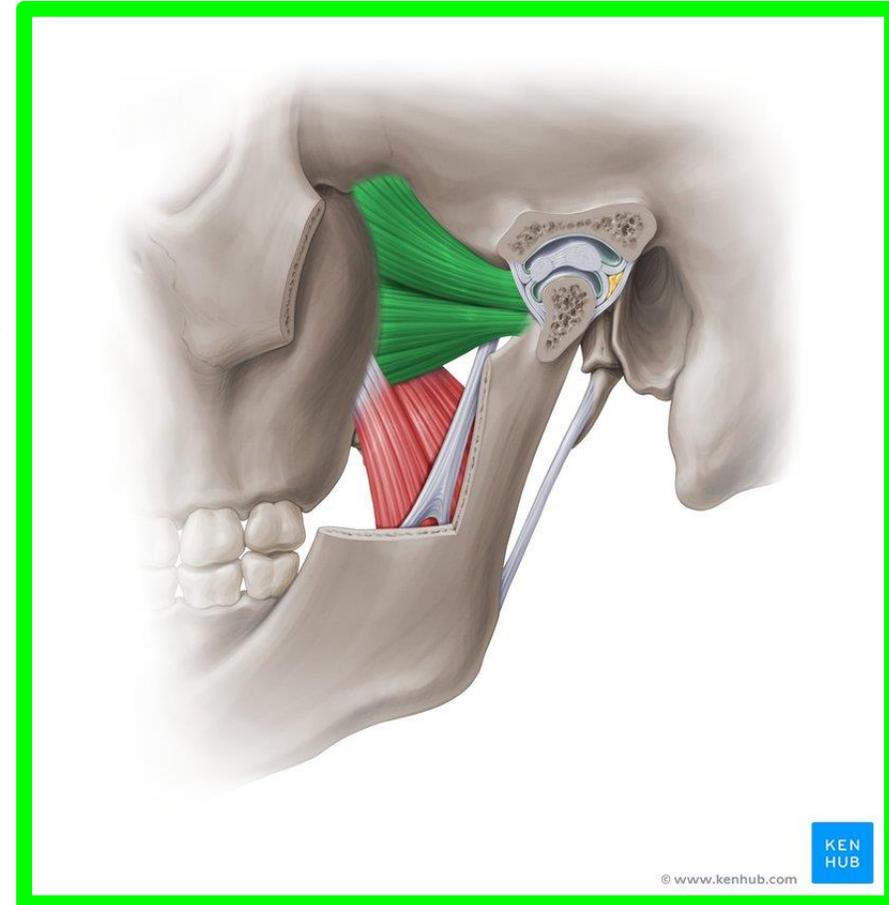
**\*\* Insertion:**

- ✓ to pterygoid fovea & neck mandible
- ✓ to capsule and articular disc of TMJ;

**\*\* N. supply:** Anterior division of mandibular nerve (CN V<sub>3</sub>)

**\*\* Action:**

- ✓ Lowering the mandible to open the mouth
- ✓ Side to side movement of the mandible
- ✓ Protrusion of mandible
- ✓ Retraction the mandible



# TEMPOROMANDIBULAR JOINT

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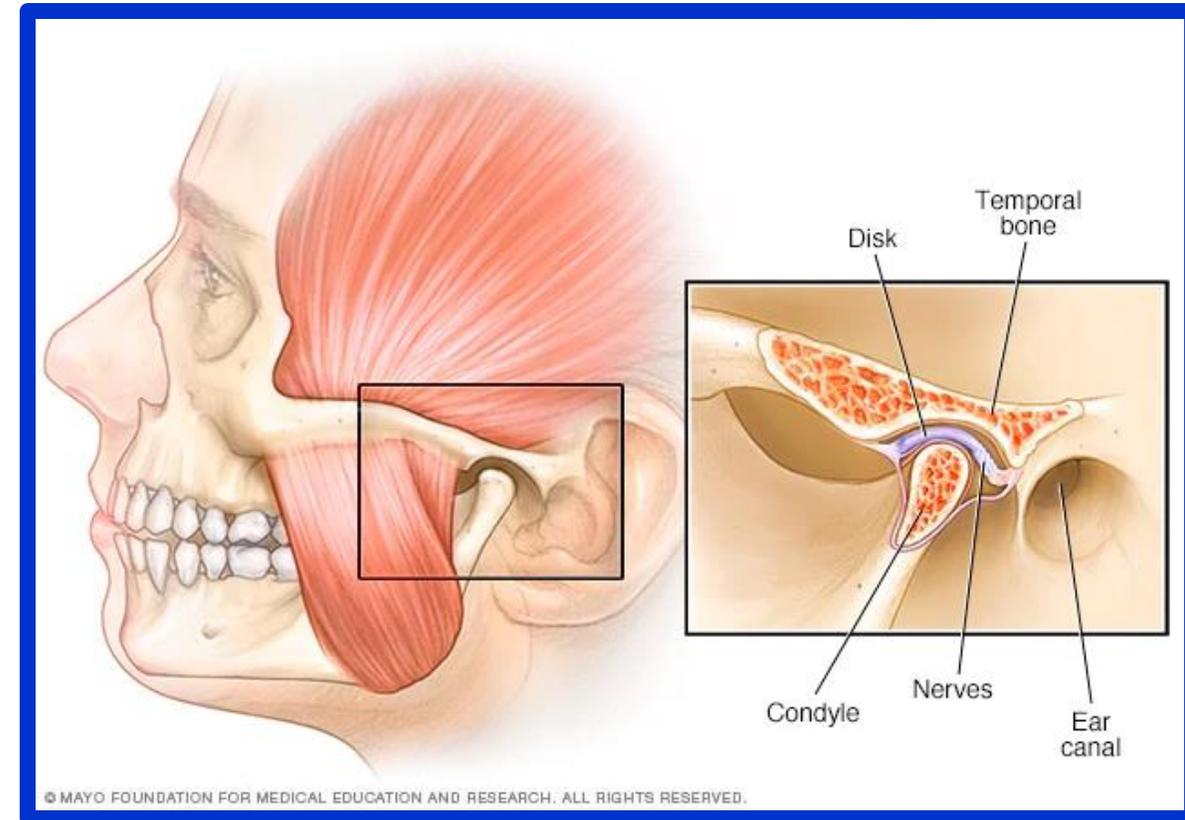
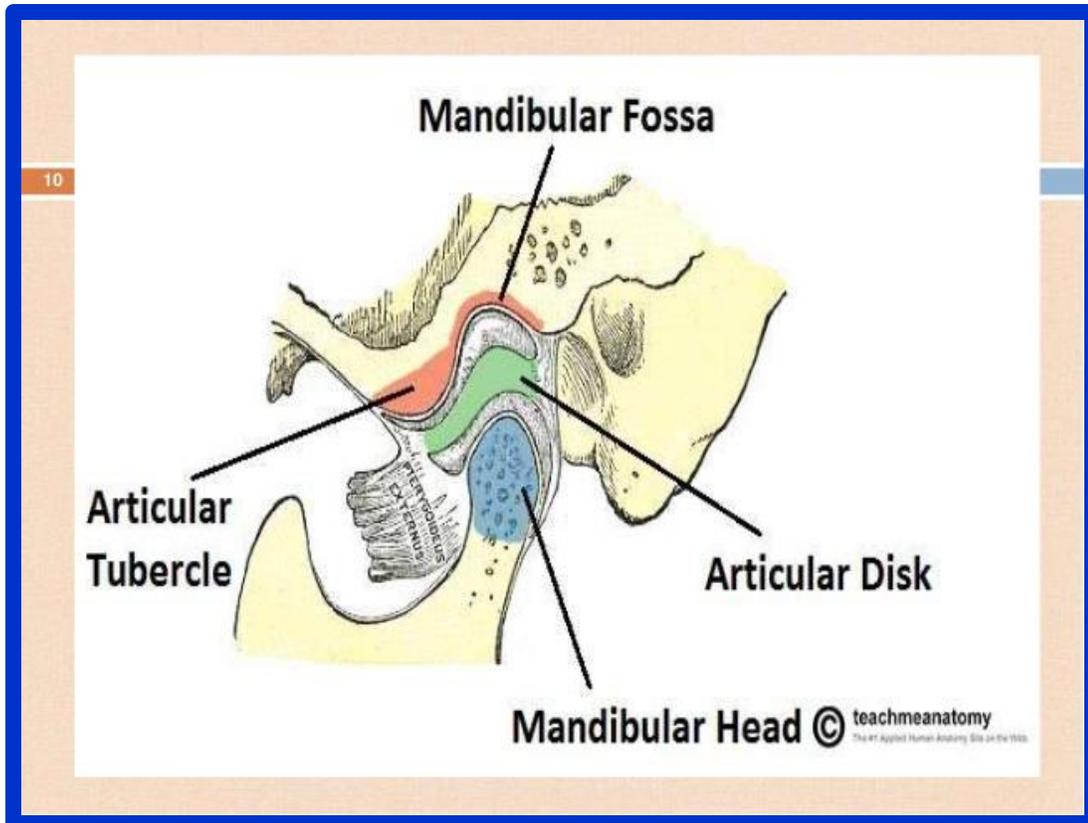
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**\*\* Type & Variety:** Synovial of condylar Variety OR (modified hinge type)

