



MORPHOMETRY OF THE SCIATIC NERVE -LENGTH OF SCIATIC NERVE-A CADAVERIC STUDY

Anatomy

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ABSTRACT

The sciatic nerve is the thickest nerve of the body.¹ It is formed by the tibial and common peroneal components in a single sheath and divides into the tibial and common peroneal nerves at the apex of the popliteal fossa; however, the level of bifurcation can be variable.² The distance between these two points can be termed as the length of the sciatic nerve. The levels of division of the sciatic nerve are important in anaesthesia, orthopaedics, rehabilitation, and neurology.³ The study was done by dissection of forty human adult lower limb specimens, irrespective of sex from the Department of Anatomy, Indira Gandhi Medical College, Shimla, Himachal Pradesh, India. During dissection, we found the minimum length of the sciatic nerve was 4.27 cm and the maximum length of the sciatic nerve was 36.07 cm. The length of the sciatic nerve depends on the level of division. Knowledge about the length of the sciatic nerve is important for clinicians and surgeons.

KEYWORDS

Sciatic nerve, the tibial, common peroneal nerves, length of the nerve.

INTRODUCTION:

The Sciatic nerve is the largest and thickest nerve of the human body, also known as the ischiadic nerve or ischial nerve¹. The knowledge about the length of sciatic nerve from its origin to termination will be useful for surgeons, anaesthetists and orthopedicians. The understanding of normal anatomy of gluteal region and sciatic nerve is essential for professionals to be cautious and plan various surgical interventions in this region eg: sciatic nerve block, total hip arthroplasty, posterior hip surgeries, sciatic nerve decompression, and deep intramuscular gluteal injections.

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 (twenty right and twenty left limbs) formalin-fixed adult cadaveric lower limbs, irrespective of sex. The pelvic, gluteal region and posterior aspect of thigh 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 i.e. length of the sciatic nerve.

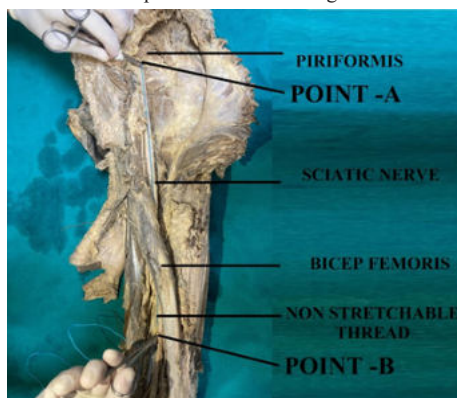


Figure No1. Measuring Length Of Sciatic Nerve

OBSERVATIONS AND RESULTS:

A) Length Of Right Sciatic Nerve

The minimum length of right sciatic nerve was 4.40 cm, the maximum length of right sciatic nerve was 36.07 cm and the mean length was 20.79 cm.

Table No 1: Length Of Right Sciatic Nerve

LENGTH OF RIGHT SCIATIC NERVE	VALUES (cm)
MINIMUM	4.40
MAXIMUM	36.07
MEAN	20.79
STANDARD DEVIATION	± 5.6

B) Length Of Left Sciatic Nerve

The minimum length of left sciatic nerve was 4.27, the maximum length of left sciatic nerve was 33.20 cm and the mean length was 19.77 cm.

Table No 2: Length Of Left Sciatic Nerve

LENGTH OF LEFT SCIATIC NERVE	VALUES (cm)
MINIMUM	4.27
MAXIMUM	33.20
MEAN	19.77
STANDARD DEVIATION	± 4.77

Student's t-test was applied to compare measurements between right and left side. However, the length showed ($p = 0.10$) i.e., insignificant difference ($p > 0.05$).

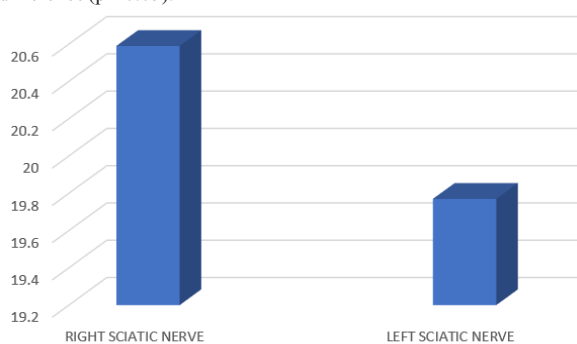


Figure 2: Histogram Showing Length Right and Left Of Sciatic Nerve

DISCUSSION:

Length Of Sciatic Nerve

In the present study we observed the length of sciatic nerve between two points i.e., the distance between the two sites: first site, where the sciatic nerve enters the gluteal region below piriformis and second, site of terminal division of sciatic nerve. The length of sciatic nerve was noted in centimetres and measured by using a non-stretchable thread and measuring tape.

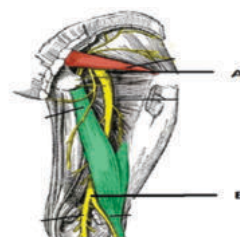


Figure No 3: Posterior View Of Right Thigh

Forty embalmed limbs (twenty right and twenty left limbs) were dissected and we found the minimum length of sciatic nerve was 4.27 cm and the maximum length of sciatic nerve was 36.07 cm. The length of sciatic nerve depends on the level of division.

Previous studies on Indian population have been done by authors like Rajalakshmi et al (2015)⁴, Prameela et al (2015)⁵ and Sangeetha G et al (2019)⁶. They found nearly same maximum length (36.3 to 39 cm), but the minimum length observed by Prameela et al (2015)⁵ was very less (2.5 cm) because of high division of sciatic nerve on left side. The sample size of their study was very low. In the present study we found minimum length 4.27 cm due to high division, and length was more (36.7 cm) in one case due to division in the middle of popliteal fossa. While in South Indian population Sangeetha G et al (2019)⁶ more cases of intermediate division and hence less maximum length (20.6 cm) and more minimum length (16.8 cm).

Table No 3: Length Of Sciatic Nerve As Reported By Various Authors

Sr. No	Author	Ethnic group	No. of specimens	Maximum length	Level of division	Minimum length	Level of division
01	Vicente et al (2007) ⁷	Brazilian population	40	36.3 cm	Low	7.63 cm	High
02	Prameela et al (2015) ⁵	Indian population	15	39 cm	Low	2.5 cm	High
03	Rajalakshmi et al (2015) ⁴	South Western India	40	36.5 cm	Low	10.1 cm	High
04	Sangeetha G et al (2019) ⁶	Indian population	50	20.6 cm	Intermediate	16.8 cm	Intermediate
05	Present study	Himachali population (Indian population)	40	36.7 cm	Low	4.27 cm	High

The knowledge about the probability of anatomical variation in length of sciatic nerve will be helpful during medical or surgical interventions. It is important to know the high division of the sciatic nerve for planning the surgical approach in lesion affecting the gluteal or femoral region. It may result in failed sciatic nerve block in anaesthesia and injury during posterior hip operation.

CONCLUSION:

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

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