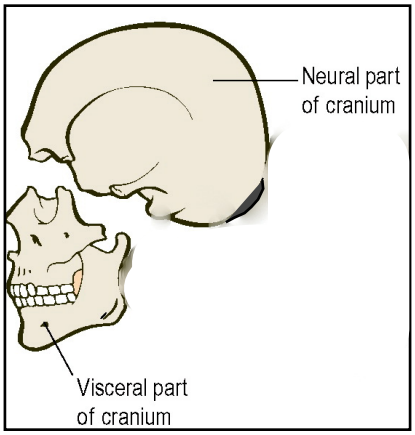
Getting Results by Working Inside the Mouth: A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

After many years in practice, I became intrigued with the changes I saw happening in client's bodies that were different from what I expected, especially in clients with chronic conditions. It seemed that there were key areas that needed to be balanced in order for my clients to really make progress – not simply feel better immediately after a session. Along with the feet, pelvis and diaphragm area, the jaw began to take center stage in my treatments. As I learned more anatomy and principles of postural compensation, I came to understand how and why our jaws play such an important role in our overall balance. Learning to ease tension and balance structures in the head and anterior neck has become a cornerstone of my treatment for most clients in my practice. To give you a sense of the potential here, I'll address three common ailments that most clients have at one time or another: headache, whiplash, and localized jaw pain. In order to see how the jaw muscles fit into the treatment of these conditions, let's take a little tour of the head. (Bring out your favorite anatomy atlas to help you follow along – we'll be using *Trail Guide for the Body* and *Anatomy Trains* primarily.)

The Head and its Appendage, the Jaw

Given the many bones and muscles we tackle as beginning massage students, it's understandable that we approach the head as a single unit. Once we have a closer look, however, we see that the head is composed of three anatomical areas: the neuro-cranium, the viscero-cranium, and the mandible.



From *Anatomy Trains,* 2nd Edition, 2009, by Thomas Myers, reprinted with kind permission.

The neuro-cranium is simply the round ball that holds the brain. It has a dense "base," which is a nest for the brain with many openings for nerves and blood vessels, and a thin "vault," which caps the brain and distributes the force of any bumps or blows. If you imagine wearing a cap, the edge of the cap would outline the place where the base and the dome meet.

The viscero-cranium is the bony scaffolding of the face, from nose to mouth and ear to ear. Structurally, the face hangs from a set of sutures just at the bridge of the nose and behind the eyes, and it includes most of our sinuses and special senses. Like the bones of the vault, the bones in the face are designed to disperse most impact forces superficially, rather than into the nerve- and vessel-rich area of the sinuses and cranial base.

The mandible is the lower jaw: a dense bone that hangs from the cranial base, like the chin strap of an old motorcycle helmet. Connected to the rest of the head by the temporo-mandibular joints (TMJ), the jaw is highly mobile and performs a variety of functions. So, looking at someone face-to-face we can see all three aspects of the head: the neuro-cranium at the forehead, the viscero-cranium from the eyes to the upper teeth, and the lower jaw at the chin. This perspective becomes very useful when assessing the alignment of each aspect in relation to each other and the neck.

Since we're accustomed to considering the face as a whole, we don't tend to think of the jaw as an highly mobile appendage of the head. However, just as the arms and legs are appendages that can either support or drag on the torso, the mandible can rest in balance…or not, which strains the head and upper neck. This heavy bone and related myofasciae form a functional unit which plays an important role in our overall balance.

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

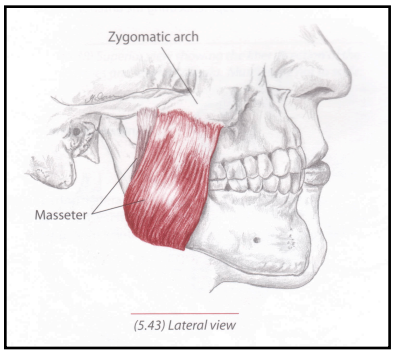
Getting Results by Working Inside the Mouth: A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

