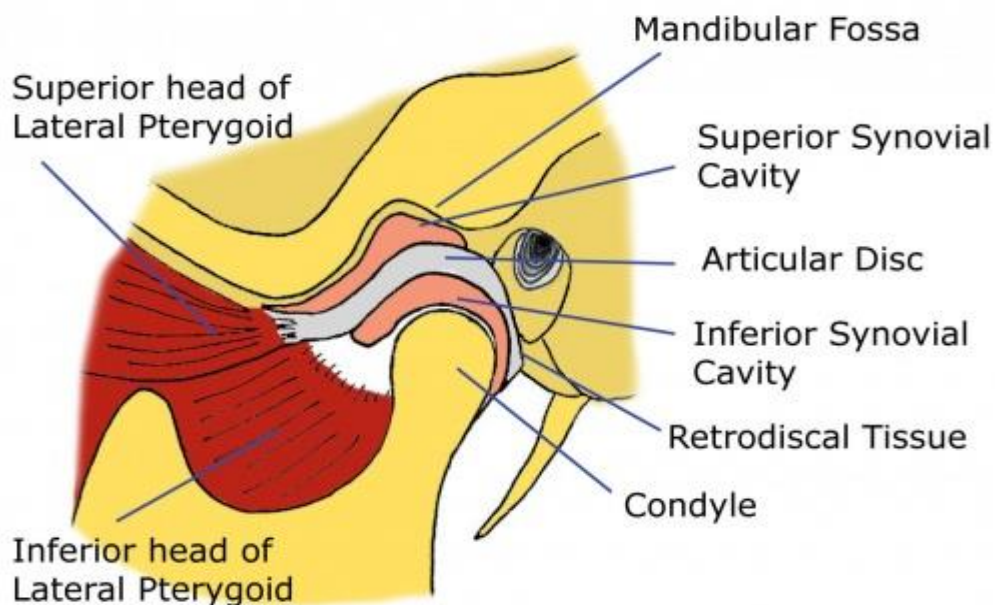


TMJ and mandibular movements

Temporomandibular joint (TMJ): Is the articulation of the condyle process of the mandible and the interarticular disk with the glenoid fossa of the temporal bone.

The TMJ consists of the following parts:

1. The mandibular or glenoid fossa (of temporal bone).
2. The condyle (head of the mandibular bone).
3. The articular disk or "Meniscus" which is found between the condyle and the glenoid fossa. It divides the synovial joint or TMJ into upper (superior) and lower (inferior) compartments.
4. Synovial cavity.



The Temporomandibular Joint

The component of TMJ are:

1. Passive components: a. Bones:

Mandibular fossa.

Condyle.

b. Articular disk.

c. Capsule and ligaments.

2. Active components: a. Muscles of mastication:

Masseter muscles.

Temporalis muscles.

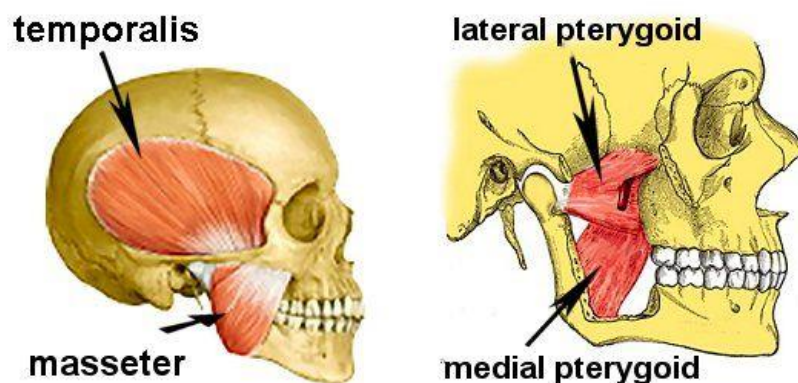
Medial pterygoid muscles.

Lateral pterygoid muscles.

b. Additional muscles:

Suprahyoid muscles.

Infrahyoid muscles.



The ligaments that effect the movements of the mandible consist of:

1. Major ligaments: a. Temporomandibularn ligament.

b. capsular ligaments.

2. Minor ligaments: a. Sphenomandibular ligament.

b. Stylomandibular ligament.

c. Other ligaments.



The mandibular bone has specific relationships to the bones of the cranium. The mandible is connected to the cranium at the two temporomandibular joint by the temporomandibular and capsular ligaments. The sphenomandibular and stylomandibular ligaments also connect the bones in such a way as to limit some motions of the mandible.

Muscles control the mandibular movements considered in 3 groups:

1. Opening muscles.
2. Closing muscles.
3. Gliding muscles.

The muscles that cause depression of mandible (opening):

- a. Lateral pterygoid muscles.
- b. Suprahyoid muscles.
- c. Infrahyoid muscles.
- d. Platysma muscles.

The muscles that cause elevation of mandible (closing):

- a. Temporalis muscle.
- b. Masseter muscle.
- c. Medial pterygoid muscle.

The muscles that cause protrusion of mandible:

- a. Lateral pterygoid muscle.
- b. Medial pterygoid muscle.
- c. Superficial fibers of masseter muscle.

The muscles that cause retraction of mandible:

- a. Posterior fibers of temporalis muscle.
- b. Deep fibers of masseter muscle.

The muscles cause side to side movements (grinding and chewing):

- a. Temporalis muscle on same side.
- b. Pterygoid muscles on opposite side.
- c. Masseter muscle.

✚ Good prosthodontic treatment have a direct relation to the structures of the temporomandibular joints, since occlusion is one of the most important parts of treatment of the patients with complete dentures. The temporomandibular joints affect the dentures and likewise the dentures affect health and function of the joints.

