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Ochoa-Villar Ozmar
Hospital Ángeles Centro Sur, Querétaro, Mexico

Seidel Daniela
American British Cowdray Medical Center, Mexico City, Mexico

Parodi Dante
Clínica RedSalud Providencia, Santiago, Chile

Corresponding Author:
Ochoa-Villar Ozmar
Hospital Ángeles Centro Sur, Querétaro, Mexico

Hamstring avulsion as a rare cause of deep gluteal pain syndrome: A case report and literature review

Ochoa-Villar Ozmar, Seidel Daniela and Parodi Dante

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Abstract

Deep gluteal syndrome (DGS) is characterized by gluteal pain with sciatic irradiation that does not originate from the lumbar spine. While often attributed to sciatic nerve compression by deep musculotendinous structures, particularly fibrovascular adhesions, proximal hamstring avulsion is an unusual and rarely reported etiology of this condition. We present the case of a patient with DGS secondary to traumatic hamstring avulsion, supported by a literature review. Using electronic databases (PubMed, Scopus, and Embase), we reviewed the literature on relevant articles focusing on the causes, diagnosis, and treatment of DGS published between 2009 and 2025.

We present the case of a 57-year-old woman with sciatic nerve compression due to scar tissue and proximal retraction of the hamstring insertion site. Endoscopic sciatic nerve decompression resulted in the complete resolution of the patient's symptoms. A literature review confirmed that hamstring avulsion is a very rare or exceptional cause, with few publications relating it to extraspinal sciatic involvement. Therefore, DGS is a compression syndrome with multiple etiologies, and proximal hamstring avulsion, although infrequent, should be considered in the differential diagnosis, particularly in patients with a history of trauma. Early diagnosis and adequate surgical treatment can yield satisfactory functional outcomes.

Keywords: Deep gluteal syndrome, hamstring injury, sciatic nerve compression, gluteal pain

Introduction

Deep gluteal syndrome (DGS), historically known as piriformis muscle syndrome, comprises a set of pathologies characterized by pain in the gluteal region with irradiation towards the sciatic path in the posterior part of the thigh, generally in the absence of evident lumbar pathology. Patients present with pain when sitting for prolonged periods or when performing movements of hip flexion and internal rotation, which improves when standing or walking [1, 2]. The symptoms in rare cases may include paresthesia and muscle weakness. This clinical presentation is caused by extrinsic compression of the sciatic nerve in the peritrochanteric path, often at the level of the subgluteal space [3, 4]. Although the piriformis muscle has been traditionally implicated as the main compressive agent, recent anatomical and clinical studies have shown that multiple structures can be involved, including the internal obturator muscle, gemellus muscles, quadratus femoris, post-traumatic scars, and anatomical variations of the sciatic nerve path, mainly the presence of fibrovascular bands of the ischiofemoral space, which traction on the sciatic nerve, restricting its movement during hip flexion and extension [5, 6].

Despite the growing understanding of DGS as a multifactorial syndrome rather than a single entity, its diagnosis remains challenging because of the overlap of symptoms with other causes of gluteal pain and radiculopathy. Clinical tests, such as the piriformis stretch test in a seated position and active piriformis test, are useful for diagnosis of this condition. Advanced imaging tools and specific clinical maneuvers have improved the ability to identify the precise cause of pain in selected patients [7, 8]. Since there is no pathognomonic diagnostic method, the combination of clinical findings and peritrochanteric findings on magnetic resonance imaging (MRI), such as tendon lesions and occasionally fibrovascular bands, leads to the diagnosis of DGS by ruling out other pathologies [1, 9].

The etiologies reported in the literature include muscular causes (such as piriformis syndrome), post-traumatic fibrosis, hypertrophy of deep compartment structures, vascular compression, ischiofemoral impingement, hamstring tendinopathy, congenital anatomical alterations, iatrogenic causes, and especially the presence of fibrovascular bands. Rare causes of DGS have also been reported. Park *et al.* presented a series of 13 patients with intraneural ganglion cysts [11], and Seidel and Parodi published a case report of a fracture of the ischial tuberosity that triggered DGS [10]. However, proximal avulsion of the hamstring muscles as a cause of DGS is infrequent and practically undocumented [2, 10, 11]

The anatomical and biomechanical relationship between the SN and proximal insertion of the hamstrings in the deep gluteal space is fundamental for diagnosing the distal causes of DGS. The close anatomical proximity of the sciatic nerve to the ischial tuberosity (between 1.2 and 2.5 cm) and the hamstring muscles can precipitate neurological dysfunction due to compression or stretching of the nerves caused by scaring or inflammatory tissue, which constitutes a rare but serious complication of this injury [12, 13].

Although surgical treatment of sciatic nerve release has initially been performed openly, endoscopic release of the sciatic nerve by resection of fibrovascular bands without tenotomy of the piriformis has also been described, which is a technique that we have been performing for more than 15 years, with good to excellent functional results in our patients [9, 5].

