

**Orofacial Myological Disorders (OMD)
Relationship to Postural Asymmetry**



International Association of Orofacial Myology (IAOM) Convention
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Charlotte, NC

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Financial Disclosure:

As founder and executive director, I do have a financial relationship to the Postural Restoration Institute®.



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Orofacial or oral myofunctional disorders incidence and prevalence is not readily found in present literature review.



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Primarily because of the difficulty in placing a number on the incidence of the following:

- abnormal resting posture of orofacial musculature
- atypical chewing
- abnormal swallowing patterns
- dental malocclusions
- blocked nasal airways
- speech problems
- tongue patterns (thrust) associated with forward cranial position (FCP)



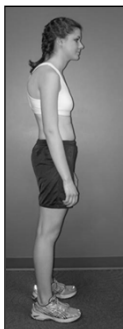
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OMD, in this presentation, will reflect causative associations related to asymmetrical:

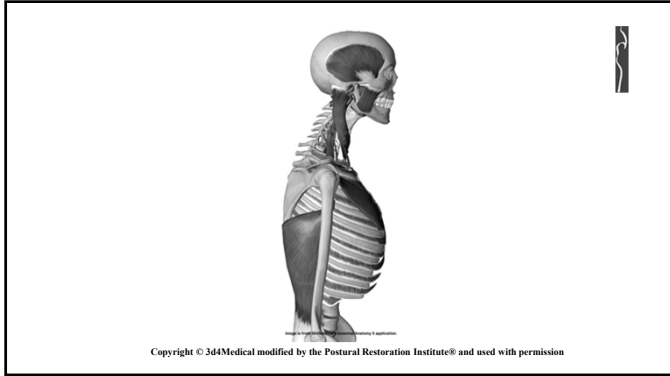
1. elevated anterior upper ribs (asymmetrical hyperinflation)/posterior positional upper mediastinum, and
2. depressed forward cranium (posterior cranial rotation = PCR)



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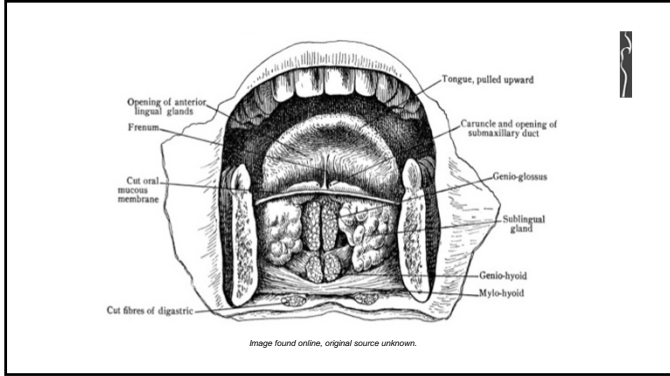
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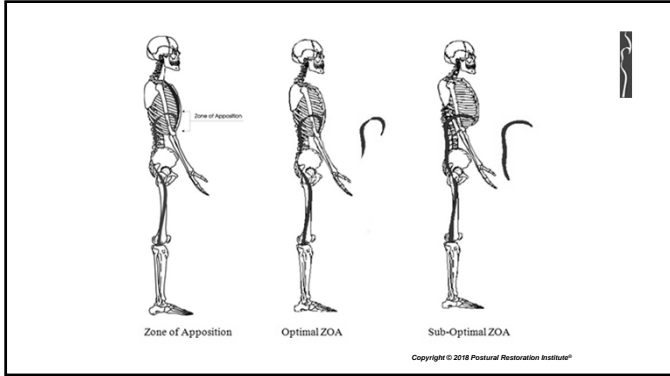


