



## VARIATION IN BIFURCATION OF SCIATIC NERVE

### Anatomy

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### ABSTRACT

**INTRODUCTION:** Sciatic Nerve (SN) is the nerve of the posterior compartment of thigh formed in the pelvis from the ventral rami of the L4 to S3 spinal nerves. It leaves the pelvis via the greater sciatic foramen below piriformis and divides into its terminal branches, Common Peroneal Nerve (CPN) and Tibial Nerve (TN) at the level of the upper angle of the popliteal fossa. Higher division of the sciatic nerve is the most common variation where the tibial nerve and Common peroneal nerve may leave the pelvis through different routes. Such variation may lead to compression of the nerve and lead to Non-discogenic sciatica. Hence study of its variation is important.

**AIMS AND OBJECTIVES:** To study the variation in division of sciatic nerve and its clinical and surgical implications.

**METHODOLOGY:** This study was conducted in Department of Anatomy of Osmania medical college, Koti, Hyderabad. During routine undergraduate dissection of human cadavers, total (44 lower limbs) 20 males and 2 females cadavers were dissected during the study. The cadavers with visible trauma or prior surgeries were excluded from routine study. Dissection of lower limb was followed, During the dissection of gluteal region, nerve was identified and carefully dissected. At first, origin was confirmed and then, it was traced down. The variation was identified, noted and photographed. The results were analysed and compared with previous study.

**RESULTS:** Higher level of bifurcation of sciatic nerve (in pelvic cavity) was identified in one cadaver on left side. Among 44 lower limb, the percentage of higher level of bifurcation is 2%

**CONCLUSION:** Sciatic nerve is the main nerve of the Lower limb. Considering its variation in bifurcation at different levels is essential for Surgeons, Orthopaedicians, Plastic surgeons, Anatomist and researchers. This high division results in sciatica, nerve injury during deep intramuscular injections in gluteal region, piriformis syndrome, failed sciatic nerve block in anesthesia and it helps the orthopedicians during posterior hip operations

### KEYWORDS

Sciatic Nerve, Piriformis Muscle, Tibial Nerve, Common Peroneal Nerve

### INTRODUCTION:

Sciatic nerve is one of the thickest nerve in the body. It is formed from lumbar plexus, it supply most of the muscle of lower limb. It consists of tibial component and common peroneal component, both of which are initially a common trunk. The tibial component is derived from ventral branches of ventral rami of L4, L5, S1, S2, S3 and common peroneal component from dorsal branch from ventral rami of L4, L5, S1, S2. Sciatic nerve emerges through greater sciatic foramen below piriformis and coming inferolaterally descends beneath the gluteus maximus midway between Ischial tuberosity and greater trochanter. In gluteal region it rests on dorsal surface of body of ischium separated from nerve to quadratus femoris, tricipital tendon of obturator internus with superior and inferior gemelli, quadratus femoris and adductor magnus. At the back of the thigh nerve is crossed superficially by long head of biceps femoris, close to the upper angle of popliteal fossa divides into tibial and common peroneal nerve. Hence study of this nerve and its variation is important in clinical and surgical aspect.

### MATERIAL AND METHODS:

This study was conducted in Department of Anatomy of Osmania medical college, kotu, Hyderabad. During routine undergraduate dissection of human cadavers. Total (44 lower limbs) 20 males and 2 females cadavers were dissected during the study. The cadavers with visible trauma, pathology surgeries were excluded from study. Routine dissection of lower limb was followed. During the dissection of gluteal region, sciatic nerve was identified and carefully dissected. At first, origin was confirmed and then, it was traced down. Any variation was identified, noted and photographed. The results were analysed and compared with previous study.

### RESULTS:

Unilateral higher level (beneath piriformis) bifurcation of sciatic nerve found in one male cadaver. The percentage of bifurcation of higher

division of sciatic nerve is 2%

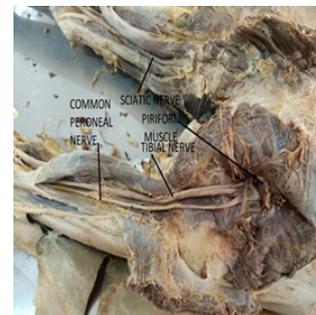


FIG : 1



FIG : 2

### DISCUSSION:

According to different study, it shows that there are many variations in sciatic nerve division especially in higher divisions. There are different types of high divisions of sciatic nerve within pelvis, usually bilateral and if it is unilateral then other side will mostly remain normal. Sciatic

nerve usually divides in the upper angle of popliteal fossa into common peroneal nerve and tibial nerve [1–3]. In the current study, high division of sciatic nerve in the pelvis was noted in 1 specimen (2%) which suggest the frequency of variant the anatomy of Sciatic nerve. Each of the anatomical variations may reflect a different and case-specific clinical presentation of sciatic neuropathy. Many anatomists have tried to classify the variations in division of sciatic nerve. According to the LE. Beaton and Anson B.J who conducted a detailed study about the sciatic nerve variation and are classified as follows.

- Type 1: Undivided nerve below undivided muscle.
- Type 2: Division of nerve between and below undivided muscle.
- Type 3: Division above and below undivided muscle.
- Type 4: Undivided nerve between heads.
- Type 5: Division between and above heads.
- Type 6: Undivided nerve above undivided muscle [3].

In present study higher division of sciatic nerve was identified that is beneath the piriformis muscle. The probable basis for this pelvic division is the separate existence of the nerves during embryonic development. The level of division of the Sciatic nerve influences the extent of neurological deficit in sciatic neuropathy. For instance, division in the gluteal region or proximal to the popliteal fossa may result in involvement of only one of the two divisions during popliteal fossa injuries. It may account for failure of Sciatic nerve block when performing popliteal block anesthesia. Hence such type of variations must be kept in mind during various operative procedures in the gluteal region.

#### CONCLUSION:

The anatomical knowledge regarding variation about the level of division of the sciatic nerve and the location where it leaves the pelvis of great importance. The variations in division of sciatic nerve in gluteal region such as above are very important for surgeons, as this is the area of frequent surgical manipulation. This knowledge will not only help surgeon to take care during surgery, but help to plan accordingly during various surgical interventions and management of this region. This high division results in sciatica, nerve injury during deep intramuscular injections in gluteal region, piriformis syndrome, failed sciatic nerve block in anesthesia and it helps the orthopedicians during posterior hip operations. This also motivates radiologist to repeat MRI on other side, as there can be differences on two sides. This knowledge is also very important for nurses and junior doctor to prevent deep intramuscular injection hazards in gluteal region. The differences in the exit routes of these two nerves are important in clarifying the clinical etiology of nondiscogenic sciatica.

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