Tinnitus and Dentistry

by Joseph Schames DMD

Many people with tinnitus experience alterations in their tinnitus as a result of movement of their jaw. When seeking advice from a dentist, after evaluation, the person with tinnitus may be diagnosed with a Temporomandibular Joint Disorder (TMD). Patients with TMD report a higher prevalence of having tinnitus. Published medical papers indicate that patients with TMD and co-existing tinnitus find that TMD therapy improves tinnitus in 46 to 96 percent of patients who have TMD and co-existing tinnitus. In addition, a survey of patients taken two years after TMD therapy suggests that improvement is sustained over time.

What is the Temporomandibular Joint (TMJ) and what is a TMD?

The TMJ is the joint directly in front of each ear where the mandible (lower jaw) moves when opening and closing the mouth, when moving the mandible from side to side, and when chewing. There is a disc which cushions the moving portion of the mandible (the condyle) in the joint keeping it from directly rubbing with the upper boney portion of the joint. The disc is held in place by ligaments. Sometimes these ligaments stretch or tear, allowing the disc to move in and out of place when opening and closing the mouth. A clicking or popping sound can then be felt or heard when the disc pops off and on the condyle. This is called a dislocation of the disc in the TMJ.

Sometimes the dislocated disc can be in a position which does not allow the disc to move around so there would be no noises detected in the joint. Such a dislocated disc can then be confirmed with an MRI.

A dislocated disc, or a disc that has been worn through and through, allows the boney surface of the condyle to rub against the upper boney surface of the joint. This can cause degenerative changes in the joint which can be verified by hearing or feeling crepitus / grating sounds in the joint.

There is a ligament that runs from the disc in the TMJ directly connecting to the malleolus bone in the ear. This malleolus bone in the ear is connected to the tympanic membrane where its movement causes tension on the

tympanic membrane. When a TMJ disc is dislocated, this ligament is stretched or torn and may not function properly.

If a person has pain emanating from within the TMJ due to inflammation of the joint, this is called a capsulitis of the TMJ.

A person may also have pain in their facial muscles that may be entirely separate than a dislocated disc in the TMJ or inflammation of the TMJ. The facial muscular pain usually is due to overworking of the muscles of mastication caused by Bruxism.

Bruxism is an involuntary repetitive jaw-muscular activity, other than normal chewing movements of the mandible, characterized by clenching or grinding of the teeth, and by bracing of the facial muscles.[1-5] Bruxism that occurs while awake is called Awake Bruxism, and while asleep is called Sleep Bruxism.[1,3,5-7] Both Awake Bruxism and Sleep Bruxism have similar clinical findings that include wear of the surfaces of the teeth, teeth indentations on the sides of the tongue, and bite mark lines on the inside of the cheeks.[3,8-11] Awake Bruxism consists of clenching of the teeth, or bracing of the facial muscles without contact of the teeth, and, on rare occasions by grinding of the teeth, however, during Sleep Bruxism, both clenching and grinding of the teeth occurs.[7,12] Most people are unaware that they experience Sleep Bruxism, where in a large population-based telephone survey of more than 13,000 respondents, only 8.2% of the respondents were aware of teeth contact.[13]

Bruxism can occur in response to stress, in response to pain, as a side effect of using certain anti-depressant medications, and can also occur while sleeping due to obstructions of the airway (snoring or Sleep Apnea).

Bruxism can produce hyperactivity of the muscles of mastication.[7] These are the chewing muscles. The muscles of mastication are innervated by the 5th Cranial Nerve, the Trigeminal Nerve. In addition to innervating the chewing muscles, the Trigeminal Nerve also innervates the Tensor Veli Palatini Muscle and the Tensor Tympani Muscle. The Tensor Veli Palatini Muscle is the muscle responsible for the controlling the opening and closing of the eustachian tube. The Tensor Tympani Muscle is the muscle responsible for tensing the tympanic membrane (the eardrum) in the ear. Both of these muscles, embryologically develop from the medial pterygoid muscle of mastication.

When a person is having bruxism of clenching or grinding, and/or bracing of the facial muscles, causing hyperactivity of the chewing muscles, it is understandable that the same Trigeminal Nerve can also cause hyperactivity in the Tensor Veli Palatini and Tensor Tympani muscles which affect the functioning of the ears.

Reversible, noninvasive, conservative treatment such as self-management instructions, behavioral modification, physical therapy, medications, and oral appliances are endorsed for the initial care of nearly all patients having a Temporomandibular Disorder (TMD). Oral appliances are used to protect the teeth from bruxism, relax the hyperactivity in the facial muscles, and to decrease excess pressures within the TMJs.

A person with tinnitus should be apprehensive of seeking treatment with a dentist who wants to perform irreversible treatments for a TMD by permanently causing changes of the bite, because there is no guarantee that treatment of TMD will help manage a tinnitus problem. Also be aware that the wearing of any oral appliance can cause permanent changes of the bite.

There are other avenues of how improper functioning of the oral cavity can affect the functioning of the ear with resultant ear problems.

As discussed above, The TVP muscle is responsible for the opening and closing of the eustachian tube. When a person swallows properly the posterior portion of the tongue presses against and initiates the lifting of the soft palate. The soft palate is lifted by the muscular actions of the Tensor Levator Muscle and also by the Tensor Veli Palatini Muscle. A person swallows about 900 times per day, thereby causing movement of the TVP muscle which then opens and closes the eustachian tube. A problem occurs because many people do not swallow properly, which then does not cause the TVP to open and close the eustachian tube throughout the day. The resultant immobility of the TVP muscle can then cause adhesions to form at the opening of the eustachian tube, further restricting the TVP muscle to act properly.

Therefore, treatment that also may be required is for a patient with tinnitus is to retrain and correct an improper swallowing habit. A knowledgeable Speech Therapist or a Myofunctional Therapist can perform an evaluation

and oversee retraining of an improper swallowing habit by performing swallowing exercises.

Additionally, there is a procedure called a Trigeminal Pharyngioplasty where the doctor places his finger at the opening of the eustachian tube and finger-lyses adhesions at the opening of the eustachain tube that may have formed. This procedure anecdotally has helped patients who suffer from pressure within the ears, pain in the ears, and even loss of hearing. This procedure does not necessarily help with tinnitus, and sometimes may increase the tinnitus complaint. Unfortunately, there are very few dentists who have been trained to perform the Trigeminal Pharyngioplasty surgical procedure.

As discussed above, Sleep Bruxism can be caused by obstructions of the airway such as which occurs when snoring or during an episode of Sleep Apnea. Scientific studies have shown that people who snore have hyperactivity of the TVP muscle throughout the entire day. If a person requires treatment of their SB with an oral appliance, a regular daytime bruxism oral appliance **must not** be used during sleep because the scientific literature has documented that a regular daytime oral appliance used during sleep can cause an increase the occurrence of obstructions of the airway which may be life threatening. A unique oral sleep appliance must then be made for the treatment of the SB, where this unique appliance will not only protect the teeth, facial muscles and TMJ from the ill-effects of the SB, but the oral sleep appliance made properly will also bring the person's tongue and mandible forward, thereby helping manage any obstructions of the airway that may be occurring.

As can be seen, there are many dental interconnections that may be contributing to a person's tinnitus, however the tinnitus sufferer who is searching for a cure or for help in the managing their tinnitus must understand that there is **no guarantee** that treatment by a dentist will help their tinnitus.