Original Article With Video Illustration

The Endoscopic Treatment of Sciatic Nerve Entrapment/ Deep Gluteal Syndrome

Hal D. Martin, D.O., Shea A. Shears, B.S.N., R.N., J. Calvin Johnson, M.D., Aaron M. Smathers, M.S., and Ian J. Palmer, Ph.D.

Purpose: The purpose of this study was to investigate the historical, clinical, and radiographic presentation of deep gluteal syndrome (DGS) patients, describe the endoscopic anatomy associated with DGS, and assess the effectiveness of endoscopic surgical decompression for DGS. **Methods:** Sciatic nerve entrapment was diagnosed in 35 patients (28 women and 7 men). Portals for inspection of the posterior peritrochanteric space (subgluteal space) of the hip were used as well as an auxiliary posterolateral portal. Patients were treated with sciatic nerve decompression by resection of fibrovascular scar bands, piriformis tendon release, obturator internus, or quadratus femoris or by hamstring tendon scarring. Postoperative outcomes were evaluated with the modified Harris Hip Score (MHHS), verbal analog scale (VAS) pain score, and a questionnaire related specifically to sciatic hip pain. **Results:** The mean patient age was 47 years (range, 20 to 66 years). The mean duration of symptoms was 3.7 years (range, 1 to 23 years). The mean preoperative VAS score was 6.9 ± 2.0, and the mean preoperative MHHS was 54.4 ± 13.1 (range, 25.3 to 79.2). Of the patients, 21 reported preoperative use of narcotics for pain; 2 continued to take narcotics postoperatively (unrelated to initial complaint). The mean time of follow-up was 12 months (range, 6 to 24 months). The mean postoperative MHHS increased to 78.0 and VAS score decreased to 2.4. Eighty-three percent of patients had no postoperative sciatic sit pain (inability to sit for >30 minutes). **Conclusions:** Endoscopic decompression of the sciatic nerve appears useful in improving function and diminishing hip pain in sciatic nerve entrapment/DGS. **Level of Evidence:** Level IV, therapeutic case series.

Originating from the ventral rami of L4 to S3, the sciatic nerve roots form a single trunk within the pelvis and exit through the sciatic notch inferior to the piriformis muscle. Covered by the gluteus maximus within the deep gluteal region, the sciatic nerve passes between the ischial tuberosity and the greater trochanter lying close to the posterior capsule of the hip joint.[1] The sciatic nerve innervates the hamstring group of muscles.[2] Proximal to the piriformis are the superior gluteal and inferior gluteal nerves. Distal to the piriformis are the nerve to the quadratus femoris/gemellus inferior and the nerve to the obturator internus/gemellus superior.[1] In a cadaveric study by Miller et al.,[3] the sciatic nerve was located at a mean of 1.2 ± 0.2 cm from the most lateral aspect of the ischial tuberosity, and the proximal origin of the hamstrings was found to have an intimate relation with the inferior gluteal nerve and artery and sciatic nerve. With hip flexion, the sciatic nerve experiences a proximal

From Oklahoma Sports Science & Orthopaedics, Oklahoma City, Oklahoma, U.S.A.

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Address correspondence and reprint requests to Hal D. Martin, D.O., Oklahoma Sports Science & Orthopaedics, 6205 N Santa Fe, Ste 200, Oklahoma City, OK 73118, U.S.A. E-mail: haldavidmartin@yahoo.com

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excursion of 28.0 mm.[4] Under normal conditions, the sciatic nerve is able to stretch and glide to accommodate moderate strain or compression associated with joint movement.

