This case report describes a patient with chronic pain due to piriformis myofascial pain syndrome related to lumbar facet joint lesion. The purpose is to demonstrate the elimination of the underlying etiological lesion by lumbar facet joint injection with steroid suspension for a complete and effective treatment of piriformis myofascial pain syndrome in order to obtain a permanent pain relief. A 46-year-old male patient had chronic pain in the right gluteal region and right leg (with tingling) for many years. Initially, he had been treated as piriformis syndrome with oral medicine, physical therapy and local injection, and had only temporary and incomplete pain relief. Finally, he visited our pain clinic and received physical therapy to the lumbar spine based on the presence of positive facet sign that reproduced his clinical symptoms. After physical therapy, he had pain relief much remarkably than before, but still incompletely. Then he received a lumbar facet joint injection at L5-S1 level. Immediately after the injection, he had pain subsided completely. This effectiveness lasted for longer than one year. It is concluded that, in some cases of piriformis myofascial pain syndrome is related to a lumbar facet joint lesion. Treatment of the lumbar facet joint can suppress the symptoms completely for a significantly long period. (Tw J Phys Med Rehabil 2009; 37(2): 115 - 122)

Key Words: injection, facet joint, piriformis myofascial pain syndrome, sciatica.

INTRODUCTION

Piriformis syndrome has been defined as a pain syndrome derived from the piriformis muscle, including all intrinsic pathology of the piriformis itself, such as myofascial pain, anatomical variations, hypertrophy, trauma, etc. Other etiology causing pain similar to piriformis syndrome includes herniated lumbar disc, lumbar facet syndrome, trochanteric bursitis, sacroiliac joint dysfunction, endometriosis, etc. However, according to the traditional definition, piriformis syndrome should be limited to those with sciatic nerve entrapment due to, or related to, the compression of the piriformis muscle. A term of “piriformis myofascial pain syndrome” has been used for those with pain caused by myofascial trigger point (MTrP) of piriformis muscle. Clinically, piriformis syndrome with sciatic nerve entrapment is different from piriformis myofascial pain syndrome. In the case of mild or early sciatic nerve entrapment, the patient...
usually complains tingling in the region of peroneal and/or tibial nerve territory as a consequence of direct irritation to the sciatica nerve. The initial symptom of compression neuropathy is tingling but not pain, since the large fibers are compressed before the small pain fibers have been compromised. On the other hand, the pain due to piriformis myofascial pain syndrome is a type of referred pain (but rarely tingling) from the MTrP of the piriformis muscle, and is usually limited in the posterior thigh above the knee, but not in the leg.\textsuperscript{1,2}

In this case report, we presented a case with piriformis myofascial pain syndrome having long-standing effect of pain relief from lumbar facet joint injection.

### CASE REPORT

**Medical history**

A 46 year-old male patient had chronic pain in the right gluteal region with episodic tingling in the leg for a few years. Initially, the pain intensity ranged from 3/10 to 5/10 (numerical analog scale from 0 to 10 with 0 = no pain and 10 = worst pain ever experienced in the life). The pain intensity had been increased progressively, and finally might go up to 9-10/10 episodically. The pain frequently radiated to the posterior and lateral aspects of the right leg, accompanied with tingling sensation. The symptoms usually became severe after carrying heavy weight or prolonged driving. He had been a truck driver for more than 15 years prior to the development of clinical symptoms. Frequently, he had to carry heavy weight up and down the truck. As the symptoms were getting worse, he had difficulty at work, particularly during prolonged driving or carrying heavy weight.

He was initially treated with non-steroid anti-inflammatory medicine prescribed by his family physician and had pain relief only partially and temporarily. He then was referred to a physiatrist by his family physician. The physiatrist suspected that he might have suffered from piriformis syndrome since he had a severe tender spot in the piriformis muscle and had severe pain and tingling in the posterior and lateral aspects of right leg when the right piriformis muscle was firmly compressed. He then received radiological studies on the lumbo-sacral spine and the pelvis. The X-ray films of lumbo-sacral spine showed evidences of mild degenerative changes including small osteophytes at the anterior-inferior L5 margin and anterior-superior S1 margin with slightly reduced intervertebral disc space between L5 and S1 vertebrae. The X-ray findings in the pelvis were unremarkable. Electromyographic study on the lumbar paraspinus and the involved limb muscles was also performed and the findings were normal. Under the impression of piriformis syndrome, he received physical therapy (heat, electrotherapy, and massage to the right gluteal region) 2-3 treatments per week. He had remarkable but only temporary pain relief for 1-2 days after each session of physical therapy. Since physical therapy provided no significant overall improvement, MRI studies on lumbar spine and pelvis were performed but showed no significant findings other than mild degenerative changes in the lumbar spine similar to that demonstrated in the plane X-ray film. The physical therapy program was discontinued 2 months later. Then he received an MTrP injection to the right piriformis muscle and had complete relief of symptoms for about 1-2 weeks. However, the pain recurred and increased progressively to the original pain level. Totally, he received 3 trigger point injections within 3 months and had only temporary pain relief with no remarkable overall improvement. Finally, he was referred to our pain clinic approximately about 6 months after the initial medical visit.

