Piriformis Muscle Syndrome

78

Navdeep Singh Jassal

Key Concepts

- Pain caused by piriformis syndrome is located in the buttock with/without radiation to the ipsilateral leg.
- Physical examination signs can be used to help in confirmation, including Pace, Lasegue, and Freiberg Sign, and may occur in a setting of trauma.
- Perisciatic and piriformis muscle injections with steroid and local anesthetic may provide several months of pain relief and improved function. If transient, botulinum toxin may be used.

Introduction

The incidence rate of piriformis syndrome has typically ranged from 5% to 8% but has been cited as high as 36% among patient with low back pain. Although uncommon, piriformis syndrome is often misdiagnosed as a cause of buttock and leg pain.

Anatomy of the Piriformis Muscle

Origin

Anterior surface of the S2–S4 sacral vertebrae, the sacroiliac joint capsule, and the gluteal surface of the ilium.

Insertion

Runs through the greater sciatic foramen and inserts into the piriformis fossa at the medial aspect of the greater trochanter of the femur.

Innervation

Branches of the ventral rami of the L5, S1, and S2 spinal nerves.

Actions on the Femur

Lateral (external) rotator of the femur in the hip joint.

It is important to understand that there can be six possible anatomic relationships that can occur between the sciatic nerve and piriformis muscle. These anomalies can cause the patient's hip and buttock pain and sciatica.

1. Undivided sciatic nerve that passes above the piriformis muscle
2. Undivided sciatic nerve that passes below the piriformis muscle (most common)
3. Undivided sciatic nerve passing through the piriformis
4. A divided sciatic nerve passing through and above the muscle
5. A divided sciatic nerve passing through and below the muscle
6. A divided sciatic nerve passing above and below the muscle

Etiologies

Etiology can include trauma to the pelvis or buttock, hypertrophy/spasm of the piriformis muscle, female gender, pregnancy, and anatomic abnormalities that exist between piriformis muscle and sciatic nerve, as described above.

N.S. Jassal, MD (✉)
Florida Pain Medicine, University of South Florida, Department of Neurology, James A. Haley VA Medical Center, Number 127, Tampa, FL 33612, USA
e-mail: navdeepjassal@gmail.com

J.E. Pope, T.R. Deer (eds.), *Treatment of Chronic Pain Conditions*, DOI 10.1007/978-1-4939-6976-0_78

Also, greater than half an inch leg length discrepancies, cerebral palsy with hypertonicity, obesity, and lumbar hyperlordosis can also predispose factors of this syndrome. There is often a history of microtrauma to the piriformis muscle in up to 50% of the cases that can occur months prior to the start of symptoms. It can be seen after total hip replacement or laminectomy, in which scar tissue can impinge on nerve roots of the sciatic nerve.

Differential Diagnosis

May include causes of low back pain with sciatic including lumbar facet syndrome, sacroiliac joint dysfunction, trochanteric/ischial bursitis, endometriosis, pelvic neoplasm, or myofascial pain syndrome. Diagnosis is often achieved after exclusion of the above differential.

Signs and Symptoms

On history taking, patients typically complain of buttock pain (sacrum to the greater trochanter) with/without radiation down the ipsilateral leg or paralumbar pain. Patient's pain is generally aggravated by activities such as biking or driving, as it includes prolonged sitting posture. Aggravation can also occur from sitting to standing positions, bowel movements, and sitting hard surfaces. On physical examination there may be a pelvic tilt on inspection and tenderness in the buttock (greater sciatic foramen to the greater trochanter) upon palpation. Neurologic weakness is usually absent; however, there may be numbness of distal lower extremity from sciatic nerve compression from the piriformis muscle. There may be normal or limited straight leg raise.

There are also three notable signs that can be characteristic for piriformis syndrome, including Pace, Lasegue, and Freiberg sign.

- Pace sign: pace and weakness upon resisted abduction of the hip, while the hip is in flexed position (or seated).
- Lasegue sign: pain on voluntary flexion, adduction, and internal rotation (FAIR position) of the hip.
- Freiberg sign: pain on forced internal rotation of the extended thigh.

Diagnosis is made mainly clinically, although electromyography (myopathic or neuropathic changes including delayed H-reflex in FAIR position), computed tomography, magnetic resonance imaging (enlargement of piriformis muscle), and bone scan (increased radioactive uptake) may reveal abnormalities.

Treatment

The mainstay of treatment of piriformis syndrome includes physical therapy in combination with the use of anti-inflammatory drugs, analgesics, and muscle relaxants for reduction of inflammation, pain, and muscle spasms. Physical therapy modalities, such as moist heat (superficial heat) and/or ultrasound (deep heat), are often beneficial forms of treatment when used in conjunction with stretching and manual therapy. Stretching of the piriformis muscle involves flexion, adduction, and internal rotation of the hip adductors and the knee while the patient lies supine. This may be followed by the physical therapist performing a muscle energy technique. Abnormal biomechanics including poor posture, leg length discrepancies, and pelvic obliquities should be corrected.

If unresponsive to conservative treatment, patients often benefit from injections into the piriformis muscle with or without per sciatic nerve injections. This can be done with an injectate containing 40 mg of Depo-Medrol and 3–5 ml of local anesthetic (lidocaine or bupivacaine). Initially performed blindly, newer techniques are performed with fluoroscopic (X-ray), with or without EMG, or ultrasound needle guidance in order to confirm proper placement of the needle. The piriformis muscle lies deep to the buttock adipose tissue and gluteus maximus muscle.

Technique (Under Fluoroscopic Guidance)

- A 22-gauge 3.5″ or 5″ (depending on patient body habitus) Quincke needle is used to advance down and contact the very tip of the inferior sacroiliac joint. Make note of the approximate needle depth.
- The needle is then withdrawn and redirected to a final target site 1 cm inferior, 1 cm lateral, and 1 cm deeper than the SI joint.
- AP view should demonstrate contrast flow in a diagonal pattern from cephalad to caudad as it goes toward the femoral attachment site of the piriformis muscle.

Botulinum toxin may also be injected into the piriformis muscle if the response to steroid/anesthetic is transient. Botulinum toxin specifically cleaves SNARE protein, preventing neurosecretory vesicles from docking/fusing with the nerve synapse plasma membrane, preventing acetylcholine release, and causing prolonged relaxation (~3 months). BTX-A (Botox) or botulinum toxin type B (Myobloc) may be utilized.

Surgery may be considered in recalcitrant cases and includes the muscle excision, division, or thinning.

Suggested Reading

1. Barton PM. Piriformis syndrome a rational approach to management. Pain. 1991;47:345–52.
2. Beason LE, Anson BJ. The relation of the sciatic nerve and its subdivisions to the piriformis muscle. Anat Rec. 1937;70:1–5.
3. Benzon HT, et al. Essentials of pain medicine. Philadelphia: Elsevier Saunders; 2011.
4. Papadopoulos EC, Kahn SN. Piriformis syndrome and low back pain a new classification and review of the literature. Orthop Clin North Am. 2004;35:65–71.
5. Parziale JR, Hudgins TH, Fishman LM. The piriformis syndrome. Am J Orthop. 1996;25:819–23.