

STRETCHING THE PIRIFORMIS

By Joseph E. Muscolino, DC

The piriformis is functionally important as a lateral rotator at the hip joint and for its role in stabilizing the sacroiliac joint. It is also functionally important for its relationship to the sciatic nerve (Image 1; see *The Piriformis and Piriformis Syndrome*, page 69). Because the piriformis has multiple roles, it is valuable for therapists to have expertise and comfort working with it. One major manual therapy treatment approach when working on the piriformis is stretching. This article explores the many ways the piriformis can be stretched, comparing and contrasting the relative benefits of each method.

WHAT IS STRETCHING?

Stretching is essentially a simple mechanical process. It is a manual/movement therapy aimed at making a soft tissue longer. This occurs via a fundamental characteristic of soft tissue known as *creep*, which states a soft tissue will deform (change shape) in response to a sustained force placed upon it. In the case of stretching, the deformation/change is for the tissue to become longer.

When musculature is stretched, in addition to the mechanical effect of lengthening, we also have a neurologic effect in which the baseline tone of the musculature is decreased, relaxing the musculature and allowing it to be even more effectively lengthened. Lengthening and relaxing myofascial tissue allows greater range of motion at the joints crossed and, therefore, more ease with movement of the body.

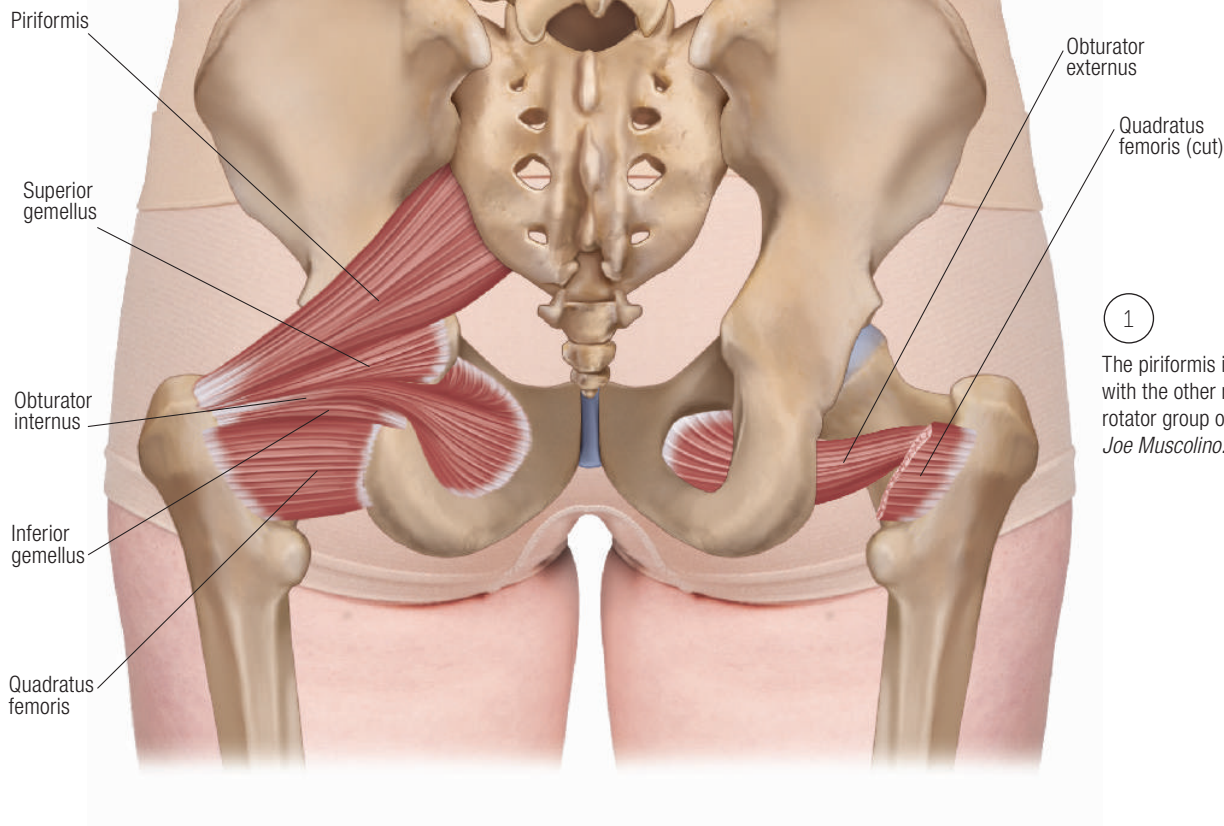
HOW IS STRETCHING ACCOMPLISHED?