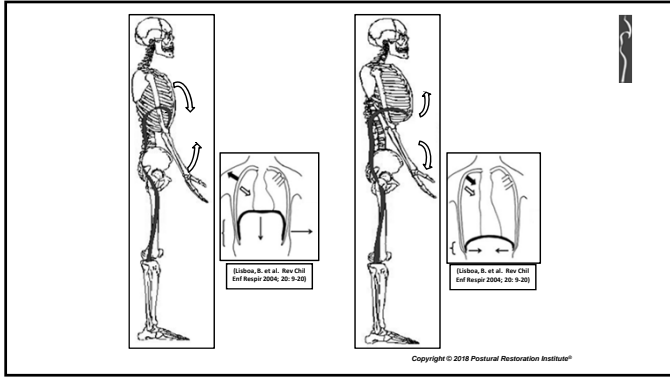
Our altered tongue, hyoid, larynx and vocal cord function can easily be influenced by habitual forward resting of the cranium and upper cervical vertebrae to assist airway management on a respiratory system that depends more on the buccal diaphragm for assisted respiration secondary to the thoracic diaphragm that has lost its zone of apposition (ZOA).

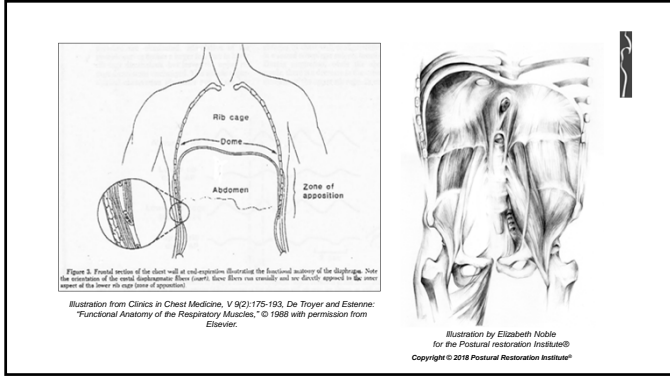
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A loss of zone of apposition or a thorax that is twisted and extended, because of hemidiaphragmatic asymmetrical function, will contribute to a forward cranial position (FCP) and anterior rib elevation (ARE).

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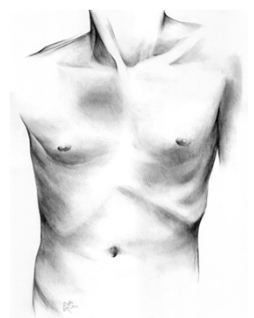
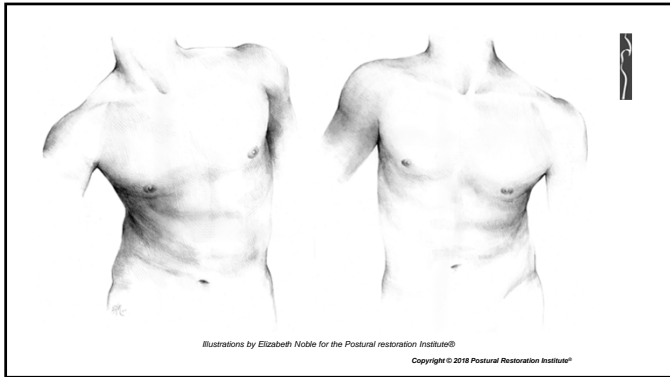


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When demand on accessory cervical muscle increases as a result of FCP, ARE and thoracic rotational torsional asymmetry, our tongues thrust forward and sideways against or between the teeth during swallowing, chewing, inhalation or speaking.

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Regardless of immature or mature oral behavior, this anterior neck and chest wall contribute to:

- 1. narrow dental arches
- 2. prolonged upper respiratory tract infections
- 3. diastemas (spaces between teeth)
- 4. oral tori
- 5. facial asymmetry
- 6. open bites/malocclusions
- 7. abnormal sucking habits
- 8. orofacial dystonia
- 9. pterygoid weakness
- 10. mandibular elevator hypertonicity

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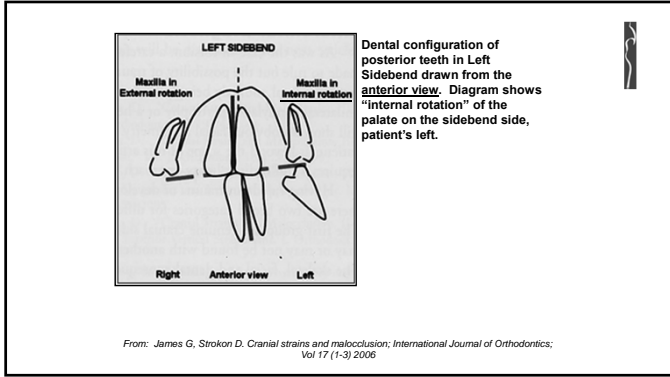


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Tongue protrusion assists with stabilization of the accessory respiratory musculature that is neurologically asymmetrically positioned for compensatory inhalation.



