Second Stage

7. lecture

Anatomy and Physiology of the Temporomandibular Joint (TMJ)

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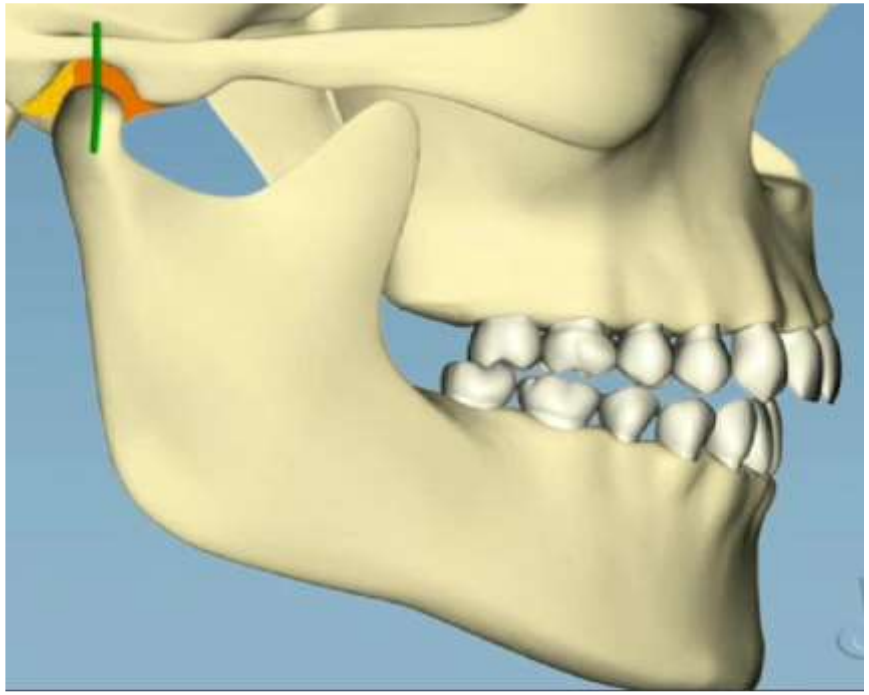
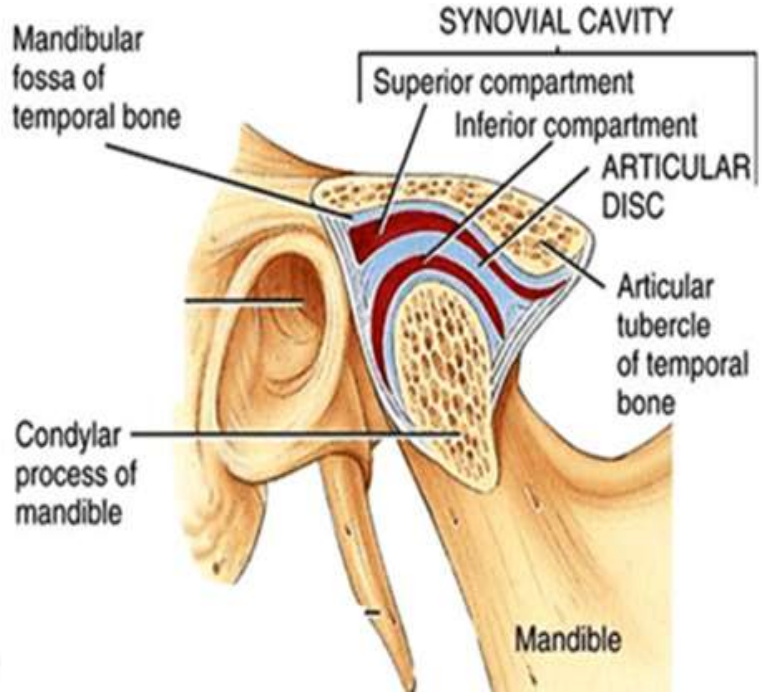
Temporomandibular Joint Consist of the Following Parts





1. The mandibular or glenoid fossa.
2. The condyle process or head of the mandible.
3. The articular disk or "Meniscus" which is placed between the condyle and the glenoid fossa. It divides the synovial joint or T.M.J into upper (superior) and lower (inferior) compartments.
4. Synovial cavity.

The ligament that affect the movement of the mandible consist of:

The mandibular bone has specific relationships to the bones of the cranium.