Knowing how to stretch a muscle, or any soft tissue, is extremely simple and can be figured out instead of memorized. Approaching how to figure out the stretch of a muscle can be done in two ways. One method is to visualize moving the attachments of the muscle away from each other. The second method is to move the client's body passively into the opposite joint actions of the joint actions of the target muscle. After all, a joint action is the concentric shortening function of the muscle, so to stretch/lengthen this muscle is to do the opposite of its action(s). For example, if a muscle is a lateral (external) rotator of the hip joint, then bringing the hip joint into medial (internal) rotation would lengthen it. If instead the muscle is a medial rotator of the hip joint, then we would lengthen it by laterally rotating the hip joint.

The piriformis attaches from the internal surface of the sacrum to the greater trochanter of the femur (Image 2). Therefore, to stretch it, all we need to do is visualize the attachments of the muscle and then move the client's body such that the femoral attachment of the muscle moves away from the sacral attachment. Alternatively, we can explore stretching the piriformis from the point of view of doing the opposite of its joint actions. However, this can be a bit complicated because the line of pull of the piriformis, and therefore its joint actions, can change when the position of the hip joint changes.

Anatomic Position

When the hip joint is in neutral anatomic position, the line of pull of the piriformis crosses posterior to the hip joint (Image 3A, page 70). Therefore, it is a lateral rotator of the thigh at the hip joint and is stretched by medially rotating the thigh at the hip joint.



1

The piriformis in the posterior pelvis, along with the other muscles of the deep lateral rotator group of the hip joint. *Permission Dr. Joe Muscolino. Artwork by Giovanni Rimasti.*

The Piriformis and Piriformis Syndrome

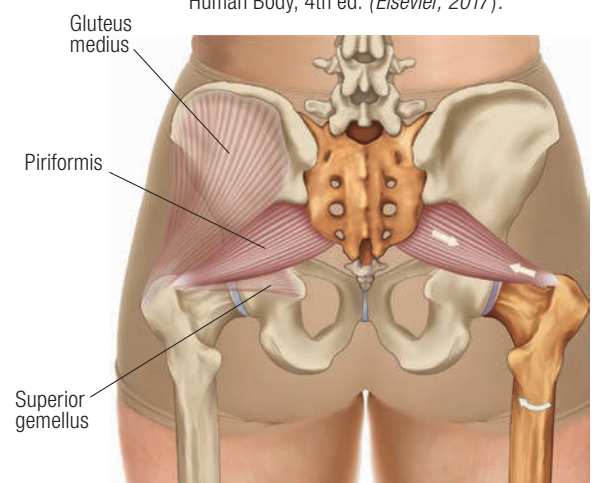
The piriformis is one of the six deep lateral rotators of the hip joint. However, because of its attachment to the sacrum and its relationship to the sciatic nerve, the piriformis is considered to be the most important muscle of this group for manual therapists and movement professionals.

Piriformis syndrome occurs when the piriformis is hypertonic (tight) at baseline tone and compresses the sciatic nerve as the nerve passes between the piriformis and the neighboring superior gemellus. There is a lot of fuss about the fact that in approximately 15 percent of individuals, the relationship of the sciatic nerve to the piriformis is different: part or all of the sciatic nerve can travel through the piriformis or superior to it, between the piriformis and gluteus medius. However, an argument can be made that these variations are not more likely to cause compression of the sciatic nerve than the usual presentation. This is because, with these variations, the sciatic nerve is less likely to be compressed since it is actually farther from the pelvic bone, a much harder structure than a tight muscle.

