

PRI Approach to Chiropractic Alignment of the Spine

Patterned Respiratory Positions Influence on Spinal Alignment & Objective Testing

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Individuals experiencing symptoms at the knee, hip, groin, sacral-iliac joint, back, top of shoulder, between the shoulder blades, neck, face, or TMJ, will demonstrate inability to fully adduct, extend or flex their legs, on one or both sides of their body.



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They usually have difficulty in rotating their trunk to one or both directions and are not able to fully expand one or both sides of their apical chest wall upon deep inhalation.



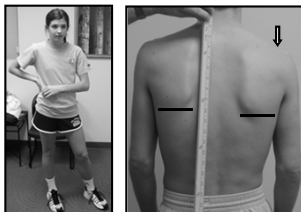
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Cervical rotation, mandibular patterns of movement, shoulder flexion, horizontal abduction and internal rotation limitations, on one or both sides will also compliment the above findings.



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Postural asymmetry will be very noticeable, with one shoulder lower than the other, and continual shift of their body directed to one side through their hips.

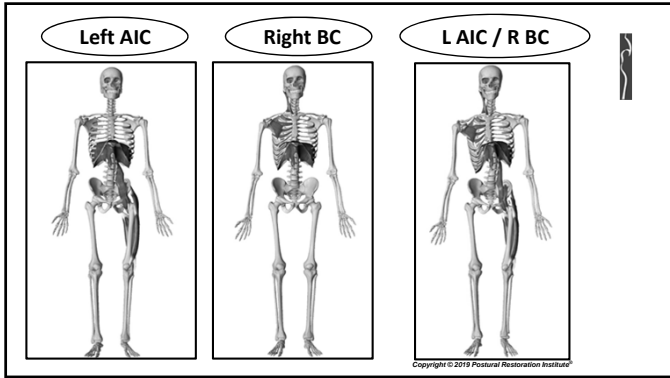


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The pattern that is most often prevalent involves the left anterior interior chain (AIC) and the right brachial chain (BC) of the body.

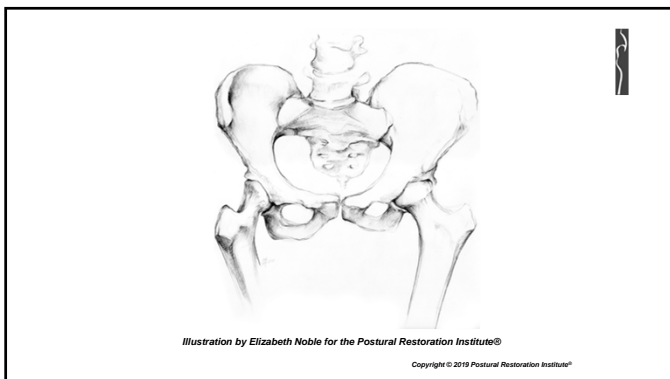


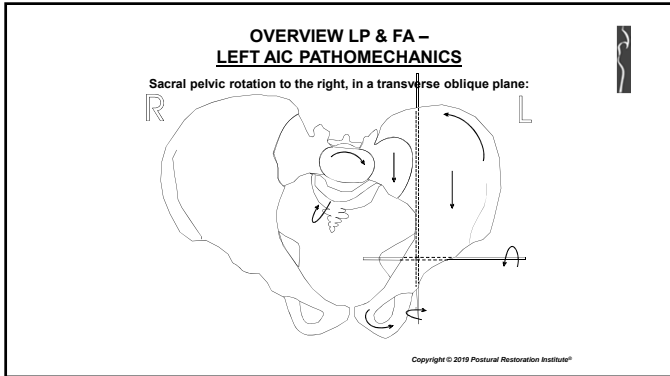
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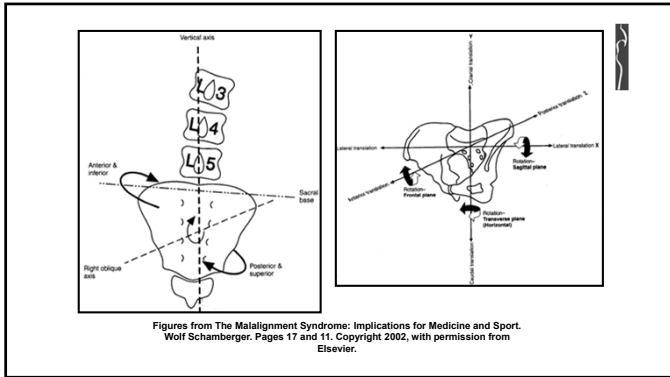