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The tongue may deviate, or push toward the tongue's weak side, usually the left side, because mandibles are more often than not oriented to the left.



This is because of asymmetrical lateral neck and chest strength. Right sternocleidomastoids (SCM's) are usually stronger on the right.


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Non-Compensatory




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The midline deviation of the tongue observed when it is fully protracted could be more related with language lateralization than handedness, changeable to external pressures.
(Han DG, Lee YH 2010)




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OMD Conventional Causative Reasoning	OMD Un-Conventional (PRI) Causative Reasoning
Upper airway constriction <i>(deviated nasal septum, enlarged tonsils, rhinitis)</i>	Lower airway constriction <i>(imbalanced hyoid, depressed larynx, elevated anterior rib cage)</i>



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OMD Conventional Causative Reasoning	OMD Un-Conventional (PRI) Causative Reasoning
General hypotonia	Overactive sympathetic vagal drive, hypervigilance, hyperinflation




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<p>OMD Conventional Causative Reasoning</p>	<p>OMD Un-Conventional (PRI) Causative Reasoning</p>	
<p>Low-lying resting position of the tongue</p>	<p>High-riding active position of the anterior thorax</p>	
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<p>OMD Conventional Causative Reasoning</p>	<p>OMD Un-Conventional (PRI) Causative Reasoning</p>	
<p>Imbalance in dental growth</p>	<p>Imbalance in vertebral column and rib cage growth</p>	
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<p>OMD Conventional Causative Reasoning</p>	<p>OMD Un-Conventional (PRI) Causative Reasoning</p>	
<p>Inadequate development of facial and cranial paired bones</p>	<p>Inadequate development of scapula rest position</p>	
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<p>OMD Conventional Causative Reasoning</p> <p>Inappropriate development of musculature of the head and neck</p>	<p>OMD Un-Conventional (PRI) Causative Reasoning</p> <p>Inappropriate development of musculature of the thoracic rib cage and spine</p>	
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Regardless of the conventional or un-conventional causative thinking, the end result is posture that includes open mouth strategy, where the upper lips are raised (posterior cranial rotation/forward cranial position or PCR/FHP) and the lower jaw is lowered by muscles that elevate the anterior rib cage (anterior rib elevation or ARE).

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In regular respiration, the tongue (genioglossus) and other muscles of the buccal diaphragm (floor of the mouth) such as the hyoglossus, are electrically involved in coordination with the diaphragm, in a period of time that briefly precedes the contraction of the diaphragm itself.
(Borel, et al. 2012 & Wang, et al. 2007)

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During exhalation, the genioglossus moves posteriorly and during inhalation, it moves anteriorly.
(Cheng et al. 2008)




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This careful coordination between signals of the peripheral neurons and the orders from the central nervous system can be interrupted by poor symmetry of the thorax and anterior neck with consequential problems in masticatory, deglutition and airway flow.




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The close relationship between the thoracic diaphragm's postural symmetry and the buccal diaphragm's postural consequences can be understood by looking at the attachment sites of the anterior neck and chest muscle.




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The inter-relationship and intra-relationship between anterior neck and chest muscle is outlined on the next slide:




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Anterior Neck & Chest Muscle	Attachments	
Upper Trapezius	Clavicle	Occiput
Sternocleidomastoid	Clavicle	Sternum Temporal
Sternohyoid	Sternum	Hyoid
Omohyoid	Hyoid	Scapula
Mylohyoid	Hyoid	Mandible
Genioglossus	Mandible	Teeth



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Therefore, an imbalanced, short, or torsionally rotated clavicle on one side, compared to its counterpart, could influence the orientation and position of teeth.



