When trying to address your athlete's or client's limitations due to pain or joint restriction, a pelvic rotation finding can be an extremely valuable. If you look at most clients/athletes that have some type of chronic pain or inhibited joint function you will more than likely find a varying degree of pelvic rotation in the transverse plane.

A rotation of the pelvis will affect many joints above and below the level of rotation. You might be saying yeah right, how can pelvic rotation affect the shoulder? This is only one example: let's say the pelvis is rotated left to right. You note the left shoulder depressed because the torso is over compensating by rotating right to left. This counter rotation causes the left lattisimus to shorten as well as the spinal erectors on the left side. The left shoulder depression will alter the scapula, thoracic spine and glenohumeral joint mechanics and cause rotator cuff impingement.

If a client or athlete had rotator cuff impingement some professionals would target the cuff with strengthening and stretching exercises. I would address the pelvic rotation first and then focus on shoulder, thoracic spine and scapular work. If you look at your client's body as a whole, keep in mind that the body works in kinetic chains rather than individual parts, you will see the correlation between a rotated pelvis and compensations in other joints throughout the body.

Another example of how a rotated pelvis can affect one of the more distal areas of the body is the subtalar joint. Let's say the pelvis is rotated right to left, you may note the right subtalar joint pronated and the right foot everted. You will also find internal rotation of the hip and maybe a valgus stress of the knee on the side rotated forward. Many professionals would simply focus on the pronation of the subtalar or maybe go as far as to note a hip weakness. But how many would look at the pelvic rotation? This may be in part to our society's gravitation towards buzz words like pronation or focusing on the symptom area or because many people do pronate. But instead of simply placing an orthotic in client's shoe to fix the pronated subtalar joint maybe we should look to see if a rotated pelvis is actually causing the pronation of the subtalar.

I know there are many who would say the orthotic will fix the pelvic rotation. It may help to a certain degree but it will not fix the cause. Try squeezing your glutes in a standing position with your feet pointing straight ahead. What happens to your feet and ankles? In most people the subtalar will supinate relative to the pronation and the arch of the foot will lift. Why not reduce the pelvic rotation so your client's center of mass away is shifted away the deviated foot and ankle. (posterior direction) How? Strengthen the external rotators of the hip and release the internal rotators.

At a basic level the root cause of pain and joint dysfunction is muscle imbalances. Start at a ground level approach and look at the alignment of your client/athlete's skeletal system in a static posture. If you notice misalignments it is impossible for the muscles to have the same length tension (tonus) from one side of the body when compared to the other. This also applies to the front to back musculature. As an example if you noted one shoulder higher than the other, the traps, levator scap, rhomboids on one side will have different muscle length tensions when compared to the other.

We all know muscles have two attachment points so the difference in height will indicate different muscle length tensions. This simple fact applies to all deviations throughout the body. Muscle imbalances cause skeletal misalignments. These misalignments will lead to faulty joint function and movement. Premature breakdown and injury will follow as well as additional compensated movement patterns. The vicious cycle continues.

In a perfect scenario where both feet are neutral (8-10 degrees of abduction), the stresses and faulty joint alignments that would occur with a rotated pelvis (right to left) are:

Right hip joint would be externally rotated The left hip would be internally rotated The right knee would be medially stressed The left knee would be laterally stressed The right subtalar would pronate The left subtalar would supinate The torso would rotate in the opposite direction to help offset the pelvic rotation The left scapula would ab duct with possible elevation The spinal segments would rotate to adapt to the rotations and lateral spinal flexion The neck would laterally flex or shift right The head would tilt left

Most times you will not see this exact scenario. Instead you will see compensatory joint and body positioning. These compensatory joint and body positions do not take in to consideration an elevated pelvis or an asymmetrical tilted pelvis. That can be addressed in another article.
Common misalignments that occur from a rotated pelvis

External and internal rotated hips depending on the direction of rotation Excessive pronation of subtalar joint more than the other Valgus knee greater on one side -- usually on side of pelvic rotation Depressed shoulder Internal rotation of glenohumeral joint greater on one arm Abducted scapula greater on one side Torso rotated (transverse) in opposite direction or in same direction as pelvic rotation Torso lateral flexion Lateral shift of the pelvis toward the side rotated forward Relative adduction of hip joint on side rotated forward

