**TMJ & Mandibular Movement**

**Temporo mandibular joint (TMJ)**: Is the area where the mandible articulates with the cranium. It is described as a complex, multi axial, synovial also called cranio mandibular joint.

**TMJ component: -**

1. Cranial component (glenoid fossa)
2. Mandibular component (ovoid condylar process)
3. TMJ capsule: - thin sleeve fibrous tissue investing joint completely inside fibrous capsule, a synovial membrane is present.
4. Ligaments:
   a. Lateral or tempromandibular ligament
      It is the major ligament of the TMJ. This ligamentous originates from the entire rim of the glenoid fossa and articular eminence, attaches to the edges of the articular disc, and passes to insert around the rim of the condyle
   2. Stylo-mandibular Ligament; originates on the styloid process of the temporal bone and inserts on the posterior border of the ramus near the angle
   3. Sphenomandibular Ligament; originates on the spine of the sphenoid bone and inserts on the anterior-superior of the mandibular foramen (lingula). The mandibular foramen is found on the internal surface of the ramus of the mandible
5-Articular discs:- an oval fibrous plate that divides the joint into an upper and lower compartments.

The articular disc is a pad of tough, flexible fibrocartilage situated between the condyle and the glenoid fossa.

The disc is a shock-absorbing mechanism. When the condyle moves out onto the articular eminence, the disc travels with it. The upper compartment (gliding movement), the lower compartment permits Rotatory as well as gliding movement.

**Muscles of mastication:-**

1- masseter (superficial and deep)

2- temporalis

3- medial pterygoid

4-lateral pterygoid (superior and inferior)
Basic Mandibular Movements

1-Opening and Closing:
From a position of centric relation, pure hinge movements are possible in opening and closing. In a hinge movement, the condyles rotate within the glenoid fossa.

Opening and closing movements, where the measured distance between maxillary and mandibular incisors is between 20-25mm and is called rotation, more than 25mm, result in combined rotation and translation of the condyles.

(Rotational movement = hinge movement)

Translation occurs whenever a condyle leaves the glenoid fossa.

2-Protrusion and Retrusion
Protrusion is when the mandible moves forward and both condyles leave their respective fossae and move down their eminences.
The opposite process is called Retrusion. Protrusion and retraction are translatory movement.
3-Lateral movement (right and left direction)
a-the side to which the mandible is moving is called the working side
b-the side that is opposite to the working side is called balancing or non working side.
TYPES OF MANDIBULAR MOVEMENT

a-ROTATIONAL: when an opening of 20-25mm measured at the central incisors.

1-Horizontal axis of rotation (HINGE AXIS)
Hinge axis: defined as an imaginary line passing through the two mandibular condyles around which the mandible rotates without translatory movement.
This line Stable, recordable, reproducible and repeatable.

2-AROUND VERTICAL AXIS (FRONTAL)
3- AROUND SAGITTAL AXIS

b- TRANSLATIONAL MOVEMENT: If the opening of the mandible continues beyond 20-25mm then translation of the mandible occurs. The condyle and articular disc leave the glenoid fossa anteriorly.

ENVELOPE OF MOTION (Posslet's motion)

Dr. Posslet's in 1952 first described a 3 Dimensions concept of mandibular movements. It was a combination of border movements in all 3 planes:

a- Sagittal
b- Horizontal
c- Frontal

with 3 reference positions

1- Centric relation (CR) DISCUSSED
2- Maximum inter cuspal position (MIP): This is a position in which the maxillary and mandibular teeth make maximum
surface contact with each other. The mandible is elevated as superiorly as possible in the sagittal plane.

3- Resting position (Postural position-PP):- is the habitual position of the mandible when the patient is resting comfortably in the upright position and the condyles are in a neutral unstrained position in the glenoid fossa. In this position, the teeth are apart and there is a wedge space between the teeth. This space is called the (inter occlusal space) and is usually 2-3mm and also called (physiological rest position)

The superior portion of the envelope is determined by the tooth contact

The other borders are primarily determined by TMJ ANATOMY AND LIGAMENT

a- Sagittal plane

ICP=inter cusp al position
CR= centric relation
b- horizontal plane

c-frontal plane

c-dental University
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