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# Anatomical study of Sciatic nerve w.s.r. to Gradhrasi

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**ABSTRACT**

**During the life period of 30-50 years the most common disorder which affects the movements of leg particularly is back ache problem. Approximately one third of these cases turns into Gradhrasi (sciatica), which is a painful condition chiefly, affecting the lower-back area which radiates downwards to one leg or both legs along the gradhrasi nadi (sciatic nerve). Complete knowledge about the pathway and level of division of grudharsi nadi (sciatic nerve) is very important for an exact management. The sciatic nerve divison normally occurs at the junction of the upper two third and lower one third of the thigh. However, this division of sciatic nerve shows variations which may be inside the pelvis or outside the pelvis. The abnormal divisions of the nerve may be the reason for several pathological disease related to the nerve. The division of the sciatic nerve at the inferior border of piriformis. The divided nerve emerges from the lower border of piriformis and showing bilateral variation. A thorough knowledge of the division of the sciatic nerve is very important for differential diagnosis of sciatica of various origins and its management by different management methods or surgical methods. This study also gives an idea for the surgeons to be very careful while doing surgery as some patients may have a difference in the division of sciatic nerve by birth itself.**

**Key words: Gradhrasi, Sciatic nerve**

## INTRODUCTION

About one third of back ache cases turns into Gradhrasi (sciatica), that is chiefly a painful condition, affecting the lower-back area which radiates downwards to one leg or both legs along the gradhrasi nadi (sciatic nerve). It is a major cause for the loss of millions of workdays annually that results in huge loss of nation's economy. According to Ayurveda, Gradhrasi is mainly of two types i.e. Vatikam and vatakaphajam. It is a condition during which dysfunction of vata affects sciatic nerve (Gradhrasi nadi) characterised by stabdhata (stiffness), ruk (pain), toda (pinning sensation), stambhana starting from sphik (buttock), kati (low back), prushta, radiating down the posterior border of the thigh, janu (knee) and outer border of jangha, pada and angulees, with stiffness and impairment of lifting the thigh while lying is supine position. Hence thorough knowledge about the sciatic nerve, its level of bifurcation into tibial (medial popliteal), common peroneal (lateral popliteal) and the pathway are very important for the proper management and surgical point of view. Sciatic nerve is the largest nerve in the human body, that arises inside the pelvis from the lumbar plexus seen on either sides of the lower part of the spinal cord. The nerve has mainly two components-tibial (medial popliteal) and common peroneal (lateral popliteal).The ventral divisions that contribute to the tibial component are the anterior primary rami of lumbar and sacral segments L4 , L5 ,S1 ,S2, and S3.

The dorsal divisions of spinal segments L4, L5, S1 and S2 contribute to common peroneal. The nerve enters the gluteal region from the pelvis passing below the lower border of piriformis which lateral runs down through the posterior compartment of thigh, reaching the junction between the upper two thirds and lower one third of the thigh, the nerve divides into the tibial and common peroneal nerves. This division rarely occur at a higher level – anywhere along the back of thigh or inside the pelvis. During the intrapelvic divison both the tibial and common peroneal nerves run separately and they may enter the posterior compartment of thigh passing inferior to piriformis. In some cases one nerve may be seen above piriformis and one below the muscle; rarely one of the nerves may pierce the piriformis and reaches the back of thigh. Thus it is very important to have knowledge in the bifurcation of the sciatic nerve and the structures which may compress the nerve helps the surgeon or physician to arrive at a clear diagnosis for a better management especially during surgeries.

Acharya Charaka described, Gradhrasi is a Vatavyadhi that is characterised by Stambha (stiffness), Ruk (pain), Toda (pricking pain) and Spandana (frequents switching). Initially these symptoms affect Sphik (buttock) as well as posterior aspect of Kati (waist), then gradually radiates to posterior aspects of Ooru (thigh), Janu (knee), Jangha (calf) and Pada (foot).

Acharya Sushrutha has described that there are two Kandara in the leg that gets afflicted. One kandara extend distally from the Parshni to the toes, and other extends above from the Parshni to the Vitapa. When these two Kandara gets afflicted with the Vata Dosha limits the extension of the leg this disease is known as Gradhrasi.

Inspite of progress in medicine and surgery in the fields of allied science it is very difficult to have diagnosis of many back pain conditions. The exact aetiology is also not sure, as a result of which no rational curative measures are known. Recently it has been reported that the methods of treatment are numerous and varied from exercise to rest, manipulation to immobilisation of muscles, joints and discs, surgery etc,. But all these are possible only after a clear knowledge about the pathway and bifurcation of the sciatic nerve.

## DISCUSSION

According to modern medicine therapy treatment for sciatica generally comprises analgesic drugs and rest in bed. So, repeated use of analgesic becomes necessary for the treatment. Unfortunately repeated and prolonged use of all these analgesic is associated with many side effects. Ayurveda advocates a different way for the management of ghrudhrasi (sciatica) giving consideration to protect the normal health while treating the disease with surprisingly safe and easily available drugs, but a scientifically proven methodology of this 21st century is not found. The whole scientific world now have high hopes in Ayurveda due to its efficiency to provide proper and safe methods for management of this disorder. The efforts of modern methods of science like the deep knowledge of anatomical structures, its pathway and its difference from normal way helps the Ayurvedic science to prove various hypothesis scientifically.

