Cantrell Center
PHYSICAL THERAPY SPORTS MEDICINE
Powerful Rehab, Profound Results

LEVATOR SCAPULA IN THE LEFT AIC, RIGHT BC PATTERNED PATIENT

By: Michael Cantrell, MPT, PRC

The levator scapula muscle is categorized in a group of muscles called the axio-scapular group along with rhomboid major and minor, serratus anterior and trapezius. The attachment sites for levator scapula are the dorsal tubercles of the transverse processes of the first four cervical vertebrae and from there the 4 slips of muscle "twist" upon themselves and run distally to the superior angle and adjacent medial border of the scapula. According to most anatomical texts, the function of levator scapula is to either move the scapula or spine depending on which attachment site is fixed and which is mobile. In the case of a fixed cervical spine the levator scapula elevates the scapula and rotates the inferior angle medially. In the case of a fixed scapula the levator scapula rotates and flexes the cervical spine laterally. Questions arise, however, when contemplating the influence of a dominant Left AIC, Right BC pattern.

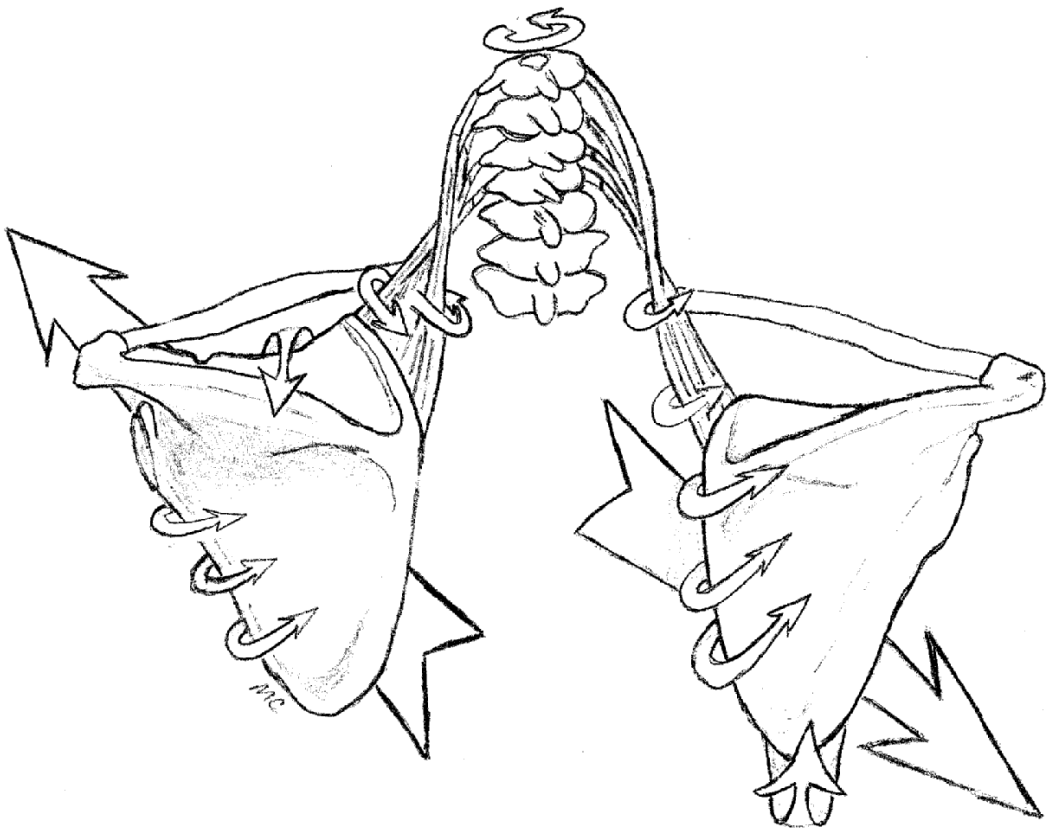
In the Left AIC, Right BC patterned individual, looking down on the transverse plane with the spine posterior to the sternum, the ribcage is in a state of leftward counter-rotation above the diaphragm resulting in internal rotation (exhalation) of the right anterior ribs and formation of the right posterior rib hump. This typical human thoracic position and orientation has been outlined in multiple documents within the Postural Respiration and Myokinematic Restoration course manuals. Rib counter-rotation results in concomitant loss of appropriate contact at rest, between the right scapula and the ribcage. The right scapula is positioned in a state of slight depression and abduction (translatory motion), upward rotation on a sagittal axis with the inferior angle moving posteriorly away from the ribcage. Internal rotation, about a vertical (or transverse axis), also leads to the appearance of a winging medial border of the scapula. Early protraction or translatory motion occurs as a result of posterior rib-hump formation and internal rotation of the anterior ribs.

