

PIRIFORMIS SYNDROME

The Proper Diagnosis and Treatment

Literature Review

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ABSTRACT

Piriformis syndrome is a disorder in which there is a compression of the sciatic nerve by the piriformis muscle. Most patients have neurological symptomatology arising in the gluteal region and traveling down the leg.(1) There are many disorders that may mimic piriformis syndrome. History and physical exam findings are essential in the diagnosis. Generally patients respond well to conservative treatment protocol, which is tailored to the individual patient. In most instances, surgery be reserved as a treatment of last resort.

The current literature review covered these topics of Piriformis Syndrome: A general description; etiology; proper history taking; clinical signs and symptoms; orthopedic examination; diagnostic tests; differential diagnosis; conservative treatment; alternative treatment; therapy modalities; exercise program; self stretching techniques; myofascial release techniques; chiropractic adjustments; and aggressive treatment.

The initial treatment of piriformis syndrome should be conservative in nature. A noninvasive protocol should be utilized for four to six weeks to see if the condition can be improved.(2) There are no detrimental effects to this form of treatment which only requires patient cooperation in the adherence to the program. Aggressive treatment, i.e. surgery or drug therapy, should be reserved for those patients who fail to respond to

conservative therapy.

INTRODUCTION

There are two types of sciatic neuritis, one caused by piriformis syndrome and the other caused by lumbosacral disc disorder. Both have similar signs and symptoms, but can be properly differentiated.(3) Lumbosacral disc disorder may cause sciatic neuritis of the radicular order, while piriformis syndrome causes sciatic neuritis of the biomechanical order. Conservative treatment of piriformis syndrome has been proven quite effective and therefore a quick and accurate diagnosis of it will lead the patient on a faster recovery route. If a doctor misdiagnoses the piriformis syndrome as a disc disorder, he may only treat the spine conservatively at first. Because of the misdiagnosis he will never completely rid the patient of pain and may try more invasive treatments like drugs and surgery. Today many doctors are discovering that "failed back syndrome" may be occurring more often because of poor diagnosis.(3) Conservative treatment of piriformis syndrome consists of soft tissue treatments along with spinal manipulation. Together these treatments have been known to restore a patient to normal biomechanics and restore their health.

The problem is that precise diagnosis and conservative treatment of piriformis syndrome are often overlooked as effective means of correction. Proper diagnostic means of evaluating, treating, and managing sciatic neuritis of the piriformis kind will be discussed thoroughly in this

paper.

The purpose of this study is to review the literature of piriformis syndrome and describe several conservative methods of diagnosing, treating, and managing it.

METHODOLOGY

The literature search for this paper began with a computerized literature search at Logan College of Chiropractic Library using the Medline computer network. The subject heading, "piriformis syndrome" was entered. This generated 19 documents. The subheadings "chiropractic manipulation," "orthopedic," "physical therapy," and "exercise therapy," were cross referenced with piriformis syndrome and this generated 9 additional documents. The titles of these 28 documents were printed and reviewed. From that list of titles, 16 abstracts were requested based upon the title's relevancy to conservative treatment and diagnosis. After reviewing these abstracts, 12 documents were obtained and 6 of these were chosen for review in this paper.

A manual search was done in the Logan College of Chiropractic Library using the "Index to Chiropractic Literature" and "Chiropractic Research Archives Collection." The subject heading of piriformis syndrome and treatment generated 2 articles which were used in this review.

Through personal communication with a fellow classmate, 2 more articles were suggested and used in this review.

One textbook was chosen from my own personal knowledge of it's relevancy to motion palpation and treatment of piriformis syndrome.

A total of 11 documents were chosen for this literature review of

piriformis syndrome. Ten of which were journals, dating from 1969 to 1987, and one authored by Dr. Faye and Dr. Schafer dated 1988.

