



PIRIFORMIS SYNDROME

[DOCUMENT SUBTITLE]

Pooran Yazdanpanah [S1702137](#)





National University Of Medical Sciences

NUMSS

Title Of Thesis:

Piriformis Syndrome

Written by :

Pooran Yazdanpanah

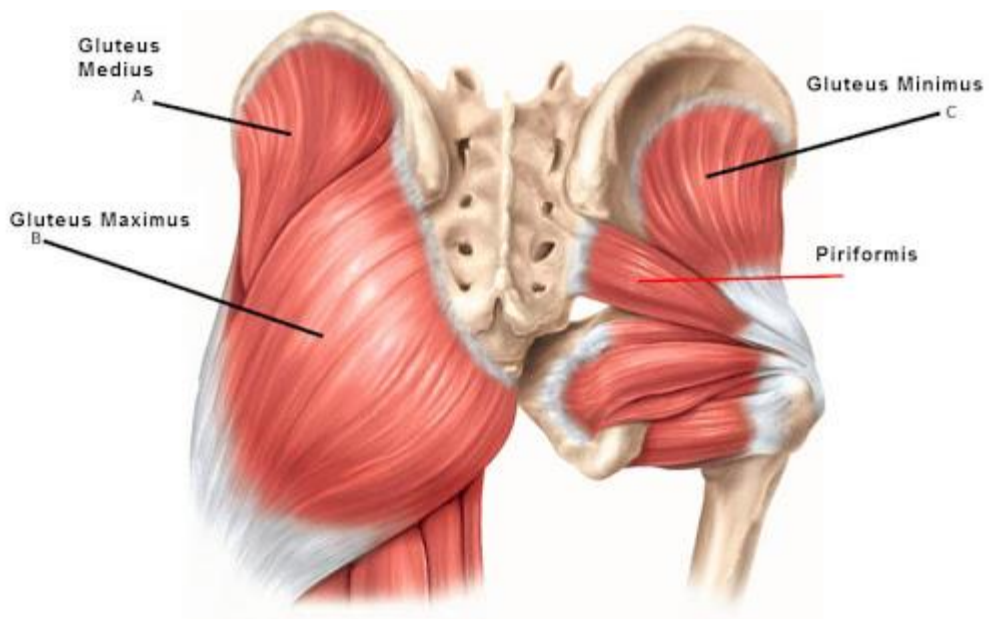
SN:S1702137

For: Doctor Of Physical Therapy Degree (DPT)

Supervisor:

Dr. Farjoud Shokouhi.PT.DPT.DO

Piriformis syndrome



The **piriformis muscle** is a flat, band-like muscle located in the buttocks near the top of the hip joint. This muscle is important in lower body movement because it stabilizes the hip joint and lifts and rotates the thigh away from the body

The piriformis muscle originates from the anterior (front) part of the sacrum, the part of the spine in the gluteal region, and from the superior margin of the greater sciatic notch (as well as the sacroiliac joint capsule and the sacrotuberous ligament). It exits the pelvis through the greater sciatic foramen to insert on the greater trochanter of the femur. Its tendon often joins with the tendons of the superior gemellus, inferior gemellus, and obturator internus muscles prior to insertion.

The piriformis is a flat muscle, pyramidal in shape, lying almost parallel with the posterior margin of the gluteus medius.

It is situated partly within the pelvis against its posterior wall, and partly at the back of the hip-joint.

It arises from the front of the sacrum by three fleshy digitations, attached to the portions of bone between the first, second, third, and fourth anterior sacral foramina, and to the grooves leading from the foramina: a few fibers also arise from the margin of the greater sciatic foramen, and from the anterior surface of the sacrotuberous ligament.

The muscle passes out of the pelvis through the greater sciatic foramen, the upper part of which it fills, and is inserted by a rounded tendon into the upper border of the greater trochanter behind, but often partly blended with, the common tendon of the obturator internus and superior and inferior gemellus muscles.

