

## Case Report

### Recurrent Piriformis Syndrome After Surgical Release

Philipp Kobbe MD, Boris A. Zelle MD,  
Garry S. Gruen MD

Received: 9 September 2007 / Accepted: 22 January 2008 / Published online: 9 February 2008  
© The Association of Bone and Joint Surgeons 2008

**Abstract** Piriformis syndrome is an uncommon condition characterized by sciatic nerve entrapment at the greater sciatic notch. Nonoperative treatment such as physical therapy, nonsteroidal antiinflammatory drugs, and local injections often results in relief of symptoms. For patients who do not benefit from nonoperative therapy, surgical exploration and decompression of the sciatic nerve has been effective. However, the success of surgery may be diminished by scar formation or hematoma in the anatomically restricted sciatic notch. We report two patients with piriformis syndrome who responded primarily to surgical decompression and had recurrent symptoms resulting from scar tissue formation in the sciatic notch. On revision surgery, polytetrafluoroethylene pledgets were placed around the sciatic nerve to avoid compression and entrapment by scar tissue. Both patients had satisfactory outcomes at 3 years followup.

#### Introduction

Piriformis syndrome is characterized by paresthesias and pain in the buttock that commonly radiate into the posterior thigh resulting from sciatic nerve entrapment at the greater sciatic notch.

Patients usually benefit from nonoperative treatment; however, in a small subset of patients, nonoperative measures are not successful and surgical decompression of the sciatic nerve at the greater sciatic notch is performed.

We report two patients with recurrent piriformis syndrome after surgical decompression. On revision surgery, both patients underwent repeat neurolysis with scar tissue débridement and insertion of polytetrafluoroethylene pledgets around the sciatic nerve to avoid potential nerve compression by scar tissue formation. To the best of our knowledge, no similar case has been reported.

#### Case 1

A 47-year-old male construction worker presented to the outpatient office with low back pain of several years' duration. During a 3-month period, he had a persistent burning pain develop in his right lower extremity extending from the right buttock to the posterior aspect of his leg. The patient reported increased pain with an extended period of sitting and extension of the lumbar spine. Furthermore, he reported numbness and weakness in his right leg and foot. He did not recall any history of trauma.

On clinical examination, the patient had full range of motion of his right lower extremity. He was nontender to palpation above his lower back. Palpation of the sciatic notch was painful and accompanied by numbness radiating down the leg. The Freiberg sign (internal rotation with the

---

Each author certifies that he has no commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc) that might pose a conflict of interest in connection with the submitted article.

Each author certifies that his institution either has waived or does not require approval for the reporting of these cases, that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

---

P. Kobbe (✉), B. A. Zelle, G. S. Gruen  
Department of Orthopaedic Surgery, Division of Trauma,  
University of Pittsburgh School of Medicine,  
Kaufmann Building, Suite 1010, 3471 Fifth Avenue,  
Pittsburgh, PA 15213, USA  
e-mail: kobbep@upmc.edu

hip extended) was positive, whereas there were negative Pace (abduction with the hip flexed) and Patrick tests (abduction and external rotation of the hip).

The sensation was decreased in the superficial and deep peroneal nerve distribution. The motor strength was 4/5 for the extensor hallucis longus and tibialis anterior and 5/5 for the flexor hallucis longus and gastrocnemius. The patient had symmetric palpable dorsalis pedis and posterior tibialis pulses. Radiographs of the lumbar spine did not reveal any abnormalities. Magnetic resonance imaging of the lumbar spine did not show any evidence of disc herniation or cord compression. An MRI scan of the pelvis showed a normal sciatic nerve but otherwise no abnormal findings. Electromyographic study revealed right peroneal mono-neuropathy. The lesion had features of partial conduction block and axonal loss. Furthermore, there were several polyphasic motor units noted in the muscles of the lower limb. These clinical, radiographic, and neurophysiologic findings were suggestive of a piriformis syndrome.