DISCUSSION

The Piriformis Syndrome has been defined as a neuritis of branches of the sciatic nerve caused by pressure of an injured or irritated piriformis muscle.(3) According to Grey's Anatomy, the piriformis muscle is flat and pyramidal in shape. It is situated partly within the pelvis against its posterior wall, and partly at the back of the hip joint. It arises from the lateral part of the ventral surface of the second, third, and fourth sacral vertebrae, the posterior border of the greater sciatic notch and the sacrotuberous ligament. It inserts into the superior border of the greater trochanter on the femur. The muscle is in contact with the anterior ligament of the sacroiliac joint and the roots of the first, second, and third sacral nerves. Its lower border is closely related to the whole trunk of the sciatic nerve. The piriformis muscle is rarely absent, but it is subject to several anatomical variations. Its origin may extend to the first sacral of the fifth sacral vertebrae and to the coccyx. The piriformis may be fused with the gluteus medius or minimus muscles, or more rarely with superior gemellus muscle. Its tendon of insertion may be fused with that of the gluteus medius or the obturator internus muscle. There is a common occurrence of the peroneal nerve perforating the piriformis muscle, dividing it into upper and lower parts. A constriction or contracture may cause irritation, first, on the peroneal

nerve and secondly, with greater involvement, on the sciatic nerve.

Due to this complex anatomy it is easy to see why a contracture of the piriformis muscle can cause an array of bizarre and seemingly unrelated symptoms. In order to get an accurate diagnosis one must understand the causative factors of a contracture or irritation of the piriformis muscle. They are as follows:

1. Postural stress- One-legged standing; sitting cross legged; automobile operation; the right leg kept on the accelerator for extended periods in lateral rotation; and sitting on one foot.
2. Acute trauma- Fracture of the femoral neck; fall or near fall; jumping short distances; sudden stops or starts, as in playing tennis; and direct injuries to the pelvis from falls or sitting on pointed objects.
3. Insidious trauma- Sleeping with one leg laterally flexed; entering and leaving automobiles on one leg; obstetric or urologic procedures in stirrups under general anesthesia; and coital positions.
4. Infection- Arthritis, tuberculosis, and malignant bone lesions frequently cause the piriformis to contract abnormally. Inflammatory reactions to injury, such as Legg-Perthes disease, are very commonly associated entities.(5)
5. Malformations- Sacral and innominate bone deformities, unilateral coxa vara; dislocation of articulations; simple unequal development; and epiphyseal injury before maturity.

These etiologies must be kept in mind when taking a proper history.

Although with piriformis syndrome, getting an accurate history may be difficult to achieve. Because the nature of a trauma usually is not traumatic, the patient often does not remember the incident.

Now that there is an understanding of how piriformis syndrome can occur, there needs to be a clinical description of what piriformis syndrome looks like. Most patients present with localized pain in the S.I./buttock region aggravated by sitting, squatting, or walking, most commonly affecting the contralateral side.(6) Pain across the sacrum to the hip, over the gluteal region posterior thigh to the popliteal area is often felt. Paresthesia along the course of the sciatic nerve and/or its branches (not past the knee) is another common symptom. Lastly, persistent, severe, radiating low back pain is felt by all patients with piriformis syndrome.(3) The following is a list of signs that the patient presents with: a) unilateral external rotation of foot in supine position, a.k.a. a position piriformis sign, (3) b) short leg on affected side (when extreme, detectable of gait analysis).(8) c) motor signs such as fasciculations, twitching and veriform movements in the piriformis muscle, (6) d) deeper silicas over the P₁/SS on the affected side.(9) Palpation can be very important in diagnosing piriformis syndrome. The patient will complain of point tenderness over the sciatic notch in almost all instances. Deep pressure over the sciatic notch or over the piriformis belly can reproduce sciatic symptoms. The doctor should palpate the gluteal muscles which are often tight. Trigger points can be found over

