

# The Symbiotic Partnership of Dentistry and Manual Therapeutics

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## INTRODUCTION

This article will explore the symbiotic partnership between the dental profession and manual therapeutics. It is intended as an interface for communications with dental professionals. It is meant as a primer for the dentist, as most manual therapist will already be aware of the information contained here. It will focus on the evaluation and treatment of functional disorders such as sensory disturbances, headaches, neuralgias, endocrine dysfunction, and autonomic nervous system imbalances.

Manual therapeutics can be thought of as the missing puzzle piece in the efficacy of many dental procedures, as it expands our awareness beyond the mandible and maxillae and provides a holistic awareness of the dental mechanism and the wellbeing of the dental patient. The goal is to better serve the individual. In addition to enhanced dental care, interfacing with the manual therapist offers the dental professional the ability to solve many instances of craniocervical pain and dysfunction. The yoga of these two professional fields offers a unique opportunity to correct various underlying dysfunctions that may have been unseen or mistreated by other professionals.

It is well understood that correction of dental mechanics should be made to a cranium that is as balanced as possible. This is important to insure the effectiveness and longevity of the correction, the prevention of negative symptoms, as well as the overall health of the individual.

Any imbalance of the craniocervical mechanism can result in imbalances of the gross anatomical structures as well as producing a myriad of unwanted symptoms. The goal in the utilization

of manual therapeutics is to bring the skeletal structure and associated soft tissue, particularly that of the craniocervical features, back into balance. A general principle of this work is that as the structure is normalized, function will follow.

Manual therapy can be highly effective in treating dental issues such as facial asymmetry, cranial imbalances, and soft-tissue hypertonicity. These conditions play a direct role in chronic malocclusion, temporomandibular dysfunction, cranial pain, sensory impairment, and a variety of mechanical disorders.

## ORTHODONTIA

Dental professionals often observe that after a patient completes orthodontic treatment, a disturbing phenomenon occurs. Much to the disappointment of the dental professional and the patient, after the appliances are removed, often the teeth begin to return to their original, pre-treated positioning. When the appliances are removed, the cranium will seek to return to some degree of balance, and in doing so will move the teeth back towards their original faulted placement.

Manual therapeutics can eliminate, or at the very least minimize, this unpleasant phenomenon. Whether it is fillings, inlays, onlays, implants, bridges, dentures, splints, or orthodontics, we want to equilibrate our work to a cranium that is as balanced as possible. For example, if we were being fitted for a suit or dress, we wouldn't want to be fitted while we were slouching!

During the filling phase ("flexion") of the craniosacral system, the structures of the hard palate respond by widening and flattening. As this occurs, the anterior teeth are withdrawn slightly posteriorly. If a

patient suffers from a significant "flexion" lesion, this could result in an underbite. Conversely, during the draining phase ("extension"), the hard palate narrows and is drawn upwards. As this occurs, the anterior teeth are slightly extruded forward. If a patient suffers from a significant "extension" lesion, creating a high, narrow arch to the hard palate and extruding the anterior teeth forward, this could result in an overbite.

Dental professionals often note that, during the course of orthodontic treatment, patients may report numerous ancillary symptoms such as cranial pain, sensory disorders, temporomandibular joint (TMJ) pain, and a decrease of energy levels. This may be due to the effect of the appliances "ratcheting" the cranium into a distorted and lesional pattern creating a variety of unpleasant symptoms. During orthodontic treatment, keeping the cranial bones balanced, and relieving the torsion and imbalanced tensions that can be created by the increased pressure of the moving teeth, will help eliminate these accompanying symptoms.

It is fascinating to treat the individual teeth using manual therapy. Just as it is possible to normalize the cranial bones and related soft tissue, it is also possible to reposition individual teeth through the process of "unwinding." Unwinding is a gentle process involving the release of the periodontal tissue that, due to trauma or excessive occlusal pressures, locks the teeth into their sockets. The release of these tissues assists the individual teeth to seek a more balanced position.

