The Myofascial System and Muscle Tension Dysphonia: An Overview

BIOMECHANICAL AND MYOFASCIAL CONTRIBUTORS TO DYSFUNCTIONAL MUSCLE USE HABITS OF THE ANTERIOR NECK

ADRIENNE CONNOR, PT

Disclosures

Nothing to disclose.

Muscle Tension Dysphonia

Primary Muscle Tension Dysphonia

- A voice disorder characterized by increased laryngeal musculoskeletal tension and excessive laryngeal and pharyngeal muscle recruitment with disruption of normal vibratory patterns

- Primary MTD – absence of identifiable laryngeal pathology
- Secondary MTD – excessive recruitment patterns in the presence of laryngeal pathology

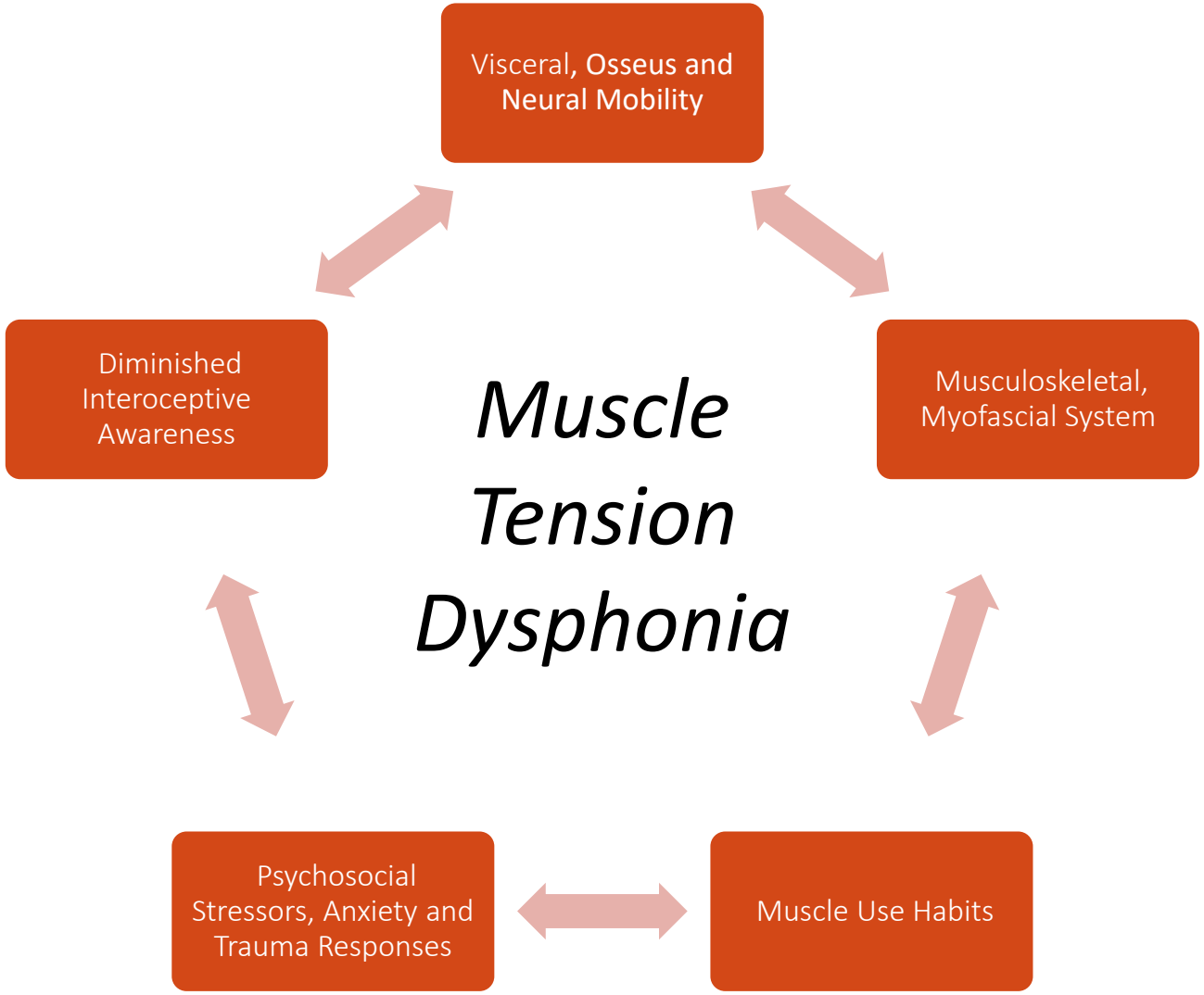
- Symptoms include hoarseness, vocal fatigue, increased vocal effort, pitch changes, reduced vocal range, pain with voice use, and neck muscle pain and tightness

