

A Gneuromuscular (GNM) Approach (Part 1)

Seeing the bigger picture – recognizing the signs and symptoms

by Clayton A. Chan, DDS

The goal of any treatment or therapeutic regimen is to improve health by returning the body to an optimal state of comfort and function.

Dental occlusion is modified when there is: 1) masticatory dysfunction; 2) joint derangement; and/or 3) pain. Radiographic evidence proves that both abnormal form and function of the masticatory system will alter (deform), displace and reposition underlying bony and condylar structures to accommodate a malpositioned occlusion.⁴ Both gnathic and neuromuscular principles and protocols are systematically implemented and are now being recognized as **Gneuromuscular (GNM) Dentistry**. Most dentists who treat TMD and occlusal problems have been taught to focus on a **joint-based diagnosis and philosophy** – ignoring the abnormal imbalance of muscles that predisposes patients to recurring dental problems including bite disturbances, muscle soreness, TMJ pain, and headaches. According to traditional occlusal concepts, muscles will triumph over teeth when engaged in a tug-o-war, thereby creating adverse forces on the teeth and other structures within the masticatory system.^{2,3}

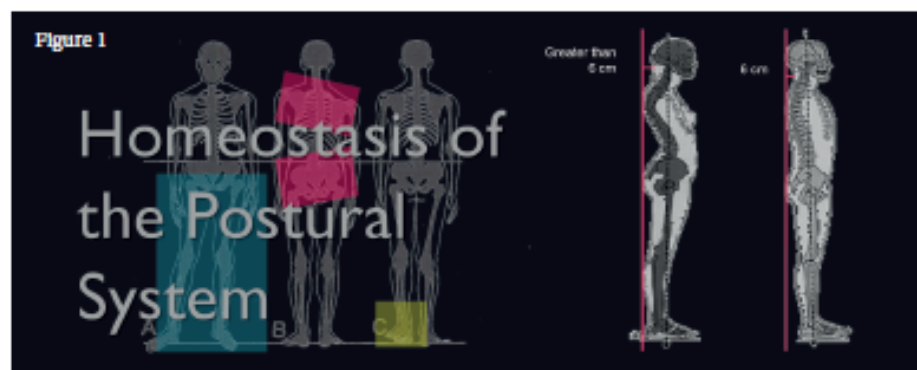
Without an objective way to assess the quality of muscle activity, as well as mandibular movements and/or positioning, the quality of joint function can only be assumed. Any occlusal scheme created by the dentist is merely an “educated” guess, *with no practical knowledge pertaining to the health of the mandibular position or relationship.*^{4,7} Maintaining balance within the masticatory system requires an understanding of what is healthy and what is not. A keen awareness of physiology and

pathology is essential to the diagnosis and effective treatment of any organ system. Many dentists today pay little attention to how dental arches relate to one another. They naturally expect the teeth to come together into their habitual contact position with ease and relatively even contacts. However, muscles may place certain unseen demands on the temporomandibular joint (TMJ), teeth and periodontium. As a result, teeth may develop wear facets, incisors may chip, tooth mobility may occur, molars and bicuspid may break and further periodontal implications such as recession or even bone loss may occur. These are some of the most common clinical problems seen in the dental office.

Seeing the bigger picture

The stomatognathic system is composed of **three major entities: the teeth, TMJ and muscles. All three entities must function together harmoniously** to allow the teeth to interdigitate into a defined intercuspal position while the TMJ and muscles assist in jaw movement.

Many practitioners fail to realize that the **muscles** and **TMJ** may be the causes of dental issues when patients present to the dental office. Traditionally, the focus of dental professionals has been placed upon identifying anything that is wrong with the **teeth** – from cavities, periodontal bone loss and endodontic problems, to missing cusps, failed restorations to fractured teeth, or even abfraction lesions causing profound root sensitivity. *The clinician ignores the underlying factors that bring about these dysfunctions and problems, albeit unintentionally.*



Oral health depends on the state of every functioning part of the oral cavity, including the muscles and TMJ. Without any of these three components, the mouth cannot optimally perform its functions for good digestion, deglutition and overall postural alignment of the body. Dental misalignment will lead to head and neck posture compensations which affect the lower back and contribute to structural disease (**Figure 1**). A direct disturbance to body function and overall health will ensue.^{3,7}

When abnormal forces are placed upon the teeth, they often become sensitive to pressure, sweets and/or temperature. Feelings of ear congestion (fullness in the ear) can occur when the condyles are pressing up and back against the glenoid fossa due to insufficient vertical support of the posterior teeth. Tenderness or pain on palpation of the temporalis muscles can contribute to headaches when the mandible is forced to posture and function posterior to the isotonic relaxed jaw position. Facial pain around the cheeks and lower border of the mandible can occur when the masseter muscles strain due to anterior occlusal prematurities occurring prior to the final maximum intercuspal position. These abnormal muscle strains resulting from bite imbalances (occlusion) contribute to torques and strains to the skull, mandible and cervical regions of the body.