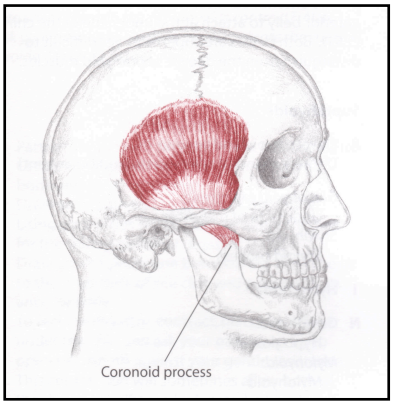
The Inner and Outer Slings of the Jaw

Two of the muscles that suspend the jaw are well-known to most massage practitioners—the masseter and temporalis. The **masseter** spans from the cheek bone (zygomatic arch) to the angle of the mandible. It is a dense, multilayered muscle with a reputation—the strongest muscle in the body for its size. It closes, clenches, bites, and grinds; with it, we can "hold our tongue" by closing our mouth instead of "speaking our mind" (and, with discrimination, avoid more than a few mis-steps).

These figures from *Trail Guide to the Body*, by Andrew Beil, reprinted with kind permission.

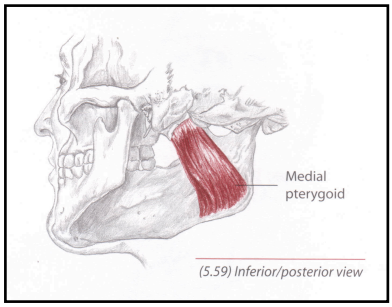


The **temporalis** forms a fan of fibers on either side of the head. The belly crosses the TMJ just in front of the ear, and dives beneath the cheek bone to attach to the coronoid process of the mandible (the thin flange at the upper, anterior aspect of the ramus). This is the muscle that we instinctively rub at the temples when we get a headache. If we look closely at its shape, we can see how the anterior (and more vertical) fibers assist the masseter in closing the jaw, while the posterior (more horizontal) fibers draw the mandible back, setting the bone in the joint. The temporalis can "rein in" the mouth—anatomically in full closure of the TMJ, or metaphorically in inhibition of self-expression. Together, the masseter and temporalis create the "set of the jaw" and everything that that implies, from anger and aggression to tenderness and vulnerability (think of the quivering chin at the brink of tears).



Less known to practitioners and clients alike is an inner sling created by the pterygoid muscles. (The "p" is silent, as in pterydactyl. Both words derive from the root word 'wing'—in this case, the wing of the sphenoid bone deep in the skull). There are two muscles—the medial and lateral pterygoid—each with a distinct path and function.

The **medial pterygoid** is the larger and more accessible of the two. It lies on the medial aspect of the mandible, anchoring on the angle and rising toward the roof of the mouth. (In this illustration, you're looking at the right medial pterygoid 'through' the inside of the mouth.) Think of its relationship with the masseter this way: if you were to make a "v" with your index and middle finger, then imagine the jaw bone resting between them where they meet, one finger could be the masseter and the other the medial pterygoid. Along with closing the jaw, the medial pterygoid works with the masseter to create grinding, that side-to-side, round-and-round movement that horses and cows do so well.



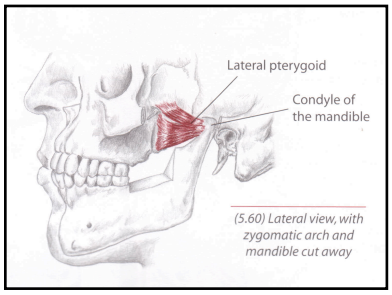
The **lateral pterygoid** is tucked away behind the upper jaw, making it a little tricky to get to but well worth the effort. To imagine its location, let's first get oriented to the TMJ: bring both hands up to your cheeks, Macaulay Culkin-style (with your index finger pad at the hole of each ear). If you slowly open your mouth, the condyle of the TMJ will rise up just beneath your middle finger. That condyle is one attachment of the lateral pterygoid; the other is at the top of the roof of the mouth, covered over by the soft palate (pterygoid plate of the sphenoid).