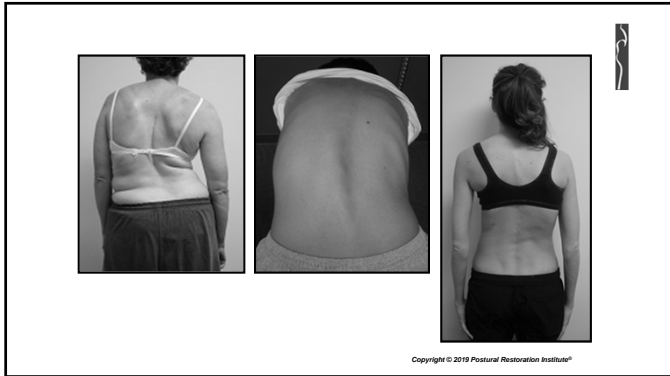
The left pelvis is anteriorly tipped and forwardly rotated. This directional, rotational influence on the low back and spine to the right, mandates compulsive compensatory movement in one or more areas of the trunk, upper extremities and cervical-cranial-mandibular muscle.

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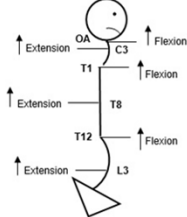


The greatest impact is on rib alignment and position, therefore influencing breathing patterns and ability. It is very possible that respiratory dysfunctions, associated for example with asthma or daily, occupational, repetitive, work positions, can also influence pelvic balance and lead to a compensatory pattern of an anteriorly tipped and forwardly rotated pelvis on the left.

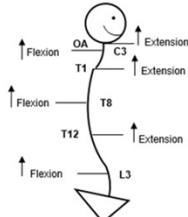


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FLAT BACK POSITION



POSITIONAL GOAL



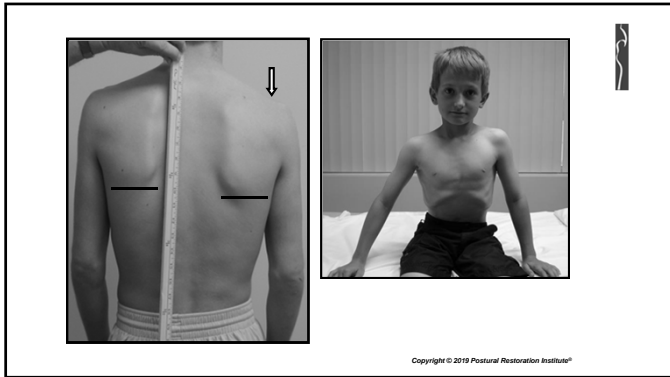
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Other common, objective findings secondary to compensatory physical attempts to remain balanced over this unlevel pelvis include elevated anterior ribs on the left, lowered, depressed shoulder and chest on the right, posterior rib hump on the right, overdeveloped lower right back muscle, curvature of the spine and asymmetry of the head and face.

