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RESEARCH ARTICLE

VARIATIONS IN COURSE OF SCIATIC NERVE IN ADULT HUMAN CADAVERS

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Abstract

Most of the sciatic nerve course in individuals is normal and variations in sciatic nerve is seen in approximately sixteen to twenty five percent of cases. Often sciatica is misdiagnosed. Pseudo-sciatica occurs as a result of non-spinal etiological factors. Understanding the origin and course of sciatic nerve is needed to correctly diagnose sciatica. The present study is undertaken to determine the normal course of sciatic nerve, along with its variations.

Material And Methods: The following study was conducted on variation of sciatic nerve found during routine dissection of 100 cadavers for teaching purpose, in the Department of Anatomy, Govt. Medical College, Kurnool and other medical colleges in Kurnool. There were no other gross anomalies or pathologies. The skin around the area was normal and no evidence of surgery was present. The gluteal region was dissected and Gluteus maximus muscle was reflected and exposing the sciatic nerve and Piriformis muscle.

Result: The incidence of variation in sciatic nerve is very low and is noted firstly in the right side of the cadaver. The occurrence of variation is 16 in 100 cadavers. Eighty four cadavers showed normal course of sciatic nerve. Out of sixteen cadavers, ten cadavers showed variation related to type b ranging 62.5% of total variations seen. Four cadavers showed type c variation ranging 25 % of total variations. Two cadavers were seen with a variation of type e ranging 12.5%.

Conclusion: Sciatic nerve is the thickest, largest and longest nerve in the body. Its pathologies are also frequent in occurrence in daily life. A thorough knowledge of its anatomy and variations of sciatic nerve is required to give proper treatment plan to the patient. Also the, significance of it should not be overlooked during surgical and popliteal nerve block anaesthetic procedures.

Introduction:-

The word sciatica originates from Greek word“Ischiadichus”which means nearer to hip bone. Sciatic nerve is categorised as mixed nerve containing both sensory and motor nerve fibers. It can be marked at the back side of the thigh, from ischial tuberosity to the apex of greater trochanter and popliteal fossa. The course of sciatic nerve traverses from ventral rami of L4 to S3 spinal nerves from lumbosacral plexus. It has two components tibial and peroneal nerves. It exits pelvis through sciatic foramen below the piriformis muscle and at the ischial tuberosity it divides into two branches peroneal and tibial nerves.The nerve innervates back of lower limb and upper parts of foot. Any variations in sciatic nerve course may be the cause of piriformis syndrome and sciatica. Knowledge of

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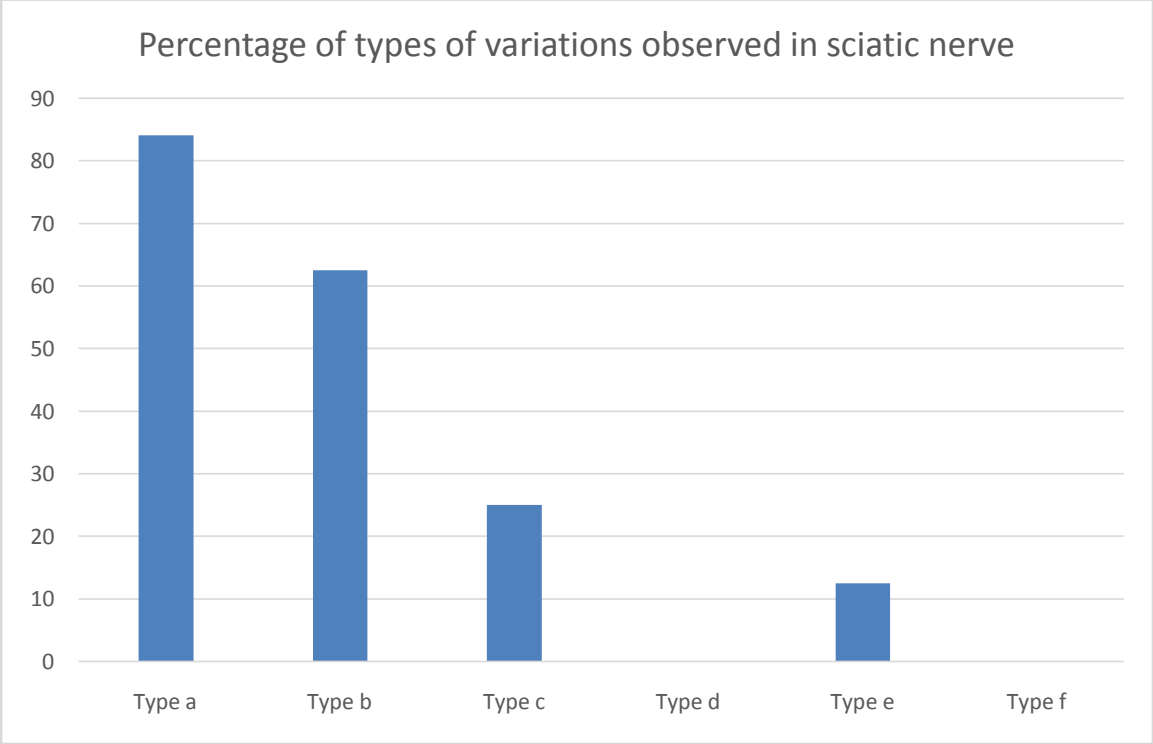
sciatic nerve course and its variations is required for the diagnosis and treatment of diseases associated with sciatic nerve. Also to avoid errors during surgical procedures, it is important to understand the course of the sciatic nerve. Hence, the following study is conducted to determine the course of sciatic nerve and its variations.