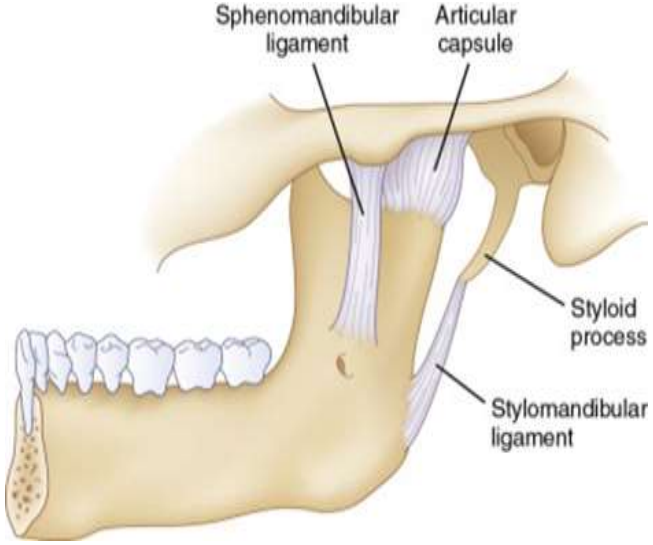
l. Temporomandibular and capsular ligaments

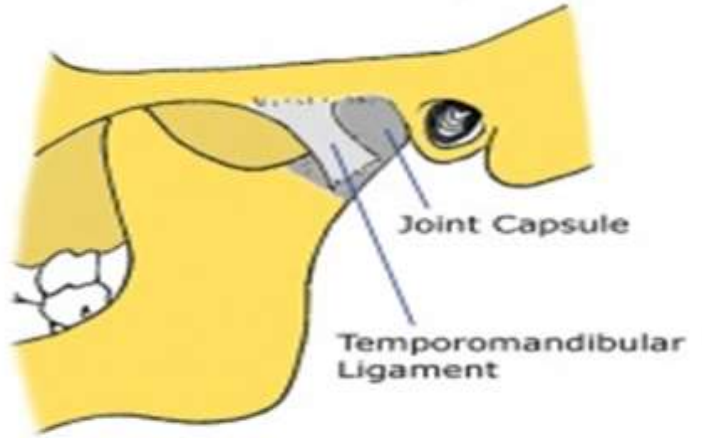
The mandible is connected to the cranium at the two temporomandibular joints by the temporomandibular and capsular ligaments.

2. Sphenomandibular ligament.

3. Stylomandibular ligament.

The sphenomandibular and stylomandibular ligaments also connect the bones is such away at to limit some motions of the mandible.





The Temporomandibular Ligament and Joint capsule (lateral view)

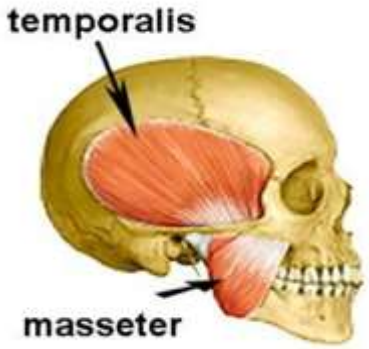
The muscles that control the movement of mandible may be considered in 3 groups:

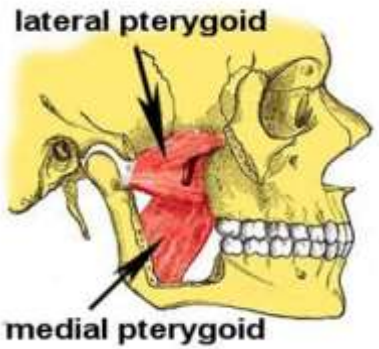
a. Closing muscles.

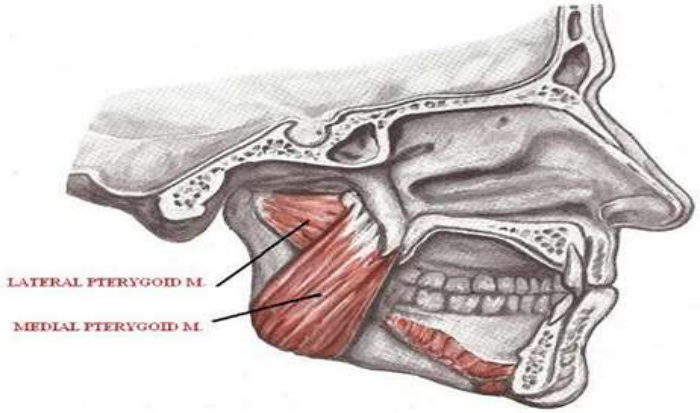
The *masseter*, *temporalis*, and *medial pterygoid* muscles supply the power for pulling the mandible against the maxillae (elevating and closing mandible).

b. Gliding muscles.

