

Applied Kinesiology Chiropractic: Clinical Algorithms for Comprehensive Management of Temporomandibular Joint Disorders

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Narrative: Since temporomandibular joint function is interrelated with so many remote problems and is so frequently involved on a functional basis, it is realistic to at least do a screening examination of this mechanism on every new patient.

This type of examination requires little time and can be very effective in finding a majority of problems in this area. A considerable amount of evidence indicating the need for a more thorough evaluation becomes available during history-taking and consultation. This information comes from what the patient tells the physician and from body language observed during the discussion.

Indexing Terms: Chiropractic; AK; Applied Kinesiology; Temporomandibular Joint Disorder; TMJ; management algorithms; clinical flowcharts.

Introduction

The identification of muscle dysfunction

The identification of muscle dysfunction is the key to successful treatment of TMD. (1, 2) Whenever there is evidence of need to examine the cranial-sacral primary respiratory mechanism, there is also evidence to evaluate the activity of the temporomandibular joint. (3, 4)

Because the activity of these two divisions of the stomatognathic system cannot be separated, it will be necessary during examination to determine which area is primary, or if involvement of both has developed simultaneously. As demonstrated in the two cases described in this report, if one is primary, initial treatment directed to it will usually be the most efficient method of obtaining a stable correction.

Sometimes correction can be obtained only when the major therapeutic effort is directed to the primary condition. The case history often gives clues to help delineate the course of events that has led to the current status, and finally leads the physician to the primary aetiology.

It should be remembered as well that all headaches are mediated by the trigeminocervical complex, and are initiated by noxious stimulation of the endings of the nerves that synapse on this nucleus, nerves which come from the muscles of the head, the dura, the teeth, jaw, face, neck muscles and skin. The TMJ system are those parts of the head, neck, and upper thorax concerned with

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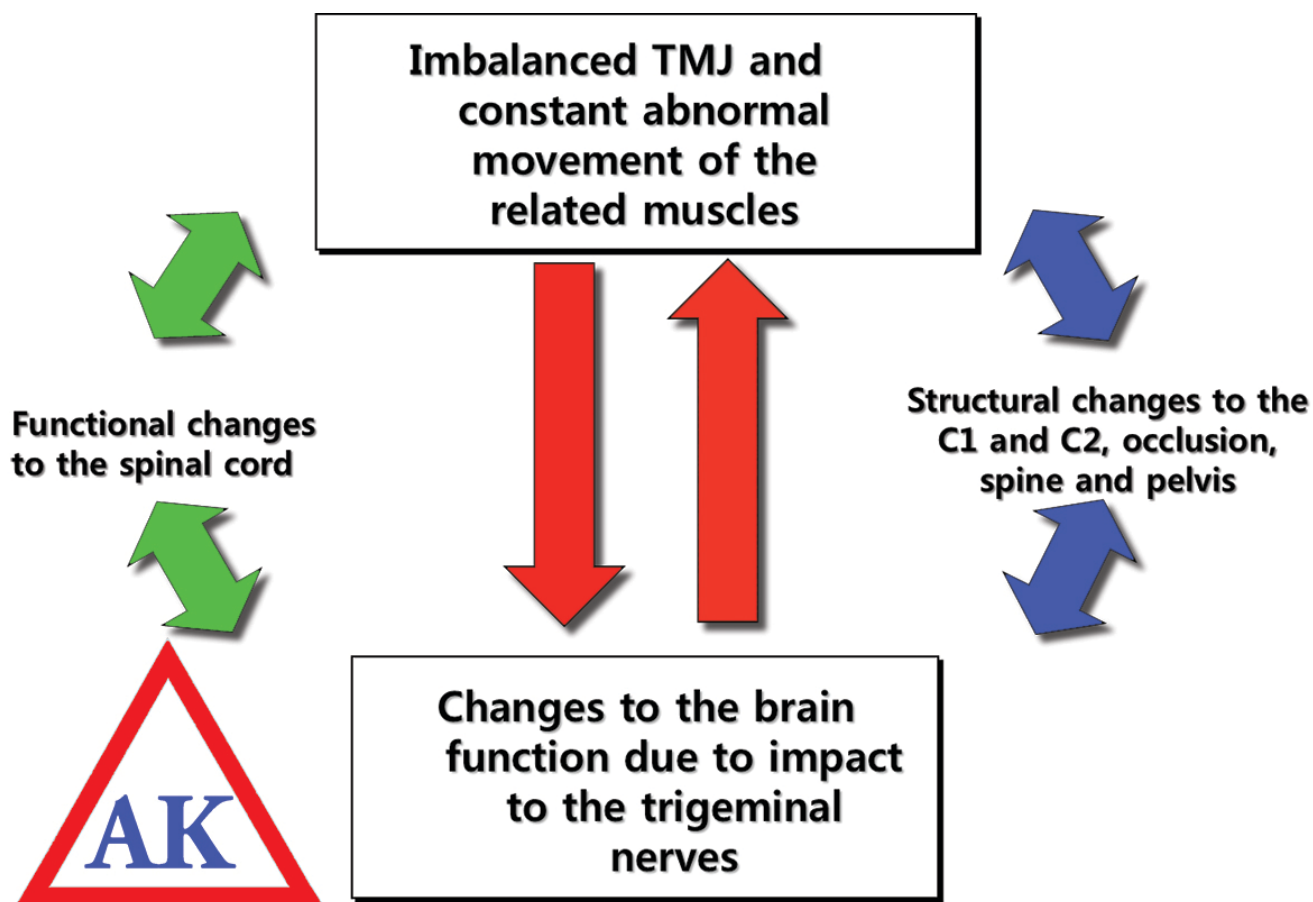
the muscular, osseous, ligamentous, fascial and nervous system control of biting, chewing, and swallowing, major functions of the trigeminocervical complex.