**Physical examination**

At the time of his first visit to our pain clinic, he reported a pain intensity of up to 7-8/10 in the right gluteal region, and 4-5/10 in the lateral and posterior aspects of right leg down to the foot. He also had tingling in the posterior and lateral aspects of right leg.

Examination of the gluteal regions revealed diffuse tenderness in the right gluteal muscles with the most painful spot on the MTrP of right piriformis muscle. The right piriformis muscle was much tighter than the left one. All provoking tests for piriformis syndrome, including the direct stretch (Lasègue’s sign with bowstring maneuver) or compression (Tinel’s sign) of the right sciatic nerve and the aggravation of the right sciatic nerve entrapment by the right piriformis muscle (stretching or active contraction against a resistance of the right piriformis muscle), showed positive findings to support the diagnosis of
right piriformis syndrome. There were active MTrPs in the right gluteus maximus, gluteus medius, gluteus minimus, and piriformis (the most irritable one) muscles. The diagnosis of MTrP was based on that described in the “Trigger Point Manual”. [2,10]

Examination of the lumbar spine revealed slightly reduced ranges of motion in the right rotation and right side bending with mild back pain in the terminal ranges. There was a normal alignment in the lumbar spine. Lumbar facet sign (ipsilateral rotation followed by extension of lumbar spine) was positive on the right side with pain referred to the right gluteal region. The referred gluteal pain was similar to the usual complaint of this patient (pain recognition). Provoking tests for sacroiliac (SI) joint dysfunction, including the direct compression of the SI joint and the direct stretch of the SI joint capsules (including ligaments), were negative. Neurological examination was unremarkable.

**Treatment**

Based on the above information, the diagnosis of “right piriformis syndrome and piriformis myofascial pain syndrome related to lumbar facet lesion” was suggested. In addition to the treatment on the right piriformis muscle similar to that he received previously, lumbar traction and lumbar mobilization therapy after a local hot pack with hydrocollator to the lower back was added into the physical therapy program. He attended this physical therapy program 3 times per week for 4 weeks and had remarkable improvement. The pain intensity was reduced to 2-3/10 level with occasional exacerbations up to 5-6/10 level. Due to incomplete symptom relief, this patient was finally treated with a local steroid injection into the right L5-S1 facet joint.

**Technique of lumbar facet joint injection**

A solution containing Kenacort-A (40 mg/ml) 1 ml plus 1% lidocaine 1 ml was used for injection. The patient was in a prone position with a pillow under his pelvis. After sterilization, the mid-point between the spinous process of L5 vertebra and the right posterior superior iliac spine was marked as the site for needle penetration (Figure. 1). A 5-cc syringe and a No.23 needle with a length of 2 1/4 inches were used for injection. The location of the right L5-S1 facet joint was just beneath this marked spot. The syringe was held gently with the thumb and middle finger of the dominant hand and the end portion of syringe was controlled by the index finger, similar to Hong’s technique for MTrP injection.[10,11] The needle was moved slowly and perpendicularly to penetrate through the skin and soft tissues under the marked spot until it encountered the bone. Then the needle was pulled out for a few mm and reinserted into another site about 1 mm in another direction. This procedure was repeated continuously in a sequence to map the depth of bony structures at and near the facet joint. When a narrow dip (facet joint or near facet joint) could be felt, the solution in the syringe was pushed into this space by the index finger. In our clinical experience, usually 1-2 ml of solution can be pushed out without any significant resistance if the facet joint is encountered. If the solution can not be pushed out from the syringe due to a strong resistance, this procedure was repeated until reaching a space where the solution could be smoothly pushed out. This technique requires delicate feeling on the accurate location of needle tips via the sensation of thumb and index finger that held the syringe.

**Outcome of treatment**

After the facet joint injection, the pain intensity of right gluteal region reduced to only 0-1/10, and no pain (0/10) in the right leg. A follow-up phone call about one year later revealed no evidence of any recurrence.