Represents 30-40% of dysphonia cases seen for treatment in voice clinics

Why Physical Therapy?

Tate, Tomlinson and colleagues (2024) found that among patients with MTD and cervicalgia, treated with manual therapy, myofascial release, postural exercise and relaxation exercises (Vanderbilt Manual Intervention protocol), VHI-10 scores improved regardless of whether they had voice therapy.

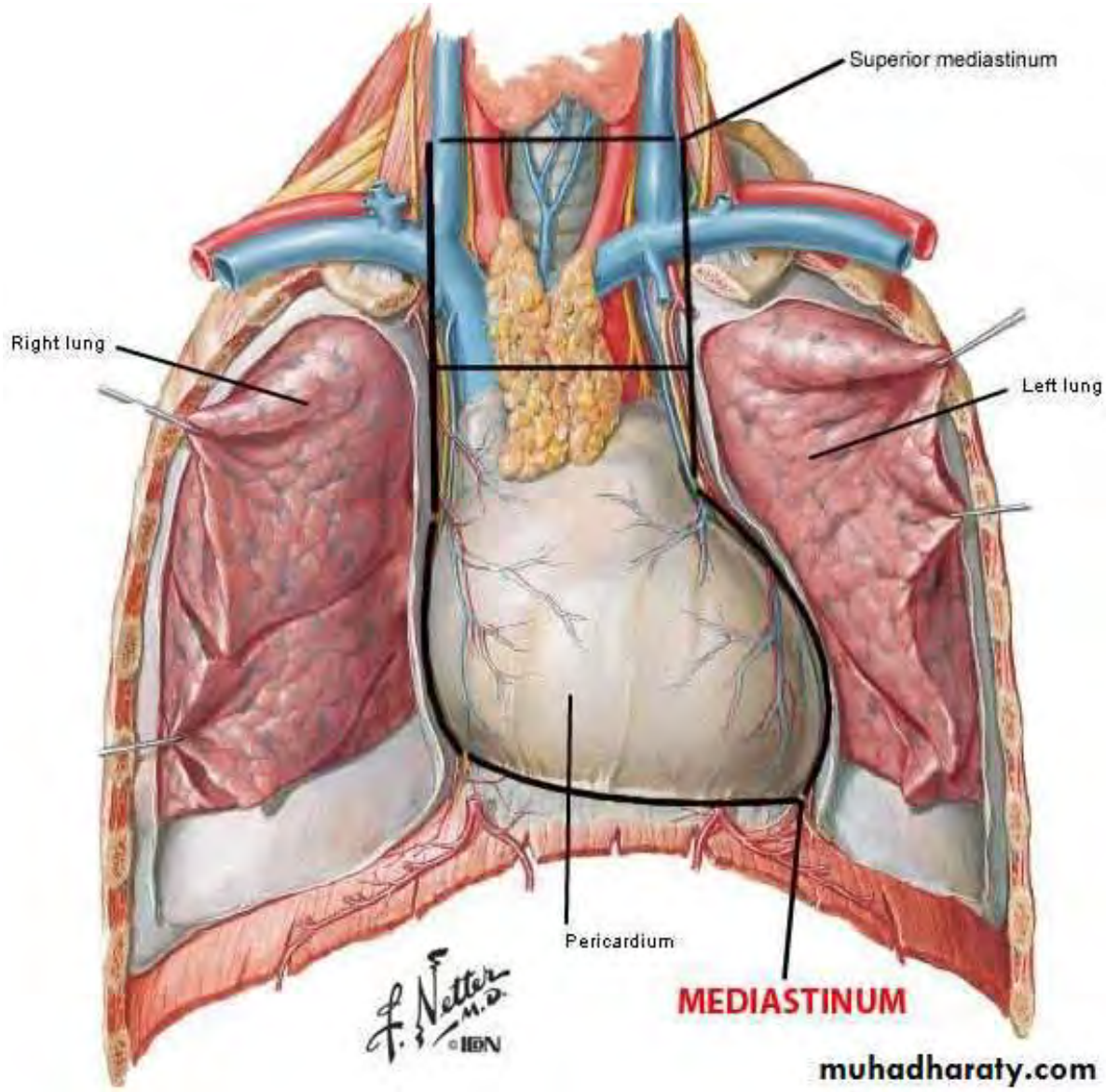
- Researchers concluded that incorporating whole body manual therapy interventions was a valuable adjunct to standard treatment in patients with cervicalgia