## TMJ DYSFUNCTION AND TREATMENT

Another field of dental health in which dentistry and manual therapy are richly intertwined is in the treatment of temporomandibular joint dysfunction (TMD).

The temporomandibular joints, because of their position in the skull, serve as a major neurological pathway for motor and sensory activity. The proximity to the ears, eyes, nose, throat, tongue, sinuses, and cervical spine make them among the most important joints in the body. Thirty-eight percent of all neurological input to the brain comes from the face, mouth, and TMJ region. The two-cubic-inch area that contains the TMJ contains the sinuses,

glands, the middle and inner ears, various tissues of the throat, brain tissue, different muscles, ligaments, nerves, blood vessels, lymphatic tissues, bones, teeth and the TMJ itself.

Because no individual has a perfect TMJ, everyone has some degree of TMD. The TMJ compensates for all the rotations, compensations, and imbalances that radiate from our feet up and from our head down. We might think of our jaw as being like the pole used by the tightrope walker to maintain a delicate balance. The TMJ can be thought of, as well, as a repository for all of our frustrations, excitement, unspoken words, and uncried tears.

The complex, interwoven network of nerves in the head and neck explains the fact that many TMJ patients also complain of pain in the neck, face, ears, eyes, sinuses, teeth, and head. Other disturbances may include dizziness, headaches, nausea, ringing in the ears, visual disturbances, loss of equilibrium, earaches, numbness or tingling in the face and hands, and oropharyngeal symptoms. Clicking and grating in the jaw joints, inability to open or close the mouth freely, and difficulty in chewing and swallowing are also reported.

Manual therapy is effective in assisting corrections in the functional anatomy of the TMJ, abnormal muscular traction (external derangement) effecting the TMJ, alteration of occlusion and TMJ function due to facial trauma, anterior disc dislocation, joint noise, and chronic malocclusion. Manual therapy addresses specific TMJ movement disorders such as deflection (pulling to one side), deviation (a "hitch," as if the mandible is maneuvering itself around some obstacle), and the locking of the TMJ (either when open or closed).

The muscles here that are among the most significant are the lateral pterygoid, masseter, and temporalis muscles. The specific treatment of TMJ soft tissue improves the tonus and function of these muscles as well as improving the function of the innervating cranial and cervical nerves.

In addressing the soft tissue of the TMJ, manual therapy helps reduce compression and abnormal traction on the joint. Compression in the TMJ often has the effect of displacing the articular disc anteriorly. The disc, then, no longer adequately protects the structures in the TMJ. Compression does not allow the cartilaginous disc to hydrate

and to receive nutrients. The disc has no direct blood supply and depends on a "sponge-like" motion to squeeze out waste products and to absorb into itself synovial fluid and nutrients. Consequently, the disc begins to degenerate, causing wear and tear to the TMJ.

Compression also squeezes out the synovial fluid and wears away the synovial tissue that produces the fluid. In the absence of sufficient lubrication, the moving parts of the TMJ system experience friction and wear and tear whenever the jaw moves.

The excessive pulling of the disc anteriorly by the lateral pterygoid muscle can also create TMJ noise such as "popping" and "clicking." When the disc is anteriorly displaced, the condyloid process of the mandible is caused to "pop" or "click" onto the disc as the jaw opens. Similarly, as the jaw closes, it may pop or click back off of the disc.

Another source of popping and clicking is a sticking disc. This is often caused by undue soft-tissue compression and/or the pressures accrued from misalignment of the cranium. The pressure on the disc "squashes" the disc flat and presses all the lubrication out of it. The disc is not able to move smoothly and the mandible may slide off of the disc.

As cranial alignment and soft-tissue imbalances are normalized, the disc is assisted back to its proper position. Lubrication can again flow through and around the disc. The disc is then able to move with the jaw, and the popping or clicking sound may disappear.