Material And Methods:-

The following study was conducted on variation of sciatic nerve found during routine dissection of 100 cadavers for teaching purpose, in the Department of Anatomy, Govt. Medical College, Kurnool and other medical colleges in Kurnool. After obtaining ethical certificate from the ethical committee department, the following study was carried out. The cadavers were formalin fixed and without any gross pathologies. Routine dissection for teaching purpose was carried out in the laboratory and the variation of sciatic nerve were noted. The gluteal region was dissected and gluteus maximus muscle was reflected, exposing the sciatic nerve and Piriformis muscle. Data was collected for a period of around three years. The variations observed were classified based on Beaton and Anson classification.

Results:-

Out of 100 dissected lower limbs of human cadavers, eighty four limbs of human cadavers showed normal anatomy of sciatic nerve in relation to piriformis muscle which according to Beaton and Anson classification is type – a variation (Fig: 3).The occurrence of variation is 16 in 100 cadavers. Out of sixteen cadavers, ten cadavers showed variation related to type b ranging 62.5% of total variations seen (Fig: 1). In these ten cadavers the Sciatic nerve was seen dividing between and below the Piriformis muscle. Four cadavers showed type c variation ranging 25 % of total variations (Fig: 2). In these four cadavers the sciatic nerve was seen dividing above and below undivided muscle. Two cadavers were seen with a variation of type e ranging 12.5%.Two cadavers showed sciatic nerve divisions between and above piriformis muscle.



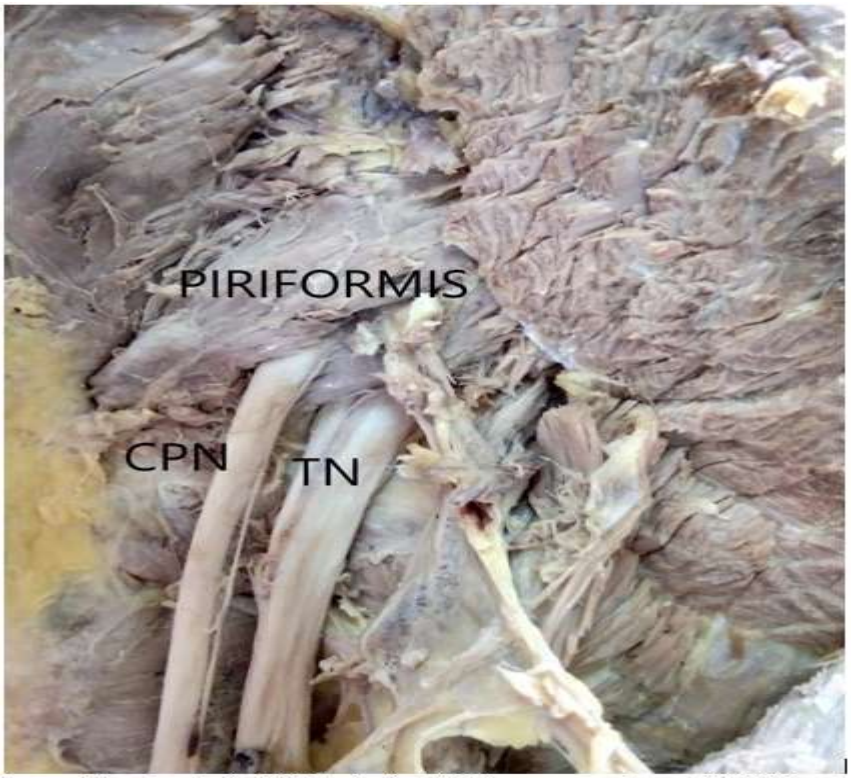


Image of dissection showing left gluteal region.CPN:Common peroneal nerve,TN:Tibial nerve

Fig 1:- Variation showing type b classification.