Patients presenting with sciatic nerve entrapment often have a history of trauma and symptoms of sit pain (inability to sit for >30 minutes), radicular pain of the lower back or hip, and parasthesias of the affected leg.[5] The sciatic nerve can be trapped above (central) or below (peripheral) the gluteal region; therefore, the spine must be excluded as the source of entrapment. Physical examination tests that have been advocated for the clinical diagnosis of sciatic nerve entrapment include passive stretching and active contraction tests. The Lasègue sign is pain with straight–leg raise testing (to 90° hip flexion).[6,7] The Pace sign is pain and weakness with resisted abduction and external rotation of the hip.[8] The Freiberg sign is pain with internal rotation of the extended hip.[6,7] A variant of the Freiberg test involves flexion, adduction, and internal rotation of the hip.[5,9]

Etiologies of sciatic nerve entrapment are fibrous bands containing blood vessels[10,11] and gluteal,[2] piriformis,[5,11] or hamstring muscles.[12] Given the variation of anatomic entrapment, it has been suggested that the term "deep gluteal syndrome" (DGS) be used because entrapment of the sciatic nerve may occur from any of the gluteal region anatomy[2] or the non-discogenic sciatica.[13] Open techniques to correct these entrapment problems have been used.[5,11] Arthroscopic treatment has been described for treating piriformis syndrome[14]; however, other anatomy can affect the sciatic nerve and cause entrapment. The peritrochanteric space lies adjacent to the sciatic nerve in the deep gluteal region, and the established arthroscopic portals[15] allow for the assessment of the sciatic nerve.

The purpose of this study was to (1) investigate the historical, clinical, and radiographic presentation of DGS patients; (2) describe the endoscopic anatomy associated with DGS; and (3) assess the effectiveness of endoscopic surgical decompression for DGS. The hypothesis was that endoscopic surgical decompression is an effective treatment for DGS.

METHODS

In a consecutive series of 650 patients evaluated and treated for intra-articular pathology between March 2006 and June 2009, descriptive data were retrospectively collected on a cohort of 35 patients with unexplained posterior hip pain. Inclusion criteria were patients with a diagnosis of DGS, confirmed with endoscopic evaluation. Exclusion criteria were patients with isolated femoroacetabular impingement or intra-articular pathology. Patients included 28 women (mean age, 48 ± 11 years; range, 20 to 66 years) and 7 men (mean age, 43 ± 11 years; range, 28 to 61 years). The mean height was 163.9 ± 9.1 cm (range, 137 to 180 cm); mean weight, 78.5 ± 19.0 kg (range, 42.3 to 120 kg); and mean body mass index, 29.2 ± 7.3 kg/m^2 (range, 20.8 to 47.8 kg/m^2). Each patient presented with unilateral symptomatic hip pain (21 right hips and 14 left hips). All cases underwent a history, physical and radiographic examination, magnetic resonance arthrography (MRA), and injection tests. A comprehensive back and hip physical examination ruled out the lumbar spine, sacroiliac joint, or femoroacetabular impingement as the source of the posterior hip pain. In addition, in many cases the spine was excluded as the principal source of pain by neurology consultation and magnetic resonance imaging (MRI).

A detailed clinical history was obtained for each patient including a description of the present condition, date of onset, mechanism of injury (traumatic or nontraumatic), factors that increase or decrease pain, prior consultations, prior surgical interventions, verbal analog pain level, and narcotic use. A standard measure of hip function was obtained by the modified Harris Hip Score (MHHS).[16] Related symptoms were recorded including sit pain, night pain, back pain, and parasthesias or radicular pain. Each consecutive patient was evaluated by a single examiner using a standardized physical examination protocol.[17-19] Patients presenting with posterior hip pain underwent additional testing when the pain could not be explained. Additional tests included the Lasègue test, Pace test, and Seated Piriformis Stretch Test. The Seated Piriformis Stretch Test is a flexion/adduction with internal rotation test performed with the patient in the seated position (Fig 1).[20] The examiner extends the knee and passively moves the flexed hip into adduction with internal rotation while palpating 1 cm lateral to the ischium (middle finger) and proximally at the sciatic notch (index finger). A positive test is the re-creation of the posterior pain. All patients were evaluated by MRA,[21,22] injection tests, standing anteroposterior pelvis radiographs,[23] and lateral radiographs.[24] Measurements included neck shaft angle, center-edge angle, joint space, femoral version, and acetabular version. The clinical diagnosis of DGS considered the history, presentation, and re-creation of posterior hip pain inconsistent with intra-articular or impingement pathology.