Endoscopic Lesser Trochanter Excision for Ischiofemoral Impingement

Devon E. Anderson,*† MD, PhD, Elizabeth J. Scott,† MD, and R. Chad Mather III,† MD, MBA
Investigation performed at Duke University, Durham, North Carolina, USA

Background: Ischiofemoral impingement (IFI) is a rare yet underrecognized cause of posterior hip, low back/sacroiliac region, and deep gluteal pain. Patient anatomy, including femoral anteversion, coxa valga, posterior pelvic tilt, and lumbar stiffness, contributes to symptomatic IFI.

Indications: Indications for surgical intervention include exclusion of alternative causes of posterior gluteal pain, failed nonoperative intervention including physical therapy and injection targeting the ischiofemoral space, and narrow ischiofemoral distance with quadratus femoris edema with or without sciatic nerve entrapment and protection of hamstring repair.

Technique Description: Our preferred technique includes endoscopic lesser trochanter (LT) excision through a posterior approach in the prone position. The patient is positioned with the hips in slight flexion and the knees at 60° of flexion to take tension off the sciatic nerve. Fluoroscopy is used to localize the LT for 4 planned portal sites, creating a diamond around the LT: 2 for sciatic nerve retraction, 1 for endoscopic visualization, and 1 for working. The sciatic nerve is identified, bluntly mobilized, and protected. Radiofrequency ablation is used to dissect through the quadratus femoris from the posterior-central LT and expose the posterior LT. A 5.5-mm diamond-tip bur is then used to fully excise the LT flush with the femoral cortex. The patient is kept touch-down weightbearing for 6 weeks to reduce the risk of proximal femur stress fracture.

Results: Endoscopic LT excision has been widely reported as a reliable method to increase ischiofemoral distance and relieve mechanical bone impingement and sciatic nerve entrapment. In our experience, the posterior approach in the prone position allows for maximum visualization to identify and protect the neurovascular structures, completely excise the LT, and treat concomitant pathology.

Conclusions: Our preferred technique for surgical treatment of IFI with posterior endoscopic LT excision in the prone position is safe based on sciatic nerve visualization and effective with complete LT excision.

Patient Consent Disclosure Statement: The author(s) attests that consent has been obtained from any patient(s) appearing in this publication. If the individual may be identifiable, the author(s) has included a statement of release or other written form of approval from the patient(s) with this submission for publication.

Keywords: ischiofemoral impingement; lesser trochanter excision; sciatic nerve; ischial tunnel syndrome; hip arthroscopy

VIDEO TRANSCRIPT

We will be presenting a case of ischiofemoral impingement (IFI) with a surgical technique for posterior endoscopic lesser trochanter (LT) excision in the prone position.

Our disclosures are listed here.

Here is an outline of this presentation in which we will present a case of IFI, review the pathophysiology and clinical evaluation, and describe our surgical technique and postoperative considerations.

BACKGROUND AND INDICATIONS

This is a case of a 53-year-old woman who presented to the clinic as a second opinion with 6 months of progressive posterior buttock pain with associated intermittent transient paresthesias down the posterior thigh.

Her symptoms were aggravated by prolonged sitting or standing, descending stairs, driving, and ballroom dancing.

*Address correspondence to Devon E. Anderson, MD, PhD, Duke Sports Sciences Institute, Duke University, 3475 Erwin Road, Durham, NC 27705, USA (email: deanderson@portermedical.org).

†Duke Sports Sciences Institute, Duke University, Durham, North Carolina, USA.

Submitted July 3, 2024; accepted September 4, 2024.

Winner of the Bronze Medal Prize at the 2024 VJSM Fellows Video Technique Challenge.

One or more of the authors has declared the following potential conflict of interest or source of funding: R.C.M. received consulting, royalties, and travel reimbursement from Stryker Corporation from 2018 to 2024, unrelated to current research. AOSSM checks author disclosures against the Open Payments Database (OPD). AOSSM has not conducted an independent investigation on the OPD and disclaims any liability or responsibility relating thereto.