the insertion of the piriformis muscle along with a sacral apex shift to the contralateral side. Motion palpation will reveal a limited internal rotation of the leg.(10) Multiple fixations at the sacral and iliac joints may be present. There may also be compensatory hypermobility of the sacroiliac joint of the contralateral side. Possible fixation patterns also include (piriformis muscle Bernard Tepoorten): pain and limited motion in the thoracics #10-11; tension in the area of the thoracics #3-4; pain and decreased motion at the contralateral cervical axis joint; pain and limited range of motion of the ipsilateral atlanto-occipital joint.(10) Once the tender areas are located by static and motion palpation, piriformis syndrome may be confirmed with orthopedic and stress tests.

The positive orthopedic and stress tests which are used to confirm piriformis syndrome are as follows:

1. Lasegue's Test: Pain and limited range of motion as early as 5 degrees in a straight leg raise; the pain will be located in the sciatic notch.(3)
2. Braggard's Test: This will reproduce the straight leg raise pain.
3. Fabre-Patrick's Test: This will show S.I. pain.
4. Freiberg's Sign: Includes pain on forced external rotation with an extended thigh. There may also be limited internal rotation of the leg and pain on resisted external rotation with weakness of the external rotators.(3)
5. Piriformis Myofascitis Test: The patient is seated with the hips

and knees flexed. The doctor applies resistance as the patient attempts to separate the knees. Piriformis is suspected when pain and weakness are noted on resisted abduction and external rotation of the thigh.(9)

6. Pace-Nagel Test: The patient is prone with knees bent and have the patient abduct with resistance. Local pain indicates piriformis myofascitis, whereas local pain with radiation down the leg is indicative of a piriformis syndrome.(9)

In order to completely rule out other disorders an electromyography should be performed. In patients with piriformis syndrome, an electromyography shows normal activity of the gluteus medius and minimus and tensor fascia latae muscles. Abnormalities in innervation of the gluteus maximus muscle can be found.(6) Piriformis syndrome will show normal paravertebral muscle activity, whereas a patient with lumbar disc disease will have abnormal EMG activity of muscles innervated by both the anterior and posterior rami of the affected nerve root.(3) Rectal examination will exhibit acute tenderness over lateral pelvic wall proximal to the ischial spine.(11)

X-rays would not be indicated unless the sacral and iliac fixations are to be quantified and also to rule out any suspected pathology as the cause of the pain.

Piriformis syndrome can be confused other disorders. The differential may be comprised of these entities. Lumbosacral disc lesion, which is usually indicated by neurological signs such as loss of the achilles and

patellar deep tendon reflexes, atrophy of the calf or thigh muscles, weakness of extensor hallicus longus, and coldness of the affected foot. The patient would usually demonstrate a positive Valsalva test. An MRI can be used to rule this disorder out. Lumbosacral stenosis, which is commonly seen in middle aged patients, has a history of neurogenic claudication. Central vascular neuropathy, for example diabetes, can be associated with sciatic syndrome, but patients usually have a history of related back pain. The onset for this is very sudden and acute.(6)

Rheumatoid arthritis, for example a Baker's cyst, can entrap the sciatic nerve above the popliteal fossa of the knee. Lumbosacral spondylolisthesis can also cause sciatic pain. X-rays should be taken if this is suspected.(6) Visceral origin may refer pain from the internal organs down the leg. Such diseases may be appendicitis, pyelitis, hypernephroma, uterine disorders, prostate disorders, and malignancies in pelvic viscera. And finally psychogenic disorders like physical fatigue, depression, and frustration may cause similar complaints as piriformis syndrome. All of these disorders can be ruled out by taking a proper history, physical examination, orthopedic evaluation, and other diagnostic tests.

Once the diagnosis of piriformis syndrome has been made, the physician needs to think about treatment. Treatment of piriformis syndrome involves reducing muscle spasm and contracture, and as a result, reduce pain and adhesions. Other objectives attaining normal hip

motion and ensuring restoration of the sacroiliac and lumbar mechanical functions. Start with soft tissue treatment. There are a battery of soft tissue techniques to choose from, most of them dealing with stretching the piriformis muscle.

