

**A CASE REPORT
OF
THE TREATMENT OF PIRIFORMIS SYNDROME
Applying Modalities of Therapeutic Bodywork**

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Abstract

Objective: This study assessed the benefits of weekly therapeutic deep tissue massage with the application of adjunct modalities, including somatic education and a stretching program to alleviate chronic pain caused by the compression of the sciatic nerve by the piriformis muscle.

Methods: A protocol of ten weekly one and ½ hour massages applied deep tissue techniques with adjunct modalities including: Proprioception Neuromuscular Facilitation (PNF); Positional Release Therapy (PRT) stretches; Feldenkrais Method of awareness through movement exercises (ATM); Kripalu yoga; and myofascial work. Focus of the work centered on the muscles and bones of the lower back, posterior and anterior legs.

Results: After the first session, subject was free of any sciatic pain for five days. When pain returned, client was able to recognize what triggered the flare-up and shifted her patterns of movement to abate the discomfort. There was a reoccurrence of chronic pain in the fourth and fifth weeks due to habitual patterns and work-related stress that required massage to remedy. From the fifth week on piriformis syndrome discomfort was rarely experienced.

Conclusion: This study demonstrates the application of therapeutic massage with a stretching program to ameliorate chronic piriformis syndrome. Rehabilitation is greatly improved with the addition of a daily stretching program and somatic education that improves the client's awareness of habitual patterns.

Key Words/Phrases: piriformis syndrome, pseudosciatica, sciatic nerve impingement, Positional Release Therapy (PRT) applications, chronic gluteal pain.

Introduction

Background: Information regarding piriformis syndrome has, since its first description in 1928, proved problematic in diagnosing, due to the lack of supporting objective evidence. It is generally the client's described pain and the supporting medical process of elimination that leads to the diagnosis of this syndrome. At least 70 to 80% of the world population suffers from some form of lower back pain in their life and of that, 50% experience piriformis syndrome. [1]

Etiology: Piriformis syndrome occurs from direct cause and effect incidents, e.g., blunt force trauma to the gluteal region, surgery, to the more common accumulative habitual patterns that create structural misalignment and functional compensation. Of the total world population experiencing piriformis syndrome, no more than 20% are caused by anatomical nerve abnormalities. [2]

Causes: 50% of piriformis syndrome cases are due to the spontaneous onset of sciatica symptoms, the most common cause being the result of vigorous physical activity. The remaining 50% are related to: contusions; concussive blow to the pelvic region; surgery; anatomical nerve abnormalities; hyperlordosis, muscle abnormalities and hypertrophy; fibrosis as a result of trauma; myositis ossificans, pseudoaneurysms of the inferior gluteal artery; cerebral palsy; and total hip arthroplasty. [1]

Morbidity: As of 2004, estimated costs related to piriformis syndrome were over \$16 billion dollars. This was spent in both direct medical costs and indirect expenses to ameliorate pain. [1] Piriformis syndrome has caused many sufferers to incur a loss of productivity because of pain, but due to the lack of agreement as to how to diagnosis this syndrome; time away from work is not fully documented. Reports suggest that there is a 6:1 female to male ratio of piriformis syndrome. [1]

Research: Standard allopathic protocols show less than a 50% reduction in chronic pain for up to three months with full recurrence of symptoms with the application of either marcaine or botulinum neurotoxin B injection therapy. [3] Botulinum toxin A proved even less effective. [4] Limited physical therapy sessions are a part of the injection protocol. One surgery study of 239 patients showed a 58.5% excellent outcome with the remaining patient statistics as follows: 22.6% good outcome; 13.2% limited; 3.8% no benefit and 1.9% symptoms worsened. [5] Sports medicine approaches reveal a greater reduction and elimination of piriformis syndrome with the application of regular stretching and manual therapy protocols. The greatest successes occur when the client commits to a daily regimen of a home stretching routine. In an acute flare-up of symptoms, the client must stretch every two to three hours when awake. This creates the beginning of somatic education in retraining tissues to learn to return to tonus and a relaxed state. After symptoms abate, it is necessary to continue the stretching exercises to reduce the return of habitual patterns that may have created this syndrome. Traditional Chinese acupuncture methods are another holistic approach used to ameliorate this syndrome. [6]

Assessment Tests: Medical doctors perform digital rectal exams to further reveal muscular tenderness and pin point the appropriate muscle for injection therapy application. Diagnostic imaging, also prescribed by doctors, is less effective in diagnosing this syndrome but helps to rule out other possible conditions. [7] The assessment protocols I applied were: the Pace test to check for abduction and external rotation of pelvic muscles; Freiberg test to force internal rotation with the leg extended; Beatty maneuver to selectively contract the piriformis muscle with the client in side lying position on the unaffected side; and functional assessment techniques, similar to the above muscle tests by Rolfing and massage therapists Art Riggs [8] and Whitney Lowe. [9]

