

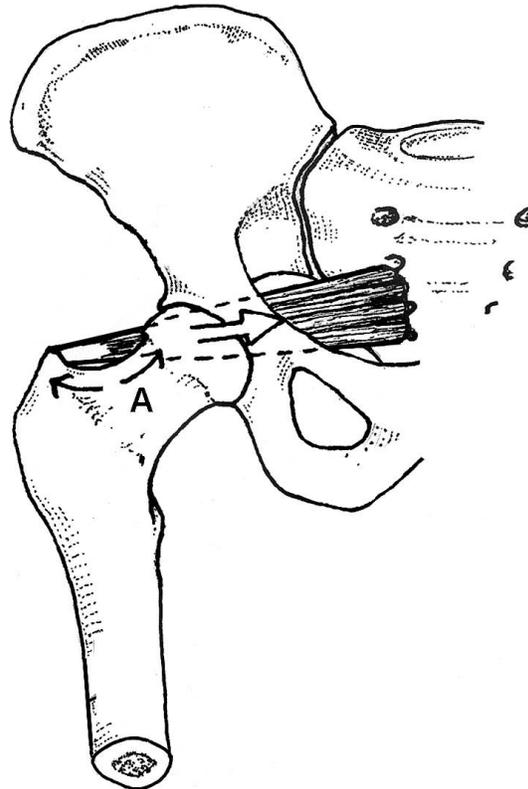
How To Beat Piriformis Syndrome

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The piriformis is a small muscle in the back of the hip that is notorious for causing trouble in high mileage runners. The word piriformis is Latin for pear-shaped, since the muscle's wide base and tapered attachment resembles a pear. While most orthopedic surgeons claim the piriformis muscle is unimportant while running (surgeons routinely cut this muscle from its attachment to treat this syndrome), the paleoanthropologist Owen Lovejoy proved otherwise. After meticulously reconstructing the pelvis of our ancient ancestor Lucy, Lovejoy confirmed the piriformis muscle reinforces the femoral neck and prevents it from bending while we walk and run (Fig. 1). Without a properly functioning piriformis muscle, our femoral necks would routinely fracture with the forces associated with even low mileage running.

Figure 1. The sciatic nerve exits the pelvis directly beneath the piriformis muscle.



Despite its importance in protecting our femoral necks, the piriformis muscle causes a lot of trouble in runners because it sits directly on top of the sciatic nerve (Fig. 2). In an unfortunate 2% of the population, the sciatic nerve runs straight through the middle of the piriformis muscle, increasing the potential for sciatic nerve injury. Because running increases activity in the piriformis muscle, high mileage running can allow the piriformis muscle to compress the sciatic nerve with so much force that the nerve becomes damaged. Common symptoms associated with piriformis-related sciatica include a toothache type of pain along the outside of the leg and/or a tingling that can travel all the way to the foot.

To differentiate piriformis syndrome from other causes of sciatica (such as a herniated disc in the low back), a simple test you can do on yourself is to pull your knee towards your opposite shoulder while lying on your

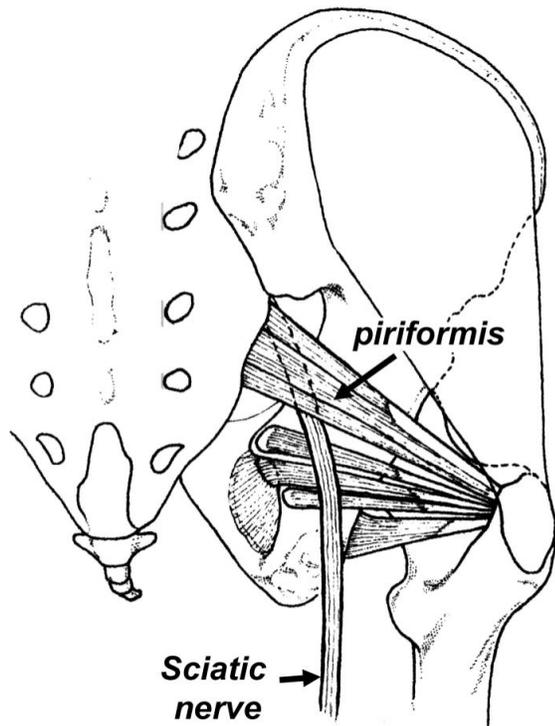


Figure 2. The piriformis muscle creates a powerful compressive force that prevents the femoral neck (A) from fracturing.