The lateral pterygoid is a relatively small muscle, with two bellies (one inferior, one superior), and because of its structure, it plays a key role in TMJ function. The most unusual anatomical feature of the

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

Getting Results by Working Inside the Mouth:
A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

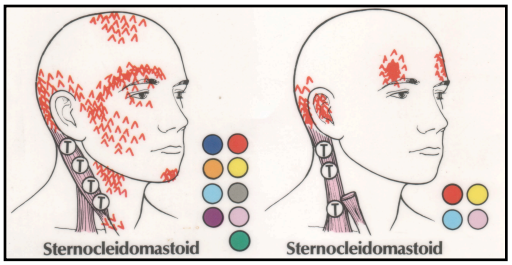


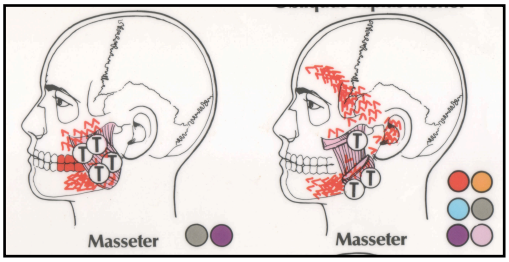
TMJ is its highly mobile articular disc. The upper surface of the joint (the temporal fossa) is curved like a spoon, and the disc rides that curve from front to back and can even move forward out of the fossa if needed (as in taking an extra large anaconda-style bite). How does the disc do it? The superior belly of the lateral pterygoid reaches into the joint and attaches to the disc, drawing it forward when we open the jaw and allowing it to ease back when we close the jaw. If the lateral pterygoid becomes chronically shortened or immobile, the disc can't move properly, and mouths open with strain, pain, pops or limitation.

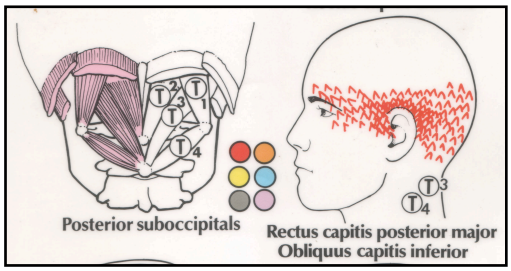
Notoriously tight and tender, the lateral pterygoid is often the key to releasing the jaw fully, but working on it can be challenging. In 15 years of practice, I have yet to meet a client for whom this work isn't intense (i.e., painful)—and remarkably effective. Once clients feel the ease of movement and decreased tension that's possible, they are "on board" and often come back requesting for more of that specific treatment. And, although these muscles can be initially confusing to find in one's own mouth, it can be very useful to teach clients to massage them as part of their home care. (See attached Homecare Instructions.)

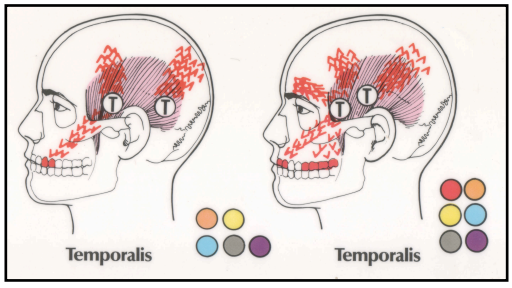
Headaches and Muscles of the Jaw and Anterior Neck

Headaches are a common, and thankfully transitory ailment, that accompany many other musculoskeletal dilemmas. As Ruth Werner, author of *Pathology for Massage Therapists* writes, "Up to 90% of adults in the United States experience a headache each year; 10 million of them will see a doctor for relief." (2nd edition, pp 225.) There are several forms of headaches, though as researchers understand more of the physiological mechanisms of headaches, they're learning that those mechanisms may have more in common than originally thought.









Illustrations taken from *Trigger Points - TMJ* poster, published by St. John and Langnes.