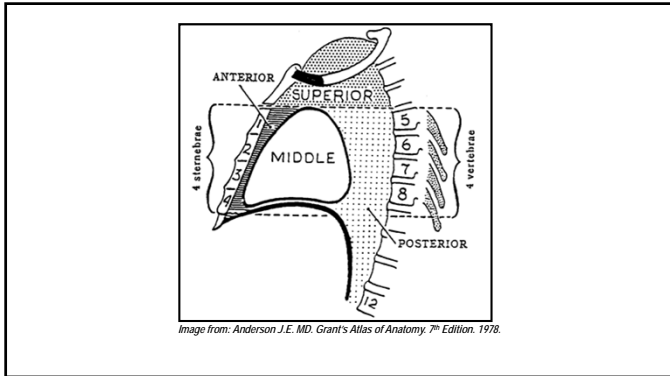


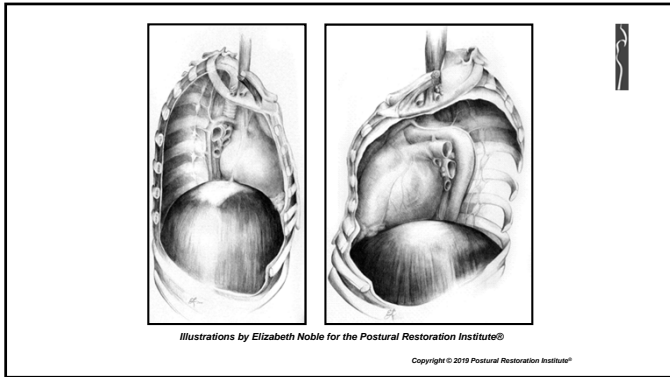
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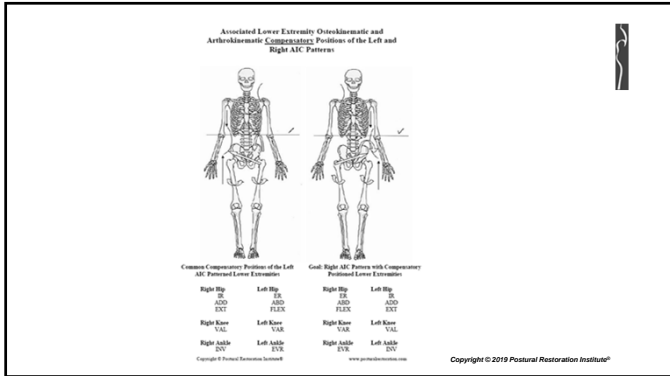












This particular pattern of neuromuscular imbalance is enhanced and generated usually at early ages of development in the pre-adolescent and adolescent years. Since the fibers from our diaphragm that attach to the front of the low spine and our diaphragm in general is stronger on the right, we all have a tendency to shift and rotate our spine to the right sooner and more often than to the left.



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The liver also assists this directional pull on the spine and pelvis because it keeps the right larger diaphragm better positioned for respiratory activity. We do not have a liver on the left side.

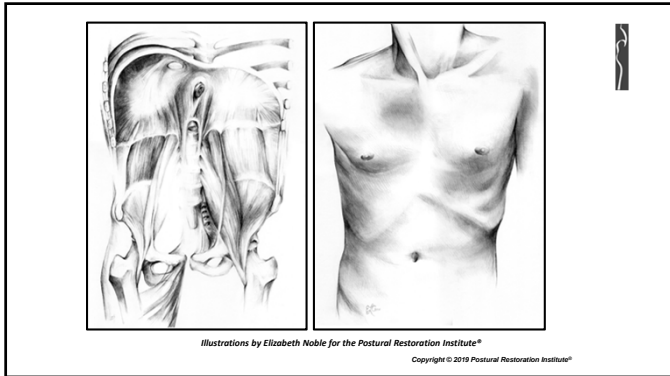


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The left diaphragm leaflet is much smaller and does not have the advantage to pull the ribs up and out upon inhalation, so there is a tendency to relax the left abdominal wall. Consequently, these abdominal muscles on the left become weak.



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This pattern complements our right dominance of extremity use, our daily shifting of weight to the right and overcompensating patterns of activity above and below our pelvic floor.

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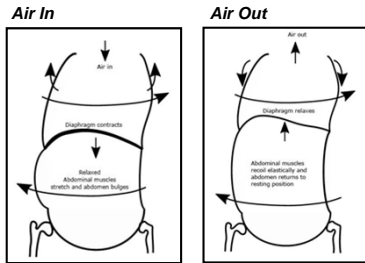


Airflow for example, will generally move more easily into the left chest wall than into the right because of the rotational influence of the ribs, as previously described.

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Hemi-diaphragmatic generated airflow during quiet breathing when in the Left AIC/Right BC pattern:



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Lack of underlying structural support exists on the right that does not exist on the left due to pericardium position. Rotation of the upper trunk to the left will generate less activity on the neck when in this pattern because of this dynamic, respiratory, structural phenomena.



