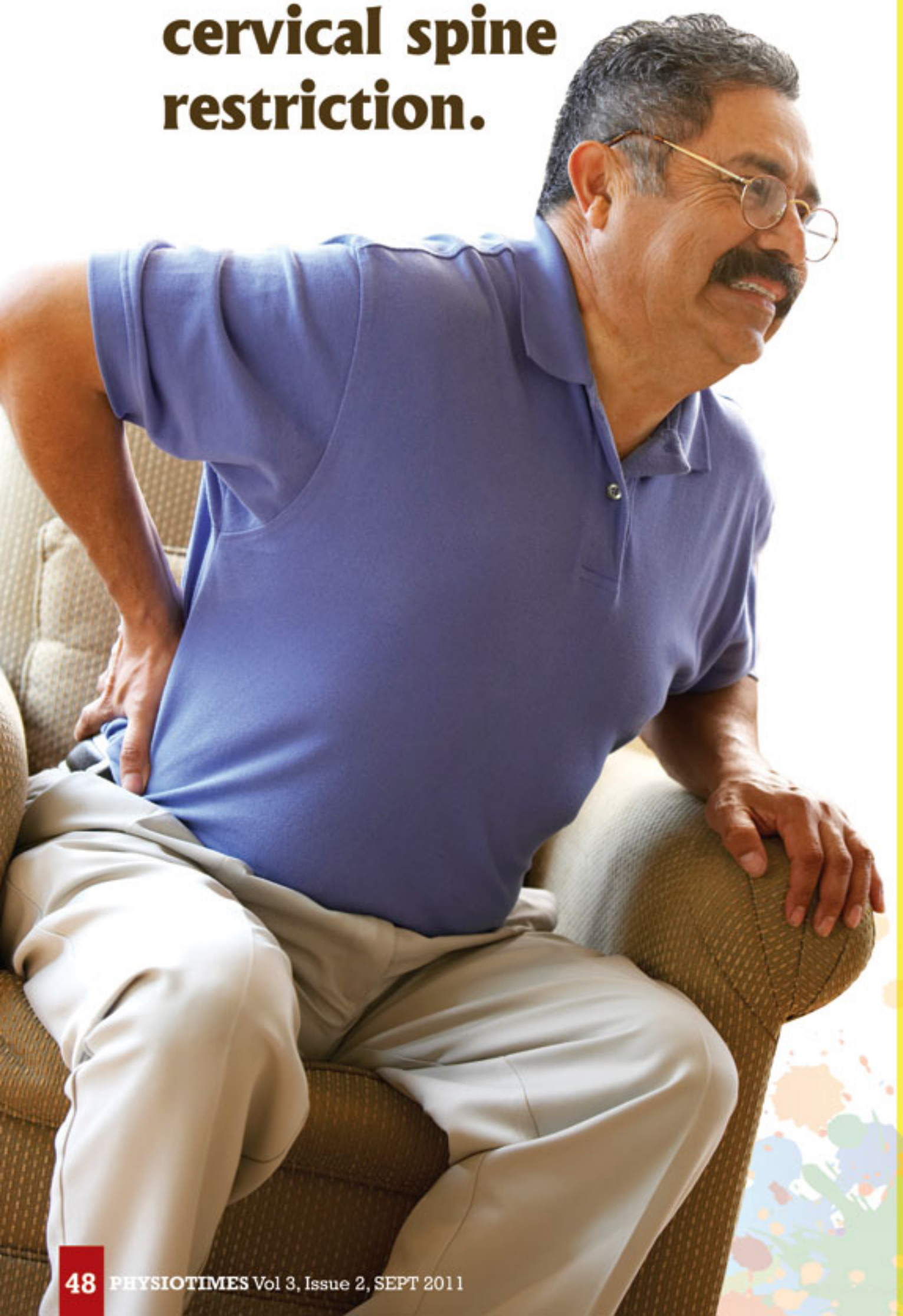
A novel test and treatment of the forgotten hip rotators in piriformis syndrome: & relation with upper cervical spine restriction.



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Piriformis Syndrome (PS) is familiar to most physiotherapists and other professions that deal with muscle dysfunction and pain. It is described as tightness in the piriformis muscle (PM) causing pain in the buttock, which may also contribute to sciatica, especially if the sciatic nerve traverses through the muscle, as it does in a percentage of the population. My purpose in writing this article is not to review PS, but rather to go beyond it in describing a test and treatment that should be performed after the typical treatment for PS. A case study will demonstrate the relationship between PS and upper cervical motion loss. For a thorough clinically oriented work on piriformis syndrome please see Mohanty.[1]

Piriformis syndrome is typically a diagnosis of exclusion, yet it can be complicated in the presence of other proximal co-morbidities. Philosophically it is reasonable to attempt to correct all biomechanical dysfunction of the body, such as restoring symmetry of posture and mobility of the pelvis, sacroiliac, lower extremities, foot and ankle, etc., prior to focusing on the PM.

