Principles of Postural Restoration®
for the Sports Clinician

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A special thanks to...

- Chris Poirier and Perform Better
- Each of you here today
- My sponsors...
  - Every patient I’ve seen in the past 12 years

What is posture?

- Posture is a reflection of the position of many systems that are regulated, determined and created through limited functional patterns. These patterns reflect our ability and inability to breathe, rotate and rest, symmetrically with the left and right hemispheres of our axial structure.
  - Ron Hruska

What is Postural Restoration?

- POSTURAL RESTORATION INSTITUTE®
  - Concepts and science developed by Ron Hruska, PT
  - Institute and Hruska Clinic located in Lincoln, NE
- PRI® PRINCIPLES
  - To explore and explain the science of postural adaptations, asymmetrical patterns and influence of polyarticular chains of muscles on the human body
  - To develop an innovative treatment approach that restores the primary contributions of postural kinematic movement dysfunction

Polyarticular chains

- Brachial Chain (BC)
  - Sternocleidomastoid, Scleneuses, Sibson’s Fascia, Deltoide-Pectoral, Anterior-Lateral Intercostals, Trapezius Sterno, Diaphragm
- Anterior Interior Chain (AIC)
  - Diaphragm, Iliacus, Psoas, TFL, Vastus Lateralis, Biceps Femoris
- Posterior Exterior Chain (PEC)
  - Posterior Intercostals, Serratus Posterior, Latissimus Dorsi, Quadratus Lumborum, Iliocostalis Lumborum
- Temporo-Mandibular Cervical Chain (TMCC)

Polyarticular chains

- Pulling empirical and “evidence-based” information from multiple sources from a myriad of different sciences, the Left and Right sides of the body truly work differently on many levels

- The Left Anterior Interior Chain is the dominant pattern
  - Driven by overactive Left psoas and iliacus, Right hemidiaphragm, Left TFL and vastus lateralis, Right bicep femoris and adductors

- The Right Brachial Chain is the dominant pattern
  - Driven by overactive Right hemidiaphragm, Left pectoralis, Right triangularis sternum, Right external obliques

- The Posterior Exterior Chain is overactivity of the back extensors, lats and QL’s
  - Underneath this PEC is a L AIC and R BC in hiding
What does L AIC and R BC look like in life?

- *Right-sided* dominance regardless of hand and foot dominance
  - Driven by our brains, nervous system, respiratory system, visual system, circulatory and lymphatic systems, etc.
  - Right "stance" with Left trunk counter-rotation most common
  - Can still be standing and weight-bearing on Left leg, but pelvis and lumbar spine is oriented to the Right
  - Trunk counter-rotation to the Left at the level of the diaphragm to balance out the system

What does history suggest about ingrained, imbalanced polyarticular chains?

*Contrapposto*
- Italian "opposite"
- A sculptural scheme in which the standing human figure is posed such that the weight rests on one leg ("engaged leg") freeing the other leg which is bent at the knee
  - L AIC stance
  - R BC counter-rotation

What does it look like in athletics?

- Googling the words "soccer change of direction", these were the first pictures shown.

- Using arrows to demonstrate dynamically what is happening, this is what’s going on biomechanically...
What does it look like in athletics?

Running

Note the Right vs Left shoulder height, lordosis, and different scapula position.
Also, in Left stance, limited Left trunk sidebend (thoracic abduction) vs Right side in Right stance.

What does it look like in athletics?

Turning sports

What does it look like in athletics?

Throwing sports

What does it look like in athletics?

Left stance loading response Right stance loading response

How about with Olympic lifts?

Which leg is doing the lifting here? Please...someone spot this guy...anyone.
What does the literature say about asymmetry?


- "The LBP group had significantly less total rotation and more asymmetry of total rotation, Right hip versus Left hip, than the NoLBP group. Left total hip rotation was more limited than Right total hip rotation in the LBP group." (Hip Rotation Range of Motion in People With and Without Low Back Pain Who Participate in Rotation-Related Sports. Van Dillen LR, et al, Phys Ther Sport, May, 2008.)

- "Right-footed turns have a longer time for the entire turn, longer time during both phases of the turn, shorter prep time for Right-vs Left-footed turns - Also greater magnitude of force with Right-footed turns - Right-footed turns more carving and Left-footed turns more parallel style" (Vaverka F, Vodickova S. Laterality of the Lower Limbs and Carving Turns. Biology of Sport, 2010; 27(2): 129-134)

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What's driving it?