Visceral, Osseus and Neural Mobility
Musculoskeletal, Myofascial System
Muscle Use Habits
Psychosocial Stressors, Anxiety and Trauma Responses
Diminished Interoceptive Awareness
Muscle Tension Dysphonia

Visceral, Osseus and Neural Mobility

Visceral mobility affects rib cage and cervical mobility

- Pleura, attaches to cervical spine
- Pericardial ligaments attached to osseus thorax and diaphragm
- Deep cervical fascia connects pericardium and thyroid cartilage/hyoid
- Respiratory diaphragm
- Esophageal fascia
- Abdominal organs with fascial connections to diaphragm (liver, kidneys, stomach)



Neural mobility and cranial osseus mobility

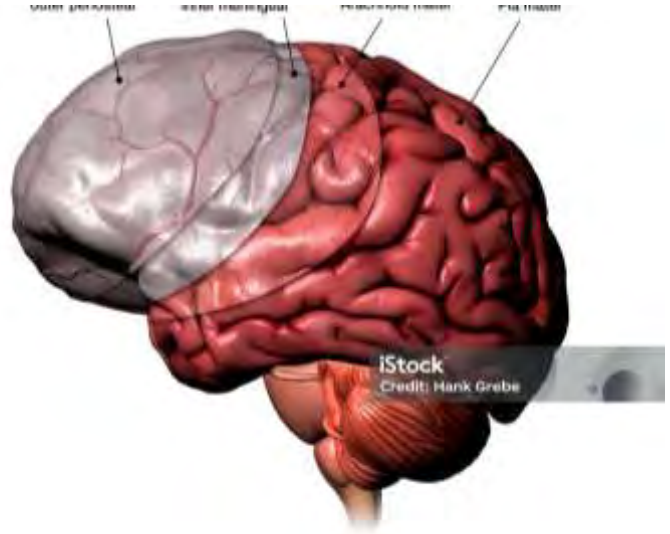
Dural/meningeal mobility relates to cranial osseus mobility

Cranial base mobility relates to cranial nerve mobility

Cranial nerve restrictions affect tone in the muscles they innervate

Peripheral nerve mobility relates to spinal joint mobility

Inferior cranial osseus mobility relates to fascial attachments of the pharynx



Past Medical History Relevant to Visceral, Osseus and Neural Mobility

- History of Inhaled Irritants (smoking/vaping, chemical inhalation)
- Concussion history, TBI, meningitis
- Significant respiratory illnesses (pneumonia, COVID, etc)
- GERD
- Trauma history
  - MVA's
  - Abuse
  - Choking events
  - Anterior throat compression/impact injuries

Common Visceral, Osseus and Neural Restrictions Relevant to MTD

Restricted pleural, mediastinal, and or pericardial mobility

Restriction of renal fascial mobility (relevant to posterior thoracic expansion, lumbar posture)

