

# How Right To Left Side Imbalances Affects Pitching Performance Part III

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verse). Improper mechanics as a result from injury and or adaptations to repeated movements will most likely contribute to an undesirable asymmetrical state.

## Restoring Pelvic Position

The most likely joint affected, regardless of the player's position, is the femoral-acetabular (FA) joint or the acetabular-femoral (AF) joint. Lumbo-pelvic-femoral symmetry and stability is essential for proper trunk rotation, scapula-thoracic (ST) rotation, and humeral-glenoid (HG) rotation. Muscles that provide movement and control of the lumbo-pelvic-femoral complex have the ability to perform in more than one plane.

An individual with a (Left AIC) pattern will demonstrate an anterior tilt and forward rotation of the left hemi-pelvis. Due to this position, the individual will usually demonstrate weakness and lengthening of specific muscles in all three planes. In the sagittal plane, attention must be given to the left biceps femoris to restore pelvic position (*Figure 1- 90-90 Hip Lift with Hemibridge*). Contraction of the hamstring provides muscular opposition to the anteriorly tilted left hemi-pelvis.

In the frontal plane emphasis is placed on the left ischiocondylar adductor and the right gluteus maximus. Shifting ones weight over the right hip results in relative adduction and internal rotation of the right hip (right acetabular-femoral internal rotation "AF IR") and abduction and external rotation of the left hip (left acetabular-femoral external rotation "AF ER"). To return the pelvic girdle to a neutral state, an active contraction of the right hip abductors and/or left hip adductors is required (*Figure 2- Left Sidelying Left Flexed Adduction with Concomitant Right Extended Abduction*).

Restoration of the transverse plane requires rotational movements across the acetabular-femoral (AF), femoral-acetabular (FA), and lumbo-sacral joints. The right gluteus maximus assists in obtaining femoral acetabular external rotation in an AF ER state on the right as well as orientating the sacrum to the left (*Figure 3- Left Sidelying Right Glute Max*). The left gluteus medius and left ischiocondylar adductor assist in obtaining femoral acetabular internal rotation (FA IR) on the left to allow for single leg stance control (*Figure 4- Right Sidelying Adductor Pull Back*).

## Restoring Thoracic Scapular (TS) / Scapular Thoracic (ST) Position

Once proper pelvic position is obtained, the initiation of left trunk rotation in an upright stance can be embarked upon. The purpose of this activity is two fold; first to promote left AF IR and second to orientate the lower spine to the left (*Figure 5- Standing Resisted Trunk Around with Left AF IR and Left Trunk Rotation*).

One must also take into account the compensatory trunk rotation to the left above T 12. Due to the orientation of the left upper thoracic spine to the left, the right shoulder appears to be lower and assumes a protracted position. This position compromises the right lower trap and serratus anterior to work correctly. The right



Part one of this series discussed the rotational influences of the pelvic girdle as it relates to the throwing motion.<sup>6</sup> Part two of this series discussed the influences of the scapular thoracic (ST) and humeral glenoid (HG) joint biomechanics as it relates to the thorax and throwing motion.<sup>7</sup> Hruska

has described an underlying postural pattern of asymmetry known as the Left Anterior Interior Chain (Left AIC) pattern.<sup>2,3,4,5</sup> This pattern reflects an imbalance of muscular activity and a host of differences between the right and left sides of the body. The overall pattern of evidence obtained when addressing a possible relationship between the left lumbo-pelvic-femoral complex and the right shoulder complex have been discussed in the preceding two articles, for this reason it warrants some general treatment considerations in terms of its theoretical relevance as it relates to the overhead throwing athlete. As a follow up to the last two articles, this article will demonstrate exercises designed to challenge the entire kinetic chain for training the overhead-throwing athlete. Proper training of the kinetic chain involves exercises designed to train the hip, trunk, and shoulder in a proximal-to-distal sequence.