Common conditions arising from rotated pelvis

Plantar fasciitis Bone spurs It band syndrome Bursitis Osteoarthritis in hip --with prolonged pelvic rotation deviations due to the rotation of hip Chronic ankle sprains Meniscus/cartilage damage with overuse Low back pain Shoulder impingement syndromes

Common movement restrictions and dysfunctions

Inhibited lateral movement Decreased hip extension Decreased glute function on the side rotated forward Overcompensation of upper body Easier to move in one direction Stronger and more stable on one leg (opposite side of forward rotated pelvis) Decreased arm swing on one side Decreased overhead arm movement Decreased torso rotation toward one side

How to evaluate a rotated pelvis

Front view -- have your client or athlete stand in completely relaxed state. Have them close their eyes and march in place for 5 seconds. When they stop that should be a natural standing position. Do not allow them to alter their stance. There will be a tendency for your client to make corrections especially if they know what you are evaluating. Next palpate their anterior superior iliac spine (asis) using both of your thumbs. If one of your thumbs is closer to you then you have noted a rotated pelvis. (Sometimes this is due to an asymmetrical pelvic tilt, however usually one side is usually elevated. This article is focusing only on pelvic rotation.)

Next have your client turn sideways. Again make sure they are standing naturally. Stand about 8 feet away and make sure you are perpendicular to them. If you see their opposite glute muscle when viewing from the side they have a pelvic rotation. (viewing their left side you would see their right glute) Check the other side to make sure. If you check the other side and can not see the opposite glute you have confirmed the pelvic rotation. (viewing their right side you would not see their left glute) You will usually even have to lean over just to see the opposite glute.

Once you evaluate your athlete or client's pelvis in a static position you can then move toward movement screening and/or stability testing.

If there is a pelvic rotation while performing these tests some of the common deviations to watch for are:

**Overhead squat or regular squat**
- increased pelvic rotation from a back view
- foot abducting on the side rotated forward
- valgus knee on the side rotated forward
- excessive pronation of subtalar on the side rotated forward
- external rotation of hip or internal rotation on the side rotated forward depending on knee position
- torso rotation
- one arm dropping forward

**One leg stance**
- internal rotation of hip on the side rotated forward
- relative adduction of the hip on the side rotated forward
- torso flexing to same side
- torso flexing to opposite side
- increased pelvic rotation toward the stance leg

**All fours opposite leg / arm reach (dog pointers)**
- pelvic dipping
- inhibited hip extension and opposite arm extension
- hip adduction on the supported knee
- pelvic lateral shift on supported knee

**Gait analysis**

Now that you have your findings from the static posture and other tests gait evaluation should be next. Evaluating your client or athlete's gait pattern can be very informative. While the body is in motion you get to see how all parts are working together to create linear movement. If you are not familiar with gait evaluation I would highly recommend learning the basics.

**Common findings**

With a gait evaluation the pelvis will either remain rotated forward through each phase of gait or quite often the rotation will be exacerbated at the swing phase (hip flexion). In either of these cases, many times the pelvis on the rotated side
will be inhibited with its ability to anteriorly rotate from midstance through toe off (hip extension). You will also notice a
decrease in the glute size and function on the side rotated forward. Your client's center of mass will be displaced
opposite of the rotated side. (if there is a right to left rotation the mass will move toward the left side) This will usually
result in compensations throughout the rest of their body to counter act the center of mass displacement. A typical
compensation will be an increased arm swing on the contra lateral side of the rotation. (right to left pelvic rotation the
left arm swing would be increased) If you do not think pelvic rotation is important try this simple test. Have your athlete
or client close their eyes and walk toward you at their normal speed. Make sure there are no obstacles to get in the
way, make sure there are no noises to help guide them and make sure they have at least 25 feet to perform this test.
See what direction they walk towards. You and your client may be amazed with the findings. If your client does walk
toward one side when their eyes are closed their body has a tendency to move more efficiently on one side. The
reason for this is their center of mass is being displaced to one side and their body is taking the path of least
resistance. (right to left pelvic rotation -- walk towards the left) With their eyes open they are simply overriding where
their body naturally wants to go. Do you think this affects your athlete's performance, function and pain? Once you
correct their pelvic rotation try the test again.

If you find a pelvic rotation you may have found the source of your athlete's or client's pain and/or limitations. Address
the deviation to gain better overall joint health and function. The steps below can be another tool in your arsenal.

