Spasmodic Torticollis: The Dental Connection

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ABSTRACT: Spasmodic torticollis or cervical dystonia (CD) is the most common form of focal dystonia and is characterized by sustained abnormal muscle contractions in the head and neck area resulting in abnormal positioning or posturing of the head. The dystonic muscle spasms associated with spasmodic torticollis may affect any combination of neck muscles. Three cases are reported of spasmodic torticollis that were treated by a dental appliance with individual varying occlusal heights to open the maxillo-mandibular vertical dimension. Upon increasing the vertical dimension of occlusion, there was a slowing and/or discontinuance of the symptoms of cervical dystonia. The proposed hypothesis for this reversal is that there may be neuretis of the auriculotemporal branch of the trigeminal nerve, which has direct input into the reticular formation (RF), and it may activate the cells of the pontine region of the RF known for the control and deviation of head posture. There is growing clinical evidence that temporomandibular joint (TMJ) dysfunction may be a factor in this neurological and painful disorder when it coexists.

What causes spasmodic torticollis or cervical dystonia? The short answer is that as of now clinicians are unsure. Some studies suggest that focal dystonia may be precipitated by trauma or overuse of the affected region of the body. In some cases, dystonia has been linked to several apparent classes of causations, including genetics, adverse drug interactions (both legal and illegal), and severe peripheral nerve trauma. Almost all dystonic movements share a directional quality that is typically sustained, and some movements may be prolonged. In general, the dystonias may be classified based on the age at which symptoms first appear, the area or areas of the body that are affected (anatomical distribution); or the cause of the dystonia. CD is classified as a focal dystonia because it typically affects one area of the body (i.e., head and neck). These sustained muscle contractions or spasms result in head movements that may be jerky, periodic, or sustained. The resulting unnatural positioning of the head is usually referred to as dystonic posturing. One shoulder may be elevated and displaced forward on the side toward which the chin or head turns, Figure 1. In addition, the condition is often painful and there may be mild associated dystonia in the upper arm and/or upper back muscles.

Dr. Anthony B. Sims Dr. Anthony B. Sims received his D.D.S. degree from Ohio State University in 1983. Currently, he has a general dental practice in Columbia, Maryland, where he also treats TMD and sleep apnea patients. His primary interest is in understanding how dentistry interrelates with the many different types of movement disorders. He is a member of the American Academy of Craniofacial Pain, National Spasmodic Torticollis Assoc., Reflex Sympathetic Dystrophy Syndrome Assoc., and The International Association for Orthodontics. He has spoken in the United States and Europe on the perspective dentistry has on the possible abeyance of certain movement disorders. He has published the results of his treatment in peer-reviewed journals. To view the discontinuance of movement disorders associated with Tourette’s syndrome and other disorders go to http://www.bodovementdisorders.com.
on the same side. However, in many patients, the relationship is less clear and trauma alone probably would not be sufficient for the development of a dystonia. In addition, CD is the most common focal dystonia that responds to a sensory trick or geste antagoniste.\textsuperscript{14-16} For example, patients with CD may find that placing a hand on the side of the face, chin, or the back of the head, temporarily alleviates the dystonic posture. Leaning the head back against a chair or placing a hand on the top of the head may also help to relieve CD symptoms. The reason that sensory tricks work for some patients and not others is not fully understood. One possible hypothesis is that the trigeminal nerve not only conveys pain/temperature impulses, but also carries touch and position feedback. As in allodynia, where the pain is due to a stimulus that does not normally produce pain, it may be that the primary sensory receptors for touch/position (Meissner’s corpuscles, Merkel’s receptors, Pacinian corpuscles, Ruffini’s corpuscles, hair receptors, muscle spindle organs, Golgi tendon organs) are structurally different from the pain/temperature receptors such that the information is processed at an unconscious level (mainly by the cerebellum and the vestibular nuclei), therefore becoming an unrecognized factor in sensory tricks that correct the head’s posture.

Materials and Methods

Three individual patients ages 60, 65, and 68 were diagnosed by their neurologists with torticollis: two women with right side rotational torticollis, and one male with right side lateral torticollis. The disorders began after a motor vehicle accident, a tennis court accident, and the third was of congenital origin. The symptoms of neck pain and pressure, headaches, shoulder pains, occipital pain, scoliosis, jaw pain, TMJ pain and dysfunction, back pain, dizziness, fatigue, muscle twitching, and sinus congestion were persistent for 25, 15, and 18 years. Numerous treatments have consisted of multiple oral medications, chiropractic treatment, baclofen injections, botulinum toxin injections, exercise programs, massage, rolfing, acupuncture, and others with varying degrees of success.

Each patient underwent a comprehensive oral and temporomandibular joint (TMJ) examination and evaluation. All three cases showed significant restricted and/or limited mandibular interincisal opening with deviation, evidence of bruxism of and/or missing posterior teeth. All underwent MR imaging of the TMJ and each patient showed a dislocation of the left, right, or both TMJ menisci. Patients were then measured for and had an oral orthotic made of stainless steel and acrylic placed over the mandibular teeth to the position that was determined to relieve all or most of their symptoms. All patients agreed to be videotaped. Within 20 minutes after placing the orthotic, the patients’ head positions began to change to a more consistently normal position. Removal of the oral orthotics resulted in the head position returning to the torticollis position. Patients were instructed to wear orthotics 24/7, including while eating, and follow-up appointments were at 1-week, 1-month, 3-month and 6-month intervals or, at more frequent intervals as a patient expressed a desire to be seen. At each interval, the patient’s head position was improved or remained constant in its normal position.

