

## Unlocking Secrets of the Pelvis (Pt. 3)

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In part 1 of this series [[Aug. 15 issue](#)], we began to identify the many asymmetries human beings are all born with and detail how these asymmetries, when they become excessive or unchecked, can create a cascade of imbalance in every system of our body, resulting in dysfunction, pain, degeneration and eventually disease.

In part 2 [[Oct. 1](#)], we discovered these asymmetries in the neuromuscular system can determine the position and movement of not only the pelvis, but also the skeletal system as a whole. Looking at the entire picture, it becomes clear that every system is interconnected and can affect any or all systems, including the neurologic, hormonal, digestive, cardiovascular, respiratory and musculoskeletal - and even including the mental and emotional.

As discussed, one continuous group or chain of muscles, comprised of the diaphragm, psoas / iliacus, TFL, biceps femoris and vastus lateralis, is called the "anterior interior chain." Most commonly, the left "AIC" is the group of muscles that has too much "tone" or activation, and affects pelvis and skeletal alignment and position.<sup>1</sup>

### Identifying Left AIC Patterns

When the left anterior interior chain of muscles is overactivated, an asymmetry will occur, affecting the position of the pelvis. This creates an orientation to the right of the entire pelvis in the transverse plane. All of the other muscles in the pelvis respond in a compensatory fashion (as described in part 2) in a "tri-planar" fashion, creating pelvic misalignment and ultimately dysfunction, pain or even decreased athletic performance.

So, how do you know if you are dealing with a basic left AIC pattern of too much tone? It starts with simple observation of gait and the presenting shape of the patient's right vs. left lateral abdominal wall. Individuals with a left AIC pattern are stuck in a right mid-stance phase and have difficulty getting off their right foot and onto their left.

One of the compensations is they have to swing their foot forward by laterally flexing their right abdominal side wall. This can present with a mild concavity on the right side as compared to the left. Why? Because they are always "hiking" that anterior / lateral abdominal wall to achieve more swing phase on the right, to get onto the left leg. You may also observe during gait that the left hemipelvis orients more to the right in transverse-plane rotation and doesn't rotate back to the left as much or symmetrically.<sup>1</sup>

There are several tests to determine if a left AIC pattern is present. One of the old standbys we have all used for years is [Ober's test](#). Commonly, this test is used to determine tightness in the fascia lata or the ITB, but it also has been called a modified Ober's or adduction drop test. The test is a starting point to determine pelvic position and if a left AIC pattern is present. The set-up and performance of this test are described as follows:

"The patient lies on his or her side with the lower leg and hip flexed (90 degrees). Stand behind the

patient and passively flex, abduct and extend the hip to neutral while maintaining 90 degrees of knee flexion. Passively stabilize the pelvis from falling backward and allowing femoral internal rotation to occur. Make sure the top innominate is positioned directly over the bottom innominate so the frontal plane starting position does not give any false positives ((top innominate too cephalad) or false negatives (top innominate too caudal). A positive test is indicated by a restriction from the anterior-inferior rim, transverse ligament and piriformis muscle or impact of the posterior inferior femoral neck on the posterior inferior rim of the acetabulum that does not allow the femur to adduct: possibly secondary to an anteriorly rotated, forward hemipelvis. Usually seen on the left especially if the left Extension Drop Test is positive in a Left AIC oriented patient."<sup>1</sup>

If this test is positive on the left side, but not on the right; that is, the femur does not drop below midline in adduction, then we begin to identify a left AIC pattern. If both sides are positive, that is called a PEC (posterior external chain) pattern (to be discussed in a future article). Suffice it to say, underneath every PEC pattern is a left AIC, so proceed to the next test anyway!