**DISCUSSION**

This case report has demonstrated the therapeutic effectiveness of lumbar facet joint injection to eliminate the underlying etiological lesion of chronic recurrent myofascial pain syndrome of piriformis.

**Diagnostic issues of piriformis syndrome VS piriformis myofascial pain syndrome**

The diagnosis of piriformis syndrome is usually based on the subjective complaints and the findings of clinical examination.[9] Some degree of confirmation is attributed to successful treatment targeted at the piriformis muscle. There are numerous tests to confirm piriformis syndrome. The basic principle of those tests is to provoke or aggravate symptoms either by a direct
irritation of the sciatica nerve or by a pressure to the sciatic nerve induced by the contracting or stretched piriformis muscle (exacerbation of impingement).

Regarding the sciatic nerve irritation tests, Straight leg raising (SLR) and Lasègue’s sign are the most frequently used techniques. A nerve is usually hypersensitive along the segment distal to the site of impingement (Tinel’s sign).

During the provoking tests to aggravate the sciatic nerve entrapment, a resistive force can be added to against the active contraction of the piriformis muscle,[12,13] or the piriformis muscle can be stretched by passive internal rotation of the leg with the hip in flexion and adduction.[2,14]

On the other hand, the diagnosis of piriformis myofascial pain syndrome is based on the existence of one or two MTrPs in the involved piriformis muscles.[1,2]

In our case, all the tests for piriformis syndrome were positive, and MTrP could also be identified in the piriformis muscle. Through a comprehensive literature review, Cummings has concluded that any sciatic nerve irritation caused by piriformis muscle can be diagnosed as piriformis syndrome.[4] This patient also had symptoms from both piriformis myofascial pain and piriformis syndrome with sciatic nerve irritation (tingling in the leg).

Therefore, the correspondence author strongly believes that this patient had both piriformis syndrome and piriformis myofascial pain syndrome. The compression of the sciatic nerve by the piriformis is identical in clinical presentation to low back pain with associated L5, S1 radiculopathy due to diskogenic and/or lower lumbar facet arthropathy with foraminal narrowing.[8,9] In this case report, we could exclude this possibility based on the physical examination (lack of radicular symptom during the facet provoking test, but only during the provoking tests involving the compression of sciatic nerve by the piriformis muscle), the radiological findings, and electrodiagnostic test.

The diagnosis of piriformis syndrome can be further confirmed by nerve conduction studies on the proximal segment of the sciatic nerve across the piriformis muscle. In our case, we failed to measure the sciatic nerve conduction across the piriformis muscle, although the chance of a positive finding could be very low when the sciatic nerve was only irritated without significant axonal lesion (negative EMG findings). When a nerve is entrapped with a demyelinative lesion only in a short segment, the slow nerve conduction may not be easily identified. H-reflex study may show an increased latency when the hip is in a FAIR position (hip flexion, abduction, and internal rotation).[14,15] Unfortunately, we did not perform this procedure during the electrodiagnostic test.

**Therapeutic issues of piriformis myofascial pain syndrome with piriformis syndrome**

Treatments for piriformis myofascial pain syndrome with or without piriformis syndrome which have been reported as successful vary from non-invasive physical modalities, through the minimally invasive needling and injection techniques, to invasive surgical procedures.[1,2,4,11] The frequently used physical therapy programs include stretch of piriformis muscle with or without the use of vapocoolant sprays,[2,16] stretch with post-isometric relaxation,[17] pressure release techniques including ischemic compression and deep pressure massage, and ultrasound.[16] Dry needling or acupuncture therapy has been used successfully in treating piriformis syndrome.[4] Local anesthetic, with or without steroid, is frequently used for injection into the piriformis muscle.[2,10,16] In our clinical experience, surgical intervention is usually unnecessary.
In many cases, physical therapy program can provide complete pain relief without any invasive approach.\[15,16,18,19\]

We had tried almost all the above techniques to treat this patient. However, only temporary relief of pain was obtained. It was obvious that there was an underlying pathological lesion that cause recurrent piriformis myofascial pain syndrome with piriformis syndrome. It is important to find out and treat the underlying etiological factor.\[11,20\]

**The correlation between piriformis syndrome and facet joint lesions**

Clinically, a patient with lumbar facet joint lesion can have pain in the gluteal muscles.\[21,22\] MTrPs in the gluteal muscles can be identified in such cases.\[2\] When the MTrPs in the piriformis muscle become active, the muscle tension would increase due to the taut band phenomenon.\[10,20\] The tight muscle may subsequently cause irritation to the sciatic nerve resulting tingling or numbness in the leg similar to piriformis syndrome. Therefore, when the facet joint is treated, the piriformis MTrPs can be inactivated, and the sciatic nerve irritation can be released. This is the most likely mechanism of facet joint injection in treating piriformis myofascial pain syndrome with piriformis syndrome.

