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### RESEARCH ARTICLE

#### THE BILATERAL HIGH DIVISION OF THE SCIATIC NERVE IN THE PELVIS

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#### Abstract

The sciatic nerve is the thickest nerve of the body.<sup>1</sup> It leaves the pelvis below the piriformis via the greater sciatic foramen and descends between the ischial tuberosity and greater trochanter in the back of the thigh, dividing into the tibial and common peroneal nerves proximal to the knee; however, the level of bifurcation can be variable.<sup>2</sup> The levels of division of the sciatic nerve are important in anaesthesia, orthopaedics, rehabilitation, and neurology.<sup>3</sup> The study was done by dissection of forty-two human adult lower limb specimens, irrespective of sex from the Department of Anatomy, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India. During dissection, 02(4.8%) specimens out of 42 specimens showed high division, 28(66.6%) specimens showed intermediate, and 12 (28.6%) specimens showed low division of the sciatic nerve. The bilateral high division of the sciatic nerve is a rare variation. Knowledge about the level of division of the sciatic nerve is important for clinicians and surgeons.

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#### Introduction:-

The sciatic nerve is 2 cm wide at its origin.<sup>2</sup> It has two components. These are the tibial and the common peroneal component. The tibial component is the larger component of the sciatic nerve. It is formed from the ventral/ anterior division of the fourth lumbar and fifth lumbar and first sacral to third sacral ventral rami. The common peroneal component is formed from the dorsal/posterior branches of the fourth lumbar and fifth lumbar and the first sacral and second sacral ventral rami.<sup>2</sup> As the hip and thigh are the areas for frequent surgical manipulation. The variations in the sciatic nerve course and its division levels are important for surgeons.<sup>3</sup> This knowledge is very important during deep intramuscular injection in the gluteal region, sciatic nerve block in anesthesia, posterior hip operations, and in the management of sciatica, and piriformis syndrome. The high division of the sciatic nerve may result in nerve injury during pelvis surgeries and deep intramuscular injections in the gluteal regions.

#### Material and Methods:-

The study was conducted in the Department of Anatomy, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India. We performed our study in forty-two (21 right and 21 left) formalin-fixed adult cadaveric lower limbs, irrespective of sex. The pelvic and gluteal region was dissection according to Cunningham's manual. After carefully cleaning the nerve, we observed the levels of terminal division of the sciatic nerve into the tibial nerve and common peroneal nerve and categorized it as:

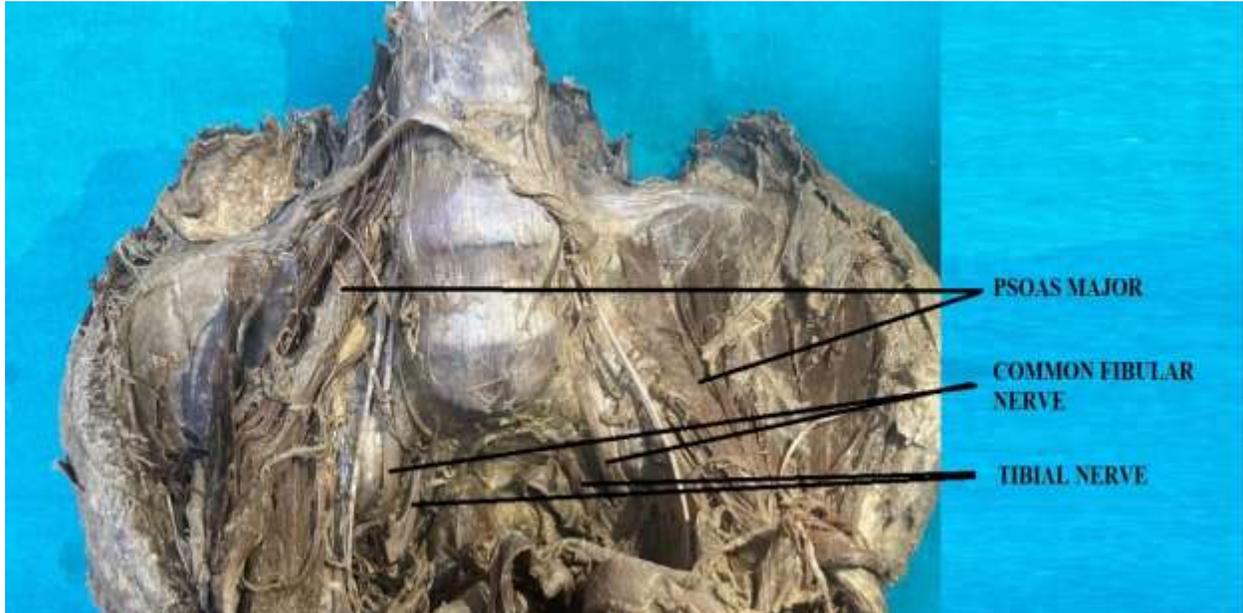
1. High division – Sciatic nerve divides inside the lesser pelvis and in the gluteal region.
2. Intermediate division – Sciatic nerve divides in the upper two-thirds of the thigh.
3. Low division – Sciatic nerve divides in the popliteal fossa.