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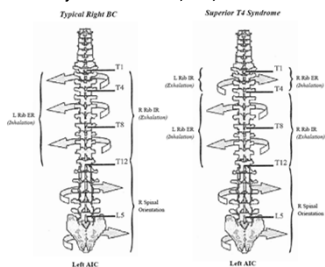
However, rotation of the upper trunk to the right limits air movement into the left chest wall. This created torque on soft tissue, secondary to movement on an imbalanced foundational structure, usually results in chronic muscle overuse, inflammation and pain, such as one would see in someone diagnosed with fibromyalgia or scoliosis.



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The Influence of Thoracic Airflow and Rib Rotation on Transverse Spine Position

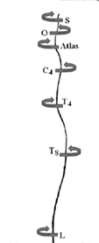
By: James Anderson, MPT, PRC



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Posterior View of the Spine/Cranium in a L AIC/R BC/R TMCC/L SB Position

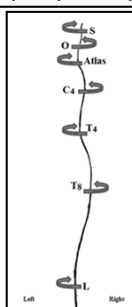
- General indicators:**
- Greater wing of sphenoid on left to low
 - High mandible on the left
 - "Shoulder rounded to the left"
 - Prominent right SCM
 - Cranial clockwise axial rotation
 - Prominent left ear flare
 - Limited passive lateral flexion of O on A to left (on right OA lateral flexion)
 - Limited passive lateral flexion above C4 to the right
 - Limited cervical axial rotation to the left secondary to sphenoid orientation to right



*Shoulder is oriented to the left as a coronal flexion as each head is oriented to the right in the transverse plane and laterally flexed to the left in the frontal plane. In the Left Sidebending position, the upper neck is oriented to the left in the transverse plane.

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Posterior View of the Spine/Cranium in a L AIC/R BC/R TMCC/L SB Position



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Potential Tendencies:

- ✓ Greater wing of sphenoid on left is low
- ✓ High maxilla on the left
- ✓ *Mandible oriented to the left
- ✓ Prominent right SCM
- ✓ Counter-clockwise facial rotation
- ✓ Prominent left ear flare
- ✓ Limited passive lateral flexion of O on A to left (in right OA lateral flexion)
- ✓ Limited passive lateral flexion above C4, to the right
- ✓ Limited cervical axial rotation to the left secondary to atlas orientation to right

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✓ *Mandible oriented to the left

**Mandible is oriented to the left on a cranium that is on a neck that is oriented to the right in the transverse plane and laterally flexed to the left in the frontal plane. In the Left Sidebending position, the upper neck is rotated to the left in the transverse plane.*

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'NEUTRAL'

If you are a PRI clinician, neutral means the human body posture is in a position in which a set of muscles are disengaging so that a new strategic process of using these same polyarticular muscles can be established.

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Those set of muscles are outlined in the summary section of the composite of PRI courses as related to the Left AIC, Right BC and Right TMCC patterns.

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TEMPOROMANDIBULAR CERVICAL CHAIN (TMCC)

BRACHIAL CHAIN (BC)

There are two brachial polyarticular muscular chains lying over the anterior glenoid and cervical area. These chains influence cervical rotation, shoulder dynamics and spinal impingement/extension. They are composed of muscle that attach to the costal cartilages and base of ribs 4 through 7 and apical to the posterior, anterior occipital base, anterior inferior mandible and coronoid process of scapula. These two tracts of muscles, one on the left side of the sternum and one on the right, are anterior to the medial and upper mediastinum and upper thoracic cavity and are composed of the trapezius minor, sternocleidomastoid, scalene, pectoralis minor, sternocleid and muscles of the pharynx and anterior trunk. They provide the support and anchor for cervical-rotational extension and rotation and rib position. The right brachial chain muscle is opposed by the right posterior back muscles (PBC), lower trap, serratus anterior, and external rib rotator, in addition to the left internal abdominal oblique. The brachial chain muscle on the left is opposed by the left posterior back muscles (PBC), lower trap, serratus anterior, external rib rotator, and right internal abdominal oblique.

ANTERIOR/POSTERIOR CHAIN (AC)

There are two anterior/posterior polyarticular muscular chains in the body that have a significant influence on respiration, rotation of the trunk, ribcage, spine and lower extremities. They are composed of muscles that attach to the costal cartilage and base of ribs 7 through twelve to the lateral psoas, head of the fibula and lateral condyle of the tibia. These two tracts of muscles, one on the left side of the anterior thoracic-abdominal pelvic cavity and one on the right, are composed of the diaphragm and the psoas muscle. With the diaphragm, serratus anterior, lower trap, levator scapulae and vastus lateralis muscles this chain provides the support and anchor for the abdominal cavity force, trunk rotation and flexion movement.

