

Temporomandibular joints lect.21

أ.د. عذراء

Temporomandibular joints (TMJ) are the two **joints** connecting the jawbone to the **skull**. It is a **bilateral synovial articulation between the temporal bone of the skull (cranium) above and the mandible below**

Development

Formation of the temporomandibular joints occurs at around **12 weeks in utero** when the joint spaces and the articular disc develop.

A growth center is located in the head of each mandibular condyle before an individual reaches maturity. This growth center consists of hyaline cartilage underneath the periosteum on the articulating surface of the condyle. This mandibular growth center in the condyle allows the increased length of the mandible needed for the larger permanent teeth, as well as for the larger brain capacity of the adult. This growth of the mandible also influences the overall shape of the face.

When an individual reaches full maturity, the growth center of bone within the condyle has disappeared.

anatomical parts concerned with mandibular articulation:

- Mandibular condyle
- Mandibular (glenoid) fossa and articular eminence
- The articular disc
- Capsule
- Ligaments

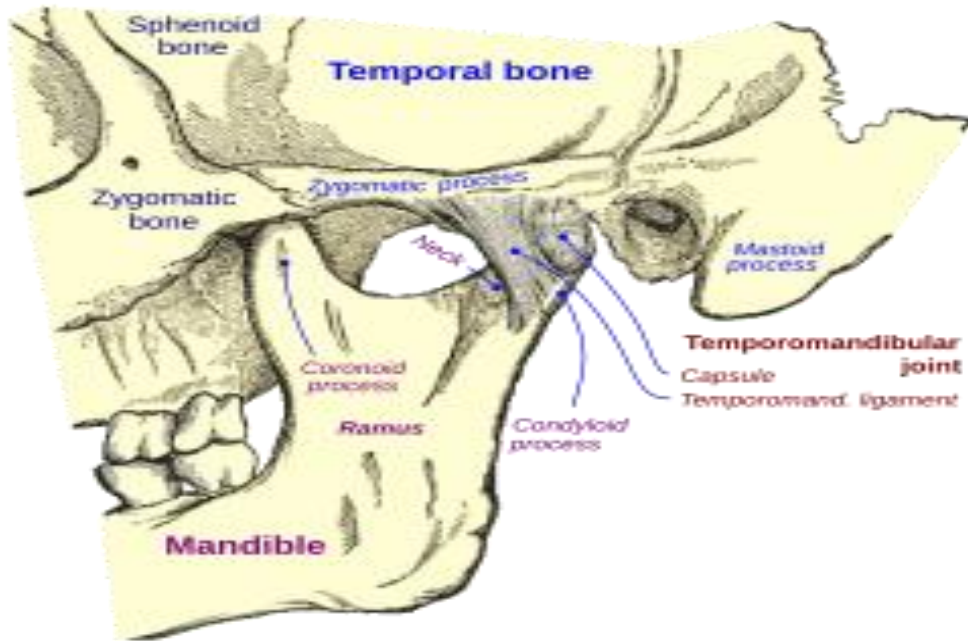
□ Muscular component

The mandibular condyle articulates with the glenoid fossa and articular eminence of the temporal bone. □ An articular disc separates the articular surfaces in □ Upper compartment between the disc and temporal bone. □ Lower compartment between the condyle and the disc

The common features of the synovial joints exhibited by this joint include a disk, bone, fibrous capsule, fluid, synovial membrane, and ligaments. However, the features that differentiate and make this **joint unique are its articular surface covered by fibrocartilage instead of hyaline cartilage.**

1.THE MANDIBULAR CONDYLE

- It's the articulating surface of the mandible.
- It is convex in all directions but wider latero-medially than antero-posteriorly.
- Composed of cancellous bone covered by a thin layer of compact bone.
- Trabeculae : of the cancellous bone is arranged in a radiating manner from the neck to reach the surface of the condyle at a right angle (to give maximum strength.)
- Bone marrow is of myeloid or cellular type and becomes fatty with age.
- Outer layer of compact bone is covered by thick layers of fibrous tissues
- Growth continues till **20 years of age.** □ Remnants of cartilage may persist in old age.



2.MANDIBULAR (GLENOID) FOSSA AND ARTICULAR EMINENCE

Glenoid fossa:

- Posteriorly limited by the squamotympanic fissure.
- Anteriorly bounded by the articular eminence.
- Roof: thin layer of compact bone separating the middle cranial fossa.

Articular eminence:

- Composed of: Spongy bone covered by thin layer of compact bone.
- Chondroid tissues commonly seen in the eminence.

The Fibrous layer covering the articulating surface of temporal bone is thin on the articular fossa and thickens on the posterior slope of the eminence

3. Articular Disc : The articular disc is the most important anatomic structure of the TMJ.

- ❖ Disk is fibrous, avascular plate
- ❖ Shape is oval, biconcave in sagittal section. It is thin in central part and thick at posterior borders(uneven thickness)
- ❖ divides the joint into a larger upper compartment and a smaller lower compartment.
- ❖ Its functions to accommodate a hinging action as well as the gliding actions between the temporal and mandibular articular bone.

The two compartments are synovial cavities, which consist of an upper and a lower synovial cavity.

4. ARTICULATING CAPSULE AND LIGAMENTS AND SYNOVIAL MEMBRANE The whole TMJ is enclosed in a fibrous capsule.

It is attached to: □ Articular tubercle (in front) □ squamous tympanic fissure (posteriorly) □ Borders of articulating glenoid fossa □ Neck of the mandible. (below)

' It is lined by synovial membrane. ' Laterally, the capsule is reinforced by TMJ ligaments.

HISTOLOGY Consists of 2 layers:

□ Outer fibrous capsule – strengthen laterally to form the temporomandibular ligament.

□ Inner synovial layer – composed of thin connective tissue layer lined with Synovial cells produces the synovial fluid that fills the cavities

SYNOVIAL FLUID

□ It is clear, straw-colored viscous fluid.

□ It diffuses out from the rich capillary network of the synovial membrane.
Contains: □ Hyaluronic acid which is highly viscous, some free cells mostly macrophages.

Functions:

□ Lubricant for articulating surfaces.

□ Carry nutrients to the avascular tissue of the joint.

□ Clear the tissue debris caused by normal wear and tear of the articulating surfaces (debridement).

Blood supply of TMJ

Its arterial blood supply is provided by branches of the **external carotid artery**, predominately the superficial temporal branch.

Nerve supply of TMJ

Sensory innervation of the temporomandibular joint is derived from the **auriculotemporal and masseteric branches of mandibular branch of the trigeminal nerve**



AGE CHANGES

- **Condyle:**
 - Becomes more flattened
 - Fibrous capsule becomes thicker.
 - Osteoporosis of underlying bone.
 - Thinning or absence of cartilaginous zone.
- **Disk:**
 - Becomes thinner.
 - Shows hyalinization and chondroid changes.
- **Synovial fold:**
 - Become fibrotic with thick basement membrane.
- **Blood vessels and nerves:**
 - Walls of blood vessels thickened.
 - Nerves decrease in number