Proprioceptive neuromuscular facilitation (PNF) of the trochanteric and sacroiliac joints, that is, a maximum contraction puts the piriformis muscle into a refractory state after which the patient is passively stretched without encountering a strong myotactic reflex.(2) Edward's technique is done to release muscle contracture. The patient is put into the prone position with the knees flexed and the legs internally rotated. The muscle is stretched by applying heavy sustained pressure over the tendon with the elbow.(4) Berry's technique contracts the piriformis on the opposite side to relax the piriformis on the affected side.(8)

TePoorten's technique applies constant pressure to the muscle-tendon junction while internally rotating the thigh to strengthen the piriformis muscle. Hold for two minutes then do isometric contractions of the muscle two to three times. Adjuncts to soft tissue therapy are ice on the acute piriformis syndrome and deep heat on the chronic conditions.

Interferential current can also be used to help relax the piriformis muscle in both acute and chronic conditions. Current helps to decrease inflammation and increase the circulation to the region.(4)

The obvious advantages to the above soft tissue and spinal manipulative methods of treatment is its conservative approach. When

these methods fail other options are available, such as drug therapy or surgery. These treatment regimes however, present greater risks of drug dependency or irreversible changes from surgery. Chemotherapeutic management includes many modalities used to enhance the holding effects of manipulation in the more severe and chronic recurring cases. These methods include:

- a) injection of procaine into trigger area of piriformis
- b) spraying trigger area with ethyl chloride can provide symptomatic relief
- c) combination of procaine and cortisone injection to the trigger point of piriformis muscle and into the myotendon junction will assist in pain relief and relaxation of any contracture
- d) ultrasound will help to break up any adhesions that are present
- e) antiinflammatory analgesics, muscle relaxants, and

anti-depressants can be used in addition to conservative therapy

Surgery is a much more drastic method and is only performed when conservative treatment has failed. Surgery will involve the division of the piriformis muscle at its tendinous insertion on the greater trochanter to alleviate pressure of the muscle on the sciatic nerve. This will relieve tension on the nerve and nerve roots. Division of the piriformis muscle is designed strictly for symptomatic relief of the sciatic pain when the exact cause of the problem cannot be found. Functional loss is minimal since the piriformis muscle is the fourth strongest of the short external

rotators of the hip.(6)

Reccomendation of exercises and instruction in lifestyle changes for patients with piriformis syndrome are also very important and will assist in a more rapid recovery.(7,9) Some examples of home exercises include knee to chest and bicycle exercises, pelvic tilt, knee bends, and cross-arm knee pushing to stretch the piriformis. Patients are advised to avoid sitting in one position for extended periods.

The prognosis is excellent with conservative therapy. The only varying factors include duration of piriformis syndrome before treatment is initiated and the age of the patient at the time of treatment. As both of these factors decrease, the treatment time will fall as well and the prognosis can only improve. Studies show a 90-95% success rate with the conservative therapy.(4) The 5-10% who do not respond require more invasive treatment (injections or surgery) (4), which are often not a guarantee of success.

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CONCLUSION

The frequency of piriformis syndrome is far too great to ignore in chiropractic practice. As conservative care physicians, chiropractors will have a very high success rate in its treatment. But in order to properly treat it, a doctor must properly diagnose it. Many chiropractors who treat low back pain patients only consider the osseous aspects of the disorders. They may misdiagnose piriformis syndrome for lumbosacral disc disorder, sacroiliac subluxations, or lumbar facet syndrome. It is easy to see how overlooking the musculoskeletal system can cause longer treatment times or even unnecessary surgeries. It is my opinion that anyone who calls themselves back specialists should have a full understanding of the piriformis muscle and its syndrome.