

**PIRIFORMIS SYNDROME**

**A review of literature**

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## **ABSTRACT**

**OBJECTIVE:** To review the current literature on the topic of piriformis syndrome. In particular I will be looking at different diagnostic avenues as well as different treatment options available.

**DATA SOURCE:** A comprehensive Medline search of the pertinent literature at the Logan College of Chiropractic library was done to compile the information needed for this literature review.

**KEY INDEXING:** (Medline) piriformis syndrome; back pain; muscular pain

**DATA SELECTION:** Research based on relevance to the topic from 1989-1997.

**CONCLUSION:** The terms disc problem or sciatica are not being used to describe all symptoms of patients who present with low back and buttock pain. In recent years the diagnosis of piriformis syndrome has recieved recognition as a primary cause of pain. New ways to diagnose, and treat the condition conservatively are being utilized. The success rate is relatively high, and so the use of surgery and steroid injections are declining, as both doctors, and more importantly patients, are finding satisfaction with conservative methods for treatment.

## INTRODUCTION

Yeoman first described piriformis syndrome, also called non-discogenic sciatica or sciatic neuritis, in 1928. At first he thought that the pain was caused by arthritic changes in the sacroiliac joint and failed to establish a direct relationship between sciatica and the piriformis muscle. Soon it was discovered that piriformis syndrome is an injury to the piriformis muscle that results in buttock pain and quite often leg pain. The etiology of this syndrome is thought to be an injury to the piriformis muscle resulting in spasm, edema, and contracture of the muscle and subsequent compression and entrapment of the sciatic nerve. Studies have shown that making the diagnosis is difficult as patient presentation varies, as does the type of pain that they are complaining of. This is partly due to the anatomical variation from person to person in relation to the piriformis muscles location.

The doctor being consulted must be sure to take a complete history, including any trauma, even minor trauma. There are also a number of different maneuvers that are being used to try to reproduce the patients chief complaint so as to help solidify the diagnosis of piriformis syndrome. Once the doctor is sure of the diagnosis, treatment will begin. There are several options available to treat this problem conservatively. The conservative approach is usually successful, however if the patient is not recovering there are some other treatments available to the patient.

## DISCUSSION

"The muscle arises from the anterior surface of the sacrum, the gluteal surface of the ilium near the posterior iliac spine, and the capsule of the sacroiliac joint. It passes through the greater sciatic foramen and is attached by a rounded tendon to the upper border of the greater trochanter, its tendon often blending with that of the obtruator internus and gemelli. The muscle is innervated by branches from L5, S1, S2. The superior gluteal nerve passes between the upper border of the piriformis and the lower border of the gluteus minimus. In most people the tibial

and peroneal components of the sciatic nerve travel under the lower border of the piriformis muscle. However, "in approximately 10% of cadavers that Beaton and Anson studied, the peroneal portion of the sciatic nerve passed through the mid-substance of piriformis muscle where as in 2-3% it was found superior to the muscle. In 0.8% of people, both the tibial and peroneal portions went right through the muscle"(9). Any of those anomalies may put a person at an increased risk of developing piriformis syndrome. The function of the piriformis muscle is as an external rotator of the hip and abductor of the thigh. When sitting the piriformis acts to internally rotate the hip. It can be stretched severely if the torso is rotated forcibly while the foot is planted firmly on the ground"(5).

### **Making the diagnosis**

The major findings include:

- ◆ buttock tenderness that reaches from the sacrum to the greater trochanter and piriformis.
- ◆ tenderness on rectal or pelvic examination.
- ◆ Patients can usually point to the area of worst pain.
- ◆ The pain is worse at night and also felt after prolonged sitting and when getting up from a sitting position.
- ◆ The symptoms are usually unilateral with a limp on the affected side.
- ◆ The symptoms are aggravated by prolonged hip flexion, adduction, and internal rotation, in the absence of low back or hip findings.

Minor findings may include:

- ◆ leg length discrepancy
- ◆ weak hip abductors

- ◆ pain on resisted hip abduction in the sitting position.(1)

Making the diagnosis is difficult though since there are no laboratory or diagnostic tests (other than physical exam) that are specifically used for piriformis syndrome. Computed tomography and MRI have recently been used to verify the diagnosis. These imaging modalities may show atrophy or fibrous tissue replacement of the piriformis muscle. Also bone scans may show increased uptake of radioactivity in the affected piriformis muscle. Traditional A-P radiograph of the pelvis can be used to evaluate a leg length discrepancy, that could be referring pain like the piriformis syndrome. The first objective should be to rule out disc involvement or radiculopathy. A herniated lumbar disc with nerve root impingement is a common initial diagnosis. Some appropriate tests that are commonly used to rule out the disc involvement are various orthopedic tests such as:

