

How PRI treatment can help patients with Vocal Cord Dysfunction

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Vocal Cord Dysfunction is a condition that develops insidiously with no known cause or etiology. Studies have shown a correlation between asthma and vocal cord dysfunction, but patients with vocal cord dysfunction do not respond to treatments for asthma such as corticosteroids and/or inhalers.

The vocal cords are located in the larynx and are responsible for generation of sounds for speech. When we take a breath of air in, or inspiration, the vocal cords should abduct or spread apart. When we speak or sing, the cords oscillate in more of an adducted state. The problem arises when the vocal cords ADDUCT on inspiration. This essentially closes the airway. Patients will often complain of tightness in the neck or throat as the source of airway restriction. Associated symptoms can include stridor, dyspnea, and or GERD.

This pathology has puzzled physicians' and researchers. They have been unable to determine a definitive causative effect and treatment for these patients. It is thought that laryngeal spasm under physical and or emotional stress can be a trigger. This affliction tends to affect more women than men, are driven Type A individuals and often excel in both academia and athletics.

Treatments currently involve a multi-disciplinary approach consisting of referrals to speech pathologist for education in diaphragmatic breathing exercises and in some cases referrals to psychologists for patients with symptoms at rest vs. activity related associated with this condition. Botox injections and anxiolytic therapy in the short term has been shown to be effective in acute cases. Long term therapy has not been shown to be effective. Speech therapy is the current standard of care.

A Postural Restoration therapist may be an appropriate referral for management of these patients in addition to the above practitioners. The foundation of PRI science is the understanding of compensations due to our anatomical asymmetric diaphragm. The right diaphragm is bigger, thicker, has a larger central tendon and a longer crura attachment to the lumbar spine. The liver organ is directly below the right hemi diaphragm allowing for leverage of the muscle on inspiration. The left hemi diaphragm shares a smaller portion of the central tendon, is thinner, flatter and has the pericardium located on the superior surface decreasing its leverage on inspiration. The spleen a much smaller organ is located inferiorly to the left hemi diaphragm. The asymmetrical pull on the lumbar spine during inspiration will cause an orientation of the lumbar spine to the right and compensatory rotation to the left at the T-8 T 9 level. When the spine rotates, so do the ribs.

The right anterior ribs move down into internal rotation and the posterior ribs move up into ER rotation. On the left rib cage, it is just the opposite. The left anterior ribs rotate up and externally and the posterior ribs move down and internally. PRI therapists refer to this change in position as a Right BC or Brachial Chain pattern. When a patient is active,

or stressed, this position may result in over use of the right anterior neck musculature to assist in helping the disadvantaged left hemi-diaphragm in getting air into the right apical chest wall. These muscles include the right scalene, right sterno-cleidomastoid, pectorals and Sibson's Fascia. When a person begins to overuse these muscles as muscles of respiration, ribs one and two will begin to externally rotate and elevate, leaving true ribs 3- 7 in an internally rotated position. Once a patient develops into this pattern or position, PRI refers to this a Superior T4 syndrome. The cervical spine and sternum are excessively oriented to the right and a person will need to rotate to the left and side-bend to the right to keep their head, eyes and neck level with the horizon. Physical evaluation of this pattern will have moderate to severe loss of left cervical rotation and mid cervical spine side bending to the right due to this compensatory position. It is this compensation that may in turn lead to dysynchronous activity of the vocal cords on inspiration. The larynx is located in the anterior neck at the level of C3-C6; this is the location of compensatory rotation and sidebending in a Superior T4 patient.

The intrinsic muscles that control vocal cord adduction include the lateral cricoarytenoid muscle and the transverse arytenoid muscles. The posterior cricoarytenoid muscle is the only muscles responsible for abduction of the vocal cords. If these muscles become weak or out of position due to the Superior T4 syndrome, it can lead to hyper activity of the cricoarytenoid and transverse arytenoid muscles resulting in excessive adduction of the vocal cords on inspiration.

The extrinsic muscles of the larynx include the omohyoid, digastric, stylohyoid, mylohyoid, genio hyoid and hyoglossus. In a Right Superior T4 syndrome, these muscles become overactive on the right or weak on the left. The hyoid bone will elevate and externally rotate to the right. This in turns results in a torsion influence of the transverse arytenoid and lateral cricoarytenoid muscles on the right as well as inhibition of the right posterior cricoarytenoid muscle. This asymmetry is likely to result in dysynchronous respiration and upon high demand or stress result in vocal cord dysfunction.

These patients's objective findings may include the following, loss of bilaterally cervical axial rotation, limited right cervical side-bending, decreased shoulder IR at 90 of abduction, limited left horizontal abduction and apical expansion limitation in the left anterior chest wall.

PRI treatment would begin with manual and non-manual techniques to restore position of the Left hemi diaphragm with retraining of the left IO's and TA's. It is imperative to secure left ZOA to stabilize the spine at T8. Patients will retrain proper scapulo thoracic musculature including the low traps, triceps and serratus anterior muscles initially to improve thorax position and strength to restore neutrality. Neuro-muscular retraining to allow for proper thorax alternating and reciprocal activity during upright activities should also include pelvis and hip stabilization to optimize a person's reciprocal gait to avoid further compensation. Consideration of cranium and bite occlusion issues may also contribute to the dysfunction of the cervical musculature. A referral to a dentist or orthodontist that understands the importance of centric relation may be an appropriate referral for these patients interdisciplinary management.

References:

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