### FA Joint Dynamics

This is a good place to introduce the capsule-ligamentous structures concerned with [femoral acetabular](#) (FA) joint dynamics:

- *Iliofemoral*: The fibrous capsule is reinforced anteriorly by the strong Y-shaped iliofemoral ligaments (of Bigelow). The iliofemoral ligament prevents hyperextension of the femoral-acetabular (FA) joint during standing by forcing (twisting) the femoral head into the acetabulum.
- *Pubofemoral*: The fibrous capsule reinforces inferiorly and anteriorly by the pubofemoral ligament. Key function is checking over-abduction of the hip.
- *Ischiofemoral*: The fibrous capsule is reinforced posteriorly by the ischiofemoral ligament. It tends to hold the femoral head medially into the acetabulum, preventing hyperextension of the femoral-acetabular (FA) joint.<sup>1</sup>

Integrity of these ligaments is critical for movement and position of the femoral acetabular joints. Assessing integrity will determine the course or algorithm of a corrective strategy for pelvic dysfunction, as outlined by PRI.<sup>1</sup> If ligament integrity is diminished or absent, corresponding muscular activation must be applied to support pathologic ligamentous structures that have been weakened by time or trauma. The "extension drop test," also quoted from the PRI course notes, is used to determine ligament integrity of the femoral acetabular (FA) structures:

"The patient is positioned in supine with both thighs on the table. Both hips and knees are flexed to the chest. Passively lower one leg over the edge of the table while helping the patient hold the untested knee close enough to the chest to maintain the low back against the table. Do not allow hip abduction to occur past zero degrees on the tested extremity while passively dropping the FA joint into extension.

"A positive test is indicated when the tested lower extremity (usually the left) is restricted in hip extension because of the forward orientation of the tested side compared to the other. If both femurs do not approach the edge of the mat or table the patient is tested on, the innominates are rotated forward bilaterally and the psoas muscles are on slack. Placing the femur in 'neutral' is actually placing the patient's femur in external rotation. This tightens the TFL and VL and restricts hip extension.

"There is also a rotary component to this issue, particularly seen with limitation in hip extension on one side. Since the forward, anteriorly rotated pelvis accompanies sacral rotation to the

contralateral side (right rotation on a right oblique axis or left rotation on a left oblique axis) the iliofemoral ligament will also limit extension when the femur is externally rotated by the therapist / doctor, through testing with the femur in a 'neutral' position.

"The femur in this case will not approach the patient support surface without femoral internal rotation and/or through luxation (i.e., 'click') of the anterior-superior femoral head moving forward under the superior-anterior condyloid labral rim of the acetabulum."<sup>1</sup>

That was a mouthful ... but what does it mean? Simply put, if that femur extends all the way to the table, especially on the left side, you need help from specific muscular structures to help stabilize that FA joint, since those femoral acetabular ligaments are shot! Stabilizing the FA joint is part and parcel to stabilizing the pelvis. (I will present the corrective strategy for that in my next article.)

### Key Tests to Determine Pelvic Dysfunctional Patterns

One of the most fascinating tests to determine dysfunctional myokinematic patterns in the pelvis is the "[adduction lift test](#)," developed by Ron Hruska, PT. This is a progression of movements and is graded at how many of the positions in the test the patient can achieve with movement / stability competency. This is a detailed test that requires a specific starting position and grading criteria for five levels of movement testing. (This is the "tease" section of the article; you will have to order the home study course from PRI or attend a workshop to become proficient at this test! And no, this practitioner receives no royalties from PRI!)

Other tests for femoral acetabular (FA) extension include the Thomas test and modified Thomas test (with rectus femoris differential). For FA flexion, there is Ortolani, Fabere-Patrick and the "snapping hip" maneuver.<sup>1</sup>

It is observation of gait, pelvis and abdominal wall positioning, the adduction drop test, the extension drop test, and the adduction lift test that will give you direction for your corrective strategy; and a way to determine if your treatment is effective or not in restoring alignment, position and function to the pelvis. These tests help to determine if your patient is stuck in a left AIC pattern, and which course of treatment is needed to restore more balanced and symmetrical neuromuscular function of the pelvis. These tests can also aid in how effective your treatment is. Simply test, treat and test again to see if your patient is really getting and maintaining the correction they need beyond walking to their car in your parking lot.

### Reference

1. Postural Restoration Institute (PRI). "Myokinematic Restoration: An Integrated Approach to Treatment of Patterned Lumbo-Pelvic-Femoral Pathomechanics." Home study course from the Postural Restoration Institute (PRI); James Anderson, PT, instructor.

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Part 4 of "Unlocking Secrets of the Pelvis" will explore how breathing with corrective strategies can provide effective and lasting correction of pelvic dysfunction.

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