- ◆ Valsalva- patient bears down if there is increased pain suspect a space occupying lesion.
- ◆ Bechterew's- while seated patient extends one leg at a time, if pain results it is positive for a disc protrusion.
- ◆ Milgram's- while supine patient raises both legs, if there is pain in the lumbar region, possible disc condition.
- ◆ Lindner's- patient supine and flex chin if painful this indicates dural involvement or disc lesion.
- ◆ Straight leg raise- with patient supine raise each leg if pain is caused at 35-70 degrees suspect disc lesion.
- ◆ Well leg raise- raise non-symptomatic leg if pain then suspect medial disc lesion.
- ◆ Braggard's- SLR to pain, dorsiflex foot: if pain 35-70 degrees suspect disc lesion.
- ◆ Sicard's- SLR to pain, dorsiflex big toe: if pain at 35-70 degrees suspect disc lesion.

But after disc and other causes of sciatica and buttock pain have been ruled out, piriformis syndrome can be diagnosed by exclusion (9). All of the patients who are diagnosed with piriformis syndrome are found to be negative for disc involvement. There is a long list of differentials of this condition which includes discogenic disease, which involves deterioration of the disc and disc spaces. Spinal stenosis, a narrowing of the spinal cord canal. Facet syndrome, which is an irritation of the spinal facets caused by either trauma or abnormal motion in the area of involvement. Sacroiliac dysfunction, which is caused by trauma or sometimes a congenital malformation, or abnormal movement patterns which cause pain in the area. And lastly, ischial bursitis which is an inflammation of the bursa which can be caused from trauma to the area and results in pain and inflammation in the area.(9)

A complete history of the patient is important in helping to make the diagnosis. Questions about trauma, no matter how minor, to the area may be found to be a causative factor in those with piriformis syndrome. For example the trauma caused by "twisting and forcibly rotating the torso during a tennis serve"(9). Doctor's may also want to question male patients on where they carry their wallet because compression of the buttock from a full wallet worn in the back pocket may aggravate piriformis syndrome. Female patients may be experiencing dyspareuria, so the doctor needs to be sure to extend their questioning into other areas that may also be affected, and therefore give clues towards the diagnosis of piriformis syndrome.

On physical examination the doctor can often "reproduce the pain by palpating the course of the piriformis muscle from the sacrum to the greater trochanter. This palpation must be done with the patient in the lateral recumbent position with the affected side up. With the patient supine, flexing, adducting, and internally rotating the hip stretches the piriformis muscle and may recreate the pain. The Freiberg sign-pain on forced internal rotation of the extended thigh- is also suggestive of the syndrome"(9).

Other signs include the posture of the patient. "The patient may stand or lie with the leg held in external rotation because of the contracture of the muscle. This may give the appearance of a short leg, or indeed the syndrome may result from a true leg-length discrepancy. Clinical evaluation of leg length with the patient supine, therefore, should be part of a complete exam"(9). A true leg length deficiency is an anatomical difference in leg length, this is corrected with the use of a heel lift to make up the difference on the side of deficiency. A functional leg length deficiency is caused by body malpositioning. For example a unlevel pelvis may cause one leg to appear shorter than the other. This type of finding is treated by chiropractic adjustments to the area creating the problem.

Some of the maneuvers used to examine if it is the piriformis muscle causing pain include: Freiberg's maneuver of forceful internal rotation of the extended thigh is thought to elicit pain by stretching the irritated piriformis, which produces pressure on the sciatic nerve at the sacrospinous ligament. There have been many anatomic anomalies found with the piriformis muscle that may be contributing to the cause. For example in approximately 12% of the population the sciatic nerve has been found to run through the belly of the piriformis muscle. The aberrant anatomy causes pressure on the nerve. "Pace has described pain and weakness on resisted abduction and external rotation of the thigh. This is elicited with the patient seated and abducting the legs against the resistance of the doctors hands. The advantage over Freiberg maneuver is that it does not rely on contraction of the piriformis muscle, but its disadvantage is that the patient is required to sit on the already painful piriformis muscle"(2). A third maneuver is performed by having the patient lay with the painful side up. The painful leg is flexed, and the knee is resting on the table. Buttock pain is produced when the patient lifts and holds the knee several inches off the table. This maneuver eliminates the variable of direct pressure on the piriformis muscle and produces pain by contraction, rather than stretching of the affected muscle.(2) To complete the physical exam a complete neurological examination must be done to

help rule out other causes of pain. Reflexes at the patella and Achilles tendon are usually normal, but motor and sensory evaluation of both lower extremities may reveal weakness of abduction-external rotation on the affected side.

### **Treatment strategies**

Management of piriformis syndrome should first begin with correcting abnormal biomechanics, for example a leg length discrepancy should be corrected with a heel lift (the criteria for which were discussed previously), and weak hip abductors are strengthened with the correct exercises. Any additional and associated conditions should be treated, e.g., facet syndrome or tight iliopsoas.<sup>(1)</sup> The goals of treatment are initially to decrease inflammation, pain and spasm. The conservative options available are varied and may include rest, cryotherapy, stretching and electrical modalities.