This study presents an overview of the clinical manifestations, diagnostic procedures, and surgical interventions for DGS associated with proximal hamstring injury. It also offers a comprehensive review of the recent literature, analyzing several relevant articles published between 2009 and 2025 to contextualize these findings within the etiological spectrum of DGS from the perspective of hip surgery.

Case Report

A 57-year-old female patient, with a medical history of fibromyalgia and rheumatoid arthritis, presented with acute left gluteal pain during ambulation, occurring six months prior without any preceding trauma. Despite undergoing multiple physiotherapy sessions, no improvement was reported, and the patient reported experiencing pain that radiated towards the posterior region of the thigh, which intensified during extended periods of sitting and resulted in a restriction of physical activities. Notably, there was an absence of muscle weakness and sensory disturbances. The initial assessment scores were HHSm 21/94, VAS 10/10, and iHOT12 8/120.

Upon physical examination, the patient presented with localized pain in the deep ischial region on palpation without intra-articular symptoms, positive provocation maneuvers (FAIR, Pace, Freiberg), and weakness of knee flexion in the prone decubitus position, without any neurological deficit in the lower limbs. The Valsalva maneuver and lumbar signs were negative

No abnormalities were observed on the pelvic X-ray (Figure 1). Pelvic magnetic resonance imaging revealed a complete insertional tear of the left hamstring tendon with retraction of approximately 2.5 cm, scar tissue formation, and perineural inflammation in the path of the sciatic nerve at the subgluteal level. (Figure 2 & Figure 3).

Fig 1: Pelvic X-ray showing bilateral narrowing of hip joint space, with no other significant findings.

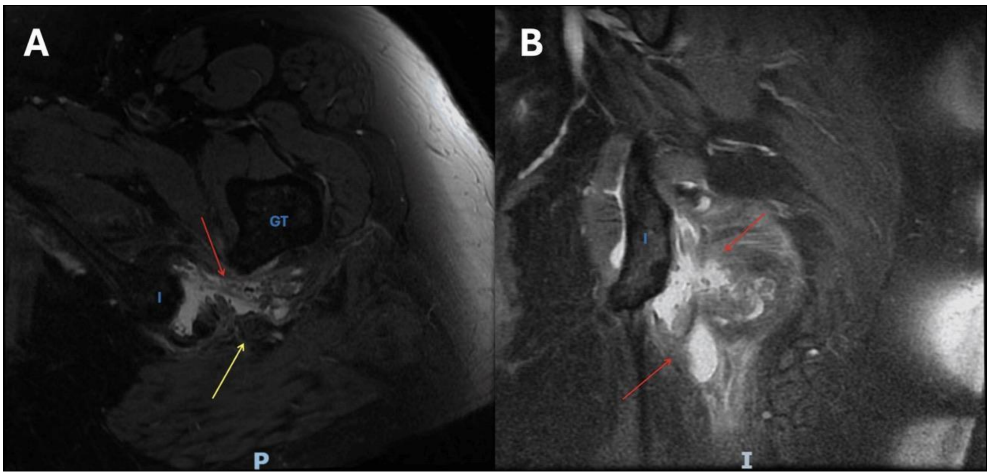

Fig 2: Left hip MRI DP FS. 2-A: Axial view showing abundant inflammatory tissue (Red arrow) in the ischiofemoral space around the sciatic nerve (Yellow arrow). (I: Tuber ischium, GT: Greater trochanter). 2-B: coronal view showing inflammatory tissue (Red arrows) in the ischial branch (I: Tuber ischium).

Surgical management was performed using a lateral endoscopic approach focused on the peritrochanteric region, identifying fibrovascular bands with traction and adhesion of the sciatic nerve to the scar tissue of the retracted hamstring tendon, endoscopic release of fibrous tissue, and neurolysis of the sciatic nerve [9].

Upon identification of the sciatic nerve, it appeared pale and surrounded by compressive adhesions and several thick fibrous bands that limited its excursion. The sciatic nerve was dissected from the fibrous tissue, revealing its restored color and perineural vasculature (Figure 4A-C).