to hold stretches for no more than 20 or 30 seconds, since a prolonged stretch can also pinch the nerve. As a rule, the stretches should be done frequently throughout the day for short durations only.

back. Hold the involved knee towards the opposite shoulder for about 30 seconds and if a piriformis syndrome is present, you'll feel a slight tingling along the outside of your leg. In my experience, piriformis syndrome is much more common than herniated discs in runners.

To treat piriformis syndrome, the vast majority of sports practitioners emphasize stretching and massaging the piriformis to soften the muscle and reduce tension on the sciatic nerve. The most effective method to lengthen the piriformis is with the dynamic stretch illustrated in figure 3. Prior to performing this stretch, consider using a soft-ball to massage the piriformis muscle. Because the piriformis muscle is thickest where it leaves the sacrum, it is important to loosen this specific area prior to stretching (Fig. 4). You should be careful while massaging the piriformis muscle to make sure you don't irritate the sciatic nerve by focusing the massage near the sacrum and along the outside of the hip. You can tell if you're accidentally hitting the sciatic nerve because your leg will go slightly numb. To avoid irritating the nerve, it is important

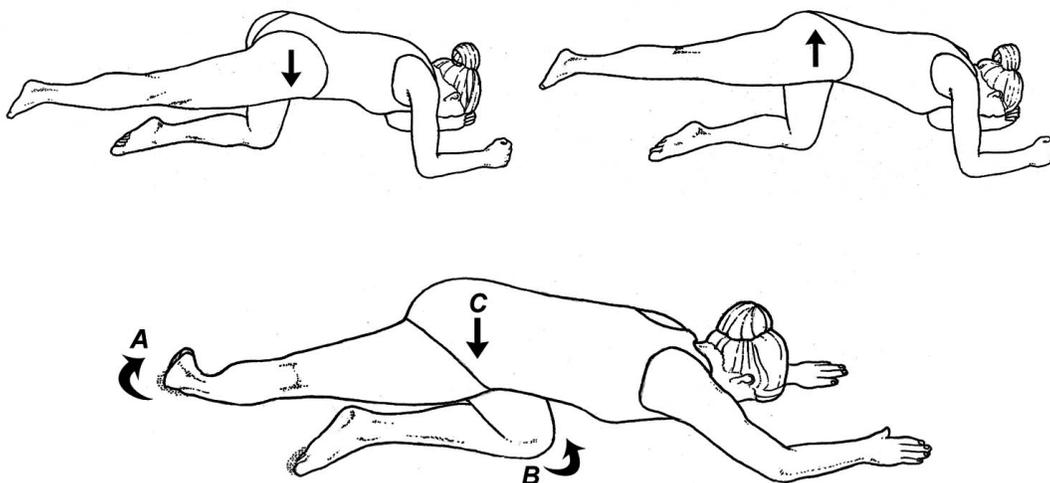


Figure 3. Dynamic piriformis stretch. To stretch the left piriformis, get on all fours with your weight supported by the left knee. At first, the right leg is held in a horizontal position. By using the left piriformis muscle, raise and lower the right hip up and down (arrows). Once the left hip fatigues slightly (after about a minute), touch the right leg to the ground by pulling it back and towards the left (arrow A). By varying the degree of hip flexion (arrow B) you can isolate specific muscle fibers of the piriformis responsible for limiting motion.