In reading the literature and taking course work, I was oftentimes puzzled by the limited focus on only the PM muscle, as though it acted alone. There are several external rotators of the hip and these muscles do tend to function as a group. Furthermore, all hip rotators have a shared (similar, proximal) nerve supply. Therefore a tight PM may well be accompanied by tightness in the other hip rotators. A review of the anatomy will show that while the gluteus maximus and PM have an oblique orientation, the gemellus superior and inferior, and the obturator internus have a conjoined tendon which effective alters their line of pull to becoming horizontal, and parallels the rather stout quadratus femoris, as shown in Figure 1.

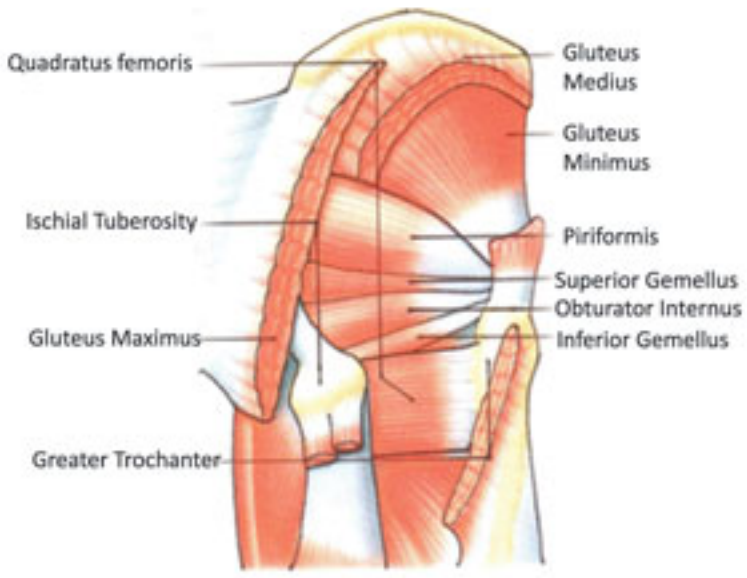

Figure 1. The external rotators of the hip excluding the gluteus maximus. *Note the oblique orientation of the piriformis, whereas the gemelli superior, the obturator internus and gemellus inferior and the large quadratus fermoris are essentially horizontal. The quadratus femoris has a broad insertion onto the posterior margin of the greater trochanter.*

The transverse band of the adductor magnus also is essentially horizontally oriented, as per Figure 2.

Figure 2. Dorsal view of adductor magnus. *Note the relatively transverse orientation of the upper fibers.*

In response to these variations in angle of pull, it seems prudent to modify the PS stretching techniques to encompass several angles above and below the typical angle of stretch.

While I cannot recall the exact time or reason why I started to screen and treat the posterior trochanter, I do know that it has been very rewarding to do so. In the presence of PS, the restriction of internal rotation (IR) can be easily restored. Yet, palpation of the posterior portion of the trochanter oftentimes reveals that the trochanter is still positioned posteriorly, and there is distinct tightness of the overlying soft tissues. Furthermore, the trochanter does not have posterior – to anterior (P-A) spring mobility. This puzzled me and further inquiry led me to the following conclusions. The quadratus femoris and the transverse fibers of the adductor magnus are large rotators which have a transverse orientation, and may best be described as the "forgotten hip rotators". Apparently, tightness of these muscles can easily be missed with traditional hip motion screening. Note the full IR in this actual client in Figure 3.

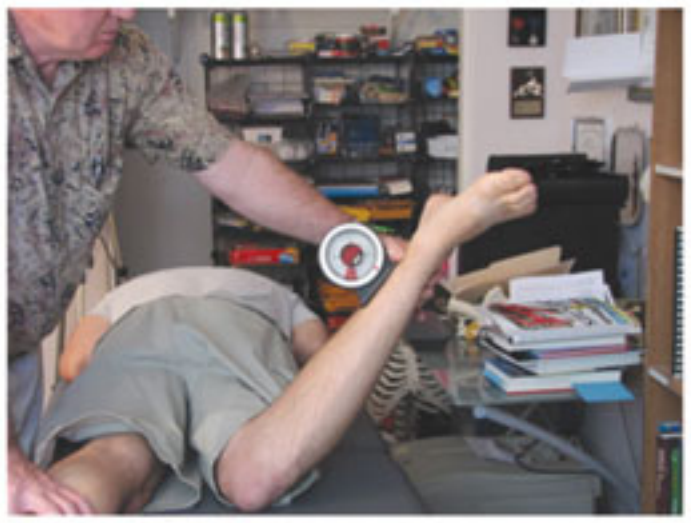

Figure 3. *Full right internal rotation as compared to opposite side, with normal end feel.*

However, supine testing reveals limited right hip IR, per Figure 4.

Figure 4. *Restricted right internal rotation only noted in supine, in the same client.*

Posterior trochanter palpation isolates large tendon of the quadratus femoris as shown in Figure 1. It seems reasonable that the specific P-A spring motion test isolates this muscle and perhaps the transverse band of the adductor magnus, more so than all other muscles of ER. Note the same client having restricted P-A spring at the trochanter, the technique shown in Figure 5.