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

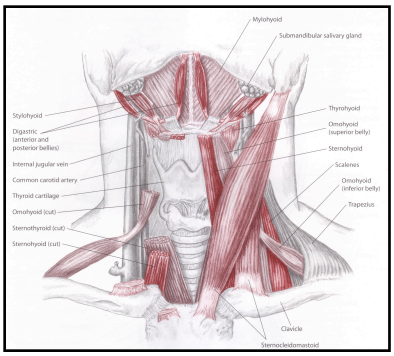
Getting Results by Working Inside the Mouth: A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

One underlying factor in headaches is simply balancing the weight of the head. Werner explains, “The average head weighs about 18 to 20 pounds...The whole thing is kept in balance by tension exerted by muscles and ligaments around the neck and head...It is not surprising then, that when things can get easily a little out of balance, the resulting pain reverberates throughout the whole structure.” (Ibid, pp 225.)

Tension is another common source, and such headaches are understood to be caused by local ischemia and trigger points within over-tight muscles. These muscles, like any other muscle in the body, can develop trigger points for a number of reasons: sustained strain, ischemia or localized microtears. Included are illustrations of the pain patterns created by a sampling of jaw and neck muscles (painful areas marked in red). Through skilled massage, we can lower the tension in these muscles and allow for increased fluid exchange, which in turn supports healing of microtears and reduction in irritating physiological wastes.

Migraines present an altogether different physiological dilemma. Some migraines are generated through chemical imbalances, which would likewise be served by greater circulation. Some are thought to be generated by a buildup of fluid pressure within the cranium; a common manual strategy aims to increase venous flow through the internal and external jugular veins. This can be accomplished by freeing the fascia on the front of the neck that wraps those vessels, per the work of Jean-Pierre Barral, DO. (See Visceral Manipulation: Thorax.) From a massage perspective, that means freeing the fascia that surrounds the SCM and anterior neck muscles (supra- and infra-hyoids). With a combination of approaches, regular massage by a professional, or at home, can decrease symptoms of an active headache, as well as diminish their frequency. (See Homecare Instructions for Self-Massage.)



Balancing the Weight of the Head—Whiplash

In whiplash, tissues of the anterior and posterior neck are over-stretched to the point of injury. This may or may not include the ligaments, depending on the severity (speed) of the accident. While we have many layers of muscular restraint on the back of the neck, the anterior neck muscles are smaller and more prone to injury (many thanks to the engineers who designed head rests to stop the backward phase of a whiplash!).

After such an injury, the larger, more superficial muscles—trapezius, sternocleidomastoid (SCM) and levator scapulae, especially—take over the job of stabilizing the weight of the head. This muscular guarding, which strengthens support for the weight of the head and makes us safer by reducing range of motion, is extremely valuable in early recovery. (Modern humans have created a mechanical version of this function with orthopedic cervical collars.) The dilemma occurs when we progress to later stages of healing, and these muscles keep guarding, creating limitations and spasm.

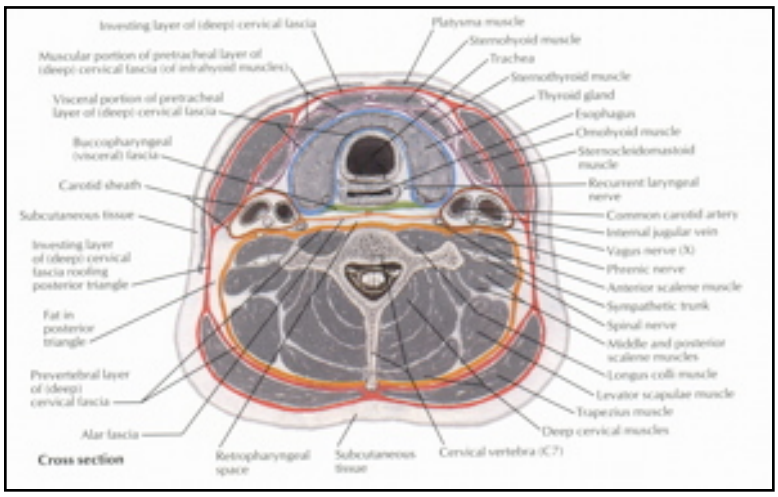
Most of the musculature that holds the head *up* is actually holding the head *back,* so we often focus our treatment on the posterior neck layers from trapezius to deep paraspinals. The front of the neck, however, is no less important in helping to balance the head. There are three distinct layers to consider. The superficial layer (outlined in red) includes the SCM which is familiar to most massage therapists and a dominant player in balancing the weight of the head. The mid-cervical (in blue and purple) includes the hyoids and visceral tubes and will be addressed further on. The deepest layer, covering the front of the

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

Getting Results by Working Inside the Mouth: A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

vertebrae (in orange), includes the scalenes, longus capitis and colli, and the anterior longitudinal ligament.