Video Journal of Sports Medicine (VJSM®), 5(1), 26350254241286526
DOI: 10.1177/26350254241286526

She had no improvement with 3 months of physical therapy or with cortisone injections to the right hip, piriformis, or sacroiliac (SI) joint. Her pain was relieved by standing, activity modification, and low-dose gabapentin. She finally responded with complete relief of symptoms during the anesthetic phase of an injection to her ischiofemoral space.

The patient's physical examination was notable for tenderness over the deep gluteal space and ischial tuberosity. She had pain with provocative testing for IFI and a negative straight-leg raise.

On radiographs, the patient had a preserved right hip joint space without osteoarthritis or femoroacetabular impingement. She had a narrow ischiofemoral space on the false profile view.

On axial magnetic resonance imaging (MRI), the hip joint is preserved without high-grade cartilage damage or labral tearing. She has a narrow ischiofemoral corridor with edema noted in the quadratus femoris muscle belly and a small partial-thickness tear of the conjoint tendon at the ischial tuberosity. The ischiofemoral space measures 7 mm of soft tissue clearance on MRI and 10 mm of bone distance on computed tomography (CT).

IFI is a rare cause of posterior hip and buttock pain. A normal ischiofemoral distance measures 18 to 26 mm.[7] In patients with increased femoral anteversion, coxa profunda, or coxa valga, this space becomes narrowed.[4,13] The space narrows further with posterior pelvic tilt and pelvic compensation for a stiff spine.[8,15] Given these factors, the pathology is most prevalent in older women. There may be a pathology related to the dynamic nature of impingement, including proximal hamstring tendon tears, and almost all patients have some degree of abductor weakness. Concurrent entrapment of the sciatic nerve may cause ischial tunnel syndrome.

Based on our clinical experience, we have identified 4 distinct clinical patterns of IFI. Focal impingement presents as deep groin pain that is reproducible on dynamic examination. Loss of lumbar extension presents with SI and lumbar pain, worse through the extension phase of gait. Ischial tunnel syndrome presents as severe pain in the deep gluteal space and radicular pain with neuropathic elements. Finally, a tear of the proximal hamstring tendon may be the primary clinical finding, but the tear originates from the dynamic impingement. Patients may have a combination of these pathologies, but the underlying cause is IFI.

Physical examination will reveal pain with hip extension, adduction, and internal rotation while lying on the side.[10] This test may not be positive in all cases, such as those that present primarily with hamstring symptoms. An ultrasound or CT-guided anesthetic injection with or without cortisone may be used to confirm diagnosis and provide early treatment.[5,12] The treating physician should repeat the examination after diagnostic injection. A course of physical therapy is indicated in all patients to work on core, abductor, and gluteal strength.[7]

Surgery is indicated when a patient has a nonoperative intervention that fails. There are 3 surgical techniques to increase anatomic ischiofemoral distance: ischioplasty, derotational osteotomy, and LT excision.[6,9,11,14,16] Our preferred technique is endoscopic LT excision through a posterior approach in the prone position. Concomitant pathology, such as a proximal hamstring tear, should be addressed at the time of surgery.

We favor a posterior approach to LT excision as the advantages outweigh the disadvantages in comparison with the anterior approach.[9] Specifically, the posterior approach affords sciatic nerve visualization and protection; direct access to the LT, which is a posterior structure; preservation of a portion of the iliopsoas attachment; and the ability to address common concomitant hamstring pathology.

TECHNIQUE DESCRIPTION

We will now review our preferred surgical technique.

It is critical to confirm with anesthesia that no active paralysis will be used. The patient is positioned prone on a radiolucent table physically rotated 180°. The chest, iliac crest, and upper extremities are well padded. The hips are aligned at 1 break point and the knees at the other. The table is slightly flexed at the hips and flexed to 60° at the knees to take tension off the sciatic nerve. The lower extremities are abducted and positioned in neutral rotation. The exposed buttock and thigh are prepped, and a shower curtain drape is placed over the patient to allow a sterile radiograph to enter over the field.