Regardless of the presentation, if the piriformis is sufficiently tight, the sciatic nerve can be compressed. This compression would create the symptoms of sciatica, similar to those that would occur if compression of the nerve roots of the sciatic nerve were compressed by a pathologic disc.

2

The piriformis is seen bilaterally. The gluteus medius and superior gemellus have been ghosted in on the left. *Permission Dr. Joe Muscolino, The Muscular System Manual: The Skeletal Muscles of the Human Body, 4th ed. (Elsevier, 2017).*





▶ Watch “Piriformis Becomes a Medial Rotator of the Thigh”

Because the piriformis can also abduct the thigh at the hip joint, it is important when stretching it to have the thigh adducted (or at least have the thigh in a neutral frontal plane position and not abducted).

Hip Joint Flexed

When the thigh is flexed at the hip joint to 90 degrees, the line of pull of the piriformis moves to the anterior side of the joint (Image 3B). Therefore, the piriformis becomes a medial rotator of the thigh at the hip joint; consequently, stretching it is accomplished by laterally rotating the hip joint.

When the thigh is flexed at the hip joint to 90 degrees, the piriformis can also be described as a horizontal abductor of the thigh at the hip joint. Therefore, the piriformis can be stretched by horizontally adducting the thigh at the hip joint.

STRETCHING PROTOCOLS FOR THE PIRIFORMIS

Given that the piriformis has multiple possible joint actions, there are many choices when it comes to stretching it. Following are some of the more common protocols that are used to effectively stretch the piriformis.

Prone Position

When the client is prone, the hip joint is in an anatomic position; therefore, the piriformis is a lateral rotator at the hip joint and would be stretched with medial rotation. Because it is difficult to rotate the client’s thigh by directly contacting it, the (lower) leg is used as a lever to rotate the thigh (see Using the Leg as a Lever to Rotate the Thigh, below). To do this, the therapist stands to the side of the client. The client’s leg is flexed at the knee joint to 90 degrees, and the therapist contacts the client’s distal leg. The client takes a breath in, and then—as the client exhales—the therapist brings the distal leg outward, which brings the thigh into medial rotation at the hip joint, stretching the piriformis

(Image 4). Because the reverse closed-chain action of the piriformis is to contralaterally rotate the pelvis at the hip joint, the therapist stabilizes the pelvis with the other hand by pressing on the opposite-side (contralateral) posterior superior iliac spine (PSIS). One precaution when using this stretching protocol is that using the leg as a lever to rotate the thigh torques the knee joint, so this protocol is not recommended if the client has a knee pathology.

Note: Bringing the client’s distal leg outward may seem counterintuitive to medially rotate the thigh, but keep in mind that rotation is always named for where the anterior surface of the body part orients. When the leg is brought outward, the anterior surface of the thigh orients inward/medially.

