

# Complete resolution of recurrent piriformis syndrome after piriformis resection with 3 years' follow up ; A case report

*by Achmad Fahmi*

---

**Submission date:** 13-Sep-2022 03:45PM (UTC+0800)

**Submission ID:** 1898697845

**File name:** er\_piriformis\_resection\_with\_3\_years\_follow\_up\_A\_case\_report.pdf (1.24M)

**Word count:** 2865

**Character count:** 16080



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

## Complete resolution of recurrent piriformis syndrome after piriformis resection with 3 years' follow up: A case report



Achmad Fahmi<sup>a,b,\*</sup>, Mustaqim Apriyansa Rahmadhan<sup>a,b</sup>, Dirga Rachmad Aprianto<sup>a,b,c</sup>, Heri Subianto<sup>a,b</sup>, Agus Turchan<sup>a,b</sup>

<sup>a</sup> Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

<sup>b</sup> Department of Neurosurgery, Dr. Soetomo General Academic Hospital, Surabaya, Indonesia

<sup>c</sup> Department of Surgery, Faculty of Medicine, Universitas Islam Sutan Agung, Semarang, Indonesia

### ARTICLE INFO

#### Article history:

Received 18 October 2020

Received in revised form

16 November 2020

Accepted 16 November 2020

Available online 20 November 2020

#### Keywords:

Piriformis syndrome

Piriformis resection

Pain relief

### ABSTRACT

**INTRODUCTION:** Piriformis syndrome (PS) is an uncommon neuromuscular condition characterized by buttock pain radiating to the leg. Although the goal of PS treatment is symptom relief, it is difficult in some patients using conservative treatment alone.

**PRESENTATION OF CASE:** A 72-year-old male underwent piriformis resection after failed sequential steroid injection of the piriformis. The patient ultimately underwent surgery for resection of the piriformis muscle and experienced satisfactory pain relief (pain reduction > 75% according to visual analog scale for at least 12 months) following surgery and in the 3-year follow-up period.

**DISCUSSION:** Conservative treatment is first-choice treatment for managing PS. Surgery was indicated when the patient did not achieve satisfactory pain relief with conservative treatment. Surgical resection of the piriformis muscle has been shown to be effective and feasible.

**CONCLUSION:** Piriformis resection is effective and can be a feasible option for the treatment of PS following failure of appropriate conservative treatment(s).

© 2020 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

### 1. Introduction

Piriformis syndrome (PS) refers to pain caused by impingement of the sciatic nerve by the piriformis muscle, resulting in irritation of the sciatic nerve and the generation of symptoms including low back, hip, buttock, and leg pain [1]. The prevalence of PS in individuals who experience chronic low back and sciatic pain is approximately 0.5%–17% [2].

PS is frequently unrecognized and/or misdiagnosed by physicians as spinal problems or other inflammatory conditions due to the lack of a gold standard tool for definitive diagnosis [3]. Other modalities can be used to exclude other pathologies, including electromyography (EMG), computed tomography (CT), and magnetic resonance neurography (MRN). Furthermore, steroid injection of the piriformis muscle, with or without neurolysis, can be performed to confirm PS [4].

Conservative treatment is the first choice in treating patients with PS. Activity modification, anti-inflammatory drugs, physical therapy, injection of anesthetics, steroids, or neurotoxins may alle-

violate symptoms. However, in some cases, conservative treatment results in only minor symptom relief. Surgical decompression can be considered as a last resort in treating PS. After failed response to conservative treatment, > 80% of patients (of 62 cases) were reported to experience significant pain relief immediately after surgical resection of the piriformis, with most experiencing long-term relief [1,5,6]. Here, we report our experience and discuss the surgical methods for managing PS. This work has been reported in line with the SCARE guideline [7]. This work has been registered at <http://www.researchregistry.com> (researchregistry6134).

### 2. Presentation of case

A 72-year-old man visited the authors' hospital outpatient clinic complaining of a 2-year history of left buttock pain radiating to his left leg. He also experienced a tingling sensation, and diffuse or poorly localized radiating pain in the left leg. These symptoms were aggravated by the activities of daily living, especially sitting. Patient frequently sit at hard wood chair. On radiological examination, dynamic lumbosacral spinal X-ray and magnetic resonance imaging revealed that the spine was stable, with facet hypertrophy and mild central canal stenosis at the level of lumbar 4–5.