Conservative management of piriformis syndrome is usually successful. Stretching is one of the main components of the treatment plan for this condition. "One of the most effective stretches involve flexing, internally rotating, and adducting alternate hips. The stretch should be felt in the midbuttock region. This maneuver stretches the six external rotator muscles and can be done alone or with assistance. The patient should also perform hamstring and hip extensor flexibility exercises"<sup>(9)</sup>. Proprioceptive neuromuscular facilitation (PNF) techniques are helpful in helping to increase range of motion for the patient. PNF allows for lengthening and relaxation of the piriformis muscle, which will restore a pain free range of motion. The main goal of PNF is muscle reeducation. The neurophysiologic principle behind PNF is that the patient contracts against resistance and for a brief moment after they release the contraction the muscle is automatically in a relaxed state, and this is when the doctor introduces the stretch, thereby resetting the muscles starting point. Reciprocal inhibition also plays a role in allowing PNF to work effectively. This means that when one muscle is contracted, its agonist is automatically



inhibited. This allows the agonist to achieve its full action without the interruption by the antagonist.

Some have used Spray-and -Stretch techniques with ethyl chloride spray(vapo-coolant spray), this technique has similar goals of PNF. This is thought to be an alternative to injection with an anesthetic for pain relief caused by trigger points. This is a passive activity and so it is helpful in the early stages when the patient may have difficulty relaxing. Sometimes Spray and Stretch may be used in combination with PNF techniques. Only trial and error will tell which is better for inhibiting the muscle with each patient.

Utilizing exercises intensity, frequency, and duration are established by tolerance of the patient. At the beginning a good guideline for active exercises includes few repetitions(5-10) done in three sets, two to three times per day. A strengthening program for the piriformis and surrounding pelvic muscles should be started early in the rehabilitation program. To begin with this strength program should be started with few repetitions and low resistance. Also a home exercise program is an important part of the recovery. If the doctor provides the patient with good illustrations of the exercises to be performed at home this will increase compliance and independence with the exercise program.

Heating modalities (hot packs, ultrasound electrical muscle stimulation) are often useful later in the rehabilitation program, when more vigorous stretching exercises are necessary. These modalities are beneficial because soft tissue elongation seems to be facilitated by the application of heat(6). Hallin reported success with ultrasound treatment in 8 of 11 patients. The focus should be in the midbuttock, and relief may be felt with as few as 6 to 10 treatments(9). Ultrasound applies a very deep heat that can relieve some of the inflammation in the piriformis muscle. This relief can possibly remove some of the irritation on the sciatic nerve thereby reducing the patients discomfort.

On the more invasive side of treatments available Pace and Nagle advocated injection of a

local anesthetic into the muscle. They reported improvement with no complications in 45 patients and only 2 had recurrences(9). "The injection is 6ml of 1% lidocaine hydrochloride made with a spinal needle into the buttock to the identified area. If the patient feels relief within 5 minutes and has no sciatic nerve irritation, a second injection at the same site is performed with 4ml of lidocaine and 2ml of triamcinolone acetonide"(9). Surgical release of the piriformis muscle was the primary method of treatment 40 to 50 years ago, and the literature reports continued use of this treatment in some circumstances(9). These circumstances are only when many attempts at conservative care have failed to produce any relief of pain. Release of the tendinous attachment of the piriformis at the greater trochanter, with resection of any fibrous bands, has been performed with success. The researchers have found that the functional loss from this procedure has been minimal as there are other muscles that can act as a external rotator of the hip.

## **Conclusion**

Increasing awareness of the piriformis syndrome in the differential diagnosis of sciatica many will lead to the piriformis muscle as being the cause of the pain in many instances. Doctors need to make sure that they are taking a complete history and doing a careful thorough exam to pinpoint the true cause of pain. The patients pain complaints and the area of the pain appear to lead to a disc related problem. Utilizing the testing strategies described in this paper the physician can successfully determine the cause of the patients pain. This will lead to a faster recovery and increased patient satisfaction. This could potentially mean referrals of other patients with the same chief complaints.

Conservative treatment should always be the first choice to alleviate the problem at hand, and

in most cases this avenue is successful. The doctor needs to be sure to educate the patient on what he is doing and why so to ensure proper patient compliance with the treatment protocol. Doctor and patients need also to be aware that the length of time the patient has had the problem will effect the recovery time ( just as in any type of injury). Research suggests that shortened muscles which have been immobilized require about four weeks of regular treatment to return to their pre-immobilization length. The process of muscle reeducation takes time. This needs to be explained well to the patient to avoid discouragement. Other procedures such as steroid injection and surgical resection are available but should only be suggested to the patient after conservative care has failed

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