The patient was started on a course of nonoperative treatment, including physical therapy, nonsteroidal antiinflammatories followed by a computed tomography (CT)-guided steroid injection in the piriformis area. These nonoperative measures did not result in a considerable relief of symptoms. Fifteen months after the initial presentation, the patient underwent surgical piriformis release through a Kocher-Langenbeck approach. The sciatic nerve was exposed from the sciatic notch to the greater ischio-tuberositas. There was an anomalous piriformis muscle with bifurcation such that the sciatic nerve went through two slips of the piriformis muscle. The nerve was flattened completely as it coursed underneath the piriformis muscle and showed a thickened epineurium. The piriformis muscle was released and the thickened epineurium was removed from the greater sciatic notch to the hamstrings at its ischial attachment. To avoid nerve compression by postsurgical hematoma in the sciatic notch, special attention was paid to the absence of any bleeding. After surgery, the patient reported complete relief of symptoms.

Six weeks after surgery, the patient returned to the clinic for his second followup. It was noted that the patient had recurrent symptoms. An MRI showed there were no abnormalities. In addition, the patient was given a repeat CT-guided injection of steroids into the piriformis muscle region. Because the injection did not result in satisfactory relief of symptoms, revision surgery was performed. During the revision surgery, we encountered a completely released piriformis muscle and no signs of hematoma formation in the sciatic notch. However, the sciatic nerve was compressed at the greater sciatic notch by fibrous adherent scar tissue around the nerve. The nerve was released completely and a polytetrafluoroethylene pledget (4 × 2 cm) was circumferentially placed around the nerve

to avoid compression by scar formation. Again, special attention was paid to avoid postsurgical hematoma formation before wound closure. After surgery, the patient reported complete relief of symptoms. Three years after surgery, the patient did not have any numbness or motor weakness in the lower extremities and reported he was free of symptoms.

## Case 2

A 43-year-old male physician presented to the outpatient office with a 2-year history of shooting pain in his left gluteal area that radiated to his left leg. The pain was exaggerated by climbing stairs, running, and prolonged sitting or standing. Furthermore, the patient reported numbness and weakness of his left leg. In addition, the patient had persistent left limb paresthesias and recurrent left ankle evorator weakness.

On clinical examination, the patient had full range of motion and a normal neuromuscular examination. He was tender to palpation over the sciatic notch. A positive Freiberg test was noted, whereas the Pace and Patrick tests were negative.

The radiographs and the MRI image of the lumbar spine showed no pertinent findings. An MRI image of the pelvis showed slight thickening of the piriformis muscle and an electromyogram was within normal limits.

These findings were suggestive of piriformis syndrome and the patient was started on physical therapy and nonsteroidal antiinflammatories. Furthermore, he was given a CT-guided corticosteroid injection in the area of his left piriformis muscle. These nonoperative treatments did not result in a considerable relief of symptoms. Nineteen months after the initial presentation, the patient underwent surgical piriformis release through a Kocher-Langenbeck approach. The sciatic nerve was exposed from the sciatic notch to the greater ischio-tuberositas. An abnormal left sciatic nerve with bifurcation over the piriformis muscle was noted. The piriformis muscle was released and a thorough epineurolysis was performed. Wound closure was performed in a standard fashion with particular attention to careful hemostasis. After surgery, the patient had minimal pain in the area of the incision but otherwise had complete relief of symptoms.

Six weeks after surgery, the patient presented for his second followup with recurrent symptoms and additional impairment of muscular function. The neuromuscular evaluation showed decreased motor strength for the extensor hallucis longus (3/5), tibialis anterior (4/5), and gastrocnemius (4/5). The patient had symmetric palpable dorsalis pedis and posterior tibialis pulses.

The patient underwent revision surgery and the intraoperative findings showed the sciatic nerve was entrapped

in extensive fibrous scar tissue. Furthermore, we encountered a completely released piriformis muscle. The fibrous scar tissue surrounding the sciatic nerve was removed and a polytetrafluoroethylene pledget (4 × 2 cm) was circumferentially placed around the nerve to avoid compression by scar formation. Thorough hemostasis was performed before wound closure. After surgery, the patient reported complete relief of symptoms. At the 3-year followup, the patient reported considerable improvement since before surgery. He had no numbness or motor weakness in the lower extremities. He reported some residual pain in the left gluteal area and the left lower extremity. He had returned to work and did not require any pain medication.

## Discussion

The importance of the piriformis syndrome often is underestimated and the diagnosis of piriformis syndrome often is complicated by limited availability of reliable clinical and radiographic tests [23]. Symptoms of piriformis syndrome and lumbar spine disease are similar and it has been estimated that piriformis syndrome accounts for approximately 6% to 8% of low back pain [8].