The *lateral pterygoid* muscles connect the mandible to the lateral pterygoid plate in such a way as to act as the steering mechanism for the mandible and act to protrude the jaw or to move it laterally.





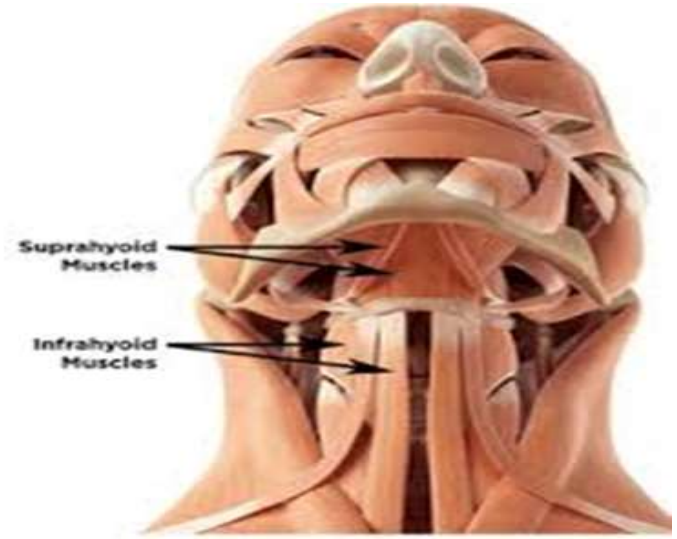


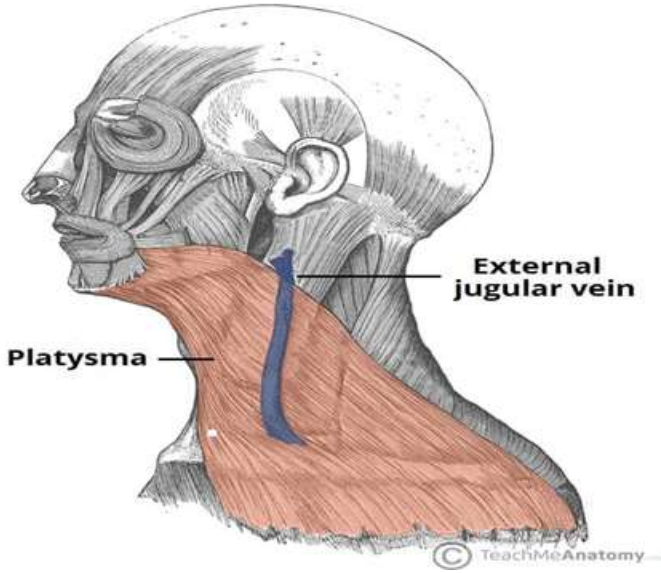
c. Opening muscles.

Muscles that depress the mandible (open) consist of three groups, *supra hyoid* muscles, *infra hyoid* muscles, and *platysma* .

All jaw relations are bone-to-bone relations

The other connection between the upper and lower jaws is through occlusal surfaces of the teeth.