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Once these muscles and corresponding predictable faulty movement patterns are placed in a neutral or disengaged state, resumption of activity can take place from a different start point or position.

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It is from this point reeducation of the neuromuscular system, to build more efficient strategies and patterns of movement, can take place.



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PRI Assessment for Neutrality



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ADDUCTION DROP TEST



Positive Test




Negative Test

- Reflective of an osseous restriction from the acetabular labral rim
- Usually seen on the left in a Left AIC oriented patient



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APICAL EXPANSION



- A positive test is indicated when the patient is unable to draw air into the right thoracic chest wall as easily as the left, through patient report or tester observation.

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HUMERAL GLENOID INTERNAL ROTATION

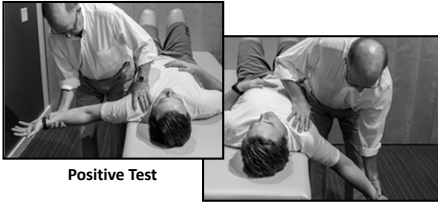


Positive test (limited) *Negative test (not limited)*

- A positive test is indicated by limited humeral glenoid internal rotation on one or both sides. Less than 80-90° is considered limited.

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SHOULDER HORIZONTAL ABDUCTION


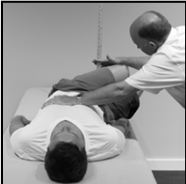


Positive Test *Negative Test*

- A positive test is indicated by limited shoulder horizontal abduction on one or both sides. Less than 45° is considered limited.

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TRUNK ROTATION

Right Trunk Rotation (limited) **Left Trunk Rotation**

- A positive test is indicated when the legs do not rotate in one direction as compared to the other.

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PRI Techniques Preceding Spinal Adjustment

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For every subluxation, whether primary or secondary, there is compensation. (Gonstead System)


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For every asymmetrical pattern of synergetic postural strategy (AIC, BC, PEC, TMCC), there is a compensatory pattern.




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Assess → Reposition → Repattern through Respiratory Retraining Integration



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Pre-Adjustment Recommendations



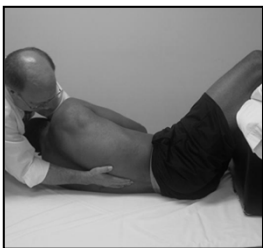
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PRI Manual Techniques

- Left AIC
- Right Superior T4
- Right Subclavius
- Infraclavicular (IC) Pump
- Right Intercostal
- Left Pectoralis

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Left AIC



Goal: To increase chest excursion on anterior right and posterior left

Position: Patient positioned supine with knees supported in a 90-90 position. Operator at the head of patient. Operator's left hand on patient's left body of sternum. Tip of operator's left third finger should be slightly below and around ziphoid process. Operator's right hand is underneath the patient's central right back with the most lordotic apaxed vertebrae between third and fourth fingers.

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Left AIC



Inhalation: Upon "air in" pull, guide and rotate more with your right hand (back hand) and forearm. "Push", guide, rotate and hold the upper left chest with your left hand as you slightly pull the entire chest with your right hand.

Exhalation: Upon "air out" guide left ribs down, pull right thoracic up and hold at "pause" phase of diaphragmatic breathing.

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Right Superior T4

Superior T4 Manual Technique is designed to:

1. Isolate the triangular sterni (left) upon exhalation
2. Inhibit the triangular sterni (right) upon inhalation
3. Inhibit the neck as an accessory means of respiration (scalenes, SCM, subclavius)
4. Integrate the diaphragm and abdominals (Left IO/TA) at the end stage of exhalation
5. Confirm if you have a patient with Superior T4 Syndrome

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Right Superior T4



Position: Patient positioned supine with knees supported in a 90-90 position. Operator at the head of patient. Left hand on left upper chest with the little finger to the left side of sternum. Right hand on right upper chest with the thumb parallel to the clavicle. Move right palm over or closer to axilla (shoulder) if needed.