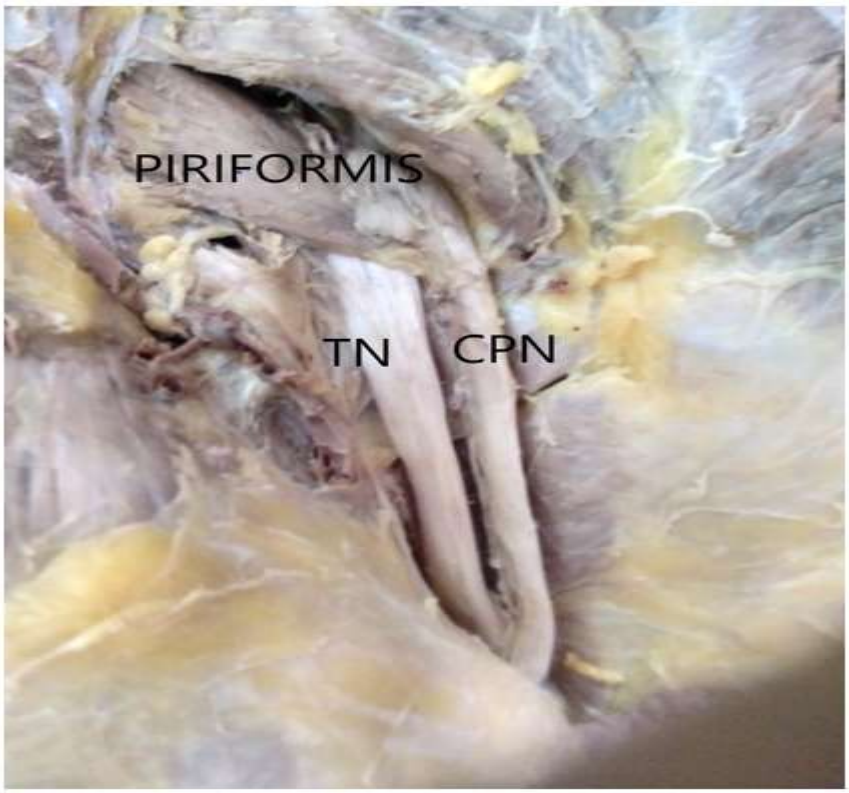


Image of dissection showing right gluteal region. CPN: common peroneal nerve, TN: tibial nerve

Fig 2:- Variation showing type c classification.

Fig 3:- Normal course of sciatic nerve.

Discussion:-

During embryological development the nerves supply to lower limbs through lumbar and sacral plexus at the lower limb bud. Further they branch to common peroneal nerve (the dorsal component of sacral plexus) and tibial nerve (ventral component). The nerves branch at different levels from their origin. Normally sciatic nerve divides into tibial and common peroneal nerve just above the, or at the superior angle of popletial fossa. According to Guvencer et al., in their study 48 percentage of the sciatic nerve showed variations[(5)]. In our study 16 percent of the sciatic nerve showed variations. According to Berihu & Debeb [(7)] most of the percentage of the sciatic nerves showed normal type a variation, only 11 percent of the variations were type b and 2 percent of the sciatic nerve variations showed type c variety. Their results coincided with our study. Singh & Sharma [(8)] conducted a similar study in which 96 cadavers showed type a i.e, normal variant of sciatic nerve and only 4 cadavers were of type b variation of sciatic nerve.

Sciatica is the most common condition occurring in the human population. The causes of sciatica are spinal stenosis, trauma, piriformis syndrome and so on. Piriformis syndrome is due to the sciatic nerve variations while dividing into branches[(5)]. In many cases this etiological factor of sciatica is misdiagnosed[(6)]. There are six types of sciatic nerve according to Beaton and Anson classification -

Type a - undivided nerve below undivided muscle
Type b - divisions of nerve between and below undivided muscle
Type c - divisions above and below undivided muscle
Type d - undivided nerve between piriformis
Type e - divisions between and above piriformis
Type f - undivided nerve above undivided muscle

In this case diagnosis is difficult and requires medical imaging with skill and expertise. Variations of sciatic nerve may also be the cause of sciatica and should be considered while treating the condition. Another clinical significance is during popletial nerve block anaesthesia the sciatic nerve is partially blocked if there are any sciatic nerve variations. Sciatic nerve variations can be completely normal without any complications in some individuals.

Conclusion:-

Sciatic nerve is the thickest, largest and longest nerve in the body. Its pathologies are also frequent in occurrence in daily life. A thorough knowledge of its anatomy and variations of sciatic nerve is required to give proper treatment plan to the patient. Also the, significance of it should not be overlooked during popliteal nerve block anaesthetic procedures.

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