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# OBTURATOR INTERNUS CONTRACTURE: AN UNDERAPPRECIATED CAUSE OF PELVIC FLOOR AND SCIATIC PAIN

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## ABSTRACT

The obturator internus muscle plays an important yet often overlooked role in the development of a range of musculoskeletal disorders, including pelvic floor and sciatic pain. This article provides a brief overview of obturator internus anatomy and discusses the important role the obturator internus muscle plays in the development of sciatica. While sciatica can be due to a wide range of conditions, such as herniated discs, spinal stenosis, piriformis syndrome, and/or trauma, contracture of the obturator internus muscle is rarely considered as a differential diagnosis. A clinical test to differentiate obturator internus related sciatica from other causes is reviewed, and conservative interventions are summarized. (J Contemporary Chiropr 2024;7:168-172)

**Key Indexing Terms:** Obturator Internus Muscle; Sciatica; Pelvic Floor Pain

## INTRODUCTION

The obturator internus muscle is unique among the body's 6 hip external rotators as its entire muscle belly is located within the pelvic bowl (1), forming the lateral portion of the pelvic floor (Fig. 1). When tight, this muscle is a common source of pain, primarily because its tendon angles more than 90° forward after passing beneath the ischial spine before inserting on the greater trochanter (Fig. 2). This abrupt angulation creates a considerable compressive force where the tendon crosses the ischium, and it is common for a protective boomerang-shaped bursa to form at this point. (2) Unfortunately, even though the bursa reduces friction at this location, the chronically inflamed bursa can become a source of long-lasting pain, which often resolves with aggressive obturator internus stretching. According to Mumma (3), with or without bursitis, a tight obturator internus is a frequent cause of pelvic floor pain. Researchers from the University of Washington recently demonstrated that 45% of patients with pelvic floor pain report significant discomfort when the obturator internus is manually palpated. (4)

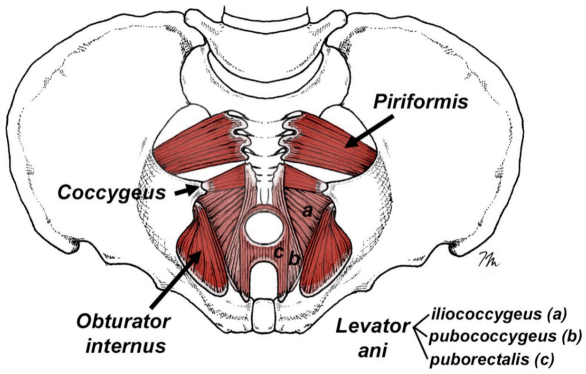


Fig. 1. The obturator internus muscle covers the lateral wall of the pelvic bowl.

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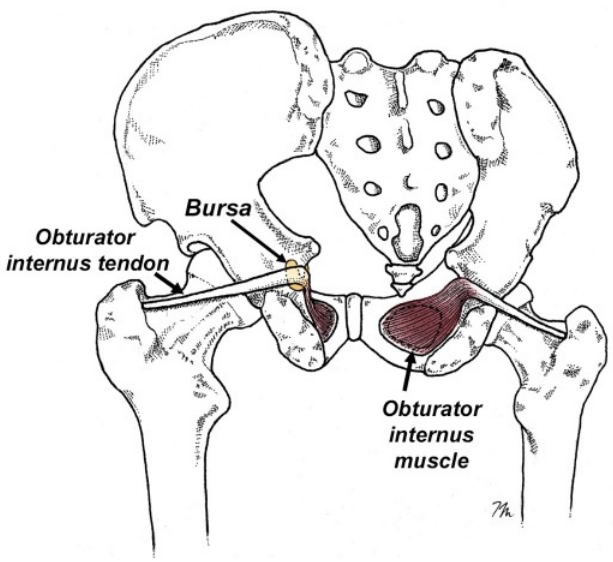


Fig. 2. The obturator internus muscle originates inside the pelvic bowl and its tendon angles abruptly forward upon passing beneath the ischial spine. This abrupt angulation creates such a strong compressive force on the ischium that a protective bursa often forms at this point.