- Our asymmetrical anatomical systems
  - Organs, nerves, respiratory system, vision
- How we breathe
  - Overinflated, hypertonic
- Habits, patterns, and position
  - ADL’s, position of ease
- Society
  - Media

What's going on inside?

- Diaphragm
  - Right has a larger, thicker and prominent central part (keel)
  - Right has three tendinous cord attachments to the ribs above (L1, L2, L3) vs the left has two (L1, L2)
  - Right has a greater diaphragm excursion than the Left
  - Right is abnormally supported by the liver
  - Phrenic nerve is longer on the Right side
  - 3 lobes in the Right lung, 2 lobes in the Left

The Right diaphragm pulls at 50% of the liver and vice versa

What's going on inside?

- Respiratory structures
  - Contractions between the diaphragm and intercostal muscles
  - External vs internal intercostal muscles
  - Diaphragm movement in relation to other structures (costal, vertebrae, thoracic cage)

What's going on inside?

- Respiratory action
  - As we inhale, our diaphragm is supposed to slightly "pull" up, (negative pressure), concentrically, through the body and diaphragm
  - The ribs should remain neutral anteriorly with slight motion anteriorly to posteriorly
  - Phrenic nerves
  - Three main ways we create stability in our system is position, muscle, and pressure
  - This ZOA allows the position of the muscles to be optimally oriented for gaseous pressure exchange
  - A fuller exhaled state with pause is the key way this is produced
  - Since the three main ways we create stability in our system is position, muscle, and pressure, this ZOA allows the position of the muscles to be optimally oriented for gaseous pressure exchange
What’s going on inside?

**Respiratory action**

- Boney structures
  - Left hemi-pelvis is anteriorly tipped and forwardly rotated
    - Due to hyperactivity of the Left psoas driven by the Right diaphragm
  - Right hemi-thorax is anterio-dorsally rotated
  - Produces Left lower rib flares greater than on the Right and larger rib angles on the Left
  - Left scapula adducted/superior orientation on thorax and Right depressed
  - Left scapula downward rotation and ER while Right is upward rotated and IR (wringing vertebral border)

What does this asymmetry produce?

**Visual observations**

- Increased lumbar lordosis
- Anterior inferior rib flares
  - Typically L > R
  - Often increased left rib angle as well
- Uneven shoulder height and often different scapula orientation

What does this asymmetry produce?

**Visual observations**

- Curvature of the spine
  - Right posterior rib hump common
- Left foot more pronated, Right foot more supinated
- LL Cool J-itis

What does this asymmetry produce?

**Assessments**

- Inability to touch toes
- Inability to squat fully to the floor with heels down, knees in alignment and feet straight
- Decreased left hip IR and right hip ER
  - Often the same total ROM on both sides but in different amounts of IR and ER

How do you assess for it?

**R BC Tests**

- Humeral-Glenoid IR
  - Supine hooklying, arm out at 90° and elbow bent 90°
  - Press on the anterior shoulder to stabilize then rotate the arm into IR
  - Compare both sides
  - Limitation of one or both sides (R > L) of the fingers being able to touch the table suggests poor positioning of thoraco-scapula
  - Poor balanced diaphragmatic breathing control
How do you assess for it?

**R BC Tests**

**Shoulder Horizontal Abduction**
- Supine, hooklying, arm out at 90° with patient/client at the side of a table
- Bring the arm into pure horizontal abduction and check for limitations, comparing both sides
- Limitation on one or both sides (L > R) suggests poor positioning of thoraco-scapula
- Poor balanced diaphragmatic breathing control!

**Apical Expansion Test**
- Supine, hooklying, hands on inferior ribs on one side, depressing posterior medially
- Client/patient abducts and the ribs are depressed further
- Maintain this pressure as the client/patient re-inhalates
- Looking for ability to apically expand the opposite chest wall
- Limitation on one or both sides (↓ R expansion when pressing on L side) suggests poor balanced diaphragmatic breathing control!
- If bilateral, then they likely have other issues as well

**L AIC Tests**

**Adduction Drop Test**
- Similar to Ober Test
- Client/patient sidelying with knees bent 90°
- Stand behind and passively flex, abduct, and extend the hip to neutral while stabilizing the pelvis with the other hand
- Important to maintain good positioning of the femur over the acetabulum
- To determine joint centration
- Positive test for L AIC = LEFT thigh does not drop to the table (adduct)
- Often correlates to a + Adduction Drop Test on the LEFT as well
- If bilateral, then they are a PEC

**Standing Reach Test**
- Performed two different ways
  - Reach straight down
  - Reach down with Right hand overlapping Left hand on left toes
- Rounded back is encouraged
- Exhalation while reaching
- Measure both from tips of fingers to floor
- Should be able to touch toes in both scenarios
What about the PEC?

