A Comprehensive Manual Therapy Treatment Guide for Piriformis Syndrome

by: Dr. Joe Muscolino  ©2018  Learnmuscles.com
Introduction to Piriformis Syndrome:

**Piriformis syndrome** is a condition in which a tight piriformis muscle compresses against the sciatic nerve, causing symptoms of sciatica into the lower extremity. The sciatic nerve usually exits from the internal pelvic cavity into the buttock/gluteal region between the piriformis and the superior gemellus muscles. However, in approximately 15% of
individuals, part or all of the sciatic nerve passes through the piriformis muscle or above it (between the piriformis and gluteus medius). Regardless of the presentation of the sciatic nerve in the gluteal region, if the piriformis is tight, it can compress against the sciatic nerve and cause piriformis syndrome.

**Causes:**

In anatomic position, the piriformis is a lateral (external) rotator of the thigh at the [hip joint](https://www.learnmuscles.com/hip-joint), as well as a contralateral rotator of the [pelvis](https://www.learnmuscles.com/pelvis) at the hip joint. If the thigh is flexed to approximately 60 degrees or more, the piriformis switches from being a lateral rotator to being a medial (an internal) rotator of the thigh, and also becomes a horizontal abductor of the thigh at the hip joint.

The piriformis also crosses the sacroiliac joint (SIJ) and is therefore active as a stabilizer of the SIJ. Because piriformis syndrome is caused by a tight piriformis muscle, any posture or movement pattern that places a demand on the piriformis to contract can increases the baseline tone of the muscle and cause or contribute to piriformis syndrome.

One of the principal causes of a tight piriformis muscle is when it tightens to stabilize a dysfunctional or painful SIJ. Dysfunctional SIJ conditions include sprain, hypomobility, hypermobility, or a macrotrauma or repeated microtrauma that causes irritation/inflammation and therefore pain at the joint. Of these, pain and hypermobility would most likely cause the piriformis to tighten. The piriformis will also tend to tighten if the client/patient has a chronic posture of lateral rotation of the thigh, thereby allowing the piriformis to adaptively shorten and become tight. This can occur due to driving when the foot is on the gas pedal but the heel is placed in front of the
brake; it can also occur in clients who have a habitual pattern of crossing the legs so that the ankle is on the opposite-side knee.

**Signs and symptoms:**

*Piriformis* syndrome causes compression upon the sciatic nerve; therefore it causes symptoms of sciatica, just as if the sciatic nerve were compressed by a pathologic disc or bone spur in the lumbar spine. (Note: Some textbooks refer to this symptomology as “pseudo-sciatica” because it is not sciatica caused by compression at the spine; however, sciatic compression is sciatic compression and should rightly be called sciatica, regardless of where the compression exists.) Sciatic nerve compression can cause sensory or motor symptoms into the lower extremity, primarily into the posterior thigh, leg or foot. Because piriformis syndrome involves a tight piriformis, this condition is also usually characterized by tightness and pain in the buttock. If the piriformis is tight enough, it might also affect the posture of the thigh, resulting in increased lateral (external) rotation of the thigh at the hip joint.
Assessment/diagnosis:

There are two major facets to assessing/diagnosing piriformis syndrome. First, compression of the sciatic nerve is assessed by both clinical history and orthopedic assessment tests for sciatic compression. Second, the piriformis is determined to be the cause of the client’s/patient’s sciatica. It should be stressed that piriformis
syndrome is not just the presence of a tight piriformis, but that the tight piriformis is compressing the sciatic nerve.

It should be first determined that the client/patient is experiencing sciatica referral symptoms into the lower extremity. During the verbal history, the client/patient should state that they are experiencing sensory or motor disturbance into the lower extremity; altered sensation (paresthesia) is most common. Orthopedic assessment tests are then performed to confirm compression of the sciatic nerve. These tests are straight leg raise (SLR), slump test, cough test, and Valsalva maneuver, as well as testing for lower extremity muscle strength by asking the client/patient to stand first on the toes and then on the heels.

Once it has been determined that the client/patient has sciatic nerve compression, piriformis tone must be assessed to see if it is possibly the cause of the compression. This can be done via palpation and also by assessing the piriformis muscle’s ability to lengthen by stretching it. The piriformis is palpated between the middle of the sacrum and the greater trochanter of the femur. With the client prone and the leg flexed at the knee joint to 90 degrees, palpating in this location, have the client/patient laterally rotate the thigh at the hip joint against your resistance by having them press their distal leg medially against your hand. Once the piriformis has been accurately located, have the client/patient relax and palpate it for tightness and pain. If the piriformis is tight or painful upon palpation, this does not confirm that the piriformis is necessarily the cause of the client’s/patient’s lower extremity sciatica; however it does make it more likely that the piriformis is involved. If palpation were to reproduce the characteristic lower extremity referral symptoms, this would confirm that the piriformis is the cause (or a cause) of the sciatica.
Length assessment of the piriformis can be done by laterally rotating the flexed thigh (note: when the thigh is flexed to approximately 60 degrees or more, the piriformis becomes a medial rotator, therefore lateral rotation will lengthen and stretch it). This stretch is often called the “Figure 4 stretch.” The piriformis can also be stretched by horizontally adducting the thigh at the hip joint. Similar to palpation assessment, tightness of the piriformis determined by length assessment stretching does not confirm that it is the cause of the client’s/patient’s sciatica symptoms, but it does increase the likelihood that the piriformis is involved. More definitive causality would be determined if stretching the piriformis directly reproduces the client’s/patient’s symptoms of sciatica.

