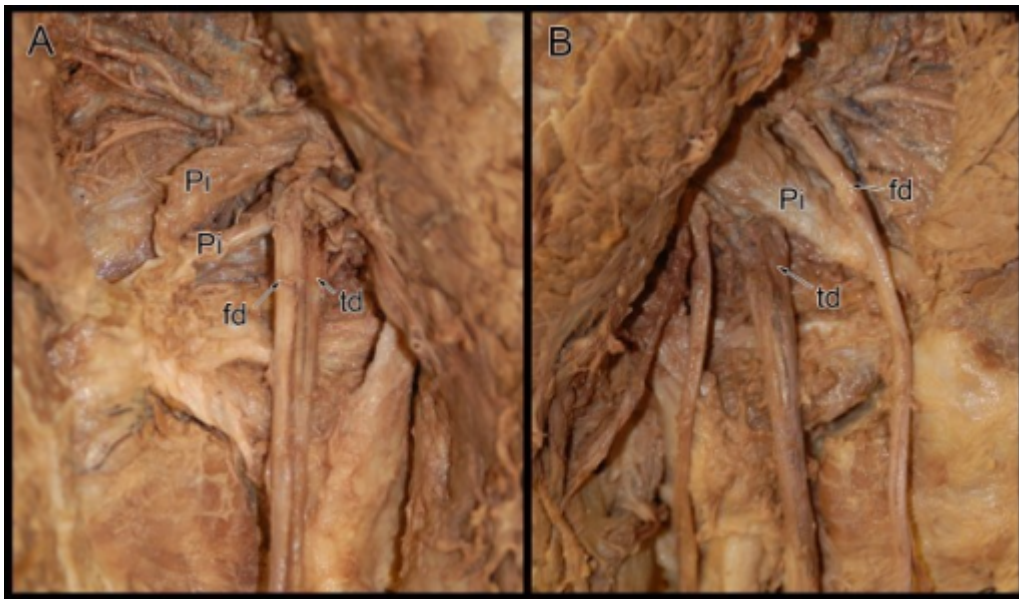


## Lesions of the Sciatic Nerve

[See online here](#)

**Lesions in the peripheral nerves result in motor deficits, reflex disorders, sensory disturbances, vegetative deficits, trophic disorders, pain, and irritation. In the following article, you will find an overview of the sciatic nerve, and the causes, diagnoses, and treatment of lesions. The likely differential diagnoses of sciatic-nerve lesions have also been discussed.**



### Definition of Sciatic Nerve Lesions

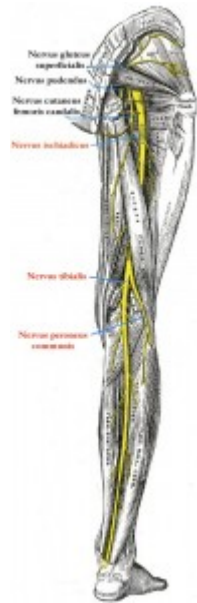


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The **sciatic nerve** is a peripheral nerve emerging from the L4–S3 segments of the spinal cord. It is the largest and longest spinal nerve in the body and is composed of all the ventral branches of the **sciatic plexus**.

Its motor functions include innervating the **ischiochrural muscles** and all muscles of the lower leg and foot. The **sciatic nerve** innervates a significant part of the skin on the lateral and dorsal surfaces of the lower leg, as well as the skin of the foot. The only exceptions are the **medial ankle region** and a narrow strip along the medial border of the foot, which are innervated by the **saphenous nerve**.

The sciatic nerve exits the **pelvis** through the **infrapiriform foramen** and runs from the **gluteus maximus muscle** to the **obturator internus**, the **gemelli muscles**, and the **quadratus femoris muscle**. It runs distally between the **tibial** and **fibular flexors** of the thigh, below the long head of the **biceps femoris**.

The **sciatic nerve** divides into the **tibial nerve** and the common **fibular nerve** at the junction of the middle third of the **distal femur** just prior to reaching the **popliteal fossa**.

