Massage Today
May, 2001, Vol. 01, Issue 05

Snap, Crackle and Pop, Part I

By Neal Cross, PhD, NCTMB

The human temporomandibular joint (TMJ) is involved in the etiology of several clinical complaints, including jaw pain, tongue pain and headache. Although small, this joint has a rather complex structure and function.

By placing your middle finger over the TMJ (just inferior and slightly anterior to the external auditory meatus) and slowly opening and closing your mandible, you should feel a nice smooth motion bilaterally. This motion will start as a jaw opening (depression); at the end of the movement (at the point just prior to fully opening the jaw), you should feel the joint glide anteriorly. Some will feel one side move out of synch with the other; others may feel one or both sides suddenly "snap" anteriorly. A few may feel a "crackle" (crepitus) on one or both sides; still others may feel and/or hear a "pop" as the articular disc releases.

Let’s consider some of the underlying anatomical and functional aspects of the TMJ. The TMJ is formed by parts of two bones: the temporal bone and the mandible. More specifically, the condyloid process of the mandibular ramus fits into the mandibular (glenoid) fossa of the zygomatic process of the temporal bone. This mandibular fossa is bounded posteriorly by the retroarticular process and anteriorly by the articular tubercle. There is a well-defined articular disc within the joint cavity and an articular capsule enveloping the joint. (*Author’s note:* For more information, please refer to one of the atlas pictures listed below.) Interestingly, the disc separates the joint cavity into two functionally separate compartments: one inferior and one superior. Another unique feature of this joint is that the articular surfaces are covered by dense fibrous connective tissue instead of hyaline cartilage, as is usual in synovial joints. This type of connective tissue allows for joint remodeling. The disc attaches to bone medially, laterally and posteriorly, but blends with the articular capsule anteriorly. The articular capsule and the lateral ligament further stabilize this joint. Medially, the sphenomandibular ligament assists in TMJ stabilization. Posteriorly, the stylomandibular ligament assists in joint stabilization.

The TMJ is considered a compound joint, because it operates as two separate but related functional units. The articular disc and the mandibular condyle form the first functional unit. These two act together in most hinge-type movements. This is when the jaw is depressed. The condyle and the disc together move (glide) on the articular eminence for full mandibular opening. The jaw may also be protracted (protruding the mandible) or retracted. In addition, there is lateral displacement about the TMJ. The primary muscles producing these mandibular movements are: depression-lateral pterygoids with help from the digastric, mylohyoid and geniohyoid muscles; elevation-masseter, temporalis and medial pterygoids; retraction-posterior temporalis; protraction-lateral pterygoids; and lateral displacement-contralateral lateral pterygoid. Earlier descriptions of a separate "superior pterygoid" muscle acting solely upon the articular disc seem to have been unfounded.[1]

The innervation of the TMJ is derived from branches of the mandibular division of the trigeminal nerve; specifically, the masseteric and auriculotemporal branches. The blood supply is derived from the superficial temporal and maxillary branches of the external carotid artery. Lymphatic drainage is primarily into the deep cervical nodes.

Next month, I will discuss various TMJ dysfunctions as they relate specifically to the underlying anatomical features. It will then become clear why so many clinicians of various types treat TMJ dysfunction.

References:

1. Klineberg I: The lateral pterygoid muscle: some anatomical, physiological and clinical considerations. Ann R Aust Coll Dent Surg: 11:96-108,1991.

Atlas illustrations:

- Frick et al; *Wolf-Heidegger's Atlas of Human Anatomy 4th Edition*: pp. 118-119. 1990.
- Clemente; *Anatomy 4th Edition*: plates 472-473. 1997.
- Moore and Dalley; *Clinically Oriented Anatomy 4th Edition*: pp. 924-925. 1999.
- Netter; *Atlas of Human Anatomy*: plate 11. 1989.

Click here for previous articles by Neal Cross, PhD, NCTMB.