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Original Research Article

Morphometric Measurements of Lateral Femoral Cutaneous Nerve and it's Clinical Significance

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Abstract:

Introduction: The lateral aspect of the thigh is supplied by the lateral femoral cutaneous nerve (L2–3). This arises directly from the lumbar plexus and enters the thigh usually by passing deep to the inguinal ligament. Occasionally, the nerve pierces the ligament and may then be pressed upon by it with resultant pain and anaesthesia over the upper outer thigh (meralgia paraesthetica). This is relieved by dividing the deeper fasciculus of the inguinal ligament where the nerve passes over it. (Clinical Anatomy sunny books Harold Ellis).

Aim: The aim of the study was to determine the anatomical course of the lateral femoral cutaneous nerve (LFCN) and measurement of the trunk from inguinal ligament to its branches in relation to certain anatomic landmarks in human cadavers.

Methods: This study was performed on 50 thighs from 25 cadavers with no detectable malformations in the Department of Anatomy, Government Medical College, Siddipet, Telangana State, India by dissection method. The LFCN position was evaluated according to its relation to the anterior superior iliac spine and its distance from the Sartorius were measured along the inguinal ligament (IL). The anatomical data were collected and analysed.

Results: Out of 25 human cadavers, the trunk measurement was ranging from 1cm to 5 cm below inguinal ligament and the measurement of trunk in the right and left limb were different in the same cadaver. In none of the cadavers it was piercing the inguinal ligament.

Conclusion: The anatomical variations of the LFCN has been viewed with meticulous care while dissecting the cadavers. The results of this study on the morphological features and variations of the LFCN in human cadavers provide understanding of its variability for further studies in the region. The purpose of this study was to evaluate the outcome of surgical decompression of the LFCN for the treatment of persistent MP with preservation of sensation along the distribution of the LFCN and conserving this nerve for various surgical procedures like anterior approach of hip replacement surgery etc.

Keywords: Lateral Femoral Cutaneous Nerve; Branching Pattern; Human Cadavers; Meralgia Paresthetica.

Introduction

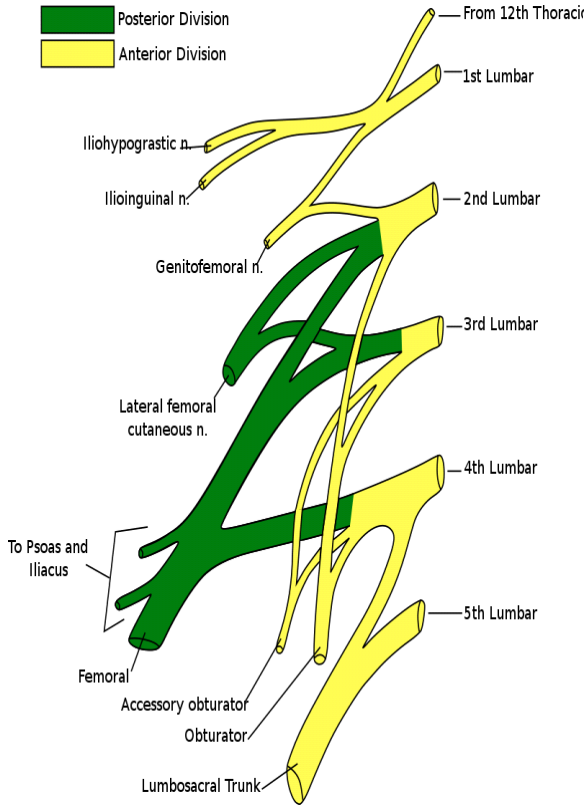
The lateral femoral cutaneous nerve, also called as the lateral cutaneous nerve of the thigh. it's a sensory branch of the lumbar plexus which arises from the posterior divisions of the anterior rami of L2 and L3 spinal nerves [1].