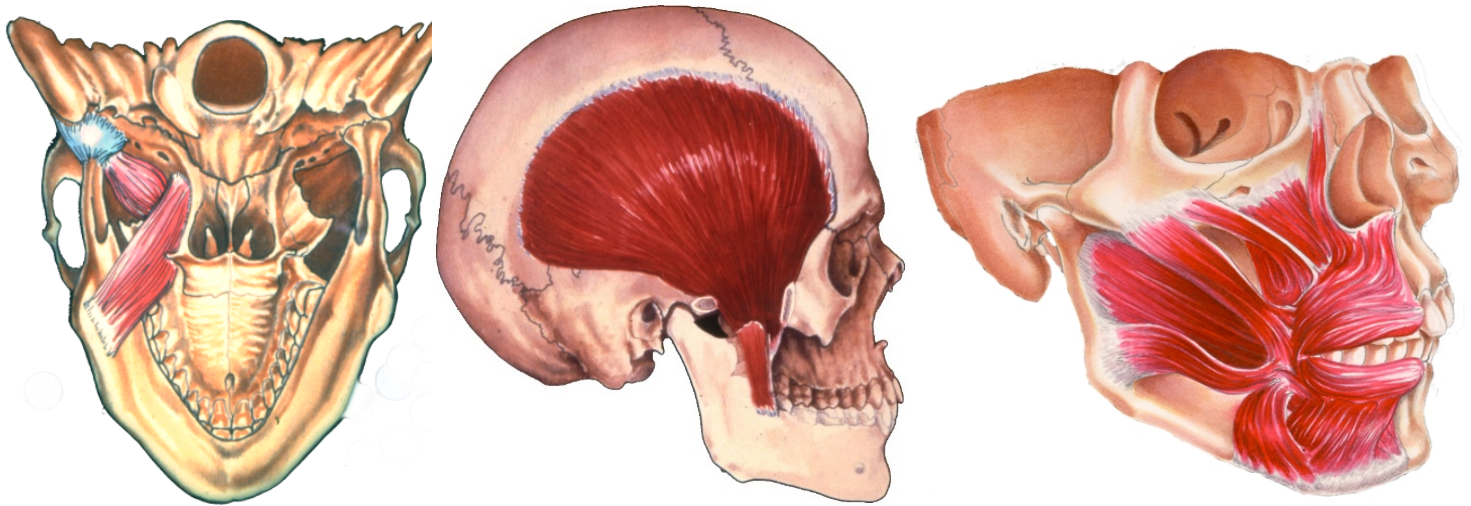
The stomatognathic system

The stomatognathic system consists of 27 bones and all the muscles that move them. In detail these are:

The temporals	2 bones
The sphenoid	1 bone
The occiput	1 bone
The maxillae	2 bones
The mandible	1 bone
The hyoid	1 bone
The clavicles	2 bones
The scapulae	2 bones
The sternum	1 bone
The upper two ribs on each side	4 bones
The 7 cervical and first 3 thoracic vertebrae	10 bones

All of the muscles of mastication are also part of the stomatognathic system.