Liver ligamentous restriction

Restricted pharyngeal and esophageal fascial mobility

Restricted anterior visceral neck mobility

Sternal, rib and thoracic spinal mobility restrictions

Cranial osseus and joint mobility restrictions, including TMJ

Restricted mobility of meninges, brain, spinal cord, cranial and peripheral nerves

Muscle Use Habits

Muscle Use Habits Relevant to MTD

Maladaptive respiratory mechanics

Laryngeal hyperfunction, maladaptive vocal habits

- Excessive musculoskeletal activity of the perilaryngeal muscles during phonation

Craniocervical, cervicothoracic and scapulothoracic dynamic compression syndromes

- (aka holding excess muscular tension in the neck and shoulders)
- Commonly co-exists with postural dysfunction

Optimal Respiratory Mechanics

From a position of normal standing posture:

- Anterior to posterior expansion of the thorax
- Medial to lateral expansion of the lower rib cage
- Minimal to no elevation of shoulders/clavicles during inhalation
- Engagement of postural support muscles of the lumbopelvic region, abdominal wall and trunk to support a mobile thorax
- Intercostal muscles and diaphragm contract to do the muscular work of respiration
- This requires adequate visceral mobility of thoracic and abdominal organs

https://youtu.be/e-Mj7Wyoj4I

Musculoskeletal and Myofascial System

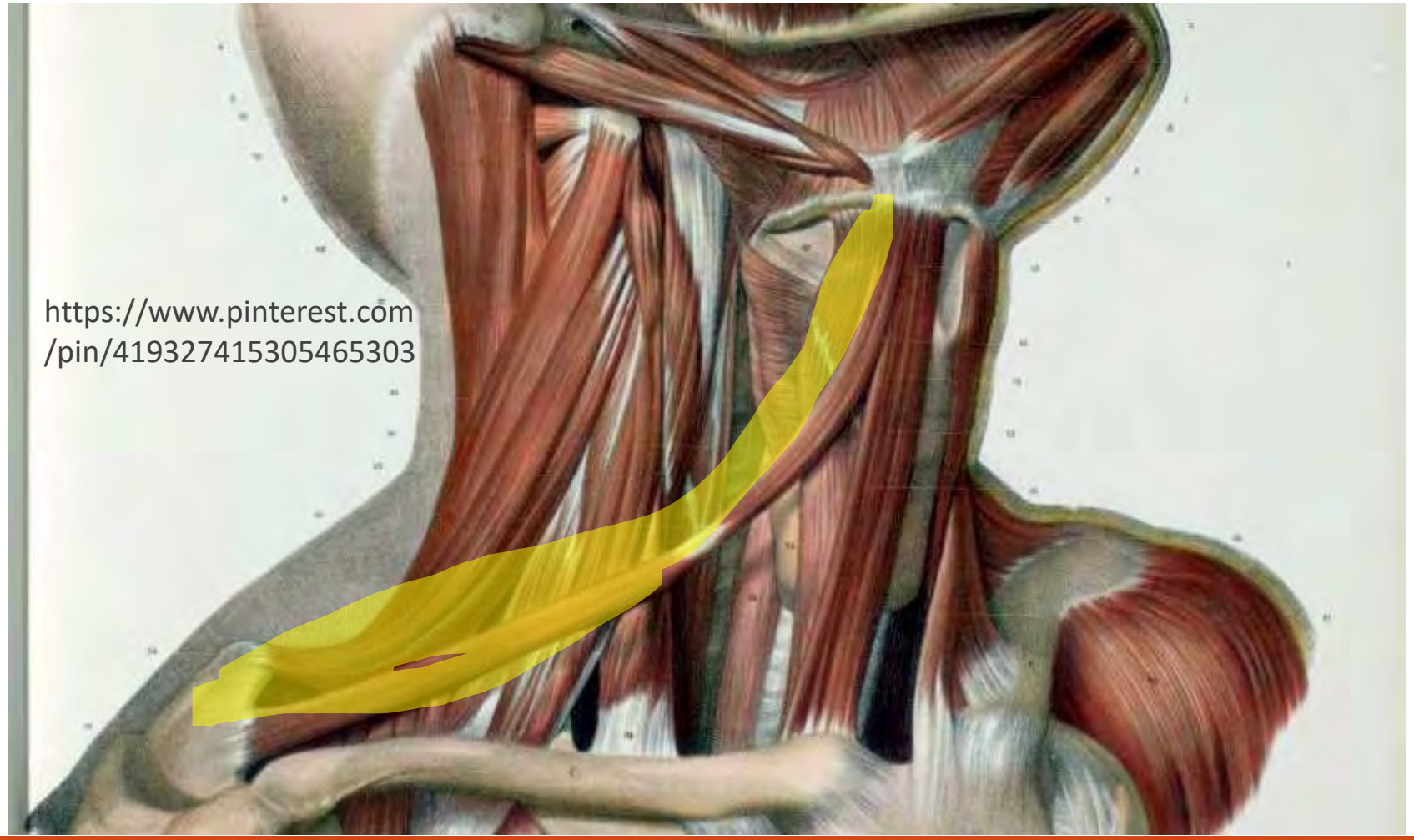
Relevant Musculoskeletal and Myofascial Factors