As stated, determining the piriformis to be tight with palpation and stretching does not necessarily implicate the piriformis as the cause of the client’s/patient’s sciatica. It is extremely common for the client/patient to have sciatica due to another cause and to also have a tight piriformis. However, if the client’s/patient’s sciatica symptoms are directly reproduced when the piriformis is palpated and/or stretched, causality of the tight piriformis and piriformis syndrome can be more confidently determined. Short of this, if the client/patient is found to have a tight piriformis and no other cause for their sciatica symptoms have been found, then treatment should proceed on the assumption that the client/patient does have piriformis syndrome. Definitive assessment of piriformis syndrome can then be made if this treatment results in improvement of their sciatica symptoms.

**Note:** Because the piriformis is so often tight to stabilize the sacroiliac joint, whenever a tight piriformis is found, it is important to also assess the health of the sacroiliac joint.
**Differential diagnosis:**

Because piriformis syndrome causes symptoms into the lower extremity, it must be differentially assessed from all other conditions that refer into the lower extremity. These conditions include a pathologic disc or bone spur (space-occupying lesion / nerve impingement) of the lumbar spine, as well as myofascial trigger point referral into the lower extremity. It is also possible for symptoms into the lower extremity to be caused by a local condition of the lower extremity but to be incorrectly assessed as being referred from the lumbar spine or pelvis. Note: Piriformis syndrome should also be differentially assessed from a piriformis muscle that is tight but not compressing the sciatic nerve. If the latter condition is present and the client/patient is experiencing lower extremity referral, then another condition is causing the referral and should be investigated and assessed.

**Manual Therapy treatment for piriformis syndrome:**

Treatment for a tight piriformis that is causing piriformis syndrome is directed at loosening the muscle. A tight piriformis can be treated very successfully with moist heat, soft tissue manipulation, and stretching. Moist heat is effective to initially warm up and relax the piriformis; application of a hydrocollator pack for approximately five minutes is sufficient. Whenever deep pressure is used, it is important to grade up to it by beginning with light and then medium pressure. Once deeper pressure is used, be sure to sink slowly into the piriformis and surrounding musculature. It is important to work as much of the piriformis as can be reached.
The piriformis responds well to strokes oriented across and along the length of the muscle. It is perhaps easiest to begin with cross fiber strokes just off the sacrum and gradually work laterally and distally/inferiorly toward the greater trochanter. A smaller contact such as a braced thumb allows for increased sensitivity and specificity when working the piriformis; however, the elbow is more effective at generating deep pressure to work through the gluteus maximus.

Pin and stretch technique is also very effective at loosening tight areas within the piriformis for the client with piriformis syndrome, especially trigger points and taut bands located more laterally within the muscle. To apply pin and stretch to the piriformis with the client prone, first relax and slacken the muscle by passively laterally rotating the thigh at the hip joint, then place the contact into the muscle and apply firm pressure to pin the muscle at that point, then stretch the pinned piriformis by medially rotating the thigh at the hip joint.

Now stretch the piriformis with either the Figure 4 stretch and/or horizontal adduction stretch. The disadvantage to the Figure 4 stretch is that the leg is used as a lever; therefore a torque is placed on the knee joint. The horizontal adduction stretch avoids placing force through the knee joint, but clients often experience an uncomfortable pinching sensation at the anterior hip joint region with this stretch. This pinch can often be lessened by placing a small rolled-up towel along the inguinal ligament. If this does not work, the therapist can often successfully decrease or eliminate the pinching sensation by using their braced finger pads to traction the soft tissue and the femur distally from the acetabulum; the client’s/patient’s thigh should then be moved around the space created by this traction. Finally, whenever the piriformis is treated, it is important to assess the motion of the sacroiliac joints and mobilize them if necessary.