Fluoroscopy is used to localize the LT. We use 4 portals to create a diamond configuration centered on the lesser, including superior, medial, inferior, and lateral portals. The initial viewing portal is established approximately 2 cm below the lesser for the inferior portal.

The 30° endoscopic camera is inserted into the inferior portal, and a second portal is established laterally.

A switching stick is inserted laterally and used to bluntly dissect the posterior space and identify the sciatic nerve running in a fat stripe between the ischium and the LT. The assistant monitors the foot and calf for any activation of the sciatic nerve during the surgery. The proximal hamstring tendon complex is inspected for tears that may need concomitant repair. The hamstring was intact for this case.

Two additional portals are established superiorly and medially. While visualizing from the medial portal, the nerve is retracted with switching sticks laterally and inferiorly. The more proximal switching stick also helps to protect the medial femoral circumflex vessels.

While viewing from the medial portal, radiofrequency ablation is used from the superior portal to divide the quadratus femoris until the entirety of the LT is exposed. Care is taken to not go too superior to avoid the medial femoral circumflex vessels. The sciatic nerve is periodically inspected.

Next the psoas tendon is peeled off the LT working from medial and superior and peeling anteriorly. The tendon is released entirely all the way to the anterior aspect, which becomes confluent with the anterior femoral periosteum.

Once the entire lesser is exposed, a diamond-tip bur is used from the superior portal to perform the LT excision, still viewing from the medial portal. The diamond-tip bur does not entangle the soft tissues like a fluted bur can.

This protects the surrounding soft tissues, including the sciatic nerve. When needed, the portal configuration can be rearranged so long as the nerve and vessels are always protected by 2 switching sticks. The entirety of the lesser is resected until the surface is congruent with the surrounding femur cortex.

Final fluoroscopy is taken in neutral, internal, and external rotation to verify complete resection.

The portal sites are closed with nylon sutures. A postoperative neurovascular examination is performed in the recovery area to check sciatic nerve motor and sensory function. We favor an overnight stay to monitor the neurovascular status to ensure a hematoma does not develop, as this could cause compressive nerve injury.

RESULTS AND DISCUSSION

Postoperatively, the patient is kept touch-down weightbearing for 6 weeks to protect the proximal femur from fracture. They may engage in immediate passive motion without the need for a brace or continuous passive motion (CPM). At 6 weeks postoperatively, they work with physical therapy to advance weightbearing, active range of motion, and strengthening, including hip flexion. The current patient was symptom free 3 months postoperatively and able to return to ballroom dancing without noted strength deficits. Prior literature has reported significant improvement in modified Harris hip scores from 2 to 5 years postoperatively and mean return to sport at 4.4 months.[2,10]

Potential complications include injury to the sciatic nerve and medial femoral circumflex vessels, which are protected using a posterior endoscopic approach.[1] The risk of proximal femur fracture can be minimized with protected weightbearing and maintenance of the surrounding cortex during excision.[3] Potential sequelae for which patients should be counseled include mild hip flexion weakness, transient or permanent injury to the posterior cutaneous nerve of the thigh, and possible deep gluteal pain from postoperative adhesions.

In summary, IFI is a rare but underrecognized cause of posterior hip, low back, and deep gluteal pain. Due to concurrent ischial tunnel syndrome, IFI is often missed or diagnosed as sciatica. With high suspicion, IFI can be clearly diagnosed with clinical examination, imaging, and diagnostic injection. Our preferred technique for surgical treatment with posterior endoscopic LT excision in the prone position is safe based on nerve and vessel visualization and effective with complete LT excision.