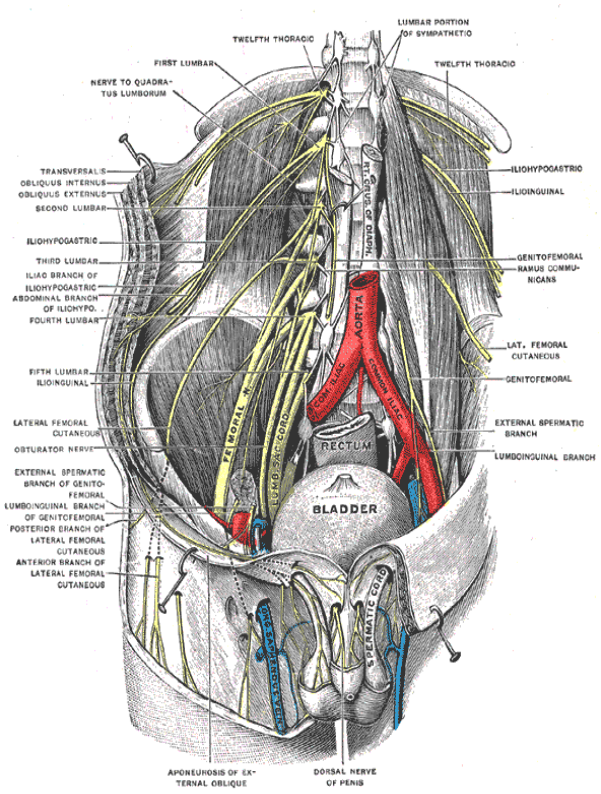
The nerve supplies the skin on the anterior and lateral aspects of the thigh. It passes under the inguinal ligament to reach the thigh. It supplies sensation to the skin on the lateral part of the thigh by an anterior branch and a posterior branch. The anterior branch becomes superficial about 10 cm below the inguinal ligament. It divides into branches which are distributed to the skin of the anterior and lateral parts of the thigh, as far down as the knee [2]. The posterior branch pierces the fascia lata which further subdivides into filaments, passing backward across the lateral and posterior surfaces of the thigh. It supplies the skin around the greater trochanter [2].

The LFCN is important because of its association with meralgia paresthetica [3,4]. Knowledge of its anatomical variations is also critical for preventing nerve injury during the insertion of needles into the ASIS [5], anterior iliac crest for bone grafts [6], and other surgical procedures [7]. LFCN grafts can also be used to repair facial nerve injuries and soft-tissue defects [8,9]. Because of the anatomical variations in the course of the LFCN, it may be difficult to identify and protect it during surgical dissection [4,5,8]. The ASIS is a classical landmark for the LFCN in some surgical procedures and in regional

anaesthesia that involve nerve blocks for the treatment of meralgia paresthetica. However, the rate of successful anaesthesia has only been approximately 40% based on the use of anatomical landmarks [10].

The aim of the study was to determine the anatomical course of the lateral femoral cutaneous nerve (LFCN) and to measure the trunk from inguinal ligament to its branches in relation to certain anatomic landmarks in human cadavers, the knowledge of which would be useful for surgeons while operating various clinical conditions.





Material and Methods

This study was performed on 50 thighs from 25 cadavers with no detectable malformations in the Department of Anatomy, Government Medical College, Siddipet, Telangana State, India by dissection method. The LFCN position was evaluated according to its relation to the anterior superior iliac spine and its distance from the Sartorius were measured along the inguinal ligament (IL). The anatomical data were collected and analysed. The nerves and their branches were exposed, and the length of the trunk was measured before division by using measurement scale.

Results

Out of 25 human cadavers, the trunk measurement was ranging from 1cm to 5 cm below inguinal ligament and the measurement of trunk in the right and left limb were different in the same cadaver. In none of the cadavers it was piercing the inguinal ligament.

