

# Achieving Optimal Oral Health: TMD and Malocclusion

*By Jay Harris Levy, D.D.S.*

Temporomandibular Disorders (TMDs) encompass a rather broad set of musculoskeletal problems that involve the jaw joints (i.e. temporomandibular joints or TMJs), the muscles that control jaw movements, the teeth as well as other related structures of the head and neck. TMDs are widespread in the United States with prevalence rates ranging from 1 to 75% in different study populations. TMDs occur more frequently in women than in men. Patients with TMDs typically experience TMJ clicking and pain in the head and neck. The pain may manifest itself as a headache, muscle spasm or toothache or may be more broadly characterized as a facial pain. Patients with TMDs may experience discomfort arising from clenching or bruxing behaviors that cause painful spasms in the jaw muscles.

Temporomandibular disorders are subdivided into 3 main classifications. The first, most common, classification, "myofascial pain" encompasses pain originating from sore, overworked jaw and neck muscles. "Internal derangement" encompasses pain originating from herniated TMJ discs and traumatically injured joints. "Degenerative joint disease" encompasses pain originating from TMJs that have been injured from rheumatoid arthritis or osteoarthritis.

Treatment for TMD is controversial because of the limited understanding of the disease processes that are at work in patients with TMD. The head and neck are complex parts of the body that can be impaired by a variety of noxious agents. At the center of the TMD debate is the role that dental malocclusion (i.e. poorly aligned teeth) plays in developing these disorders. The arrangement of the teeth determines the end position of jaw closure during chewing and swallowing. The rationale for addressing malocclusion in the treatment of TMD is based on the observation that the teeth may direct the jaw into uncomfortable positions causing muscle fatigue and pain. The correction of malocclusion can allow the jaw to be centered and close into stable tooth contacts.

Teeth are tactile sensory organs. The sensory system of the teeth plays a crucial role in providing the tactile sensory feedback necessary for the teeth to endure, relatively unscathed, the rigors of pulverizing the vast quantities of food that humans require for survival into old age. Feedback from tooth sensors enables the jaw muscles to provide just the right amount of force to break-up food while sparing the teeth excessive trauma and wear. Many years of eating will cause only minimal tooth wear or damage when the chewing system is optimally balanced. Tooth misalignment, trauma to TMJs or the use of some antidepressant medications that induce bruxism may damage the teeth and gums causing pain and eventually tooth loss.

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Occlusion is the contact relationship of the upper and lower teeth in the jaws (i.e. the bite). An ideal occlusal relationship distributes biting forces to all of the teeth thereby minimizing point loads that can break or wear out individual teeth. Our hominid ancestors had ideal occlusal relationships, ate whole foods and for the most part retained all of their teeth for life. Naturally occurring, ideal occlusal relationships are less common in modern culture. In an ideal occlusal relationship the upper and lower teeth are aligned in arch forms that allow the all of teeth to meet simultaneously (with approximate equal intensity) with the jaw joints fully seated in their sockets. Cusp tip to flat surface biting forces should be directed vertically through all teeth. If cusp tips contact opposing inclined tooth surfaces the bite can shift and cause the jaw joints to deviate from their fully seated positions. The upper front teeth should overlap the lower front teeth sufficiently to ensure that only the front teeth guide the jaws during sliding jaw movements (i.e. the back teeth should separate during sliding jaw movements because of the front-tooth overlap).

Malocclusion refers to a deviation from the normal contact relationship of the teeth and jaws as described above. One of the most common causes of malocclusion in modern culture is airway obstruction. Factors that may cause airway obstruction include allergies, environmental pollutants and respiratory diseases. Other causes of malocclusion include genetics and personal habits. Breastfeeding promotes normal development of the jaws and teeth whereas prolonged use of a bottle, thumb-sucking and pacifier misuse may contribute to malocclusion.

Malocclusions may make it difficult to bite with the jaw joints fully seated in their sockets. Subtle malocclusions may prevent controlled chewing movements from occurring. For example, suppose that a thin piece of lettuce is to be chewed by the teeth on the right side of the mouth but teeth on the left side touch before those on the right. The teeth on the left that interfere with jaw movements are called "occlusal interferences". In order to break-up the lettuce on the right side the jaw muscles will have to use excessive force to squeeze the jaw closed and slide the teeth around the interferences. This type of interference leads to excessive tooth wear and may even generate grating sounds while chewing. Occlusal interferences may overwork jaw muscles and cause muscle pain. In neurophysiologic terms occlusal interferences cause the chewing system to accommodate to conflicting sensory signals that arise from competing tooth contacts. The result may be the inability to move the jaw in one particular direction (i.e. a spastic movement) with accompanying elevated bite force levels.

Treatments for malocclusion and TMD often overlap. Bite-changing occlusal therapies and orthotics (e.g. alteration of the shape or position of the teeth and occlusal splints or night guards) can be used to simultaneously treat TMD and malocclusion. However, the type of

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TMD must first be correctly diagnosed and a phased treatment approach developed. The initial treatment phase often involves the use of orthotics and other relaxation therapies. Definitive changes to the teeth may be made only after a proper diagnosis has been made and success of initial therapy accomplished. The highest goal of occlusal therapy is to recreate an ideal bite with the TMJs fully seated in their sockets.

Typically myofascial TMDs that are sub-classified as occlusal-muscle disorders are most responsive to occlusal therapy. Treatment for TMDs is more difficult and less predictable in patients with damaged, internally deranged joints or joints that are actively breaking down from degenerative joint diseases. Active breakdown of the TMJs causes the back of the jaw to become shorter and major changes in the bite to occur. When this happens back teeth become higher than the front. Patients with degenerative joint disease may posture their jaws forward traumatizing their front teeth or in extreme cases may develop an anterior (i.e. front tooth) open bite.

Patients with malocclusion or TMD have unstable chewing systems. If left untreated, premature tooth loss and pain are common consequences. The use of a night guard or an occlusal splint is usually the first step toward achieving bite stability, jaw comfort and reduced tooth breakdown.