An upward head tilt and abnormal forward head posture will occur to compensate for the evolving asymmetric muscle pull in multiple areas. These signs and symptoms are often overlooked or neglected due to a weak understanding of how occlusion plays a key role in functional balance and body posture.

Headaches are often referred to the neurologist and TMJ pains to the oral surgeon. The chiropractor or physical/massage therapist receives referrals for neck and shoulder pains while the ENT specialist can be called for ear congestion symptoms. **However, have dentists considered that these symptoms may stem from a dental problem?**

Musculoskeletal occlusal signs and symptoms

Many dentists attempt to find a jaw relationship where muscles are comfortable. The dental profession acknowledges that TMJ pain is mostly caused by muscle strains and uncoordinated function rather than from the TMJ per se. Practitioners are trained at dental schools that diagnosing the health of a patient's TMJ is equally as important as the condition of muscles responsible for jaw movements **before doing any occlusal treatment**. All dentists are trained to perform a comprehensive muscle palpation examination – yet very few have learned how to relate the clinical findings of tender muscles to specific occlusal imbalances.

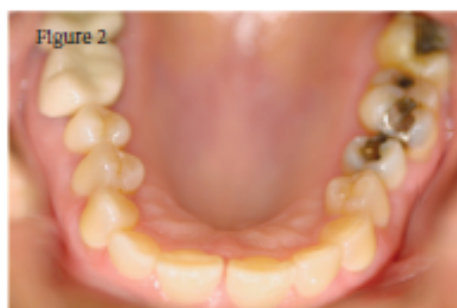
When the dentist performs a muscle palpation examination, what do tender muscles mean to them?

Most practitioners admit that results from this examination hold little significance for them when it comes to deciding whether or not to perform dental procedures. Dental instructors have failed to adequately convey how

particular muscle pains can relate to certain areas of occlusal prematurities. When a patient closes with certain premature tooth contacts that were not present prior to a new restoration, the muscles will strain and torque causing a tooth to become tender and painful. Joint clicking or popping may occur and TMJ problems begin to arise, thus weakening and impairing the body's ability to function optimally.

Excessive tooth grinding and clenching is another clinical indicator that neck muscles (sternocleidomastoids and scalenes) are not properly balanced with a supporting occlusion. Clenching may result from imbalances of the back muscles connecting the sacroiliac and occipital regions, as well as central nervous system (CNS) emotional stress factors.

Worn down dentition, tooth wear facets, dental crowding, lingually tipped teeth, deficient vertical dimensions, an accentuated Curve of Spee, deep bites, excessive overlap and retrusive mandibles are additional clinical indicators of **strained muscles and something 'abnormal'** (**Figure 2**).



Intraoral signs indicative of masticatory system imbalance:

- Crowded lower anterior teeth
- Wear of lower incisal edges
- Fractured cusps
- Narrow arches
- Vaulted palates
- Deep Curves of Spee
- Over-closed bites
- Flared upper anterior teeth
- Locked upper buccal cusps
- Wear facets
- Cervical erosion (abfractions)
- Receding gums
- Mobile teeth
- Open interproximal contacts
- Loss of molars
- Crossbites
- Anterior open bites
- Anterior or lateral tongue thrust
- Midline discrepancy

Abnormal extraoral signs indicative of masticatory system imbalance (Figure 3):

- Facial asymmetry
- Short lower third of the face (chin to nose point diminished)
- Cheilitis
- Abnormal lip posture
- Deep mental crease on the chin
- Dished out or flat labial profile
- Facial oedema
- Mandibular torticollis
- Cervical torticollis
- Forward head posture (lordosis)
- Elongated lower face (steep mandibular angle)
- Speech abnormalities

The human body, the stomatognathic system (teeth, muscles of the head and neck, TMJ), branches of the nervous system innervating the masticatory system as well as posturing of the head and neck should all be considered by dentists and hygienists when diagnosing and comprehensively treating patients. *Any symptom involving these systems should not be ignored by dentists.*



Figure 3: a) Patient's profile in habitual centric occlusion (CO/MIP) before treatment. b) Patient after treatment, wearing a GNM orthotic at physiologic position.