## MANDIBULAR WHIPLASH

Whiplash, with resultant injury to the TMJ, is often caused by rear-end motor vehicle collisions. This type of accident causes the head to be suddenly thrown back. Because the anterior, submandibular muscles of the neck do not have time to relax, they anchor the mandible while the head is thrown backward. This causes the mouth to open far beyond its functional capacity, causing the TMJ musculature, tendons, ligaments, and synovial membranes to be significantly bruised, strained, and/or torn. Most often, the disc is forced out of position, relocating in front of the joint, from the traction exerted by the lateral pterygoid muscle. This type of injury is called an "anterior displaced disc," or an "internal derangement."

The subsequent "whipping" motion of the head and neck forward into hyperflexion further exacerbates this injury, causing the jaw to snap shut. Along with injury and anterior displacement of the disc, the mandible is forced posteriorly.

Manual therapy helps to normalize the traction of the lateral pterygoid muscles and the various soft tissue structures of the TMJ. Normalizing the traction of the lateral pterygoid muscle will help to recapture the disc. Manual therapy also assists in repositioning the mandible, which results in decreasing the hyperstimulation and the nociceptive (pain) impulses of the trigeminal nerve. Additionally, repositioning the mandible will help restore a more balanced occlusion with the maxillary teeth.

## TEMPORAL-BONE ROTATION

TMJ compression causes both rotation of the temporal bone and displacement of the mandible. Because of the placement of the condyloid process in the fossa of the temporal bone, when the TMJ is compressed, the temporal bone is "internally" rotated and the mandible is retruded. If cranial imbalances exist such that the temporal bone is "externally" rotated, the mandible is protruded.

Whenever the temporal bone is out of its proper position ("lesioned"), the mandible does not have appropriate seating in the joint. This is a direct cause of TMD. Moreover, temporal-bone lesions can be a major cause of tinnitus, vertigo, and equilibrium dysfunctions.

Malocclusions, TMJ dysfunctions, and cranial imbalances reach far beyond the masticatory system. This is the reason patients often report to their dentist a myriad of "non-dental" symptoms that accompany their dental disorder. The manual therapist working in conjunction with the dentist can address many of these conditions. They are often able to treat the "root causes" of conditions, often overlooked by other specializations.

## SPHENOID BONE

The sphenoid bone is considered the central bone of the craniosacral system. Because of its unique and complex anatomy, it articulates with almost every other bone in the cranium. We can imagine the sphenoid being like a central cog in a wristwatch. If that central cog is out of balance, we would

imagine that it can affect the balance of all of the other cogs in the watch, or in this case, all of the other cranial bones in the head.

The sphenoid comes into intimate contact with the hard palate via its pterygoid processes abutting the palatine bones. If the sphenoid is out of alignment in anyway, it will directly affect the anatomy of the hard palate. This in turn will influence the position of the upper teeth, the individual's occlusion, and the function of the TMJ.

Located between the pterygoid processes of the sphenoid and the palatine bones are the sphenopalatine ganglia, which innervate the lining of the nose, sinuses, and nasopharynx. If the sphenopalatine ganglia are hyperstimulated because of improper pressures of the hard palate and the sphenoid, it can result in rhinitis and rhinorrhea. It can also increase an individual's susceptibility to airborne allergens.

The maxillary branch of the trigeminal nerve (CN V) innervates the sphenopalatine ganglia. As such, the sphenopalatine ganglia play an important role in migraine headaches due to its sensory influence of the trigeminal nerve.

Located directly on the sphenoid is the pituitary gland. The pituitary exerts profound influence over the endocrine system and, as such, directly influences the body's physiology and health. If the sphenoid is out of position ("lesioned") due to misalignment of the hard palate, pituitary function will suffer, and the body's physiological systems will be affected.

The pituitary is located outside of the brain because it needs to operate in a cooler environment than the brain has to offer. One of the ways that the body helps "cool" the pituitary is the gentle rocking motion of the sphenoid provided by the craniosacral rhythm. This rocking motion ("flexion" and "extension") helps to pump the hot blood away from the pituitary. Any cranial misalignment interferes with this motion, causing the pituitary to heat beyond its optimal physiological range. Even a slight temperature increase of the pituitary will result in diminished pituitary function.