## DISCUSSION

Along with the other external rotators, obturator internus functions to stabilize the femoral head in a manner similar to how the rotator cuff muscles stabilize the humeral head. In addition to producing hip external rotation, the obturator internus muscle can also produce hip abduction, particularly when the hip is flexed 90°. (1) Because it is such an important stabilizer of the femoral head, a common mechanism for injury occurs when there is a rapid change in direction on the weight-bearing leg and/or while losing balance while kicking a ball. (5) These 2 mechanisms explain why this injury is so common in soccer players. As with most muscle injuries, obturator internus is more likely to be hurt if there is underlying weakness. Once injured, the muscle stiffens, greatly increasing the compressive force of the obturator internus tendon against the ischium. Performing stretches and exercises that specifically target the obturator internus is essential to avoid chronic injury.

Putting aside the potential for developing ischial bursitis and/or pelvic floor pain, a tight obturator internus is highly likely to cause recalcitrant sciatic pain. More than 20 years ago, Meknas et al. (6) performed Lasegue tests during exploratory operations on patients as they were being treated for sciatica that was believed to be due to piriformis tightness. To their surprise, it was not the piriformis muscle that was compressing the sciatic nerve; rather, the sciatic nerve was being tractioned as it ran over the obturator internus muscle. The authors described 6 surgical cases in which tension on the sciatic nerve was relieved by sectioning the obturator internus. More recently, Balius et al. (7) performed a detailed study on 6 fresh cadavers and 31 healthy volunteers to determine the exact mechanism in which obturator internus can cause sciatica. They performed meticulous dissections on the cadavers and then used ultrasonography to evaluate movement of the sciatic nerve relative to the obturator internus as the hips were internally and externally rotated. The cadaveric dissections were especially interesting as they discovered a connective tissue anchor between the sciatic nerve and the obturator internus tendon. They theorized that this connective tissue anchor stabilizes the sciatic nerve against excessive back-and-forth movements associated with upper and/or lower body movement. The extent of this fibrous anchorage varied from individual to individual but was present in all eight of the cadaveric specimens.

Although the fibrous bridge between the obturator internus tendon and the sciatic nerve helps to stabilize the sciatic nerve in the hip, it can also be problematic when the hip internally rotates excessively and/or when obturator internus is tight. Using ultrasonography to evaluate movement of the sciatic nerve, the authors found that during passive internal hip rotation in both cadavers and healthy subjects, the tendon of the obturator internus is pulled down and forward, displacing the corresponding section of the sciatic nerve (Fig. 3). When the obturator internus muscle is relaxed with external hip rotation, displacement of the sciatic nerve is reduced, allowing the sciatic nerve to assume its naturally straightened position.

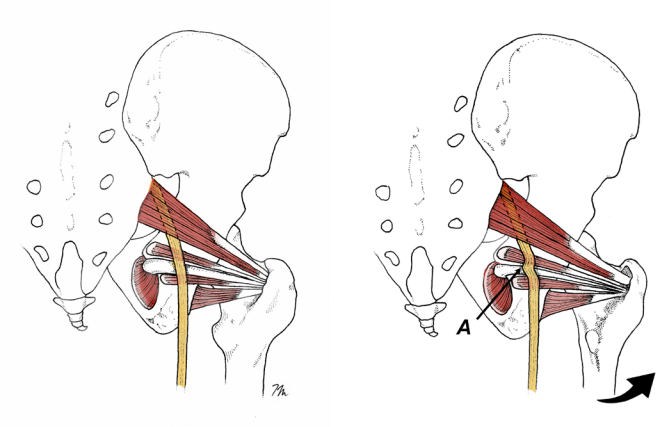


Fig.3. Because there is a fibrous anchor between the sciatic nerve and the obturator internus tendon, internal rotation of the femur (curved arrow) causes the sciatic nerve to be displaced forward as it is pulled by the obturator internus tendon (A).

This finding explains the connection between obturator internus tightness and sciatica: when the obturator internus muscle is supple and the hip is internally rotated, the muscle itself absorbs some displacement that would otherwise cause the tendon to shift with hip internal rotation. The tighter the muscle belly, the more the obturator internus tendon will pull on the sciatic nerve, potentially leading to chronic sciatic pain.

Given that forward displacement of the obturator internus tendon often tractions the sciatic nerve with it, it is possible to diagnose obturator internus related sciatica by creating excessive tension in the obturator internus tendon, then applying a long axis compression to stress the sciatic nerve. This is easily accomplished with the mobilization illustrated in figure 4. This particular movement creates maximal stress on the obturator internus tendon, which in turn will produce significant displacement of the sciatic nerve when obturator internus is tight. Typically, the patient feels a dull ache when the femur is compressed downward, and sciatic symptoms are often reproduced within the first 10-15 seconds while performing this maneuver.