The differences between TMJ and other joints in the body are:

1. TMJ has an articular disk which completely divided the joint spaces into upper and lower joint compartments.

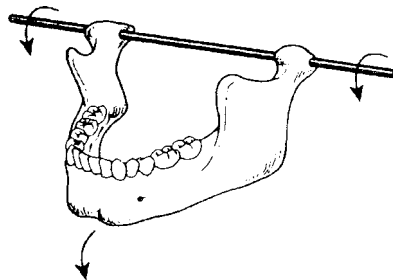
2. TMJ is ginglymoarthrodial joint.
 - a. Hinge action (rotation).
 - b. Slide action (translation).
3. The mandible is the only bone in the body hinged on both ends.
4. Relationship of teeth affects the relationship of the articulating components.

Mandibular axes of movements:

There are three axes around which the mandibular movements take place in three planes, horizontal, sagittal and frontal planes. These axes include the followings:

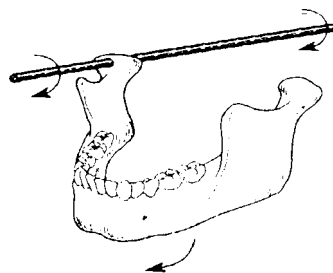
1. Hinge axis or transverse horizontal axis:

An imaginary line around which the mandible may rotate within the sagittal plane (during the opening and closing movement).



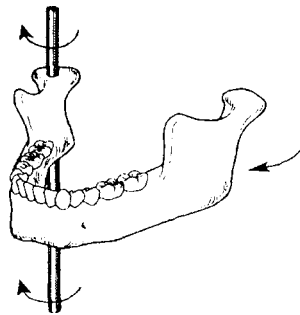
2. Sagittal axis of the mandible:

An imaginary anterioposterior line around which the mandible may rotate within the frontal plane.



3. Vertical axis of the mandible:

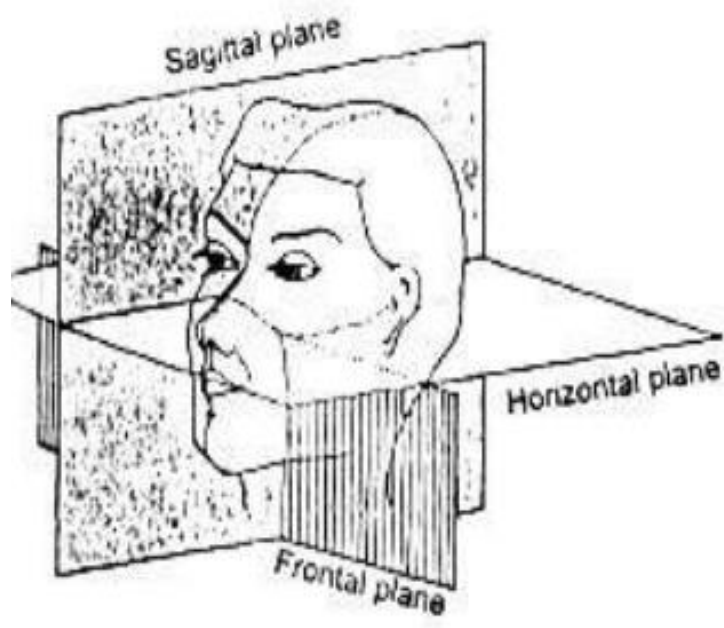
An imaginary line around which the mandible may rotate within the horizontal plane.



Mandibular Movement:

Movement of the condyle occurs along the posterior slope of the articular eminence and extends as far forward as its crest. In some instances, movements may involve part of the anterior slope.

Mandibular movements are related to three planes of the skull: the horizontal, frontal, and sagittal. The mandible rotates in each of the three planes of space around the axes. The point of intersection of the three axes is called the **center of rotation**.

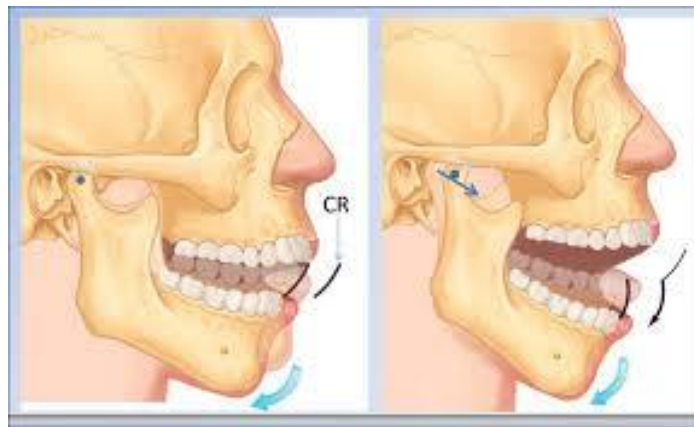


Mandibular movements divided into two types:

1. Basic movements: these movements occur at the level of TMJ it may be divided into two types:

a. Rotational movement: the rotational movement occurs between the condyle and the inferior surface of the articular disk, i.e. in the lower compartment of the TMJ.

b. Translatory or gliding movement: it takes place in the upper compartment of the TMJ, i.e. between the superior surface of the articular disk and the glenoid fossa.



2. Functional movement: all mandibular movements except the terminal hinge movement, are combination of rotational and translational (movement during food chewing and mastication). They are including:

a. Opening and closing movements.

b. Symmetrical forward and backward movements.

c. Asymmetrical side wise movement or lateral movement.