Summary of Manual Treatment Protocol for Piriformis Syndrome

1. Moist heat for approximately five minutes.

2. Soft tissue deep pressure manipulation to the piriformis. An effective approach is to perform cross fiber strokes: begin at the sacrum and gradually
work toward the greater trochanter

3. Apply pin and stretch

4. Stretch the piriformis using lateral rotation (Figure 4 stretch) and/or horizontal adduction of the thigh

5. Mobilize (arthrofascial stretching for) the sacroiliac joint.

**Precautions/contraindications:**

Care must be exercised to avoid placing excessive pressure directly on the sciatic nerve. If deep pressure in the gluteal region causes a sharp pain that shoots down the lower extremity, adjust your location slightly so that you are no longer pressing directly on the sciatic nerve. Regarding stretching of the piriformis, avoid the Figure 4 stretch if the client/patient has an unhealthy knee joint.
Self-care for the client/patient:


Self-care for piriformis syndrome involves moist heat followed by stretching. The client/patient can perform either the Figure 4 or the horizontal adduction stretch. It is also important to avoid postures that would likely cause the piriformis to become tight. Postures that involve lateral rotation of the thigh at the hip joint would result in adaptive shortening and therefore tightening of the lateral rotators, including the piriformis. A typical example is sitting with the legs crossed with the ankle on the opposite-side thigh. If the client/patient overpronates, this should be corrected because it places an increased stress on the piriformis to prevent the leg and thigh from falling into medial rotation.
Self-care trigger point work can also be done by having the client roll on a ball (such as a soft ball or perhaps a commercially designed ball by Yoga Tune Up® or other company).

**Medical approach:**

The medical community does not often recognize Piriformis syndrome. When it does, typical allopathic treatment includes oral steroidal anti-inflammatory (cortisone) medication, as well as cortisone injection into the gluteal region.

**Manual therapy case study:**

Raj is a marketing and sales manager for a large corporation who travels extensively by car for his work. He has noticed a tingling into his left foot. The tingling began insidiously approximately two weeks ago but has quickly worsened and is now quite uncomfortable. He notices that it tends to be worse during the week after long drives. He has decided to consult an orthopedic manual therapist to see if massage could help.

The therapist performed passive straight leg raise (SLR), slump test, cough test and Valsalva maneuver. Raj was negative for referral to slump test, cough and Valsalva, but SLR did slightly reproduce the tingling. Nachlas and Yeoman’s test were performed and resulted in mild left sacroiliac pain, but did not reproduce the tingling. Motion palpation of Raj’s sacroiliac joints demonstrated hypomobility on the left side. His low back ranges of motion are normal. His erector spinae musculature on the left side is moderately to markedly tight. His piriformis on the left side is markedly tight and tender to palpation, and
reproduces a faint sensation of tingling into his left foot. His left thigh medial (internal) rotation range of motion is decreased and postural exam reveals that Raj stands with his left foot flared out laterally (his left thigh laterally rotated). Local examination of this left foot revealed no sign of pathology.

Given that Raj has been experiencing tingling in the left foot, which is typical of sciatica, it seemed fairly certain that he was experiencing sciatica. What the therapist had to determine was the cause or causes. Positive SLR indicates sciatic nerve compression. However, because the slump test, cough and Valsalva maneuver were negative, there is a good chance that the compression is not coming from the lumbar spine. Tightness of the left piriformis, with reproduction of the characteristic tingling indicates that piriformis syndrome is likely the cause of the sciatic compression. Left sacroiliac pain with Nachlas and Yeoman’s tests make it likely that the piriformis is tightening as a compensatory mechanism to stabilize an unhealthy sacroiliac joint.

The therapist recommended that Raj come in twice a week for three weeks to work on his piriformis and sacroiliac joint. Additionally, the therapist’s treatment plan included soft tissue manipulation and stretching to the lumbar extensor and hamstring musculature, especially on the left side. Given that there was still a chance that some or all of the nerve compression was coming from nerve impingement at the spine, the therapist was careful to pay attention to how Raj progressed with treatment (especially given that double knee to chest stretch which would be part of the treatment plan would possibly aggravate a disc pathology, if present).

The therapist’s session consisted of moist heat, soft tissue manipulation, pin and stretch, and horizontal adduction stretch to the left piriformis, as well as work to all of the lateral rotation musculature in the gluteal region. This was followed by moderate depth pressure to
Raj’s low back and hamstrings bilaterally, and also knee to chest and double knee to chest stretches. The therapist then gently mobilized Raj’s sacroiliac joint. For self-care, the therapist recommended that Raj apply moist heat and stretch his piriformis, as well as his hamstrings, and his lumbar erector spinae with double knee to chest stretch. It was also recommended that Raj avoid sitting and driving as much as possible for the next few weeks, and that he begin Pilates to build up his core strength.

At the end of three weeks, Raj’s symptoms were relieved. The therapist progressively weaned Raj down to one visit every two to four weeks for proactive care.
1. Multiple Approaches to Stretching the Piriformis (20:29 min)
2. Transitioning Piriformis Stretch into Sacroiliac Joint Mobilization (3:15 min)
3. Piriformis Test for Piriformis Syndrome (4:05 mins)
4. Piriformis pin and stretch modification with Michael Wolff (2:22 mins)
5. Piriformis Horizontal Adduction Stretch – Modified for Anterior Discomfort (2:00 mins)
6. Piriformis Becomes a Medial Rotator of the Thigh
7. Palpating the Piriformis using Forearm for Resistance (1:41 mins)