Therapeutic bodywork has presented promising applications for the reduction and remedy of pain associated with sciatic nerve impingement by gluteal muscles and at tenoperiostial junctions. Cataloging of therapies suggest a greater amelioration of symptoms with non-pharmacological approaches to reduce chronic pain. [1] Emphasis on awareness of habitual patterns and movement, release of myofascial adhesions [10], deep transverse cross fiber friction and a daily stretching protocol show the greatest results in ameliorating piriformis syndrome. [1]

Profile of client: Subject, a 43-year-old active female, works in a corporate setting as an executive in Human Resources. Medical history includes the removal of her thyroid gland thirteen years ago due to cancer. Client is clear of any reoccurrence of cancer and is under medical supervision including daily doses of synthroid. Client suffers from asthma and allergies. Weekly allergy shots are given in her right deltoid muscle. In addition to the allergy shots and thyroid medication, client takes 800 mg. of ibuprofen for pain management as needed. A relative who is a physician’s assistant concurred with the client’s self-diagnosis of sciatic pain.

Subject has experienced chronic pain for the past few years. Pain is experienced in the right gluteal region that travels inferior along the lateral side of the leg and down along the fibula. This is experienced with a verbal numerical rating scale at an intensity level of ten, often as a dull, throbbing ache that can travel distally to the hallux. Under stressful situations, pain moves contralateral. Ibuprofen for pain management is the only form of treatment prior to this case study. Client’s desired outcome is to manage the pain with the hope to be pain free. At the conclusion of the study client stated, “ While the pain or discomfort may not completely go away, I can be more aware of how they get started and make adjustments early on to prevent or lessen it.”

Table 1. Profile of client at start of study

Outcomes evaluated	Baseline at initial intake
Degree of pain	Level 10 intensity on scale from 1 to 10
Frequency of pain	3 to 7 times a week, sometimes more than once a day
Pharmacological use	800 mg ibuprofen as needed, 1 to 2 doses a day
Work activity	Pain triggered by sitting for long periods of time
Personal activity	Standing for long periods of time on hard floors, standing and walking in high heeled shoes, or driving in her SUV

The symptoms of piriformis syndrome sciatic nerve impingement are treatable with massage, by addressing the muscles surrounding the sciatic nerve that are shorter and compressing the nerve. Application of deep transverse friction at tenoperiosteal junctions and focus on softening and relaxing the piriformis and the other deep lateral rotators as well as the gluteal muscles greatly reduce symptoms of nerve impingement. Focus work on the surrounding hamstring muscles and proximal and distal bone attachments are also noteworthy to address, as they may further aid in compressing the sciatic nerve as it branches out and travels inferior dividing into the peroneal and tibial nerves. The most appropriate muscles and attachments to massage include: tensor fascia latae (TFL); iliotibial band; iliac crest; quadratus lumborum; quadriceps; hamstring group; the greater trochanter; and sacroiliac joint attachments. Special attention was given to the lateral side of the leg including vastus lateralis, peroneus longus and brevis, and extensor hallucis longus muscles, as well as the psoas.

Assessment of the symptoms indicated impingement of the sciatic nerve in the gluteal region. Further research with colleagues and source literature confirmed my assessment of piriformis syndrome, and enabled me to review my plan of treatment.

Report of Clinical Visits and Treatment Plan:

Subject entered case study treatment experiencing chronic sciatic pain in her right gluteal region on a daily basis. Range of pain was at the highest level, assessed with a verbal numeric rating scale, ranging from one to ten, and often transferred to her left side with a constant ache. Client experienced intermittent tingling down the lateral side of the right leg and calf. Assessment of client revealed a positional pattern of lateral rotation at the feet referring into the hips. Her left anterior superior iliac spine was elevated approximately 1" higher than her right side, and her right leg felt heavier and denser in passive movement. Both feet resisted medial rotation in passive testing. Client's range of motion was restricted at the coxofemoral joint where congested and contracted muscles were felt. In addition her left shoulder was elevated due to habitual patterns of cradling the phone to her ear at work.

The subject received a series of ten consecutive massages of one and ½ hour in duration. The sessions were administered by a massage therapist in training as part of the graduation and certification protocol outlined by PMTI Core 600+ massage therapy program. Focus of each session was to ameliorate chronic sciatic pain radiating from the gluteal region. The weekly approach incorporated deep tissue with other bodywork modalities to address the softening of muscles and fibrous adhesions at muscle and tenoperiosteal junctions of the pelvic girdle, the leg and lower leg affected by sciatic pain.

