



## A CASE REPORT OF BILATERAL HIGH DIVISION OF SCIATIC NERVE OF TWO DIFFERENT TYPES

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**Abstract :** Sciatic nerve is the thickest nerve of the body arising from sacral plexus. The nerve emerges through greater sciatic foramen below the piriformis muscle and divides into tibial and common peroneal nerve in the popliteal region. During routine cadaveric dissection in Institute of Anatomy, Madurai Medical College, a rare variation of bilateral high division of sciatic nerve of two different types and also unilateral high origin of genicular branch from common peroneal nerve were found. Such high division of the sciatic nerve either unilateral or bilateral can result in compression of the nerve and result in sciatica.

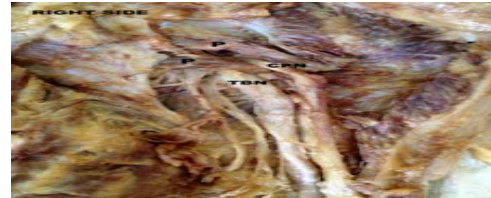
**Keyword :** Sciatic nerve, common peroneal nerve, tibial nerve and piriformis muscle.

### INTRODUCTION:

Sciatic nerve is the widest nerve of the body, about 2cm broad and consists of tibial and common peroneal components, both of which form initially a common trunk. The sciatic nerve emerges through the greater sciatic foramen below the piriformis descends beneath the gluteus maximus. At the back of thigh the nerve is crossed superficially by the long head of biceps femoris, and close to upper angle of popliteal fossa it divides into tibial and common peroneal nerves. Sometimes the division takes place in the pelvic cavity, in such case the common peroneal nerve pierces the piriformis and the tibial nerve emerges below the muscle. The piriformis is a flat muscle, pyramidal in shape and is the key muscle of gluteal region. It arises from the front of sacrum by three fleshy digitations, upper margin of greater sciatic foramen, capsule of sacro- iliac joint and adjoining pelvic surface of sacro-tuberous ligament. The muscle appears in the gluteal region after emerging through the greater sciatic foramen and is inserted as a rounded tendon into upper border of greater trochanter [1]. Variations in the division of sciatic nerve and the piriformis muscle can result in entrapment of the nerve and result in sciatica. Pain caused by compression or irritation of the sciatic nerve is called sciatica. In the present study a rare variation of bilateral high division of sciatic nerve with unilateral divided piriformis muscle and also unilateral high origin of genicular branch from common peroneal nerve were found. These variations are not frequently encountered; hence the aim of this study is to discuss the anatomical variation of sciatic nerve and their clinical significance.

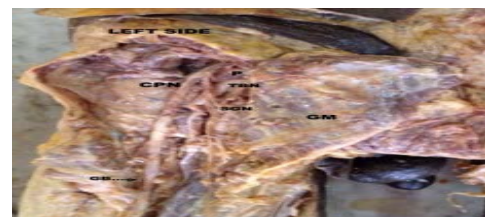
### CASE REPORT:

During routine dissection of gluteal region of an adult male cadaver in the Institute of Anatomy, Madurai Medical College variations in the sciatic nerve were found on both sides. On the right side, the piriformis muscle was bifid and the sciatic nerve divided within the pelvis. The tibial nerve passed below the piriform muscle and common peroneal nerve passed in between the two division of piriformis muscle. Further course of both nerves were found to be normal.



**Figure.1**

Figure 1: Photograph of right side gluteal region showing two divisions of piriformis muscle, common peroneal nerve passing in between two divisions and tibial nerve below the lower division. (CPN common peroneal nerve, TB- tibial nerve and P- piriformis muscle). On the left side, single belly of the piriformis was observed and the sciatic nerve divided within the pelvis. The tibial nerve passed below the piriformis and common peroneal passed above the piriformis muscle. Also the genicular branch arose from common peroneal nerve at higher level 8cm below the lower border of piriformis muscle. The genicular branch descended lateral to common peroneal nerve and terminated by piercing the capsule of knee joint.



**Figure.2**

Figure 2: Photograph of left side gluteal region showing common peroneal nerve passing above the piriformis and tibial nerve below the piriformis and genicular branch arising from common peroneal nerve. (CPN- common peroneal nerve, TBN- tibial nerve, GB- genicular branch, GM- gluteus maximus, SGN- superior gluteal nerve and P-piriformis muscle).



**Figure.3**

Figure 3: Photograph of left thigh showing the genicular branch arising from common peroneal nerve and piercing the capsule of knee. (CPN- common peroneal nerve, TBN- tibial nerve, BF- biceps femoris, GB- genicular branch).

#### DISCUSSION:

Normally the sciatic nerve passes out through greater sciatic foramen and enters the gluteal region below the piriformis and divides at apex of the popliteal fossa into tibial and common peroneal nerve. S. Smoll in his study found that the prevalence of high division of sciatic nerve in cadavers was 16.9% and in surgical case series was 16.2% [4]. High division of sciatic nerve can result in entrapment and sciatica. Pain caused by compression or irritation of the sciatic nerve is called sciatica. There are different types of high division of sciatic nerve within the pelvis and Beaton and Anson classified them into six types [9]. In the present study, two different types of high division of sciatic nerve were noted. On the right side, two divisions of piriformis muscle was noted, tibial nerve passed below the muscle and the common peroneal nerve passed in between two divisions. Khan et al (2011) observed similar findings on the left side. Interestingly, on the left side the common peroneal nerve passed above the undivided piriformis and gave the genicular branch at higher level 8cm below the lower border of piriformis and tibial nerve passed below the piriformis. Khan et al (2011) in his study, found a different type of high division of sciatic nerve on the right side, common peroneal nerve passed piercing the piriformis and gave the genicular branch at 13.5cm below lower border of piriformis and tibial nerve passed below piriformis [3]. In the present study, two divisions of piriformis on the right side was noted and common peroneal nerve passing in between the divisions of muscles. In such case, myospasm or contraction of the piriformis muscle itself can lead to entrapment of the nerve and result in pain along the back of thigh to knee, loss of sensation or numbness and tingling into the leg and sole of the foot. This is classically known as piriformis syndrome and should be differentiated from sciatica which is due to lumbar disc pressing on sciatic nerve [7]. Knowledge of unilateral division of piriformis is very important in clinical diagnosis and treatment as the patient may present with different symptoms on both sides. In the present study, the genicular branch arose at higher level from common peroneal nerve on the left side 8cm below the lower border of piriformis muscle. Similar findings were found by Khan et al 13.5cm below the piriformis [3] and by Ali Ewediah 20cm below piriformis [5]. Knowledge of unilateral high branching of genicular branch of common peroneal nerve is important for surgeons as this nerve can be easily damaged during varicose vein stripping [5]. Combination of such variations, high division of sciatic nerve of two different types, unilateral divided piriformis and origin of genicular branch at higher level makes this study clinically more significant.

#### CONCLUSION:

The anatomical relationship between sciatic nerve and piriformis muscle is of great importance as the gluteal region is frequently involved in surgical manipulations such as posterior hip surgeries and also in deep intramuscular injections. High division of sciatic nerve results in sciatica, nerve injury during deep intramuscular injections, piriform syndrome, failed sciatic nerve block in anaesthesia and injury during posterior hip operations. A thorough knowledge of high division of sciatic nerve and its relation to piriformis muscle is necessary for surgeons to make diagnosis and manage accordingly to prevent complications.

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