

An Unusual Bilateral Sciatic Nerve Variation: A Case Report.

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Abstract

Sciatic nerve is a branch of the sacral plexus that controls the neurological activities of the hamstrings and all the other muscles of the lower limb below the knee. Variation in the level of sciatic nerve branching is of common occurrence. We report a case of bilateral variant formation of the sciatic nerve, found in a male human cadaver. The commencement of sciatic nerve trunk formation was found to be in the lower gluteal region instead of the pelvic region. All the roots of the sciatic nerve, namely the lumbosacral trunk (L4, L5), S1, S2 and S3 were seen to remain separate up to lower part of the gluteal region. Incidence of above variation in the general population needs to be studied in order to make surgeons, anesthetists and radiologists aware of the degree and extent of variation. Complete sciatic nerve blockages with local anaesthetics may fail even after multiple attempts if the sciatic nerve is present as a separately sheathed bundle upto the lower gluteal level. Radiologists may erroneously report an abnormally small sciatic nerve, in cases where the presence of a separate bundle is missed.

Key Words: *Sciatic nerve, Variations*

Introduction

Sciatic nerve is the thickest nerve in the human body and the largest branch of the sacral plexus that is formed within the pelvis before its entry into the greater sciatic foramen.^[1] It is directly accessible in the interval between the gluteus maximus and long head of biceps femoris. Prior to this window of accessibility, it is in the gluteal region, where it gains entry via the greater sciatic foramen beneath the piriformis muscle. Beyond this point of accessibility, it passes underneath the long head of the biceps to eventually divide into the tibial and the common peroneal nerves in the lower part of the thigh. Higher levels of sciatic nerve division and its variable relationship with piriformis is a relatively frequent phenomenon that has been reported in the past.^[2,3,4,5,6] The present case report is of an unusual bilateral formation of sciatic nerve, seen in the gluteal region.

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Case Report

In the course of a routine dissection class for medical students, unusual bilateral formation of the sciatic nerve was found in a male cadaver. All the components of the sciatic nerve (Lumbosacral trunk(L4,L5), S1, S2 and S3) were separate upto the lower part of the gluteal region (Figure 1 and 2). The sciatic nerve trunk formation began at a lower level in the gluteal region, instead of beginning proximally in the pelvic region. All the roots of the sciatic nerve joined at a lower level, midway between the ischial tuberosity and the midpoint of the intertrochanteric crest of the femur; to form a single unified sciatic nerve trunk. The lumbosacral trunk gained entry in the gluteal region by piercing the piriformis muscle, and the three sacral roots entered the gluteal region below the piriformis muscle through the greater sciatic notch. At a point, 2cm below the lower border of piriformis, the three sacral roots joined each other to form a 2.5 cm wide, thick band. Distal to this, the unified sacral roots joined the lumbosacral trunk at a point nine centimeters below the lower border of the piriformis, midway between the ischial tuberosity and the midpoint of the intertrochanteric crest; to form the main trunk of sciatic nerve (Figure 1 and Figure 2). Later course and division of sciatic nerve was seen to be normal.



Figure 1: Unusual formation of sciatic nerve of right side showing lumbosacral trunk, S1, S2, S3 and Piriformis.

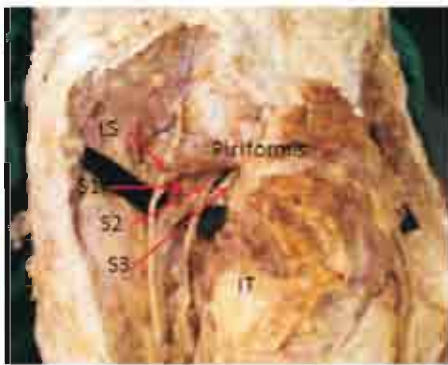


Figure 2 : Unusual formation of sciatic nerve of left side showing Lumbosacral trunk, S1, S2, S3, Piriformis, Sciatic nerve and Ischial tuberosity.

Discussion

In the course of intrauterine development, the nerves contributing to the lower limb form two plexuses (lumbar and sacral) at the base of the limb bud.^[7] Later, as the elements from each of these plexuses grow out into the limb, they are subdivided into dorsal and ventral components, for the dorsal and ventral musculatures.^[7] These plexuses are derived from dorsal and ventral divisions of anterior primary rami of lumbar and sacral spinal nerves. Sciatic nerve is formed when the large dorsal divisions (common peroneal nerve) combines with the ventral divisions (tibial nerve). The two parts of the sciatic nerve develop separately in early embryonic stage and maintain their individual identity throughout their extent, even though joined together to form a single nerve trunk by a common connective tissue sheath.^[8] Thus, during development, the two components of the sciatic nerve in the process of unification get wrapped around by a common connective tissue sheath. The variations

at the level where common connective tissue wrapping ceases and branching begins, has been highlighted by a number of studies.^[2,3,4,5,6] This case reveals that the level where the common connective tissue wrapping for sciatic nerve commences is also variable, as indicated by the presence of separate component roots of the sciatic nerve upto the lower gluteal region. A thorough search of literature did not yield any references related to the lower level of sciatic nerve formation in the gluteal region.

The usual description of passage of the entire nerve trunk, inferior to the piriformis, is observed in 80 to 90% of cases.^[9] The incidence of sciatic nerve trunk division before its entry into the gluteal region and its variable relation with piriformis was observed by Pokorný et al^[2] in 20.9%, Ugrenovic et al^[3] in 4.0% and Gabrielli et al^[4] in 13.7% of cases. When the nerve division was present in the pelvis, the common peroneal component of the nerve pierced the piriformis muscle in 2.5% cases and passed above the piriformis in 1.5% of cases.^[2,3,10,11,12] In our case also, the lumbosacral component descended into the gluteal region through the piriformis, thus, once again emphasizing the existence of intimate but variable relationship the sciatic nerve and its components has with the piriformis muscle.

During sciatic nerve block, local anesthetic medication is infiltrated into the connective tissue sheath around the nerve. Complete sciatic nerve blockage will fail if the sciatic nerve is present as separately sheathed bundles upto the lower gluteal level. This condition, if present, might lead to failure of sciatic nerve block even after multiple attempts.^[13] A radiologist might miss the separate trunks of the sciatic nerve and report a gross difference in the diameters of the sciatic nerves, though the condition may be absolutely normal.^[14]

Conclusion

None of the reported studies, on variations of the sciatic nerve, so far, have observed a lower level of formation of sciatic nerve trunk. In present case, it was found that a single sciatic nerve trunk formation began in the lower gluteal region instead of the pelvic cavity region. All the components of the sciatic nerve were seen to remain separate upto the lower half of the gluteal region, making this an unusual case. This and other variations need to be further evaluated for their prevalence in the general population so that surgeons, anesthetists and radiologists are made aware of the degree and extent of these variations.

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