**\*\*The articular surfaces:**

✓ Above: the articular tubercle and the mandibular fossa of the temporal bone

✓ Below: the head of the mandible

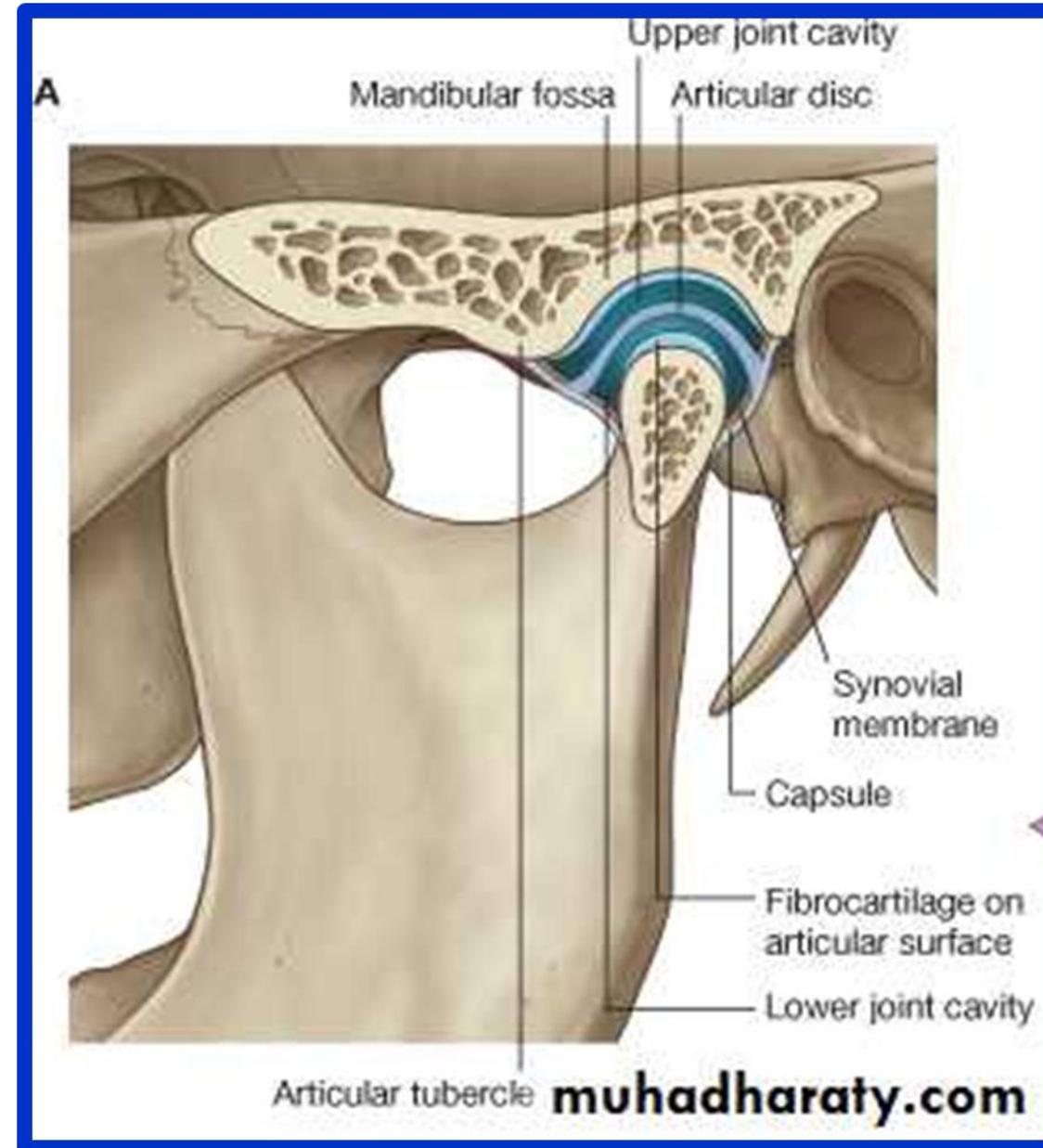


# TEMPOROMANDIBULAR JOINT

- \*\* An articular disc:** divides the joint cavity into two separate synovial compartments
- ✓ The articular surfaces of the TMJ are covered by **fibrocartilage** rather than hyaline cartilage as in a typical synovial joint.

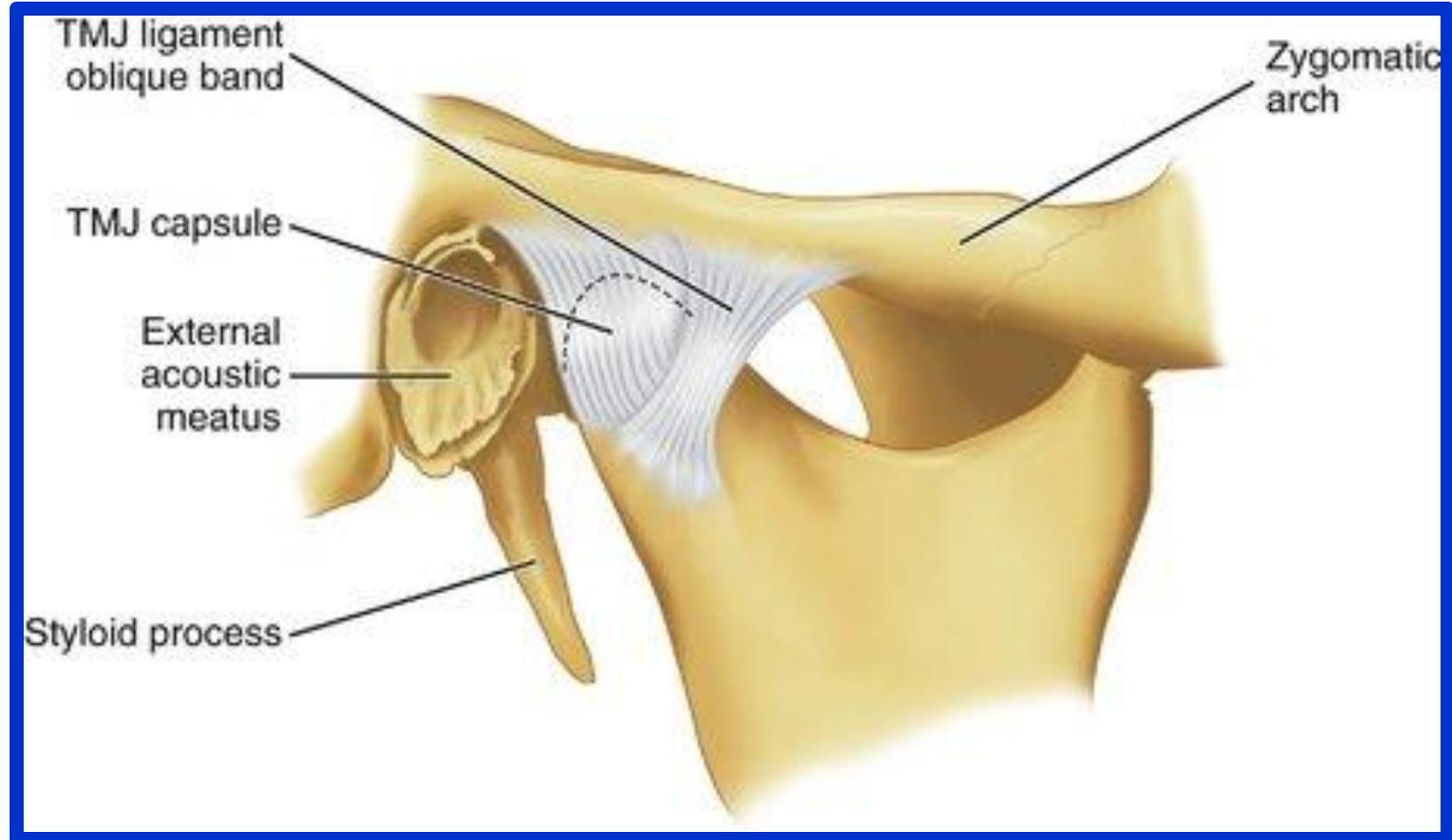
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**\*\* The capsule:** is loose & attaches to the margins of the articular area on the temporal bone and around the neck of the mandible