Often an individual will unconsciously attempt self-corrective measures. It is important to notice if a child keeps having accidents involving hitting his head, or if the child is involved in head banging, particularly if the same part of the head

is hit each time. This may be the child's attempt to self-correct a cranial lesion. Even bruxism in adults may be an attempt to remedy cranial misalignment.

TMJ disorders are a major contributor to head pain. Because of its intricate anatomy, myriad of related structures, and sensory innervation of the trigeminal nerve, any dysfunction of the TMJ can create pain throughout much of the head.

The lateral pterygoid muscles connect the TMJ to the pterygoid processes of the sphenoid. So, any imbalance of the TMJ affecting the lateral pterygoid muscles will pull the sphenoid out of position and affect its motion and functioning. This "faulting" of the sphenoid can result in visual disturbances because the sphenoid is a major structural feature of the orbits. Also, cranial nerves affecting visual acuity and eye movement travel through or above the sphenoid bone. Moreover, all but one of the muscles that control the movement of the eye are attached to the sphenoid.

When the condyloid process of the mandible is forced up into the temporal bone due to a "tight jaw," the temporal bones are forced into rotation. The temporal bones contain the mechanisms for hearing and balance, and these functions can be seriously impaired if these bones are out of proper alignment.

There are many ways that a "tight jaw" perpetuates its condition in the absence of treatment from a trained practitioner. For example, when muscles contract and go into spasms, insufficient blood reaches the muscles. This can cause an anaerobic condition and a build-up of lactic acid and toxins. This discomfort results not only in the muscles going into further contraction, but also produces throbbing or continual pains in the muscles, joints, teeth, and other areas of the head and neck.

Located slightly anterior to the TMJ is an autonomic nerve plexus termed the reticular activating system. Imbalance of the TMJ can produce a constant hyperstimulation of this autonomic system, resulting in the patient experiencing a pervasive sense of "fight or flight." It is like leaning on a fire alarm twenty-four hours a day. This can affect not only the patient's emotions, but his endocrine and other physiological systems as well. If the patient clenches his jaw and/or grinds his teeth during sleep, he may wake up more fatigued than he had been

when he went to bed due to the constant firing of the sympathetic nerve fibers.

A complex pattern of cranial and cervical nerves provides sensory and motor pathways in the head. Motor and sensory disturbances can accrue when the functional anatomy associated with these nerves is out of balance ("lesioned"). Cranial nerves of particular interest in dentistry include cranial nerves V, VII, IX, X, XI, and XII.

The fifth cranial nerve, known as the trigeminal nerve, is the largest of the twelve paired cranial nerves. It supplies motor fibers to the masticatory muscles and sensory input from the face, mouth, and much of the head. Disorders of the trigeminal nerve are often the reason a patient will seek the help of a dental professional. Trigeminal nerve pain radiation can often confuse the diagnosis of whether a pain is coming directly from a tooth or is a referred pain.

Branches of the trigeminal nerve can be compressed and/or entrapped, creating excruciating head and facial pain in the patient. This condition is referred to as "tic douloureux." This entrapment can be caused by disturbance of the dural membranes enveloping the gasserian ganglion, or caused by articular strain of the temporal and sphenoid cranial bones. This condition can often be successfully resolved utilizing manual therapy, particularly if treated soon after the onset of symptoms.

Just as the fifth cranial nerve can become entrapped creating debilitating pain, so can the ninth cranial nerve (the glossopharyngeal nerve). This entrapment manifests as severe pain in the middle ear, mastoid air cells, tongue, and/or pharyngeal wall. This condition can be successfully addressed with the utilization of craniosacral techniques.

