Ischiofemoral impingement (IFI) was first described in 1977 by Johnson in patients with persistent hip pain after total hip replacement. The symptoms were described as medial thigh and groin pain, worsening with external rotation, adduction, and extension of the hip and improving with regional lidocaine injections. The modern concept of IFI, in which the quadratus femoris (QF) is compressed between the lesser trochanter (LT) and ischium, has come to light in the past decade after the publication of several case reports and radiologic studies.2-4

IFI is a relatively rare diagnosis, and proper clinical workup and imaging are imperative to exclude other pathologies.5 The differential diagnosis for patients with chronic groin and/or buttock pain can include snapping psoas tendon, lumbar radiculopathy, proximal hamstring tendinopathy, QF tear, and adductor tendinopathy.

Establishing the diagnosis includes a thorough physical examination in which pain is likely elicited by palpation of the area just lateral to the ischial tuberosity. This pain is usually worsened with external rotation, adduction, and extension of the affected hip. The location of pain lateral to the ischium is important in the diagnosis of IFI because this differs from the more medial-based pain observed with proximal hamstring tendinopathy. Patients may exhibit a shortened stride length to decrease hip extension, which elicits pain during IFI. Additionally, impingement between the ischium and LT can be assessed by passive extension of the affected hip, which reproduces the patient’s symptoms when the hip is positioned neutrally or adducted. However, their symptoms are not reproduced when the hip is extended and abducted5 (Fig 1).

Recommended plain radiographs include an anteroposterior pelvis radiograph and cross-table or frog-leg lateral radiograph of the hip. Although these images can appear normal, patients with chronic IFI may show cystic and/or sclerotic changes of the lesser trochanter and ischium. Additionally, narrowing of the ischiofemoral space on false-profile radiographs has been described as a screening tool.6 Dynamic ultrasound can help delineate if the pathology is impingement related rather than a direct QF tear.

Magnetic resonance imaging (MRI) is currently accepted as the best method to evaluate QF pathology. Axial T2-weighted images can show edema within the muscle belly of the QF or disruption of the muscle fibers.7 Sclerosis of the lesser trochanter can also be evident on MRI, indicating a likely chronic pathology versus an acute injury. Moreover, axial imaging can be used to assess the ischiofemoral space, defined as the
distance between the medial cortex of the lesser trochanter and the lateral cortex of the ischial tuberosity. However, conflicting results have been reported for the cutoff value between a normal ischiofemoral distance and pathologic narrowing. Coronal-plane images will show edema between the lesser trochanter and the ischial tuberosity. The hamstring origin and intra-articular hip, as well as other muscular and intra-abdominal pathologies, must also be investigated as potential causes of pain clinically and on MRI.

There is a relative paucity of data regarding the best treatment strategy for IFI, which is likely because of the degree of difficulty in establishing the diagnosis and the commonly successful results with conservative treatment. Authors have previously described initial conservative modalities consisting of activity restriction, anti-inflammatory medications, and physical therapy. In addition to diagnostic utility, ultrasound-guided injections may provide patients with long-standing relief. Many authors have described successful access to the lesser tuberosity endoscopically with favorable outcomes. The advantages of open surgical management of IFI are likely a quicker operative procedure, better visualization, direct visualization of the sciatic nerve, a decreased risk of damaging the femoral circumflex artery, and a decreased number of intra-operative radiographs. Additionally, an open approach can afford increased exposure to remove all bony debris to decrease the risk of heterotopic ossification. Finally, an open approach has a decreased learning curve compared with an endoscopic approach for surgeons who may not be as familiar with endoscopic procedures surrounding the hip.

**Surgical Technique**

After administration of general anesthesia, the patient is placed prone on a radiolucent operating table. Care is taken to ensure proper padding of all bony prominences as well as the upper extremities with gel rolls positioned transversely at the chest and pelvis. The entire operative leg is prepared and draped to allow for rotation and excursion of the proximal femur to double-check anatomic landmarks. A 5-cm transverse incision is made in the gluteal crease (Fig. 2). The transverse fibers of the gluteus maximus are identified, the fascia is split, and a plane is developed bluntly under

**Fig 1.** Physical examination findings of ischiofemoral impingement. (A) Pain with passive extension of affected hip. (B) No pain when hip is extended and abducted. (Courtesy of Gomez-Hoyos et al. Arthroscopy 2016.)