Important clinical point

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Recognition that the TMJ is a neuromuscular system allows integrative chiropractic physicians with skills in muscular and manual assessments, particularly muscle testing technologies, to unravel the complex phenomena of temporomandibular disorders (TMD). Every single one of our patients has a characteristic pattern of masticatory movement, and this individuality of motor control makes individualised assessment of the motor system in TMD critical.

Again, the most important reason to evaluate the motor function of the head, neck and jaw is due to what Lund and colleagues have shown, namely that in patients with TMD, the painful masticatory muscles do not show an increase in EMG activity, i.e. hypertonicity of the affected muscles is not present.

Instead, the force of maximal voluntary contractions of the painful muscles is reduced. According to Travell & Simons 'the experimental support for the assumption that activation of muscle nociceptors leads to increased activity in motor neurons is weak. (2, 3)

In their discussion of the neurology of muscle pain, nociceptive input from a muscle leads to only transient excitation of neurons, which 'evolves into an inhibition when the input continues for several hours'. Most patients who see chiropractors around the world have had their subtle or overt 'jaw problem' for much longer than several hours.

Specific AK examination and observation in TMJ cases

With the patient seated or standing, have him or her simply open their mouth. The mandible should drop straight down with no special effort on the patient's part. Muscular imbalance or dysfunction is evidenced by the mandible swinging to one side and back to the centre, or staying off-balance. The most common muscular cause of mandibular deviation on opening is an

imbalance of the *lateral pterygoid* muscles. Other muscles, especially the posterior fibres of the *temporalis*, can also be involved.

Another cause of lateral mandibular deviation is poor harmony of the TMJ disc with joint function. Usually there is an anterior disc on one side, causing the condyle not to move smoothly. Popping, clicking, or crepitation is usually also present with this condition.

Often a patient will tilt his head back as his mouth opens. Goodheart calls this '*opening the head instead of opening the jaw*'. The most efficient method of opening the mouth is simply dropping the mandible. When the head tilts back, as in '*opening the head*', there is generally imbalance in the stomatognathic system or poor general use of the body's postural muscles; this is another useful clue to examine for these conditions.

While in the observation phase, the dentition should be evaluated. Naturally this stage of examination is overlooked only by the non-dental physician who may possibly feel that's not his province. Without this evaluation, examination of the stomatognathic system is incomplete. It is certainly not necessary to do a thorough dental evaluation, but the general nature of the occlusion, signs of orofacial muscle imbalance, the approximate amount of freeway space, and periodontal health should be observed, as well as the status of dental repair, prophylaxis, and any missing teeth.

