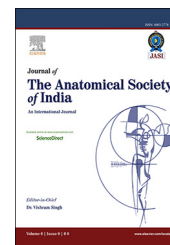


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## Original Article

# Anatomical structure and topographic anatomy of sciatic nerve in human fetuses

A.D. Aydın Kabakçı<sup>a,\*</sup>, M. Buyukmumcu<sup>b</sup>, M.T. Yılmaz<sup>c</sup>, A.E. Cicekcibasi<sup>b</sup>,  
D. Akin<sup>a</sup>

<sup>a</sup> Instructor, Department of Anatomy, Meram Faculty of Medicine, University of Necmettin Erbakan, Konya, Turkey

<sup>b</sup> Professor, Department of Anatomy, Meram Faculty of Medicine, University of Necmettin Erbakan, Konya, Turkey

<sup>c</sup> Assistant Professor, Department of Anatomy, Meram Faculty of Medicine, University of Necmettin Erbakan, Konya, Turkey

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## ABSTRACT

**Introduction:** Sciatic nerve is the longest and thickest nerve of the human body which divides into two branches in popliteal fossa. Variations of sciatic nerve can be observed during the course of the nerve. These anatomical variations contribute to some clinical manifestations such as piriformis syndrome, sciatalgia.

**Methods:** This study was conducted on 60 aborted fetuses aged between 9 and 40 gestational weeks and with no gross anomalies. Morphometrical measurements related to the nerve and the neighboring structures were performed and also incidence of anatomical variations was determined.

**Results:** All parametric data were seen increased with gestational age ( $p < 0.05$ ). Also, no statistical differences between the parameters from right and left were found ( $p > 0.05$ ). The sciatic nerve division was observed in 99 (82.5%) lower extremities in the popliteal fossa, 19 (15.83%) at a level above the popliteal fossa, and in 2 lower extremities (1.67%), high division was observed. Also, the status of sciatic nerve was assessed in regard to piriformis muscle. In 118 of the lower extremities (98.3%), sciatic nerve was observed leaving from underneath the piriformis muscle as one piece and the remaining 2 (1.67%) were observed as giving division at higher levels. In one of these lower extremities of the right side, tibial nerve branch was observed following a path under piriformis muscle and common peroneal nerve was observed passing through the piriformis nerve.

**Discussion:** We believe that our study will provide data regarding the development of sciatic nerve in fetal period and that data will contribute to related clinical studies and applications.

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\* Corresponding author.

E-mail address: [anil\\_didem\\_aydin@hotmail.com](mailto:anil_didem_aydin@hotmail.com) (A.D. Aydın Kabakçı).

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## 1. Introduction

Sciatic nerve is the longest and thickest nerve of the human body and it is formed by the joining of anterior branches of L<sub>4</sub>-S<sub>3</sub> spinal nerves. These branches come closer in order to create the sciatic nerve, which is an approximately 2 cm wide, flat, and thick band near the inferior margin of piriformis muscle. Sciatic nerve passes under the infrapiriform foramen and progresses inferolateral between the greater trochanter and ischial tuberosity under the cover created by gluteus maximus muscle. The nerve extends over the ischium and later passes behind the internal obturator muscle, the quadratus femoris, and the adductor magnus muscles.<sup>1</sup> Sciatic nerve, which is formed by tibial nerve and common peroneal nerve, is surrounded by a single epineural sheath that is divided into its branches in popliteal fossa after its course in posterior thigh. This division point may be at different levels in popliteal fossa.<sup>2</sup>

Sciatic nerve is a long and thick and therefore a strong nerve. But it can also be damaged easily due to its features. Fractures and dislocations in gluteal region, penetrating injuries and surgical interventions, tumors in pelvis, improper hip injections usually applied to children and newborns, aneurism of internal iliac artery and its branches may injure sciatic nerve and the branches of this nerve along the posterior thigh. The anatomical variations in addition to these pathologies and the injury tendency are further increased. Therefore, it is very important to know the course of the nerve in both gluteal and posterior thigh and its relationships with its neighboring structures.<sup>3-9</sup>

In this study, we aimed to determine the anatomical course of the sciatic nerve, its distance from its neighboring structures, and its possible variations in human fetuses.

