

What Does the Tongue Have to Do with Muscle Tension Dysphonia?

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Session Description:

In this seminar, SLPs who work with voice disordered patients will be introduced to the possibility that muscular and mechanical connections between the tongue and the larynx could be contributing to muscle tension dysphonia (MTD). Previous literature indicates that mandibular and hyoid bone positions are affected by ankyloglossia (tongue-tie), that tension in and around the larynx can affect tongue mobility, and that treating ankyloglossia with orofacial myofunctional therapy and lingual frenectomy can improve self-perceived vocal strain and overall vocal function in professional voice users. Attendees will learn how to screen pediatric and adult patients for basic orofacial myofunctional disorders and anterior and posterior tongue tie so that they can make appropriate referrals for treatment.

Abstract/Summary:

Patients presenting with muscle tension dysphonia (MTD) often have underlying pathologies or conditions that lead them to use excessive perilaryngeal muscle tension as compensatory strategies (secondary MTD). Others appear to have hyperfunctional laryngeal behaviors for no other physiologic or anatomic reason whatsoever (primary MTD). These may or many not eventually lead to vocal fold lesions (Hillman et al., 2020), but they are uncomfortable, fatiguing, and even painful for the vocalists. In this seminar, we will explore the potential for tongue tension and ankyloglossia to be concomitant, or even precipitating, conditions for what appears to be primary MTD.

The anatomical connections between the tongue and the larynx are plentiful and well documented. These will be reviewed from the perspective of standard anatomy, especially focused on the muscular attachments from the tongue and the laryngeal muscles to the hyoid bone, but also noting attachments from the mandible, base of skull, upper torso and shoulders. The anatomy, however, extends even further, through the seemingly continuous connection of all deep fascia in the body from head to toe, illustrated through extensive anatomical dissections (Meyers, 2020). Jahn (2013) discussed the vocal apparatus as starting in the abdomen or perhaps the pelvic floor and continuing through the larynx, pharynx mouth and nasal cavity. He claims that the tongue is one of the most important components because it changes in size, shape and location influencing the pharyngeal air column, resonating chambers intraorally and affecting articulation.

Voice therapists and singing coaches are well aware of the need to include the tongue in stretching and mobilization exercises to warm up the voice and prepare it for performance.

Tongue-root tension is considered to be a contributor to vocal tension and is often a focus in voice therapy. Although online tutorials to this end can be found on popular video posting websites, we know of no peer-reviewed evidence for improving vocal function after conducting tongue stretches or exercises. However, research has demonstrated improved function in the opposite direction. That is, reducing laryngeal tension appears to improve tongue flexibility. Dromey et al. (2008) and Roy et al. (2009) retrospectively evaluated the effects of a single session of manual circumlaryngeal techniques on speech articulation in 111 women with MTD and 20 controls. The slopes of F1 and F2 transitions, timing for speech continuity, vowel space and the vowel articulation index all increased for the diphthongs /aI/ and /eI/ within the context of a reading passage for the MTD group. These measures indicate improved dynamic functioning of the upper airway, presumably due to improved tongue mobility.

In addition to links between laryngeal and tongue muscular tension, ankyloglossia, or 'tongue-tie,' can create a mechanical tension between the structures. Ankyloglossia presents when the lingual frenulum is too short, thick, taut or attached atypically and impacts function by literally restricting the tongue's movement. This can lead to compensatory actions such as posterior mandibular positioning and an elevated larynx. For example, singers with ankyloglossia have informally reported that they elevate the mandible in order to accurately articulate lingual-alveolar consonants while singing and that their voices become fatigued while singing because of the chronically elevated laryngeal position to accommodate the tethered tongue (Radosz & Stewart-Hill, 2021).

This mechanical linkage has been studied and documented in children. Studies have documented a more elevated and posterior hyoid bone position and more posterior mandible in children with ankyloglossia than in children with normal tongue mobility based on lateral x-rays (Arkekani et al, 2016) and clinical assessment (Camargo & Canton, 2019). However, functional effects of ankyloglossia on vocal function in children has not been systematically examined (Baxter et al., 2020) or was not able to be confirmed due to other contributing factors (Camargo & Canton, 2019).

As singers are increasing their awareness of a potential relationship between ankyloglossia and MTD and otolaryngologists are observing signs and symptoms of ankyloglossia in their patients with MTD, professional voice users with MTD are presenting to specialty clinics for ankyloglossia management. Twelve such cases were recently reported from one otolaryngology practice that specializes in the management of ankyloglossia (Summersgill et al., 2023). Their approach includes lingual frenuloplasty (surgical release of the restrictive tissues) combined with orofacial myofunctional therapy before and after the procedure, a protocol named 'functional frenuloplasty.' Eleven of the twelve patients who followed this protocol reported improvements in their self-perceived vocal strain and reported overall improvement in vocal function. This highly encouraging report provides a basis for future studies utilizing experimental controls and improved outcome measures (e.g., control group, randomization, blinded assessment, validated self-report measures, objective measures).

There are a variety of methods available to assess patients for ankyloglossia (Yoon et al., 2017) that are within the scope of practice of speech-language pathologists. For example, a clinically feasible protocol for assessing and classifying anterior and posterior ankyloglossia based on functional tasks was recently published by Zaghi et al. (2021). The presenters will introduce measures and protocols so that attendees can learn how to acquire the resources and training to accurately screen patients for ankyloglossia and make appropriate referrals as indicated. They will also outline and demonstrate basic elements of orofacial myofunctional therapy as provided to patients pre- and post-frenectomy.

Our overall goal with this seminar is to increase the attendees' awareness that there may be a relationship between tongue tension and/or tongue-tie in their voice patients and that SLPs may want to screen patients for these issues. This is especially relevant for patients whose MTD is intractable to other more traditional voice-therapy techniques.

Learner Outcomes:

After completing this activity, participants will be able to:

1. Describe muscular and fascial connections between orofacial and laryngeal structures.
2. Assess patients at risk for ankyloglossia for potential referral.
3. Defend a referral for functional frenuloplasty for selected patients with MTD.

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