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Right Superior T4



Inhalation: Upon "air in" operator guides or pulls right chest up and back with right hand and secure left chest with left hand.

Exhalation: Upon "air out" guide or push left chest down with left hand as you secure right chest with right hand.

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Right Subclavius

Position: Patient positioned supine with knees supported in a 90-90 position. Operator at the right side of patient. Operator takes the patient's right arm and positions and secures it between operator's right lateral trunk and right forearm and arm while securing the patient's right proximal arm with operator's right hand. Operator places their left hand on the patients right second, third, and fourth ribs, with operator's left ulnar border and pisiform directly under patient's right clavicle and directly ahead of, but not on, the patient's right shoulder.



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Right Subclavius



Inhalation: Upon "air in" move the patient's right arm up toward the ceiling using your right upper extremity and trunk, as the soft tissue will allow and to patient's tolerance.

Exhalation: Upon "air out" depress right ribs downward and into internal rotation (i.e. the right zone of apposition.)



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Infraclavicular (IC) Pump

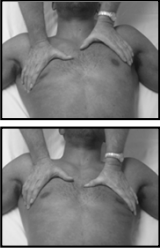


Position: Patient positioned supine with knees supported in a 90-90 position. Operator at the head of patient. Operator's left hand on patient's left upper chest with ulnar border of hand below clavicle. Operator's right hand on patient's right upper chest with ulnar border of hand below the clavicle.



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Infraclavicular (IC) Pump




Inhalation: Upon "air in" assist expansion into the upper lobes. Patient needs to maintain a posterior pelvic tilt on "air in".

Exhalation: Upon "air out" pump out the "dead" air by compressing down and through the palms and fingers, addressing the side that is most restricted upon exhalation. For the Right BC patient, start by moving air out of right chest wall on the right with your right hand, then air out of the left with your left hand and then with the right again. After this third "pump" ask the patient to breathe in and fill the left chest wall. Then go left, right, left, air into the right and finally right, left, right, air into the left.

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Right Intercostal



Position: Patient positioned supine with knees supported in a 90-90 position. Patient's right arm and forearm is in a flexed, abducted rest state. Operator at the right side of patient. Operator's left hand and forearm on patient's right shoulder and arm. Operator's right hand on patient's right lateral mid chest with right fingers in intercostal spaces.

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Right Intercostal




Inhalation: Upon "air in" pull and draw upper quarter and fascia with left forearm and hand. Secure mid lateral ribs with right hand.

Exhalation: Upon "air out" guide and push lower rib cage down towards right hip with right hand while the left hand secures right upper quarter and fascia.

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Left Pectoralis



Position: Patient positioned in supine hooklying. Patient's left arm and forearm in flexed abducted rest state. Operator at the left side of patient. Operator's left hand on patient's left anterior lower chest with left fingers on intercostals. Operator's right hand and forearm on patient's anterior left shoulder and arm.

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Left Pectoralis




Inhalation: Upon "air in" lift and pull upper quarter and fascia with right forearm and hand. Patient needs to maintain a pelvic tilt even through trunk rotation. Secure lower ribs with left hand.

Exhalation: Upon "air out" guide and push rib cage down and to the right with the left hand as the patient slowly rotates their knees to the right through the lower trunk. The right hand secures left upper quadrant.


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PRI Non-Manual Techniques


90-90 Hip Lift with Balloon



Supine Pectoralis Stretch with Left Trunk Rotation





Left Sidelying Left Flexed FA Adduction with Right Glute Max and Right Trunk Rotation



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PRI Non-Manual Techniques


Supine Active Sacro-Spheno Flexion 

Standing Cervical-Cranial Repositioning 

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Thank You!