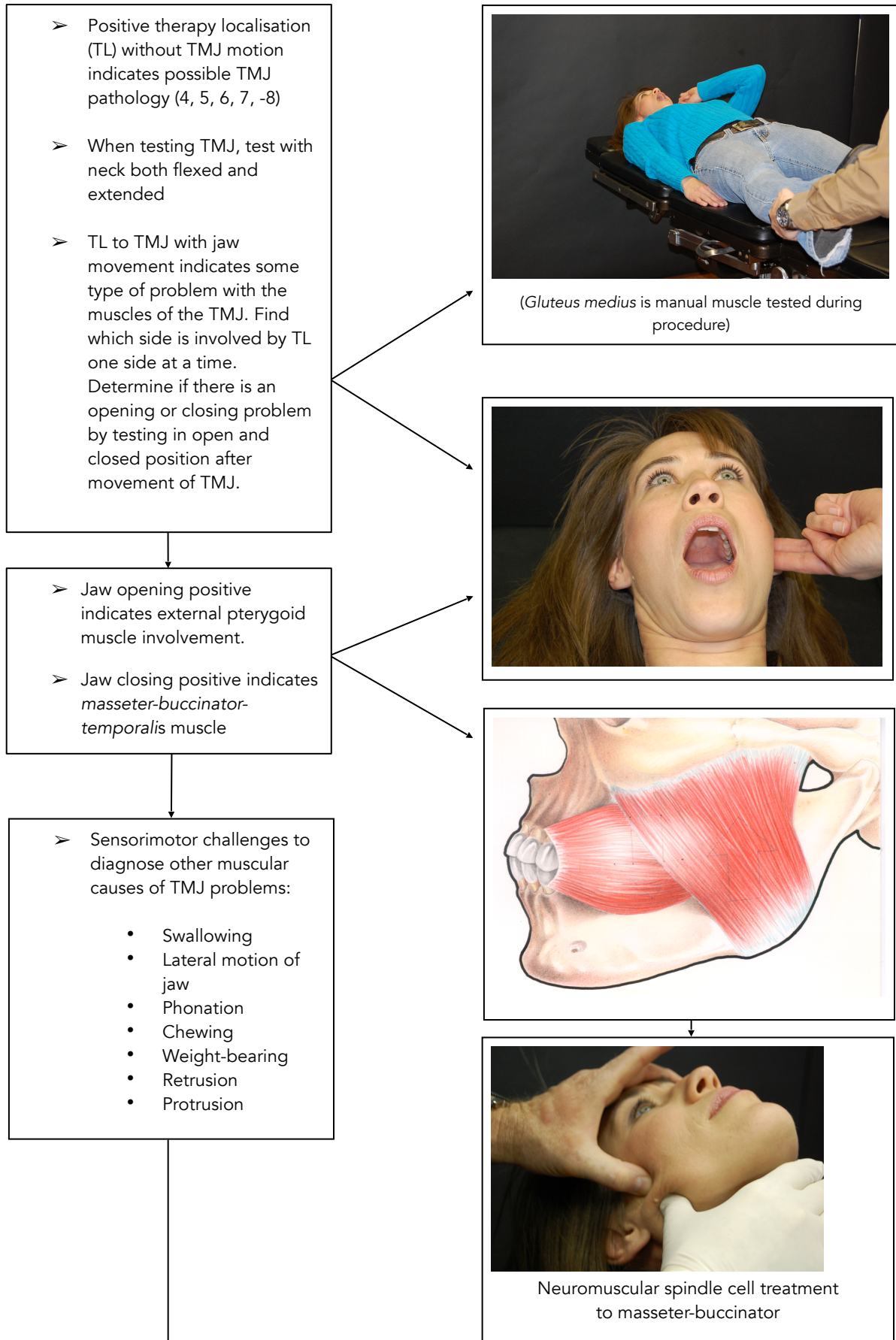
The amount of mandibular opening should be noted. It is generally considered that the proximal interphalangeal knuckles of the first two knuckles of either hand should fit between the upper and lower incisor teeth when the mouth is actively opened to its maximum amount. If the range of motion is limited, it should be recorded for future reference. Although this measurement is valuable in relating with future therapy, it is not pathognomonic of temporomandibular joint dysfunction. Many patients with TMJ dysfunction can open the jaw to meet the two-knuckle rule; conversely, some patients having no problem with the TMJ or muscles of mastication cannot open the jaw to meet the rule.

Loose two-knuckle test

**The relaxed, fully open mouth
should easily admit
the first two knuckles
(of either hand)
between the incisor teeth**



**Table 1: Applied Kinesiology Chiropractic:
A Clinical Algorithm for Management of Temporomandibular Joint Disorder**



- Forceful opening of jaw with TL causing strong indicator muscle to weaken indicates the need for fascial release technique.
- If repeated stretching of the TMJ muscles produces weakness in strong indicator muscles, then an assessment of the muscle stretch reaction involving all the muscles of the body should be done. If positive globally, folic acid-B12 supplementation is considered for myofascial gelosis. (8, 9)

Important clinical point

If positive challenge to the TMJ remains, foot and ankle problems should be checked against MMT findings in TMJ.

All muscles and joints associated with the TMD have not been corrected, e.g. SCM, *gluteus maximus*, neck extensors, etc.

Occlusal dysfunction that may require dental co-management: test by having the patient chew and bite down hard and then reexamine for cranial faults to determine if they return.

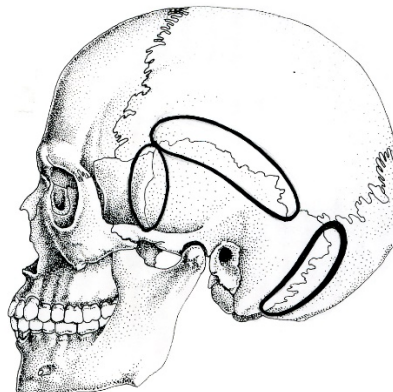
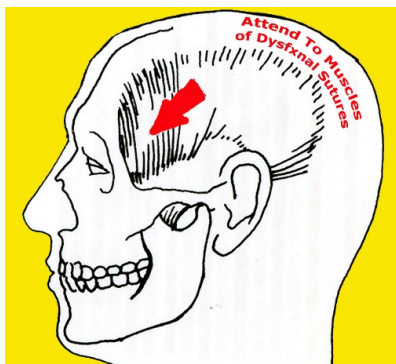
- Evaluate craniofacial muscles for imbalances perpetuating stomatognathic problems.
- Patient chewing gum may conceal cranial faults or TMJ involvement during MMT.