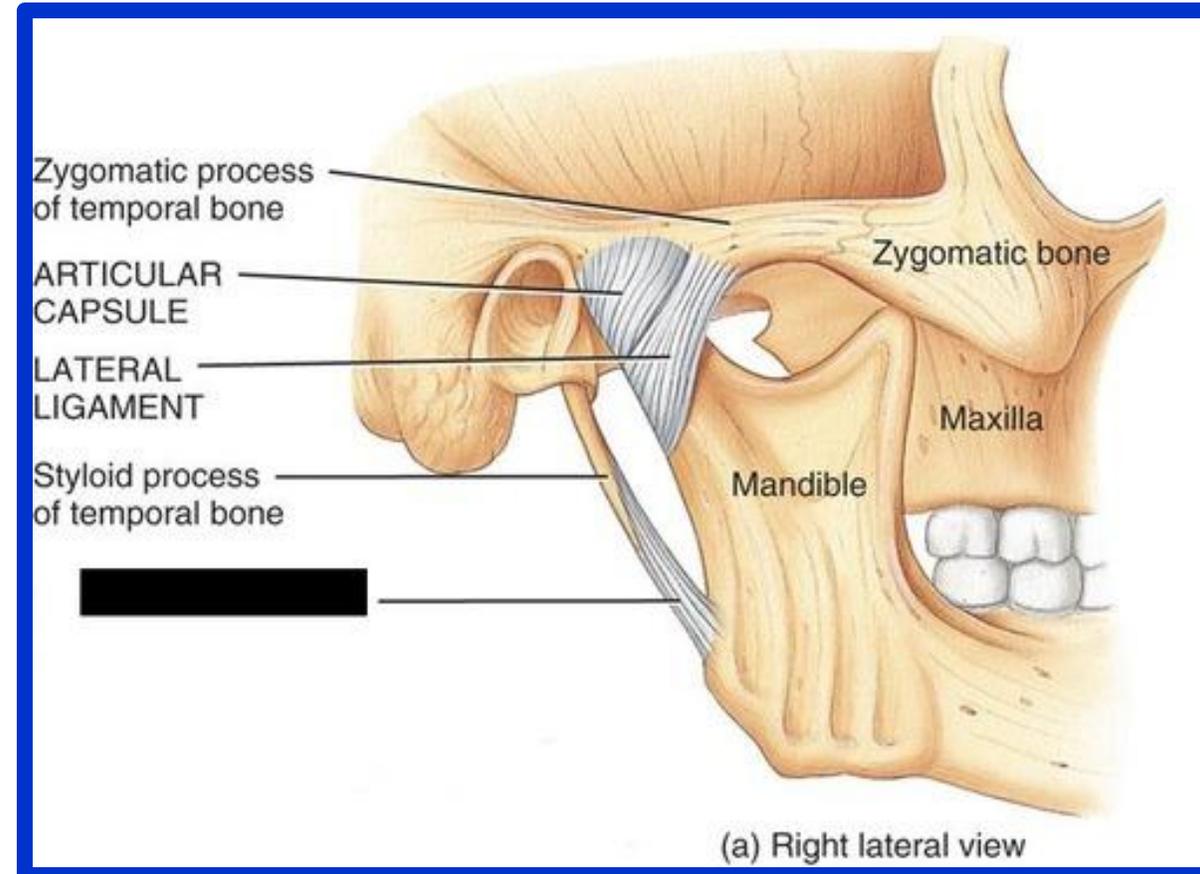
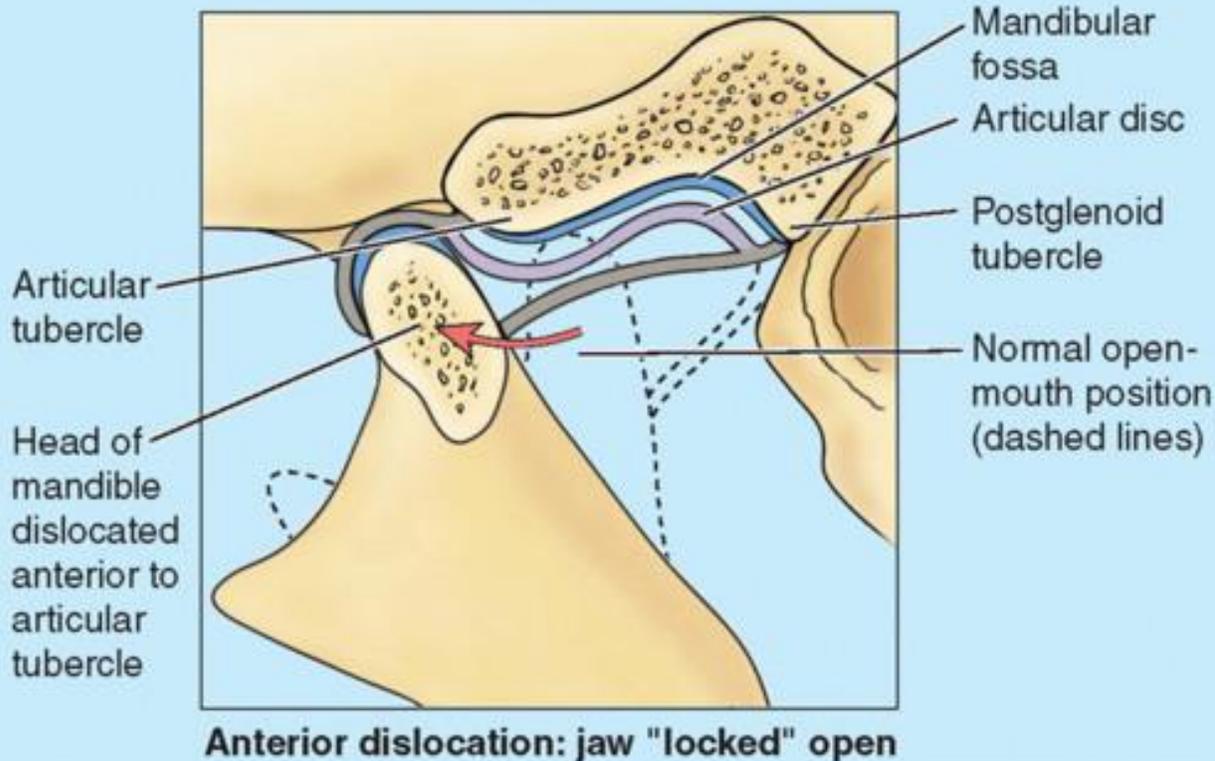


# TEMPOROMANDIBULAR JOINT

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- ❖ The thick part of the joint capsule forms the **intrinsic lateral ligament** (lateral or temporomandibular ligament), which strengthens the TMJ laterally and, with **the postglenoid tubercle**, acts to prevent **posterior dislocation of the joint**



# TEMPOROMANDIBULAR JOINT

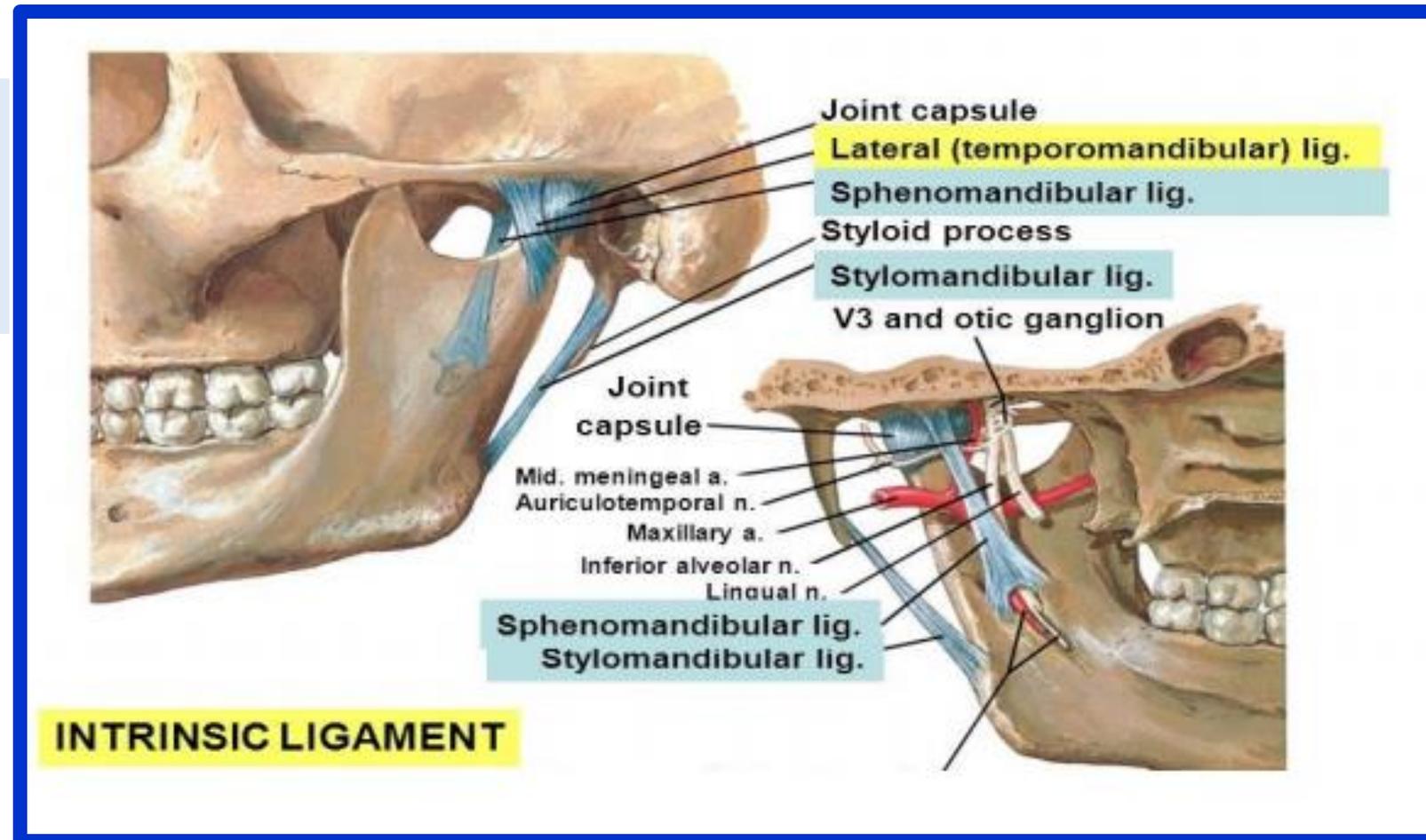
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## ❖ Two extrinsic ligaments:

- ❑ (1) **The stylomandibular ligament:** a thickening of the fibrous capsule of the parotid gland, runs from the styloid process to the angle of the mandible