Each session began with a verbal intake and visual assessment. Generally, sessions began with the client in supine position beginning with a series of range of motion (ROM) movements at the feet, assessment of where movement was impeded, then palpating for the impingement of the sciatic nerve by the piriformis muscle.

As the session progressed the subject was moved into at least two positions (supine/prone, supine/side lying). The protocol of each massage alternated with deep tissue massage and adjunct modalities including CranioSacral Therapy (CST), PNF and PRT stretches, somatic awareness, Trager rocking and myofascial work.

The 15-minute conclusion of each session included a review of lengthening exercises and awareness of habitual patterns and movements for at-home focus. The last portion of closure included a verbal and visual review of client's state and postural alignment.

Focus work addressed the softening of hypertonic muscles especially of the rectus femoris, vastus lateralis, tensor fascia latae, piriformis and gluteus maximus and medius. These muscles were most benefited by applying cross-fiber friction at tenoperiostial junctions. The frictions were applied for up to five minutes. No compressions or glides were ever used over the piriformis to reduce any further possibility of compressing the nerve. Cross-fiber glides, as well as glides along the grain of the muscle were applied to aid in the softening of the quadratus lumborum. Cross-fiber friction from the posterior superior iliac spine along the iliac crest attachment was done with considerable gentleness as client described a bruised sensation. This "bruised feeling" was most pronounced at all of the tenoperiostial junctions of the deep lateral rotator muscles, the gluteal area, as well as in the distal aspect of the iliotibial band. Intermittently, when the iliotibial band was most restricted, the patella tendon and ligament on the lateral side would cause discomfort. Assisted PNF stretches and PRT movements enabled the contracted muscles around the hips and knees to release, allowing for an increased range of motion. As needed, compressions of the iliopsoas were applied to balance work on the quadratus lumborum.

Deep tissue compressions and cross fiber friction of the piriformis muscle and tenoperiostial attachments at the sacrum and the greater trochanter gave the greatest softening and improvement of impingement of the sciatic nerve. In addition, cross fiber friction of the iliac crest assisted in bringing slack to the gluteus maximus muscle overlaying the piriformis. Client was very sensitive in this area, so friction techniques were administered very gently. For congestion in the TFL and rectus femoris muscles, soft fist compressions and hand glides were the preferred strokes and tools to achieve reduction in tissue density. PNF resisted stretches involved the client in her process, while PRT stretches and ROM movements brought awareness of what she does, and how her body functions. This was especially useful when addressing the quadriceps muscles

and iliotibial band. Somatic awareness education enabled the client to find other options of movement, looking for greater ease and comfort. This led her to catch herself as she moved into an habitual pattern that created pain. She was able to find options as to what she could do to improve the situation and reduce the discomfort. CST holds were applied to the occipital region to assess where along the spinal column movement of cerebrospinal fluid (CSF) was impeded. This directed my focus to where I could assist in releasing the compression of thoracic and lumbar muscles. As the client's constricted muscles began to release, the muscles of her lower trunk and gluteal area began to soften.

List of modalities applied

CranioSacral Therapy (CST)
Cross fiber friction (XFF)
Deep Tissue Massage (DT)
Swedish and ancillary strokes
Kripalu yoga poses
Myofascial Release
Proprioception Neuromuscular Facilitation (PNF)
Positional Release Therapy (PRT)
Trager rocking

Results:

Massage appeared to ameliorate the symptoms of piriformis syndrome in the subject. Deep tissue techniques proved an effective means to reduce compression of the sciatic nerve by surrounding muscles. Cross fiber frictions were applied for several minutes at the tenoperiosteal junctions, specifically at the greater trochanter and sacrum attachments of the piriformis, and the iliac crest moving lateral from the posterior superior iliac spine to address the iliolumbar ligament, as well as the gluteus maximus and minimus attachments. In conjunction with deep tissue techniques, adjunct modalities that proved most effective were: resisted PNF stretches of the iliotibial band; PRT movements to increase range of motion at the hip and decompress client's coxofemoral joint; and somatic education to bring awareness to patterns of movement that create a dynamic that resulted in compression of joints and congestion in muscles. The 1" differential in the subjects anterior superior iliac spine leveled out to approximately a ¼" variable by the end of the first session. As the sessions progressed and her muscles began to relax more, the anterior hip imbalance disappeared.