Parts of the deep layer, particularly the scalenes, have become routine within entry-level massage training. Investigating this layer more thoroughly can bring precision to our work and becomes critical in treating whiplash, as it is these structures which often have suffered the most damage.

We tend not to include the mid-cervical layer (the throat) in our structural considerations, but the infrahyoid muscles, esophagus, trachea and their associated fasciae—all of which are suspended from the hyoid bone, which in turn is suspended from the mandible and temporals via the suprahyoids—can also be damaged and misaligned during whiplash. If the throat is pulled to one side, the jaw can be similarly skewed, creating tension and pain in the TMJ or upper neck. Working sensitively and precisely, we can release spasm, free fascial restrictions and help our clients regain full range in their necks.

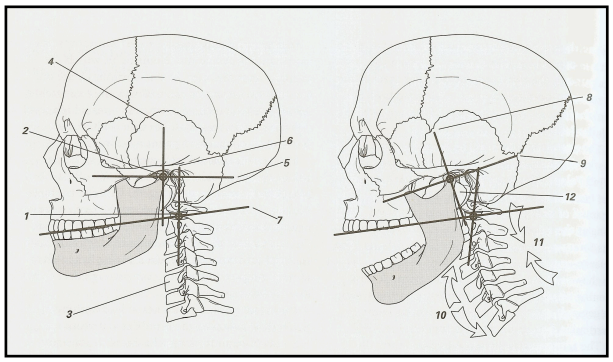
Taking a Bite: TMJ and Function of the Upper Neck

Because eating is such a fundamental function, we know that balance of the jaw will be important in our overall health. Like many primary activities, chewing and swallowing involve a complex set of reflexes (over 18 reflexes and more than 5 cranial nerves) coordinating a slew of voluntary and involuntary muscles.

Lean Chaitow and Judith Walker DeLany put it this way: “The process of mastication is a complex coordinated interaction...and is tremendously dependent upon the integrity of the TM joint and health of the associated myofascial tissues...Since these muscles are also responsible for many of the activities needed for speaking, the dysfunctions associated with TM joint and tongue movements can have a far-reaching impact on our daily lives.” (Chaitow-DeLany, pp 269)

If we ask ourselves which voluntary muscles are involved in chewing, we’ll come up with the two slings described above, and that may seem to cover it. When we look more deeply at the strength of the bite, we see—or feel—that these slings don’t quite tell the whole story. There’s an important kinesthetic link that often goes unexplored when we look at muscles from an simple origin/insertion standpoint.

Try this: first, close your jaws so that the biting surfaces are just touching. Gently put your fingertips on the masseter and temporalis bellies and feel them do their work. Now, continue to add pressure to your bite and feel how the muscular compression continues back, including the side and back of the upper neck. It may seem subtle, but it’s there.



Guzay’s Theorem, as described in Hugh Milne’s *Heart of Listening, Vol. 2, pp 191.*

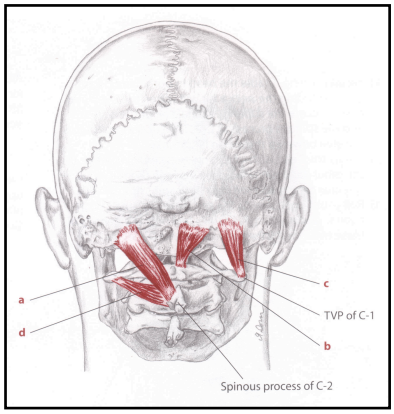
Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

Getting Results by Working Inside the Mouth:
A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

What's happening here has been described by researcher Casey Guzay and is now known as *Guzay's theorem.* When he looked at the bioengineering of the TMJ, Guzay found that the axis of the bite, as we apply pressure beyond initial occlusion of the teeth, is not at the TMJ, but at the dens of C2! This helps us to understand how closely related jaw and upper cervical function are.