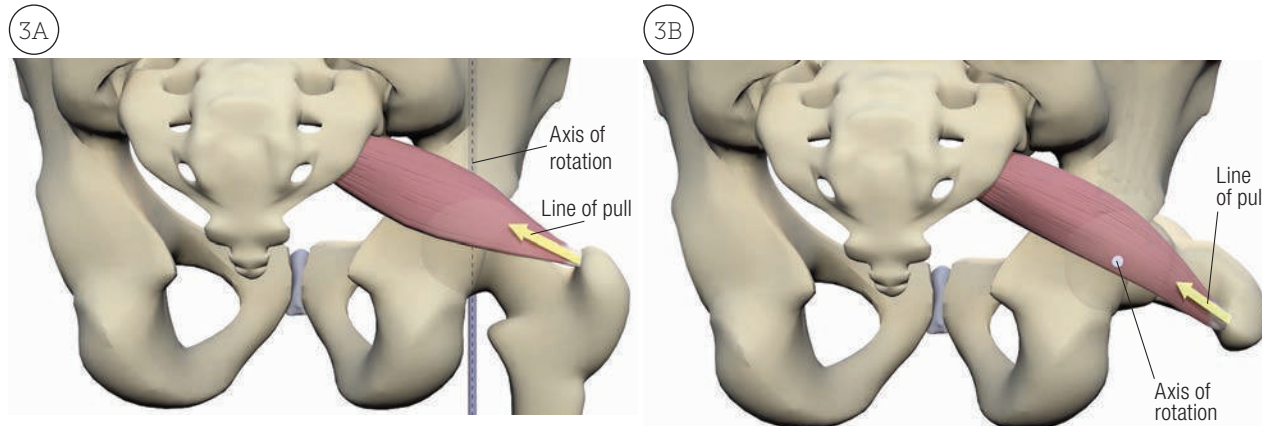
Supine Position—Lateral Rotation

There are many ways the piriformis can be stretched when the client is supine. Perhaps the best known protocol is the stretch that is sometimes referred to as the figure-4 stretch because the positioning of the lower extremities resembles the numeral 4.

Using the figure-4 stretch protocol, the client’s hip joint is flexed and laterally rotated, and the knee joint is flexed to 90 degrees. The therapist then places a force into the client’s (lower) leg, using it as a lever to laterally rotate the thigh at the hip joint, thereby stretching the piriformis.

Using the Leg as a Lever to Rotate the Thigh

Because of the soft tissues that surround the femur, it is logistically difficult to directly contact the thigh to rotate the femur. Instead, the (lower) leg is usually used as a lever to rotate the thigh/femur at the hip joint. This is extremely efficient but does place a torque (rotational force) into the knee joint. For this reason, if the client has an unhealthy knee, any protocol that uses the leg as a lever to stretch the piriformis is either precautioned against or contraindicated.



When in anatomic position, the line of pull of the piriformis crosses posterior to the hip joint; therefore, the piriformis is a lateral rotator of the thigh (3A). However, when the hip joint is flexed to 90 degrees, the line of pull of the piriformis changes to pass anterior to the joint; therefore, the piriformis becomes a medial rotator (3B).
Artwork by Dave Carlson.

4

Stretching the right-side piriformis with the client prone.



The distal thigh can also be contacted to add to the lateral rotation force. As discussed earlier, when the thigh is flexed to 90 degrees, the piriformis becomes a medial rotator and is therefore stretched with lateral rotation. There are a number of ways the client can be contacted when performing this stretch (Images 5A–5C).

Note: As with the prone stretch, because the leg is used as a lever to achieve the stretch, this protocol is precautioned against or contraindicated if the client has an unhealthy knee joint.

Supine Position—Horizontal Adduction—Pushing

Because the piriformis becomes a horizontal abductor when the thigh is first flexed to 90 degrees, it can be stretched with horizontal adduction—in other words, bringing the thigh across the front of the client's body. This protocol is usually performed by the therapist standing to the side of the client and pushing the thigh into horizontal adduction (Image 6).

It is important when performing this stretch that the client's pelvis remains on the table; otherwise, the stretch will move into the lumbar spine and be lost for the piriformis. Keeping the pelvis on the table is achieved by pushing across the table but also somewhat down toward the floor.

An advantage to this stretching protocol is that the therapist can contact directly on the client's thigh instead of the (lower) leg. Therefore, this stretch can be performed even if the client has an unhealthy knee joint.

Supine Position—Horizontal Adduction—Pulling

Another way the supine client's piriformis can be stretched into horizontal adduction is for the therapist to stand on the opposite side of the table from the side of the piriformis being stretched and pull the client's thigh into horizontal adduction instead of pushing it. The advantage to this approach is that the therapist can use their body weight to create the stretch.



Supine position: Stretching the right-side piriformis with lateral rotation of the thigh at the hip joint. The client's other lower extremity is used to contact the client's leg. The therapist directly contacts the client's leg.

Stretching and Breathing

Many breathing protocols are recommended when stretching the client, especially when using manual methods for the stretch. However,

To have access to the complete article, subscribe to LMCE.

CLICK HERE TO SUBSCRIBE!