Hruska's (Left AIC) pattern proposes the tendency for the anterior tilt and forward rotation of the left hemi-pelvis. This position of the pelvic girdle orientates the pelvic girdle to the right causing a shift in ones center of gravity to the right. This predominate position orientates the sacrum and the spine to the right with compensation usually occurring above the diaphragm rotating the spine back to the left. Upon observation, the thorax and lumbar spine will be sidebent to the right with the right shoulder appearing to be lower than the left.<sup>2,3,4,5</sup>

A thorough understanding of functional anatomy and movement patterns of the kinetic chain are critical to effectively evaluate and treat the overhead-throwing athlete. Because pitching involves all body segments, treatment should address three-dimensional movements throughout all three planes (sagittal, frontal, and trans-

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lower trap is unable to retract the scapula back on the rib cage secondary to the thoracic spine and rib cage's orientation to the left (Figure 6- *Sidelying Resisted Right Serratus Punch with Right Trunk Rotation*). Therefore the tendency for the right lower trap is limited in its ability to retract the scapula with right upper trunk rotation called scapular thoracic (ST) movement as well as its ability to rotate the spine back to the left above T 12 called thoracic scapular (TS) movement <sup>1</sup> (Figure 7- *Sidelying Trunk Lift*).

Just as the left hamstring assists in repositioning the left hemi-pelvis on the femur and the ischiocondylar adductor pulls the femur back towards the pelvis with internal rotation, the right lower trap and triceps work together to correct the scapula's resting position on the rib cage. The right lower trapezius and triceps retract and posteriorly tilt the scapula whereas the right serratus anterior pulls the thorax back towards the properly positioned scapula <sup>1</sup> (Figure 8- *All Four Belly Lift Reach*).

## Heading for Home!

Once pelvic, thoracic, and scapular position is obtained, the individual may now initiate humeral glenoid internal rotation (HG IR). With a strong base of support established throughout the lumbo-pelvic-femoral and scapular-thoracic complex, proper humeral glenoid internal rotation via the subscapularis can occur. With the scapula in a retracted state this decreases the inclination for the humeral glenoid joint to achieve greater external rotation throughout the cocking phase and thus decreasing the tightness of the posterior capsule and external rotators (Figure 9- *Supine Resisted Right HG IR*).

It is beyond the scope of this article to fully understand how to treat an individual with a (Left AIC) pattern, however these three

articles should provide the reader a better appreciation of how the arthrokinematics and myokinematics of left lower extremity and right upper extremity are interrelated. In closing, the next time one is evaluating an overhead throwing athlete's right shoulder take the obligation to consider the pathomechanics of the left lumbo-pelvic-femoral complex and incorporate techniques from the Postural Restoration Institute™ (PRI) into their rehabilitative program. **R**

**More Information Please!** To contact Jason go to the Postural Restoration Institute™ web sit at [www.posturalrestoration.com](http://www.posturalrestoration.com)

## References

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**Figure 1: 90-90 Hip Lift with Hemibrige**

1. Lie on your back with your feet flat on a wall and your knees and hips bent at a 90-degree angle.
2. 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.
3. Maintain your hip lift with your left leg on the wall and straighten your right leg.
4. Slowly take your straight right leg on and off the wall as you breathe in through your nose and out through your mouth. You should feel the muscles behind your left thigh engage.
5. Perform 3 sets of 10 repetitions, 1-2 times a day.

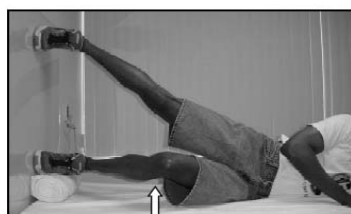
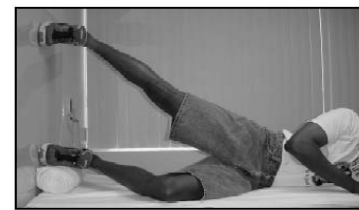


**Figure 2: Left Sidelying Left Flexed Adduction with Concomitant Right Extended Abduction**

1. Lie on your left side with your right leg straight and your left leg bent at a 60-degree angle. Your right shoulder, hip, knee and ankle will be lined up.
2. Place 2-3 pillows under your head so that your head is slightly side bent to the right.
3. Place your left foot on a 2-3 inch bolster with your toes pressing into the wall and a small bolster underneath your left side.
4. Slightly raise your left knee off of the floor by turning your thigh

"in" or by pushing your left heel into the wall and using it as a pivot point. You should feel your left inner thigh engage.

8. Keep your left knee raised from the floor and turn you right toes in.
9. Attempt to take your right foot off of the wall. You should feel your right outside hip engage.
10. Hold this position while you take 4-5 deep breaths in through the nose and out through the mouth.
11. Relax and repeat 4 more times.



