

**The inherent asymmetries of the body can impact an athlete's performance. A new treatment program is focused on restoring inner balance through specialized postural and breathing exercises.**



AP PHOTOS/RICH SCHULTZ

# FINDING BALANCE

BY MICHAEL J. MULLIN

Helping athletes reach their athletic goals requires a complex and multifaceted approach, with nutrition, injury avoidance, and recovery just a few of the many components that need to be considered. However, another crucial piece of the puzzle is only beginning to receive attention—the structural and functional asymmetry of the body and its influence on the way we breathe and move.

Internally, human anatomy is asymmetrical, so the various systems of the body—neurological, respiratory, circulatory, visual—are not the same on the left side as they are on the right, with one side usually more dominant than the other. Since our muscular patterns are determined by how these systems are integrated, the differences on our left and right sides have a direct influence on our body alignment and posture, shaping our respiratory function and movement.

These anatomical asymmetries are normal and don't typically cause problems unless they become pronounced enough that the body is unable to control them. This can happen when a particular pattern of movement is repeatedly reinforced and ingrained over time during high-impact sports or exercise, or even through simple, everyday activities such as the way a person sits in a chair.

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When asymmetries are pronounced, the body begins to compensate for them in such a way that it can no longer maintain stability in these areas. Over time, this can begin to significantly shift bones and joints—and the muscles that cross them—out of a balanced, or neutral, position, restricting muscle movement in the affected areas and increasing the risk for musculoskeletal pain and injuries.

An effective method of curtailing such asymmetries is through a treatment approach developed by the founder of the Postural Restoration Institute (PRI), Ron Hruska, MPA, PT. The discipline utilizes specific exercises, manual techniques, and positional corrections that combine with the body's innate balancing mechanisms to enhance athletic performance and treat a variety of sports-related injuries.

#### NEW BALANCE

Reciprocal activity is the body's primary method of preventing major imbalances. When muscles are active, the body counters the activity and maintains balance in a number of ways, such as relaxing

other muscles. In PRI, practitioners look at the muscle activity on one side of the body as counterbalancing that of the other side. Something as basic as walking is a good example of this concept.

During the left-stance phase of a person's gait, the pelvis rotates backward on the left side of the body as the left leg goes underneath the body, while the mid to upper thorax counterrotates to the right to balance the movement. The right arm also provides balance by swinging backward to match the action of the left leg. This process is called alternating reciprocal activity and should occur equally and evenly on both sides of the body.

If muscles are overactive and working too hard on one side of the body, methods of reciprocal action are employed elsewhere to help inhibit this excessive muscle activity. However, these methods also involve activating or facilitating other muscles to help equal out the imbalance and allow the body to move efficiently. This can negatively affect an athlete's performance because the muscles best suited to the activity aren't as active, and other, less ideal muscles are being used instead. PRI techniques seek

to address these asymmetries and help patients retrain their movements.

#### RESPIRATION IS KEY

One of the most common ways for anatomical asymmetries to affect performance is through the respiratory system. The diaphragm is stronger, better positioned, and has greater leverage on the right side of the body—its tendon (crura) attaches to three lumbar vertebrae on the right and only two on the left, the right lung has three lobes while the left lung only has two, and our liver sits on the right side of the body, providing more support to the right side of the diaphragm.

When our core muscles are not able to maintain balance, the diaphragm begins to take on more of a static, postural role. This causes it to change its orientation and length, making it less effective for optimal air exchange. As a result, other muscles begin to perform the diaphragm's normal function. This can lead to a number of different compensations and movement dysfunctions, from structural abnormalities such as a forward head posture, scapular malposition, and

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increased kyphotic and lordotic postures, to breathing dysfunction issues such as hyperinflation, paradoxical breathing, shortness of breath, fatigue, and even exercise-induced asthma. If not addressed, a static, malpositioned diaphragm can ultimately result in reduced athletic performance and any one of a number of acute or chronic injuries.

Many of the muscles that cross multiple bones and joints are called poly-articular muscle chains. These groups of muscles run in the same direction and are structurally and neurologically connected—when one of them is active, the others are influenced as well. There are three dominant polyarticular muscle chains that greatly affect the respiratory system—one of each on the left side and one of each on the right. From the cervical region distally, these chains are:

**Brachial Chain:** Anterior to the spine, the brachial chain muscles help connect and coordinate movement between the head and the thorax. This chain includes the diaphragm, anterior and lateral intercostal, deltoid and pectoralis, triangularis sterni, sternocleidomastoid, and scalene muscles.