Function

The piriformis muscle is part of the lateral rotators of the hip, along with the quadratus femoris, gemellus inferior, gemellus superior, obturator externus, and obturator internus. The piriformis laterally rotates the femur with hip extension and abducts the femur with hip flexion. Abduction of the flexed thigh is important in the action of walking because it shifts the body weight to the opposite side of the foot being lifted, which prevents falling. The action of the lateral rotators can be understood by crossing the legs to rest an ankle on the knee of the other leg. This causes the femur to rotate and point the knee laterally. The lateral rotators also oppose medial rotation by the gluteus medius and gluteus minimus. When the hip is flexed to 90 degrees, piriformis abducts the femur at the hip and reverses primary function, internally rotating the hip when the hip is flexed at 90 degrees or more.

Function of piriformis muscle ,

- Assist movement of lower body.
- Stabilize pelvis and hip joint.
- Assist while lower leg is lifted from ground .
- Assist during rotation of lower leg .

Contraction of piriformis muscle

- Stabilize pelvis and hip joint while walking .
- Maintain balance of the pelvis when weight is transmitted from one leg to another leg .

Piriformis syndrome is a condition in which the **piriformis** muscle, located in the buttock region, spasms and causes buttock pain. The **piriformis** muscle can also irritate the nearby sciatic nerve and cause pain, numbness and tingling along the back of the leg and into the foot (similar to sciatic pain).

Piriformis syndrome is becoming popular and this syndrome is not clearly understood .

There is minimal information related to the subject of piriformis syndrome.

Clearly ; piriformis syndrome can be confused sciatica and lower back pain .

Sometimes it is hard to differentiate between piriformis syndrome and lumbar spinal disc herniation which both cause sciatica .

The piriformis muscle arise from the anterolateral part of the sacrum and is inserted in to the posterior aspect of the greater trochanter (deep in to the buttock)pain associated with piriformis syndrome is usually deep in the buttock and post thigh.

it may also include the posterior aspect of the leg due to irritation of the sciatic nerve .

The patient will complain of pins and needles down the leg and confusion may happen with patient being misdiagnosed as having lumbar disc herniation.

Primary causes of piriformis syndrome

In most cases piriformis muscle splits the sciatic nerve resulting in irritation sciatic nerve and pain .

In few cases sciatic nerve splits piriformis muscle contraction pinches sciatic nerve which results in pain .

Secondary causes of piriformis syndrome

Piriformis syndrome is caused by ischemic changes in muscles because of decreased blood supply .

Pain is also caused by muscle injury following major or minor trauma.

Major trauma is known as macro trauma

Other causes may include :

Twisting and bending while picking up an object from the floor .

Carrying heavy objects on the stairs.

Downhill running.

Symptoms of Piriformis Syndrome

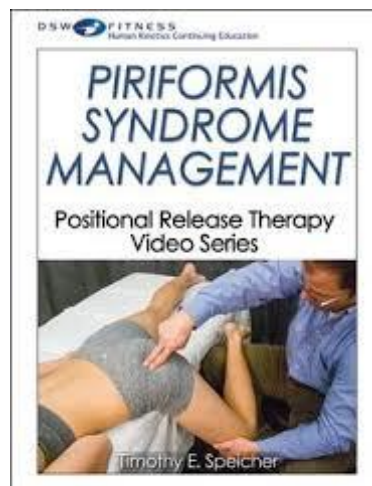


Most commonly, patients describe acute tenderness in the buttock and sciatica-like pain down the back of the thigh, calf and foot. Typical piriformis syndrome symptoms may include:

- A dull ache in the buttock
- Pain down the back of the thigh, calf and foot (sciatica)
- Pain when walking up stairs or inclines
- Increased pain after prolonged sitting
- Reduced range of motion of the hip joint

Symptoms of piriformis syndrome often become worse after prolonged sitting, walking or running, and may feel better after lying down on the back.

Diagnosing Piriformis Syndrome



● Online Course

Diagnosis of piriformis syndrome is based on a review of the patient's medical history, a physical examination and possibly diagnostic tests.