Being the largest nerve in the human body, the sciatic nerve is susceptible to injuries throughout its anatomic course. It is responsible for the supply of motor functions to the lower limb. The sciatic nerve also provides sensory innervation to the upper as well as the lower part of the leg except for the saphenous territory.

## Etiology of Sciatic Nerve Lesions

Sciatic nerve lesions can occur on account of the following conditions:

- After implantation of a hip prosthesis
- External pressure
- Circulatory disorders
- **Gunshot wounds**
- Fracture of the pelvis

- Femur fracture
- Tumors
- Injection damage
- Infections

Injury to the sciatic nerve following intramuscular injections is the most common trauma. In this case, an intense foreign-body reaction occurs around the nerve, after which the nerve is compressed by a **dense scar tissue** that surrounds it.

Approximately 20% of all **sciatic nerve** lesions occur during total endoprostheses of the hip. Apart from the transection that can occur during detachment of the external rotators, pressure damage caused by surgical instruments, as well as the damage caused by the splintering of bone fragments is possible. In addition, mechanical damage to the nerve, during the use of drills and saws in surgical procedures, has also been observed.

In approximately 14% of all patients in whom external pressure was applied, lesions of the **femoral nerve** were detected as a result of strain and sprain in flexion of the hip joint. Nerve damage is regularly observed during lengthening osteotomies of the femur with length increases of > 3 cm, provided they are made unilaterally.

Furthermore, **sciatic paresis** can be caused by the exogenous application of pressure and positioning. In children and lean individuals, compression damage may result owing to prolonged periods of sitting on hard surfaces.

Circulatory disorder, resulting from **atherosclerotic stenosis** of the **common iliac artery**, leads to **unilateral painful sciatica** and atrophy of the leg muscles. This is often followed by sciatic compression that is accompanied by pain and paresis.

Tumors appearing in the **vicinity of the nerve** and, more rarely, in the sciatic stem are detected using magnetic resonance imaging (MRI) or computed tomography (CT), respectively. Tumors can affect the sciatic nerve even before the nerve originates from the **pelvis**.

Infections are rare. Nevertheless, there have been reports of **Staphylococcus aureus**-induced abscesses in the piriformis leading to **severe sciatica**.

## Symptoms and Clinical Signs of Sciatic Nerve

### Lesions

Symptoms of sciatic nerve lesions include pain that originates in the back and moves down the leg and, at times, radiating into the foot. Weakness, tingling, and numbness in the leg may also occur. The symptoms can worsen while sitting, standing for prolonged periods, or generating movements that cause the spine to flex. The intensity of the pain is difficult to quantify. However, facial expressions and wincing displayed by the patient may serve as useful pointers.

The symptoms that may occur based on the location of the lesions are listed below.

#### Pelvic outlet

Active flexion of the knee is no longer possible when the **sciatic nerve** is damaged in the **pelvic outlet**.

## Common fibular nerve (popliteal nerve or at the head of the fibula)

If damage occurs in this area, the patient displays complete paralysis of the dorsiflexion of the foot and toe as well as a tendency to pronate the foot. Further, sensation in the lateral lower leg and dorsum of the foot is lost, and 'foot drop' may occur.

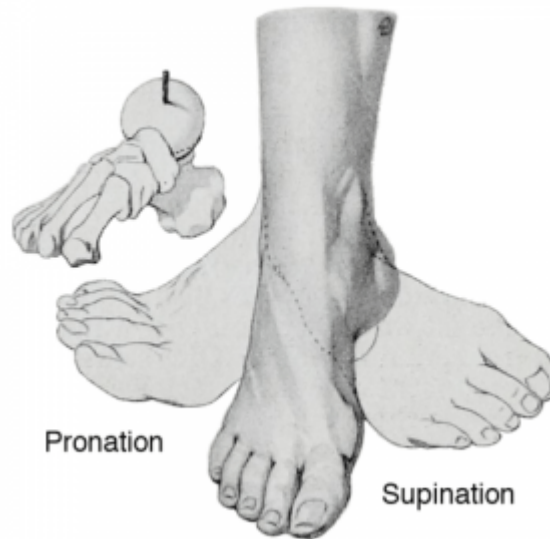


Image: "Anatomical Illustration From the 1921 German Edition of Anatomie des Menschen: Ein Lehrbuch für Studierende und Ärzte With Latin Terminology." by Hermann Braus. License: Public Domain {{PD-US}}

