Refer to: Pace JB, Nagle D: Piriform syndrome. West J Med 124: 435-439, Jun 1976

THE WESTERN
Journal of Medicine

Piriform Syndrome

J. BLAIR PACE, MD, *and* DENNIS NAGLE, MD, *Irvine*

Among a variety of deep muscle trigger points, the piriform muscle trigger point is selected for individual scrutiny. This seems fully justified by the great potential for confusing this entity with discogenic disease and consequently having unnecessary surgical procedures carried out.

The diagnosis can be made from findings on simple physical diagnostic tests and an appropriate history. Low back and hip pain with pain radiating down the back of the leg should suggest piriform syndrome as part of the differential diagnosis. This is especially true if a female patient has complaint of dyspareunia.

Pain and weakness on resisted abduction-external rotation of the thigh is a sign of piriform syndrome. This is confirmed by tenderness and reproduction of the patient's complaints by digital pressure over the belly of the piriform muscle, completing the diagnostic criteria.

Local injection of the muscle belly is curative. There are no laboratory or x-ray findings leading to a diagnosis.

IN DAILY PRACTICE, pain syndromes—including muscle trigger points[1]—due to focal hyperirritability of tissues are a common occurrence. To a patient they are real, disabling, distressing and, in fact, may dominate a person's very existence.[2] Diagnosis depends on a searching history and an examination by a physician who is experienced in identifying the telltale tender trigger points. Relief of pain by simple local injection is diagnostic proof.

A sound experimental basis for this phenomenon of focal hyperirritability of deep muscle tissue was developed years ago by Kellgren and Lewis[3] and reaffirmed by, among others, Inman and Saunders[4] of the University of California, San Francisco.

More recently, in the German literature a pathological lesion has been consistently identified in the muscle consisting of edema plus platelet aggregation.[5,6]

A particular deep muscle trigger point is singled out for report here because of the relative seriousness of the disability produced and because of the implications of misdiagnosis. This condition might best be called piriform syndrome. The term "piriformitis" as used in the German literature is rejected.[7] There is no sound evidence that the muscle trigger point syndromes are inflammatory.

From the Department of Family Medicine, University of California, Irvine, California College of Medicine; and the Problem Back Service, Rancho Los Amigos Hospital, Downey.

Submitted August 13, 1975.

Reprint requests to: J. Blair Pace, MD, Coordinator, Residency Programs, Department of Family Medicine, University of California, Irvine, California College of Medicine, 101 City Drive South, Orange, CA 92668.

Definition

Piriform syndrome is a clinical syndrome characterized by pain and disability. A description of the pain's location by a patient is often imprecise, the pain variously being considered a pain in the hip, tailbone, buttock or groin, and often down the back of the leg as sciatica. In females dyspareunia is often present and in both sexes there may be a limp, with dragging of the lower leg on the affected side.

Yoemans first described the syndrome in 1924,[8] and his description was expanded by Freiberg. Freiberg noted a test using forced internal rotation of the hip to show the presence of pain in the piriform muscle.[9,10] Proctologists discovered and frequently encountered pain and tenderness in the piriform muscle as part of the spectrum of causes of coccydynia.[11] Thiele found that pain radiated down the posterior thigh in the piriform syndrome. His concept of the pathophysiology was that muscle spasm and hypertrophy irritated the sciatic nerve. Thiele refers to 37 cases of piriform muscle pain. Shordania also reported on 37 cases all in women and termed the condition "piriformitis."

Incidence

The present report covers 45 cases gleaned from the practice of the senior author, primarily patients referred to the Problem Back Service at Rancho Los Amigos Hospital. The list is incomplete inasmuch as there was no standard coding for piriform muscle on our diagnostic index. The 45 cases are from some 750 patients admitted and processed through the Back Service. The ratio of females to males is 6 to 1. While the overall incidence may seem low, it is higher than confirmed incidence of disc protrusion with nerve root deficit in this group of referred patients.

Causes

There is no discernible common causative factor in piriform muscle syndrome. Trauma, or history of trauma is elicited in approximately half the cases. The nature of trauma is seldom dramatic. For example, it might be recounted by a patient as "My foot slipped as I ran around the swimming pool, but I caught myself and didn't fall." One man was spreading his knees to maximum while lowering one end of a large container between his knees and onto the floor. One lady suffered piriform syndrome as an occupational hazard. She worked long hours each day as a masseuse at a spa, always throwing the weight of her body to her right and over the client while checking with the hip abductors. One young woman developed a piriform syndrome after a fall while mountain climbing.

Early writers on this subject were impressed with the origin of the piriform muscle from the anterior capsule of the sacroiliac joint and felt that the syndrome was a result of sacroiliac arthritis.