## FIRST STEP

Training athletes using Postural Restoration Institute techniques starts with identifying any potentially restrictive imbalances in the athlete's body. A thorough evaluation is performed using a number of tests, including:

**Adduction Drop Test:** Evaluates the position of the pelvis and is similar to the Ober test. An inability of one or both femurs to adduct to the table suggests a malpositioned pelvis.

**Horizontal Adduction Test:** Looks at the position of the scapula on the thorax, which should be equal on both sides when arms are hanging off the side of a table. Imbalances suggest a rotated thorax.

**Humeral Glenoid Internal Rotation Test:** Examines the position of the scapula on the thorax. The forearm should be able to freely rotate when lying supine on a table with arms in a 90/90 position. Imbalances suggest a rotated thorax.

**Shoulder Flexion:** With the rib cage and pelvis flat on the table, the arms should be able to flex freely and bilaterally above the table. Imbalances suggest an overextended thorax.



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**Anterior Interior Chain:** Anterior to the spine, the anterior interior chain muscles help connect and coordinate movement between the thorax and the pelvis. This chain includes the diaphragm, iliacus, psoas, tensor fascia latae, vastus lateralis, and biceps femoris muscles.

**Posterior Exterior Chain:** Posterior to the spine, the posterior exterior chain muscles help with alternating but reduce reciprocal functioning. This chain includes the latissimus dorsi, quadratus lumborum, serratus, and external rib rotator muscles.

As an athlete becomes more active and they task their respiratory muscles more, the diaphragm has to pull harder and faster, along with the pelvic floor and deep abdominal muscles. Due to a stronger pull from some of the key anterior interior chain muscles on the right, the pelvis and lumbar spine become rotated to the right. The thorax has to counter-rotate to balance this pull, which also affects the shoulders and cervical spine. Below the pelvis, femoral and lower-leg orientation is often affected as well. This creates a great deal of torque to the body.

As this imbalance continues, it produces a change in the position and function of some muscles. They can become over- or underactive and can even change their orientation to adapt to their new positions. The diaphragm, for example, begins to shorten and tighten from the increased breathing rate and from its attempts to help the stabilizer muscles control the body as it moves. This scenario can be seen in athletes who demonstrate increased thoracic and lumbar extension (arched backs), shortness of breath, an inability to squat deep or jump and land with their feet flat, and poor alignment control of their legs, among other things.

Ultimately, the muscle imbalance affects the polyarticular chains, causing them to work in a dyssynchronous way, and the result is referred to as a left anterior interior chain pattern. A right-sided dominance emerges as a result of overactivity of the right diaphragm, adductors, and biceps femoris, and the left iliopsoas, tensor fasciae latae, and vastus lateralis. This means the athlete favors and puts more weight on the right side of the body when standing, leaning, pushing off, or side-bending.

The typical way in which the body compensates for the left anterior interior chain pattern involves an overrotation of the thorax to the left, which itself can cause an imbalance in the upper body called a right brachial chain pattern. This in turn can cause overextension and overuse of the back extensor muscles, another imbalance known as the posterior exterior chain pattern, which is a back-to-front imbalance.

The key to this domino effect on the body is the imbalanced diaphragm. Using non-manual techniques, or occasionally a combination of manual and non-manual techniques, PRI seeks to restore optimal, balanced breathing by establishing a zone of apposition in the area of the thorax directly apposed by the diaphragm. The zone of apposition is a neutral space that enables the diaphragm to return to its proper position and function normally.

#### POSTURAL TRAINING

To achieve a zone of apposition and maintain balance in the respiratory system, the body must be able to empty the lungs of air upon exhalation. It

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Figure One: Modified All-Four Belly Lift



Figure Two: Right Side-Lying Respiratory Left Adductor Pullback



Figure Three: 90/90 Hip Lift with Hemibridge

must also restore balanced activity to the polyarticular muscle chains, re-educate the proper muscles with some corrective exercises, and change how the athletes carry themselves.

To start, a number of tests are used to assess for respiratory, pelvic, and thoracic imbalances (see “First Step” on page 30). The athlete is then taught how to establish a zone of apposition through non-manual techniques, after which he or she is briefly reevaluated to determine if neutrality has been established in the target areas. If not, the practitioner will perform some manual techniques to assist with this. A few corrective, repositioning exercises are then introduced to reinforce the proper muscle-firing patterns necessary to help maintain

this new position.

PRI uses various forms of ventilation training to exercise the expiratory muscles. Here are a few examples of some non-manual zone of apposition techniques:

*Stair Short-Seated Balloon:* Because of its effectiveness in restoring optimal breathing, this exercise is best used prior to physical activity. A balloon is used to train the expiratory muscles because it provides resistance during the exhalation phase and sends feedback to the respiratory system to help it re-inhale properly. (In case of latex allergy, or if a balloon is not available, a flexible straw can be used instead.)