Left counter-rotation of the thoracic spine accompanies left ribcage counter-rotation. This biomechanical, torsional, compensatory strategy exhibited in the spine is the result of efforts to forward-orient the neck, head and eyes along all three planes. The loss of a Zone of Apposition (ZOA) of the left diaphragm also accompanies this leftward counter-rotation of the torso as the left anterior ribs move into external rotation (inhalation). Left ZOA loss and limited right apical expansion results in compromised respiratory function and consequential loss of normal cervical lordosis, as accessory respiratory muscle hyper-activation and positional discord become the primary pattern of movement. Loss of cervical lordosis and cervical leftward counter-rotation alters the normal length-tension and orientation of the levator scapulae muscles bilaterally.

405 Osigian Boulevard • Warner Robins, GA 31088 • Phone (478) 953-3535 • Fax (478) 953-0353

As the cervical spine rotates left and the right scapula moves into the position described above, the right levator scapula begins to lose its mechanical advantage by losing its normal, twisted state and literally “untwists”.

The twist of levator scapula is central to its ability to maintain control of the scapula, head and neck and is dependent upon neutral or normal rest positioning of the scapula and normal cervical lordosis.



As the right scapula moves as described, the scapular attachment of levator moves proximally toward the cervical spine and thus allows the cervical spine to rotate toward the left via right sternocleidomastoid (SCM) activity; which consequently becomes active as both a cervical spine rotator and an accessory respiratory muscle.

The SCM then exerts excessive sagittal-plane torsional force on the right mastoid process of the temporal bone resulting in temporal bone internal rotation thus altering neutrality within the cranial sphere. The SCM's influence on the mastoid process is outlined in the Cervical-Cranio-Mandibular course manual. The levator scapula muscle, therefore, has a profound influence on SCM activity, as a result of its "untwisting" state or untwisted position.

On the left side an alternate scenario takes place. In the Left AIC, Right BC patterned individual, as leftward counter-rotation of the ribcage is occurring, the left anterior ribcage is moving into a state of external rotation, consistent with inhalation. As outlined in the Postural Respiration manual and in the Impingement and Instability manual, the left scapula abducts or elevates on the thorax (translatory motion) as it downwardly rotates, resulting in overactive and short pectorals (sagittal axis). It also simultaneously externally rotates as the medial border moves toward the ribcage (transverse or vertical axis). The left scapula rests on a more posteriorly positioned ribcage, compared to the right, and therefore appears retracted.

The end-result of this scapula position is a natural, increased, twist of the left levator scapula compared to the right. This twist facilitates left rotation of the cervical spine as the more-powerfully positioned left levator draws the cervical spine into left rotation and sidebending. The levator scapula then becomes a primary limiter of right passive cervical sidebending as well. In this scenario the left SCM becomes more inhibited than the right since the cervical spine is rotating to the left. As a result, the normal force exerted on the proximal attachment site of SCM (the mastoid process) is dampened and the temporal bone externally rotates.

In summary, the levator scapula muscle therefore, like so many other muscles in the Left AIC, Right BC and TMCC pattern, is asymmetrically recruited and inhibited and can perpetuate an obligatory pattern of motion. It can many times be a source of symptoms at best and at worst be a primary limiter of progress in so many treatment plans. The levator scapula should then be carefully considered with regard to its impact on these polyarticular chains and when implementing treatment plans.