Table 1:

Number of Cadavers	Approximate range of length of trunk LFCN Right side	Approximate range of length of trunk LFCN Left side
GROUP A 9 Cadavers	1-3 cm	1-5 cm
GROUP B 8 Cadavers	1-1.2 cm	0.5-2 cm
GROUP C 8 Cadavers	1-2.5 cm	1-4.5 cm

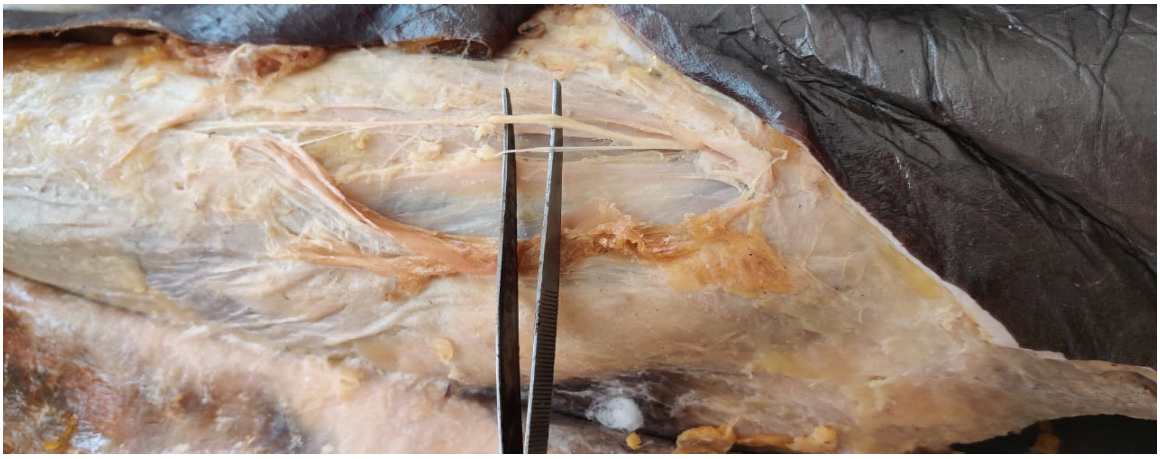


Figure 1: Left Lfcn [Group A]

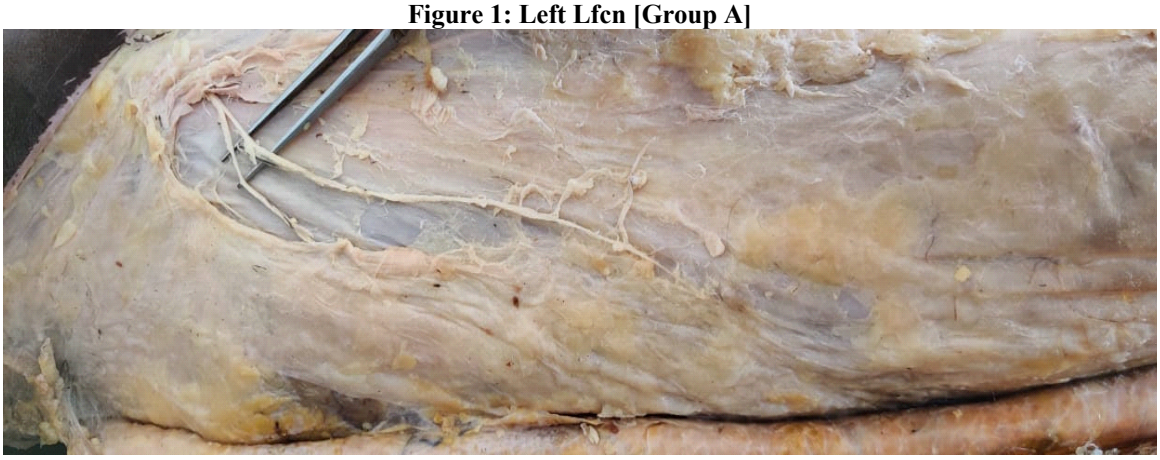


Figure 1: Right Lfcn [Group A]