To start, sit on a step with feet and knees together and left fingertips under

left toes. It’s important to maintain a rounded back and refrain from using the neck muscles or cheeks when performing this activity.

Use the right hand to place the balloon in the mouth between lightly pursed lips. Round out the back and roll the pelvis under to feel the ischial tuberosities, or sit bones, on both sides of the body. After inhaling through the nose—without losing the rounded posture—stabilize the balloon with the right hand and blow into it slowly, but fully. Pause for three seconds, using the tongue to press the balloon against the roof of the mouth to prevent air loss.

Maintain this position and take another breath in through the nose. Slowly blow air into the balloon, repeating this sequence until the fourth inhale. When finished, take the balloon out of the mouth and deflate it. Repeat for three to five sets.

*Modified All-Four Belly Lift:* This is another great exercise to use prior to physical activity. Starting on the hands and knees with the back rounded toward the ceiling, tuck the pelvis underneath and shift the weight forward until the nose is over the fingertips. While rounding the back further to maximize abdominal activity, inhale deeply before exhaling fully, but not forcefully (see Figure One, above).

Pause in the exhaled state for three seconds and repeat the sequence for a total of four full breaths. As breathing becomes less restricted, the exercise is then performed on hands and toes with hips up.

Once the zone of apposition has been established and the diaphragm repositioned, the body can be much more easily retrained to reduce the pull of the left anterior interior chain pattern. In doing so, the left pelvis rotates back and into a well-oriented position that supports standing, pushing off, rotating, and turning.

In this position, the over- and under-active muscles take on different roles as their positions change. Some need to be inhibited on one side of the body while others need to be facilitated on the other side. The left proximal biceps femoris and adductors, left gluteus medius and abdominal obliques, and right iliopsoas have to be facilitated using corrected patterns of the pelvis and trunk.

PRI describes correcting these positions as the ability to “shift” into the left pelvis by moving the left femur back,

while subsequently rotating the left pelvis back. This muscle repositioning work keeps the athlete's body in balance and enables him or her to freely flex, squat, and rotate with minimal risk for joint compression and tissue strain. The following repositioning exercises are used to help correct a left anterior interior pattern, and they should be performed after the zone of apposition work. To avoid worsening an imbalance, they need to be done exactly as listed below and not on the opposite sides of the body:

**Right Side-Lying Respiratory Left Adductor Pullback:** Lie on the right side of the body with the back rounded and the hips and knees at a 90-degree angle. Press the feet into a wall with a bolster such as a rolled-up towel between them so the left knee is lower than the left ankle (see Figure Two, at left).

Begin by inhaling slowly through the nose while shifting or pulling the left leg back. This movement corrects the position of the anteriorly rotated left pelvis. Next, exhale fully while squeezing the left knee and bringing it down towards the right thigh. Inhale again, pull the left thigh back further, then exhale and

press the left knee down again. Continue this sequence for four or five full breaths, trying to pull the left thigh further back with each inhalation. Perform three or four sets.

**90/90 Hip Lift with Hemibridge:** Lie on the back with feet flat on a wall—preferably with shoes on—and both knees and hips bent at a 90-degree angle (see Figure Three, at left). Inhale through the nose and, while exhaling through the mouth, perform a posterior pelvic tilt by lifting the tailbone slightly off the ground. Instead of simply pushing the feet into the wall, the athlete should think about pulling through the heels as they lift the tailbone.

Next, while keeping the left leg on the wall to maintain the hip lift, take the right leg off the wall and straighten it. Slowly take the straight right leg on and off the wall while maintaining good breathing patterns that feature full—but not forced—exhalations. Perform three sets of 10 repetitions each.

**Left Side-Lying Knee Toward Knee:** Lie on the left side of the body with hips and knees bent at a 90-degree angle, back rounded, and feet pressed into a wall with

a bolster underneath. Shift the right thigh forward and lift it or turn it out. Holding this position, lift or turn in the left thigh until it's just behind the right. Hold the position for four or five deep breaths and repeat three or four times.

There are many benefits of introducing PRI concepts into training and conditioning programs. Athletes who have plateaued in their performance level are often limited because underlying imbalances are reducing their ability to produce the necessary power. Performing some of the assessments at the onset of treatment would reveal if the brachial chain, anterior interior chain, and/or posterior exterior chain muscles are playing a role, and through the establishment of a zone of apposition and use of repositioning exercises, the athlete should be able to return to free, unrestricted movement.

Introducing components of PRI techniques into warm-ups, muscle preps, and as part of a larger training or injury-reduction program will only improve your athletes' performance and recovery. And better positioning their systems for optimal function will take them up yet another level. ■

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