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Keep in mind, the greatest influence on PCR/FCP or anterior lateral tongue thrust, are the unilateral scalenes. They move the top cervical vertebrae forward (FHP) and the top ribs up (ARE), or both; contributing to bruxing and clenching from the temporalis muscle, and mandibular stabilization and lowering from the digastrics and suprahyoid muscle.



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The cranium now moves and rotates through its suture's least pattern of resistance, more than it should because the mandible is over-regulated and stabilized in a bed of tonic asymmetrical positioned muscle limiting occipital atlanto, oral airway, pharyngeal, larynx, and glossus alternating and rhythmic function.



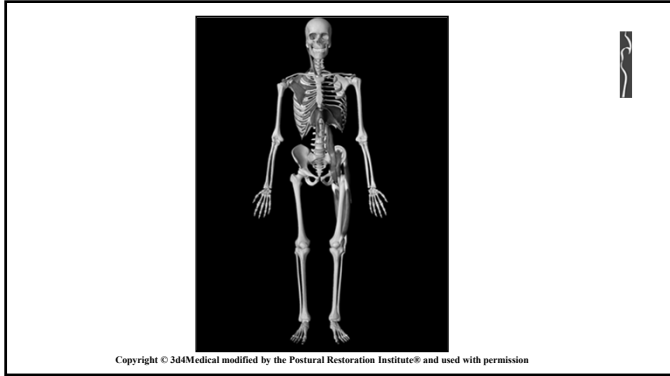
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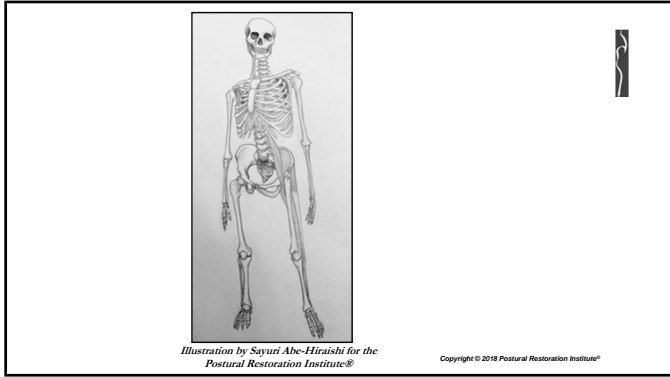
Supportive Research Findings:

Posterior unilateral cross-bite malocclusions, mouth breathing and narrowing of the upper dental arch are most likely to be related to asymmetric orthopedic anomalies; i.e. oblique shoulder, oblique pelvis, functional leg length differences and scoliosis.
(Monika, et al. 2015 & Korbmacher, et al. 2007)

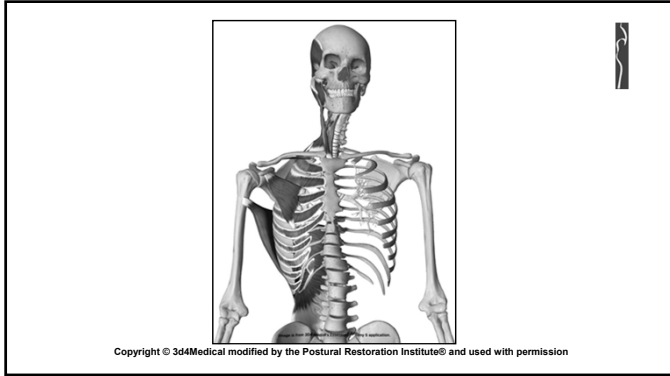


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Supportive Research Findings:

Spinal and thoracic deformities predispose a possible difficult airway intubation. Visualization of the glottis becomes difficult due to deviation of epiglottis and larynx in patients with scoliosis or kyphoscoliosis.
(Saracoglu KT, et al. 2015 & Gvozdenovic A, et al. 2012)

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Supportive Research Findings:

Hyoid depression usually accompanies a FCP secondary to suprahyoid lengthening and infrahyoid excessive muscle tone and airway size, and stability therefore is compromised in the retrolingual and hypopharyngeal airway region. In order for the tongue and airway to become relaxed, the airway needs to come up (with respect to the base of the neck), and forward (with respect to the head that needs to move back).