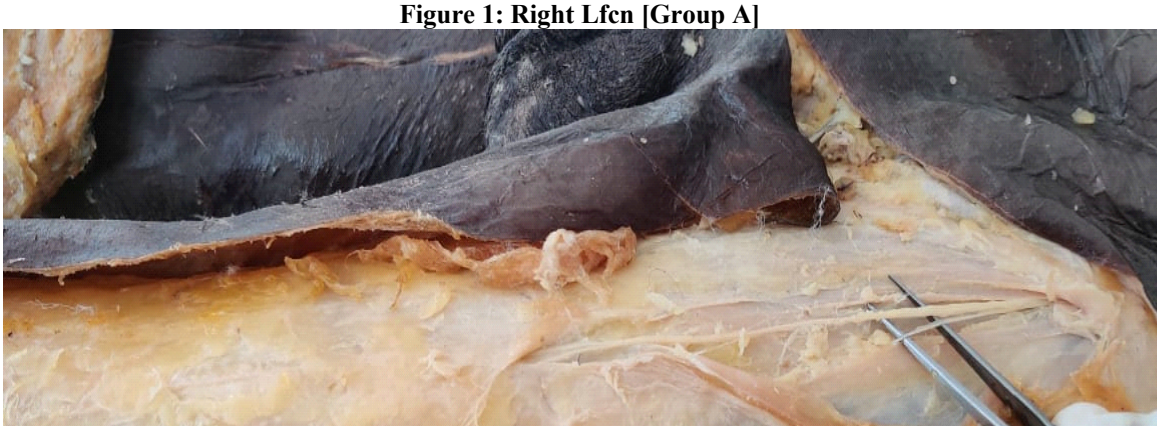


Figure 2: Left Lfcn [Group B]

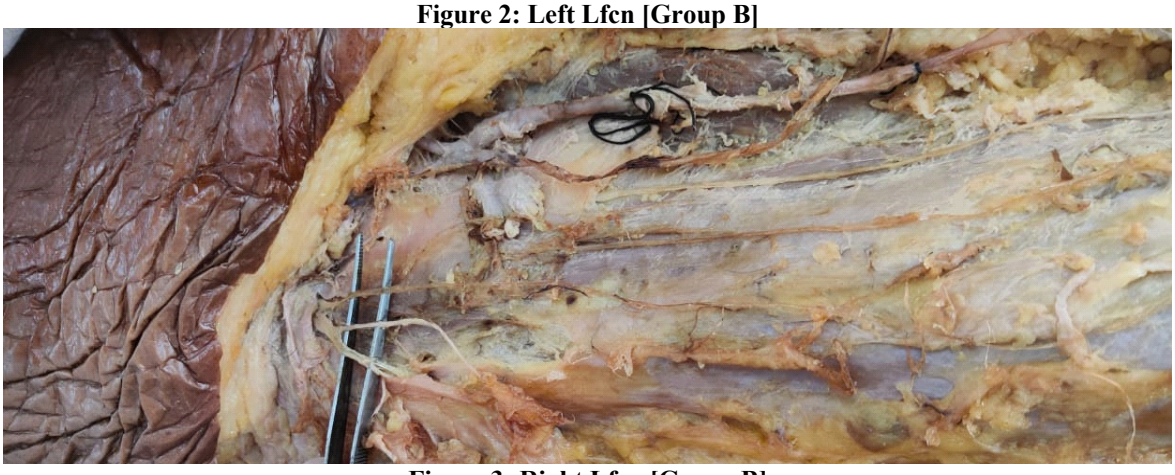


Figure 3: Right Lfcn [Group B]