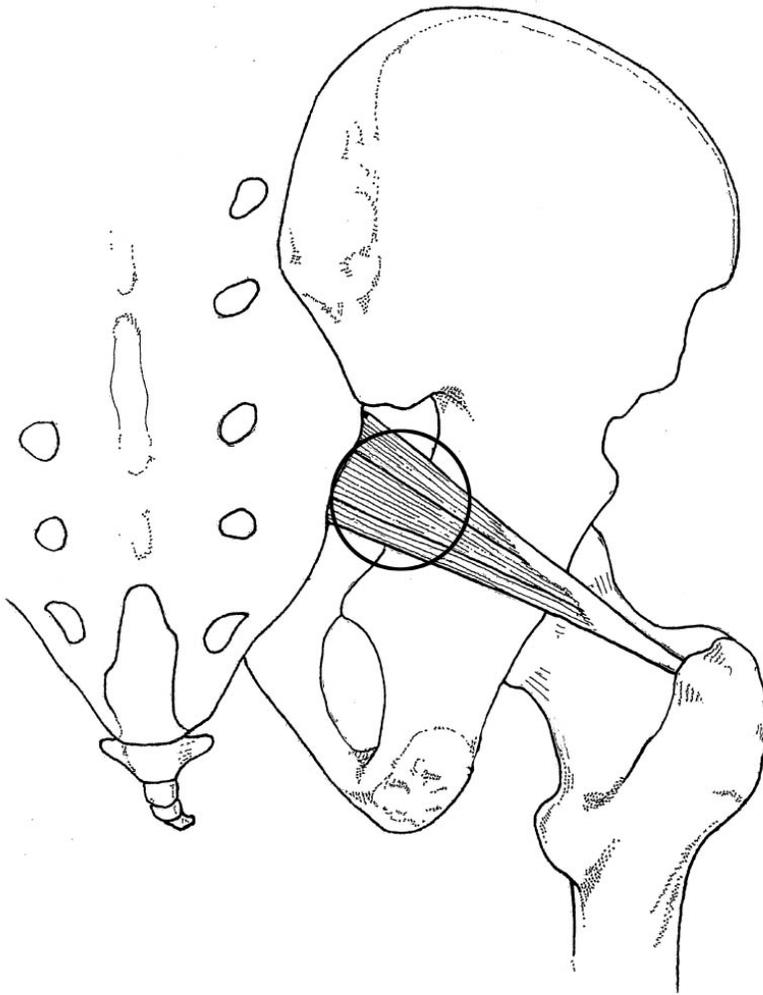


Figure 4. Prior to stretching, it is important to loosen the section of the piriformis muscle closest to the sacrum (**circle**).

Even though most sports doctors suggest that piriformis syndrome can be corrected with stretches alone, any injured runner will tell you that stretching and deep tissue massage often provide only temporary relief. In an attempt to improve clinical outcomes, a group of sports physical therapists came up with an alternate theory for the development of piriformis syndrome (1). These PTs claim that because gluteus maximus is the hip's most powerful rotator, weakness of this muscle may allow the hip to twist in excessively while running, resulting in higher forces being transferred to the piriformis muscle. While attempting to compensate for the weak glute max, the piriformis muscle becomes overworked and stretched, eventually irritating the neighboring sciatic nerve.

To test their theory that glute weakness can cause a piriformis syndrome, Jason Tonley and his colleagues (1) had a triathlete with a 2-year history of piriformis syndrome perform specific exercises to strengthen the hip. Following this structured exercise intervention, the athlete reported 100% pain relief that continued to the 1-year follow-up. After reviewing the literature on piriformis syndrome, these authors made the interesting observation that although 9 different studies reported that hip weakness was associated with piriformis syndrome, only 2 authors recommended strengthening exercises, with one study pointing out that that incorporating hip abduction exercises "seems to hasten recovery" from a piriformis syndrome (2). Figure 5 reviews specific exercises that target the important hip muscles. After reading this research, I began treating runners with piriformis syndrome with the exercises in figure 5 and noticed significant reductions in reinjury rates.

