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Piriformis muscle syndrome in 19 patients treated by tenotomy – A 1- to 16-year follow-up study

Accepted: 17 October 2001 / Published online: 26 January 2002
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Abstract We treated 19 patients with piriformis muscle syndrome. All patients complained of pain in the buttocks and the posterior thigh. Clinically the buttock was tender and passive stretching increased the pain. In ten patients skin sensation was reduced and three had a limp. All patients were treated with tenotomy. At follow-up after an average of 8 (1–16) years, eight patients had pain relief. Two-thirds of the patients evaluated their clinical state as being better.

Résumé Nous avons traité 19 malades avec un syndrome du muscle pyramidal par ténotomie. Tous les malades se plaignaient de douleurs de fesse et la face postérieure de cuisse. Cliniquement la fesse était souple et l'étirement passif augmentait la douleur. Dix malades souffraient d'une hypoesthésie cutanée et trois boitaient. Après un délai moyen de 8 (1–16) années, huit malades étaient indolores. Deux tiers des malades ont évalué leur état clinique comme amélioré par l'intervention.

Introduction

The sciatic nerve, the gluteal vessels, and the piriformis muscle leave the pelvis through the greater sciatic foramen. Apparently, the close contact between the muscle and the sciatic nerve can cause sciatic pain, a piriformis syndrome. Some consider this an entrapment syndrome of the sciatic nerve, whereas others define it as a tendinitis of the piriformis tendon/muscle.

The syndrome has been treated by nonsteroidal anti-inflammatory drugs (NSAIDs), analgesics and muscle relaxants, physical therapy as postisometric stretching exercises [19], transrectal massage [26], ultrasound [6], injection of the muscle trigger point with local anaesthetics and corticosteroids [15, 18, 22, 27], epidural-caudal

steroid injection [14], rectal diathermy [23], and surgical division of the muscle [3, 4, 13, 20, 24].

Freiberg reported on tenotomy in 12 cases with three failures in 1941 [3], and Mizuguchi [13] reported 85% satisfactory results after division of the piriformis muscle in 14 patients. Several case reports describe successful surgical treatment in a few patients [20, 24], but long-term follow-up studies are lacking.

Patients and methods

Nineteen patients were operated on with tenotomy of the piriformis muscle from 1981 to 1997. In the same period more than 1,500 patients were operated on for sciatica due to lumbar disc herniation.

There were 14 women and five men, and the mean age at operation was 43 (24–64) years. Eleven patients had heavy and five sedentary work, whereas three were unemployed. Prior to their present condition nine patients suffered low back pain and two had fractured a leg. Nine patients had experienced trauma to the gluteal region on the ipsilateral side.

All patients complained of deep buttock pain and posterior thigh pain. Fifteen patients complained also of reduced sensation or reduced muscle strength of the leg. The average preoperative disability was six (1–30) years. Fourteen patients were unfit for work. Earlier treatment included physiotherapy, treatment by chiropractor, acupuncture, cortisone injections, and medication with NSAIDs and analgesics.

On clinical examination all patients had tenderness of the buttock increased by passive stretching and active contraction of the piriformis muscle (passive internal rotation and active external rotation of the hip). Reduced skin sensation was noticed in ten patients and reduced muscle strength in three. Five patients had a positive Lasègue's sign. In all patients computed tomography (CT) or radiculography excluded lumbar disc herniation, posterior facet syndromes, and central spinal stenosis.

All patients had a tenotomy of the piriformis muscle at the attachment on the greater trochanter (Fig. 1), and all but one had a routine evaluation 6–8 weeks postoperatively. Eight different surgeons operated on the patients.

After an average follow-up of 8 (1–16) years, 17 patients had a clinical examination and two were interviewed by telephone. Treatment results were evaluated by the patients using the scale better, as before, or worse. The physician evaluation was based on the examination and whether the patient was relieved from pain, experienced some pain but was satisfied with the result, or was unrelieved from pain. The treatment was then categorised to the following scale: good, fair, and poor.

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Table 1 Results after piriformis tenotomy. *Ano* Anomalies, *Adh* adhesions

Patient (no)	Age (yr)	Gender	Duration of symptoms (yr)	Trauma	Ano, Adh	Evaluation post-op. (pain)	Evaluation at follow-up (pain)	Follow-up (yrs)	Work	Patients' evaluation	Physicians' evaluation
1	64	M	1	Yes	No	No	Yes	16	Disabled preop.	Better	Fair
2	31	F	4	Yes	Adh	No	No	15	Changed occupation	Better	Good
3	24	F	2.5	Yes	No	Yes	Yes	15	Changed occupation	Better	Fair
4	42	F	10	No	Ano	No	No	13	Changed occupation	Better	Good
5	61	M	2.5	No	No	Yes	Yes	12	Disabled myelomatosis	As before	Poor
6	41	F	5	Yes	Adh	No	No	12	Changed occupation	Better	Good
7	45	F	3	No	No	No	Yes	10	Unemployed	Worse	Poor
8	50	F	30	No	Ano	Yes	Yes	4	Disabled preop.	As before	Poor
9	44	F	4	Yes	No	No	No	1	Problems other side	Better	Good
10	35	F	1	No	Ano	No	No	11	Back to work	Better	Good
11	28	M	4	No	No	No	No	5	Back to work	Better	Good
12	29	F	7	Yes	No	No	Yes	3	Unemployed	As before	Poor
13	32	F	16	No	No	Yes	Yes	1	Back to work	Better	Fair
14	59	F	1	Yes	No	Yes	Yes	3	Back to work	As before	Poor
15 ^a	33	F	1	No	Adh	Yes	Yes	3	Back to work	Better	Fair
16	35	M	5	No	Ano	Yes	No	9	Unemployed	Better	Good
17	47	F	2	No	No	Yes	Yes	10	Back to work	As before	Poor
18	60	F	4	Yes	No	No	No	6	Disabled preop.	Better	Good
19	57	F	9	Yes	No	Missing	Yes	6	Changed occupation	Better	Fair