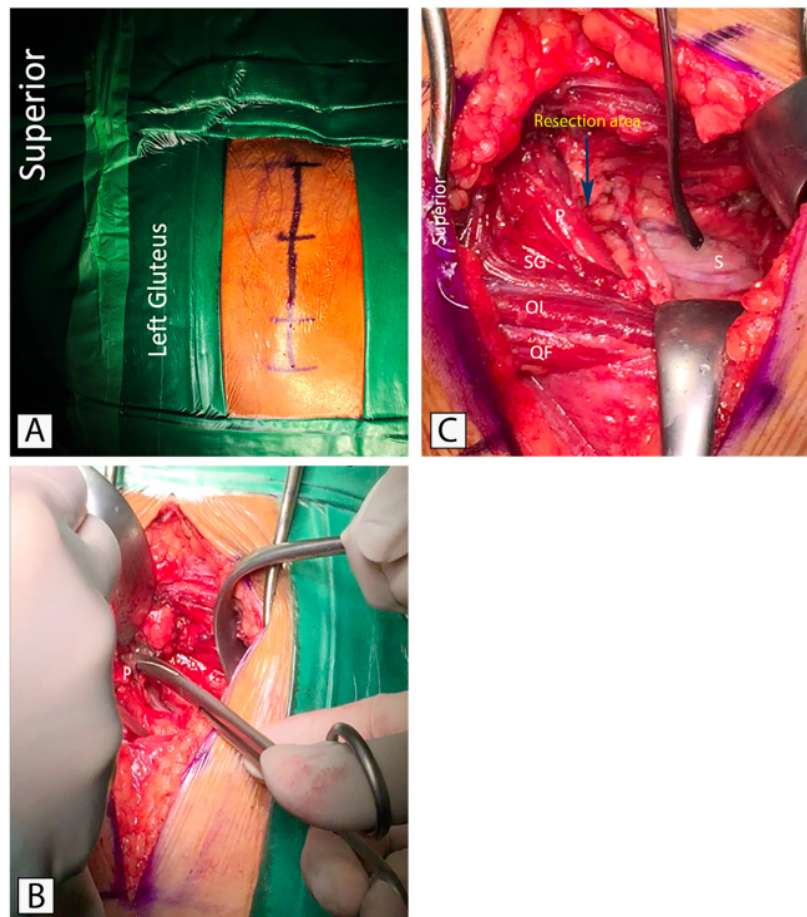
On physical examination, the left foot was externally rotated in the resting position. The straight leg raise test was positive at 40° and the Flexion Adduction Internal Rotation (i.e., FAIR) test was con-

\* Corresponding author at: Faculty of Medicine, Universitas Airlangga, Dr. Soetomo General Academic Hospital, Jalan Mayjend Prof. Dr. Moestopo No. 6 - 8, Surabaya, 60286, Indonesia.

E-mail address: [achmad.fahmi-13@fk.unair.ac.id](mailto:achmad.fahmi-13@fk.unair.ac.id) (A. Fahmi).

<https://doi.org/10.1016/j.ijscr.2020.11.099>

2210-2612/© 2020 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).



**Fig. 1.** Intraoperative photographs. A. Surgical incision planning. B. The inner side of the piriformis muscle (P) was resected. C. Dissected fibrous tissues around the sciatic nerve. SG: superior gemellus muscle, OI: obturator internus muscle, QF: quadratus femoris muscle.

firmed after performing provocation maneuvers. Piriformis muscle stretch pain and tenderness on palpation were noted. The patient's response to buttock pain, assessed according to a visual analog scale (VAS) scored 0–10, was 8. No sensorineural deficits were present over the lower extremity. Based on the patient's history and physical examinations, a provisional primary diagnosis of myofascial pain syndrome of the piriformis muscle was made.