The various symptoms associated with sciatica are nerve pain, numbness, tingling, and weakness. It may include inability to walk depending upon the where the pressure of the sciatic nerve occurs; this clue of pressure on the sciatic nerve helps to decide what type of poorvakarma or panchakarma should be done. CT-scan, MRI, EMG (electrical activity of the muscle) and Nerve conduction test and Blood tests are routine investigations done to identify nerve pathology.

Going through the embryology of the sciatic nerve, it is mentioned the thickest nerve in the body that is covered by a common sheath of epineurium. Though the nerve has a common epineurium the component nerves, but tibial nerve and the common peroneal nerves remain separate. During the development period the two nerves migrate towards each other and get enclosed in a common sheath. Failure in the development of the epineurium or a thin layer of epineurium that may be due to any reason results in the separation of the nerve into its components at a higher level. In the present study division of sciatic nerve is at a higher level than usual. This type of division may result in several problems like sciatica, nerve injury during deep intramuscular injections in gluteal region, piriformis syndrome, failed sciatic nerve block in anesthesia and injury during posterior hip operations. This knowledge also motivates radiologist to repeat MRI on other side, as there can be differences on two sides. This knowledge is also helpful in preventing deep intramuscular injection hazards in gluteal region. The differences in the exit routes of these two nerves are very hepful in clarifying the clinical etiology of nondiscogenic sciatica. This condition may be an inborn. After emerging from the lower border of piriformis, the divided nerves were found to run over the tendon of obturator internus.

The nerves were not bound by the common epineurium and neither of the components pierced the piriformis. Various authors reported variation in the division of sciatic nerve at different levels above the superior angle of popliteal fossa. The division of nerve may be intra-pelvic and the component nerves – tibial and common peroneal may leave the pelvis below the lower border of piriformis, may pierce the piriformis or appear above the upper border of piriformis. This may be also possible that the tibial and common peroneal nerves may divide outside the pelvis at any level between the lower border of piriformis and the superior angle of popliteal fossa.

In present study the sciatic nerve divison was found to be below the lower border of piriformis into the tibial and common peroneal nerves, this may be a condition which is inborn and may not be a case of gradhrasi (sciatica). In this study the stress is mainly given to understand the pathway and the difference of division of sciatic nerve which may be helpful in the management of gradhrasi (sciatica).

The therapeutic measures that should be adopted for Gradhrasi are oral medications, purvakarma of panchakarma like abhyanga (oil application) with snehas (oil), swedana (sudation) etc and panchakarma. The therapies described in Bhagna

Chikitsa (management of fracture) are also found to be useful in Gradhrasi (sciatica) cases caused by trauma. Traction are done in cases of Gradhrasi according to patients condition. A complete knowledge about the pathway and the level of division of sciatic nerve is very important for all these therapies. The present study is a preliminary study regarding the sciatic nerve and its importance in Gradhrasi.

Yet to derive at a conclusion the study should be conducted in larger samples. Previous studies have shown different degrees of variation in the division of sciatic nerve. Thus this study helps to know the differential diagnosis of Gradhrasi (sciatica) by various etiology as well as piriformis syndrome which helps in the effective management of Gradhrasi (sciatica) clinically and surgically. The compression caused by structures other than Inter Vertebral Disc prolapse are of importance for physicians and surgeons in effectively relieving the cause behind sciatica of varying etiology which helps to reach the right management.

## CONCLUSION

A thorough knowledge of the division of the sciatic nerve is very important in differential diagnosis of sciatica of various origins and its management by different treatment methods. During surgery, surgeons should have deep knowledge of divison of sciatic nerve as some patients may have a difference in the division of sciatic nerve by birth itself. Present study has shown that the division of sciatic nerve below the inferior border of piriformis which is unusually at a higher level than the normal level of division. The level of division of sciatic nerve is intra-pelvic or extra-pelvic. When intra-pelvic the level of division inside the pelvis and how it leaves the pelvis and the extra-pelvic division of sciatic nerve are of great significance as this may cause compression on the nerve by various structures.

Thus this study helps to throw light on Gradhrasi (sciatica) of various etiology as well as piriformis syndrome. This helps in the effective management of Gradhrasi (sciatica) clinically and surgically.

## REFERENCES

[1]. Acharya Shushrut, sushurut samhita, Nidansthan, 1st Chapter, Ambika Datt shashtri commentary, Chaukhambha subharti prakashan Varanasi.
[2]. Acharya vagbhatta, Astang hridaya, Nidansthan, chapter 16, Atridev gupta chukhambha publication Varanasi.
[3]. Acharya Aganivesh, charak samhita, chikitsasthan, brahmanand tripathi, 28th Chapter, chaukhambha sanskrit prakashan Varanasi.
[4]. B D Chaurasia, Human Anatomy, vol -1 to 3, Sixth edition, CBS Publication, Pulication.