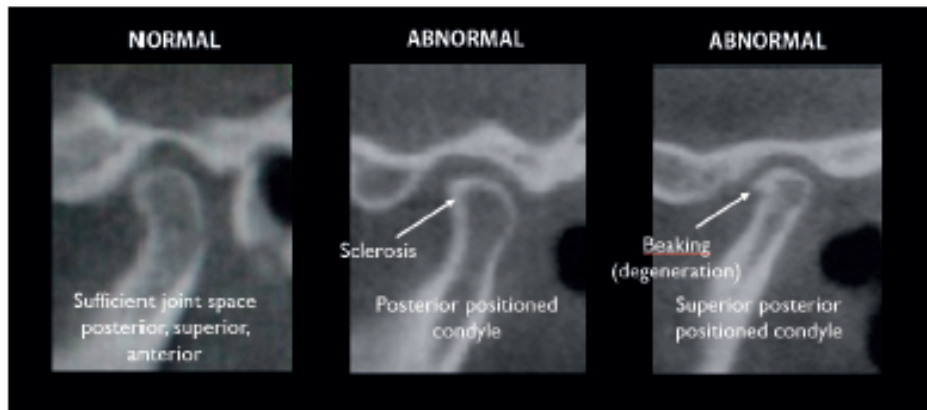


Figure 4: Tomographic evidence of the TMJ can indicate degenerative condylar changes contributing to masticatory dysfunction. It is imperative that the clinician considers another approach to resolving these issues that goes beyond the routine, everyday dental procedures done in habitual occlusion.

Temporomandibular joint disorder (TMD): Masticatory dysfunction, joint derangement and pain

Clinical dysfunction and symptoms occur when the need for structural and physiological accommodation exceeds the ability of the organ system to accommodate. **Compression** of anatomic structures is a generic medical model of pathophysiology, pain and dysfunction. **Decompression** of impinged anatomic structures is the medical therapeutic model.

Abnormal forces placed upon the condyles will contribute to deterioration and bony breakdown (Figure 4).⁸⁻¹¹ The TMJs are not load-bearing joints since it has been recognized as a synovial joint with a disc interposed between an upper and lower joint space. Lack of vertical occlusal support in the posterior bite regions will contribute to impingement and compression forces to the condyles as well as discs within the temporal fossae, resulting in degenerative condylar changes and further masticatory dysfunction. **It is the teeth that bear the load, not the condyles and TMJ discs.**

It is not uncommon for individuals who have deficient occlusal vertical support in the posterior regions to have degenerative joint disease or internal derangement problems of the TMJ. Deep overbites and retruded mandibles (Class II Division 2, aberrant lateral tongue swallow patterns) are a couple of examples.

Deviations of the lower jaw to either the left or right side during mouth opening can occur either unilaterally or bilaterally because the condyles may be positioned posteriorly and superiorly within the glenoid fossa. When condyles are sitting in this “up and back” position, there is an increased likelihood for articular disc displacement to occur during the opening and closing cycles of mandibular movements, leading to clicking and joint popping and, sometimes, restricted mouth opening (*Figure 5*).^{11,12} **Again, this is not normal – these are signs of an occlusal dysfunction. DA**

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Individuals with Occlusal Signs & Symptoms

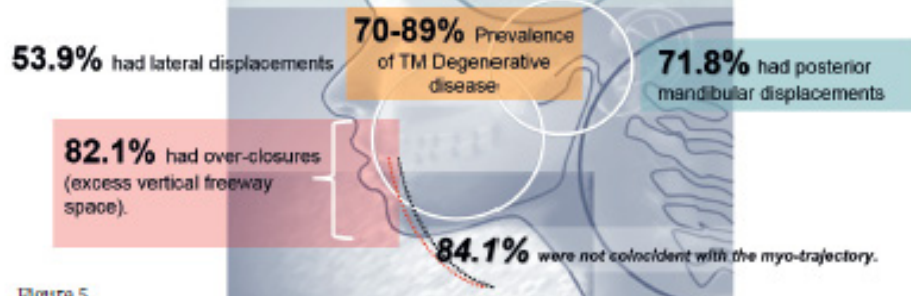


Figure 5

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About the Author



Clayton A. Chan, DDS is a general dentist, clinician, teacher/mentor and educator to hundreds of dentist around the world. He is considered an authority on dental occlusion, TMD and its applications in clinical dentistry. With his training as a dental laboratory technician, along with his clinical experience, he has combined both gnathologic and neuromuscular perspectives now noted as a neuromuscular (GNM) approach, which is now widely recognized as a logical and systematic approach to occlusal challenges amongst advanced clinicians.

Dr. Chan's conservative approach to treatment has attracted patients and dentists from all over North America and outside US who have sought his assistance for treatment of their TMD, craniomandibular myofascial pain and orthopaedic problems. His unique approach to Phase I (stabilization) and Phase II (completion) applying these GNM principles is a hallmark in comprehensive care.

Dr. Chan is the founder and director of Occlusion Connections™ (www.occlusionconnections.com),

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