We have seen severe tenderness of the piriform muscle in arthritis of the hip joint and a case of piriform syndrome subsequent to total hip replacement responded to simple local injection.

In spinal stenosis there may be bilateral piriform muscle tenderness not relieved by local injection.

Anatomy and Physiology

The piriform muscle arises from inside the pelvis, over the sacrum and anterior capsule of the sacroiliac joint. It runs laterally through the sciatic notch to become tendinous and insert on the greater trochanter of the femur. The belly of the muscle crosses over the sciatic nerve. In 15 percent of cases it has two bellies and the sciatic nerve runs between the two, or the nerve may have two trunks interdigitating with the two muscle bellies.

On physical examination, through rectum or

Figure 1.—The patient is told to push the hands apart with the knees. Weakness, faltering and a reproduction of pain on the left are present.

vagina, the piriform muscle belly lies above, that is, proximal to, the ischial spine and superior to the spino coccygeus ligament.

Along with the gemelli, the piriform is an external rotator, abductor of the thigh. In cases of piriform syndrome, the senior author has for several years described to students and residents a useful sign: weakness and pain on resisted abduction, external rotation of the thighs.[12]

Diagnosis

The diagnosis of piriform syndrome must be entirely clinical. The history may give clues, especially if one inquires about dyspareunia in female patients. Sometimes the nature of the trauma is highly suggestive, especially a history of almost falling but regaining balance.

It must be emphasized repeatedly that there are no x-ray or laboratory findings in this syndrome. Incidental x-ray reports showing "narrowing of the disc space" or "degenerative changes with spur formation" must not be taken as diagnostic of another condition.

Degenerative changes occur in the spine with aging and do not correlate well with symptoms.

On physical examination, one may find excellent range of motion of the lumbar spine despite the severity of symptoms. Patients may bend forward and touch the toes with knees extended. On the other hand, there may be restricted straight leg raising. There will almost invariably be sciatic notch tenderness on the involved side.

Physicians should examine searchingly. If a patient's pain is accepted and cooperation is obtained by the reassurance that the intent is quite literally to put the finger on the source of the pain, the patient will usually offer full cooperation. The usual routine back examination is carried out, including determination of the range of motion of back and of hips. Pain on internal rotation of the hips on the affected side is a positive Freiberg sign.[10]

A more consistent finding in piriform syndrome is that of pain and weakness on resisted abduction-external rotation of the thigh. This has not been previously reported in the literature. It simply tests for loss of function of the piriform muscle. With the patient seated, the examiner places his hands on the lateral aspects of the knees and asks the patient to push the hands apart. Faltering, pain and weakness will be observed on the affected side (Figure 1).

Rectal or pelvic examination, or both, should be *included in all* evaluations of low back complaints. In a patient with piriform syndrome, there will be distinct tenderness on the lateral pelvic wall which reproduces the original complaint. This tender trigger point is high—proximal to the ischial spine. The piriform muscle may seem tense or enlarged, or both. The patient manifests pain and often exclaims that for the first time someone has found "my pain."

Differential Diagnosis

Piriform syndrome is one of a number of conditions that may produce low back or pelvic pain with sciatica.[13,14] As such, it is most likely to be confused with herniated intervertebral disc. The two should be distinguished by lack of neurologic deficit in piriform syndrome. A diagnosis of discogenic disease should include neurologic deficit or evidence of nerve root tethering.

Facet syndrome with low back pain and sciatica may be difficult to diagnose unless one is willing to use differential therapeutic trials, injecting alternately the lumbar and lumbosacral facet joints.

When pelvic wall tenderness is bilateral, one may suspect spinal stenosis. This is especially true in patients in whom multiple surgical operations on the back have been carried out. We have, however, seen three cases in which there were

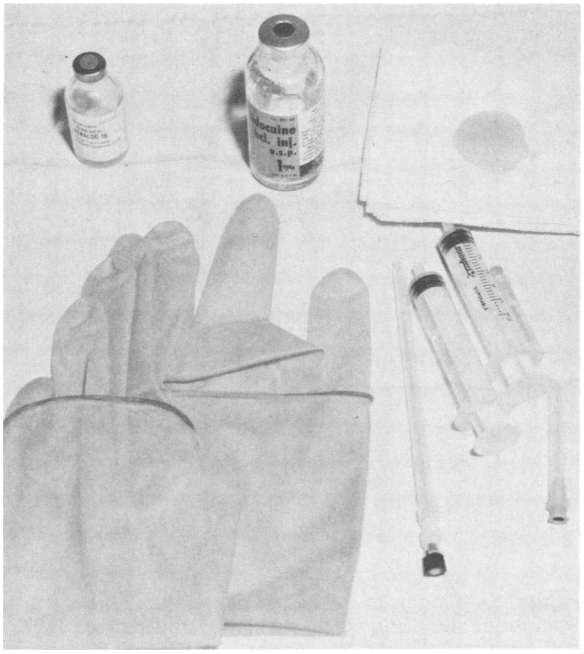

Figure 2.—Tray set up for injection into piriform muscle. **Upper left,** Kenalog 10 mg/cc, Xylocaine 1 percent, lubricant. **Lower,** sterile gloves, #22 spinal needle and two 6 cc syringes.

