



## PROSPECTIVE AND SEMIEXPRIMENTAL

## The Piriformis Syndrome: Evaluation of Seven Cases

Farhad Mustafa Mousa\*, Zainab Aziz Bakr

Department of Physiotherapy, Cihan University-Erbil, Kurdistan Region, Iraq

## ABSTRACT

Low back pain is one of the causes of Piriformis syndrome. Low back pain is the second most common medical complaints encountered by physicians. More than 50% of the population will complain of low back pain at the same time. Piriformis syndrome may constitute up to 5% of cases of low back pain, buttock pain, and lower limb pain. This is a prospective and case-control study. In this study, we study 268 cases with low back pain; in 268 cases, seven cases had Piriformis syndrome. We studied pain, severity pain, radicular pain, limping, and painful sitting. Evaluation of musculoskeletal, BMI, and physical examination of Piriformis sign, Freiberg sign, and pace sign. Neurological evaluation was taken by paraclinical examination elevated through X-ray, computed tomography scan, magnetic resonance imaging, and electromyography. Data show as mean±SD and we used SSPS software for analysis. In 268 cases with conservative method, 100% of cases were cure treatment after 4 months, in contrast to surgery methods after 1 month. The result illustrated the significantly improved between two methods of treatment ( $P < 0.0025$ ). In seven cases, four cases had a history of blunt trauma and one case had a history of surgery that after 6 months had complication of surgery and scare tissue that with the second surgery release of scare was done with 100% cure. Anomaly of Piriformis muscle was seen in one case that surgery was done. Tumor was seen in one case that had pressure effect on sciatic nerve that surgery was done. Heterotopic ossification was seen in two cases. BMI of all cases was in normal range. All cases with diagnosis of disc herniation were excluded from the study. They were need to surgical operation for herniated disc. Piriformis syndrome is differentiated primary from secondary type, in which it is done according to history and physical examination. According to the etiology of Piriformis syndrome, the treatments are different. If you see mass that compressed the sciatic nerve, you must remove it. If the patient had sacroiliitis, it must be treated in early phase. Surgery of Piriformis is not accepted by all surgeons. It is limited to release Piriformis tendon and insertion to femur.

**Keywords:** Piriformis syndrome, low back pain, buttock pain

## INTRODUCTION

Low back pain is the second most common medical complaints encountered by physicians. More than 50% of the population will complain of low back pain at same time. Most of us, at 1 time or more, have experienced of low back pain. One of the most differential diagnoses of back pain is sciatica pain and Piriformis syndrome is one causes of differential diagnosis to sciatica pain. The Piriformis muscle is a pear-shaped muscle in the buttocks.<sup>[1-3]</sup> The Piriformis muscle has origins from several anatomical locations including the anterior surface of the lateral process of the sacrum, the spinal region of the gluteal muscles, and the superior/gluteal surface of the ilium near the margin of the greater sciatic notch. The muscle passes through the greater sciatic notch and inserts on the greater trochanter of the femur. It is one of the six muscles in the hip short external rotator group, coursing parallel to the posterior margin of the gluteus medius.<sup>[4,5]</sup> Piriformis syndrome is an uncommon cause of buttock and leg pain. Piriformis syndrome may constitute up to 5% of cases of low back, buttock, and leg pain. Piriformis syndrome is an often misdiagnosed cause of sciatica, leg or buttock pain, and disability. Dysfunction of the Piriformis muscle can cause signs

and symptoms of pain in the sciatic nerve distribution, that is, in the gluteal area, posterior thigh, posterior leg, and lateral aspect of the foot. The sciatic nerve may be compressed within the buttock by the Piriformis muscle, with pain increased by muscular contraction, palpation, or prolonged sitting.<sup>[6-8]</sup> It is often not included in the differential diagnosis of back, buttock, and leg pain. In addition, it has received minimal recognition because it is often seen as a diagnosis of exclusion. Pain is increased in prolonged sitting; specific physical findings are tenderness in the sciatic notch and buttock pain in flexion,

**Corresponding Author:**

Farhad Mustafa Mousa, Department of Physiotherapy,  
Cihan University, Erbil, Kurdistan Region, Iraq.  
E-mail: Farhadm.atrushi@gmail.com

**Received:** Apr 20, 2019

**Accepted:** Apr 23, 2019

**Published:** Jun 30, 2019

**DOI:** 10.24086/cuesj.v3n1y2019.pp71-74

Copyright © 2019 Farhad Mustafa Mousa, Zainab Aziz Bakr. This is an open-access article distributed under the Creative Commons Attribution License.