Piriformis syndrome is often a diagnosis made through a process of ruling out other possible conditions that may be causing the patient's symptoms, such as a lumbar disc herniation or sacroiliac joint dysfunction

Piriformis Test

Piriformis syndrome is a neuromuscular condition characterized by hip and buttock pain. This syndrome is often overlooked in clinical settings because its presentation may be similar to that of lumbar radiculopathy, primary sacral dysfunction, or innominate dysfunction. The ability to recognize piriformis syndrome requires an understanding of the structure and function of the piriformis muscle and its relationship to the sciatic nerve. The authors review the anatomic and clinical features of this condition, summarizing the osteopathic medical approach to diagnosis and management. A holistic approach to diagnosis requires a thorough neurologic history and physical assessment of the patient based on the pathologic characteristics of piriformis syndrome. The authors note that several nonpharmacologic therapies, including osteopathic manipulative treatment, can be used alone or in conjunction with pharmacotherapeutic options in the management of piriformis syndrome.

There is no definitive test for piriformis syndrome. Diagnosis of piriformis syndrome is made from your description of symptoms and by physical exam using a variety of movements to see if you have pain in the piriformis muscle. In some cases, a contracted or tender piriformis muscle can be found during a physical exam.

It can be performed in two methods:

1. **Piriformis test in side-lying position:** For performing the test, the patient is positioned in side-lying on the unaffected side. The symptomatic leg is positioned in 60 to 90 degrees of flexion in the hip and 90 degrees flexion in the knee joint. The patient should be lying with the face directed towards

the examiner, the examiner's hand is placed on the pelvis to stabilize it, The other hand is placed on the lateral side of the knee. The examiner gives hand pressure on the lateral side of the knee and tries to stretch the part as far as possible. The examiner performs a horizontal adduction while putting pressure on the knee in the direction of the table. During the stretch the patient may feel pain or discomfort .This test is also named as the [FAIR test](#) (Flexion Adduction and Internal Rotation).



2.Seated Piriformis Test: The piriformis test can also be examined in seated position on the chair with back upright and feet resting on the ground. The test is performed by crossing the affected leg and placing the ankle of the affected leg on the unaffected knee. One hand of the examiner is at the ankle to stabilize the part while the other hand is placed on the lateral side of the knee. The patient is then asked to bend forwards to feel the stretch in the gluteal region or the examiner pulls the knee towards the chest.

Results

The patient may complain of pain in the piriformis muscle region or the gluteal region, The pain may increase suddenly and there could also be a pain in the posterior aspect of the thigh. This indicates that the pain is because of the piriformis muscle tightness and the sciatic nerve is not directly involved by the lumbar disc herniation. There could be pain in the buttock and throughout the course of the sciatic nerve that is posterior part of thigh and leg then this indicates that the sciatic nerve has become pinched by the piriformis muscle. The positive result of the test indicates [Piriformis syndrome](#). Although the pain could be because of both the piriformis muscle and a lumbar disc herniation which can be identified by performing the Straight Leg Raising Test. The Freiburg sign also stretches the piriformis muscle where, in the supine lying position, the hip is passively medially rotated and extended. There is burning pain felt in the gluteal region and also throughout the course of the sciatic nerve signaling that the

sciatic nerve has been irritated by the pinching of the piriformis muscle. This is also an indication of Piriformis syndrome. In this syndrome, we speak of pain or numbness in the buttock and posterior thigh with occasional radiation into the foot. Another possible cause for the clamping of the sciatic nerve are [trigger points](#) in the piriformis muscle.

3-The Beatty test is another diagnostic test for piriformis syndrome. In this test, the patient lies on the unaffected side, lifting and holding the superior knee approximately 4 inches off the examination table. If sciatic symptoms are recreated, the test result is positive.



The attachment of the piriformis muscle to the anterior surface of the sacrum, fixing the sacrum's oblique axis on the contralateral side and causing the sacrum to rotate to the ipsilateral side.

Treatment

Throughout the physical evaluation of patients, clinicians should maintain a high index of suspicion for piriformis syndrome. Early conservative treatment is the most effective treatment, as noted by Fishman et al, who reported that more than 79% of patients with piriformis syndrome had symptom reduction with use of nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, ice, and rest.

