



A CASE REPORT ON ORIGIN OF SURAL NERVE FROM SCIATIC NERVE

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ABSTRACT: The sciatic nerve is the thickest nerve in the body. It leaves the pelvis via the greater sciatic foramen below piriformis and descends between the greater trochanter and ischial tuberosity, along the back of the thigh, dividing into the tibial and common peroneal (fibular) nerves at a varying level proximal to the knee. During routine dissection for the first MBBS students, I observed an unusual termination of the sciatic nerve on the back of the left thigh in the middle of the popliteal fossa of a 70 year old, donated embalmed male cadaver in the Department of Anatomy, K.J. Somaiya Medical College, Sion, Mumbai, India. The sciatic nerve terminated in the middle of the popliteal fossa into the tibial nerve, common peroneal (fibular) and the sural nerve. The photographs of the three branches of the sciatic nerve were taken for proper documentation and for ready reference. **Conclusion:** The trifurcation of the sciatic nerve is very rare. The knowledge of low level of termination of sciatic nerve is important for clinicians and surgeons. Clinically, the sural nerve is widely used for both diagnostic (biopsy and nerve conduction velocity studies) and therapeutic purposes (nerve grafting). Thus, a detailed knowledge of the anatomy of the sural nerve and its contributing nerves are important in carrying out these and other procedures.

Key words: Sciatic Nerve, Trifurcation, Tibial Nerve, Common Peroneal, Lateral Sural Cutaneous Nerve, Popliteal Fossa, Sural Nerve.

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INTRODUCTION

The sciatic nerve being the thickest nerve in the body is 2 cm wide at its origin. It leaves the pelvis via the greater sciatic foramen below piriformis and descends in the gluteal region deep to Gluteus Maximus and posterior to the obturator internus, the gemelli and quadratus femoris. Posterior femoral cutaneous nerve lies medial to it in the gluteal region. It then descends along the back of the thigh behind adductor magnus and is crossed posteriorly by the long head of biceps femoris. At the junction of middle and lower one third of the thigh, near the apex of the popliteal fossa it divides into the tibial and common peroneal (fibular) nerves. This division can occur at varying level proximal to the knee. It gives muscular branches to biceps femoris, semitendinosus, semimembranosus and the ischial part of adductor magnus and articular branches to supply the hip joint [1]. The point of division of the sciatic nerve into the tibial and the common peroneal nerve may occur at any level above the knee, through rarely below it. The sural nerve also called as short saphenous nerve, is a sensory nerve formed by the union of the medial sural cutaneous and peroneal anastomotic branch of the lateral sural cutaneous nerve. It descends down along the lateral margin of the tendo calcaneus, lying close to the small saphenous vein, and reaches the interval between the lateral malleolus and the calcaneus. Below the lateral malleolus, it continues as the lateral dorsal cutaneous nerve along the lateral side of the foot and little toe. On the dorsum of the foot it communicates with the intermediate dorsal cutaneous nerve, a branch of the superficial peroneal [1].

Case Report

The sciatic nerve is the thickest nerve in the body. It leaves the pelvis via the greater sciatic foramen below piriformis and descends between the greater trochanter and ischial tuberosity, along the back of the thigh, dividing into the tibial and common peroneal (fibular) nerves at a varying level proximal to the knee. During routine dissection for the first MBBS students, I observed an unusual termination of the sciatic nerve on the back of the left thigh in the middle of the popliteal fossa of a 70 year old, donated embalmed male cadaver in the Department of Anatomy, K.J. Somaiya Medical College, Sion. The sciatic nerve terminated in the middle of the popliteal fossa into the tibial nerve, common peroneal (fibular) and the sural nerve (tibial nerve (2)) (Fig 1). The sural nerve was thicker than the common peroneal nerve. The sural nerve continues down the leg along the lateral margin of the tendo calcaneus, along the lateral side of the foot and little toe. The photographs of the three branches of the sciatic nerve were taken for proper documentation and for ready reference.