adduction, and internal rotation (FADIR) of the hip. An initial description was given by Yeoman, in 1928. In 1934, Freiberg recognized the signs specific to this syndrome. However, it was only in 1947 that Robinson called this clinical entity the “Piriformis” or pyramidal syndrome. The Piriformis muscle has been said to receive innervation from L5 to S3 ventral rami with most sources using S1 and S2 ventral rami as the most common innervation this muscle. The most common nerve branches to the Piriformis are from the superior gluteal nerve and the ventral rami of S1 and S2. More recently, many etiologies of sciatic nerve entrapment around the gluteal region or the non-discogenic area have been identified, resulting in the use of a new term “The Deep Gluteal Syndrome.”<sup>[9-11]</sup>

**Causes**

- An injury, such as fall, a blow to area or car accident
- Overuse, such as from frequent running, excessive exercise, or overstretching, trauma to the buttocks or gluteal region is the most common cause of Piriformis syndrome
- A sedentary lifestyle, especially with long periods of sitting

- Changing from a sedentary lifestyle to more frequent exercise
- Buttock muscles wasting away
- Muscle tension and excess weight due to pregnancy
- Skiers, truck drivers, tennis players, and long-distance bikers are at high risk
- In Morton’s foot, the prominent head of the second metatarsal causes foot instability and a reactive contraction of the external rotators of the hip during gait
- Spinal stenosis can lead to bilateral Piriformis tenderness
- Anatomic variations of the divisions of the sciatic nerve above, below, and through the belly of the Piriformis muscle may be causative factors.<sup>[12]</sup>

Piriformis syndrome is a diagnosis of exclusion. 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. The history and physical findings are key elements in differentiating the more



**AQI** **Figure 1:** Piriformis sign: More external rotation in the same side of pain



**Figure 3:** Pace test: Pain and weakness are present on resisted abduction-external rotation of the thigh **AQI**



**AQI** **Figure 2:** Freiberg sign: Pain occurs with passive internal rotation of the extended thigh when the patient is supine



**Figure 4:** It is combination of abduction and external rotation test, it is positive in all cases **AQI**

common forms of LBP and Piriformis syndrome. Many patients who underwent unsuccessful surgery in the lumbosacral region were later found to have Piriformis syndrome. The female-to-male incidence ratio of Piriformis syndrome is 6:1. In one study at a regional hospital, 45 of 750 patients with LBP were found to have Piriformis syndrome. Another author estimated that the incidence of Piriformis syndrome in patients with sciatica is 6%. The function of the Piriformis muscle is to externally rotate and abduct the thigh. In Piriformis syndrome, the only true-positive sign is tenderness over the gluteal region.<sup>[13]</sup> The pain can be reproduced with maximum elongation of the Piriformis muscle in FADIR of the hip. Weakness can be observed with resisted external rotation and abduction of the hip.

For diagnosing Piriformis syndrome, several authors describe the use of the following signs:

1. Lasegue sign: Pain is present in the vicinity of the greater sciatic notch during extension of the knee with the hip flexed to 90°, tenderness to palpation of the greater sciatic notch is noted
2. Freiberg sign: Pain occurs with passive internal rotation of the extended thigh when the patient is supine
3. Pace sign: Pain and weakness are present on resisted abduction-external rotation of the thigh.

Robinson, who first described the syndrome, stated that Piriformis syndrome had six cardinal features:<sup>[14]</sup>

1. Sausage-shaped mass over the Piriformis muscle
2. Positive Lasegue sign
3. Gluteal atrophy in chronic cases
4. Trauma to the region
5. Pain exacerbated by lifting and relieved by traction on the affected extremity
6. Pain in the sacroiliac joint region, gluteal muscles, or greater sciatic notch.

Beatty explained two maneuvers to reproduced the pain of Piriformis syndrome in the following way:<sup>[10]</sup>

1. The patient lies with the painful side up and the involved leg flexed
2. The knee of the affected side rests on the table. Pain in the buttocks is reproduced when the patient lifts the leg and knee slightly above the table.

## Diagnostic Considerations

- Bursitis or weaver's bottom (i.e., ischiogluteal bursitis)
- Sciatica caused by compression secondary to a fibrotic band, hematoma, or aneurysm of the inferior or superior gluteal artery
- Pelvic mass, tumor, or endometriosis (in women)
- Gout
- Referred pain to the buttock caused by pronator forces of the foot
- Spinal canal stenosis.