Table 2. Profile of client during the study

Field	Response from subject
Degree of pain	Pain moved from a level 10 to 6
Frequency of pain	On a weekly basis, moved between 2 to 4 times, and often there was no pain experienced
Pharmacological use	800 mg of ibuprofen taken occasional in response to a flare-up of symptoms
Work activity	Occasional flare-up if seated at meetings for hours
Personal activity	Occasional flare-up standing or walking in high heeled shoes

Although massage did not alleviate symptoms all the time, the protocol did reduce the level of pain and the frequency of episodes of discomfort. Somatic education enabled the client to take control and recognize her movement patterns that participated in exacerbating this syndrome. Through the client's awareness of her habitual patterns and a daily stretching regimen, the compression that creates this chronic pain syndrome was greatly reduced. When the subject was not diligent in following her daily stretching exercises her symptoms were more prone to reappear.

As the level of pain and the frequency of discomfort diminished, the client was also able to reduce the amount of NSAID taken on a daily basis to occasional use. This, as a secondary benefit, reduces the possibilities of gastric upset caused by NSAID.

Table 3. Comments made by the client throughout the process.

<p>a.) During or after sessions: 1st session: Feels a cool air blowing through her leg 2nd session: Bruised feeling from last session greatly reduced 3rd session: Feel compressed when pain returns 6th session: Great improvement all week with no pain 8th session: A little tweak (location is at the iliac crest) 10th session: Feeling great</p>
<p>b.) A week after the end of the case study: I have become more aware of how I stand, walk and sit since all of these contribute to my discomfort. I make adjustments more quickly to prevent or reduce the pain. Exercises given help me stretch and release tension I build up on a daily basis. No return of pain currently seven days after final treatment.</p>

Conclusion:

This study demonstrates that the application of massage to reduce piriformis syndrome in general, especially during a flare-up, is possible with appropriate decompression at the joints involved, relaxation of muscles that surround the sciatic nerve and a daily stretching protocol. It would be beneficial to pursue a more comprehensive study involving several clients over the duration of one year that live with this syndrome to track the rate of improvement and the recurrence of symptoms. This could be further enhanced with observation of the long lasting effects of massage and stretching in addressing this concern. The inclusion of somatic awareness to learn how and what patterns of movement may contribute to piriformis syndrome would be of great value in reeducating the individual. This would give the client some control over what they can do, and how they can alleviate their discomfort.

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Appendix of exercises for Piriformis Syndrome client

Butterfly pose – lie on your back keeping your head, neck and spine straight, bending at your knees, and bring your feet together with the heels and balls of your feet touching, then bring your feet as high up to your groin as possible and hang out – remember to breathe! When it gets too much, take another breath and hold 10 more seconds then slowly straighten your legs and rest

½ Frog pose – lie on your stomach and get comfortable, then as you bend your knee and lift your leg forming a 4 position, make sure that your head is turned to the same side as your raised knee. Hold this for as long as is comfortable, you may wish to slowly turn your head to the opposite side to feel what happens in your body, then rotate and address the other side. Always move very slowly.

Feet in and out – lie on your back keeping your head, neck and spine straight, then slowly while keeping your knees straight, turn your feet into the center so that your big toe touches the bed, or floor (this is medial/internal rotation), then slowly allow your feet to move straight up so that the back of your heel is resting on the bed or floor and your toes are pointing straight up, then move your feet out so that the lateral side of your foot begins to touch the bed or table (lateral/external rotation) and then continue to rotate back to center, to medial and repeat slowly several times. You want to pay attention to what movement is happening in your ankles, knees and hips, and breathe!

Sitz bones – You may do this both in a chair or on the floor. Sit and with your hands pull/stretch your gluts/cheeks away from your body so that you are increasing the area touching the sitting surface. Feel your Sitz bones and how you balance on them. Slowly begin to make very small movements from front to back then side-to-side and then making a small circle all the while resting on your Sitz bones, become more aware of how you are doing this and what you feel in your hips, knees and spine, and breathe!

IT band stretch – lie on your side on the edge of the bed so that you can let your top leg hang behind you and off of the bed. Make sure to counter balance yourself with your top arm/hand, then slowly take a deep breath, as you exhale, allow your top leg with straight knee to fall behind you and off the bed, hanging in the air. With each breath, become aware of how you can best allow your leg to hang, and with each exhale allow your leg to drop a little further down feeling how the IT band slowly begins to open and lengthen. Repeat on each side.

Quad stretch – lie on your back on the edge of the bed and allow the leg closest to the edge to drop off the bed with your knee bent, again you will want to counter balance yourself with your opposite hand/arm, with each exhale allow your thigh to fall down a little bit more with the feeling of it moving out and down. When you breathe have the feeling of lengthening your back onto the bed, and when you exhale allow your leg to soften and drop down allowing for a greater lengthening of the quadriceps muscles.