Stretching of the piriformis muscle and strengthening of the abductor and adductor muscles should also be included in patient treatment plans. A manual medicine approach may combine muscle stretches, Gebauer's spray and stretch technique, and soft tissue, myofascial, muscle energy, and thrust techniques to address all somatic dysfunctions in the patient with piriformis syndrome. If the patient does not respond adequately to manual treatment, then acupuncture and trigger point injection with lidocaine hydrochloride, steroids, or botulinum toxin type A (BTX-A) may be considered.

If all of the pharmacologic and manual medicine treatments fail, the final treatment option is surgical decompression

Pharmacologic Treatment

Nonsteroidal anti-inflammatory drugs and acetaminophen have been considered the medications of choice in the management of the many conditions that manifest as low back pain, including piriformis syndrome. Patients using NSAIDs, compared with those using placebo, reported global reduction of symptoms after 1 week of treatment.

Muscle relaxants are another frequently prescribed medication for patients with piriformis syndrome. Patients using muscle relaxants are nearly five times

as likely to report symptom improvement by day 14, compared with patients given placebo. Common adverse effects of muscle relaxants are dryness of mouth, drowsiness, and dizziness.

Few studies have examined the role of narcotic analgesics in managing acute vs chronic musculoskeletal pain. However, it is clear that some patients with chronic pain do benefit from these medications. Narcotics can be helpful in controlling episodes of severe or debilitating pain, but they should be considered a short-term treatment only. Constipation, gastrointestinal upset, and sedation are common adverse effects of narcotic medications. In addition, the potential for addiction should always be considered when initiating treatment with medications from this drug class.

Local steroid injections can produce an anti-inflammatory effect. Although evidence for the efficacy of steroids in cases of chronic musculoskeletal pain is inconclusive, steroid injections have proven helpful in the treatment of carefully selected patients. Infection is the most common complication of this invasive treatment.

Other potential treatments for patients with piriformis syndrome include prolotherapy (ie, sclerotherapy, ligament reconstructive therapy). This kind of treatment involves injection of an irritating solution at the origin or insertion of ligaments or tendons to strengthen the weakened or damaged connective tissue. There is little published research regarding the efficacy of this treatment option. Infection is the most common complication of prolotherapy.

Osteopathic Manipulative Treatment

The goals of osteopathic manipulative treatment (OMT) for patients who have piriformis syndrome are to restore normal range of motion and decrease pain. These goals can be achieved by decreasing piriformis spasm. Indirect osteopathic manipulative techniques have been used to treat patients with piriformis syndrome. The two indirect OMT techniques most commonly reported for the management of piriformis syndrome are counterstrain and facilitated positional release. Both techniques involve the principle of removing as much tension from the piriformis muscle as possible.

Three tender point locations can be addressed with counterstrain—at the midpole sacrum, piriformis muscle, and posteromedial trochanter. To position a patient for counterstrain treatment, the patient is generally asked to lie in a prone position with the affected side of the body at the edge of the examination table. In performing the counterstrain technique, the osteopathic physician brings the patient's affected leg over the side of the table, placing it into flexion at the hip and knee, with abduction and external rotation at the hip .

Facilitated positional release can also be achieved, with compression through the long axis of the femur from the knee toward the sciatic notch. This additional compressive force can reduce patient treatment time from 90 seconds when performing counterstrain to 3 to 5 seconds when performing facilitated positional release.

Direct OMT techniques can be performed using either active or passive methods. The direct OMT techniques that are the most useful in treating patients with piriformis syndrome include muscle energy, articulatory, Still, and high velocity/low amplitude. The muscle energy technique can be applied in the management of piriformis spasm, as well as for associated dysfunctions

of the sacrum and pelvis. No absolute contraindications are defined for the muscle energy technique. The patient must understand the required amount of muscular force and the correct direction of this force for the technique to be effective.