symptoms and findings that responded to piriform injection.

In patients in whom coccydynia and pain down the posterior thigh are present there may be muscle trigger points in other muscles—such as the gemelli, the quadratus femoris or obturatorius internus. Ischiogluteal bursitis, or weaver's bottom, is a similar pain. This condition is more likely to occur in victims of gout.

The differential diagnosis is made largely by precise palpation, physical examination and test of function. Pain and weakness on resisted external rotation is characteristic of piriform syndrome. On pelvic examination, the one muscle trigger point to be found proximal to the ischial spine is the piriform. The tendon of the piriform muscle is usually tender as it exits the sciatic notch.

Therapy

As in other deep muscle trigger point problems, the essential therapy is the injection of local anesthetic into the precise focal point of hyperirritability deep in the belly of the muscle.[12] Temporary local anesthesia reverses the hyperirritable state in the muscle.

One may, and usually does, add a small dose of corticoid to the second half of the local injection (see Figure 2). This does not imply that inflammation is responsible for muscle trigger point pain. Empirically, results are slightly more lasting and permanent with the addition of corticoid (10 mg of sterile triamcinolone acetonide suspension [Kenalog®] is usual for the author).

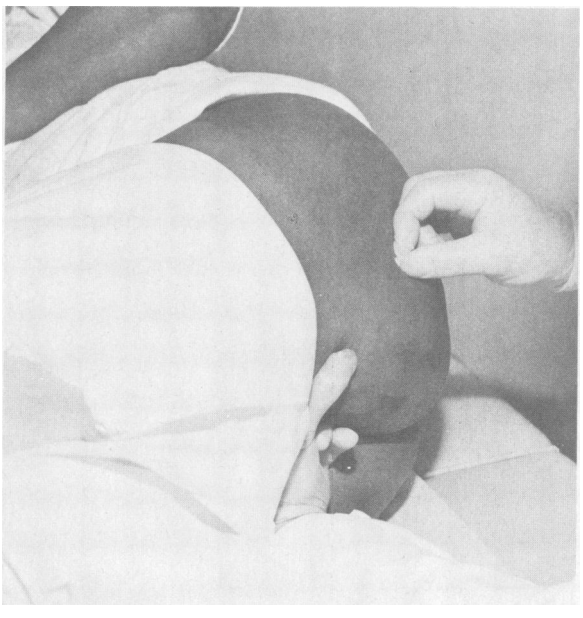

Figure 3.—Finger of left hand is on the tender spot. Spinal needle is aimed at the finger and can be felt to disturb tissues over the finger. Six ml of 1 percent Xylocaine is injected. Patient has relief. After waiting five minutes to detect possible injection into the sciatic nerve, a second injection is made. Second syringe contains 4 ml Xylocaine and 2 ml (20 mg) Kenalog.

TABLE 1.—*Summary of Previous Therapy and Incidence of Recurrence after Injection into Piriform Muscle*

	Patients	
	Female, 39	*Male, 6*
Bilateral piriform injections	3	..
Previous laminectomy	15	3
Laminectomy plus fusion	3	1
Facet block and/or caudal	13	2
Repeat piriform injection	4	..

A gynecologist may feel more comfortable making the local injection into the piriform by the vaginal route. An anesthesiologist may prefer going alongside the vagina to reach the piriform with a 3 inch spinal needle. The author has primarily trained orthopedic and family practice residents. Orthopedic residents seem to accept an approach through the sciatic notch just inferior to the bony margin. It is essential that the physician have one finger, or two, in the vagina or rectum and be palpating the precise tender spot in the muscle belly. The spinal needle is then aimed at the examining finger which can detect the needle disturbing the tissues under the examining finger.

The patient is awake and would let it be known if the needle touches the sciatic nerve. The needle should be proximal to the nerve. The first injection is clear 1 percent lidocaine (Xylocaine®). *No solids* are injected until a five minute period of observation notes pain relief on the part of the patient without numbness of the leg. The second syringe contains a mixture of 1 percent Xylocaine with corticoid (see Figure 3).

