



## TMJ Disorders: A Misunderstood Condition in the Medical and Dental field

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Most patients, and even many doctors, are not aware how a misaligned or unstable bite can adversely affect the head and neck. The muscular tension from a poor jaw posture can cause many symptoms including headaches, migraines, neck pain, and even many ear symptoms like tinnitus or vertigo. Unfortunately, these people who are suffering often never identify the root cause of these symptoms because of the lack of understanding of this connection in the medical and dental fields. This isn't that surprising considering most medical and dental professionals are not trained to evaluate the TMJ or occlusion as a possible factor for this long list of symptoms. People seek help from their primary care physician or ENT physician, neurologist, or they find a chiropractor to give them relief, when in reality, they are suffering from an undiagnosed TMJ disorder.

### Defining a "TMJ Disorder"

It is widely misunderstood what symptoms fall under a temporomandibular joint disorder. Because the word "joint" is involved in this condition, most patients, physicians, and even dentists believe that clicking, popping, or pain in the TM joints needs to be present if a person is considered a "TMJ" patient. This can be the case with many patients, however, it does not have to be true for every patient to have a TMJ disorder.

The majority of TMJ patients that I treat have no noise in their joints, no actual discomfort in their jaws, and have an extremely healthy dentition. Unfortunately, they are suffering daily with migraines and muscular tension headaches, ear congestion and pain, upper cervical tension and discomfort, and ringing in the ears or vertigo. Therefore, I have been trying to describe these patients without using the word "TMJ disorder" and more appropriately, "Craniofacial Pain" patients.

### Common Symptoms of a TMJ disorder (Craniofacial Pain Disorder)

- Headaches
- Ear pain
- Migraines
- Jaw pain (with or without joint sounds)
- Neck pain
- Subjective hearing loss
- Ear congestion or blockage
- Tinnitus (ear ringing)
- Vertigo (Dizziness)
- Sinus Pressure or pain

### Less Familiar TMJ Symptoms and how they occur...

**Ear Symptoms:** The main facial muscles surround and connect to the area right in front of the ears where the TMJs meet the skull. There are numerous blood vessels, nerves, and ligaments that exit and enter this area offering blood supply, innervation and support to the structures of the ears. When a person's bite has been adversely affected by bruxism, parafunction, excessive dental work, or even improper orthodontics, it can cause muscular tension in these areas. If this tension compresses these very sensitive nerves and blood vessels around the ears, symptoms like ear ringing, ear congestion (blockage), and vertigo (dizziness) can occur. For instance, cranial nerve V innervates the Tensor Tympani, a tiny middle ear muscle that is attached to the malleus. Tinnitus can also arise from the traction on the malleus by Pinto's ligament (disco-malleolar ligament) and/or associated musculature to the ear

and Eustachian tube (tensor tympani and tensor veli palatini from throat), as well as other triggers like the medial pterygoid muscle. By stabilizing and properly supporting a person's jaw in a muscularly relaxed and comfortable position, we decompress the area around the joints and ears, allowing healthy physiology to occur and symptoms to be relieved.

**Neck Symptoms:** Did you know that approximately 80% of all "pain" patients have lost some physiologic curvature of the upper cervical spine? These people may experience daily headaches, neck pain, vertigo (dizziness), and even ringing in the ears which are all common symptoms of a temporomandibular joint (TMJ) disorder. Most people would never suspect that the neck and jaw would be related, but they can directly affect the other causing discomfort or pain if they are out of balance. In fact, the latest research is showing that a bad neck position and poor posture can be one of the main causes of a TMJ disorder, and unless it is properly addressed, patients will continue to suffer from the previously mentioned symptoms.

There is a direct relationship between the upper cervical spine and a bad jaw position. The nerves of these structures, specifically the upper 3 cervical vertebrae, are physiologically derived from the Trigeminal Cervical Nucleus, just like the main nerves of the face and jaws. Therefore, if a person has compression in their upper cervical spine resulting in misalignment, this will also force them into uncomfortable and misaligned jaw position. Vice versa, if a patient has a compromised bite due to older dental work, clenching and grinding, or crowding, this can cause the patient to change their head position resulting in neck discomfort or pain. Furthermore, the relationship between the masticatory and cervical muscles is important when considering the effects of head posture and the resting position of the mandible. TMJ often alters the neck posture as patients can develop a forward head posture to try and compensate for their jaw pain or it is a compensatory mechanism to open the airway for oxygen.