To manage the patient's condition and confirm the diagnosis of PS, injection blocking of the piriformis muscle using steroid was performed. The symptoms were significantly reduced (VAS score, 3) following the procedure, and he was able to perform his daily activities by himself. During follow-up, however, the symptoms recurred 3 months later (VAS score, 7). A second piriformis injection was performed with the same result. After failed conservative treatment and a confirmed diagnosis of PS, we performed surgical resection of the piriformis muscle as the last resort.

Intraoperative findings revealed pinching of the left sciatic nerve by the piriformis muscle. After the sciatic nerve was released by resecting the piriformis muscle, steroids were administered to the area surrounding the nerve and tissue to address inflammation along with adhesion barrier gel to prevent adhesion after surgery.

## 2.1. Surgical approach

Surgery was performed by the author, with the patient in the prone position. A linear skin incision was made > 10 cm over the greater trochanter. The piriformis muscle was located at the posterior aspect of the greater trochanter and obturator internus muscle (Fig. 1A). The gluteus maximus was bluntly dissected in the direction of its fibers by blunt dissection until the piriformis muscle was exposed. The sciatic nerve was explored and found below the piriformis muscle, with inflamed tissue surrounding the sciatic nerve. Decompression was performed by partial resection of the inner part of the piriformis muscle that compressed the sciatic nerve (Fig. 1B) [6,8]. Subsequently, the fibrous tissues around the sciatic nerve were carefully dissected to avoid damaging the nerve (Fig. 1C). Triamcinolone acetonide (20 mg) (Flamicort, Dexa Medica, Palembang, Indonesia), a synthetic corticosteroid, and barrier adhesion gel (Mediclone, Jakarta, Daewoong Pharmaceutical Company, Indonesia), were applied to the sciatic nerve and its surrounding tissues to achieve an anti-inflammatory effect and prevent adhesion.



Fig. 2. Schematic location of the sciatic nerve travelling below the piriformis muscle.

## 2.2. Result

The surgical outcome was considered to be satisfactory if there was a significant decrease in pain response according to VAS, with > 50% reduction during 1-year follow-up after surgery. The patient exhibited satisfactory results that lasted > 3 years after surgery, with no neurological deficits or surgical complications. The symptoms were significantly relieved (VAS score, 2), with no neurological deficits or complications after surgery. During the 3 years of follow-up, the patient experienced satisfactory pain relief, patient evaluated in every 3 months after surgery (VAS score, 2; pain reduction > 75% according to VAS for at least 12 months) following surgery and in the 3-year follow-up period (yearly evaluated).

## 3. Discussion

PS is a neuromuscular condition that affects between 5% and 36% of patients with chronic low back and sciatic pain. PS is believed to be more common in women than men, mainly occurring in the fourth to fifth decades of life [8,9]. The sciatic nerve is formed by L4-S3 nerve roots and commonly passes anteriorly to the piriformis muscle (Fig. 2). However, in 17% of cases, the sciatic nerve and its branches pass through the piriformis muscle, as observed in our patient intraoperatively, thus causing a selective or dermatomal type of pain when the nerve or its branch is compressed [10]. Typical presentation of piriformis pain would be from the lower back or buttock to the knee, as exhibited by our patient. PS is mostly caused by microtrauma to the buttocks, leading to inflammation of soft tissue, muscle spasm, or both, with resulting nerve compression [11]. Microtrauma may result from the overuse of piriformis muscle, long-time repetitive sitting on a hard-surface chair, and by direct compression, such as in "wallet neuritis" [12].

Clinical assessment of patients with PS is difficult because the symptoms are similar to and may be biased by other lumbar or intra- or extra-articular hip diseases. Physical examination tests have been used for the clinical diagnosis of sciatic nerve entrapment including the Lasègue, Pace, Freiberg, Beatty, FAIR, and piriformis stretch tests. Fishman's clinical criteria can also be used to assess PS (Table 1) [1,13]. A positive FAIR test and Lasegue's sign were

Table 1

Fishman's clinical criteria for piriformis syndrome.

1. Positive Laseque sign at 45°
2. Tenderness at the sciatic notch
3. Increased pain in the sciatic distribution with the thigh in the FAIR (Flexion Adduction Internal Rotation) position
4. Electrodiagnostic studies that exclude myopathy or neuropathy

observed in our patient, indicating that the pain originated from the gluteal or sciatic area, mostly due to compression of the sciatic nerve by the piriformis muscle [13].

