Principles of Postural Restoration® for the Sports Clinician

Perform Better Functional Training Summit:
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Michael J. Mullin, ATC, LAT, PTA, PRC
OA Centers for Orthopaedics
mmullin@orthoassociates.com

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?

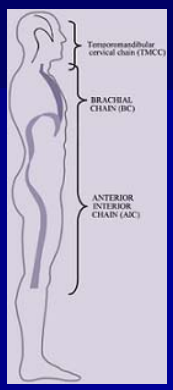
- **POSTURAL RESTORATION INSTITUTE® (PRI)**
  - Concepts and science developed by Ron Hruska, PT
  - Institute and Hruska Clinic located in Lincoln, NE
- **PRI® PRINCIPLES**
  - To explore and explain the science of postural adaptations, asymmetrical patterns and influence of polyarticular chains of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

Postural Restoration Institute®

HRUSKA CLINIC (402) 467-4545
Restorative Physical Therapy Services

Polyarticular chains

- Brachial Chain (BC)
  - Sternocleidomastoid, Scalenes, Sibson's Fascia, Deltoid-Pectoral, Anterior-Lateral Intercostals, Triangularis Sterni, 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
- Tempro-Mandibular Cervical Chain (TMCC)



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Polyarticular chains

Dominance on Left vs Right sides

- 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
  - Referred to as the L AIC
    - 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
  - Referred to as the R BC
    - Driven by overactive Right hemidiaphragm, Left pectoralis, Right triangularis sterni, Right abdominal 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 weightbearing 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?

"This PRI-stuff is new, isn't it?"

- Contrapposto
  - Italian-"opposite"
    - A sculptural scheme in which the standing human figure is poised 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.


What does it look like in athletics?

- Using arrows to demonstrate dynamically what is happening, this is what's going on biomechanically. . .


What does it look like in athletics?

Googling the words "soccer cutting"




What does it look like in athletics?

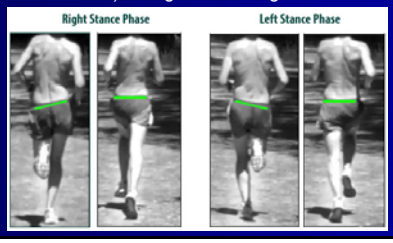
Running

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



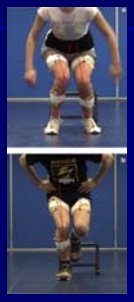
What does it look like in athletics?

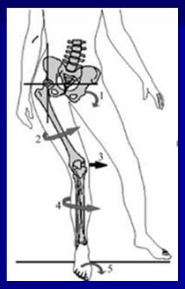
Turning sports

What does it look like in athletics?

Throwing sports

What does it look like in athletics?





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?

- "Development of scoliosis is connected with 'gait' and habitual 'standing at ease' on the Right leg"

(***Biomechanical aetiology of the so-called idiopathic scoliosis: New clinical and radiological classification.*** Karski, TK, Journ US-China Med Sci, May, 2011).

- "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."

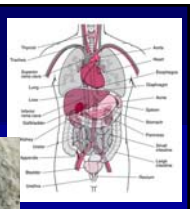
(***Hip Rotation Range of Motion in People With and Without Low Back Pain Who Participate in Rotation-Related Sports.*** Van Dillen LR, et al, Phys Ther Sport, May, 2008).

What does the literature say about asymmetry?

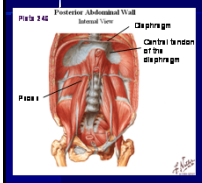
- Right-footed turns have a longer time for the entire turn, longer time during both phases of the turn, shorter prep time for Right- vs Left-footed turns
  - Also greater magnitude of force with Right-footed turns
  - Right-footed turns more carving and Left-footed turns more parallel style
    - Vaverka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

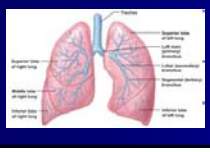
What's driving it ?

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



What's going on inside?
Respiratory structures

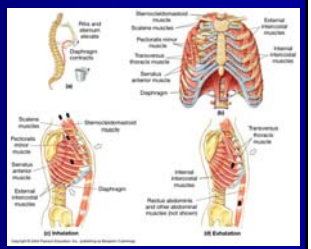




- Diaphragm
  - Right has a larger, thicker and stronger central part (leaflet)
  - Right has three tendon (central crura) attachments to the lumbar spine (L1, L2, L3) while the Left has two (L1, L2)
  - Right is more superiorly orientated than the Left
  - Right is structurally supported by the liver
  - Phrenic nerve is longer on the Left side
- 3 lobes in the Right lung, 2 lobes in the Left
- **The Right diaphragm pulls air into the Left side and vice versa**

What's going on inside?
Respiratory action

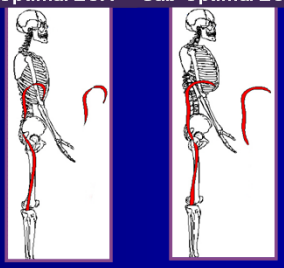
- As we inhale, our diaphragm is supposed to inferiorly "pull" the air in (negative pressure), concomitantly through the belly and rib expansion
  - There should be fairly equal distribution into the entire thorax
  - The ribs should remain fairly neutral anterior to posterior
  - Eccentric contraction of abdominals and pelvic floor
- As we exhale, the diaphragm slowly returns to its domed shape and helps "push" the air out of out lungs
  - Considered to be a passive activity with regular tidal breathing
    - Making it active is training these muscles
  - IR and depression of anterior ribs
    - The fuller the exhalation, the more IR
  - Concentric raising of the pelvic floor and abdominals (TrA, IO's and EO's)