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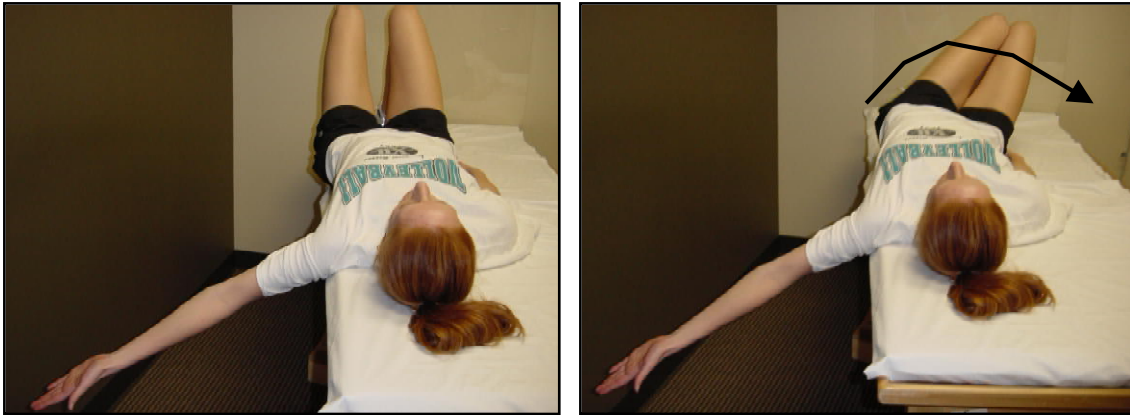
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90-90 Hip Lift with Balloon



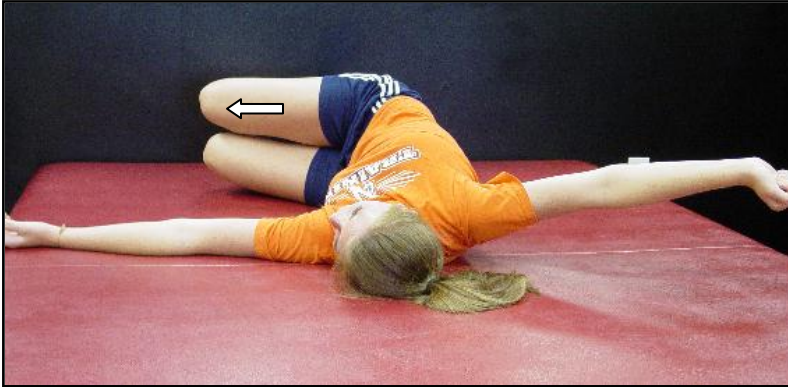
1. Lie on your back with your feet flat on a wall and your knees and hips bent at a 90-degree angle.
2. Place a 4-6 inch ball between your knees.
3. Place your right arm above your head and a balloon in your left hand.
4. Inhale through your nose and exhale through your mouth, performing a pelvic tilt so that your tailbone is raised slightly off the mat. Keep your back flat on the mat. Do not press your feet flat into the wall instead dig down with your heels. You should feel the muscles on the back of your thighs engage.
5. Inhale through your nose and slowly blow out into the balloon.
6. Pause three seconds with your tongue on the roof of your mouth to prevent airflow out of the balloon.
7. Without pinching the neck of the balloon and keeping your tongue on the roof of your mouth, take another breath in through your nose.
8. Slowly blow out again as you stabilize the balloon with your hand.
9. Do not strain your neck or cheeks as you blow.
10. After the fourth breath in, pinch the balloon neck and remove it from your mouth. Let the air out of the balloon.
11. Relax and repeat the sequence 4 more times.

Supine Pectoralis Stretch with Left Trunk Rotation



1. Lie on an elevated surface with the left side of your body close to the edge and your knees bent.
2. Slowly lower your arm over the edge at shoulder level.
3. Keeping your elbow straight, rotate your thumb towards your head.
4. Maintaining the above position, inhale through your nose.
5. Exhale through your mouth and rotate your knees to the right.
6. Inhale again, exhale and let your knees rock further to the right. You should feel a stretch across the front of your left chest.
7. Continue this breathing sequence for a total of 4-5 breaths, in through your nose and out through your mouth. On each exhale, rock your knees further to the right.
8. Bring your knees back to center and your arm back to your chest.
9. Relax and repeat 4 more times.