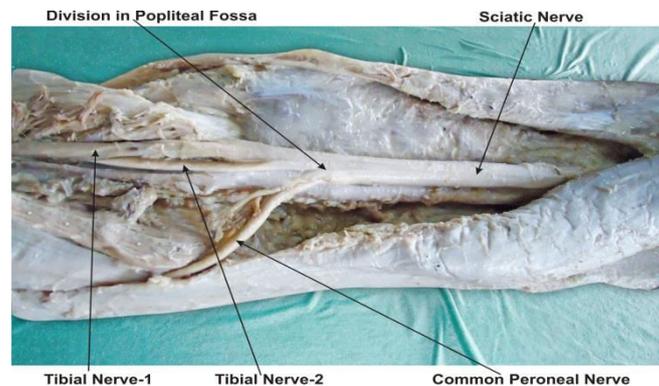


Figure 1 showing the photographic presentation of the sciatic nerve terminating in the middle of the popliteal fossa by giving tibial nerve-1, common peroneal and tibial nerve-2 [sural nerve].

DISCUSSION

Higher level of the sciatic nerve division is a relatively frequent phenomenon. A number of variations in the course and distribution of the sciatic nerve have been reported. Bifurcation into its two major divisions (common peroneal and tibial) may occur anywhere between the sacral plexus and the lower part of the thigh [2]. The two terminal branches of the sciatic may arise directly from the sacral plexus and in such cases the common peroneal nerve is usually seen piercing the piriformis muscle [3]. The common peroneal nerve can also pass above the piriformis or the entire sciatic nerve may pass through the piriformis causing the sciatica [4]. The tibial nerve passing deep and common peroneal nerve passing superficial to the superior gemellus has also been seen [5]. The trifurcation of sciatic nerve into tibial, common peroneal and lateral cutaneous nerve of calf has been observed [6] but the trifurcation of sciatic nerve into tibial, common peroneal and sural nerves is not documented in literature. Normally the sural nerve is formed by medial sural cutaneous nerve arising from the tibial nerve and lateral sural cutaneous nerve from the common peroneal nerve [7]. In the present case sciatic nerve terminated in the middle of the popliteal fossa into the tibial nerve, common peroneal (fibular) and the sural nerve and the sural nerve was found to be thicker than Common Peroneal Nerve. This is an important finding because in such cases can be used for nerve grafts.

Embryological Basis

During embryological development, the nerves contributing to the lower limb forms two plexuses (lumbar and sacral) at the base of the limb bud. The elements from each of these plexuses grow out into the limb, and get subdivided into dorsal and ventral components, for the dorsal and ventral musculatures. The large dorsal component of the sacral plexus (common fibular nerve) and the ventral component (tibial nerve) moves downward close together forming the sciatic nerve. It is not uncommon for the major components to leave the sacral plexus separately, in which case the common peroneal component usually passes through piriformis at the greater sciatic notch while the tibial component passes below the muscle [8].

Clinical significance:

The knowledge of these variations is important because the sural nerve is the most frequently used sensory nerve in nerve transplantation. The trifurcation of the sciatic nerve is important to the surgeons who perform the popliteal block for leg surgery, because high divisions of sciatic nerve may lead to failure of popliteal block anesthesia [9]. The thick sural nerve in this case is ideal for nerve grafts as it serves a purely sensory function, and therefore its removal results in only a relatively trivial deficit. The sural nerve is also widely used for diagnostic purposes like biopsy and nerve conduction velocity studies [10].

Thus, a detailed knowledge of the anatomy of the sural nerve and its contributing nerves are important in carrying out these and other procedures. Although entrapment of the sural nerve is a rare condition, the resultant pain can be debilitating for patients [11]. If the sciatic nerve passes either behind piriformis or sometimes through the muscle it may become entrapped (the piriformis syndrome; this is a common anatomical variant but an extremely rare entrapment. Anatomical Variations in the division of Sciatic Nerve into the tibial and common peroneal nerve from the sacral plexus to the lower part of the popliteal space may contribute to piriformis syndrome, sciatica, coccygodynia and muscle atrophy [12]. This should be taken into account by clinicians who are planning interventions around the sciatic nerve and its division in the lower extremity.

CONCLUSION

Anatomical Variations in the division of Sciatic Nerve into the tibial and common peroneal nerve from the sacral plexus to the lower part of the popliteal space may contribute to piriformis syndrome, sciatica, coccygodynia and muscle atrophy. This should be taken into account by clinicians who are planning interventions around the sciatic nerve and its division in the lower extremity. The trifurcation of the sciatic nerve is important to the surgeons who perform the popliteal block for leg surgery, because high divisions of sciatic nerve may lead to failure of popliteal block anesthesia. The thick sural nerve in this case is ideal for nerve grafts.

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Conflict of Interest

The authors declare that they have no conflict of interest.

Statement of Human and Animal Rights

All procedures performed in human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

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