Muscle imbalances

- Intrinsic and extrinsic laryngeal muscles
- Rhomboids and omohyoids
- Scalenes and respiratory diaphragm
- Transversus abdominus and anterior neck

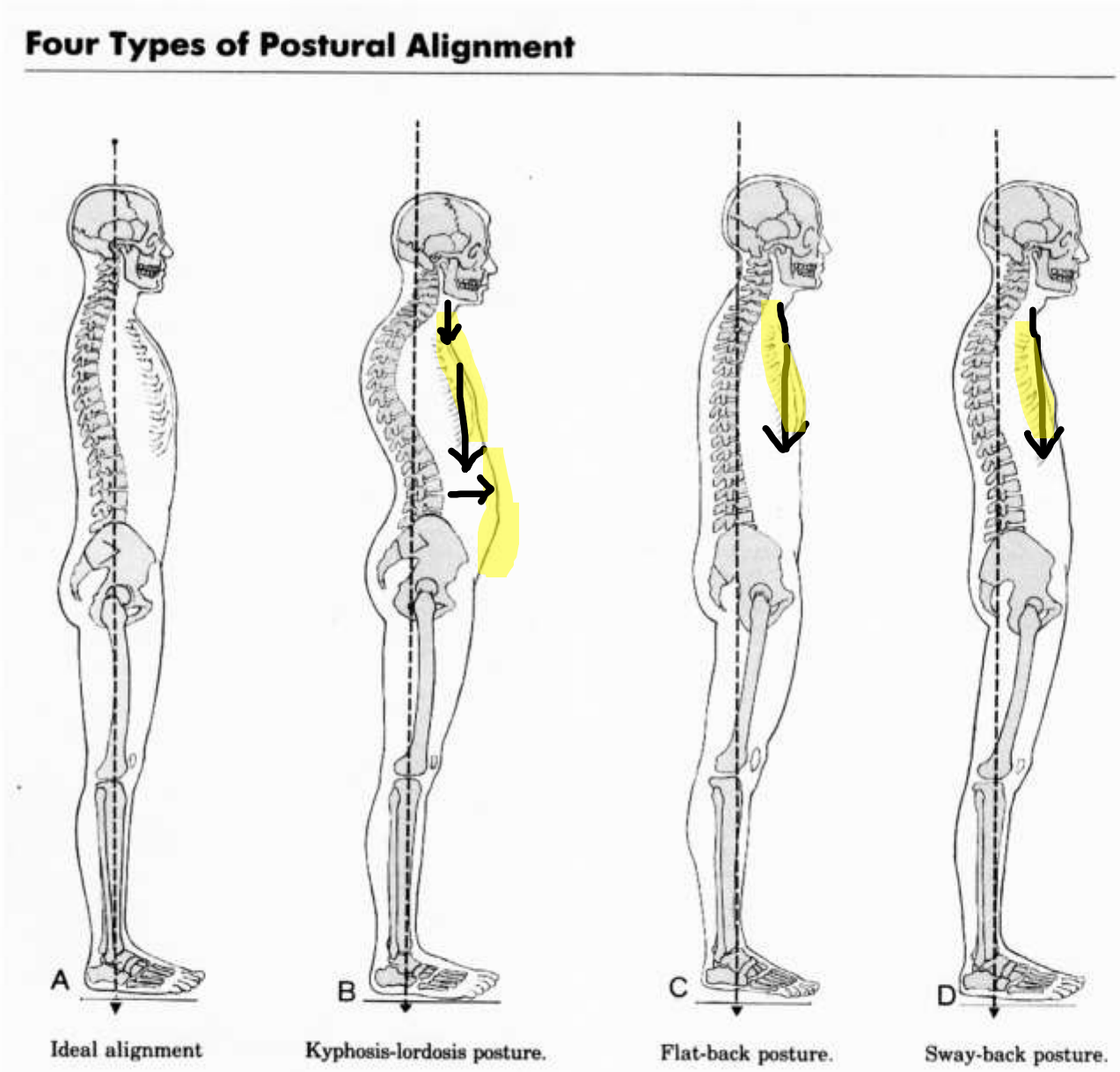
Postural Dysfunction

- Head forward, rounded shoulders, thoracic kyphosis, reduced buccal opening
- Shortened hip flexors, trunk flexion
- Reduced cervical and thoracic mobility



Common Muscle Imbalances

Lumbopelvic Posture and Head Position



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Abdominal (Belly) Breathing and the Anterior Neck

- Contributes to muscle imbalance between transversus abdominus and anterior neck muscles
- Relaxation of the transversus abdominus allows for increased lumbopelvic lordosis, biasing head forward position
- Lose base of abdominal muscle and postural stability for our rib cage and diaphragm to move on
- Downward draw of abdominal and thoracic viscera, combined with loss of postural support, increases compensatory mechanical tensions in the anterior neck
- When we discourage expansion of the rib cage during breathing, we naturally limit normal expansion of the rib cage which is necessary for optimal inflation of the lungs
- *The rib cage and intercostals are anatomically designed for motion... why would we instruct a respiratory pattern that limits use of natural anatomic motion?*

Is It Always the Myofascial System?

A 2023 study by Shembel and colleagues found that during a vocal loading task, compared to typical voice users, a population of patients with pMTD reported significantly higher levels of vocal effort and vocal discomfort, but *there were no differences in levels of extrinsic laryngeal muscle tension* as measured by shear wave elastography (SWE)

- Researchers used SWE to assess intermuscular tension of the anterior digastric, geniohyoid, thyrohyoid, and sternohyoid muscles

In the pMTD, group there was a significant *negative* correlation between supra/infrahyoid muscle tension and vocal effort/discomfort after the vocal load task

- Does pMTD have more to do with the *feel* of voicing than amount of muscle tension?

Patients with pMTD *did* have greater mediolateral supraglottic compression, which researchers theorized may be due to hyper-responsive airway protection mechanisms

Diminished Interoceptive Awareness

Diminished Interoceptive Awareness

Interoception: An individual's awareness of their internal physiologic state, and the associated emotional processes and regulatory responses to this state.

