

Find the Piriformis Muscle Easily: From Anatomical Landmark to Sonographic Target

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Dear Editor,

Piriformis syndrome (PS) is a condition that is characterized by pain associated with the piriformis muscle. This syndrome encompasses various pathological changes of the piriformis muscle, such as those caused by myofascial pain, anatomical variations, muscle hypertrophy, trauma, and any external condition that causes pain similar to PS. PS can arise from a range of lesions, including herniated or degenerative lumbar discs, lumbar facet syndrome, trochanteric bursitis, sacroiliac joint dysfunction, and endometriosis.^[1] The management of PS typically begins with pharmacotherapy and physical therapy. When the conservative regimen fails, injection can be applied to the piriformis muscle to relieve pain.^[2]

Piriformis muscle injections were conventionally performed without image guidance in clinics by physicians. However, due to the muscle's small size, deep location, and proximity to critical neurovascular structures, using image guidance has been suggested to enhance accuracy and minimize risk.^[3] Beaton and Anson explained six distinct anatomical configurations involving the relationship between the sciatic nerve and the piriformis muscle. In >80% of the population, the sciatic nerve passes deep and exits inferiorly to the inferior edge of the muscle belly/tendon.^[4] The success rate of blind injections is generally low, as evidenced by the various techniques that utilize different landmarks. A study conducted on cadavers comparing ultrasound-guided versus fluoroscopically-guided piriformis injections revealed a success rate of 95% with ultrasound guidance, whereas only a 30% success rate was observed with fluoroscopic guidance.^[3] Identifying the piriformis muscle through palpation of anatomical landmarks can be challenging. We recommend a four-step ultrasound-guided approach for the piriformis muscle.

To find the piriformis muscle easily under ultrasound guidance, the patient is positioned prone, and the lumbosacral area is aseptically prepared for injection. Using a low-frequency curvilinear probe, the transverse plane is examined with the medial border of the probe positioned on the posterior superior iliac spine (PSIS). All steps are performed by using the transverse ultrasonographic view:

- Step 1: The transducer is positioned transversely on the PSIS [Figure 1a]
- Step 2: The transducer is moved laterally until the iliac cortex and gluteus Maximus muscle are appeared [Figure 1b]. The iliac bone appears as a hyperechoic structure (curved line)
- Step 3: At this level, the transducer is moved in the caudal direction toward to obtain the axial sonographic view of the sciatic notch [Figure 1c]. Using Doppler imaging, the inferior gluteal artery can be visualized close to the sciatic nerve, while the superior gluteal artery is situated between the gluteus Maximus muscle and the piriformis muscle [Figure 1d]
- Step 4: Next, one end of the transducer is directed toward the greater trochanter to obtain the piriformis muscle. At this level, two muscle layers will be visible - the gluteus Maximus and the piriformis. Dynamically, internal and external rotation of the hip with the knee flexed is performed to demonstrate the piriformis muscle sliding, and helps with anatomical confirmation [Figure 1e].

In conclusion, for beginner physicians in particular, performing this procedure in a certain order, like navigation, will make it more memorable.

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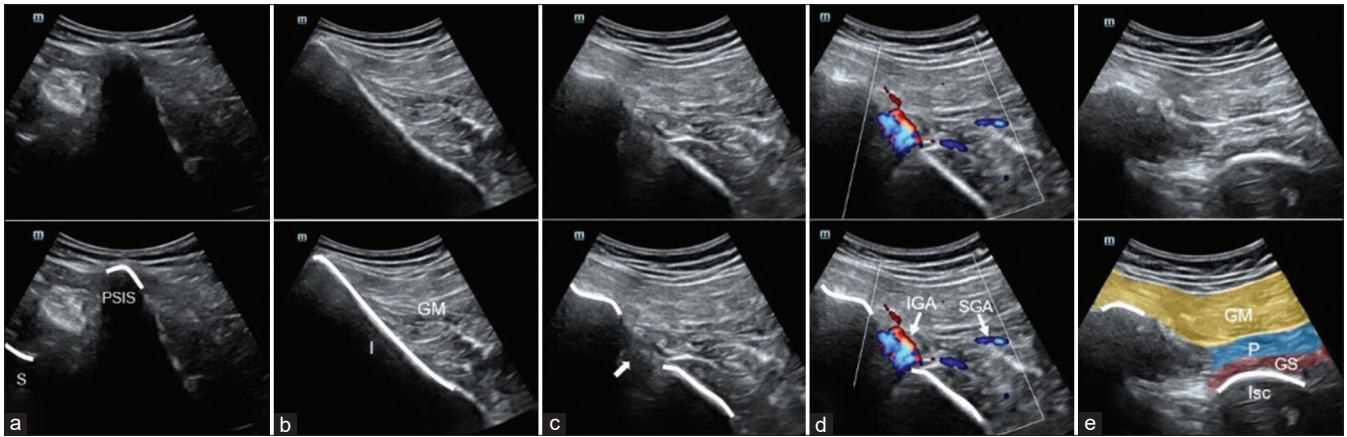


Figure 1: Ultrasound-guided piriformis injection: (a) Axial image showing the posterior superior iliac spine, (b) axial image showing the iliac bone (curved line) and gluteus Maximus, (c) axial image showing the sciatic notch (arrow), (d) axial image showing the vascular structures, (e) longitudinal image showing the piriformis muscle. PSIS: Posterior superior iliac spine, S: Sacrum, I: Iliac cortex, GM: Gluteus Maximus muscle, IGA: Inferior gluteal artery, SGA: Superior gluteal artery, P: Piriformis muscle, GS: Gemellus superior muscle, Isc: Isciium

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Conflicts of interest

There are no conflicts of interest.

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