Desired PRI Clinical Application for Integrated Gait Progression Activities:

Facilitating Right Brachial Inhale and Left Brachial Exhale During Left Stance.

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A central premise of advancing a PRI program is inhibition of the Left AIC in early left stance and delaying it's activity longer as the stance phase progresses. Overactivity, or limited coordination of the Brachial Chain (BC) can also interrupt progression if not considered.

The Brachial Chain limits upper trunk rotation to the ipsilateral side or the lower trunk rotation to the contralateral side. The right appendage dominant oriented patient who functions in a Right BC pattern during the gait cycle will exhibit a state of rib external rotation in the left chest wall and Rib internal rotation in the right chest wall that limits upper trunk and spinal rotation to the right or lower trunk and pelvic rotation to the left. This is in part due to an inability to inhibit the Left AIC in left stance, preventing the lower trunk (inferior to T8) from properly rotating to the left during the gait cycle. This right pelvic and spinal orientation results in a left rotating thoracic spine with side bending vertebral segments and rib approximation (internal rotation) on the right, and rib divergence on the left (external rotation). A patient who functions in a Left AIC/ RBC pattern spends too much time centered over the right LE with inability to expand the right chest wall (a state of Right Brachial Exhale). When on the left LE, they are unable to compress the left chest wall for exhale (restricted in a state of Left Brachial Inhale).

The primary goal for improving integrated gait performance in the Left AIC / Right BC patterned patient is to ensure they can establish and maintain AFIR and a Zone of Apposition on the Left side. This involves coordinating Right Brachial Inhale state with Left AIC inhibition earlier in the left stance phase (Left early stance Right Brachial Inhale); and promoting Left Brachial Exhale state in late left stance (Left late stance Left Brachial Exhale). Two good activities for beginning this process are described below.

PRI Supine Weighted Right Serratus Punch and Apical Expansion with Resisted Left HGIR is a good example of an early program activity that encompasses both Right Brachial Inhale and Left Brachial Exhale and helps to develop proprioceptive recognition of upper trunk rotation towards the right. Reaching during the exhale phase establishes the left ZOA and lower trunk rotation to the left. Resisted left HGIR on inhale restricts opening in the left apical chest wall (preserving Left Brachial Exhale) permitting the right apical rib cage to expand (Right Brachial Inhale) as the Right UE descends, or is lowered back to the mat under eccentric control of the right pec major, serratus anterior, triceps and lower trap.

Seated Resisted Reciprocal Pull Downs

Another activity that promotes both Right Brachial Inhale with Left Brachial Exhale is Seated Resisted Reciprocal Pull Downs. In phase one of this activity, the patient is asked to reach the left UE forward and pull the Right back, as the trunk rotates to the right, creating a state of Left Brachial Exhale. In phase two of the activity, the patient is asked to maintain the right trunk position while reversing UE positions. If they are able to do this, they are maintaining Left Brachial Exhale and creating Right Brachial Inhale states while their UEs are mimicking a Right stance position and thus reducing need for over integration of the Right Brachial and Left Anterior Interior Chains during right stance.

Neither of these activities are particularly coupled with a phase of gait at this point so the patient has to be progressed to standing activity to coordinate Anterior Interior and Brachial Chain inhibition.

Left Stance in the Left AFIR Position from the Left AIC Pattern

Early mid stance Left AIC inhibition
Left early mid stance Right Brachial Inhale

This activity provides early stance inhibition of the L AIC in a right late stance position via a right reach on exhale. It is also desirable to achieve an improved Right Brachial Inhale state at this time or reduced "collapse" of the right ribcage. Reaching with the right arm during the exhale phase of this activity orients the lower sternum over the pelvis during left rotation of the lumbar and lower thoracic spine, establishing a ZOA (Left Brachial Exhale). The right lower trap's action on the spine assists this by rotating the vertebrae to the left while the right triceps provides the lower trap leverage via it's long head attachment on the scapula. Once this position is established, the right serratus anterior is empowered to assist in brachial expansion during inhale (increasing Right Brachial Inhale) via external rotation of the first 3-5 ribs. As the ribs rotate externally on inhale, the spinal segments rotate towards the right and tilt left, thus reducing overall lower spinal orientation to the right when in left stance.

Left stance in the R AFIR Position from the R AIC pattern

Late mid stance Left AIC delay
Left late mid stance Left Brachial Exhale

This activity provides mid to late stance delay of the L AIC in a right early stance position via a left reach on inhale. To preserve upper rib cage rotation to the right in late left stance, the patient must be able to achieve state of exhalation on the left. Reaching with the left arm during the inhale phase of this activity orients the upper sternum to the right, assisting in internally rotating the left ribs (Left Brachial Exhale). This facilitated collapse of the left apical chest wall in early right stance reduces the rate at which the patient loses the right trunk rotation and overactivity of the Right BC. Again the serratus anterior plays an important role (once it is given the opportunity to work) in brachial chain inhibition by adducting the upper thorax and reducing latissimus influence on weight shift onto the right foot.

Other examples of activities that may help prepare a patient for these dynamic integrated techniques:
Short Seated Left Arm Reach with Balloon (L Brachial Exhale)

90-90 Resisted Right Glute Max with Weighted Right Serrated Anterior (R Brachial Inhale)

Left Sidelying Resisted Right Serratus Punch with Right Trunk Rotation (R Brachial Inhale)

Seated Resisted Single Arm Pull Down with Adduction and Balloon (L Brachial Exhale)

Standing Passive AFIR with Right Reach (R Brachial Inhale)
PRI Wall Supported Squat with Balloon (R Brachial Inhale)

Standing Supported Left Knee Flexion with Right Psoas and Iliacus and Right Trunk Rotation (Both R Brachial Inhale & L Brachial Exhale)

Left Stance in Left AFIR Position from the Left AIC Pattern with Right Upper Extremity Resistance Reach