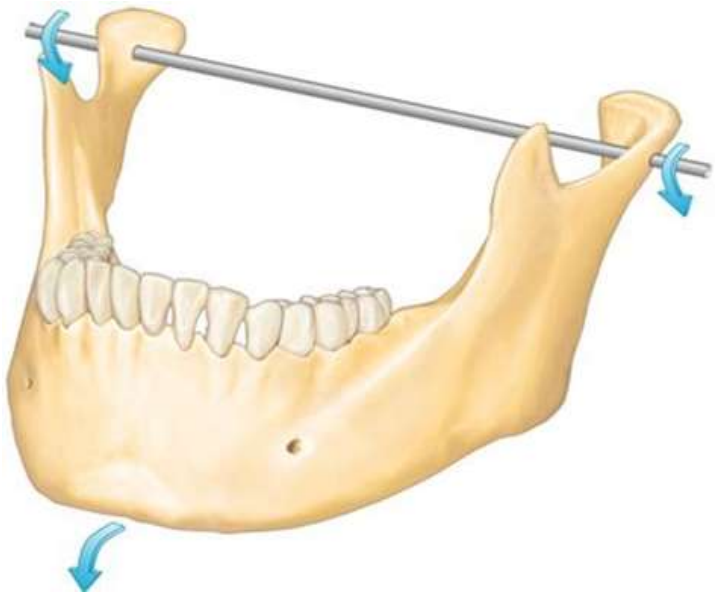


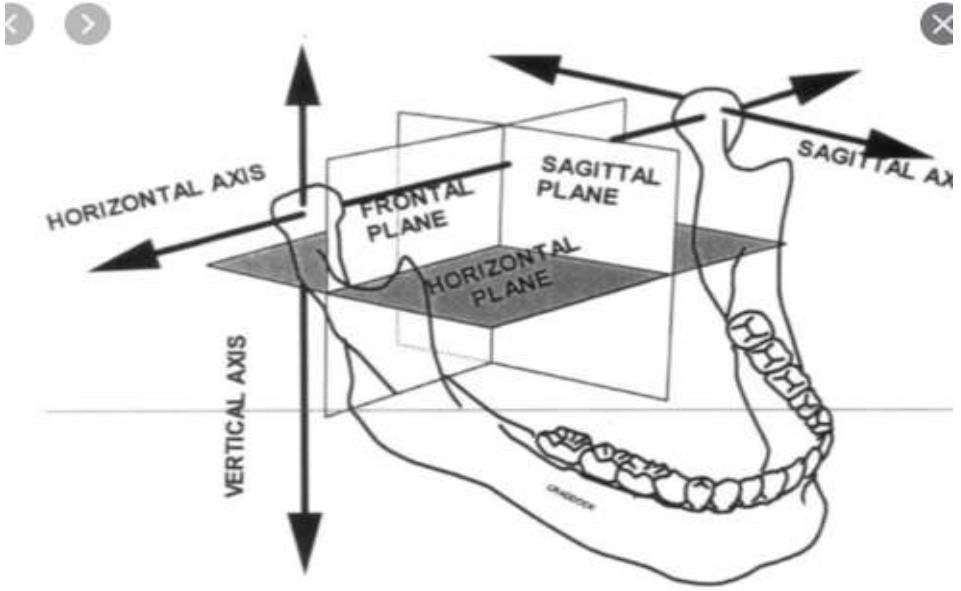


Mandibular axes and mandibular movements

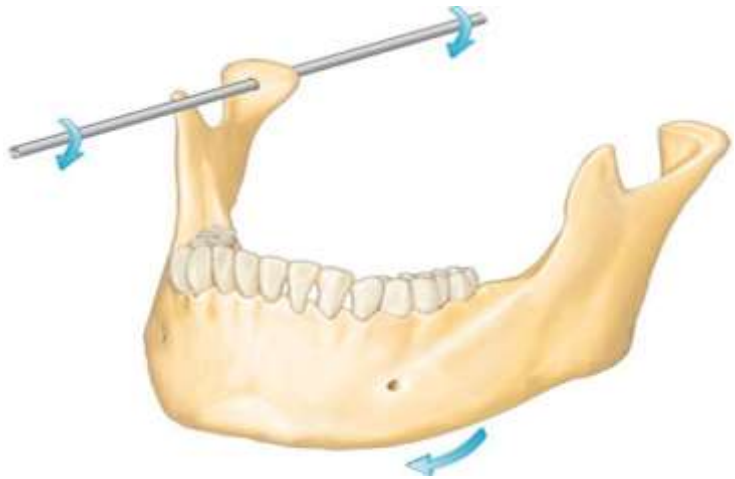
Mandibular axes: There are 3 axes around which mandibular movements take place in horizontal, sagittal and frontal planes these axes include the following:

A. Hinge axis: An imaginary line around which the mandible may rotate within the **sagittal plane** (During opening and closing movement).