Several modalities can be used to assess PS, including EMG, CT, and MRN. However, there is no gold standard diagnostic tool for PS. These modalities can be used to help exclude other pathologies that may elicit symptoms [4]. Aside from clinical history and physical examinations, steroidal blocking injection, with or without neurolysis, of the piriformis muscle remains a reliable method of confirming a diagnosis of PS. In a study by Filler et al., patients with PS demonstrated a good response to local anesthetic and steroid injections of the piriformis muscle [14]. In our case, the patient also responded to local steroid injection, but lasted for only 3 months after every injection.

Conservative treatment is first-choice treatment for managing PS. Conservative treatment for patients with PS includes activity modification (education about changing habitual postures or physical activities), anti-inflammatory drugs, physical therapy, injection of local anesthetics or corticosteroids, and botulinum neurotoxin injections [1,5,8,15]. Our patient also underwent conservative treatment before surgery. At the beginning of the disease course, the patient demonstrated good response to medications and physical therapies, lasting for 3 years. However, as the condition worsened, he failed to respond to conservative treatment(s).

Surgery was indicated when the patient did not achieve satisfactory pain relief with conservative treatment. The goal of surgery is to release the sciatic nerve by resecting the piriformis muscle that compresses the nerve. Surgical resection of the piriformis muscle has been shown to be effective and feasible [6,8]. In a study by Han et al. in 2017, conservative treatment failed in 12 of 239 patients, who subsequently underwent surgical procedures. After surgical resection of the piriformis, 10 (83%) patients experienced satisfactory results based on VAS scores, which were recorded before and after surgery. No postoperative complications were observed during the 1-year follow-up [8]. A similar result was reported by Filler et al., in which 62 (80%) surgical patients experienced significant pain relief with no surgical complications [14]. In our case, we performed surgical resection of the piriformis using the method described by Kobbe et al. [6]. Steroid and anti-adhesion gel were applied to achieve anti-inflammatory effects and to prevent adhesion.

## 4. Conclusion

The diagnosis of PS can be vague and often elusive due to its clinical presentation, which mimics other pathologies of sciatic pain. Consideration of patient history, clinical presentation, and response to diagnostic or therapeutic steroid or anesthetic local injection of the piriformis muscle are essential to confirm the diagnosis of PS and provide proper treatment. The surgical procedure for resecting the piriformis muscle is not complicated and yields a satisfactory result. Surgical treatment can be a last-resort option to treat refractory PS that fails conservative treatment.

## Declaration of Competing Interest

None.

**Sources of funding**

None.

**Ethical approval**

All of the procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee.

**Consent**

All of the patient had sign informed consent for the surgery. Sorry, we could not get written informed consent from the patient, because we did not see the patient again in last one year and we could not contact the patient, patient identity doesn't exist in this case report and we have permission from head of neurosurgery Department in our Hospital

**Author contribution**

Achmad Fahmi, MD, PhD: study concept or design, data collection, data analysis or interpretation, writing the paper.

Mustaqim Apriyansa Rahmadhan, MD.: study concept or design, writing paper.

Dirga Rachmad Aprianto, MD: study concept or design.

Heri Subianto, MD: study concept and critical revised article.

Agus Turchan, MD, PhD: study concept, critical revised article and supervising.

**Registration of research studies**

1. Name of the registry: <http://www.researchregistry.com>
2. Unique identifying number or registration ID: researchregistry6134
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

**Guarantor**

Achmad Fahmi, MD, PhD  
Department of Neurosurgery, Faculty of Medicine, Universitas Airlangga, Indonesia  
Agus Turchan, MD, PhD  
Head of Neurosurgery Department, Faculty of Medicine, Universitas Airlangga, Indonesia

18

**Provenance and peer review**

Not commissioned, externally peer-reviewed.

**Acknowledgments**

Our acknowledgments to PHC Hospital, Surabaya, Indonesia, where the surgeries were performed.

