Differences Between the Left and Right Abdominal, Lower Trap and Serratus Anterior Function in the Left AIC/Right BC Pattern

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The Postural Restoration Institute™ has described a pattern of normal human asymmetry called the Left Anterior Interior Chain (AIC)/Right Brachial Chain (BC) pattern. In this pattern, pelvic orientation positions the lumbar spine and the diaphragm toward the right while the upper thorax and rib cage above the diaphragm compensate by rotating back to the left. A better positioned right Zone of Apposition (ZOA) supports this right-oriented spine position as the upper trunk counter rotates back to the left.

Efforts to rehabilitate this pattern should include rotating the pelvis, spine and diaphragm back towards the left, establishing left acetabular-femoral (AF)/femoral acetabular internal rotation (FA IR) strength and left ZOA abdominal integration. This left ZOA then serves as support for the lower trunk as the upper trunk counter rotates back towards the right during the restorative right trunk rotation phase of rehab. Understanding the differences in left and right sided muscle function of the abdominal, lower trap and serratus anterior when in this pattern is necessary to properly outline rehab objectives for each side. A successful program should allow alternating reciprocal pelvic and thoracic activity during gait with balanced respiratory activity to minimize the negative influence of this pattern.

Abdominals

This Left AIC/Right BC pattern moves the ribs on the right side into an exhaled state of internal rotation (IR), which creates the typical right posterior thoracic rib hump. The ribs on the left side concurrently move into an inhaled state of external rotation (ER), which creates a left anterior rib flare. The downward position of the right anterior ribs and the exhaled state on the right shorten the right transverse abdominis (TA). The associated left upper trunk rotation shortens the right internal obliques (IO) because the superior attachment of the right IO is moving closer toward the inferior attachment on the right oriented pelvis. Conversely, the upward position of the left anterior ribs and the inhaled state on the left lengthens the left TA. The associated left upper trunk rotation lengthens the left IO because the superior attachment of the left IO is moving further from the inferior attachment on the right oriented pelvis.

Efforts to rehabilitate this pattern should include reversing the airflow and rib position on both sides so the left abdominal wall can integrate with the left ZOA. Exhalation on the left side, as the front of the ribs move down and in, will allow proper activation of the left TA. The associated right upper trunk rotation shortens the left IO because the superior attachment of the left IO is moving closer toward the inferior attachment on the left oriented pelvis. Inhalation on the right side as the front of the ribs move up and out will allow proper inhibition of the right TA. The associated right upper trunk rotation lengthens the right IO because the superior attachment of the right IO is moving further from the inferior attachment on the left oriented pelvis. This will ensure left ZOA abdominal support of left oriented lumbar spine position as the upper trunk counter rotates to the right without compensation by the right IO/TA.

Lower Trap

In the Left AIC pattern, pelvic orientation positions the lumbar spine and the diaphragm toward the right, and even though the upper thorax and rib cage above the diaphragm counter rotates back to the left, the thoracic spine remains oriented to the right of midline in the transverse plane. As the thorax counter rotates to the left, the scapulas commonly rotate about a vertical axis into IR on the right and into ER on the left. This position lengthens the right low trap as the right scapula IRs and moves away from the spine, and shortens the left low trap as the left scapula ERs and moves toward the spine. In this position, the spinal attachment of the shorter left low trap feeds this pattern by maintaining or possibly turning the right-oriented spine further right [thoraco-scapular (TS) activity]. The scapular attachment of the left low trap assists with rotation of the upper thorax back to the left as the left scapula is externally rotated and pulled towards the spine [scapulo-thoracic (ST) activity]. The longer and biomechanically challenged right low trap is unable to help orient the spine back toward the left (TS) or to assist with any right upper trunk rotation (ST).

Efforts to rehabilitate this pattern should include activation of the spinal attachment of the right low trap (TS) to help orient the spine back toward the left. This will complement left AF IR pelvic position and left ZOA abdominal position. The scapular attachment of the right low trap (ST) should then assist with right upper trunk rotation by pulling the right scapula into ER and moving it toward the spine. The lower thoracic spine will then be given concentric stability from the previously longer right low trap and eccentric stability from the previously shorter left low trap to maintain a stable base position during reciprocal trunk rotation during gait.

Serratus Anterior

The dominant pattern of the upper thorax and rib cage above the diaphragm rotating back to the left with the ribs on the right side being rotated into an exhaled state of IR can lead to overactive right scalene activity as the neck musculature attempts to overcome the airflow restrictions on the right side. If the scalenes pull the right upper ribs up into ER, elevation of the right upper ribs will occur and lead to lengthening of the anterior attachments of the upper part of the right serratus anterior. The lower ribs remain in an exhaled state of IR which lengthens the anterior attachments of the lower part of the right serratus anterior fibers. The common scapular adaptation to this deflated and restricted right thorax is the internally rotated scapula, with the medial border of the right scapula moving posteriorly (ST). This lengthens the scapular attachment of the right serratus anterior and the muscle becomes biomechanically challenged at both ends. Because of this positional discord, reaching with the right serratus does not appropriately rotate the ribs (TS) or stabilize the medial border of the right scapula (ST), but instead causes the patients original pattern of left upper trunk rotation to occur.

The left serratus anterior is not biomechanically challenged at the anterior rib attachments or at the posterior scapular attachment like the right side is, but its primary deficiency in this pattern is the ability to hold the left ribs back (TS). Furthermore, the patterned long position of the left IO/TA and the externally rotated left rib position does not hold the left ribs back into a left posterior kyphosis or rib hump position (TS), which restricts left

posterior mediastinal fulfillment. The patterned short position of the right IO/TA and the internally rotated right rib position holds the ribs back into a right posterior kyphosis or rib hump (TS) which can allow more right posterior mediastinal fulfillment than necessary.

After attaining a left ZOA, the left serratus anterior will be needed to pull the ribs back (TS) to provide optimal position for the left abdominals and to allow left posterior mediastinal fulfillment. The left abdominals hold the left ribs down and the properly positioned left low trap stabilizes the left oriented spine position (TS and ST) so the upper thorax can rotate back to the right without functional loss of the left ZOA. If the scalenes have elevated the superior ribs on the right, the right serratus anterior will be needed to pull the anterior upper ribs into IR (TS) and pull the anterior lower ribs into ER (TS). The right serratus anterior also pulls the medial border of the right scapula forward toward the rib cage (ST), positioning the right scapula for optimal right low trap activity (TS and ST). Putting both the anterior and posterior attachments of the right serratus anterior in the correct position will ensure that reaching with the right arm does not result in upper trunk rotation to the left.