(Yamazaki Y, et al. 2017)

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Obstructive sleep apnea correction can occur and apnea-hypopnea index can be significantly reduced after hyoid suspension surgery. However, alternating movement of the mandible, with simultaneous contralateral movement of the occiput, and ipsilateral movement of the atlas and neck will balance the tri-planar tension of the hyoid suspensory and inspiratory (omohyoid and sternohyoid) musculature and fascia, and thus contribute to unobstructed swallowing, voice production (vocal cord function), breathing, and normal postural myological function.

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Normal postural myological function depends on cyclical jaw movement in food processing.
(Palmer JB, et al. 1997)

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During chewing (mastication), the tongue pushes laterally and the cheek pushes medially, therefore repositions food on the occlusal surfaces, **AND THE OCCLUSAL SURFACES ON THE FOOD** before each closing stroke of the teeth.
(Mioche L, et al. 2002)




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The tongue moves anteroposteriorly, mediolaterally, and rotates on three axes during chewing. Bilateral chewing is necessary for normal orofacial and postural myology re-patterning and re-positioning.
(Mioche L, et al. 2002)



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**Postural Myological Dysfunction (PMD)
and Hyoid Considerations**

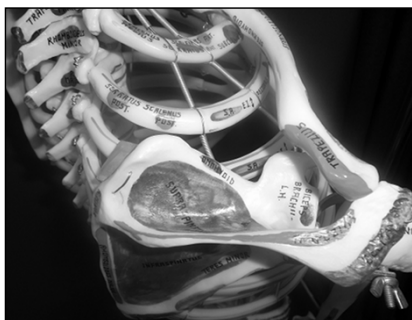


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Our oral-pharyngeal and thoracic inlets and outlets depend on this position and alignment.



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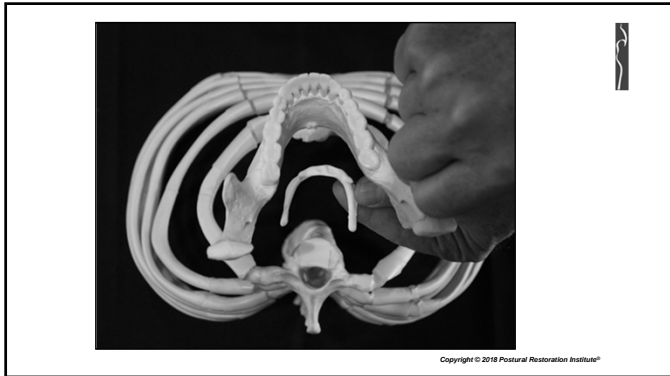


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Our cervical lordosis and cervical retention of appropriate re-tension, suprahyoid and infrahyoid polyarticular chain of muscle, visual focal flexibility, chest wall and lung wall recoil, and mandibular condylar growth, all depend on this inlet and outlet alignment effort and limitation as well as the management of the mandibular, hyoid and clavicle/first rib “slings” of muscle, which are one in the same.