### How can we identify these patients?

There are 3 things that determine your bite: Your teeth, your facial muscles, and your temporomandibular joints. The teeth dominate the system, so wherever your teeth are, your TM joints and facial muscles must accommodate. Unfortunately, many times they must accommodate at a price which is a compressed condylar position in the glenoid fossa and muscular tension and pain. This should, of course, be confirmed with a 3D cone beam CT before the beginning of any treatment.

It is an accepted fact in dentistry that 90% of all TMJ symptoms are muscular in origin. Therefore, we must take this facial musculature into consideration when treating these TMJ patients. A person brings their teeth together 3-5,000 times per day and if they have a poor occlusion, muscular tension and pain could result. In order to identify a poor occlusion or jaw posture, we have many intraoral and extraoral signs that we look for in these patients.

### Signs of a patient with a "destructive" bite

- Worn down teeth (Attrition)
- Fractured or Missing teeth
- Abfractions
- Large Overbite (30% or greater)
- Large Overjet
- Posteriorized mandible (retruded chin)
- Bony Tori
- Forward head posture
- Obstructed airway

If a patient exhibits any or several of these signs, an unstable bite is present which will affect jaw posture and can result in muscular symptoms of a potential TMJ disorder. Another measurement that is very helpful determining the stability of a bite is called the Shimbashi number. This measurement from CEJ to CEJ of the maxillary and mandibular central incisors in stable dentitions should be between 17-21mm. The Shimbashi number was established to indicate an ideal relationship between the upper and lower jaws. When there is an optimal position of the lower jaw relative to the upper jaw, the muscles which are connected to them will also be at their optimal length and can function ideally. Any measurement less than 17mm is considered a deficient vertical dimension and could be a factor in an over closed occlusion or posteriorized mandibular position (See Figure 1). After identifying these patients, we want



*Figure 1 Shimbashi number less than ideal*



to confirm that they are candidates for a neuromuscular approach to treating their Craniofacial pain. Through the use of jaw tracking and electromyography, a complete analysis of the function (or dysfunction) of the masticatory system can then be performed for further data.

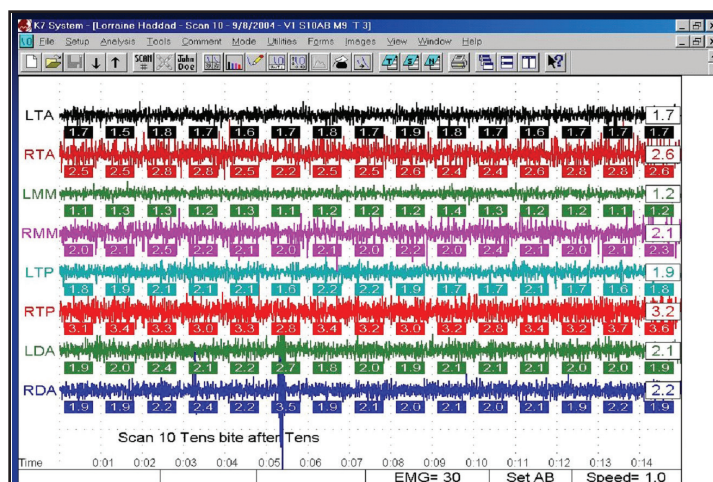
### Objectively Measuring a Poor Occlusion

In order to predictably fabricate an orthotic to support a patient in a comfortable and asymptomatic jaw position, we utilize specialized instrumentation. The K7 computerized jaw tracking system from Myotronics allows us to establish a baseline to record the location of a person's habitual bite and the activity level of the surrounding musculature in that occlusion. This instrumentation uses surface electromyography (EMG) to measure the 4 main facial muscle groups including the anterior temporalis muscles, masseters, Sternoclenomastoid (SCM) muscles, and anterior digastrics. Computerized jaw tracking is used to precisely identify the relationship of the mandible