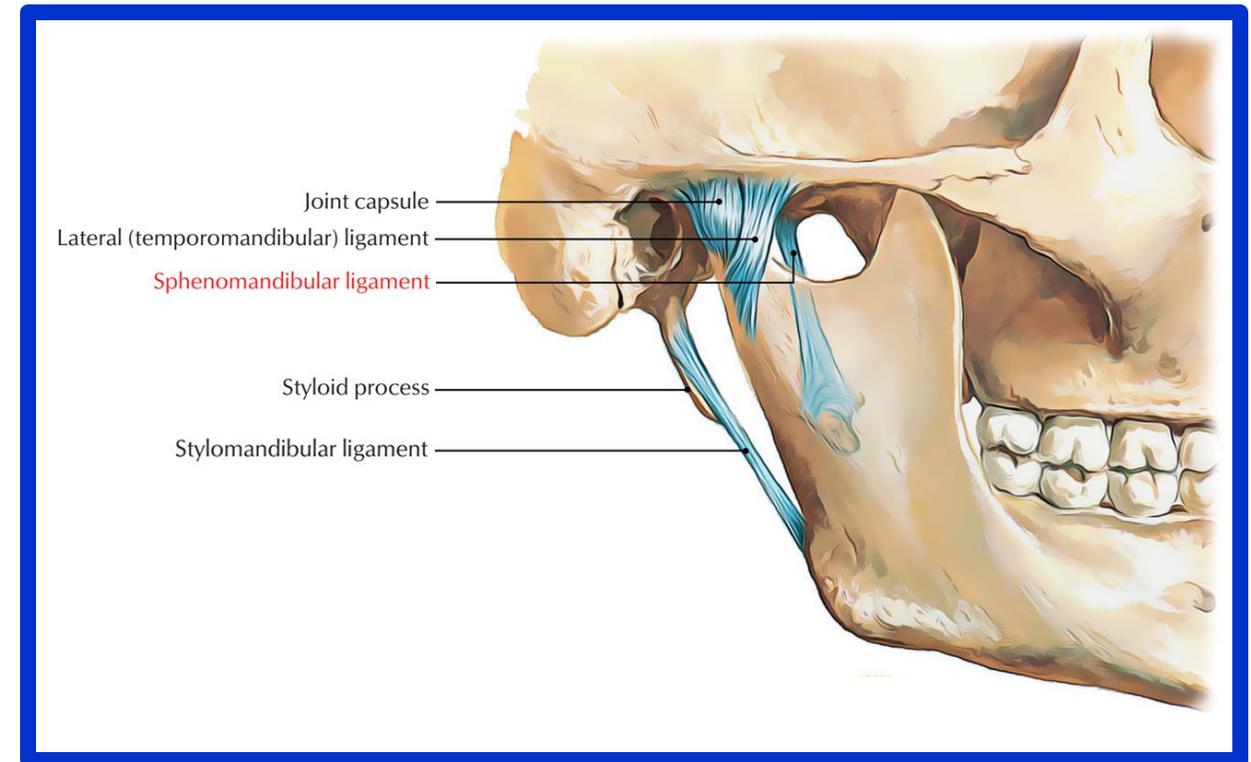
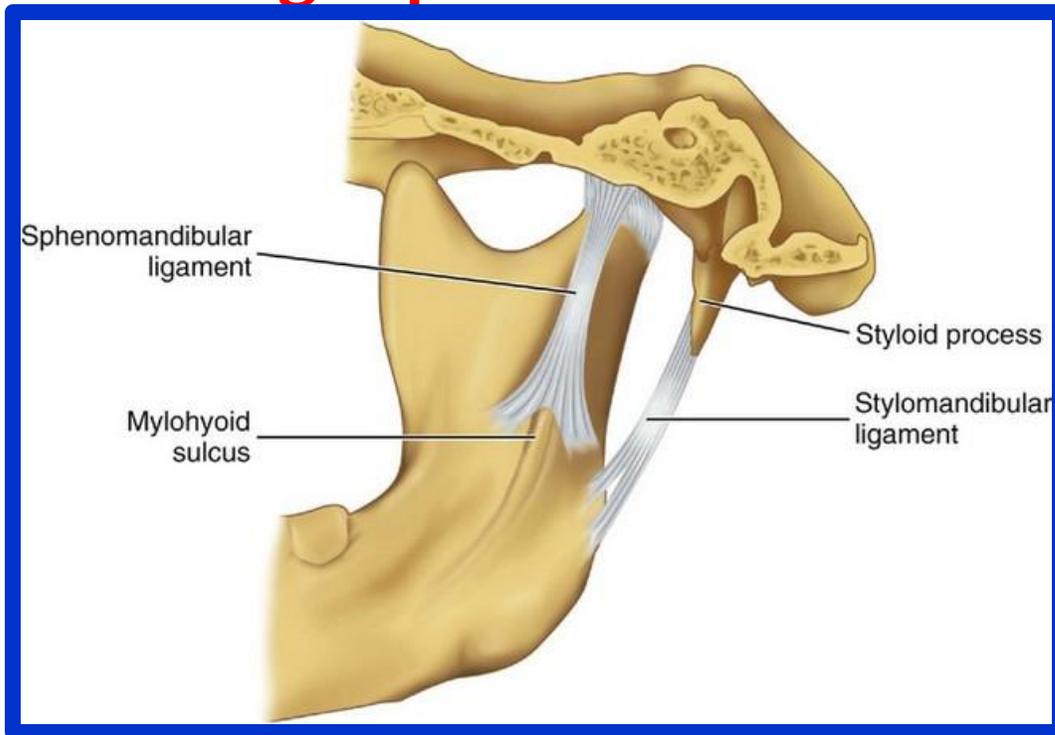
✓ It does not contribute significantly to the strength of the TMJ.



# TEMPOROMANDIBULAR JOINT

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- ❑ (2) The sphenomandibular ligament runs from the spine of the sphenoid to the lingula of the mandible and is the primary passive support and “swing rope” of the mandible.



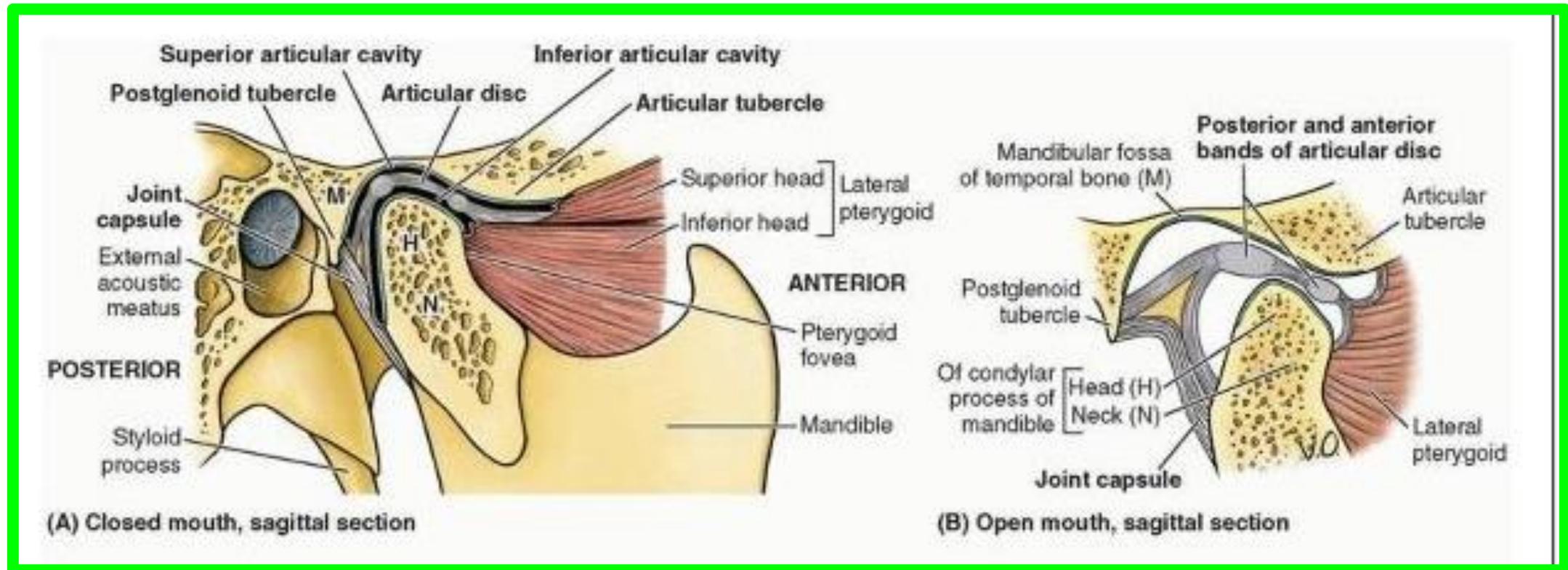
- ❖ Two extrinsic ligaments and the lateral ligament (intrinsic ligament) connect the mandible to the cranium.