## Differential Diagnoses

- Hamstring muscle injury
- Lumbosacral disc herniation injuries
- Sacroiliac joint injury
- Lumbosacral discogenic pain syndrome

- Lumbosacral facet syndrome
- Lumbosacral spine sprain-strain injuries
- Lumbosacral spondylolysis
- Lumbosacral radiculopathy
- Lumbosacral spondylolisthesis.

## Imaging Evaluation

*Computed tomography (CT) scan and magnetic resonance imaging (MRI)*

- CT scans can be used to identify spinal stenosis or arthritic changes
- MRI findings can rule out other causes of back pain, such as a herniated disc, spinal tumor, or abscess
- MRI may demonstrate a large mass anterior to the Piriformis muscle
- The Piriformis muscle also can appear enlarged on T1- or T2-weighted images.<sup>[4]</sup>

*Electromyography (EMG)*

- In Piriformis syndrome, abnormal patterns are found in the gluteus maximus and Piriformis muscles
- In Piriformis syndrome, EMG findings in the gluteus minimum, gluteus medius, and tensor fasciae late muscles are normal
- EMG can also be performed to determine neurologic or muscular changes
- In the case of a herniated disc, all muscles that are posteriorly and anteriorly innervated should be affected.

With a herniated disc, a significant delay in the Hoffman reflex or H-reflex (motor nerve fiber response after activation of afferent sensory spindle fibers) in the affected limbs is often present during EMG.<sup>[12]</sup>

## METHODS

This is prospective and case-control study. In this study, we evaluated patients with low back pain or lower limb pain (268 patients). All cases with diagnosis of disc herniation were excluding. In 268 cases, seven cases had Piriformis syndrome; these seven cases had low back pain and radicular pain with mean average of 42 years old (12–67 years old). In the first physical examination was done, we studied pain, severity pain, radicular pain, limping, and painful sitting which were taken. For evaluation of musculoskeletal we used BMI and physical examination of piriformis sign, freiberg sign, pace sign. Neurological evaluation was taken. And after that, paraclinical examination elevated X-ray, CT-scan, MRI, and EMG. Data show as mean±SD and we used SSPS software for analysis.

## RESULTS

In Table 1, specifications of all seven cases, with conservative method 100% of cases, were cure treatment after 4 months, in which in surgery methods after 1 month that is significant between two methods of treatment ( $P < 0.00025$ ). In seven cases, four cases had a history of blunt trauma. One case had a history of surgery that after 6 months had complication of surgery and scare tissue that with the second surgery release of scare was done with 100% cure. Anomaly of Piriformis muscle was seen in one case that surgery was done. Heterotopic

**Table 1:** Specifications, age, sex, symptom, causes, treatment, and results of seven cases of Piriformis syndrome

Age	Sex	Symptom	Cause	Treatment	Results
61	Female	Hip pain	Trauma	Conservative	After 6 months cure
45	Male	Lower limb pain	Trauma heterotopic ossification	Surgery	After 1 month cure
41	Male	Hip and lower limb pain	Scare of surgery	Surgery	After 3 months cure
67	Female	Numbness and pain in lower limb	Trauma heterotopic ossification	Conservative	After 4 months cure
42	Male	Low back pain and hip pain	Anomaly of Piriformis muscle	Surgery	After 2 months cure
52	Male	Sciatica	Blunt trauma	Conservative	After 3 months cure
12	Female	Sciatica	Tumor of gluteal area	Surgery	After 1 month cure

ossification was seen in two cases. BMI of all cases was in normal range.

## DISCUSSION

In this study, we evaluated patients with low back pain or lower back pain (268 patients). All cases with diagnosis of disc herniation were excluded from the study. They are need surgical operation for disc herniation. The best and most point in Piriformis syndrome are differentiating primary from secondary. It is done according to history and physical examination.<sup>[18]</sup>

According to the etiology of Piriformis syndrome, the treatments are different. You see mass that compressed the sciatic nerve you must remove it. If the patient had sacroiliitis, it must be treated in early phase.

The most differential diagnosis of secondary Piriformis syndrome is sacroiliitis in patients with buttock pain. In general, condition sacroiliitis are without sciatica pain.<sup>[7,8]</sup> However, it may be secondary to tension of Piriformis muscle (Hiltz – 1976) about 8.22% of sacroiliitis was seen in all low back pain patients. According to this for differentiated, we need to injection to this joint.<sup>[10]</sup>

Surgery of Piriformis is not accepted in all surgeons. It is limited to release Piriformis tendon and insertion to femur.<sup>[18]</sup> Surgery itself has complication and morbidity, scar tissue, and compressed the sciatic nerve. Surgery must be limited to only remove tissue around sciatic notch and inferior border of Piriformis muscle that limited space around the nerve. The secondary type of Piriformis syndrome was seen more in inflammatory process.<sup>[15-18]</sup> Surgery and release of Piriformis muscle decrease and removed pain in sacroiliitis indirectly. However, direct treatment of sacroiliitis joint must be done with sacroiliitis girder, manipulation, injection physical therapy and at the end, surgery of joint and fusion the joint.