Articulatory OMT techniques are applied by advancing and retreating from a restrictive barrier in a repetitive manner to advance that barrier and increase the range of motion. The presence of osteoarthritis can limit the applicability of this technique secondary to articulatory pain. The Still technique, a specialized form of articulatory treatment, is begun by placing a joint in a relaxed position away from restrictive barriers. Then, with an arching motion, compression is applied to the level of dysfunction and moved toward the restrictive barrier while the patient is passive and relaxed. No absolute contraindications are defined for the Still technique.

High velocity/low amplitude technique is most often used in cases of piriformis syndrome to correct associated sacral and pelvic somatic dysfunctions. Extreme caution should be exercised when using this manual technique with individuals who have osteoporosis.



Coinvestigator Rance L. McClain, DO, demonstrates application of the counterstrain technique of osteopathic manipulative treatment as used to treat the piriformis counterstrain point.

Physical Therapy

Patients with piriformis syndrome may be treated with physical therapy involving a variety of motion exercises and stretching techniques. It is important for the physician to clearly demonstrate the stretches that the patient is expected to perform. It is also advisable to have the patient perform these exercises for the first time in the office, where the physician can observe and modify the patient's techniques, as needed. If the patient demonstrates

excessive difficulty in understanding or performing the exercises, the physician can refer the patient to a licensed physical therapist for assistance.

If a patient is able to perform the required exercises at home, he or she should be advised to do so in multiple short sessions each day, with each session lasting only a few minutes. Physical therapy in a professional setting is commonly performed in two or three sessions per week for the duration of the treatment regimen, with each session lasting somewhat longer than it would take the patient to perform the same actions independently during a home exercise session.

The ultimate goal of physical therapy is symptom elimination through a systematic program designed to increase the range of motion of the surrounding muscle groups and joints, as well as to increase the supporting strength of these muscle groups. In particular, the strengthening of the adductor muscles of the hip has been shown to be beneficial for patients with piriformis syndrome.

Several studies have reported that additional benefit can be derived from physical therapy modalities, such as heat therapy, cold therapy, BTX-A injection, and ultrasound. Heat or cold therapy is usually most effectively applied before the physical therapy or home therapy sessions because it may lessen the discomfort associated with direct treatment applied to an irritated or tense piriformis muscle. Injections of BTX-A, when used as an adjunct to physical therapy, have been shown to produce more pain relief than lidocaine with steroids or placebo. Iontophoresis, the use of electrical current to transport solubilized medication across the skin, and sonophoresis, the use of ultrasonic energy to drive the cutaneous transport of medication molecules, have both been advocated as adjuncts to physical therapy though neither has

been studied extensively in the treatment of patients with piriformis syndrome.

Surgery and Prevention

As a last resort, surgery has been occasionally used in cases that have failed to resolve with the use of other treatment measures. The goal of surgery in these cases is to reduce any tension under which the piriformis muscle may be placed, as well as to explore the sciatic notch to ensure that there are no fibrous bands or constrictions compressing the sciatic nerve.

Prevention of repetitive trauma (ie, microtrauma) may prove effective in decreasing a patient's risk of piriformis syndrome. Correcting biomechanical deficiencies and functional adaptations to those deficiencies can reduce the incidence of piriformis syndrome.

Conclusion

There are many gaps in knowledge regarding piriformis syndrome. An increase in the breadth and depth of our understanding of this condition is necessary for optimal patient care. Additional research is needed for patients with piriformis syndrome, primarily concerning epidemiologic factors, risk factors, and optimal treatment. The length of time from symptom onset to initial presentation is not known and needs to be studied further. The proportion of patients presenting with low back pain who demonstrate symptoms and signs consistent with piriformis syndrome is also unknown and merits further consideration.

Piriformis syndrome is a complex condition that is often not considered in the differential diagnosis of chronic hip and low back pain. To aid diagnosis, several tests have been developed to recreate the pain by actively contracting

or passively stretching the piriformis muscle and compressing the sciatic nerve. Radiographic studies and neuroelectric tests are primarily used to narrow the differential diagnosis toward piriformis syndrome by ruling out other pathologic conditions.