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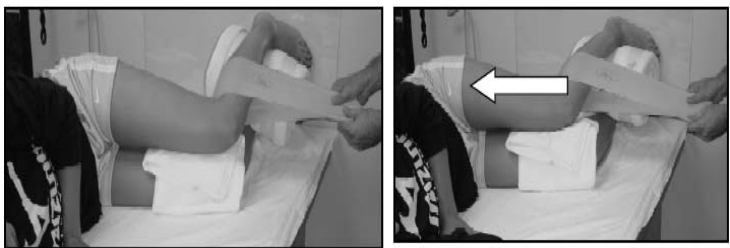
## Figure 3: Left Sidelying Right Glute Max

1. Lie on your left side with your hips and knees bent at a 60-90-degree angle.
2. Place your ankles on top of a 3-5 inch bolster and place your feet firmly on a wall.
3. Place tubing around both thighs slightly above your knees.
4. Shift your right hip forward until you feel a slight stretch or pull in your left outside hip.
5. Keeping your toes on the wall, raise your right knee keeping it shifted forward. You should feel your right outside hip engage.
6. Hold this position while you take 4-5 deep breaths in through your nose and out through your mouth.
7. Relax and repeat 4 more times.



## Figure 4: Right Sidelying Adductor Pull Back

1. Lie on your right side with your toes on a wall, ankles and knees together and your back rounded. Place a pillow under your head and keep back and neck relaxed.
2. Place a bolster of appropriate size between your feet and a towel between your knees. Your left knee should be lower than your left hip and ankle.
3. Place tubing around your left leg just below your knee for resistance. Have another person hold the other end to provide resistance.
4. Push your bottom foot into wall.
5. Begin by inhaling slowly through your nose as you “pull back” your left leg.
6. Exhale through your mouth as you squeeze your left knee down into the towel for 3 seconds.
7. Inhale again as you “pull back” your left leg further. You should begin to feel your left inner thigh engage.
8. Exhale and squeeze your left knee down.
9. Continue the sequence until you have completed 4-5 breaths in and out. Attempt to pull back your left leg further each time you inhale.
10. Relax your knees back to the starting position and repeat the sequence 4 more times.



## Figure 5: Standing Resisted Trunk Around with Left AF IR and Left Trunk Rotation

1. Stand with tubing in your right hand facing away from the door.

2. Shift your hips to the left and slightly bend both knees.
3. Keeping your hip shifted to the left, begin to orient your trunk to the left by reaching across the midline of your body with your right hand. You should feel your right abdominal wall engage.
4. Keeping your trunk turned to the left, raise your right foot off of the ground. You should feel your left hip and the top of your left thigh working.
5. Balance in this position while you take 4-5 deep breaths in through your nose and out through your mouth.
6. Relax and repeat 4 more times.



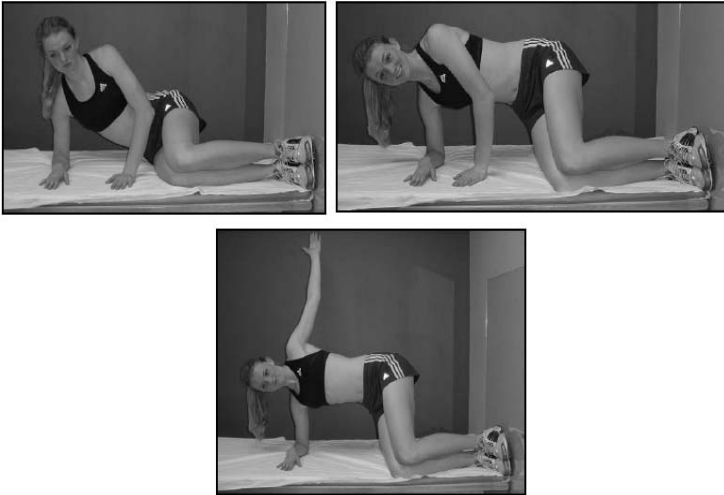
## Figure 6: Sidelying Resisted Right Serratus Punch with Right Trunk Rotation

1. Place a piece of tubing in each hand with the tubing wrapped around your back.
2. Lie on your left side with your knees bent, head supported by pillows, and a bolster underneath your left side.
3. Shift your right knee ahead of your left.
4. Reach forward with your right hand by straightening your right elbow against the resistance of the band.
5. Keeping your right knee shifted forward and your right elbow straight, inhale through your nose and exhale through your mouth as you turn your right knee and right arm up towards the ceiling.
6. Maintain the above position and inhale again through your nose.
7. Exhale and reach upward with your right hand. You should feel the muscles in your right outside hip and back of your right shoulder blade engage.
8. In this position, inhale once more and as you exhale lower your right knee and right arm.
9. Relax and repeat 4 more times.