**References**

- [1] J.S. Kirschner, P.M. Foye, J.L. Cole, Piriformis syndrome, diagnosis and treatment, *Muscle Nerve* 40 (2009) 10–18.
- [2] I.M. Fowler, A.A. Tucker, B.P. Weimerskirch, T.J. Moran, R.J. Mendez, A randomized comparison of the efficacy of 2 techniques for piriformis muscle injection: ultrasound-guided versus nerve stimulator with fluoroscopic guidance, *Reg. Anesth. Pain Med.* 39 (2014) 126–132.
- [3] S.P. Cass, Piriformis syndrome: a cause of nondiscogenic sciatica, *Curr. Sports Med. Rep.* 14 (2015) 41–44.
- [4] D. Jankovic, P. Peng, A. van Zundert, Brief review: piriformis syndrome: etiology, diagnosis, and management, *Can. J. Anaesth.* 60 (2013) 1003–1012.
- [5] K. Hopyan, A. Danielyan, Four symptoms define the piriformis syndrome: an updated systematic review of its clinical features, *Eur. J. Orthop. Surg. Traumatol.* 28 (2018) 155–164.
- [6] P. Kobbe, B.A. Zelle, G.S. Gruen, Case report: recurrent piriformis syndrome after surgical release, *Clin. Orthop. Related Res.* 466 (2008) 1745–1748.
- [7] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A. Fowler, D.P. Orgill, For the SCARE Group, The SCARE 2018 statement: updating consensus surgical CARE Report (SCARE) guidelines, *Int. J. Surg.* 60 (2018) 132–136.
- [8] S.K. Han, Y.S. Kim, T.H. Kim, S.H. Kang, Surgical treatment of piriformis syndrome, *Clin. Orthop. Surg.* 9 (2017) 136–144.
- [9] J.W.T. Byrd, Piriformis syndrome, *Oper. Tech. Sports Med.* 13 (2005) 71–79.
- [10] P.M. Barton, Piriformis syndrome: a rational approach to management, *Pain* 47 (1991) 345–352.
- [11] R. Hua, J. Shi, X. Wang, J. Yang, P. Zheng, H. Cheng, M. Li, G. Dai, Y. An, Analysis of the causes and types of traumatic spinal cord injury based on 561 cases in China from 2001 to 2010, *Spinal Cord* 51 (2013) 218–221.
- [12] E.C. Papadopoulos, S.N. Khan, Piriformis syndrome and low back pain: a new classification and review of the literature, *Orthop. Clin. North Am.* 35 (2004) 65–71.
- [13] L.M. Fishman, G.W. Dombi, C. Michaelsen, S. Ringel, J. Rozbruch, B. Rosner, C. Weber, Piriformis syndrome: diagnosis, treatment, and outcome—a 10-year study, *Arch. Phys. Med. Rehabil.* 83 (2002) 295–301.
- [14] A.G. Filler, J. Haynes, S.E. Jordan, J. Prager, J.P. Villablanca, K. Farahani, D.Q. McBride, J.S. Tsuruda, B. Morisoli, U. Batzdorf, J.P. Johnson, Sciatica of nondisc origin and piriformis syndrome: diagnosis by magnetic resonance neurography and interventional magnetic resonance imaging with outcome study of resulting treatment, *J. Neurosurg. Spine* 2 (2005) 99–115.
- [15] L.P. Carro, M.F. Hernando, L. Cereza, L.S. Navarro, A.A. Fernandez, A.O. Castillo, Deep gluteal space problems: piriformis syndrome, ischiofemoral impingement and sciatic nerve release, *Muscles Ligaments Tendons J.* 6 (2016) 384–396.

**Open Access**

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.

# Complete resolution of recurrent piriformis syndrome after piriformis resection with 3 years' follow up ; A case report

## ORIGINALITY REPORT

19%

SIMILARITY INDEX

9%

INTERNET SOURCES

18%

PUBLICATIONS

0%

STUDENT PAPERS

## PRIMARY SOURCES

- 1 [www.e-neurospine.org](http://www.e-neurospine.org) 1%

Internet Source
- 2 M. Arifin Parenrengi, Fatkhul Adhiatmadja, Muhammad Reza Arifianto, Tedy Apriawan, Asra Al Fauzi, Franco Servadei. "Bilateral skull fracture with massive epidural hematoma secondary to pin-type head fixation in a pediatric patient: Case report and review of the literature", International Journal of Surgery Case Reports, 2019 1%

