

# The Temporomandibular Joint is affected by Synovial Chondromatosis

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## Description

The two joints that connect the jawbone to the skull in anatomy are referred to as the Temporomandibular Joints (TMJ). It is a synovial articulation between the mandible below and the temporal bone above the skull. The name of this creature comes from these bones. Because it is a bilateral joint that functions as a single unit, this joint is one of a kind. The right and left joints cannot function independently of one another because the TMJ is connected to the mandible. The joint capsule, articular disc, mandibular condyles, temporal bone articular surface, temporomandibular ligament, stylomandibular ligament, sphenomandibular ligament and lateral pterygoid muscle are the primary components. The articular tubercle immediately in front of the articular capsule (capsular ligament) is attached above to the mandibular fossa's circumference by a thin, loose envelope. Below, to the condyle of the mandible's neck. It can move freely due to its loose connection to the mandible's neck.

## Upper and Lower Synovial Cavities

The articular disc is the temporomandibular joints distinguishing feature. The dense fibrocartilage tissue that makes up the disc is located between the temporal bone's mandibular fossa and the head of the mandibular condyle. One of the few synovial joints in the human body that has an articular disc is the temporomandibular joint, along with the sternoclavicular joint. The lower and upper compartments of each joint are separated by the disc. The upper and lower synovial cavities that make up these two compartments are called synovial cavities. The synovial fluid that fills these spaces is produced by the synovial membrane that lines the joint capsule. The shape of the disc is biconcave. The superior head of the lateral pterygoid is inserted into the anterior portion of the disc. The temporal bone is attached to the posterior portion. Unless the disc is damaged, the upper and lower compartments do not communicate with one another. The central portion of the disc is avascular and does not have innervation, so it gets its nutrients from the synovial fluid that surrounds it. On the other hand, the posterior ligament and the capsules that surround it have nerves and blood vessels. There are only a few cells, including fibroblasts and white blood cells. In comparison to the peripheral region, which is thicker but has a consistency that is more cushioned, the central area is also thinner but denser. The avascular central region of the disc receives nutrition from the

synovial fluid in the synovial cavities. The synovial membrane covers the inner surface of the articular capsule in the TMJ, with the exception of the surface of the articular disc and condylar cartilage. With age, the entire disc thins and may add cartilage to the central portion, resulting in impaired joint movement. Rotational movement, which is the initial movement of the jaw when the mouth opens, involves the lower joint compartment formed by the mandible and the articular disc. Translational movement, also known as the jaw's secondary gliding motion when it is widely opened, involves the upper joint compartment that is formed by the articular disc and the temporal bone.

The temporomandibular joints are connected to three ligaments: Two minor ligaments and one major ligament. These ligaments are crucial because they define the mandible's border movements, or the farthest extents of movement. Painful stimuli will result from mandibular movements that go beyond the functional limits set by the muscular attachments. As a result, mandibular movements that go beyond these more restricted boundaries are rare in normal function. The auriculotemporal and masseteric branches of V3, also known as the mandibular branch of the trigeminal nerve, provide the temporomandibular joint with sensory innervation. This is just tactile innervation. Keep in mind that the motor is like the muscles.

## Second-Order Sensory Neurons

There are four receptors involved in the specific mechanics of proprioception in the temporomandibular joint. The mandible is positioned by the ruffini endings, which act as static mechanoreceptors. Pacinian corpuscles are dynamic mechanoreceptors that, during reflexes, accelerate movement. Golgi tendon organs protect the ligaments surrounding the temporomandibular joint by acting as static mechanoreceptors. The pain receptors that safeguard the temporomandibular joint themselves are free nerve endings. The TMJ's bones, ligaments and muscles are innervated by free nerve endings, many of which are nociceptors. In healthy TMJs, the fibrocartilage that covers the TMJ condyle is avascular and not innervated. Sensory signals are transmitted along small-diameter primary afferent nerve fibers that make up the trigeminal nerve when bone tissue, ligaments, or muscles become inflamed or injured. Signals are directed through the trigeminal nerve and manipulated by neuronal cell bodies in the trigeminal ganglion. The spinal trigeminal nucleus, which is home to second-order sensory neurons, receives nociceptive signals. Sensory signals

are transmitted to higher-order brain regions like the somatosensory cortex and thalamus from the trigeminal nucleus.

Because it is both a ginglymus (hinging joint) and an arthroal (sliding joint) joint, each temporomandibular joint is referred to as a "ginglymoarthrodial" joint. The condyle of the mandible articulates with the temporal bone in the mandibular fossa. A concave depression in the squamous portion of the temporal bone is known as the mandibular fossa. An articular disc actually separates these two bones, separating the joint into two distinct compartments. The condylar head can be rotated around an instantaneous axis of rotation in the inferior compartment, which corresponds to the first 20 mm or so of the mouth opening. The superior compartment of the temporomandibular

joints must become active once the mouth reaches this level of openness. Not only are the condylar heads rotating within the lower compartment of the temporomandibular joints at this point, but the entire apparatus—the condylar head and articular disc—translates if the mouth is opened further. On the anterior concave surface of the mandibular fossa and the posterior convex surface of the articular eminence, this translation amounts to a rotation around another axis, despite the fact that it had previously been explained as a forward and downward sliding motion. The result is an evolute that can be referred to as the resultant axis of mandibular rotation. It is located close to the mandibular foramen and provides a low-tension environment for the mandibular vasculature and innervation.