# TEMPOROMANDIBULAR JOINT

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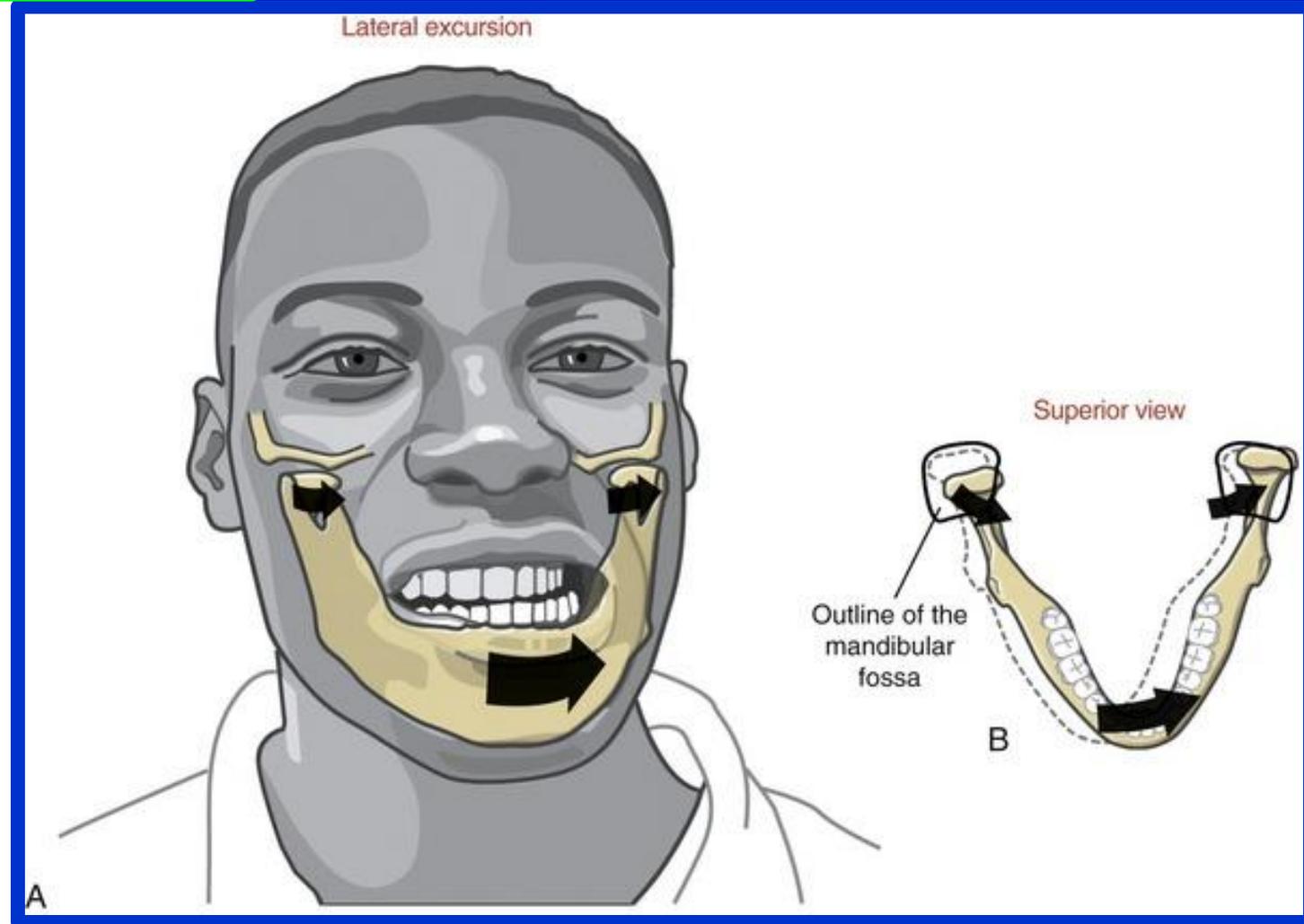
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❖ To enable more than a small amount of depression of the mandible—that is, to open the mouth wider than just separating the upper and lower teeth—the head of the mandible and articular disc must move anteriorly on the articular surface until **the head** lies inferior to **the articular tubercle** a movement referred to as *translation* by dentists.



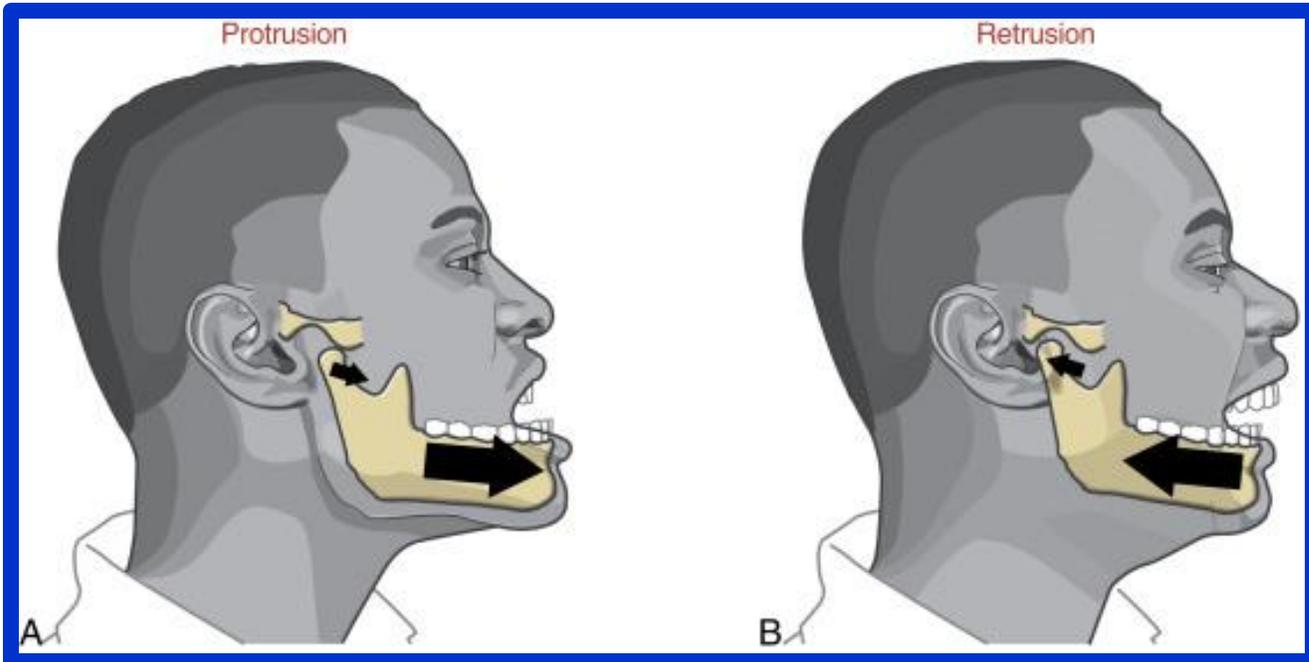
# TEMPOROMANDIBULAR JOINT

❖ If this anterior gliding occurs unilaterally, the **head of the mandible** on the retracted side rotates (pivots) on the inferior surface of **the articular disc**, permitting **simple side-to-side chewing or grinding movements over a small range.**



# TEMPOROMANDIBULAR JOINT

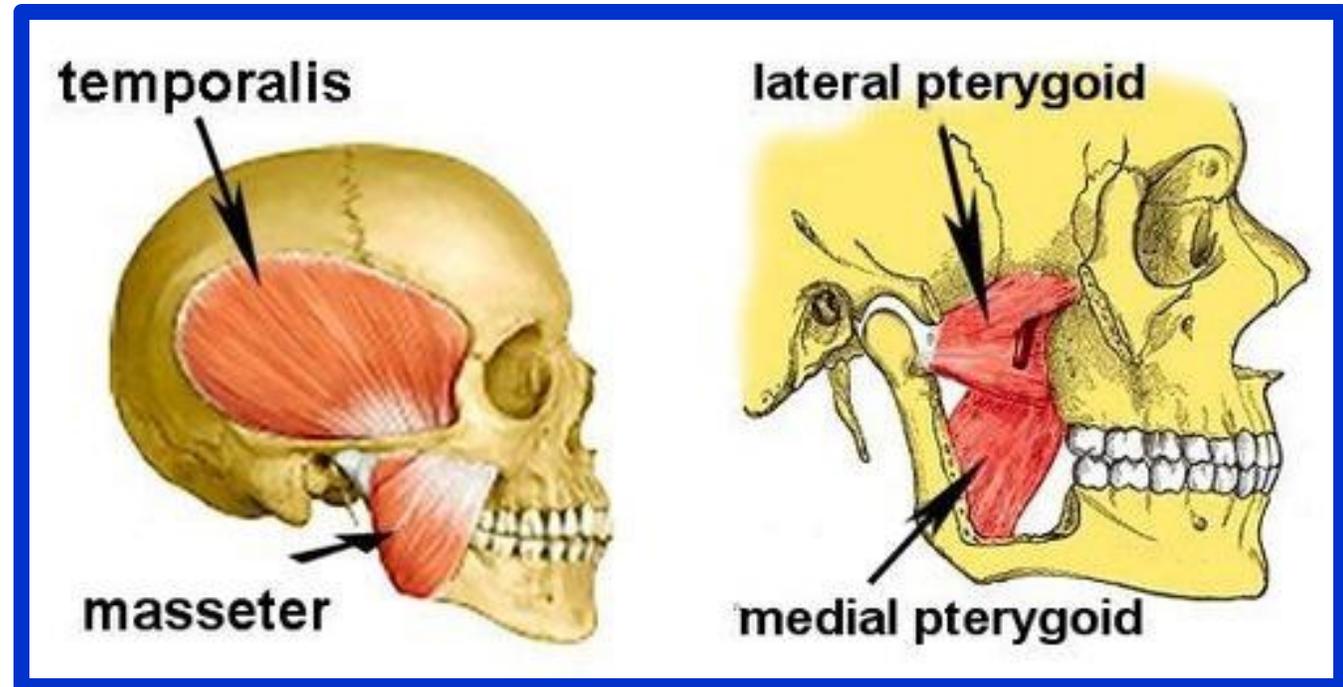
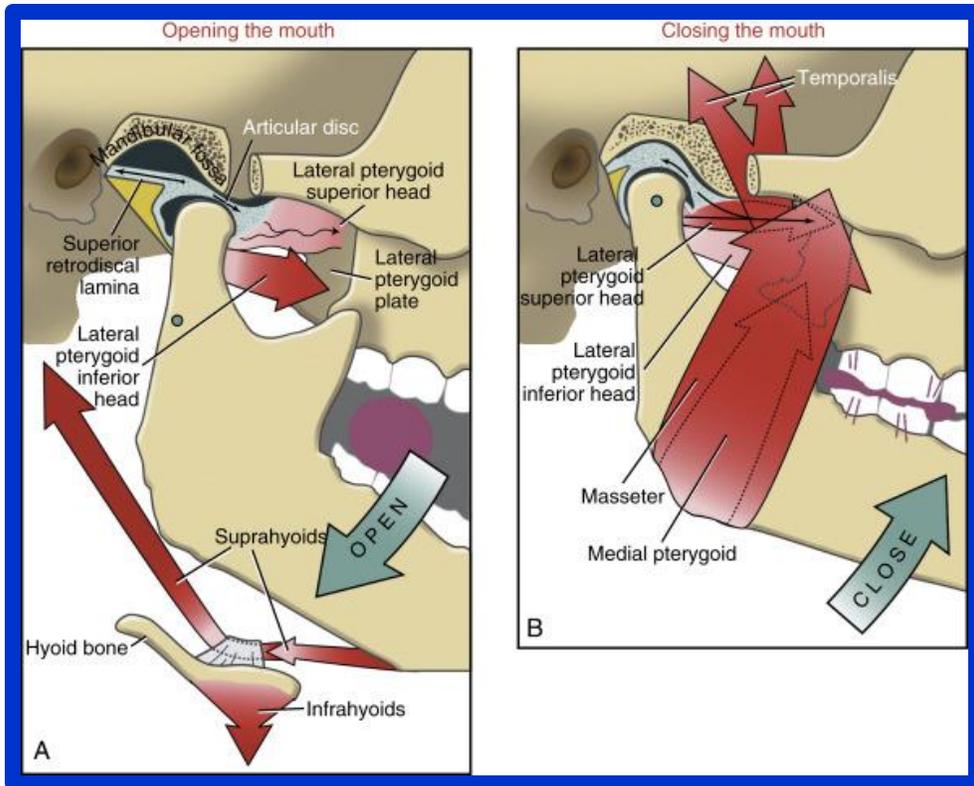
- ❖ During protrusion and retrusion of the mandible, the mandibular head and articular disc slide anteriorly and posteriorly on the articular surface of the temporal bone, with both sides moving together.