## Deep peroneal nerve

Patients show symptoms similar to those observed during damage to the common **fibular nerve**. When the **deep fibular nerve** is damaged, lifting the lateral margin of the foot is possible. A loss of sensation in the dorsal ridge of the foot may be experienced.

## Tibial proximal nerve (e.g., popliteal nerve)

If there is proximal damage to the **tibial nerve**, the patient can no longer actively flex the foot and toes, supinate the foot, or spread the toes. Sensory disturbances are experienced in the dorsal muscles of the leg and in the soles.

## Tibial mid-lower leg

In case of damage or lesions in this region, clawing of the toes is a common observation in patients. The malfunction manifests via a slight plantar flexion weakness of the foot with a possible supination weakness, as well as a plantar flexion weakness of the toes. There is a loss of sensation on the entire sole.

## Tibial nerve behind the internal malleolus

**Tibial nerve** damage behind the **medial malleolus** results in pareses of the spreading of the toes and is often associated with symptoms of pain and dry soles of the feet. Sensory loss on the soles of the feet is also diagnosed.

## Injections

Damage to the **sciatic nerve** has been reported after misplaced intramuscular injections

in the gluteal region. Paralysis can occur, which usually causes radiating pain in the leg and results in sensory and motor defects. In some patients, pareses of the extensor muscles of the foot and toe may ensue after a few hours or days.

## Diagnosis of Sciatic Nerve Lesions

Tumors, fractures, and bruises are responsible for damages to the **sciatic nerve**, which can be detected using CT and MRI.

Apart from the evident sign of significant restrictions in movement, the pathological deformities of the feet and pain symptoms, resulting from lesions of the **sciatic nerve**, can be diagnosed using clinical function tests. The physician can check the function of the knee flexors to diagnose lesions. Ideally, this examination is conducted with the patient lying on their front. When the knee is bent to about 60%, and on applying gentle pressure, the distal lower leg will extend. With tension, the medial (**musculus semitendinosus** and **musculus semimembranosus**) and lateral (**biceps femoris**) tendons that form the boundary of the **popliteal fossa** are palpable.

## Differential Diagnosis

Careful examination will seldom result in monoparesis of the leg being diagnosed as **sciatic nerve** lesions. Nevertheless, incipient amyotrophic lateral sclerosis can be confused with sciatic paresis if examined superficially; however, sensory disturbances will be absent in this condition.

## Therapy of Sciatic Nerve Lesions

Injuries to the sciatic nerve are treated surgically.

Minor injuries are treated using end-to-end neurorrhaphy (nerve suture), while slight flexion is applied to the knee joint. These usually occur along the thigh up to the point of the division above the knee pit, and are mainly caused by cuts or gunshot wounds.

In cases of major defects, a nerve transplant may be required. In cases of complete injury of the **sciatic nerve**, the loss of sensitivity in the soles of the feet is possible. Restoration of sensitivity is considered an indicator of a successful transplant. Additionally, the restoration of plantar flexion and dorsal extension, to a reasonable extent, indicates satisfactory rehabilitation.

The primary preventive measure should be preventing foot drop and contraction of the calf muscles. An aluminum night shoe should be worn at night and a shoe with plastic inserts should be used during the day.

## Alternative Approaches to Alleviate Pain

- Spinal adjustments by a chiropractor
- Yoga and stretching
- Acupuncture and massage therapy
- Avoiding sitting on hard surfaces for prolonged periods
- Use of heating pads
- Reducing inflammation

# References

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Notes