ORCID iDs

Devon E. Anderson https://orcid.org/0000-0002-4592-9265

Elizabeth J. Scott https://orcid.org/0000-0003-1238-1931

REFERENCES

1. Aguilera-Bohorquez B, Pacheco J, Castillo L, Calvache D, Cantor E. Complications of hip endoscopy in the treatment of subgluteal space pathologies. *Arthroscopy*. 2021;37:2152-2161. doi:10.1016/j.arthro.2021.02.016
2. Aguilera-Bohórquez BLM, Pacheco J, Calvache D, Fernandez M, Cantor E. Pain relief and good functional outcomes after hip endoscopy via posterior approach in patients with ischiofemoral impingement. *Knee Surg Sports Traumatol Arthrosc*. 2021;29:2394-2400. doi:10.1007/s00167-020-06309-6
3. Baert M, Vandekerckhove M, Vanlommel J. Stress fracture after arthroscopic lesser trochanter resection: diagnosis and therapy. *Hip Pelvis*. 2024;36:70-75. doi:10.5371/hp.2024.36.1.70
4. Boschung A, Antioco T, Steppacher S, Tannast M, Novais E. Limited external rotation and hip extension due to posterior extra-articular ischiofemoral hip impingement in female patients with increased femoral anteversion: implications for sports, sexual, and daily activities. *Am J Sports Med*. 2023;51:1015-1023. doi:10.1177/03635465231153624
5. Gabrielli AS, Tisherman RT, Curley AJ, Mauro CS, Arner JW. Open ischiofemoral impingement decompression. *Arthrosc Tech*. 2022;11:e1149-e1155. doi:10.1016/j.eats.2022.02.024
6. Gollwitzer H, Banke IJ, Schauwecker J, Gerdesmeyer L, Suren C. How to address ischiofemoral impingement? Treatment algorithm and review of the literature. *J Hip Preserv Surg*. 2017;4:289-298. doi:10.1093/jhps/hnx035
7. Gomez-Hoyos J, Khoury A, Schröder R, Johnson E, Palmer I. The hip-spine effect: a biomechanical study of ischiofemoral impingement effect on lumbar facet joints. *Arthroscopy*. 2017;33:101-107. doi:10.1016/j.arthro.2016.06.029
8. Goodwin JA, Chhabra A, Patel KA, Hartigan DE. Lesser trochanter osteoplasty for ischiofemoral impingement. *Arthrosc Tech*. 2017;6:e1755-e1760. doi:10.1016/j.eats.2017.06.047
9. Hatem MA, Palmer IJ, Martin HD. Diagnosis and 2-year outcomes of endoscopic treatment for ischiofemoral impingement. *Arthroscopy*. 2015;31:239-246. doi:10.1016/j.arthro.2014.07.031
10. Jo S, O'Donnell JM. Endoscopic lesser trochanter resection for treatment of ischiofemoral impingement. *J Hip Preserv Surg*. 2015;2:184-189. doi:10.1093/jhps/hnv019
11. Kim D-H, Yoon DM, Yoon KB. Ultrasound-guided quadratus femoris muscle injection in patients with lower buttock pain: novel ultrasound-guided approach and clinical effectiveness. *Pain Physician*. 2016;19:E863-E870.
12. Liou H, Long J, Kransdorf M, Schmieder S. CT-guided quadratus femoris injection for ischiofemoral impingement. *Eur Radiol*. 2023;33:3956-3960. doi:10.1007/s00330-023-09497-0
13. Murata Y, Fukase N, Utsunomiya H, Brady A, Rosenberg S. A biomechanical analysis of ischiofemoral impingement in a cadaver model. *J Hip Preserv Surg*. 2020;7:604-605. doi:10.1093/jhps/hnaa052
14. Safran M, Ryu J. Ischiofemoral impingement of the hip: a novel approach to treatment. *Knee Surg Sports Traumatol Arthrosc*. 2014;22:781-785. doi:10.1007/s00167-013-2801-8
15. Spencer-Gardner L, Nunley B, Gomez-Hoyos J, Wells J, Khoury AN. Sagittal pelvic tilt directly influences the ischiofemoral space: a cadaveric study. *Orthopedics*. 2024;47:167-171. doi:10.3928/01477447-20240122-03
16. Zhang Q, Han D, Ying L, Ye L, Yang X. Arthroscopic lesser trochanter osteoplasty, quadratus femoris debridement, and sciatic neurolysis via posterior approach for ischiofemoral impingement. *Front Surg*. 2022;9:805866. doi:10.3389/fsurg.2022.805866