It has been suggested that posttraumatic hematoma formation with subsequent scarring of the sciatic nerve to the external hip rotators may be a common cause of sciatic nerve compression [2, 20]. Furthermore, anatomic abnormalities may predispose one to having piriformis syndrome develop.

Treatment of piriformis syndrome with nonsteroidal antiinflammatory agents and physical therapy has been well described [1, 8, 9, 17, 24]. Benson and Schutzer reported nonoperative therapy to be successful in 85% of patients [2]. For patients who do not benefit from noninvasive measures, the use of local corticosteroid or botulinum toxin injections is recommended [3, 5, 6, 19]. However, a small subset of patients does not benefit from those measures and surgery is performed. The surgical treatment of piriformis syndrome has been well established and usually consists of releasing the piriformis tendon from its femoral insertion with neurolysis of the sciatic nerve [7]. Poor surgical outcome is associated with failure to fully release the piriformis muscle at its ischial attachment or the formation of hematoma or scar tissue in the anatomically restricted sciatic notch. Published reports on the treatment of recurrent piriformis syndrome after surgical release are limited. To the best of our knowledge, there are no reports on the surgical management of recurrent piriformis syndrome.

We present two patients with piriformis syndrome resulting from an anatomic variation. In our two patients, MRI was not helpful, although one showed a slightly thickened piriformis muscle. In contrast to previous reports [1, 12, 18, 21], the anatomic variation was not detected by MRI. Changes in

the initial electromyography were either absent or not specific for compression of the sciatic nerve. Once the diagnosis was established by careful clinical examination and exclusion of other morbidities, the patients were started on a nonoperative treatment course. Because nonoperative treatment was not beneficial, the piriformis muscle was surgically released. Both patients showed immediate relief of symptoms after surgery. In our two patients, the symptoms recurred approximately 6 weeks after surgery.

On surgical exploration, both patients showed formation of extensive fibrous scar tissue around the sciatic nerve. In both cases, the piriformis muscle was completely released and there were no signs of hematoma formation in the sciatic notch. Previous reports did not address the problem of revision surgery for recurrent piriformis syndrome [2]. However, postoperative scar formation with subsequent sciatic nerve compression may considerably limit the functional outcomes of surgical piriformis release. The sciatic nerve may be entrapped in the anatomically small sciatic notch by only small amounts of postsurgical hematoma or scar formation. Whether arthroscopic release of the piriformis muscle as reported, may reduce the incidence of recurrent piriformis syndrome by minimizing soft tissue trauma and consequent scar formation has yet to be evaluated [4].

The use of polytetrafluoroethylene pledgets is an established procedure in neurosurgery to avoid nerve compression by pulsative intracranial arteries [11, 13, 16, 22, 25]. Furthermore, polytetrafluoroethylene membranes are used to decrease epidural and peridural scarring after spinal surgery [10, 14, 15]. Teflon membranes prevent scar formation by providing a mechanical barrier to fibroblastic invasion. In our two reported patients, we placed polytetrafluoroethylene pledgets around the path of the sciatic nerve to avoid fibroblastic invasion and subsequent sciatic nerve entrapment. Both of our patients benefited from this revision procedure.

The success of a surgical piriformis release can be compromised by development of fibrous scar tissue entrapping the sciatic nerve. This may result in recurrent symptoms. This particular subset of patients may benefit from revision surgery. On revision surgery, placement of polytetrafluoroethylene pledgets around the sciatic nerve may decrease the risk of recurrent nerve entrapment by scar formation. However, larger series are required to determine the success rates of this type of revision procedure.

## References

1. Barton PM. Piriformis syndrome: a rational approach to management. *Pain*. 1991;47:345–352.
2. Benson ER, Schutzer SF. Posttraumatic piriformis syndrome: diagnosis and results of operative treatment. *J Bone Joint Surg Am*. 1999;81:941–949.