Publication
- 3 Wen Jiang, Daniela Carvalho. "COVID-19 effects on operating room cancellations at a pediatric tertiary care hospital: A retrospective cohort study", Annals of Medicine and Surgery, 2022 1%

Publication
- 4 "Regional Nerve Blocks in Anesthesia and Pain Therapy", Springer Science and Business Media LLC, 2022 1%

Publication

5

[docplayer.biz.tr](https://docplayer.biz.tr)

Internet Source

1 %

6

Jeffrey Kay, Darren de SA, Laura Morrison, Emily Fejtek, Nicole Simunovic, Hal D. Martin, Olufemi R. Ayeni. "Surgical Management of Deep Gluteal Syndrome Causing Sciatic Nerve Entrapment: A Systematic Review", *Arthroscopy: The Journal of Arthroscopic & Related Surgery*, 2017

Publication

1 %

7

Gabriella Garruti, Michele De Fazio, Palma Capuano, Gennaro Martinez et al. "Exercise and apulian hypocaloric diet affect adipokine changes and gastric banding-induced weight loss: A prospective study on severe obese subjects", *Annals of Medicine and Surgery*, 2020

Publication

1 %

8

Jurij Janež, Jasna Preskar, Matic Avguštin, Zdravko Štor. "Surgical repair of a large ventral hernia under spinal anaesthesia: A case report", *Annals of Medicine and Surgery*, 2019

Publication

1 %

9

Renaldi Prasetia, Hans Kristian, Agus Hadian Rahim, Yoyos Dias Ismiarto, Hermawan Nagar Rasyid. "Soft tissue reconstruction on the very

1 %

late presenting neglected acromioclavicular dislocation Rockwood type IV. A case report", International Journal of Surgery Case Reports, 2022

Publication

10

[fk.unair.ac.id](http://fk.unair.ac.id)

Internet Source

1 %

11

[www.geology.wisc.edu](http://www.geology.wisc.edu)

Internet Source

1 %

12

Bahman Jabbari. "Botulinum Toxin Treatment of Pain Disorders", Springer Science and Business Media LLC, 2015

Publication

<1 %

13

Sopant Datta, Taweetham Limpanuparb. "Steric vs Electronic Effects: A New Look into Stability of Diastereomers, Conformers and Constitutional Isomers", American Chemical Society (ACS), 2021

Publication

<1 %

14

[emedicine.medscape.com](http://emedicine.medscape.com)

Internet Source

<1 %

15

[media.neliti.com](http://media.neliti.com)

Internet Source

<1 %

16

Sriyana Herman, Budi Santoso, Hermanto Tri Joewono, Agus Sulistyono, Andi Nilawati Usman. "Relationship between early preterm birth (22–33 weeks) and late preterm birth

<1 %



(34–36 weeks) with the characteristics of sociodemography in primiparous and multiparous", Enfermería Clínica, 2020

Publication

17

[clinicaltrials.gov](https://clinicaltrials.gov)

Internet Source

<1 %

18

[medcraveonline.com](https://www.medcraveonline.com)

Internet Source

<1 %

19

[topics.sciencedirect.com](https://www.topics.sciencedirect.com)

Internet Source

<1 %

20

Dinesh Manoharan, Dipin Sudhakaran, Ankur Goyal, Deep Narayan Srivastava, Mohd Tahir Ansari. "Clinico-radiological review of peripheral entrapment neuropathies – Part 2 Lower limb", European Journal of Radiology, 2021

Publication

<1 %

21

Gamze Gül Güleç, Kübra Neslihan Kurt Oktay, İlknur Aktaş, Barış Yılmaz. "Visualizing Anatomic Variants of the Sciatic Nerve Using Diagnostic Ultrasound During Piriformis Muscle Injection: An Example of 4 Cases", Journal of Chiropractic Medicine, 2022

Publication

<1 %

22

Hal David Martin, Anthony Khoury, Ricardo Schröder, Ian James Palmer. "Ischiofemoral Impingement and Hamstring Syndrome as