### Observations and Results:-

We dissected a total of 42 lower limbs (21 right and 21 left). We observed the level of terminal division of the sciatic nerve into the tibial nerve and common peroneal nerve. 02 (4.8%) specimens showed high division, 28(66.6%) showed intermediate division and 12(28.6%) showed low division.

### Discussion:-

During dissection, we found the bilateral high division of the sciatic nerve in the pelvis, we were able to find the two components of the sciatic nerve i.e. common peroneal and tibial separated in the pelvis.

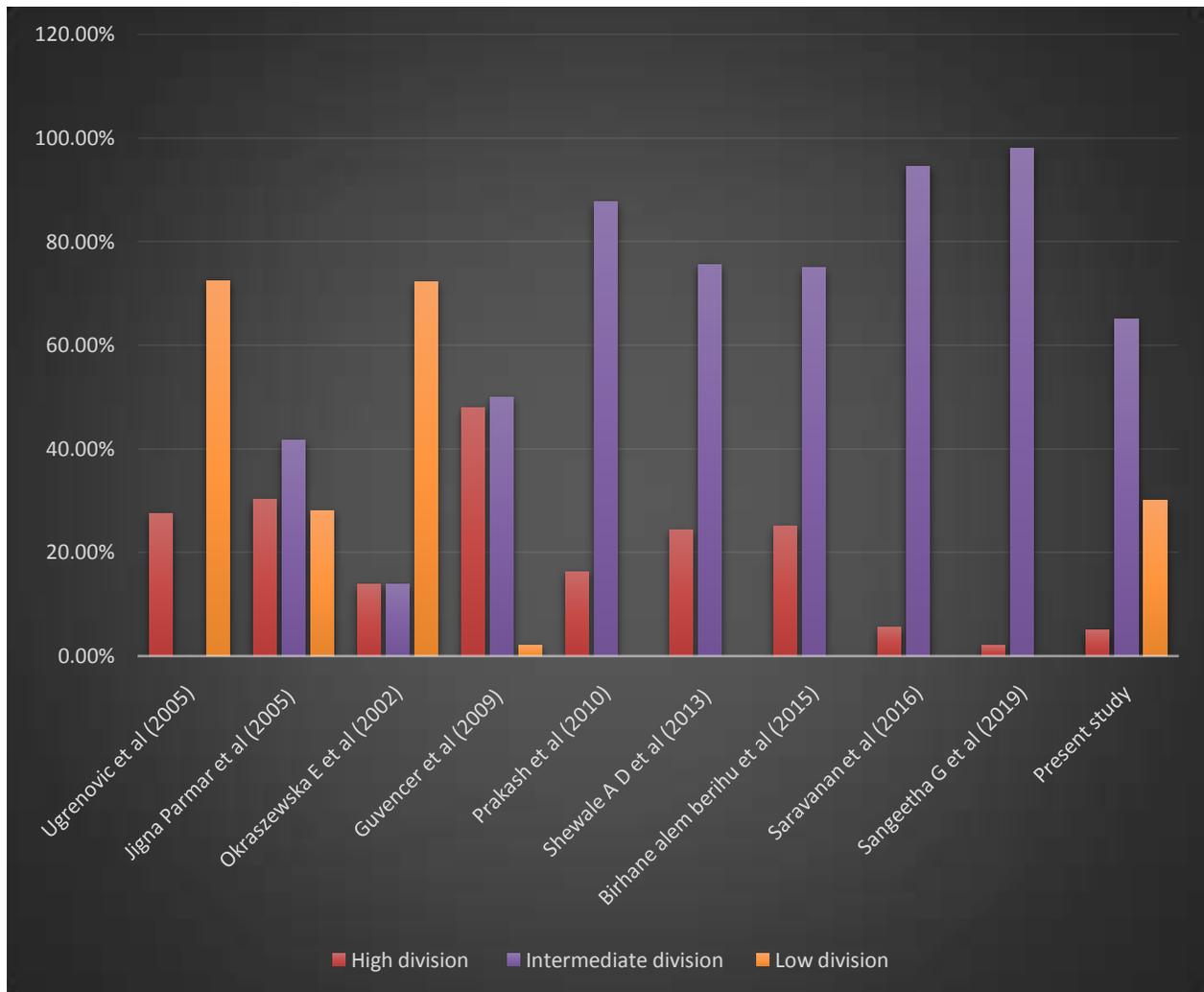


**Fig No.1:-** Photograph of High Division of Sciatic Nerve.

In literature, various studies have been reported, about the levels of division of the sciatic nerve. Thus, the present study has been compared with the previous studies below.

**Table no 1:-** Showing Division Of Sciatic Nerve As Reported By Various Authors.

Authors	Ethnic group	Total number of specimens	High division	Intermediate division	Low division
Ugrenovic et al <sup>4</sup> (2005)	Republic of Croatia, Europe	200	27.5%	---	72.5%
Okraszewska E et al <sup>5</sup> (2002)	Polish population	36	13.89%	13.89%	72.22%
Guvencer et al <sup>6</sup> (2009)	German	20	48%	50%	2%
Prakash et al <sup>7</sup> (2010)	Singapore	86	16.3%	40.7%	34.9%