**Diagnosis and treatment of facet lesions**

In clinical practice, facet joint lesions are very common. The facet joint lesions can be caused by various spinal pathological conditions including degenerative joint disease, degenerative disc disease, compression fracture, fracture-dislocation, meniscoid impingement, etc.\[21\] If the facet joint capsules are over stretched, the facet joint becomes unstable. If the facet joint is locked or even fused, it becomes hypomobile. In either condition, the nociceptors in the facet joint may become hyperirritable and elicit referred pain to the remote regions. In many cases, the facet joint instability (posterior segment lesion) can be caused by the collapsed (desiccated) intervertebral disc (anterior segment lesion) few years after the ligament injury (rupture of annulus fibrosus) due to disc herniation. In a few cases, the facet instability can be caused by a direct trauma. Any injury to the facet joint capsule can cause pain in facet joint syndrome.\[23\] Reviewing the x-ray findings in our case, we did not see any decrease of the intervertebral disc space (collapsed disc) but mild degenerative change. Therefore, the facet joint lesion in our patient might be caused by a direct injury with accumulation of chronic repetitive minor trauma, and could be job related.

When the facet joint is unstable due to ligament laxity, a rotary movement of the corresponding vertebral segments followed by hyperextension can induce extreme stretch to the injured ligament so that a pain in the facet joint itself and a referred pain to a certain corresponding region can be elicited. This is a “positive facet sign”.

The first choice of treatment for a lumbar facet lesion is the physical therapy program including the local thermotherapy of lumbar spine followed by a lumbar traction with hip flexed and legs elevated.\[24-26\] Manual therapy such as mobilization or manipulation may be effective.\[24,27\] We have tried hot pack to lumbar spine followed by lumbar traction and mobilization therapy on this patient with good, but not the best, result. This is probably due to chronicity of our case. If we could find out the facet joint problem and treat it appropriately in the early stage, we might be able to cure this patient completely without facet joint injection.

Lumbar facet joint injection is an option to treat a lumbar facet lesion if conservative treatment is unsuccessful. It is usually under the guidance of fluorescent direction.\[28,29\] We used this technique to avoid the radiation exposure. It was fast, less expensive and successful. In a previous unpublished pilot study on the lumbar facet injection with our technique, we had confirmed the accurate position of the needle tip in the facet joint region by a subsequent fluoroscopic study in 3 cases. However, if an ultrasonography is available, the ultrasound guidance may be a better way to perform this procedure.\[30\]

**CONCLUSION**

Chronic recurrent piriformis myofascial pain syndrome with evidence of piriformis syndrome (sciatic nerve irritation) may be caused by a lumbar facet joint lesion. It is necessary to treat the underlying etiological lesion appropriately (such as lumbar facet joint injection) in order to avoid the recurrence of myofascial pain.
REFERENCES


本報告提出一位因腰椎小面關節損傷引起梨狀肌肌筋膜疼痛症候群之慢性疼痛病例，並以腰椎小面關節類固醇注射方式使其達到完全緩解及止痛。患者為 46 歲男性，主訴多年右側臀部疼痛及右腿麻痛。在一般診所接受口服止痛藥、一般物理治療及局部注射治療，但都只達到暫時性的緩解及減輕疼痛。經我們檢查後發現患者的腰椎小面關節受損為造成其不適感的主因，便改以腰椎小面關節之物理治療處理。經治療後疼痛獲得明顯改善但亦不能完全緩解。後來，以 L5-S1 之小面關節局部注射，患者的疼痛即刻獲得完全的緩解，並持續超過一年以上。因此，對於某些梨狀肌肌筋膜疼痛症候群之慢性疼痛病例而言，腰椎小面關節損傷可能是壓迫坐骨神經或是造成梨狀肌肌筋膜激痛點的主因之一。針對腰椎小面關節的治療可以改善疼痛的症狀並使患者的症狀獲得長期完全的緩解。（台灣復健醫誌 2009; 37(2): 115 - 122）

關鍵詞：注射(injection)，小面關節(facet joint)，梨狀肌肌筋膜疼痛症候群(piriformis myofascial pain syndrome)，坐骨神經痛(sciatica)