3. Childers MK, Wilson DJ, Gnatz SM, Conway RR, Sherman AK. Botulinum toxin type A use in piriformis muscle syndrome: a pilot study. *Am J Phys Med Rehabil.* 2002;81:751–759.
4. Dezawa A, Kusano S, Miki H. Arthroscopic release of the piriformis muscle under local anesthesia for piriformis syndrome. *Arthroscopy.* 2003;19:554–557.
5. Fanucci E, Masala S, Sodani G, Varruciu V, Romagnoli A, Squillaci E, Simonetti G. CT-guided injection of botulinic toxin for percutaneous therapy of piriformis muscle syndrome with preliminary MRI results about denervative process. *Eur Radiol.* 2001;11:2543–2548.
6. Fishman LM, Anderson C, Rosner B. BOTOX and physical therapy in the treatment of piriformis syndrome. *Am J Phys Med Rehabil.* 2002;81:936–942.
7. Foster MR. Piriformis syndrome. *Orthopedics.* 2002;25:821–825.
8. Hallin RP. Sciatic pain and the piriformis muscle. *Postgrad Med.* 1983;74:69–72.
9. Hughes SS, Goldstein MN, Hicks DG, Pellegrini VD Jr. Extrapelvic compression of the sciatic nerve: an unusual cause of pain about the hip: report of five cases. *J Bone Joint Surg Am.* 1992;74:1553–1559.
10. Ivancic GM, Pink PT, Schneider F, Stuecker M, Homann NC, Preidler KW. Prevention of epidural scarring after microdiscectomy: a randomized clinical trial comparing gel and expanded polytetrafluoroethylene membrane. *Eur Spine J.* 2006;15:1360–1366.
11. Jarrahy R, Eby JB, Cha ST, Shahinian HK. Fully endoscopic vascular decompression of the trigeminal nerve. *Minim Invasive Neurosurg.* 2002;45:32–35.
12. Kosukegawa I, Yoshimoto M, Isogai S, Nonaka S, Yamashita T. Piriformis syndrome resulting from a rare anatomic variation. *Spine.* 2006;31:E664–E666.
13. Kraemer JL, Pereira Filho AA, David G, Faria MB. Vertebrobasilar dolichoectasia as a cause of trigeminal neuralgia: the role of microvascular decompression: case report. *Arq Neuropsiquiatr.* 2006;64:128–131.
14. Llado A, Guimera J, Garcia F, Navarro A. Expanded polytetrafluoroethylene membrane for the prevention of peridural fibrosis after spinal surgery: an experimental study. *Eur Spine J.* 1999;8:138–143.
15. Llado A, Sologastua E, Guimera J, Marin M. Expanded polytetrafluoroethylene membrane for the prevention of peridural fibrosis after spinal surgery: a clinical study. *Eur Spine J.* 1999;8:144–150.
16. Marneffe V, Polo G, Fischer C, Sindou M. [Microsurgical vascular decompression for hemifacial spasm: follow-up over one year, clinical results and prognostic factors: study of a series of 100 cases][in French]. *Neurochirurgie.* 2003;49:527–535.
17. Melzack R. Prolonged relief of pain by brief, intense transcutaneous somatic stimulation. *Pain.* 1975;1:357–373.
18. Ozaki S, Hamabe T, Muro T. Piriformis syndrome resulting from an anomalous relationship between the sciatic nerve and piriformis muscle. *Orthopedics.* 1999;22:771–772.
19. Pace JB, Nagle D. Piriform syndrome. *West J Med.* 1976;124:435–439.
20. Pecina M. Contribution to the etiological explanation of the piriformis syndrome. *Acta Anat (Basel).* 1979;105:181–187.
21. Rossi P, Cardinali P, Serrao M, Parisi L, Bianco F, De Bac S. Magnetic resonance imaging findings in piriformis syndrome: a case report. *Arch Phys Med Rehabil.* 2001;82:519–521.
22. Sindou M, Fischer C, Derraz S, Keravel Y, Palfi S. [Microsurgical vascular decompression in the treatment of facial hemispasm: a retrospective study of a series of 65 cases and review of the literature][in French]. *Neurochirurgie.* 1996;42:17–28.
23. Steiner C, Staubs C, Ganon M, Buhlinger C. Piriformis syndrome: pathogenesis, diagnosis, and treatment. *J Am Osteopath Assoc.* 1987;87:318–323.
24. Vandertop WP, Bosma NJ. The piriformis syndrome: a case report. *J Bone Joint Surg Am.* 1991;73:1095–1097.
25. Yuan Y, Wang Y, Zhang SX, Zhang L, Li R, Guo J. Microvascular decompression in patients with hemifacial spasm: report of 1200 cases. *Chin Med J (Engl).* 2005;118:833–836.