ANATOMY OF THE MANDIBLE
SECOND STAGE
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THE MANDIBLE

The mandible or lower jaw is the largest and strongest bone of the face, and it articulates with the skull at the temporomandibular joint.
THE MANDIBLE

The body of the mandible, on its external surface in the midline, has a faint ridge, the **symphysis menti**.
The mental foramen can be seen below the second premolar tooth; it transmits the terminal branches of the inferior alveolar nerve and vessels.
On the medial surface of the body of the mandible in the median plane are seen the mental spines; these give origin to the genioglossus muscles above and the geniohyoid muscles below.
**The Mandible**

- The *mylohyoid line* can be seen as an oblique ridge that runs backward and laterally from the area of the mental spines to an area below and behind the third molar tooth.
THE MANDIBLE

- The **submandibular fossa**, for the superficial part of the submandibular salivary gland
- The **sublingual fossa**, for the sublingual gland
THE MANDIBLE

- The upper border of the body of the mandible is called the *alveolar part*.
- The lower border of the body of the mandible is called the *base*.
- The *digastric fossa* is a small, roughened depression on the base, on either side of the symphysis menti.
THE MANDIBLE

The ramus of the mandible is vertically placed and has an anterior **coronoid** process and a posterior **condyloid** process, or head; the two processes are separated by the **mandibular notch**.
THE MANDIBLE

- On the medial surface is the **mandibular foramen** for the inferior alveolar nerve and vessels
- In front of the foramen is a projection of bone, called the **lingula**, for the attachment of the **sphenomandibular ligament**
THE MANDIBLE

The foramen leads into the mandibular canal, which opens on the lateral surface of the body of the mandible at the mental foramen.

The incisive canal is a continuation forward of the mandibular canal beyond the mental foramen and below the incisor teeth.
The coronoid process receives on its medial surface the attachment of the temporalis muscle.
Articulation

Occurs between the articular tubercle and the anterior portion of the mandibular fossa of the temporal bone above and the head (condyloid process) of the mandible below.

The articular surfaces are covered with fibrocartilage.
**Type of Joint**

The temporomandibular joint is synovial. The articular disc divides the joint into upper and lower cavities.

*The TMJ is a hinge and gliding joint and is the most constantly used joint in the body.*
**Capsule**

The capsule surrounds the joint and is attached above to the articular tubercle and the margins of the mandibular fossa and below to the neck of the mandible.
TEMPOROMANDIBULAR JOINT

Ligaments
- lateral temporomandibular ligament strengthens the lateral aspect of the capsule
- This ligament limits the movement of the mandible in a posterior direction
TEMPOROMANDIBULAR JOINT

**Ligaments**

- The *sphenomandibular ligament* is a thin band lies on the medial side of the joint.
- Attached above to the spine of the sphenoid bone and below to the lingula of the mandibular foramen.
Ligaments

- The **stylomandibular ligament** lies behind and medial to the joint and some distance from it.
- It is a band of thickened deep cervical fascia extends from apex of the styloid process to angle of the mandible.
TEMPOROMANDIBULAR JOINT

The **articular disc** divides the joint into upper and lower cavities. It is an oval plate of fibrocartilage that is attached circumferentially to the capsule.

It is also attached in front to the tendon of the lateral pterygoid muscle and by fibrous bands to the head of the mandible.
TEMPOROMANDIBULAR JOINT

The upper surface of the disc is concavoconvex from before backward to fit the shape of the articular tubercle and the mandibular fossa; the lower surface is concave to fit the head of the mandible.
**Synovial Membrane**

This lines the capsule in the upper and lower cavities of the joint.
TEMPOROMANDIBULAR JOINT

• Blood supply
  1. Superficial temporal a.
  2. Anterior tympanic a.
TEMPOROMANDIBULAR JOINT

- **Nerve Supply**
- Auriculotemporal n.
- Masseteric branch of mandibular nerve
MOVEMENTS OF TMJ

A. Elevation of mandible
B. Depression of mandible
C. Retrusion
D. Protrusion

E. Protrusion
F. Lateral movement to right side
G. Lateral movement to left side
MOVEMENTS OF TMJ

- Depression of the Mandible
  - As the mouth is opened, the head of the mandible rotates on the undersurface of the articular disc around a horizontal axis. To prevent the angle of the jaw impinging unnecessarily on the parotid gland and the sternocleidomastoid muscle, the mandible is pulled forward.
• Depression is brought about by contraction of the digastrics, the geniohyoids, and the mylohyoids; the lateral pterygoids play an important role by pulling the mandible forward
Elevation of the Mandible

- The movements in depression of the mandible are reversed.
- First, the head of the mandible and the disc move backward
- Then the head rotates on the lower surface of the disc
MOVEMENTS OF TMJ

- Elevation of the mandible is brought about by contraction of the temporalis, the masseter, and the medial pterygoids.
- The articular disc is pulled backward by the fibroelastic tissue.
MOVEMENTS OF TMJ

- **Protrusion of the Mandible**
  - The articular disc is pulled forward onto the anterior tubercle, carrying the head of the mandible with it. All movement thus takes place in the upper cavity of the joint.
MOVEMENTS OF TMJ

- Retraction of the Mandible
  - The articular disc and the head of the mandible are pulled backward into the mandibular fossa.
  - Retraction is brought about by contraction of the posterior fibers of the temporalis
Lateral Chewing Movements

- These are accomplished by alternately protruding and retracting the mandible on each side.
- For this to take place, a certain amount of rotation occurs, and the muscles responsible on both sides work alternately.
IMPORTANT RELATIONS OF THE TEMPOROMANDIBULAR JOINT

• **Anteriorly:** The mandibular notch and the masseteric nerve and artery

• **Posteriorly:** The tympanic plate of the external auditory meatus and the glenoid process of the parotid gland

• **Laterally:** The parotid gland, fascia, and skin

• **Medially:** The maxillary artery and vein and the auriculotemporal nerve
MUSCLES OF MASTICATION

- **Masseter**
  - **Origin:** Zygomatic arch
  - **Insertion:** Lateral surface ramus of mandible
  - **Nerve supply:** Mandibular division of trigeminal nerve
  - **Action:** Elevates mandible to occlude teeth
**Temporalis**

- **Origin**: Floor of temporal fossa
- **Insertion**: Coronoid process of Mandible
- **Nerve supply**: Mandibular division of trigeminal nerve
- **Action**: Anterior and superior fibers elevate mandible; posterior fibers retract mandible
Lateral pterygoid (two heads)

- **Origin:**
  - Superior head: greater wing of sphenoid
  - Inferior head: lateral aspect of lateral pterygoid plate

- **Insertion:** Neck of mandible and articular disc

- **Nerve supply:** Mandibular division of trigeminal nerve

- **Action:** depress mandible; protrude mandible
medial pterygoid (twoheads)

- **Origin:**
  - Superficial head: maxillary tuberosity
  - Deep head: medial aspect of lateral pterygoid plate

- **Insertion:** Medial surface of angle of mandible

- **Nerve supply:** Mandibular division of trigeminal nerve

- **Action:** Elevate mandible
REFERENCES

• Snell, Richard S. Clinical anatomy by regions. Lippincott Williams & Wilkins, 2011.
Thank You