Shewale A D et al <sup>8</sup> (2013)	Maharashtra (Indian Population)	90	11.11%	81.11%	7.8%
Berihu et al <sup>9</sup> (2015)	Ethiopian population	56	25%	75%	---
Sangeetha G et al <sup>10</sup> (2019)	South Indian population	50	2%	98%	---
Present study	Himachali population (Indian population)	42	2 (4.8%)	28 (66.6%)	12 (28.6%)



**Fig No.2:-** Comparison of Division of Sciatic Nerve as Reported by Various Authors.

Ugrenovic et al (2005)<sup>4</sup> and Okraszewska E et al (2002)<sup>5</sup> found the most common type of division was low. Rest all found the most common type was intermediate. In the present study, we found the same findings. Rashmi C Koshi et al (2015)<sup>11</sup> in a case report observed that the sciatic nerve divided before entering the pelvic fossa into the tibial nerve and common (fibular) peroneal nerve. The common (fibular) peroneal nerve pierced the piriformis muscle dividing it into upper and lower parts. The tibial nerve passes between the lower slip of the piriformis muscle and the gemellus superior muscle to reach the gluteal region. These two nerves remained separate in their entire course. This study coincides with our study.

### Conclusion:-

The present study will be of great clinical importance for surgeons as well as for patients to decrease morbidity.

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