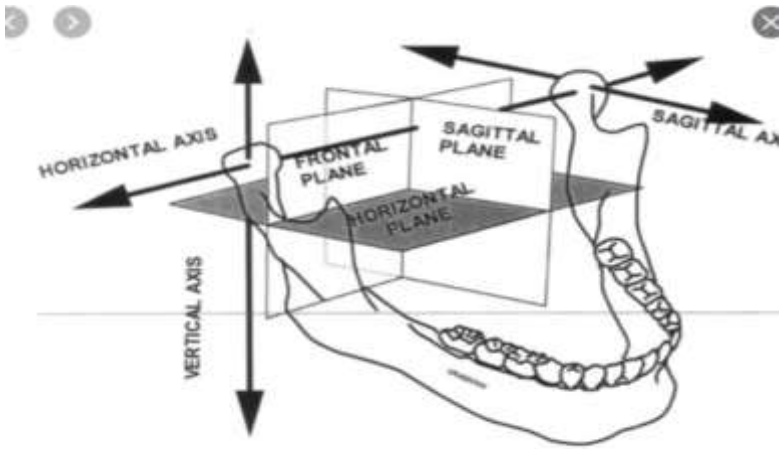


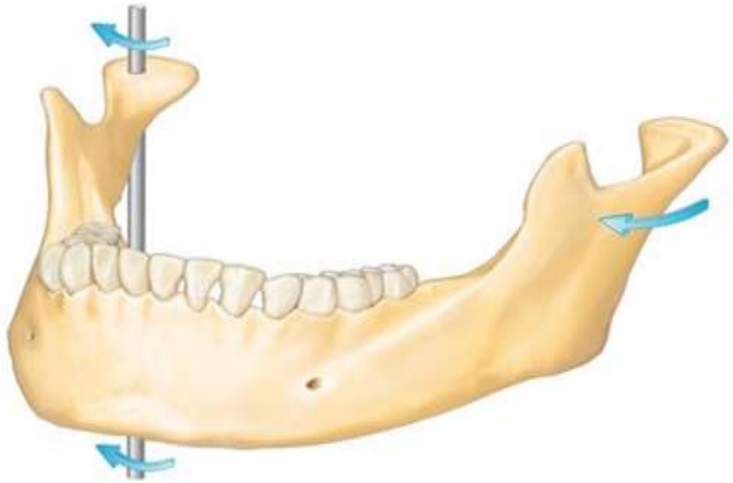


B. Sagittal axis of mandible: An imaginary anterior posterior line around which the mandible may rotate when view in the **frontal plane**.



C. Vertical axis of mandible: An imaginary line around the mandible may rotate through the **horizontal plane.**





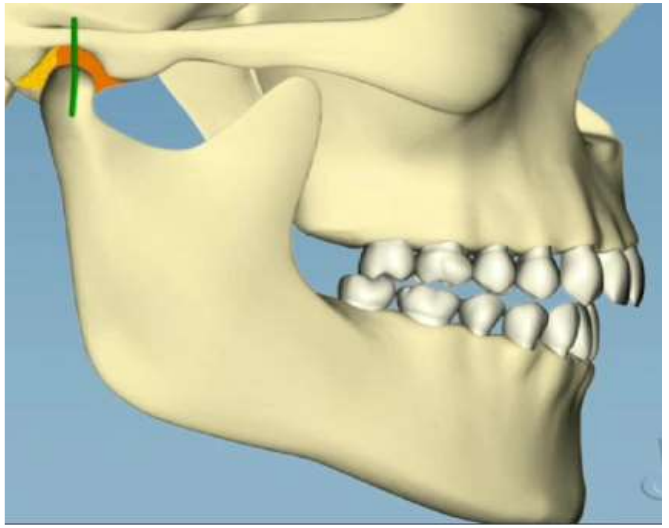
Mandibular movements:-

May be divided into two types either basic or functional movement:

1- Basic movements: it may be divided in to two types:

a. Rotational movement.

b. Translatory or gliding movement.



2- Functional movements: They are including:-

- Opening and closing movements.
- Symmetrical forward and backward movements.
- Asymmetrical side-wise movement or lateral movement.

- Lateral rotation or (laterotrusion).

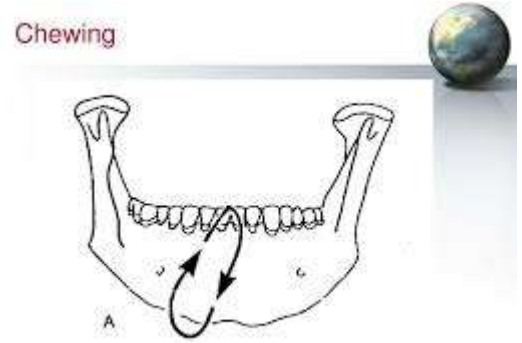
I. Right.

II. Left.

- Lateral translation or (*Bennett movement*) is classified according to the timing of the shift in relation to the forward movement of the non-working condyle

Functional movement.

I. Chewing cycle.



II. Swallowing.

III. Yawing: open the mouth wide and take a deep breath usually as an involuntary reaction to fatigue or boredom.

IV. Speech.

Para-functional movement

I. Clenching.
II. Bruxism.
III. Other habitual movements.

Bruxism is a parafunctional activity which involves the clenching and grinding of teeth. This can occur consciously when awake (awake bruxism) or at night when asleep (sleep bruxism). Awake bruxing is more common in females, has been linked to anxiety and stress, and is thought to affect 20% of the population

Envelope of motion in the sagittal plane:-

In an explanation of the clinical implications of mandibular movements, it is helpful to define the limits of possible motion and certain mandibular reference positions.

Envelope of mandibular movement in sagittal plane

P: Most Protruded position of mandible with the teeth in contact

CO: Centric Occlusion

CR: Centric Relation

MHO: Maximum Hinge Opening position

MO: Point of Maximum Opening of the jaws.

Rest: Mandibular Rest position.