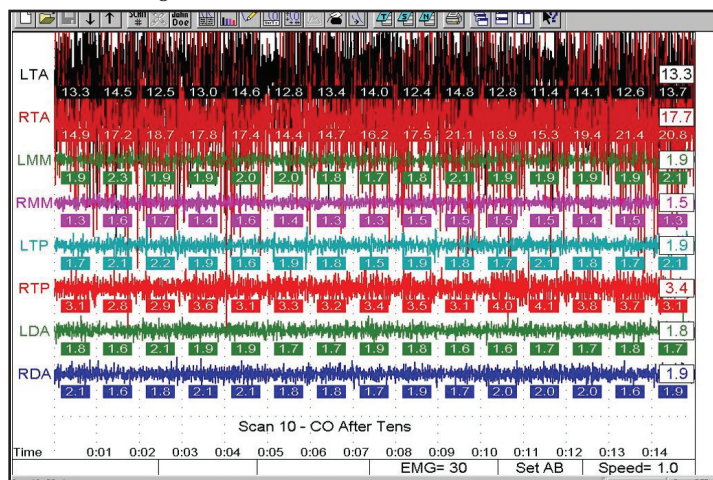
to the skull and to study mandibular movement dynamically. A good indication of an unstable mandibular position is a significant increase in EMGs in a patient's anterior temporalis muscles when in light occlusion (*See Figure 2*). These muscles are responsible for the positioning of the mandible. Utilizing this instrumentation at a patient's initial consultation has become integral in identifying which patient's will benefit from neuromuscular orthotic therapy.

### Determining the proper bite, where do you begin?

Muscles of the face and neck are often propriocepted to control head and mandibular posture in a way that accommodates occlusion, even if that particular occlusion is less than ideal. After identifying a baseline for habitual occlusion and its associated musculature, an ultra-low frequency Myomonitor TENS unit (Myotronics) is used to relax muscles into a more untorqued position and establish the physiologic rest position of the mandible. Ultra-low frequency TENS deprograms muscle engrams, increases blood flow to these muscles, and restores muscle health which is essential in determining a comfortable jaw posture. At this point, the proper path of closure can be established using the computerized jaw-tracking capabilities of the K7 with simultaneous monitoring of the patient's EMGs. Once this jaw position is determined, an ideal bite is registered with Futar bite material. This bite registration is based on physiologic rest position, proper path of closure, and the lowest EMGs of jaw musculature and then used to have an anatomical mandibular orthotic made (*Figure 3*).



*Figure 2 Relaxed Muscles in Orthotic*



*Figure 2 Painful muscles in poor occlusion*



*Figure 3 Anatomical mandibular orthotic*

### Supporting your Physiologic Jaw Posture

To relieve "TMJ" symptoms for a patient, a removable anatomical mandibular orthotic is fabricated to wear for a minimum of 4 months (a critical step to stabilize



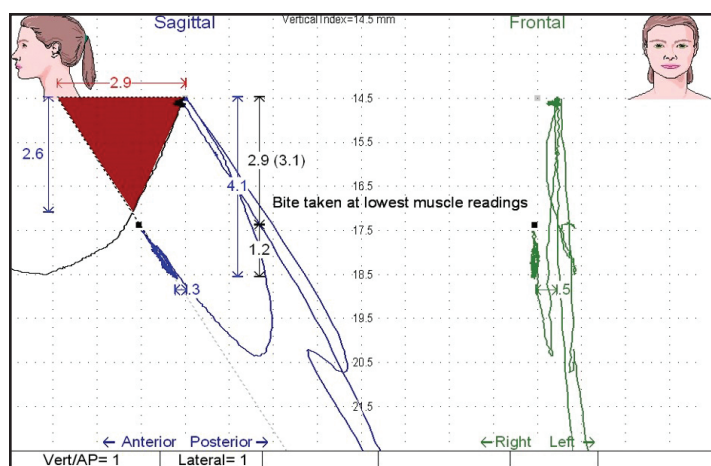


Figure 4 K7 computerized jaw tracking system

treatment. This jaw position is confirmed utilizing the K7 computerized jaw tracking (Figure 4) and surface electromyography (Figure 5). A final cone beam CT is then taken with the patient wearing their orthotic to confirm final condylar position in the glenoid fossa. The patient is given the opportunity to either continue with an orthotic, but on a limited basis, or move on to a permanent orthodontic or a restorative solution to their dentition.