- Return of TMJ problem with chewing indicates need for dental referral for equilibration of occlusion, or for further cranial fault correction. Severe adverse interplay between TMJ and cranial faults may need dental co-management with splint therapy to balance equilibration while cranial corrections are being stabilised, and finally dental equilibration of teeth if TMJ symptoms or impairments continue.

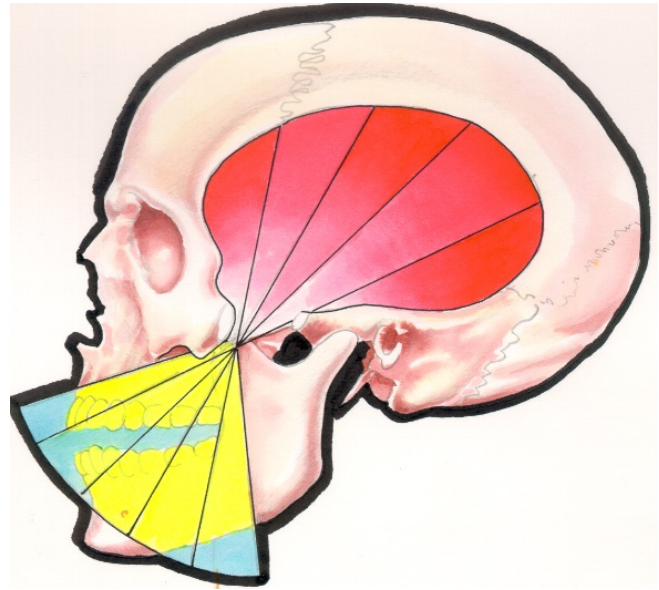
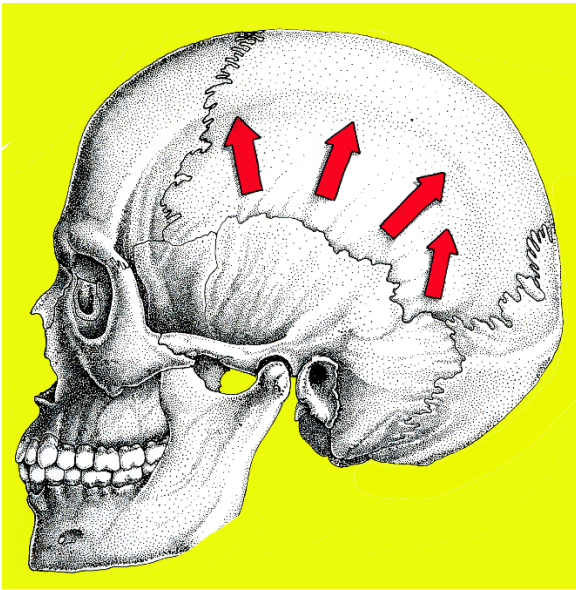
Palpation of Muscles of Mastication

The muscles of mastication are palpated for hypertonicity, pain, trigger points, and fibrous masses that probably relate to dysfunctioning Golgi tendon organs or neuromuscular spindle cells. The 'jump sign' of Travell's trigger point technique and the indications for various types of treatment are discussed in the Journal in a previous paper; these should be applied to the examination and treatment of the TMJ and muscles of mastication.

Chaitow remarks in his comprehensive cranial textbook that Marc Pick (1999), (9) in his landmark text on cranial sutures '*inexplicably fails to mention the profound potential impact of muscular attachments that frequently overlie and traverse sutures*'. He does, however, describe different patterns of sutural dysfunction (he calls these variously '*deformities*' or '*displacements*') that clearly implicate the attaching musculature. Its likely that more efficacy occurs in '*cranial work*' for patients if the musculature overlying the cranial sutures are corrected first. (10)



The temporalis muscle is a jaw-closer and the angles of its fibres align with all the teeth, providing a crushing mechanism.



Temporalis

The broad fan-like *temporalis* muscle should be palpated first with a light digital contact and then with a deeper one because of the heavy investing temporal fascia covering the muscle. Care must be taken not to confuse active points on the temporal sphenoidal line with palpatory findings of the muscle itself. The three divisions of the temporalis should be considered individually, as they refer pain differently from trigger points.