^a Operated twice

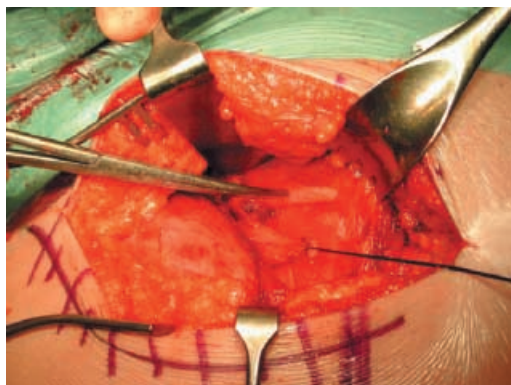


Fig. 1 Surgical division of the tendon of the piriformis muscle at the insertion on the greater trochanter. Suture in the proximal end of the piriformis tendon. Forceps pointing at the sciatic nerve

Results

Results are summarised in Table 1. In four cases anatomical anomalies as to the relation between the muscle and the nerve were noticed; adhesions were observed in three. No complications were noted.

At follow-up, eight patients were relieved from pain; 11 were not. The patients' evaluations were 13 better, five as before, and one worse. According to the physician's evaluation, eight patients had good, five fair, and six poor results. One patient with poor results proved to

have myelomatosis and should not have been operated on. Two patients were relieved from pain initially, but pain later relapsed. One of these patients was operated twice, and she was relieved from pain after the last operation for about 1 year, then experienced a new relapse. Further on, two patients had pain at the first postoperative evaluation but no pain at the follow up. When the initial pain was initiated by trauma, seven out of nine patients were relieved. Three of the four patients with anomalies in the relation between the piriformis muscle and the sciatic nerve, and two of three patients with adhesions, were relieved from pain.

Discussion

Our results show that tenotomy of the piriformis muscle may relieve patients from atypical sciatica, suggesting an entrapment syndrome – a piriformis syndrome [10, 20]. More than two-thirds of the patients had favourable results. However, the syndrome is not a well-defined diagnosis, and it is unlikely that the average preoperative disability (1–30 years) gives a homogeneous study group.

The piriformis muscle is one of the few muscles that connect the lower limb to the axial skeleton. It arises mainly from the surfaces of the second, third, and fourth lumbar vertebral body, passes through the greater sciatic foramen, and inserts – under cover of the gluteus medius

muscle – in the upper border and medial side of the greater trochanter. Functionally, the piriformis muscle is primarily an external rotator of the hip joint when the thigh is extended and an abductor when the thigh is flexed. Functional loss after tenotomy appears to be minimal, since the muscle is one of four short external rotators of the hip [13, 20]. This implies that there is no clinical method for testing the piriformis muscle isolated from the other external rotators.

Usually the sciatic nerve passes in front of the piriformis muscle, but cadaver studies have demonstrated from 10 to 21% anatomic variations in the relationship between the sciatic nerve and the piriformis muscle [3, 17]. The sciatic nerve, or parts of it (usually the peroneal portion), may pass through or behind the muscle. Our results are in accordance with Pecina [17], as we found 21% anomalies peroperatively.

Although a trauma was reported in about half of our patients we did not observe any injury to the piriformis muscle with subsequent compression and entrapment of the sciatic nerve [15, 19, 20]. Nor have we seen an inflamed piriformis muscle or sciatic nerve suggesting sciatic neuritis induced by biochemical agents released from the muscle [18, 25].

Many patients had neurological deficits. This observation does not support the contention of referred pain from the piriformis muscle itself [22], while it may indicate an entrapment syndrome [9, 10].

Pressure on a peripheral nerve may lead to impairment of the intraneural vascular permeability, blood flow, and axonal transport [11, 21]. Further, moderate pressure on the sufficiently excitable nerves is supposed to give nerve fibre interaction [5]. Peroperatively, however, we did not observe any evidence of compression of the sciatic nerve nor, macroscopically, pathology of the piriformis muscle, so the cause of the pain syndrome in our patients remains uncertain.

The diagnosis of piriformis syndrome is made primarily on the basis of history and clinical examination. A patient with a herniated lumbar disc may, however, present with similar pain without back pain. In such cases CT or an MRI can be helpful.

Case reports have been published on enlarged piriformis muscle by CT and MRI [7], abnormal Tc-99 m uptake in the soft tissue in the pelvis by scintigraphy [8, 12], and delay of the H-reflex in electrophysiological examination [2]. These diagnostic tools are not used routinely but primarily to exclude other syndromes where pain is a dominant feature.

The piriformis syndrome is a diagnosis of exclusion and, in most cases, conservative treatment is sufficient [1, 16]. If there is no response to conservative treatment, more aggressive therapy includes local injections of anaesthetics and corticosteroid preparations. If these measures fail, some selected patients may have good and lasting effect of tenotomy of the piriformis muscle.

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