Discussion

The mean age of symptom onset in patients with cervical dystonia is approximately 41 years. However, onset is variable and may range from childhood to old age. Women are more commonly affected by CD than men, in a ratio of 2:1.

There are several theories that researchers present, such as genetic predisposition, physical trauma, or even psychological trauma. Though not life threatening, the social implications are very profound. One area that has not been totally explored is the aspect of peripheral nerve
The expression of DBP is a common issue in many patients, and the typical clinical symptoms include cough, chest tightness, and dyspnea. The possible mechanisms behind these symptoms are not fully understood, but several hypotheses have been proposed, including increased pulmonary vascular resistance, heightened sympathetic nervous activity, and altered lung mechanics.

A recent study investigated the role of angiotensin-converting enzyme (ACE) inhibitors in the management of DBP. The study found that ACE inhibitors were effective in improving pulmonary function and reducing symptoms in patients with DBP. However, longer-term follow-up studies are needed to determine the long-term efficacy and safety of these medications.

In conclusion, the management of DBP remains a challenge, and further research is needed to better understand the pathophysiology of this condition and develop more effective treatment strategies.
Most treatments are aimed at restoring normal anatomy, encouraging normal range of motion of the joints and muscles, within the neck and decreasing or eliminating all aggravating factors.\textsuperscript{29,30} Surgery is only indicated where there is clear evidence that a disc or vertebrae remains out of place and continues causing pain and dysfunction. More conservative treatments should be attempted initially.

At the present time, the first line of treatment is botulinum toxin injected into various muscles by a neurologist. This blocks the release of acetylcholine from the neuromuscular junction effectively weakening the muscles for a period of 3-4 months. The process must then be reapplied. The disadvantage is that it over time the body can become immune to the toxin and the toxin becomes non-effective. The second is denervation neck surgery which essentially cuts the nerves to the muscle which allows for possible correction of the torticollis. The disadvantage to this procedure is that it is non-reversible and sometimes there is numbness in the back of the head, some remaining movements, difficulty swallowing, and there may be a lack of benefit. The third treatment is deep brain stimulation surgery (DBS) in which two electrodes are placed into the basal ganglia or globus pallidus to control the movement disorder. This procedure is used mainly for general dystonia's but also for those who do not respond to any of the other treatments and it is only 50\% effective. This too is irreversible and requires a second surgery to implant a battery-operated medical device called a neurostimulator. The amount of reduction varies from patient to patient and the patient still has to take medications after the surgery. We propose an alternative treatment with a specifically made oral orthotic that increases the vertical dimension and decrep neuropathy within the TMJ joint, and thus the severity of cervical dystonia may diminish or discontinue.

Research has shown that when the auriculotemporal nerve in the TMJ is stimulated, there is motor activation of the sternocleidomastoid and splenius muscle neck.\textsuperscript{31,32} This stimulus travels via primary affre the auriculotemporal nerve to the brainstem and an area called the reticular formation.\textsuperscript{33,34} Within areas of the reticular formation, particularly the medial pontine reticular formation, are nerves that stimulated cause the head and neck muscles toward the same side as the stimulation.\textsuperscript{35,36} The treatment for spasmotic torticollis may be that these reticular formation nerves are being constantly bombarded by innocuous stimuli originating in over-stimulated nerves of the TMJ. With a constant stimulation of the auriculotemporal nerve, possibly caused by some type of peripheral trauma or injury (i.e., an internal derangement of the temporomandibular joint), the aberrant signal may be in causing the head and neck to turn to the ipsilateral side of the stimulation. When the stimulus is relieved, the stimulus in the reticular formation is relieved, which then relieves the turning of the head.

**Conclusion**

Precision orthotics made by a dentist can relieve the noxious nerve stimulation within the TMJ without drugs and/or surgery. During initial evaluation, patients are usually given a prescription for an MR scan of the TMJ joints to determine if there is any internal dislocation in the joint.
ment of one or both joints. In a majority of the cases that are treated in this manner, it is found that there is compression within the joints causing an inflammation or internal trauma to the tissues due to the internal derangement. This neuroinflammation may be one of the underlying factors of the disorder. When the compression is relieved by the orthotic, there is a gradual discontinuance of the spasmodic torticolli, and the muscles of the head and neck begin to return to normal with a decrease in pain. This has been done in a number of cases, and tremendous relief for patients was accomplished. See Figure 3 for an example of one ST patient's improvement from the use of an orthotic.

Trials are still being done in this field and continued research is needed. It is an alternative treatment for ST, but the success rate is good for those with well-defined TMJ disorders. Significantly, treatment with TMJ orthotics is fully compatible with established treatments, including botulinum toxin injections, muscle relaxants, balscience injections for pain, and various kinds of physical therapy. Patients may find some combination of treatments will provide maximum relief.

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References

Dr. Brendan C. Stack is an orthodontist who has limited his practice to orthodontics, craniofacial pain, and TMJ disorders for the past 42 years. Having graduated from Georgetown University, he is also the Tufts University 2003 recipient of the “Lifetime Achievement Award” for his years of contribution to the field of craniofacial pain. In the United States and Europe, he is frequently an invited lecturer on the topics of TMJ and craniofacial pain. He has published peer-reviewed literature on the long-term results of his treatment procedures. He has contributed chapters to TMJ textbooks and written numerous articles and manuals on the diagnosis and treatment planning of craniofacial pain patients and has also produced videotapes of his treatment technique to teach other doctors. Dr. Stack is a founding member and was the first president of the American Academy of Craniofacial Pain and is a diplomate of the American Board of Craniofacial Pain. He is a member of the International Headache Society, the American Pain Society, and the American Association of Orthodontists.

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