The posterior fibres, which are almost on a horizontal plane above and posterior to the ear, are more often found to be involved in applied kinesiology diagnosis. Trigger points in this area refer pain to the upper molar teeth and to the occiput. These fibres are often hypertonic, requiring neuromuscular spindle cell or fascial release technique. Hypertonic posterior fibres are often present when an individual has had the occlusion equilibrated to match a retruded superior centric relation condylar position. They are also frequently present when there is an anterior disc with an opening click or lock.

Trigger points in the middle fibres refer pain to the upper dental arch from approximately the canine to the second pre-molar teeth and to the temple, and occasionally to the temporomandibular joint. Trigger points in the anterior portion of the temporalis refer pain to the supraorbital ridge and into the upper incisor teeth.

General hypertonicity of the temporalis muscle is frequently responsible for temporal headaches. There is often a jamming of the squamosal suture that may require strong, sustained separation techniques.

Masseter

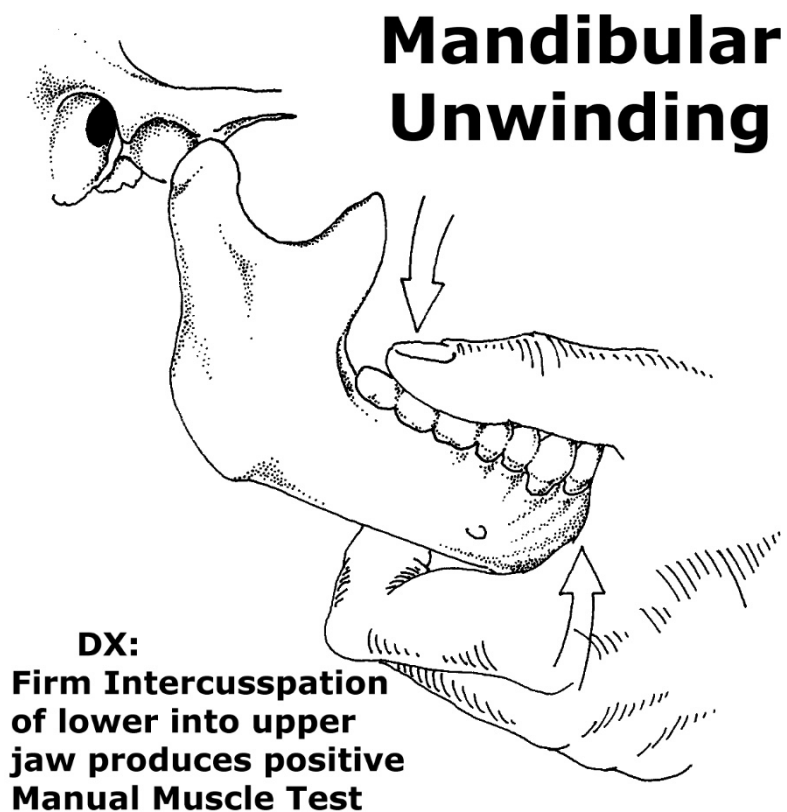
If the masseter is found hypertrophied on palpation, bracing or bruxism should be considered. The most common abnormal finding in the masseter muscle is the nodular, ropy, or puffy swelling indicative of a malfunctioning neuromuscular spindle cell.

Trigger points in the superficial layer refer pain to the general area of the jaws. The upper portion of this division of the muscle refers pain to the molar teeth and gingiva of the upper arch, while the lower part causes pain in the lower molar teeth and gingiva.

Trigger points in the insertion area at the angle of the mandible refer pain to the outer end of the eyebrow.

Trigger points in the deep layer of the masseter refer pain to the TMJ and deep into the ear.

For patients who experience indicator muscle weakness AFTER specific muscle treatments have been given, including joint treatment to related muscles, then '*mandibular unwinding*' is an effective final step in this process of treatment.



Internal pterygoid

The *internal pterygoid* is palpated with the patient holding his jaws wide open. Palpation usually begins at the muscle's insertion on the ramus of the mandible and progresses superiorly to the origin on the lateral pterygoid plate and pyramidal process of the palatine bone. There will often be considerable tenderness in this muscle, along with the nodular, ropy, swollen feeling of neuromuscular spindle cell dysfunction, but it requires considerable experience to feel it. Many dentists and orthodontists consider tenderness in any of the *pterygoid* muscles as indicative of malocclusion. (11, 12)

Trigger points located in the *internal pterygoid* muscle refer pain to the tongue, posterior hard palate, and TMJ. Pain is not noted to be referred to the teeth from this muscle.

