Subgluteal space (SS) is a cellular and fatty tissue situated between the middle and deep gluteal aponeurosis layers. Sciatic nerve entrapment can be caused by various etiologies in different points along the deep gluteal space. Therefore deep gluteal syndrome (DGS) has been the term suggested to describe the clinical manifestation of these various points of nervous compressive pathology.

Deep gluteal syndrome (DGS) is an underdiagnosis entity characterized by pain/dysesthesias in the buttock area, hip or posterior thigh and/or radicular pain, due to a nondiscogenic sciatic nerve entrapment in the subgluteal space. Endoscopic decompression of the sciatic nerve appears useful in improving function and diminishing hip pain in sciatic nerve entrapment /deep gluteal syndrome (DGS)

Because of the ever-increasing use of advanced MRI techniques and the excellent outcomes of the new endoscopic treatment, orthopaedic surgeons must be aware of the anatomy and pathologic conditions of this space.

After exclusion of the lumbar nerve root compression, it is known that extra spinal sacral plexus and sciatic nerve entrapments may be result from a high spectrum of extra pelvic (within the sub-gluteal space) or intra-pelvic pathology. An extensive list of orthopedic and non-orthopedic conditions may manifest as a DGS: We describe this conditions and present a guiding tool for the surgeons regarding the preoperative planning in terms of appropriate instruments application, portal placement and more precisely during intraoperative management.
Classification of Deep Gluteal Syndrome etiology

1. Specific musculoskeletal entrapments
   1.1. Fibrous bands containing or not blood vessels
   1.2. Piriformis syndrome
   1.3. Obturator internus and gemellus syndrome
   1.4. Quadratus femoris. Ischiofemoral pathology
   1.5. Hamstring conditions
   1.6. Gluteal disorders
   1.7. Orthopedic causes

2. Non-specific pathology
   2.1. Traumatic
   2.2. Iatrogenic
   2.3. Inflammatory/Infectious
   2.4. Vascular
   2.5. Gynecological
   2.6. Tumors/Pseudotumors

The sciatic nerve entrapment in the subgluteal space by fibrous bands with or without blood vessels in it, represent a radical change in the current diagnosis and therapeutic approach of the DGS. Diminished or absent sciatic mobility during hip and knee movements due to these bands is the precipitating cause of sciatic neuropathy (ischemic neuropathy).

Endoscopic view showing the pathogenic mechanism of DSG. (a) Edematous and flattened sciatic nerve due to fibrovascular entrapment (ischemic neuritis). (b) Normal vascularization recovery after nerve decompression.

From the point of view of its MACROSCOPIC STRUCTURE there are three primary types of bands: **Fibrovascular bands**, with vessels macroscopically identifiable by MRI and endoscopy, **Pure fibrous bands**, without identifiable macroscopic vessels and **Pure vascular bands**, exclusively formed by a vessel without surrounding fibrous tissue.

Based on their LOCATION, fibrovascular bands can be classified as a) **Proximal**, affecting the sciatic nerve in the proximity to the greater sciatic notch, b) **Distal** affecting it in the ischial tunnel region, between the quadratus femoris and proximal insertion of the hamstrings, and c) **Middle bands**, located at the level of the external rotator muscles (piriformis and obturator internus-gemelli complex).
Depending on the PATHOGENIC MECHANISM of the sciatic nerve entrapment, bands can be classified as:

1. **Compressive or bridge-type bands (type 1)** limit the movement compressing the nerve from front to back (Type 1A) or from back to front (Type 1B).
2. **Adhesive bands or horse-straps bands (type 2)**, located in the same anteroposterior plane to the sciatic nerve and can be attached to it laterally, from the major trochanter (type 2A) or medially, from the sacrotuberous sacrospinous ligament (type 2B).
3. Bands anchored to the sciatic nerve with diffused or undefined distribution (type 3).

![Anomalous course of the sciatic nerve (anatomical variations)](image)

**Six categories of variations** were originally described in 1938 by Beaton and Anson:

- A. Undivided nerve comes out below the piriformis muscle.
- B. A divided sciatic nerve passing through and below the piriformis muscle (g in the figure). A subset additional variation has been described consisting in a smaller accessory piriformis, with its own separate tendon, passing between the fibular and tibial portions of the sciatic nerve. We find this variation is not uncommon.
- C. A divided nerve passing above/below undivided muscle.
- D. An undivided sciatic nerve passing through the muscle.
- E. A divided nerve passing through/above the muscle heads.
- F. Undivided sciatic nerve passing above undivided muscle.
The anomaly itself may not be the etiology of DGS symptoms as some asymptomatic patients present with these variations and some symptomatic patients do not. A subsequent event such as prolonged sitting, direct trauma to the gluteal region, prolonged stretching, overuse, pelvic instability or orthopedics conditions is often required to precipitate sciatic nerve neuropathy.

- **Obturator internus and gemellus syndrome**

  Dynamic compression of the sciatic nerve caused by stretched or altered dynamic of the obturator internus muscle should be included as a possible diagnosis for DGS. As the sciatic nerve passes under the belly of the piriformis and over the superior gemelli/obturator internus, a scissor effect between the two muscles can be the source of entrapment. Insertional pathology and variations concerning sciatic nerve and OG-C are also possible being the most frequent an obturator internus penetrating the nerve. (Split)
Hamstring conditions

Take Home Message

Think in deep gluteal syndrome in patients with sciatic pain or gluteal pain.

Diagram: Diagnosis and Treatment Algorithm for Deep Gluteal Syndrome