<1 %

# Causes of Posterior Hip Pain", Clinics in Sports Medicine, 2016

Publication

23

[www.scribd.com](http://www.scribd.com)

Internet Source

<1 %

24

Darcy A. Krueger, Anjali Sadhwani, Anna W. Byars, Petrus J. de Vries et al. "Everolimus for treatment of tuberous sclerosis complex-associated neuropsychiatric disorders", Annals of Clinical and Translational Neurology, 2017

Publication

<1 %

25

Manuel Reus. "Piriformis syndrome: a simple technique for US-guided infiltration of the perisciatic nerve. Preliminary results", European Radiology, 03/2008

Publication

<1 %

26

Philipp Kobbe. "Case Report", Clinical Orthopaedics and Related Research, 07/2008

Publication

<1 %

27

Smith, J.. "Ultrasound-Guided Piriformis Injection: Technique Description and Verification", Archives of Physical Medicine and Rehabilitation, 200612

Publication

<1 %

28

Sumedh S. Shah, Jose M. Consuegra, Ty K. Subhawong, Timur M. Urakov, Glen R.

<1 %

Manzano. "Epidemiology and etiology of secondary piriformis syndrome: A single-institution retrospective study", *Journal of Clinical Neuroscience*, 2018

Publication

---

29

Sungjun Kim, Jin-Young Choi, Yong-Min Huh, Ho-Taek Song, Sung-Ah Lee, Seung Min Kim, Jin-Suck Suh. "Role of magnetic resonance imaging in entrapment and compressive neuropathy—what, where, and how to see the peripheral nerves on the musculoskeletal magnetic resonance image: part 1. Overview and lower extremity", *European Radiology*, 2006

Publication

---

<1 %

30

Taizo Sakata, Hideki Katagiri, Tadao Kubota, Takashi Sakamoto et al. "Delayed graft duodenal perforation due to impacted food five years after simultaneous pancreas-kidney transplantation: A case report", *International Journal of Surgery Case Reports*, 2017

Publication

---

<1 %

31

Vorapatu Tangsirapat, Vichack Chakrapan Na Ayudhya, Panutchaya Kongon, Kobkool Chakrapan Na Ayudhya et al. "Tuberculous peritonitis in a cerebral palsy patient: A challenge in diagnosis and management",

<1 %

# International Journal of Surgery Case Reports, 2019

Publication

32

[biomedres.us](http://biomedres.us)

Internet Source

<1 %

33

[brief.land](http://brief.land)

Internet Source

<1 %

34

[jbnc.emnuvens.com.br](http://jbnc.emnuvens.com.br)

Internet Source

<1 %

35

[www.spandidos-publications.com](http://www.spandidos-publications.com)

Internet Source

<1 %

36

Fowler, Ian M., Anthony A. Tucker, Brian P. Weimerskirch, Thomas J. Moran, and Robert J. Mendez. "A Randomized Comparison of the Efficacy of 2 Techniques for Piriformis Muscle Injection : Ultrasound-Guided Versus Nerve Stimulator With Fluoroscopic Guidance", *Regional Anesthesia and Pain Medicine*, 2014.

Publication

<1 %

37

Jason Pan, John Vasudevan. "Piriformis Syndrome", Elsevier BV, 2018

Publication

<1 %

38

Byung-chul Son, Changik Lee. "Piriformis Syndrome (Sciatic Nerve Entrapment) Associated With Type C Sciatic Nerve Variation: A Report of Two Cases and

<1 %

# Literature Review", Korean Journal of Neurotrauma, 2022

Publication

---

39

Kevork Hopayian, Fujian Song, Ricardo Riera, Sidha Sambandan. "The clinical features of the piriformis syndrome: a systematic review", European Spine Journal, 2010

Publication

---

<1 %

---

Exclude quotes      On

Exclude matches      Off

Exclude bibliography      On

# Complete resolution of recurrent piriformis syndrome after piriformis resection with 3 years' follow up ; A case report

---

GRADEMARK REPORT

---

FINAL GRADE

**/100**

GENERAL COMMENTS

**Instructor**

---

PAGE 1

---

PAGE 2

---

PAGE 3

---

PAGE 4

---