What's going on inside?
Respiratory action

- Ultimately looking to achieve a Zone of Apposition—that aspect of the diaphragm that apposes the chest wall—in the respiratory cycle in which the diaphragm returns to its domed shape
  - 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 gasseous *pressure* exchange

Optimal ZOA **Sub-Optimal ZOA**



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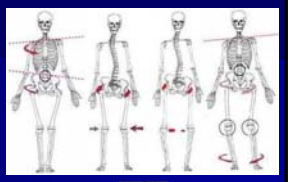
What's going on inside?
Respiratory action


What's going on inside?
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 anteriorly-inferiorly positioned (internally rotated) vs the Left side
  - 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 (winging vertebral border)




What does this asymmetry produce?
Visual observations

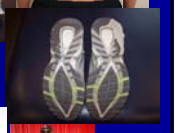
- Increased lumbar lordosis
- Anterior inferior rib flares
  - Typically L > R
  - Often increased left rib angle as well
- Uneven shoulder height and often different scapula orientation



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 on 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!*

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How do you assess for it?

R BC Tests

- Apical Expansion Test
  - Supine, hooklying, hands on inferior ribs on one side, depressing posterior medially
  - Client/patient exhales and the ribs are depressed further
  - Maintain this pressure as the client/patient re-inhales
  - 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, than they likely have other issues as well

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How do you assess for it?

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 + L Ext Drop Test on the LEFT as well
    - If the hip can't extend, it can't adduct!
  - If bilateral, than they are a PEC

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How do you assess for it?

L AIC Tests

- Extension Drop Test
  - Similar to Thomas Test
  - Both legs are passively brought to the chest and one leg is lowered off the end of the table, making sure to not let thigh abduct past 0°
  - A positive test is indicated when the femur—on the LEFT side with a L AIC—cannot extend to the table
  - Again, often correlates to a + Adduction Drop Test on the LEFT
    - If the hip can't extend, it can't adduct!
  - If bilateral, than they are a PEC

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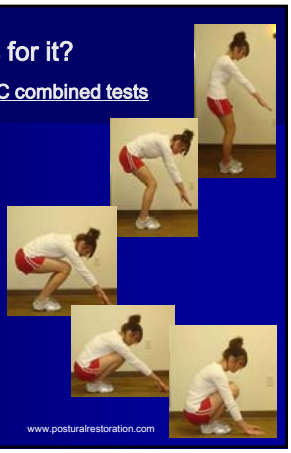
How do you assess for it?

L AIC / R BC / PEC combined tests

- Functonal Squat Test
  - Graded on a scale of Levels 1 – 5
  - Different than other common squat tests as it is performed with trunk flexion, knees go forward of toes, and heels must stay down ***without a block to assist!!***



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How do you assess for it?

L AIC / R BC / PEC combined tests

- Standing Reach Test
  - Performed two different ways
    - Reach straight down
    - Reach down with Right hand overlapping Left towards 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

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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 (Left), then GMax (Right), then obliques (Left) ***in the corrected position!***
- Then have them hold each exercise for 4 breaths with full (not forced) exhalation then pause. . . .
- Consider it activation methods for pre-performance work

What should be done to correct these imbalances?

Left sidelying knee toward knee
Starting position

Left sidelying knee toward knee
Finish position

What should be done to correct these imbalances?

Left sidelying Right GluteMax
Starting position

Left sidelying Right GluteMax
Finish position

What should be done to correct these imbalances?
Opening/expanding the posterior mediastinum

Starting position
Inhale while rounding back

Finish position
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

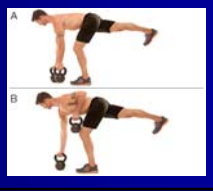
Exhale with Right trunk rotation and R hip ER and R leg reach

What should be done to correct these imbalances?

- 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.

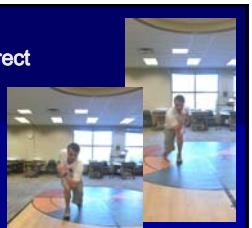
What should be done to correct these imbalances?

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



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

Left hemi-pelvis is posteriorly rotated. . .

. . .with Left thoracic "crunch" (abduction)

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

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

Push-pull sequences. . .

. . .for reciprocal activity

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

Push-pull sequences for reciprocal activity. . .

. . . in a corrected position

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

Push-pull sequences for reciprocal activity. . .

. . . in a corrected position both ways

What about when they are training?

NO!

NO!

What about when they are training?

NO!

Bad bicep curls

NO!

Bad bicep curls

What about when they are training?
Good bicep curls examples

Good, body weight centered over feet, reciprocal

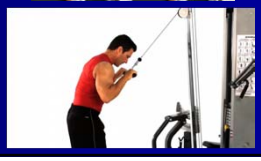
Better! Left leg posterior shift stagger stance, trunk crunch, reciprocal

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?

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?
Corrective cues

Dynamic valgus loading response

Cues to shit into Left hip and bring torso forward

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