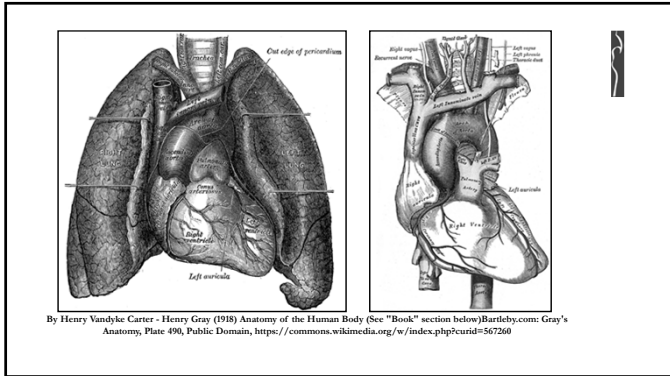


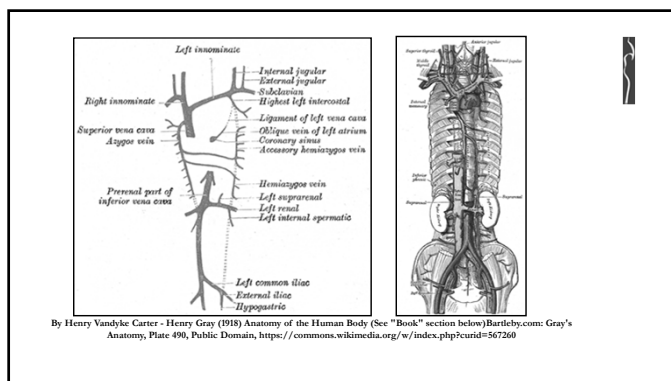
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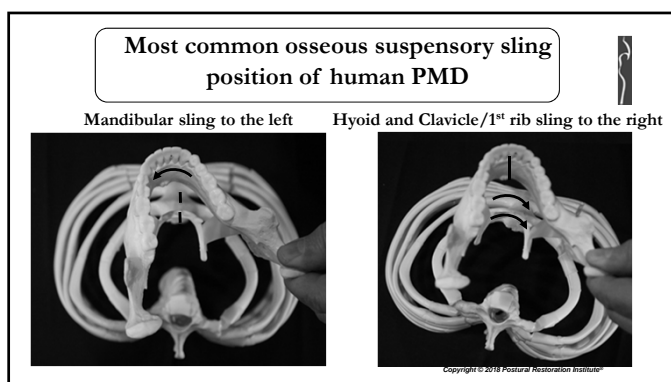


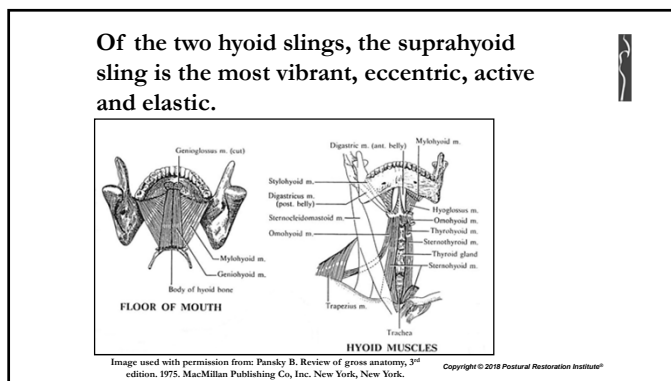
Malalignment management is challenged by normal asymmetrical growth and development, and patterned airflow.

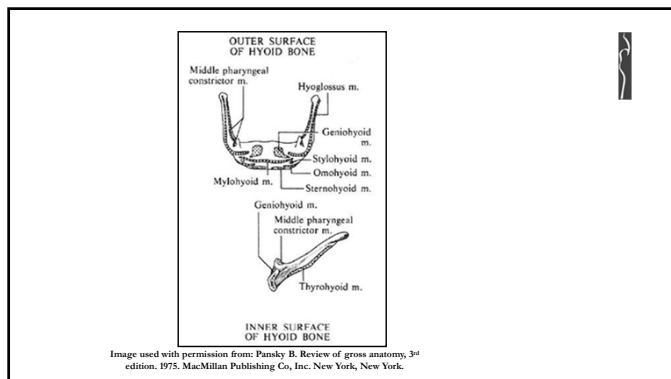
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The four muscles of the suprahyoid sling are the digastric, stylohyoid, geniohyoid, and mylohyoid. They are considered pharyngeal muscles with the exception of the geniohyoid muscle.

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They all:

- > assist in elevating the hyoid
- > widen the esophagus during swallowing

However, for them to effectively work, they require counter or antagonistic balance from the infrahyoid muscle.

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The infrahyoid sling muscle positions the hyoid bone from the thorax. They play an active role in swallowing and larynx movement, as well as with depression of the hyoid.



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Maintaining symmetry of the hyoid and balance of the anterior neck, reduces tension of the suprahyoid muscle and dropping (down and back) of the hyoid. *(Gonzalez HE, Manus A. 1996)*



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An insecure and imbalanced hyoid poorly elevates the larynx during swallowing, and epiglottis and pharynx regulation activity behind it.



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Our hyoid, infrahyoid and suprahyoid position depends on depends on our mandibular and thoracic independent unrestricted movement. Asymmetrical restriction of the mandible or upper chest results in hyoid backward, downward and lateral displacement with respect to the forward depressed head and anterior elevated chest.