This is what it looks like... . . . and this is often why

- Over activity of the back extensors coupled with hyperinflation produces marked tone. . . and not necessarily good tone!

What do you do to manage it?

L AIC / R BC

- Get your clients / patients to breathe diaphragmatically
  - Need to establish a Zone of Apposition by getting the diaphragm to move properly, especially on the Left side
  - Fuller, not forced, exhalation with warm-ups and muscle prep activities

Training them to learn to inhale with proper expansion and exhale with control is integral to:
- reducing unwanted pressure in the system
- creating good joint position
- optimizing muscle activity
- improving performance

What should be done to correct these imbalances?

After establishing a ZOA, especially on the Left (getting more air in on the Right), the system needs to be repositioned to get them more neutral

- Need to go after the upper hamstrings, adductors and IR’s
- Keep the lower hamstrings and erector spinae (Left) as the corrected position
- Then have them hold each exercise for 4 breaths with full (not forced) exhalation then pause.
- Consider ‘activation methods for pre-performance work

What should be done to correct these imbalances?

Left sidelying knee toward knee

- Starting position
- Finish position

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What should be done to correct these imbalances?

Left sidelying Right GluteMax

- Starting position
- Finish position

Opening/expanding the posterior mediastinum

- Starting position
- Finish position

What should be done to correct these imbalances?

Left sidelying Right GluteMax

- Starting position
- Finish position

Opening/expanding the posterior mediastinum

- Starting position
- Finish position

Inhale while rounding back

Full exhalation while bringing sternum to ceiling
What should be done to correct these imbalances?

Starting position/inhale
Opening/expanding the posterior mediastinum

Finish position
Exhale with right trunk rotation and R hip ER and R leg reach

What should be done to correct these imbalances?

Introduce more unilateral bias activities to really get the pelvis and hip/trunk muscles integrated.

What should be done to correct these imbalances?

Integrating into standard workouts

Left hemi-pelvis is posteriorly rotated... with Left thoracic "crunch" (abduction)

What should be done to correct these imbalances?

After performing the exercises in a more stable position to get them more neutral, stand them up and perform some exercises in the corrective position.

Again, integrate breathing with this.

What should be done to correct these imbalances?

Then get them up for their movement prep and warm-up drills with a bias towards the corrected position.

Cues are:
- Slide your left thigh back
- Bring your left lower ribs to your pelvis
- Exhale with control

What should be done to correct these imbalances?

Integrating into standard workouts
What should be done to correct these imbalances?
Integrating into standard workouts

PRI is about reciprocal activity... preferably in a corrected position

Push-pull sequences... for reciprocal activity

What about when they are training?

NO! NO!

Bad bicep curls

BAD BICEP CURLS
What about when they are training?

**Good bicep curls examples**

- Good, body weight centered over feet, reciprocal
- Better! Left leg posterior shift, stagger stance, trunk crunch, reciprocal

What about when they are training?

**Good bicep curls integration**

What about when they are training?

**Triceps presses examples**

- **NO!**
- **YES!**

What about when they are training?

**Lat pull downs examples**

- Overextended...over-latted
- Good, balanced control

What about when they are training?

**Corrective cues**

- Dynamic valgus loading response
- Cues to shift into Left hip and bring torso forward

- Not recommended...or at least finish with twice as many in the complete opposite way with...
- Left leg and pelvis back, trunk counter-rotated Right
What about when they are training?

Cueing for optimal results

"Where do you feel it?"

Conclusion.

- Careful evaluation and assessment of movement strategies is imperative for all athletes and clients.
- It is important to consider the underlying patterns which may be driving some of your evaluation findings and consider biasing some of your training sessions accordingly.
- Integration of optimal breathing patterns coupled with corrective exercise strategies to reduce overactive movement patterns will improve results.
- Consider taking courses from Postural Restoration Institute to further your understanding of this:
  - Myokinematic Restoration
  - Postural Respiration
  - Pelvis Restoration
- www.posturalrestoration.com