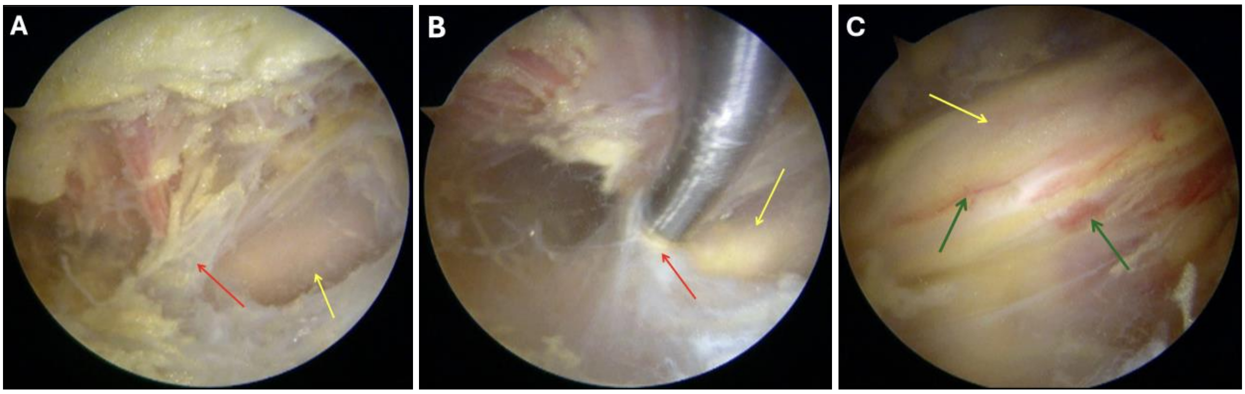

Fig 3: 3-A Sciatic nerve (Yellow arrow) appears pale and surrounded by fibrous bands (red arrow). 3-B Removal of fibrous bands with arthroscopic cautery. 3-C Restoration of the sciatic nerves' normal coloration and reappearance of perineural vasculature (green arrows)

Immediate rehabilitation was initiated using a progressive, protected weight-bearing protocol. At 9 months, she presented with complete resolution of pain, functional recovery, and return to her previous activity level, with an important improvement in her functional scores: Modified Harris Hip Score (HHSm) 76/94, Verbal Analog Scale (VAS) 1/10, and International Hip Outcome Tool - 12 (iHOT12) 99/120.

Discussion

DGS is a clinical condition that remains frequently underdiagnosed, partly because of its symptomatic similarities with lumbar pathology and hip musculoskeletal dysfunctions. While the piriformis muscle has traditionally been seen as the primary cause of sciatic nerve compression, contemporary literature acknowledges this syndrome as having multiple etiologies, with various compressive factors within the subgluteal space, which is bounded by musculotendinous, osseous, ligamentous, vascular, and nervous structures [13-16].

Reviewing the literature over the past 15 years, we found that most of the published cases of DGS were due to peritrochanteric fibrovascular bands, mainly in the ischiofemoral region; hypertrophy or fibrosis of the piriformis; anatomical variants of the path of the sciatic nerve; post-traumatic fibrosis; tumors (schwannomas, lipomas); ischiofemoral syndromes; and fibrous bands of the internal obturator muscle. Only a handful of articles have discussed proximal avulsion of the hamstrings as a potential cause of sciatic nerve compression, all within the context of high-energy sports injuries; however, they lack detailed documentation of the surgical approach employed. Gattringer *et al.* described two chronic cases of hamstring injuries in young athletes who were primarily treated conservatively at another institution after suffering from a proximal hamstring injury and developing sciatic nerve symptoms over the course of a few months. Both were treated with open neurolysis without reattachment of the ruptured muscles to the ischial tuberosity because of the chronicity of the injuries [17]. Wilson *et al.* reported in a retrospective analysis of proximal hamstring tears, a 27.8% rate of sciatic nerve symptoms; which included radiating pain (22.2%), sensory deficits (6.8%), and motor deficits (4.9%). They also divided their cohort into conservative and surgical treatment groups, where the latter group presented a higher rate of sciatic nerve injury (24.2% vs. 32.8%). This result may be biased because the most severe injuries (complete tears and tears with retraction of > 2 cm) were mainly treated surgically [18]. Irger *et al.*, on the other hand, reported a rate of 5% of neurological deficits in their retrospective analysis of surgically treated cases which included patients with complete avulsion of the hamstring muscles [19]. Hermoso *et al.* reported a case of DGS originating from the hamstrings of a young female marathon runner, which they termed proximal hamstring tendinopathy-related sciatic nerve entrapment (PHTrSNE) [20].

Rigorous studies are crucial to accurately determine the true incidence of sciatic nerve damage following proximal hamstring tears, which is necessary for developing effective treatment algorithms to identify patients who are less likely to respond to conservative treatment and will ultimately require surgical intervention.

Conclusion

DGS is an important condition characterized by sciatic nerve compression. Its etiology is extensive and attributable to various inflammatory causes that cause sciatic nerve compression and severe posterior pain in the gluteal region. Early diagnosis is important to offer surgical management when conservative measures don't work, and a secondary DGS develops due to the vicinity of the sciatic nerve.

Therefore, the case presented here constitutes a relevant contribution to the current body of evidence regarding the etiology of DGS and consequences of a proximal hamstring avulsion.

Abbreviations

- DGS: Deep Gluteal Syndrome.
- mHHS: Modified Harris Hip Score.
- IHOT: International Hip Outcome Tool.
- VAS: Verbal Analog Scale.

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Authors' contributions
DP designed the case report and collected the data. OOV and DS wrote the manuscript. DP designed the case report and critically reviewed the manuscript. All authors have read and approved the final manuscript.

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Declarations

Ethics approval and consent to participate
Ethical approval was not applicable for this case report. All procedures were performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The subject gave his written informed consent to participate in this publication.

Consent for publication
The subject provided written informed consent for publication of this case report.

Competing interests
The authors declare that they have no competing interests in relation to this case report.

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