As osteopath Torsten Liem states, "There is a close connection between the occipito-cervical (joint) and the tonus of the muscles of the neck, and the position and function of the temporomandibular joint. The head is involuntarily held in the position that ensures the best occlusion of the teeth. Bahnmann (a researcher) was almost always able to demonstrate changes in spinal posture in cases of malpositioning of the jaw." (Liem, pp 337.) As such, we are well advised to include a detailed approach to the sub-occipital triangle as part of a comprehensive treatment program.



We also begin to appreciate how misalignment, strain and compression in the upper neck directly affect jaw function and placement. One way to picture it is to imagine a team of horses, reined together and pulling the weight of the head. The cranial base is a horse, C1 is a horse, C2 is a horse, the mandible is a horse. If one of these horses shifts direction, the whole team feels the pull—and either resists, increasing tension, or goes along, increasing the deviation. Unsurprisingly, it's common to find rotations and counter-rotations between the cranial base, upper neck and jaw.

Whether we're addressing localized problems like headache or teeth grinding or looking more systemically at whiplash or scoliosis, balancing the jaw can yield tremendous results. Clients often want to receive intraoral work as part of their ongoing care, even after their acute problems have resolved. Many, once their jaw symptoms are diminished, are surprised at the degree of tension they had been tolerating. These clients are also likely to want to learn to treat themselves. Getting to this situation —when clients gain new understanding and move towards better self-care—is one of the most gratifying aspects of my practice.

Homecare Instructions (2 pp)

Author's Information:
Lauren Christman has been a bodyworker since 1994; her practice focuses on structural integration (KMI), craniosacral therapy and visceral manipulation for adults and children. As a certified teacher for Tom Myers, she teaches locally and abroad, with over 13 years experience teaching beginning and advanced massage students. **Richard Polishuk** has been practicing bodywork since 1986, and teaching since 1989. As a teacher he is most passionate about the principles that create a strong ongoing link between assessment and treatment. His practice centers on Aston-Patterning and orthopedic methods. Together, they teach classes in intraoral work, postural assessment and fascial release techniques, and they share a clinic from their home in Seattle, Washington. Their website is www.craftedtouch.com, and they are happy to receive considered responses to this article and inquiries about their work.

Sources and Further Reading:

Barral, Jean-Pierre, *Visceral Manipulation: Thorax*, Eastland Press, Seattle, WA, 1991.

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009

Getting Results by Working Inside the Mouth:
A Key Territory for Treating Headache, Whiplash, and Jaw Pain

by Lauren Christman, LMP and Richard Polishuk, LMP
Seattle, WA USA

Biel, Andrew, *Trail Guide for the Body,* 2nd Edition, Books of Discovery, Boulder, CO, 2001.

Chaitow, Leon & Walker DeLany, Judith, *Clinical Application of Neuromuscular Techniques,* Volume 1 The Upper Body, Churchill Livingstone, London,UK, 2000.

Liem, Torsten, *Cranial Osteopathy - Principles and Practice,* 2nd edition, Elsevier, London, UK, 2004.

Milne, Hugh, *Heart of Listening*, Volume 2, North Atlantic Books, Berkeley, CA, 1995.

Myers, Thomas, *Anatomy Trains: Myofascial Meridians,* 2nd Edition, Elsevier, London, UK, 2009.

St. John, Paul & Langnes, Dawn, *Trigger Points – TMJ* (poster), self-published, 1991.

Werner, Ruth, *A Massage Therapist's Guide to Pathology*, 2nd Edition, Lippincott Williams & Wilkins, Philadelpia, PA, 2002.

Lauren Christman & Richard Polishuk, Crafted Touch, Inc. © 2009