The classic signs of a TMJ patient involving joint sounds, clicking and popping, are only a fraction of the population that falls into the category of Craniofacial pain. It is our job as dental providers to inform our patients that we have ways of addressing

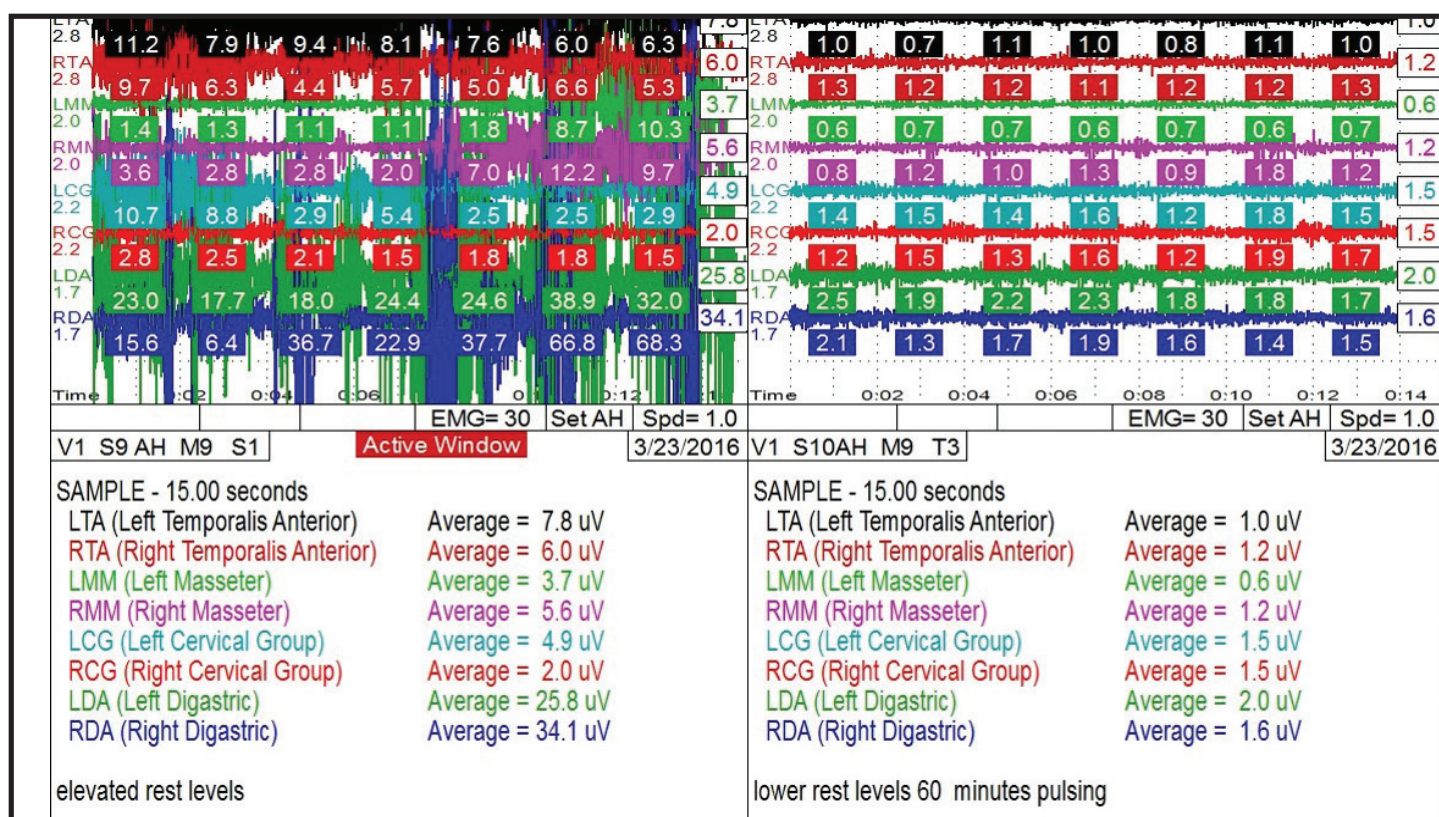


Figure 5 Surface Electromyography

jaw posture and ensure they are symptom-free before discussion of any permanent changes to their dentition). All treatment performed in this therapeutic phase is completely reversible. This neuromuscular orthotic therapy continues for 4-6 months with several adjustments utilizing ultra-low frequency TENS and computerized jaw tracking with EMG monitoring. After resolution of symptoms to the patient's satisfaction, and verification of stability of path of closure and calm facial musculature, the patient has completed this phase of

symptoms that may not be perceived as a dental issue. It is also important to educate these asymptomatic patients that they have the potential to be pain patients, and if they experience these symptoms to keep their dentist informed. Not all "TMJ" patients have the obvious red flags, however, by educating ourselves on symptoms, asking the right questions and paying attention to signs in the mouth, we can help many people who are unaware of the relief that their dentist can provide.. ♦