# MOVEMENTS AT THE TEMPOROMANDIBULAR

## JOINT

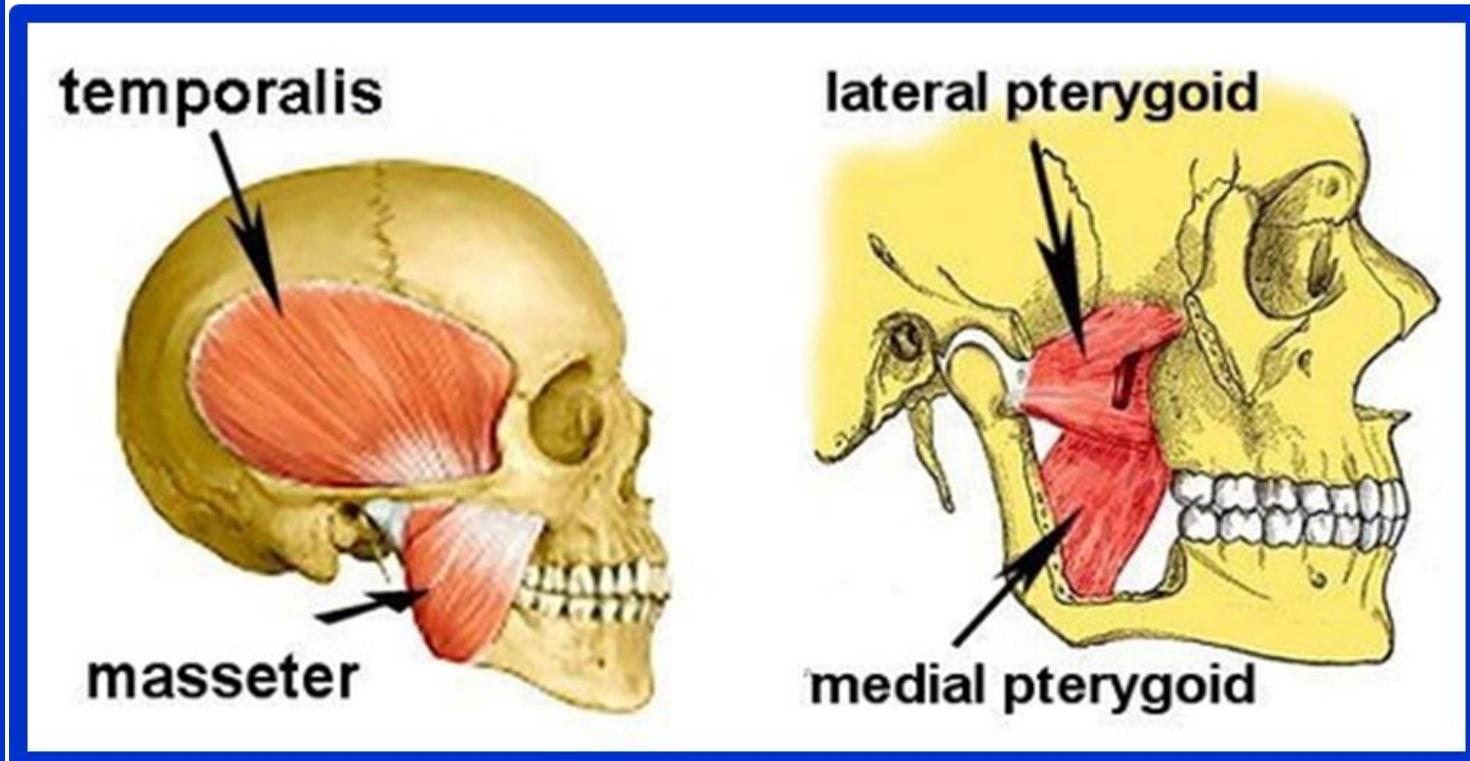
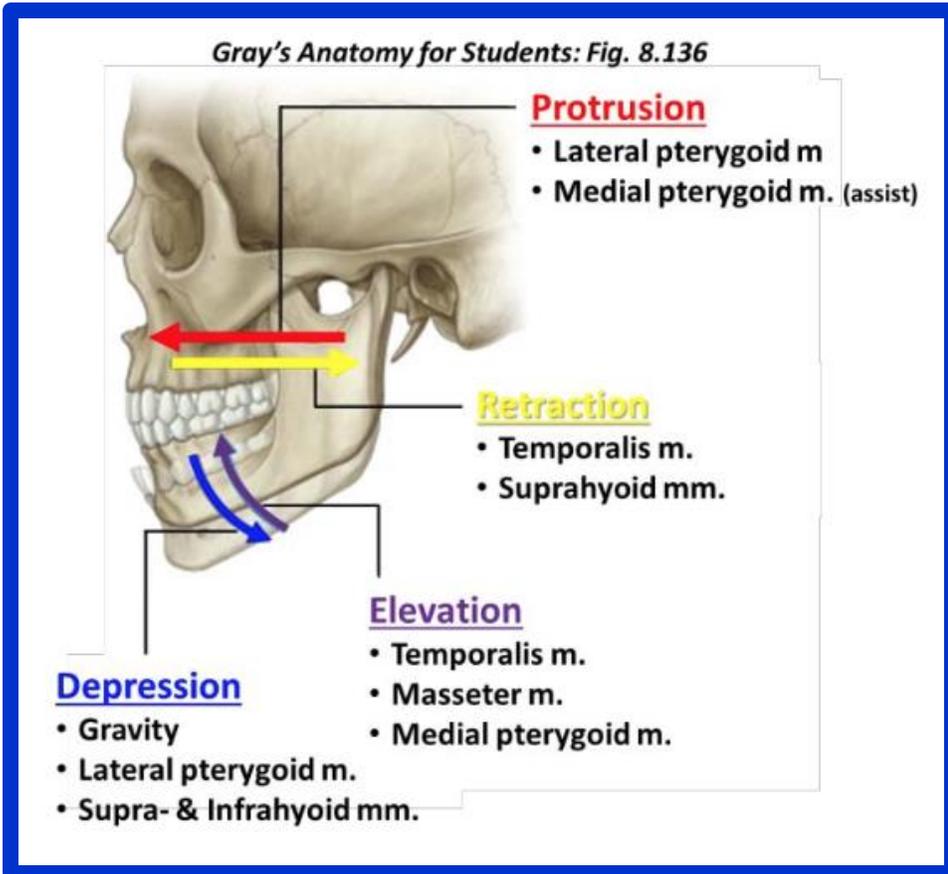
- ❖ TMJ movements are produced chiefly by the muscles of mastication.
- ❑ Elevation (close mouth)..... Temporalis, masseter, and medial pterygoid
- ❑ Depression (open mouth) ..... Lateral pterygoid and suprahyoid and infrahyoid muscles