One correspondent reports treating the piriform muscle trigger point successfully by a special transvaginal ultrasonic applicator.

Results

We have reviewed the records of treatment of 39 female patients and six male patients. As in all our chronic pain patients, we find these patients' total complaints and disability to be multifactorial. Psychic stress, physical trauma, defensive need for pain, conversion hysteria, depression, facet syndrome and postoperative scar-

ring have all been observed in patients with piriform syndrome. In several, multiple surgical operations had been done before admission.

The usual routine allows for muscle trigger point injection as part of the examination and workup by the medical chief. More complex procedures may be scheduled to follow. The benefit and relief from piriform injection is immediate and dramatic. The patient literally discards the crutches and walks away without limp.

Several patients had had facet block done before piriform block (see Table 1). The facet block may relieve the back pain, but only piriform block relieves the limp and buttock, posterior thigh pain.

Of 39 female patients, bilateral injections were done in three. In one male patient treated with injection there was relief of pain after a full six weeks of inpatient treatment at our facility without relief. In this latter case, all our usual measures had failed. The patient had very strong psychological predictors for failure; however, improvement after piriform block was sustained.

Recurrences are uncommon. A patient, mentioned previously, who worked as a masseuse had a recurrence, related to her occupation, and chose to retire. One patient from the author's private practice had two recurrences in 20 years. A woman, 40 years old, had a mild relapse after three weeks and was reinjected with relief that has now lasted for one year.

Duration of symptoms before diagnosis and injection is often quite long, indicating a lack of knowledge among physicians generally. We have seen patients in whom symptoms have been present for from six months to four years. One young woman was diagnosed and successfully treated two months after she slipped while mountain climbing.

Complications

We have noted no complications with this method of treatment. The question most frequently asked is "aren't you afraid of hitting the sciatic nerve?" The patient is awake and will tell you if you touch the nerve. It would be possible to produce a footdrop if one injected solid material, such as suspended corticoid, into the nerve. To prevent this, we use a double syringe technique.

In summary, it is well to emphasize that local injection of muscle trigger points is both diagnostic and therapeutic. There are no laboratory or x-ray findings that are useful in making a diagnosis. One must rely entirely on clinical acumen.

The condition discussed, piriform syndrome, is one of a number of conditions that may give rise to "sciatica." This list includes facet syndrome discogenic disease, ischiogluteal bursitis and perhaps others. Disability from piriform syndrome is very lasting and severe even though true neurologic deficit should never be found. One should be alert to the condition and include function testing and pelvic examination in all low back and hip or thigh pain complaints.

REFERENCES

1. Bonica JJ: Management of intractable pain. Am Fam Physician-GP 33:107-123, 1966

2. Pace JB: The psychophysiology of pain: Diagnostic and therapeutic implications. J Fam Practice 1:9-13, May 1975

3. Kellgren JH, Lewis T: Observations relating to referred pain (trigger point production by injection of hypertonic saline). Clin Sci 4:47, 1939

4. Inman VT, Saunders JB deCM: Referred pain from skeletal structures. J Nerv Ment Dis 99:660-667, May 1944

5. Brenstrup P, Jespersen K, et al: Morphological and chemical connective tissue changes in fibrositic muscles. Ann Rheum Dis 16:438, 1957

6. Awad EA: Interstitial myofibrositis: Hypothesis of the mechanism. Arch Phys Med Rehabil 59:449-453, Oct 1973

7. Shordania JF: Die chronische entzundung des musculus piriformis die piriformitis—Als eine der ursachen von kreuzschmerzen bei frauen. Die Medizinische Welt, 28:999-1001, Jul 1936

8. Yoemans W: The relation of arthritis of the sacro-iliac joint to sciatica. Lancet 2:1119-1122, 1928

9. Freiburg AH, Vinke TA: Sciatica and the sacro-iliac joint. J Bone Joint Surg 16:126, Jan 1934

10. Freiburg AH: Sciatica pain and its relief by operation on muscle and fascia. Arch Surg 34:337, Feb 1937

11. Thiele GH: Tonic spasm of the levator ani, coccygeus and piriformis muscles. Trans Am Pract Soc 37:145-155, 1936

12. Pace JB: Commonly overlooked pain syndromes. Postgrad Med 58:107-113, Oct 1975

13. Robinson DR: Piriformis syndrome in relation to sciatic pain. Am J Surg V LXXIII, 355-358, Mar 1947

14. Scully FJ: Conditions simulating sciatica. J Arkansas Med Soc 26:179-181, Feb 1930

15. Mooney V, Robinson J: Facet syndrome. (In preparation)