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Key Concepts Relating to Infrahyoid and Clavicular Function



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1. We will feel more relaxed, calm and reserved, if we keep the distance between the right posterior manubrium sterni and right anterior superior surface of the scapulae unrestricted and opposed to each other. (PRI Balloon Techniques)



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2. We need to strive to keep our awareness of apical asymmetrical 'balanced' sense of chest expansion, especially on the right side.



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3. Reciprocal clavicular movement (depression/elevation, anterior rotation/posterior rotation, and protraction/retraction) is required for reduced forward head posture, hyoid depression and retraction, and sternocleidomastoid activity. (Alternating/reciprocal arm swing during gait)



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4. We need to keep our clavicles moving forward as our middle chest wall/spine/posterior mediastinum moves back. (Arm reach)



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All Four Squares 10

All Four Belly Lift




1. Position yourself on your hands and knees, and arch your back so that it is rounded.
2. Maximizing a rounded spine, raise knees off the mat or floor as straight. Shift your body weight forward so your nose is over your hands. You should feel your arms fully extended.
3. Shift weight to your left side and raise your right hand slightly off the mat. You should feel your left shoulder well supported. Shift the position when you take a deep breath, so through your nose and not through your mouth.
4. Repeat and repeat 4 more times.

(You could alternate this exercise by shifting your weight to your right side and raise your left hand slightly off the mat and then your right shoulder.)

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All Four Squares 10

All Four Right Arm Reach




1. Place a 2-3 inch folded towel under your left knee.
2. Position yourself on your hands and knees with your back rounded.
3. Bring forward with your right arm and right knee as you inhale to the left. Keep your weight forward and to the left. You may decide to use your left arm again. You should feel your left shoulder.
4. Inhale through your nose and exhale through your mouth as you reach forward and to the left with your right arm. You should feel your left shoulder engage and stretch as you exhale back and over your right.
5. Repeat the 4-8 deep breaths, reaching a little farther on each inhalation.
6. Repeat and repeat 4 more times.

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All Four Squares 10

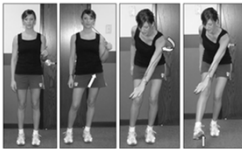
All Four Right AIC Pelvic Floor Respiratory Crawl



1. Position yourself on your hands and knees with your left hand and left knee close to each other and your right hand and right knee away from each other.
2. Breathe in through your nose and exhale through your mouth.
3. As you inhale through your nose, move your left hand forward and your right knee forward as you inhale and raise your body to your left or the counter-clockwise direction.
4. At the end of inhalation, your right hand and right knee should be close to each other as your trunk remains adducted to the left.
5. Begin to exhale through your nose as you move your right hand forward and your left knee forward as you continue to move and raise your body to your left or the counter-clockwise direction.
6. At the end of exhalation, repeat 4 to 7 breaths and repeat sequence 4 more times.

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Standing Revised Trunk Around
with Left AP IR and Right Trunk Rotation



1. Stand with knees on your left hand. Bring arms down the floor.
2. Shift your left hip back, and slightly heel with knee. You should feel your left arm tip slightly up.
3. Rotate your left hip back and weight through your left and feet heel, begin to rotate your trunk to the right to reach across the middle of your body with your left hand. You should feel your left shoulder and weight.
4. Rotate your trunk toward to the right, now your right foot roll off the ground. You should feel the toes on the front of your left foot, left over the (thigh) and left shoulder weight.
5. Balance on the ground while you take 4-5 deep breaths, to through your nose and out through your mouth.
6. Rotate and repeat 4 more times.

Reference Exercise: Left Abdominal, Left foot
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OMD are patterns involving oral or PMD orofacial musculature that first, is influenced by normal human designed postural asymmetry, and second, influences human developmental behavior around this design.

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This behavior may interfere with balanced orofacial function, normal orofacial growth, or normal structural function.

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This is why having a thorough understanding of the asymmetrical patterned relationship between muscles of the mandible, hyoid and sternum is so important in assessing OMD and PMD, and designing an integrative treatment approach.



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Thank You!



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