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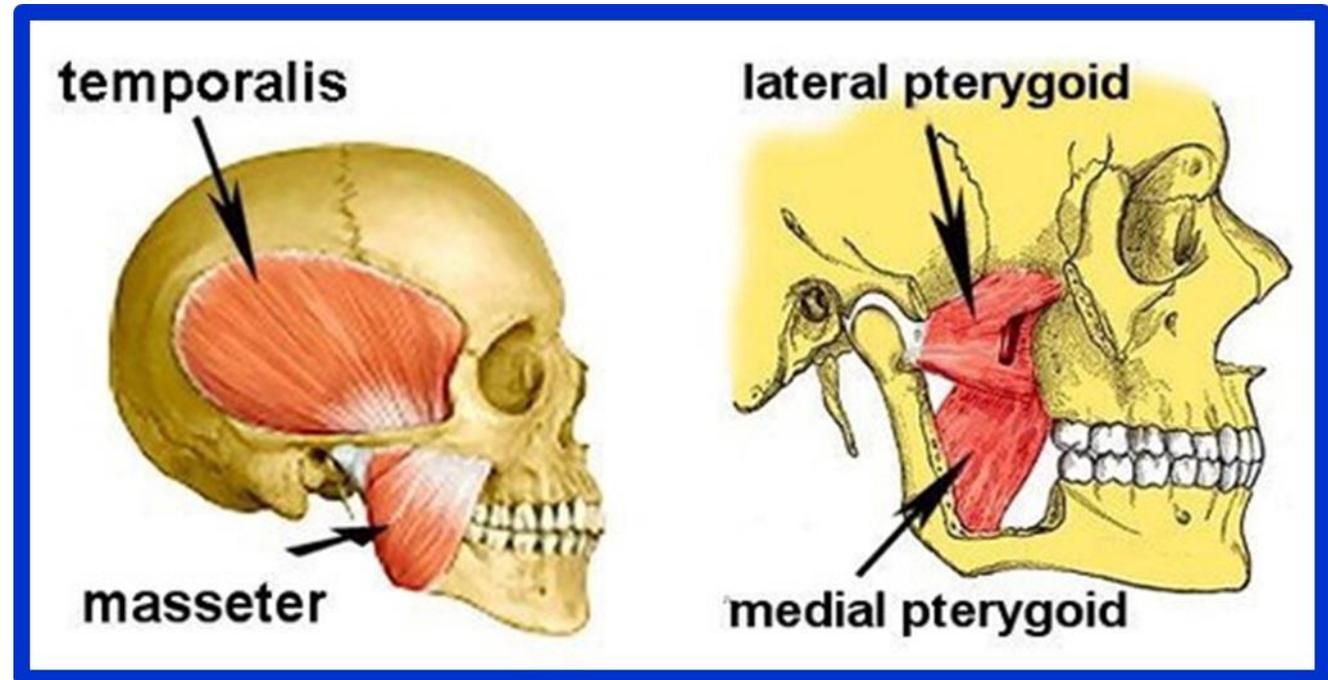
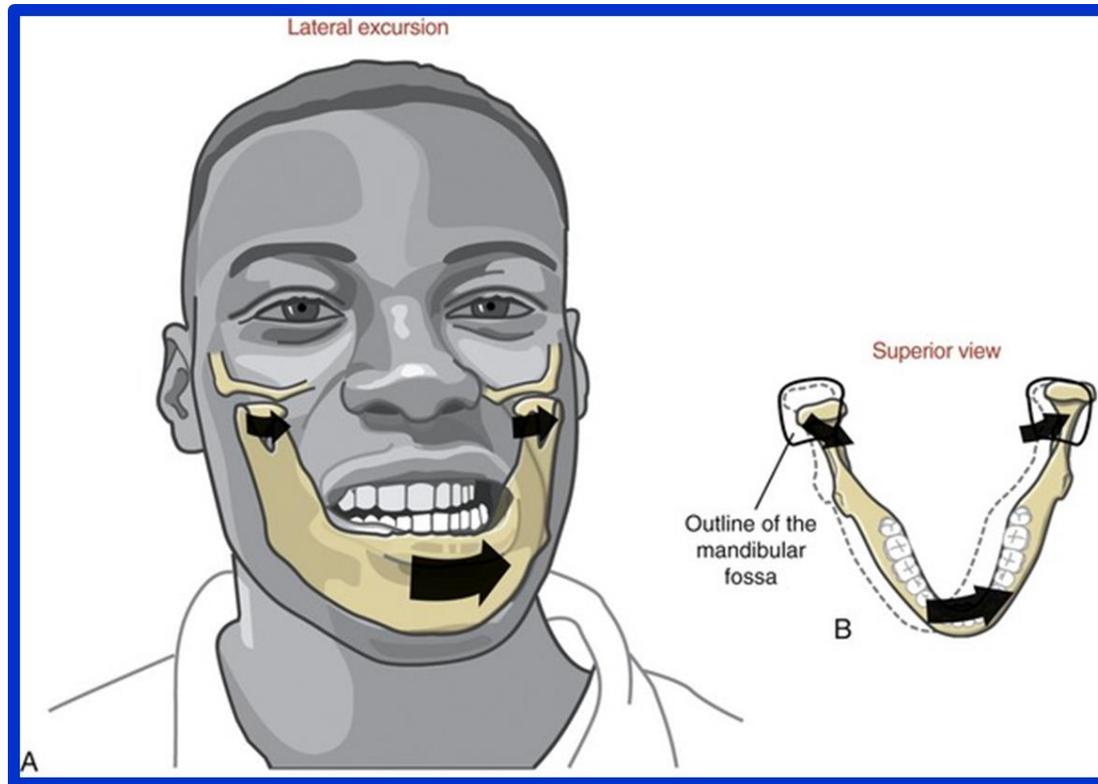
# MOVEMENTS AT THE TEMPOROMANDIBULAR JOINT

- Protrusion (protrude chin) .....Lateral pterygoid, masseter, and medial pterygoid
- Retrusion (retrude chin )..... Temporalis (posterior oblique and near horizontal fibers) and masseter



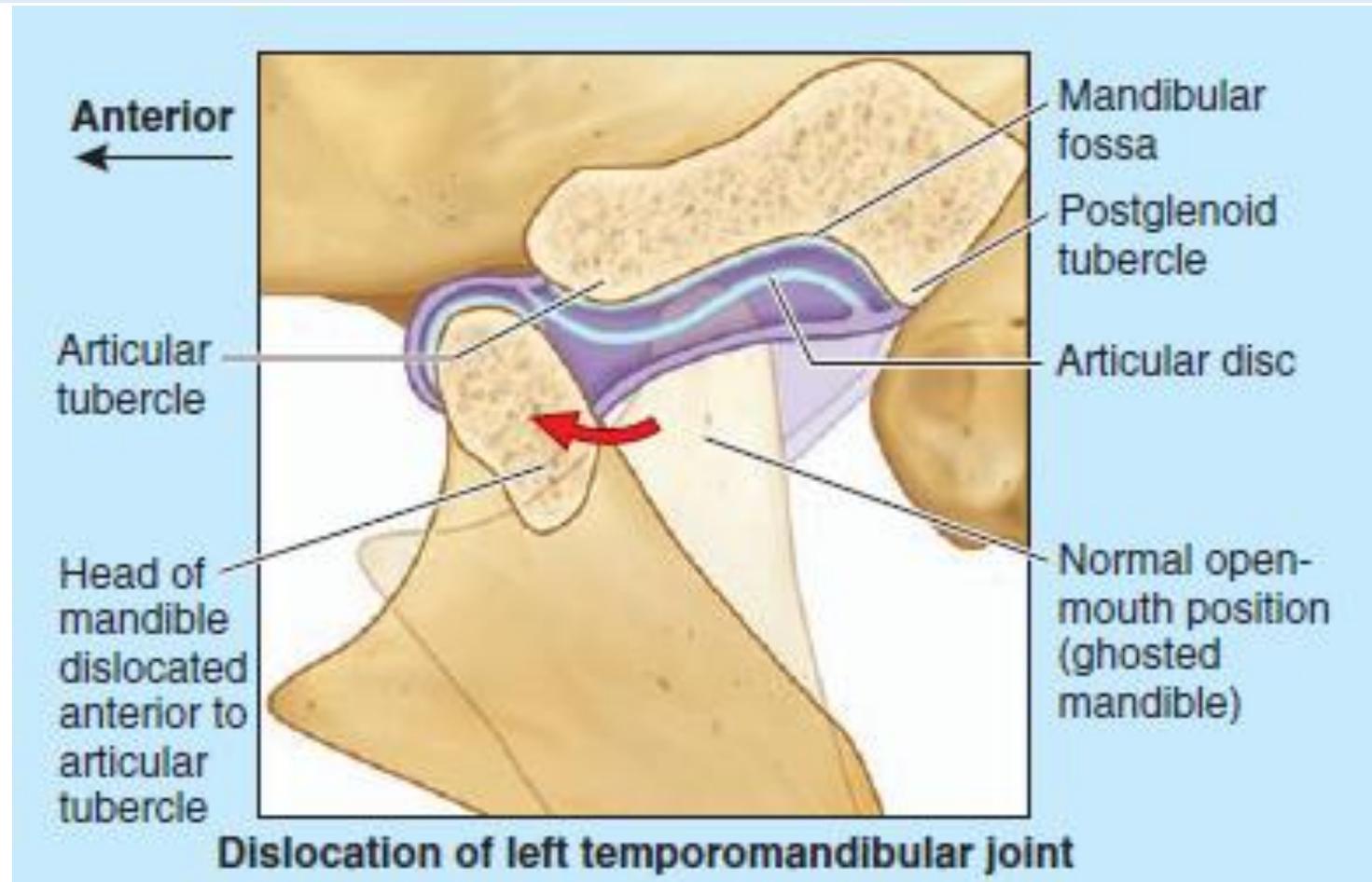
# MOVEMENTS AT THE TEMPOROMANDIBULAR JOINT

- Lateral movements .....Temporalis of same side, pterygoids of opposite side, (grinding and chewing) and masseter



# Dislocation of Temporomandibular Joint

During **yawning or taking a large bite**, excessive contraction of **the lateral pterygoids** may cause the heads of the mandibles to dislocate anteriorly, by passing anterior to the articular tubercles



