

Original article:

Cadaveric study of the exit of sciatic nerve pattern: observational study

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Abstract:

Introduction: The sciatic nerve is also known as the ischiadic nerve or ischiatic nerve, is a large nerve in humans and other animals. It is the longest and widest single nerve in the human body. The sciatic nerve is comprised of five nerves.

Material and methods: The present study was carried out in department of Anatomy for one year duration. 30 gluteal regions were examined in 15 formalin fixed cadavers with no pathology during the period of one years. Fifteen of the cadavers were male and fifteen were female. The sample size was estimated with the help of expert.

Results: Variations in SN bifurcation were seen in 2 cadavers . Totally six lower limbs showed variation in the division of sciatic nerve Male cadaver on the left lower limb showed that sciatic nerve divided in the pelvis, CPN nerve emerged through the bifid piriformis and TN below the muscle .

Male cadaver showed bilateral variation. Sciatic nerve on the right side divided about 50 mm above the popliteal crease (0-150 mm) but below the superior angle of popliteal fossa. On the left side Sciatic nerve divided at the level of the popliteal crease .

Conclusion: The sciatic nerve is frequently involved in daily medical practice of neurology, orthopedics, rehabilitation and anesthesia. Sciatic neuropathy is the result of injuries, leading to neurological defects. Its long course makes it vulnerable to nerve injury.

Introduction:

The sciatic nerve is also known as the ischiadic nerve or ischiatic nerve, is a large nerve in humans and other animals. It is the longest and widest single nerve in the human body. The sciatic nerve is comprised of five nerves. It is formed on the right and left hand side of the lower spine. It is derived from the spinal nerves L4-S3. It contains fibers from both the anterior and posterior divisions of the lumbosacral plexus. It runs from each side of the lower spine, deep in the gluteal region, back of the thigh all the way down to the foot via its branches, connecting the spinal cord with the leg and foot muscles. It supplies nearly the whole of the skin of the leg, the muscles of the back of the thigh, and those of the leg and the foot. Commonly at the apex of popliteal fossa (PF) the sciatic nerve bifurcates (85-89%) into Tibial nerve (TN) and Common Peroneal nerve (CPN). Pain caused by a compression or irritation of the sciatic nerve is called sciatica. The sciatica symptoms include nerve pain, numbness, tingling, and weakness. It may include inability to walk depending upon the where the pressure of the sciatic nerve occurs. Investigations are CT-scan, MRI, EMG (electrical activity of the muscle) and Nerve conduction test and Blood tests are routinely done to identify nerve pathology.(1)

Our study was to describe and analyze sciatic nerve variation in relativity to the statistical analysis. Clinical significance and some relevant previous studies will be presented in this work. A frequent variation in this regard calls for Surgeons attention to avoid error in treatment.

Material and methods:

The present study was carried out in department of Anatomy for one year duration. 30 gluteal regions were examined in 15 formalin fixed cadavers with no pathology during the period of one years. Fifteen of the cadavers were male and fifteen were female.

The sample size was estimated with the help of expert.

The Gluteus maximus was elevated to explore the piriformis and the sciatic nerve. Following the proper exposure the location of the SN and its exit from pelvis and the level of the SN division were all recorded. Normally Sciatic nerve bifurcates at the superior angle of popliteal fossa in 80-90% of individuals.

Results:

Variations in SN bifurcation were seen in 2 cadavers . Totally six lower limbs showed variation in the division of sciatic nerve Male cadaver on the left lower limb showed that sciatic nerve divided in the pelvis, CPN nerve emerged through the bifid piriformis and TN below the muscle .

Male cadaver showed bilateral variation. Sciatic nerve on the right side divided about 50 mm above the popliteal crease (0-150 mm) but below the superior angle of popliteal fossa. On the left side Sciatic nerve divided at the level of the popliteal crease .

Discussion:

The sciatic nerve is frequently involved in daily medical practice of neurology, orthopedics, rehabilitation and anesthesia. The anatomy of the sciatic nerve and its relationship with the piriformis muscle are better studied in cadavers^{1,2}. Recording the findings of such anatomical studies may help in understanding piriformis syndrome, a condition that according to some physicians is well established, but according to others does not even exist³.

Piriformis syndrome is an underdiagnosed cause of gluteus and leg pain, but according to some authors it is vastly overdiagnosed⁴. The piriformis muscle is closely related to the sciatic nerve, which makes it possible that trauma and inflammation in the piriformis muscle might be clinically represented by sciatic pain⁴. Identification of the syndrome and accurate diagnosis are usually difficult, especially if the regional anatomy is not known by the physician. Although originally described in 1947¹, the existence of the piriformis syndrome is still contested by some authors⁴. However, a very comprehensive recent review of the literature on piriformis syndrome⁵ has pointed towards confirming the existence of this syndrome as a clinical entity, albeit still somewhat unknown in the medical world.

The piriformis muscle is flat and pear-shaped, originating from the anterior border of the second to fourth sacral segment, from the upper margin of the greater sciatic notch, and from the sacrotuberous ligament⁵. With the leg extended, the piriformis is mainly an external rotator for the hip, but when the leg is flexed, it is a hip abductor⁶.

The long and thick sciatic nerve is prone to injuries, and a variety of conditions may originate sciatic pain. One of them seems to be entrapment by the piriformis muscle³. The relationship between the piriformis muscle and the

sciatic nerve is variable, since the undivided nerve may emerge above the muscle or through the muscle. The major divisions of the nerve may lie on either side, above or below the muscle⁷

Sharma et al. [5] observed in routine dissection of 60 years male cadaver that two divisions of SN were separate in the gluteal region on both the sides with TN passing below the piriformis and CPN piercing the piriformis muscle. The high division may account for failures in the popliteal block. Similar feature was observed in our one male cadaver. The division of the SN in the popliteal fossa is related to anatomical implications for popliteal nerve blockade. Vloka et al. [6] concluded in their studies that SN divided at a mean distance ranging from 0-115 mm above the popliteal fossa. An ideal popliteal block is by insertion of the needle at 100 mm above the popliteal crease i.e. proximal to division of SN. Saleh et al. [7] mentioned in their studies that SN division occurs at a variable level about the 50-180 mm above the knee and may account for frequent failures with popliteal blocks. We should adopt newer technology in routine dissection and teaching. (8,9)

Conclusion

The sciatic nerve is frequently involved in daily medical practice of neurology, orthopedics, rehabilitation and anesthesia. Sciatic neuropathy is the result of injuries, leading to neurological defects. Its long course makes it vulnerable to nerve injury.



Fig: Cadaveric dissection – Sciatic Nerve

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