CASE REPORT

# Bilateral Low Division of Sciatic Nerve: A Case Report

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## Abstract

**Aim:** The sciatic nerve shows many variations in its course, division, and branching pattern. These are of clinical importance to the orthopedics, surgeons, plastic surgeons and anesthetists.

**Background:** The sciatic nerve is the largest branch of the sacral plexus with root values L4, L5, S1, S2, and S3. It usually divides into the tibial nerve and the common peroneal nerve at the junction of the middle and lower thirds of the thigh. Low division of the sciatic nerve is a rare observation as compared to high division.

**Case description:** During routine dissection, for 1st year MBBS students in the Department of Anatomy, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, Punjab, India, bilateral low division of sciatic nerve in a cadaver were observed. It is divided in the middle of the popliteal fossa on the right side and just below the superior angle on the left side. No deviation or communication was seen in the branches of the sciatic nerve or with other nerves.

**Conclusion:** Low division of the sciatic nerve was observed bilaterally which is a rare phenomenon.

**Clinical significance:** Knowledge of anatomical variations in the course, division, and branches of the sciatic nerve is important to clinicians for performing their surgical procedures and nerve blocks. This will prevent any damage to the sciatic nerve and its terminal branches and also help the anesthetists to provide effective nerve blocks.

**Keywords:** Case report, Common peroneal nerve, Low division, Nerve blocks, Rare case, Sciatic nerve, Surgical procedures, Tibial nerve.

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## Introduction

The greatest branch of sacral plexus is the sciatic nerve. It takes its origin in the pelvis from the ventral division of the L4, L5, S1, S2, and S3 spinal roots. It is the thickest nerve in the body and is approximately 2 cm thick at its origin.[1] It terminates by dividing into tibial (a ventral division of anterior primary rami L4, L5, S1, S2, S3) and common peroneal nerve (a dorsal division of anterior primary rami L4, L5, S1, S2). It usually divides at the meeting point of the upper 2/3 and the lower 1/3 of the posterior aspect of the thigh, at the superior angle of the popliteal fossa, but may divide above it and rarely below it.[2] Variations have been reported by various authors regarding its high division or low division. Within the popliteal fossa, the tibial nerve gives muscular branches, genicular branches, and a sural cutaneous nerve. The common peroneal nerve gives the genicular branch, lateral sural nerve, or lateral cutaneous nerve of the calf, and peroneal communicating nerve (PCN).[3]

## Case Description

While dissecting, bilateral low division of the sciatic nerve in a cadaver was seen. On the right side, it was seen to divide just in the mid of the popliteal fossa. On the left side, it was seen to divide just below the superior angle (Fig. 1). No deviation or communication was seen in the branches of the sciatic nerve or with other nerves.

## Discussion

Various authors have previously reported numerous variations in the level at which sciatic nerve divides. Usually, the standard Anatomy books state high division of sciatic nerve either below the piriformis muscle or at the meeting point of the upper two third and lower one-third of thigh.[4,5] Inferior division of the Sciatic nerve has rarely been described. Rajendiran and Manivasagam reported a lower division of the sciatic nerve; in the lower part of the popliteal fossa where the sciatic nerve was seen to divide into three branches – tibial, common peroneal, and PCN. This division occurred at a distance of 24 mm below the popliteal crease.[6] Saleh et al. reported that the sciatic nerve is divided into the tibial nerve and common peroneal nerve 50–180 mm below the popliteal crease that is low division of the sciatic nerve.[7] Its trifurcation in the middle of the popliteal fossa has been reported by Nayak S where it is divided into a tibial nerve, the common peroneal nerve, and another unnamed trunk. The unnamed trunk further gave two branches – the lateral cutaneous nerve of the calf and PCN.[8] Sawant SP reported trifurcation of sciatic nerve bilaterally in the mid popliteal fossa,

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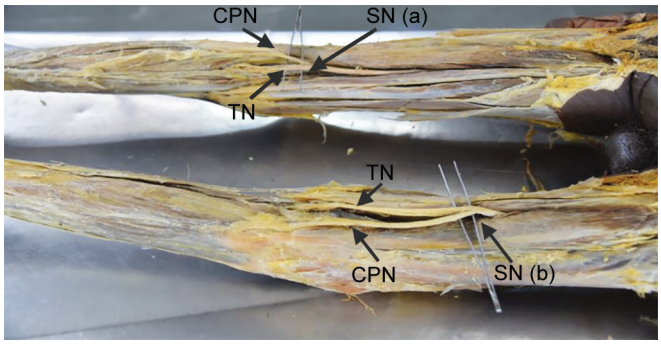


**Fig. 1:** Showing low division of sciatic nerve (a) on right side and (b) on left side
CPN, common peroneal nerve; SN, sciatic nerve; TN, tibial nerve

which divided into the tibial, superficial, and deep peroneal nerves.[9] In our case, the nerve was seen to divide lower than its usual level bilaterally; on the right side in the center of the popliteal fossa and on the left side just below the superior angle. No abnormal communication with any other nerve was seen.

## Clinical Significance

The knowledge of variations in the branching pattern of the sciatic nerve holds importance for the orthopedics, surgeons, and plastic surgeons while performing any surgeries in the gluteal region, back of the thigh, and popliteal fossa to prevent the injury of the sciatic nerve or its end branches. It holds equal importance for the anesthetists to give nerve blocks. Faster onset of nerve block has been reported in both the nerves are blocked separately but it is possible only if the anesthetists know about the anatomy and variations in the sciatic nerve and its terminal branches.[10] Therefore, comprehended knowledge of the unusual variations whether in its course, division, or branching will help the orthopedicians, surgeons, plastic surgeons, and anesthetists in performing their procedures and nerve blocks.

## References

1. Hollinshed HW. Anatomy for surgeons. The back and limbs. 1st edition. Philadelphia: Hoeber Harper books;1958. pp. 614–615, pp. 823–831.
2. Stranding S. Gray's anatomy. The anatomical basis of clinical practice. Spain: Elsevier Churchill Livingstone; 2005. pp. 1384, pp. 1427–1428.
3. Moore KL, Dalley AF. Clinical oriented anatomy, 7th edition. Baltimore: Lippincott Williams and Wilkins; 2014. pp. 575, pp. 587–593.
4. Morris H. Human anatomy. A complete systemic treatise. Philadelphia and Toronto: Blakistan; 1953. pp. 1161–1171.
5. Anson, Maddock. Callender's surgical anatomy. 1st edition, W.B Saunders Co; 1958. pp. 927–1014.
6. Rajendiran R, Manivasagam M. Low level division of the sciatic nerve and its clinical significance - Case report. Brunei Darussalam Journal of Health 2015;6(1):35–38.
7. Saleh HA, El-fark MM, Abdel-Hamid GA. Anatomical variations in the sciatic nerve division in the popliteal fossa and its implications in popliteal nerve blockade. Folia Morphol (Warsz) 2009;68(4):256–259. PMID: 19950076.
8. Satheesha Nayak B. An unusual trifurcation of the sciatic nerve. Neuroanatomy 2008;5:7–8.
9. Sawant SP. A case report on the bilateral trifurcation of the sciatic nerve and its clinical significance. World Research J of Orthopaedics 2013;1(1):7–10. Available online at: http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000131.
10. Buys MJ, Arndt CD, Vagh F, et al. Ultrasound-guided sciatic nerve block in the popliteal fossa using a lateral approach: Onset time comparing separate tibial and common peroneal nerve injections versus injecting proximal to the bifurcation. Anesth Analg 2010;110(2): 635–637. DOI: 10.1213/ANE.0b013e3181c88f27.