Steps to addressing pelvic rotation

Each objective and exercise in the list will "set up" for the next. It is very important to follow in this order.
There are many exercises you can use to achieve each objective. I am only providing examples.

1. Reciprocal inhibition (abductors and adductors) -- done supine to take torso muscles out of equation -- by
performing reciprocal inhibition you allow the pelvis to "release" in to the floor while benefiting bilateral activation of the
hip abductor and adductors. They are important hip, pelvis and lumbar stabilizers. Perform abduction and adduction
each for (3 sets of 20 reps) Start by placing a strap just above the knees. Make sure the knees are tied together and
the feet are at least hip width. This will create internal rotation so the muscle fibers around the hip are put on tension.
Press out against the strap and release. Only use about 70 percent of maximum effort. Perform (3 sets of 20 reps)
Next place a foam roller or bunched up beach towel between the knees. Make sure the feet and knees are hip width
apart. Squeeze and release the roll. Again only use about 70 percent maximum effort. Perform (3 sets of 20 reps)

2. Stretch deep external rotators of hip while supine -- done supine to take advantage of gravity and minimize muscle
contracture of other areas while the deep hip rotators are released. Make sure the pelvis does not shift away from the
tightness in the hip. If it does shift the pelvis back over to increase the stretch. Hold between (1-2 minutes per leg
depending on the tightness)
3. Activate internal and external hip rotators. Also achieve pelvic and lumbar movement to help coordinate hip rotation with lumbopelvic movement. (2x15 reps)

4. Unilateral hamstring/hip flexor stretch -- done supine again to take help reduce any pelvic rotation - done unilateral to address tonicity of hamstring while releasing the hip flexors. Perform pullovers while in this position to gain additional hip extension due to thoracic and lumbar extension as the arms raise overhead. (3x10 each leg)

5. Bilateral adductor stretch with legs up wall in split -- done to release adductors while knees are in extension - passively shortening the abductors while hips are in external rotation. Place legs up wall in a split position. Dorsiflex the feet and tighten the quads. Hold for (one minute to two minutes)

6. Activate and strengthen external rotators of hip - activate deep hip rotators to hold pelvis in place. The pelvis will anteriorly tilt and there will be shortening of lumbar erectors. Squeeze and release a foam roll or bunched up towel. Try to squeeze with the feet so the deep glutes activate. If your client does not feel the deep glutes have them widen their knees. (3 sets of 15 repetitions)
6. Activate and strengthen external rotators of hip and; 7. Bilateral vertical load -- wall sit

7. Bilateral vertical load -- wall sit -- disengage iliopsoas while in a loaded position. Keep the weight towards the heels. The wall serves as a point of reference where the pelvis is neutral. Hold for (one minute)

At this point check your client. Your athlete or client's pelvic rotation should be better. You have now set your client's body up for dynamic movements. (triplanar, one leg squats, pelvic and torso rotation, stability training, etc) My feeling is do not train and ingrain dysfunction. Check for skeletal deviations and address the dysfunction. Then proceed with functional movements. If you have time constraints simply have your clients or athletes perform the exercises at home. Of course make sure they know how to perform the exercises properly before sending them home. Check for pelvic rotation before each workout.

Aaron, owner of Perfect Postures, is an exercise physiologist / biomechanist who has been helping people with pain and movement restrictions for over 14 years. He has traveled extensively consulting other health care professionals and has set up mobile clinics to help with clients' pain and limitations. His clients range from children to adults as well as many professional athletes. Some of the professional players consist of the San Diego Flash. (professional soccer team) With this team he helped the players with chronic injuries and in pre season he developed and ran the team through conditioning camps. He has worked on numerous NFL, MLB, collegiate and high school athletes including 49'ers, Bills, Seahawks, Steelers, Expos, Padres, Chargers, professional triathletes and many others. He has spoken at and worked with the Jazzercise corporate headquarters. He has been a special advisor to Arnold Schwarzenegger's California Governor's Council on Physical Fitness and Sports. His previous company was featured in the San Diego Union Tribune, front page coverage in the North County Times in San Diego and numerous other publications. He has been featured on San Diego's KUSI television and has been interviewed on radio from all over the world. In 2003 his former company was named "Best Place to go for Sports Injury" in all of southern California by Competitor magazine. In addition he has a patent pending on an ergonomic chair device to help with pelvic and spinal deviations.

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