The seventh cranial nerve is known as the "facial nerve." This nerve provides much of the motor fibers to the muscles of facial expression and the buccinator muscle. When there is irritation or entrapment of this nerve, there is often a pattern on one side of the face that can include the mouth drooping, impaired chewing due to a weak buccinator muscle, and loss of the sense of taste to the anterior two-thirds of the tongue. This condition is referred to as Bell palsy. Cranial lesions, particularly of the temporal bones, can be a significant factor in the pressure exerted on the facial nerve. The partnership of manual therapy and the

dental professional can often successfully treat this condition.

Dentists and manual therapists, together, have a unique role in health care. The work that they do goes far beyond the mandible and maxillae and has ramifications throughout the patient's entire system. Working with the manual therapist enhances the dentist's ability to have this profound influence.

## Approaching the Summit

By Brian T. Shea, D.O.

In writing an article about treatment approaches for structures in the head and upper neck region, one is immediately impressed by the sheer volume of information that can be written on this subject. What follows is my perspective on a small piece of this puzzle. The view is distinctively osteopathic with a decided biodynamic approach. It is tempered by twenty-six years of combined clinical practice both in Rolfing® and osteopathy. The format will include some general treatment principles with a practical example at the end of this article that knits together some of these ideas.

First things first. Most people have varying amounts of structural compensations already going on by the time they get to your office. This can depend on the amount of hands-on work they have already had but, in general, everyone is a work in progress. Their nervous systems tend to have a dominant sympathetic tone and this generally tightens up the structure on a daily basis. Having an office space that is soothing can be a refreshing change of pace for them. Take the first five or ten minutes of each session just to allow their systems to settle down. Not rushing into things will make your job easier. Granted, these are elementary ideas, but they need to be repeated time and again.

In approaching your work on the head and neck, it really helps to have a good sense of the client's embryological development. Think of the adult form as a compensatory pattern for the underlying embryology. Always keep in mind where the origin

of structure and form came from. It is an integral part of the puzzle.

Next, for every one part of direct technique on the head, there should be a larger number of corresponding parts of finesse work. A little goes a long way. When you think you are forcing something, you probably are. Pause and let the tissues reflect information back to you – make it a relaxed dialogue.

Next, the head, jaw, and neck are linked reflexively to each other. Your work is not producing the results you expect, venture on down to the extremities, especially the arms and lower legs, and work there for a bit. Some of the best work I have seen on the neck and head has come from work on the extremities. This observation includes both Rolfing® and osteopathic sessions.

Finally, what would a head be without proper seating and balanced tension at the atlanto-occipital (A/O) joint and underlying cervicals? Think ease and length through these areas. Mashing through the suboccipital region with direct technique tends to be a slippery slope that leads to over stimulating these tissues, as well as the nervous system, rather than having the desired effects of ease and lengthening. As mentioned above, check the extremities, especially the arms, to help what is above. Effectiveness of the seventh-hour work can be enhanced when this area is balanced at the end of the session.

Finally, what follows is a practical demonstration of how some of these ideas fit together. This can be of use in your practice.

Whenever I am treating someone who has a compressed and tight A/O area, I check the mandible. Embryologically, the mandible has three ossification centers on each rami. It is also connected to the A/O region via the embryologic pharyngeal arches. Each of these ossification centers can have a different cranial rhythmic impulse due to trauma. Numerous times I have treated people who have had temporomandibular joint (TMJ) problems or trauma to this area. Once these different areas of the mandible are balanced, there is a ripple effect along the pharyngeal seams in an anterior/posterior direction – they tend to decompress and ease. This significantly reduces occipital compression while simultaneously freeing up the upper cervical region and the anterior pretracheal fascial planes. In addition, this lessens the strain on the TMJ, which in turn frees up the temporal bone structures. Finally, it generally tends to reduce the overall sympathetic tone in the body.

As mentioned before, this is just one particular viewpoint with just a couple of ideas for working on the head and upper neck. It is an enormous task to master due to the complexity involved. Persistence and an open mind are prerequisites for this journey.

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