Smeltzer, Choiu, and Shembel (2023) looked at the relevance of interoception in voice disorders

Using the MAIA-2 (Multidimensional Assessment of Interoceptive Awareness), researchers found that patients with MTD scored significantly lower on the Emotional Awareness subscale that typical voice users

Conclusions:

Patients with functional voice disorders with lower ability to attend to body sensations may score higher on voice-related outcome measures like VHI-10 and VFI- Part 1

Patients with primary muscle tension dysphonia may also have lower ability to process their body sensations than typical voice users

Psychosocial Stressors, Anxiety and Trauma

Psychosocial Stressors, Anxiety and Trauma Responses

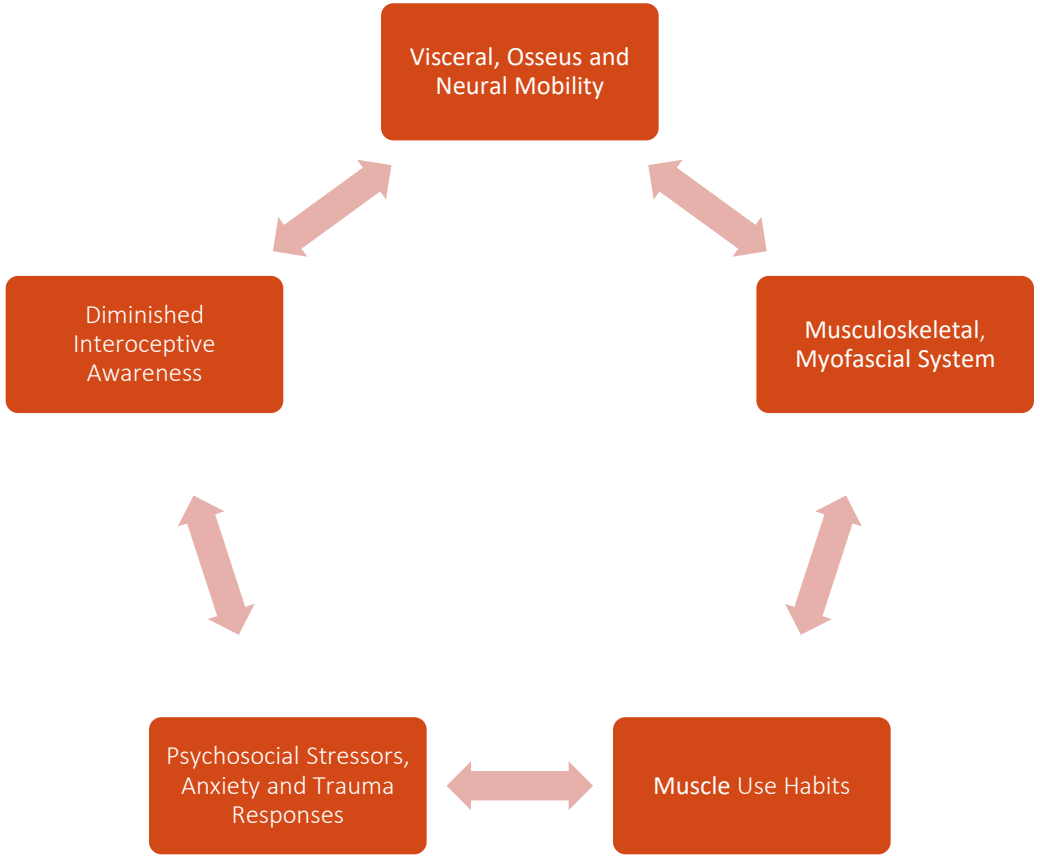
Autonomic upregulation is well known to increase tension in the cervical and intrinsic/extrinsic laryngeal muscles

- Effective treatment programs incorporate varying forms of relaxation and/or meditation practice such as progressive muscle relaxation, mindfulness practices, or breathing exercises for the purpose of relaxation
- Consider referral to a health psychologist or mental health provider specializing in the treatment of anxiety and/or PTSD

Basic Exercise and Manual Therapy Strategies for MTD

- Diaphragmatic breathing
- Cervical and thoracic muscle stretching/strengthening to correct muscle imbalances
- Myofascial release for oral, cervical and thoracic muscles
- Postural exercise
- Yoga
  - Yoga with Adriene (YouTube), Johns Hopkins Somatic Yoga Series (YouTube)
- Alexander technique
- Mindfulness and relaxation exercises
- Postural Restoration strategies (i.e. PRI)

Who's Driving the Bus and Does It Always Matter in the Outcome?....



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