## 2. Methods

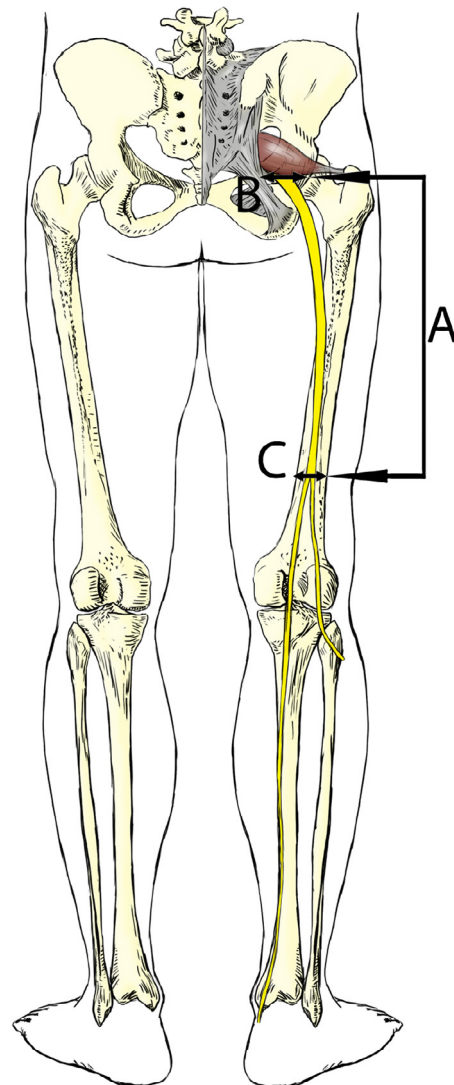
This study was performed with 60 fetuses (34 males and 26 females) without gross anomalies and aged between 9 and 40 gestational weeks. These fetuses were obtained from the fetus bank of Necmettin Erbakan University, Meram Medicine Faculty Anatomy Department (Table 1). Required permissions for the study were obtained from Necmettin Erbakan University, Meram Medicine Faculty Non-Interventional Clinical Research Ethics Committee with the decision number of 2012/74.

In the study, all fetuses were dissected from their gluteal regions and posterior thigh regions until the inferior edge of popliteal fossa. Microdissection instruments, 0.01 mm

precision digital caliper (Stainless hardened), microsurgery microscope (Kaps Sam 62), and a camera (Canon D1000) were used. Measurements were performed in two categories: measurements of sciatic nerve length (SNL) and measurements of the distance between the sciatic nerve and its neighboring structures.

### 2.1. Measurements related to sciatic nerve (Fig. 1):

1. **SNL:** The distance between the place of the sciatic nerve where it passes under the piriformis muscle and its terminal branches.
2. **Proximal width of sciatic nerve:** The width of sciatic nerve where it leaves.
3. **Distal width of sciatic nerve:** The width of the sciatic nerve before it divides into its terminal branches.
4. **Division level of sciatic nerve:** The position of the place where the sciatic nerve divides into its terminal branches



**Fig. 1 – Measurements related to sciatic nerve (Drawn by Gökalp Şahin). A: Sciatic nerve length (SNL); B: Proximal width of sciatic nerve (PWSN); C: Distal width of sciatic nerve (DWSN).**

**Table 1 – The distribution of fetus numbers according to gestational age.**

Gestational age	1st Trimester (9–12 week)	2nd Trimester (13–26 week)	3rd Trimester (27–40 week)
Female	1	17	8
Male	6	16	12
Total	7	33	20

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