A holistic approach to diagnosis involves a thorough neurologic history and physical assessment of the patient, inclusive of the osteopathic structural examination, based on the pathologic characteristics of piriformis syndrome. Osteopathic manipulative treatment can be used as one of several possible nonpharmacologic therapies for these patients. Nonpharmacologic therapies can be used alone or in conjunction with pharmacologic treatments in the management of piriformis syndrome in an attempt to avoid surgical intervention.

Stretches for Piriformis Syndrome

A number of stretching exercises for the piriformis, hamstrings and hip extensors may help decrease the painful symptoms along the sciatic nerve and return the patient's range of motion.



Sciatica Stretches for Piriformis Syndrome







Piriformis Pigeon Stretch

Piriformis stretches

There are a number of ways to stretch one's piriformis muscle. Two simple ways include:

- Lie on the back with both feet flat on the floor and both knees bent. Pull the right knee up to the chest, grasp the knee with the left hand and pull it towards the left shoulder and hold the stretch. Repeat for each side.
- Lie on the back with both feet flat on the floor and both knees bent. Rest the ankle of the right leg over the knee of

the left leg. Pull the left thigh toward the chest and hold the stretch. Repeat for each side.

Each piriformis stretch should be held for 5 seconds to start, and gradually increased to hold for 30 seconds, and repeated three times each day.

A comprehensive approach to managing piriformis syndrome may include a combination of the following nonsurgical treatments

MANAGEMENT

- Physical therapy
- Lifestyle modification
- Pharmacological agents (NSAIDs, muscle relaxants, neuropathic pain medications)
- Piriformis muscle injections
- Botox injections
- Surgery

Ice and Heat Therapy for Piriformis Syndrome

Ice Packs and Ice Massage

At the onset of pain, lie in a comfortable position on the stomach and place an ice pack on the painful area for approximately 20 minutes. Repeat as needed every 2 to 4 hours.

It may be more helpful to combine a gentle massage with the ice. Lie on the stomach and have someone gently massage the painful area with a large ice cube. If ice is applied directly to the skin (instead of a cold pack), limit it to 8 to 10 minutes to avoid an ice burn.

If specific activities are usually followed by increased pain, it may be a good idea to apply ice immediately following the activity.

Heat Therapy

Some people find it helpful to alternate cold with heat. If using a heating pad, lie on the stomach and place the heating pad on the painful area for up to 20 minutes. Be sure to avoid falling asleep on a heating pad, as this may lead to skin burns.

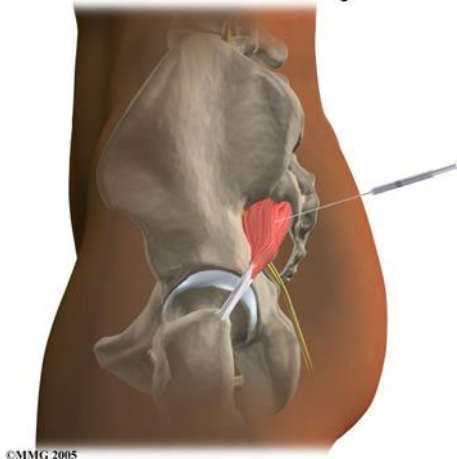
Physical exam

The physical exam will include an examination of the hip and legs to see if movement causes increased low back pain or lower extremity pain (sciatica pain).

Typically, motion of the hip will recreate the pain. The exam will also identify or rule out other possible causes of the sciatica pain, such as testing for local tenderness and muscle strength.

Medical history

Piriformis Muscle Injections



A medical history includes an in-depth review of the patient's symptoms, such as what positions or activities make the symptoms better or worse, how long the symptoms have been present, if they started gradually or after an injury, and what treatments have been tried.

It will also include a review of conditions that may be in the patient's family, such as arthritis.

- Piriformis syndrome is treated with iontophoresis ; using mild electric current and botulin injection.
- Patient is considered for surgery when all nonsurgical treatment has failed to relief pain and pain is intolerable.