**Fig 2.** The patient is positioned prone with gel rolls oriented transversely at the chest and pelvis. A 5-cm transverse incision is planned and made in the gluteal crease. This location allows for better cosmesis.
the muscle (Fig 3). One can work superior to the QF by splitting the external rotators. Alternatively, if large lesions are present, the external rotators can be released or tagged for future repair. Deaver retractors are used to retract the muscle proximally (Fig 4, Video 1). After palpation of the ischial tuberosity, the sciatic nerve is identified lateral to the origin of the proximal hamstring tendons. The leg can be internally and externally rotated to confirm the location of the ischial tuberosity and lesser trochanter. Neurolysis of the sciatic nerve is performed with Metzenbaum scissors, and a vessel loop is placed carefully around the nerve without traction (Fig 5). The lesser trochanter prominence is then palpated. The external rotators are retracted proximally, and a key elevator and blunt dissection are used to visualize the prominent LT. A pointed Hohmann retractor is then placed on the ischial tuberosity, with careful observation of the position of the sciatic nerve, and the hip is extended and internally rotated to expose the lesser trochanter further. Blunt Hohmann retractors are placed around the lesser trochanter with the help of blunt dissection (Fig 6). Intraoperative radiographs are used to confirm the position on the LT (Fig 7), and the iliopsoas tendon is released. A sagittal saw (Stryker, Kalamazoo, MI) is then used to remove the lesser trochanteric prominence, with care taken to avoid injury to the sciatic nerve (Fig 8). Resection is completed using an osteotome and rongeur (Fig 9). After resection, the hip is taken through a full range of motion to ensure no further impingement. Additional
assessment using radiographs with the hip in full external and internal rotation confirms no residual impingement (Fig 10). Radiographs also confirm that an over-resection into the femoral neck has not occurred (Fig 11). Bone wax is placed over the resection area, and hemostasis is achieved. The vessel loop is removed from the sciatic nerve and then evaluated visually to assess for signs of trauma. The wound is irrigated with care to remove any residual remaining bone to minimize the heterotopic ossification risk, and the gluteal fascia is closed with absorbable suture followed by a standard layered closure. A waterproof dressing is applied.

**Postoperative Protocol**

The postoperative protocol includes immediate physical therapy with toe-touch weight bearing for 1 month with no range-of-motion restrictions. Heterotopic ossification prophylaxis includes indomethacin for 4 days and naproxen daily for 1 month. Additionally, deep vein thrombosis prophylaxis consists of 81 mg of aspirin twice daily for 1 month.

**Discussion**

The described surgical technique is a reproducible and safe method for ischiofemoral decompression. This technique confers an efficient procedure as well as a decreased number of intraoperative radiographs owing to open exposure, direct visualization of the sciatic nerve, decreased risk of femoral circumflex artery injury, and increased exposure for removal of bony debris to prevent heterotopic ossification. Pearls and pitfalls of our technique are presented in Table 1, and advantages, disadvantages, and limitations are listed in Table 2.
Lesser trochanter resection can also be successfully performed endoscopically, as previously described by several authors.\textsuperscript{18-22} Several complications have been reported with the endoscopic approach, including temporary sciatic nerve injury, hematoma, permanent nerve injury of the posterior femoral cutaneous nerve,\textsuperscript{23} and intra-abdominal fluid extravasation.\textsuperscript{24} This method does incur a steeper learning curve as well as less direct visualization of the important surrounding neurovascular structures; consequently, entrapment of the sciatic nerve is the leading reported cause of revision surgery.\textsuperscript{23} Complications from an endoscopic approach can be severe, and an open approach may reduce the risk of several of these complications.

Numerous open approaches to resect lesions of the lesser trochanteric region have been described. Previously defined open techniques include open resection of ischial exostosis, which was described in a case report; however, this was completed using an anterior approach to the ischiofemoral space.\textsuperscript{25} Another case report described open resection of the LT, although this was performed through a lateral approach including an iliobibial band split, subperiosteal release of the psoas

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**Fig 9.** Osteotomy completion. The cut across the heterotopic bone is completed using an osteotome and mallet, with care taken to avoid the sciatic nerve. The cut is confirmed on intraoperative fluoroscopy.

**Fig 10.** Confirmation of lesser trochanter position. Intraoperative radiographs are used to confirm the position on the lesser trochanter (arrow), and the iliopsoas tendon is released.
tendon, and ischial release of the QF. A final report described a case of IFI due to a lipomatous tumor that was excised through an open posterior approach in the lateral position. The open approach may improve cosmesis because it is made in the gluteal crease.

In conclusion, this Technical Note presents a reliable surgical method for open ischiofemoral decompression and sciatic nerve neurolysis. This technique may be used in isolation when indicated for IFI alone or combined with proximal hamstring pathology through the same surgical approach.

Figure 11. Confirmation of adequate resection. After resection, the hip is taken through a full range of motion to ensure no further impingement. Additional assessment using radiographs with the hip in full external and internal rotation confirms no residual impingement. Radiographs also confirm that an over-resection into the femoral neck has not occurred.

Table 1. Pearls and Pitfalls for Key Elements of Open Ischiofemoral Decompression Technique

| Pearls |
|--------|
| Proper palpation of posterior bony prominences to ensure well-placed incision |
| Identification and neurolysis of sciatic nerve |
| Hip position during exposure |
| Proper retractor placement |
| Iliopsoas tendon management |
| Optimal lesser tuberosity resection |

| Pitfalls |
|---------|
| Incision too far laterally or medially |
| Incomplete neurolysis |
| Over-dissection of QF leading to iatrogenic medial femoral circumflex artery injury |
| Poor exposure of LT |
| Extension of LT osteotomy into femoral neck |

LT, lesser trochanter; QF, quadratus femoris.

Table 2. Advantages, Disadvantages, and Limitations of Open Ischiofemoral Decompression Technique

| Advantages |
|------------|
| Cosmetic incision |
| Better visualization of neurovascular structures |
| Quicker operative time |
| Decreased number of intraoperative radiographs |
| Improved release of sciatic nerve |
| Improved removal of bony debris |

| Disadvantages and limitations |
|-----------------------------|
| Larger incision than arthroscopic approach |
| Risk of injury to sciatic nerve |
| Wound complications |
| If bony overgrowth extends proximally or distally, approach is not very extensile |

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