The temporomandibular muscles interact with the teeth and cranium and cervical spine. In this example, the muscles on the right are pulling harder, creating strain on the teeth and cranium. There is malocclusion as a result, with the teeth on the right meeting first.



Lateral pterygoid

The most difficult masticatory muscle to palpate is the *lateral pterygoid*. In cases of temporomandibular joint dysfunction it is often very tender. Routine palpation for diagnostic information is usually not done; rather, when there is evidence the muscle must be treated, palpation for diagnosis and pressure for therapy are done simultaneously. Only portions of the *lateral pterygoid* can be digitally contacted by the physician.

The varying anatomical arrangements of individual patients usually allow a better contact from a lateral approach to the muscle with the 5th finger. The clinician should stand on the opposite side of the head and shoulders of the involved muscle. The patient holds his jaws open wide. To approach the muscle from its lateral aspect, the physician guides his index finger past the buccal surfaces of the upper molar teeth to the *lateral pterygoid* plate and continues to direct his finger along the inferior margin and as lateral as possible aspect of the *lateral pterygoid* muscle, continuing toward the neck and condyle of the mandible.

This approach requires a gentle touch because there is often extreme tenderness of this muscle when there is temporomandibular joint dysfunction. Only with considerable experience

will the physician be able to feel the nodular swellings of a suspected neuromuscular spindle cell dysfunction.

Trigger points in the *lateral pterygoid* refer pain within the temporomandibular and maxillary regions. Because of the muscle's inaccessibility, the patterns of the two divisions have not been clearly separated.

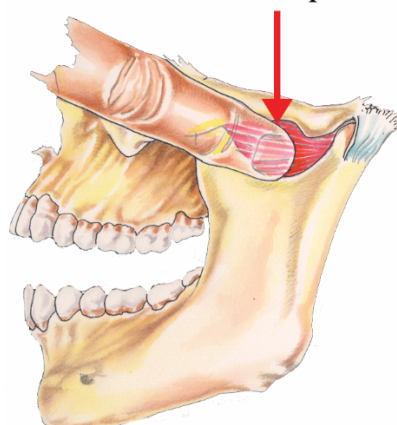


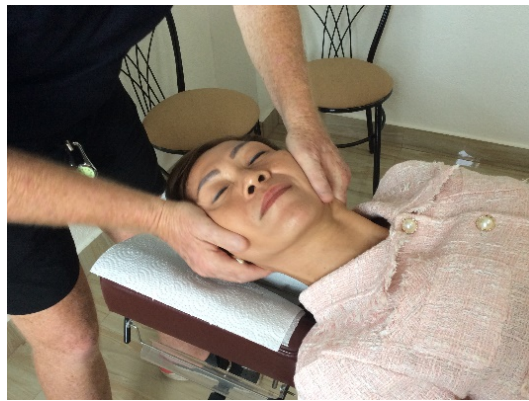
Lateral Pterygoid dysfunction and spondylogenic reflex treatment

An important additional approach has been discovered by Goodheart which obviates *lateral pterygoid* dysfunction very rapidly on a dependable basis. The physician contacts the painful *lateral pterygoid* muscle while tapping the T2-T4 Dvorak & Dvorak spondylogenic reflex areas, with the patient in a seated position. (12) The patient and the doctor both feel the 'release' or 'relaxation' of the *lateral pterygoid* muscle simultaneously after this procedure is properly applied (10 to 20 seconds). *Pterygoid* pocket pain is successfully relieved when proper correction has been applied. Goodheart and Guzay both suggest that a C2 subluxation on the same side must be corrected in this condition. (12)

AK Cranial Examination Includes All The Muscles That Move The Head --

Lateral Pterygoid Of Jaw
Moves The Sphenoid





There are many other muscles that are palpated in the total examination of the stomatognathic system. Many of these have trigger points that refer pain into the masticatory apparatus. Important among these are the upper trapezius and sternocleidomastoid.

Joint Palpation

The use of palpation early in the examination can save considerable time, as well as provide additional information about the condition. Included in this phase of examination are the joint itself and the muscles of mastication.

Often this phase of observation will clearly indicate aberrations in joint movement. There may be an audible pop on opening or closing, and a visually observed rapid shift in condylar position. This leads to joint palpation.