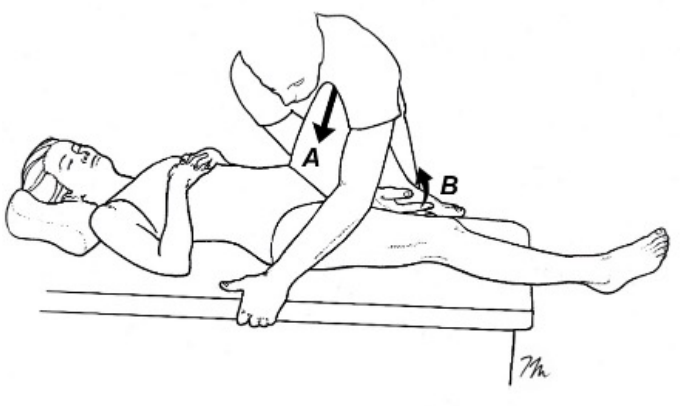


Fig. 4. Modified thigh thrust test to diagnose obturator internus contracture. With the patient supine and the hip flexed 90°, the examiner places the patient's knee on the inner aspect of his/her shoulder and uses the opposite hand to pull up against the table, thereby driving the femur downward (A). To create maximum tension on the obturator internus tendon, the opposite hand pulls the ankle laterally to internally rotate the femur (B) while the upper shoulder is used to adduct the flexed hip. This particular position creates substantial tension on the obturator internus tendon.

Because a weak obturator internus is predisposed to strain (with subsequent tightening), it is important to identify weakness by measuring external rotation strength with the hip flexed 90°, which selectively targets the obturator internus muscle. (8) This muscle test is easy to perform (see figure 5), and subjects should generate a minimum of 20% of their body weight when performing it. (9) In addition to quantifying obturator internus strength, this specific muscle test should be included in almost all biomechanical examinations, as research shows that athletes who are unable to generate 20% of their body weight with this test are more prone to knee and ankle injuries (10) and are 7 times more likely to tear their ACL in a single sporting season. (9) Specific exercises that target the obturator internus muscle are illustrated in figure 6. A typical exercise prescription is to do 3 sets of 15 repetitions of each exercise, with enough resistance to produce fatigue. This exercise routine is typically repeated 3 times per week.

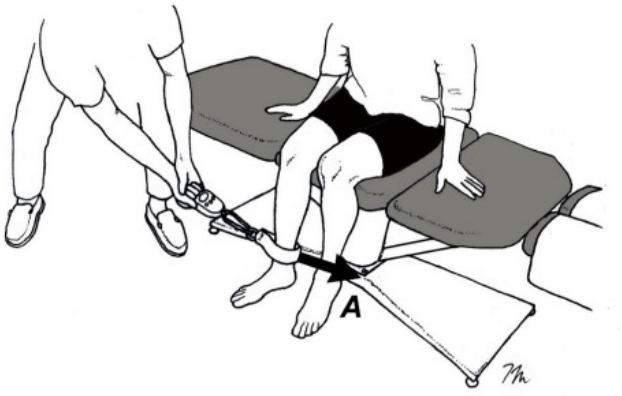


Fig. 5. Using a handheld dynamometer, the examiner pulls the seated patient's ankle laterally, while the patient maintains the knee in a fixed position. Ideally, the person will generate 20% of their body weight when performing this test.

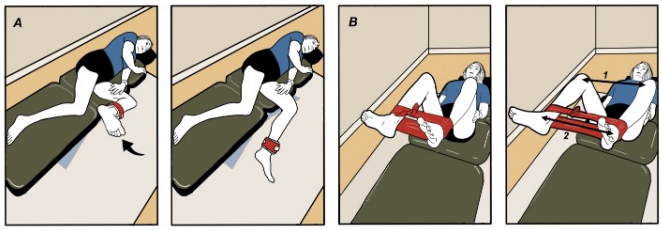


Fig. 6. Obturator internus exercises. A) While sidelying with an ankle weight wrapped around the malleoli, obturator internus is exercised by raising and lowering the ankle (arrow) while maintaining 90° of hip and knee flexion. B) One of the best ways to target obturator internus is to lie supine with an elastic band wrapped around your ankles. In this position, separate your knees by abducting your flexed hips (1) and immediately follow this by separating your ankles while keeping your legs in the horizontal plane (2). Because obturator internus is most active with the hips are flexed 90°, internally rotating the femur lengthens the obturator internus as it is abducting the hip, which very effectively targets this difficult to access muscle.