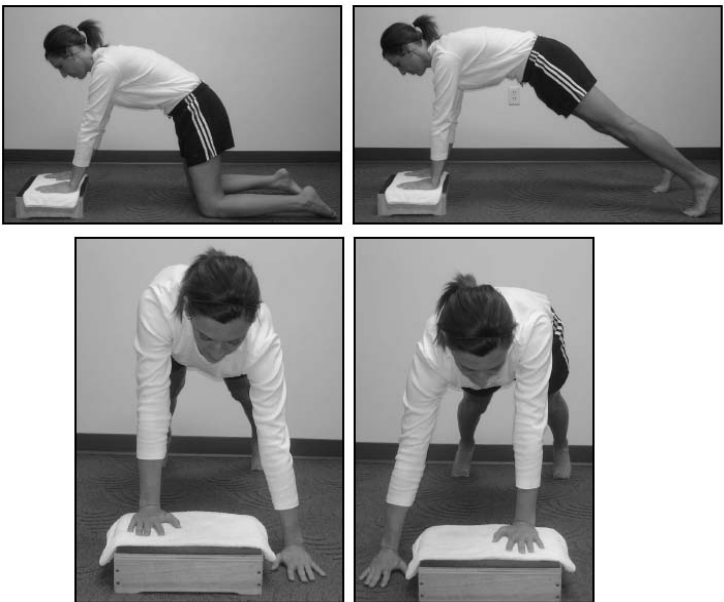


**Figure 7: Sidelying Trunk Lift**

1. Lie on your right side with your hips and knees bent at a 90-degree angle.
2. Prop your trunk up on your right forearm keeping your elbow directly below your shoulder.
3. Press your left knee down into your right and pull your right shoulder blade down and back.
4. Keeping your right shoulder blade pulled back, slowly raise your right hip up and off the mat. You should feel the muscles in the back of your right shoulder blade engage.
5. Maintaining the above position, raise your left arm up above your head and take 4-5 deep breaths in through your nose and out through your mouth.
6. Slowly lower yourself back down to the mat and repeat 4 more times.



**Figure 8: All Four Belly Lift Reach**



1. Position yourself on your hands and knees with your hands on a 2-6 inch block.
2. Place your knees at shoulder width or slightly wider and round your back.
3. Maintaining a rounded back, raise your knees off the floor until your legs are straight.
4. Shift your weight to your right side and reach towards the floor with your left hand without bending your right elbow. You should

feel the muscles in your shoulder blades engage.

5. Inhale through your nose filling up the back of your right chest wall with air.
6. Exhale through your mouth and reach or push with your left hand.
7. Place your left hand back on the block and shift your weight to your left side.
8. Reach towards the floor with your right hand without bending your left elbow.
9. Inhale filling the back of your left chest wall with air.
10. Exhale and reach or push with your right hand.
11. Continue this sequence of breathing taking 4-5 deep breaths in through the nose and out through the mouth while holding one position at a time.
12. Relax and repeat 4 more times with each arm.

**Figure 9: Supine Resisted Right HG IR**

1. Lie on your back with your knees bent.
2. Bring your arms to shoulder level and rest them on bolsters.
3. Bend both arms at a 90-degree angle.
4. Anchor a piece of tubing around a post directly above your right hand and place both ends of the tubing in each hand.
5. Keep your left hand stable with your thumb towards your body and turn your right hand so your palm is towards your body.
6. Pull your shoulder blades down and together.
7. Keeping your shoulder blades pressed down and together, straighten your right elbow against the resistance of the tubing. You should feel the muscles in the back of your right arm and shoulder blade engage.
8. Maintaining the above position, turn your right hand down towards the mat. You should feel the muscles in the front of your right shoulder engage.
9. Hold this position while you take 4-5 deep breaths in through your nose and out through your mouth.
10. Relax and repeat 4 more times.