In addition to stretches and strengthening exercises, runners with piriformis syndrome often have to change the way they sit and sleep. Because rotating the hip up and out reduces tension in the piriformis muscle, runners

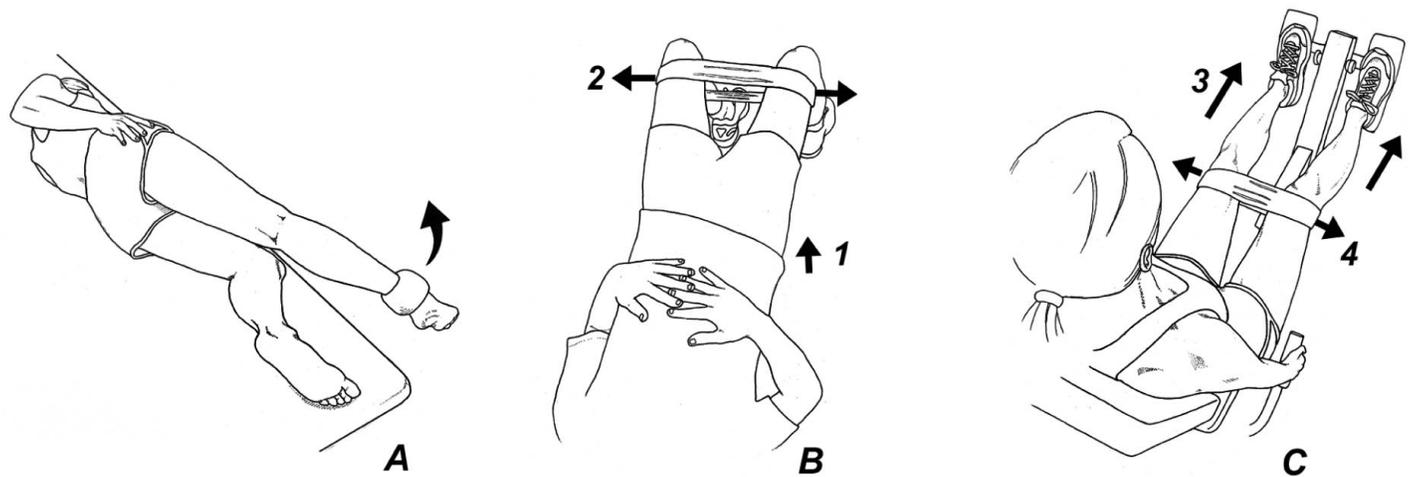


Figure 5. Hip strengthening exercises for piriformis syndrome.

A) While keeping the pelvis stationary with the upper leg hanging off the edge of a workout bench, raise and lower the upper leg through a 45 degree range of motion.

B) With your shoulders resting flat on the floor, perform a plank by raising your pelvis (1) and then actively abduct your hips by pushing your knees outward against resistance provided by a TheraBand (2).

C) This exercise requires a leg press, which is available at most gyms. The leg press is performed by moving your knees through the final 30° of extension (i.e., with the knees almost straight). While pushing the press (3), you simultaneously abduct your hips against resistance provided by a TheraBand (4).

with this injury tend to sit and sleep with their legs folded in a figure 4 position; i.e., with the foot of the involved side touching the opposite knee. Even though this position reduces tension on the sciatic nerve and feels comfortable, it causes problems because it allows the piriformis muscle to tighten even more, worsening the discomfort while running. Most runners are unaware they are rotating the injured side outward and it can take months to correct the faulty sitting and sleeping positions. To reduce the potential for chronicity, runners with piriformis syndromes should sleep on their side with a pillow folded between their knees, and sit with their knees straight. Because a piriformis syndrome tends to produce low grade discomfort that can go on for months, it is usually possible to continue running with this injury. To reduce strain on the piriformis muscle while running, consider shortening your stride by increasing your cadence 10% and try switching to a midfoot strike pattern. By correcting common perpetuating patterns and improving hip strength and flexibility, most piriformis syndromes can easily be resolved in a few months.

References:

1. Tonley J, Yun S, Kochevar R, et al. Treatment of an individual with piriformis syndrome focusing on hip muscle strengthening and movement reeducation: a case report. *J Orthop Sports Phys Ther.* 2010;40:103.
2. Hallin RP. Sciatic pain and the piriformis muscle. *Postgrad Med.* 1983;74:69-72.