Diagnostic tests

X-rays and other spinal imaging studies cannot detect if the sciatic nerve is being irritated at the piriformis muscle. However, diagnostic tests (such as X-rays, MRI and nerve conduction tests) may be conducted to exclude other conditions that can cause similar symptoms to piriformis syndrome.

An injection of anesthetic with or without steroids may help to confirm if the piriformis muscle is the source of the symptoms.

Piriformis syndrome occurs when the piriformis muscle spasms and irritates or compresses the sciatic nerve. It often causes symptoms similar to sciatica, though it is not caused by a spinal problem like sciatica is.

The piriformis is a small muscle located deep in the buttock, behind the gluteus maximus. It runs diagonally from the lower spine to the upper surface of the femur, with the sciatic nerve running underneath or through the muscle. The piriformis muscle helps the hip rotate, turning the leg and foot outward.

As a result of overuse, injury, or strain, the piriformis muscle can tighten, swell, or spasm. Sports that involve repetitive forward movement of the

legs, or problems in surrounding joints like the sacroiliac joints are typical causes of piriformis syndrome.

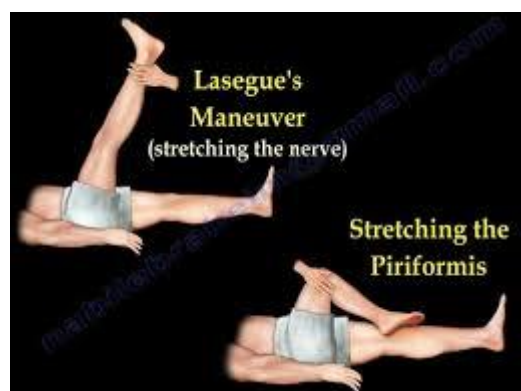
The location of the piriformis muscle near the sciatic nerve means that when the piriformis muscle is irritated or injured, it can affect the sciatic nerve as well.

Symptoms of piriformis syndrome include tenderness and pain in the buttock area, accompanied by sciatica-like pain, numbness, and weakness that runs down the back of the thigh, calf, and foot. Pain from piriformis syndrome is often worse when walking up stairs, after sitting, or while walking or running.

Piriformis syndrome is often confused with other conditions, especially lumbar spine conditions. Attaining a proper diagnosis of piriformis syndrome is important when considering treatment for low back and leg pain.

Piriformis test

There are several tests commonly to diagnose piriformis syndrome .



Lusegues Maneuver (stretching the piriformis)

Lusegues Maneuver : reproduction of the pain by the hip being flexed to 90 degrees and the knee extended .

The test can also be done with the patient on the side .

FAIR test :



The FAIR test is not the FABER test .

FABER test is used to diagnose SI joint problems.

The FAIR test is a piriformis syndrome test .we are going to assess if stretching of the piriformis muscle is causing pressure on the sciatic nerve and the patient symptoms .

we do that by flexing , adducting and internally rotating the hip . This maneuver will stretch the piriformis muscle and cause symptoms by compressing the sciatic nerve .

This will put tension on the muscle and reproduce the patients symptoms. When the examiner places pressure on the posterior part

of the buttock , the patient will complain of sever tenderness and pain .

Physical therapy for piriformis syndrome



- Joint mobilization
- Ultrasound
- Soft tissue massage
- Application of heat and ice
- Orthotics
- Exercises to improve flexibility ; strength ; pelvic stability and balance and core stability and endurance
- Electrical stimulation
- Stretching exercise
- Postural training

Prevention for piriformis syndrome

- Maintain good flexibility of the lower extremity and trunk muscles.
- Maintain strength of the gluteal and abdominal muscles.
- Sitting with feet flat on ground.
- Adjusting the seat in order to keep the knees and hips comfortably bent while driving .
- Sitting with a wallet in the back pocket must be avoided.

- Maintaining perfect posture while standing ; lifting and sitting.
- Don't lift with a back bent . preferable to also bend the knee to pick the object.
- Keeping the objects close to the body during lifts.

Treatment a patient with piriformis syndrome in my clinic









Content :

- **Articles**
- **Categories**
- **Presentations**
- **Research**
- **Projects**