Because a supple obturator internus is less likely to cause displacement of the sciatic nerve, it is extremely important to lengthen a tightened obturator internus. One of the most effective ways to lengthen obturator internus is with the muscle energy mobilization illustrated in figure 4. By performing a hold/relax stretch in this position, it is easy to rapidly increase the range of horizontal flexion as obturator internus is a small muscle that is readily amenable to targeted lengthening. In addition to in-office mobilizations, the home stretch illustrated in figure 7 is an easy way to restore and maintain obturator internus flexibility. In difficult cases, better outcomes can be achieved by applying shockwave to the obturator internus tendon as it passes beneath the sciatic nerve. This safe and effective modality loosens adhesions and improves clinical outcomes.

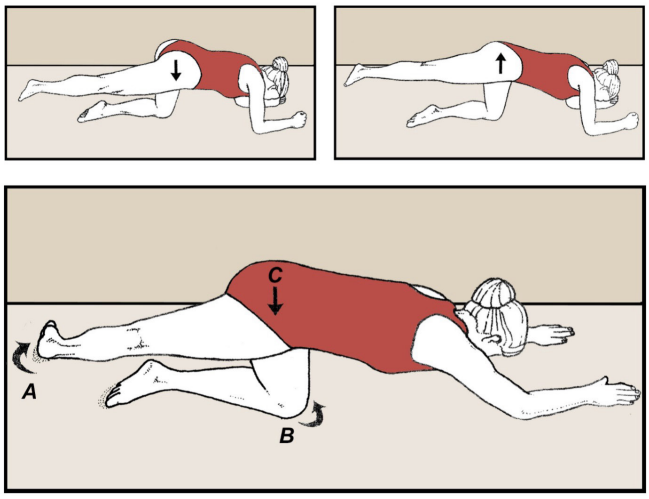


Fig. 7. Obturator internus muscle energy stretch. To stretch the left obturator internus muscle, get on all fours with your weight supported by the left knee. To start, maintain the right leg in a horizontal position and then slowly raise and lower the right hip up and down repeatedly (arrows). Once the left hip fatigues slightly (after about a minute), touch the right leg to the ground by pulling it back and toward the left (arrow A). By varying the degree of hip flexion (arrow B) you can isolate the tightest section of obturator internus (you will feel a pull in the back of the left hip), and then slowly lower the right hip to increase tension in the obturator internus muscle (C). To finish this stretch, gently push your left knee down into the floor for 5 seconds, then relax and drop deeper into the stretch by lowering the right hip (C). Repeat this process 3 or 4 times. A video of the stretch is availiable at www.humanlocomotion.com

An alternate technique for difficult cases is to use focal muscle vibration, which is usually applied above the medial aspect of the ischium so as to more effectively target obturator internus. Several studies have shown that oscillating a muscle at 40-60 cps inhibits muscle spindles thereby reflexively reducing muscle tone. (11,12) One particularly interesting study showed that applying focal muscle vibration to a muscle that is isometrically contracting not only reduces muscle tone,

but also produces long-lasting increases in muscle strength. (12) The isometric contractions may allow for deeper penetration of the vibration, which is important when managing obturator internus muscle injuries. (13) Lastly, measuring the degree of horizontal flexion pre and post treatment allows the practitioner to quantify improvement over time. Should conservative treatments fail, botulism injections into the center of the obturator internus muscle produce favorable outcomes, and surgical interventions with endoscopic neurolysis are effective (14), but are usually not necessary as comprehensive conservative care almost always produces excellent outcomes.

## CONCLUSION

In many situations, the obturator internus tendon is bound to the sciatic nerve by a small connective tissue anchor that is capable of significantly displacing the sciatic nerve. Sciatica secondary to obturator internus contracture can be diagnosed with a modified thigh thrust test, in which the hip is flexed 90°, horizontally adducted, and slightly internally rotated prior to producing long axis compression of the femur. When present, obturator internus related sciatica responds well to specific muscle energy mobilizations, stretches, and strengthening exercises.

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