## REFERENCES

1. K. Hopayian and A. Danielyan. "Four symptoms define the piriformis syndrome: An updated systematic review of its clinical features". *European Journal of Orthopaedic Surgery and Traumatology*, vol. 28, no. 2, pp. 155-164, 2018.
2. L. M. Fishman and M. P. Schaefer. "The piriformis syndrome is underdiagnosed". *Muscle and Nerve*, vol. 28, no. 5, pp. 646-649, 2003.
3. K. Meknas, A. Christensen and O. Johansen. "The internal obturator muscle may cause sciatic pain". *Pain*, vol. 104, no 1-2, pp. 375-80, 2003.
4. A. G. Filler, J. Haynes, S. E. Jordan and J. Prager. "Sciatica of nondisc origin and piriformis syndrome: Diagnosis by magnetic resonance neurography and interventional magnetic resonance imaging with outcome study of resulting treatment". *Journal of Neurosurgery Spine*, vol. 2, no. 2, pp. 99-115, 2005.
5. M. R. Foster. "Piriformis syndrome". *Orthopedics*, vol. 25, no. 8, pp. 821-825, 2002.
6. L. M. Fishman, G. W. Dombi and C. Michaelson. "Piriformis syndrome: Diagnosis, treatment, and outcome-a 10-year study". *Archives of Physical Medicine and Rehabilitation*, vol. 83, no. 3, pp. 295-301, 2002.
7. H. T. Benzon, J. A. Katz, H. A. Benzon and M. S. Iqbal. "Piriformis syndrome: Anatomic considerations, a new injection technique, and a review of the literature". *Anesthesiology*, vol. 98, no. 6, pp. 1442-1448, 2003.
8. S. K. Han, Y. S. Kim, T. H. Kim and S. H. Kang. "Surgical treatment of piriformis syndrome". *Clinics in Orthopedic Surgery*, vol. 9, no. 2, pp. 136-144, 2017.
9. P. M. Barton. "Piriformis syndrome: A rational approach to management". *Pain*, vol. 47, no. 3, pp. 345-352, 1991.
10. R. A. Beatty. "The piriformis muscle syndrome: A simple diagnostic maneuver". *Neurosurgery*, vol. 34, pp. 512-514, 1994.
11. R. P. Beauchesne and S. F. Schutzer. "Myositis ossificans of the piriformis muscle: An unusual cause of piriformis syndrome. A case report". *Journal of Bone and Joint Surgery American*, vol. 79, no. 6, pp. 906-910, 1997.
12. J. A. Brown, M. A. Braun and T. C. Namey. "Piriformis syndrome in a 10-year-old boy as a complication of operation with the patient in the sitting position". *Neurosurgery*, vol. 23, no. 1, pp. 117-119, 1998.
13. Z. Durrani and A. P. Winnie. "Piriformis muscle syndrome: An underdiagnosed cause of sciatica". *Journal of Pain and Symptom Management*, vol. 6, no. 6, pp. 374-379, 1991.
14. A. H. Freidberg. "Sciatic pain and its relief by operation on muscle and fascia". *Archives of Surgery*, vol. 34, pp. 337-349, 1937.
15. J. W. Frymoyer. "Back pain and sciatica". *The New England Journal of Medicine*, vol. 318, no. 5, pp. 291-300, 1988.
16. J. J. Jankiewicz, W. L. Hennrikus and J. A. Houkom. "The appearance of the piriformis muscle syndrome in computed tomography and magnetic resonance imaging. A case report and review of the literature". *Clinical Orthopaedics*, vol. 262, pp. 205-209, 1991.
17. S. P. Cass. "Piriformis syndrome: A cause of nondiscogenic sciatica". *Current Sports Medicine Reports*, vol. 14, no. 1, pp. 41-44, 2015.
18. C. Steiner, C. Staubs, M. Ganon and C. Buhlinger. "Piriformis syndrome: Pathogenesis, diagnosis, and treatment". *The Journal of the American Osteopathic Association*, vol. 87, no. 4, pp. 318-323, 1978.

Author Query???

AQ1:Kindly cite figures 1-4 in the text part