Left Sidelying Left Flexed FA Adduction with Right Glute Max and Right Trunk Rotation

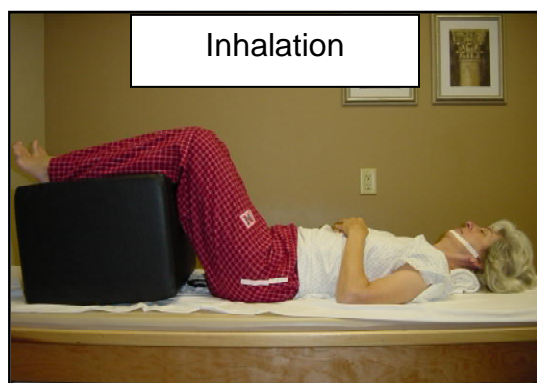


1. Lie on your left side with your feet on the wall, and your hips and knees at a 90-degree angle. If needed place a pillow under your head and keep your back and neck relaxed.
2. Rotate your left shoulder forward and right shoulder backward so that your trunk is rotated to the right.
3. Push your left hip down into the table, so that your right hip moves toward the wall. You should feel your left abdominals engage as you lift up away from the table.
4. Push your left foot into the wall and shift your right knee forward so that it is ahead of your left knee.
5. Keeping your right knee shifted forward, turn your right knee up or out. You should feel your right outer hip (buttock) engage.
6. Then lift up your left knee toward your right. You should feel the muscles in your left inner thigh engage.
7. Extend your right arm behind you toward the 10 o'clock position. You should feel a stretch in your mid-back.
8. Maintaining the above position, inhale through your nose while keeping the left abdominal wall engaged, and then exhale through your mouth. Pause for 3 seconds before inhaling again. When you inhale, do your best to direct air into the right chest wall (look for the right ribcage to expand).
9. Repeat for 4-5 breaths, in through your nose and out through your mouth.
10. Relax and repeat 4 more times.

Reference Center(s): *Left abdominals, Left heel, Right arch*

Supine Active Sacro - Spheno Flexion

1. Lie on your back with your knees and hips bent at a 90-degree angle resting on a chair, couch, ottoman, or any similar object approximately 14 inches high.
2. Place a rolled-up towel (approximately 2 inches in diameter) under your mid neck.
3. Place your hands on your lower ribs. Inhale through your nose and exhale through your mouth slowly
4. As you feel your ribs move down, perform a posterior pelvic tilt by slightly lifting your tailbone off the floor (1-3") with your hamstrings as you flatten your back. Simultaneously rotate your chin and neck towards the ceiling by looking upward with your eyes.
5. With your mouth slightly opened, look down toward your feet without moving or rotating your head.
6. Protrude your jaw forward and to the left keeping mouth slightly opened.
7. Hold this position 5 seconds.
8. Relax your hamstrings, pelvis, head, neck, eyes and mandible.
9. Then slowly inhale, filling up your chest with your diaphragm – do not use your neck.
10. Repeat this sequence 4 more times.



Go slow and fill chest using only diaphragm not neck.

Axis of hip

Axis of sphenobasilar joint (base of head)

Relax your hamstrings, pelvis, head, neck, eyes, and mandible





STANDING CERVICAL-CRANIAL REPOSITIONING

Designed to position Right BC in right rotation and Right TMCC in right flexion. Cervical and cranial neutrality will be encouraged with co-activation of left abdominals with right SCM and co-activation of left lateral pterygoid with left gaze, occlusion and ground.



Place your right leg ahead of the left and most of your body weight on the left foot.

Reach forward with your left hand as you slightly bend your left knee, while keeping a majority of weight going through your left foot.



Bring your left upper and lower teeth together. As you sense your left bite turn your head to the right. Look straight ahead.

Sense your right head, neck and trunk rotation as you feel the left foot on the floor and your left upper teeth on the lower teeth for 10-15 seconds before advancing to the next step.



While keeping your left teeth and foot, on teeth and the floor, turn your head to the left without the right shoulder coming forward. Your line of vision should remain straight ahead.

You are learning how to feel independent movement of the head on a neck that is now supporting a head that is rotated to the left; without using the right anterior neck muscle to simultaneously achieve right trunk rotation.

Sense the left teeth, left floor and left abdominal wall work with the right anterior neck for 10-15 seconds before advancing to the next step.



Sense and feel your left teeth, left floor and left abdominals as you move your head and jaw bone straight ahead.

Now look to the left. Hold this position for 10 to 15 seconds as you breathe.

Without losing your sense of the left teeth, left floor, left abdominals and left gaze, consider turning your head to the right (L SCM), then to the middle, then to the left, then to the middle, then to the right, then to the middle, etc. for 10 to 15 seconds.