Most palpation information about temporomandibular joint function can be obtained by placing fingers in each external auditory meatus, with the finger's fleshy pad toward the condyle. Unless the physician has relatively small fingers it is usually best to use the little finger while facing the supine, sitting, or standing patient. Crepitation, popping, and clicking can easily be palpated, along with general smoothness of the condyle's movement from rotation to translation.

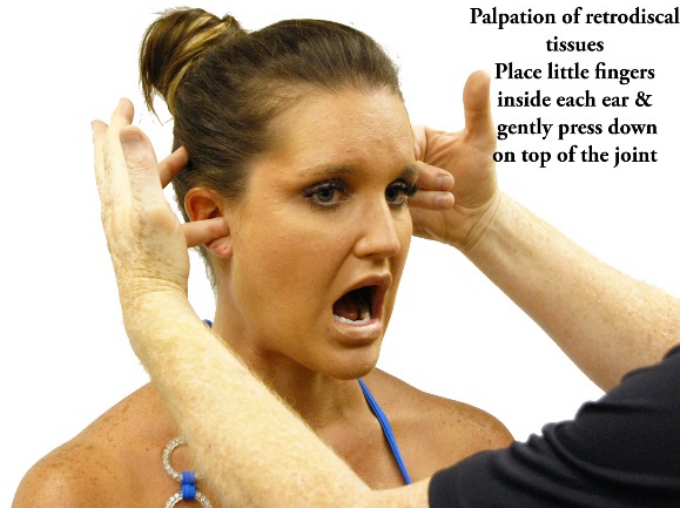
As the mandible opens the motion should be smooth and bilaterally symmetrical. When there is chronic joint strain or pathology there will usually be pain when mild pressure is exerted toward the articulation through the external auditory meatus.

Clinical tip

A stethoscopic examination of the joint will also reveal low-level sounds of clicking or popping.



Palpation of lateral TMJ condyle.
Anterior to tragus of the ear.
Palpate both sides so patient can compare pain or tenderness



Palpation of retrodiscal tissues
Place little fingers inside each ear & gently press down on top of the joint

Temporomandibular joint motion can also be palpated at the lateral aspect of the joint. It is sometimes easier to observe bilateral asymmetry from this position, especially if the deviation occurs in the middle or latter part of the condyle's translation on the articular eminence. Examination here includes palpating for capsular swelling and other signs of joint disease, such as heat in rheumatoid arthritis and infection, morphology of neoplasms, etc.

This lateral location is where the patient will place his fingertips for future therapy localisation examination.

It is valuable at this point to show the patient where the temporomandibular joint is. Have him feel the clicking that takes place if there is crepitation, popping, or cracking. Say to the patient, 'Mr. Teves, feel right here for the clicking in your jaw. Note the location of your jaw joint just in front of the little bump (tragus) of your ear. I'm going to have you place your fingers there later in the examination'.

When the physician asks patients to place their fingers on the jaw joint, there is a tendency for them to be too low. Making a specific note of the joint's location at this stage saves time later in the examination.

The joint can be further evaluated by observing passive range of joint motion. The examiner grasps the anterior portion of the mandible with his thumb over the lower incisor teeth and the index finger wrapping around the lower anterior border.

Many cases of chronic TMJ strain and those with pathology will have a posterior capsulitis. Pain is increased in this localised area as the examiner gently moves the mandible posteriorly to place strain between the condyle and the posterior fossa. If there is no discomfort with the gentle posterior movement, a little more forceful evaluation can be done.

The range of TMJ motion previously observed on an active basis can be further evaluated passively by the examiner manipulating the mandible with the anterior contact mentioned above. When motion is limited, the examiner should not force the jaw but should evaluate for pain created during the passive movements. This information can be used for comparison purposes after treatment to the TMJ.

Conclusion

The main message of this report is that TMJ problems can be caused by dysfunction in any area of the closed kinematic chain. For the best resolution of our patient's problems, comprehensive chiropractic examination must be conducted. Further, TMJ dysfunction is not limited to jaw pain. Because of resulting cranial dysfunctions, many health problems can develop. The differing levels

of examination and treatment have been outlined in this report for these patients. The most successful chiropractic approach is the most comprehensive one.

Because the body works as an integrated whole, remote dysfunction is often the cause of TMJ problems. Manual Muscle Testing permits the detection of these interactions rapidly and reliably by the doctor.

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