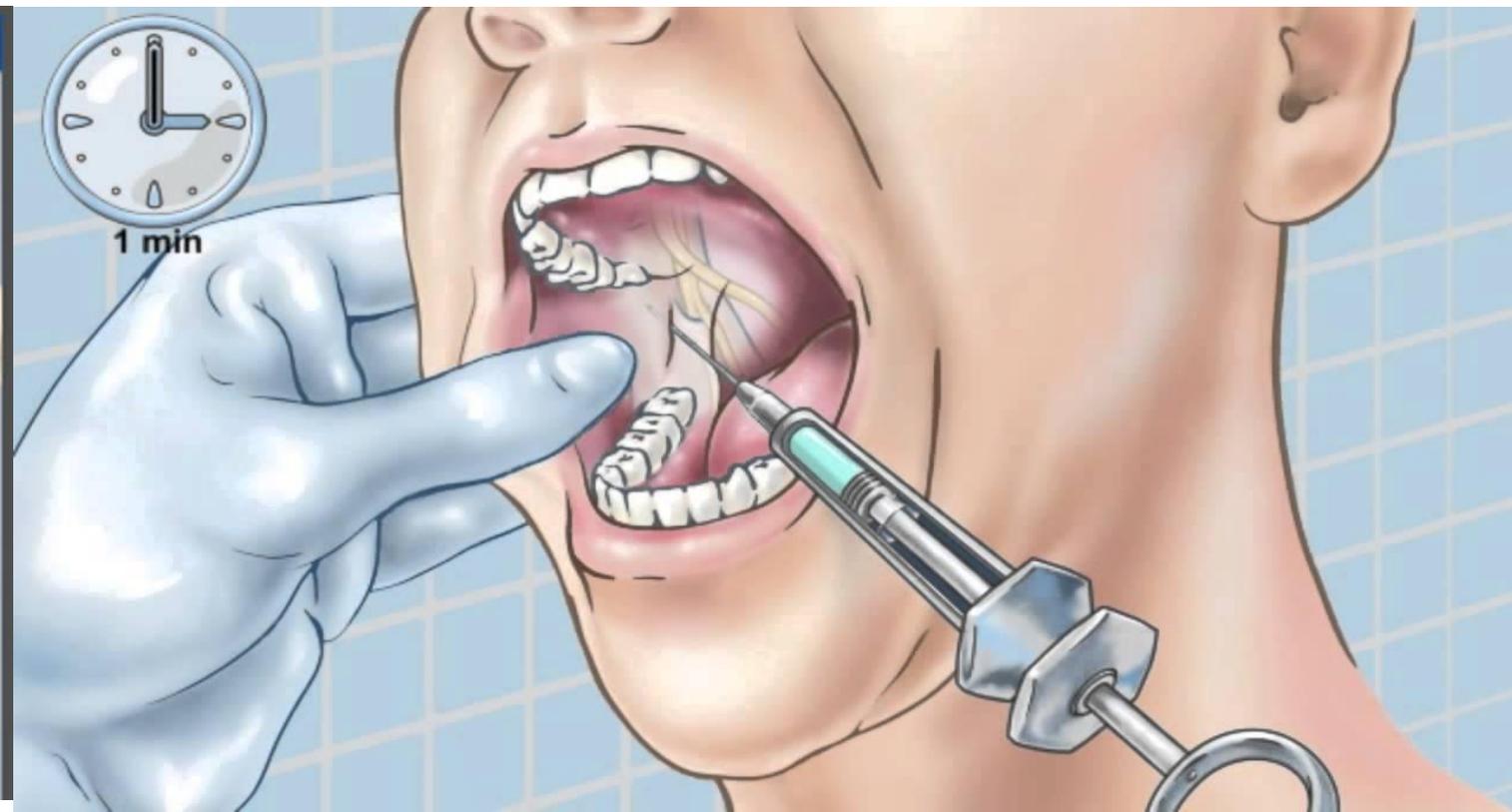
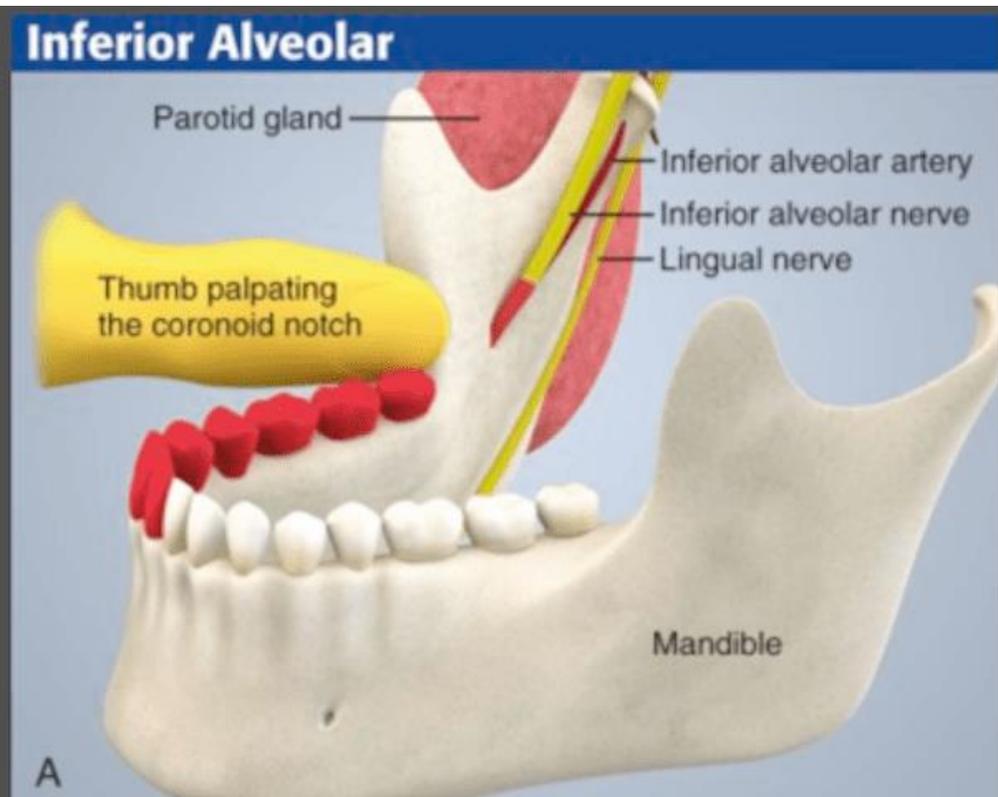
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# Inferior Alveolar Nerve Block

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**An alveolar nerve block**—commonly used by dentists when repairing mandibular teeth—anesthetizes the **inferior alveolar nerve**, a branch of **CN V<sub>3</sub>**. The anesthetic agent is injected around the **mandibular foramen**, the opening into the mandibular canal on the medial aspect of the ramus of the mandible.



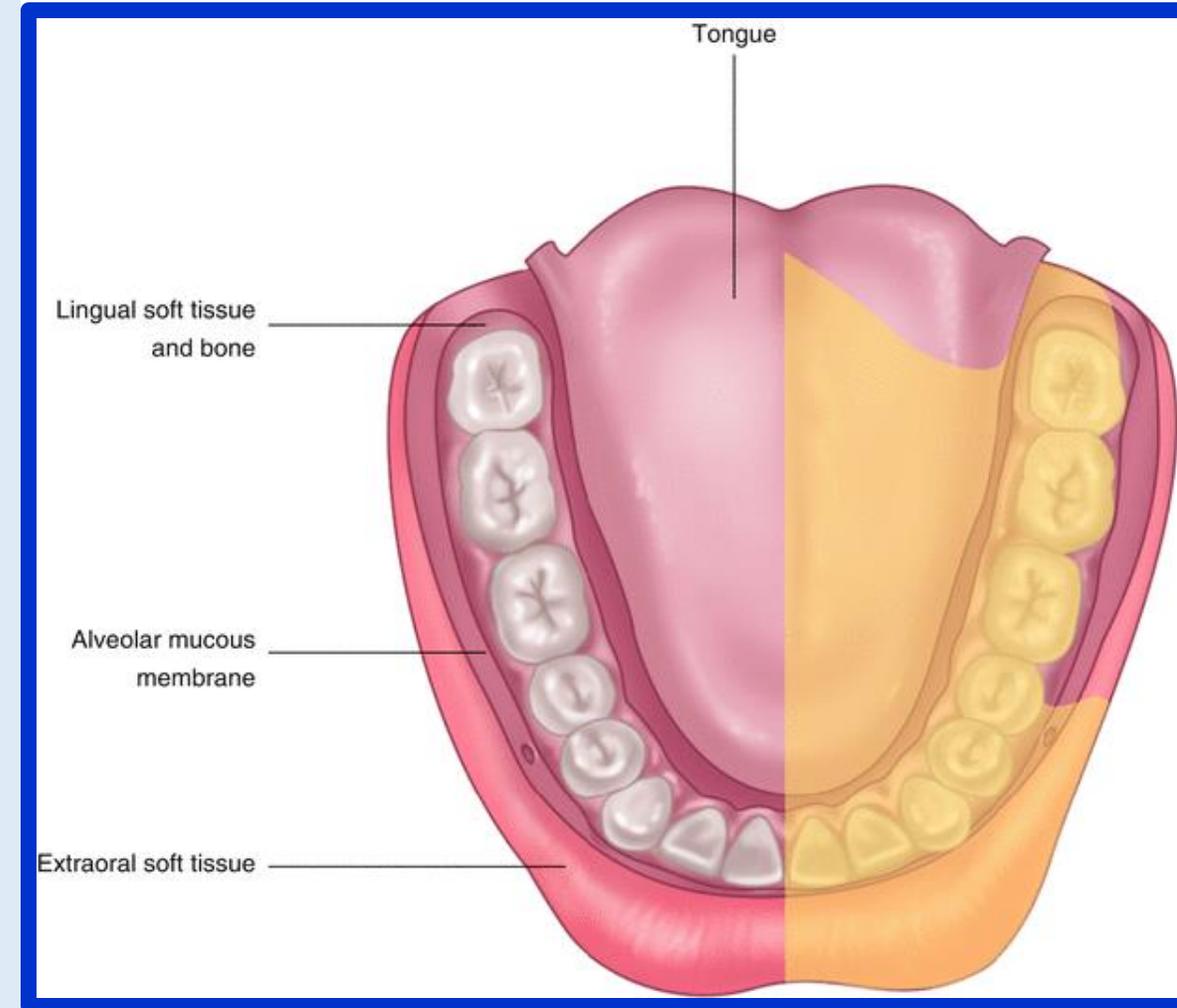
# Inferior Alveolar Nerve Block

This canal gives passage to the **inferior alveolar nerve, artery, and vein.**

**When this nerve block is successful,**

- ✓ all mandibular teeth are anesthetized to the median plane.
- ✓ The skin and mucous membrane of the lower lip,
- ✓ the labial alveolar mucosa and gingiva, and
- ✓ the skin of the chin are also anesthetized because they are supplied by **the mental branch of this nerve.**

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