Figure 5. *Restricted P-A spring mobility of the right trochanter. Client is prone.*

There is some controversy regarding the role of the adductor magnus. Recently there is some evidence indicating that the proximal portion may act more as an external rotator, than an internal rotator in certain phases of the gait cycle.[2,3] I submit that due to the bowing of the femur, and alterations of femoral position during gait; perhaps the upper and lower adductor magnus fibers may have alternate roles regarding ER and IR respectively.

Figure 3 shows full internal rotation of the right hip as tested in prone. Yet in this client, P-A spring of the trochanter was restricted, as was restriction of internal rotation measured in supine, with legs in neutral. See Figures 4, 5. This client was treated with a foam roll placed under the right trochanter in supine for five minutes (Figures 6, 7) and this restored full IR in supine (Figure 8).

Figure 6. *Foam roll placed vertically, under the right trochanter of anatomical model.*

Figure 7. *Foam roll placed vertically, under the right trochanter of actual client.*

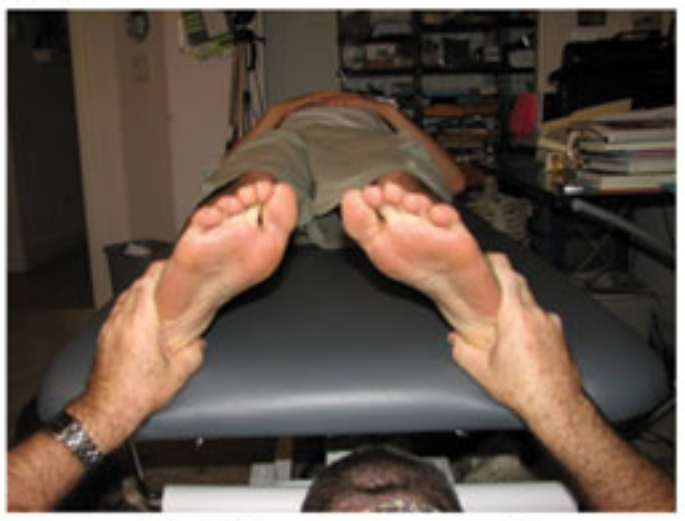

Figure 8. *After treatment the supine internal rotation is restored.*

Another recent case will demonstrate the importance of testing and treating P-A mobility of the trochanter, and its influence on the upper cervical spine. A client came to see me for back, buttock, and cervical pain. I initially thought that his very limited hip IR of 15 degrees bilaterally with a firm end-feel, was developmental and therefore not amenable to treatment. I was very surprised at how significantly tight his upper cervical spine was, lacking passive accessory motions at the occipito-atlantal, C1-C2 and C2-C3 joints. The degree of tightness and very limited response to direct cervical mobilization and soft tissue work informed me, (based on past experience) that this was a reflex muscular response, being influenced from some distal structure(s).

I therefore rescanned the rest of the body, starting at the feet, and the only proximal potential cause was the tightness with P-A spring of the trochanters. Therefore I treated his hips, having him lie supine on 4" by 8" (10cm by 20cm) firm foam rolls, placed vertically underneath the trochanters.
In the absence of foam rolls, firmly rolled towels will suffice. In response to 10 minutes of P-A glide, he achieved a rather surprising 45 degrees of IR bilaterally, and a dramatic release of the upper two cervical joints. I then treated C2-3 with 15 degrees of cervical flexion to isolate the joint, and sustained manual traction for 3 minutes. On the 3rd treatment day he returned with full upper cervical passive accessory motions, and greater than 45 degrees of IR of both hips with normal P-A spring at the trochanters. He was delighted with the pain relief, and I shared his enthusiasm, having learned something new. In this example, restricted hip IR correlated with lack of P-A spring at the trochanters.

However, I wish to repeat that oftentimes, the client can have restored IR of the hip (prone test) and still require treatment to restore P-A trochanter spring. I have seen a unilateral hip restriction causing a reflex counter rotation of C1-C2, probably mediated by the righting reflex, though this was my first experience with a bilateral hip restriction, causing severe bilateral cervical restriction.

In conclusion, one can have restricted P-A spring mobility of the trochanter(s), even in the presence of normal IR hip mobility. Treatment with a foam roll as a fulcrum can be very effective in restoring P-A spring mobility of the trochanter(s). Whether unilateral or bilateral, hip mobility limitation can have a significant unyielding, reflex tightness in the upper cervical spine. The astute clinician must treat the hips in order to reflexively release the cervical spine. The cervical spine may occasionally require additional treatment. Hip self-treatment is simple.

I hope this is helpful in the clinic as a novel way to treat limited hip P-A spring mobility, which can also reduce reflex upper cervical tightness. The body functions as an integrated system and biomechanically and reflexively, we must evaluate and treat it as such. A YouTube video on the topic can be viewed at http://www.youtube.com/watch?v=oYdGoXaTsQQ.

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