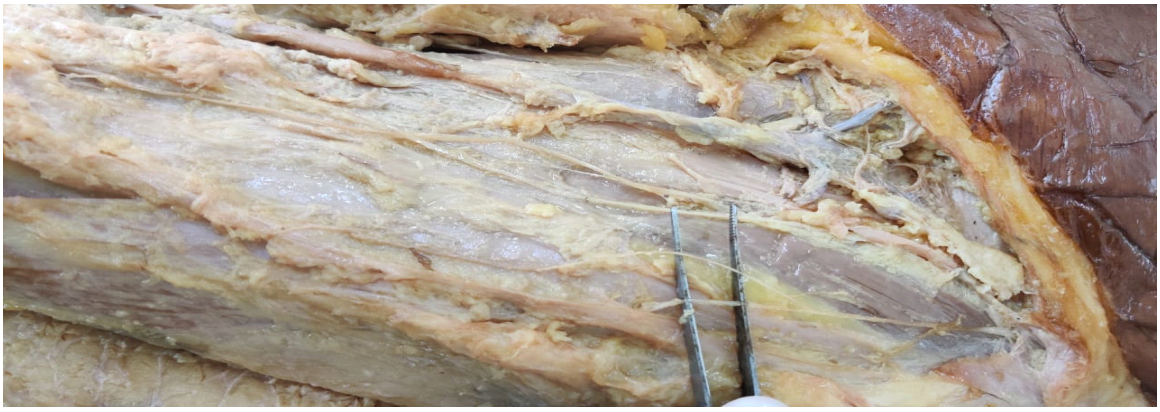


Figure 4: Left Lfcn [Group C]

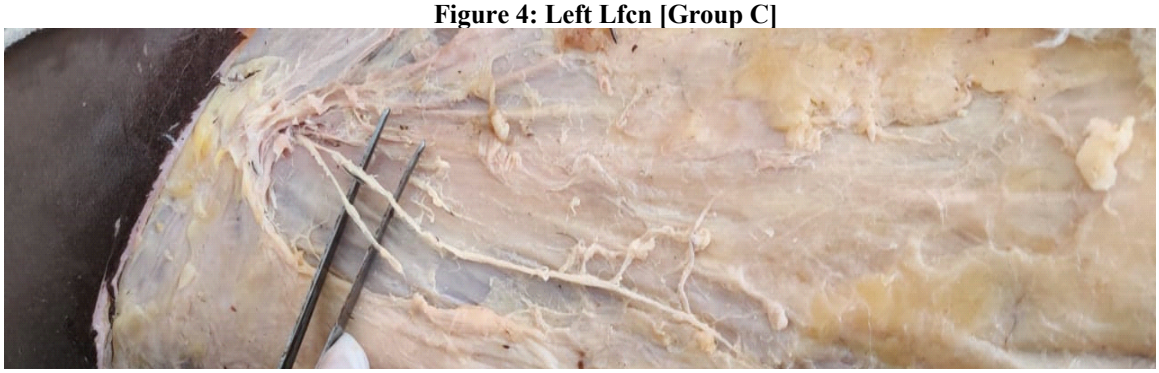


Figure 5: Right Lfcn [Group C]

Discussion

The LFCN is a sensory nerve innervating the lateral and upper parts of the thigh [11]. Meralgia paresthetica is altered sensation of the LFCN that has clinical manifestations including numbness, burning, itching, or pain over the anterior and lateral parts of the thigh [12,13]. Iatrogenic injury of the LFCN can occur during surgery or due to the circumstances of a trauma to the ilium, usually by accidents. To protect the LFCN and its branches during interventions, a good knowledge of the localization and distribution of the LFCN in the region is required. In the present study, we investigated localization of the trunk of LFCN in relation to anterior superior iliac spine and the Inguinal Ligament in human cadavers. Morphological features and variations of the trunk of LFCN in human cadavers can provide understanding of its variability to guide during various surgical procedures. The general rule of thumb used by surgeons is approximating the LFCN as running two fingerbreadths medial to the ASIS [14]. Such a strategy, however, can grossly miscalculate the location of the nerve depending on the patient as well as the surgeon's anatomical knowledge. Ideally an imaging approach like ultrasound would help to determine the precise location of the LFCN and confirm. Based on the analysis of present study, the danger zone for all surgical procedures is about 3 cm around the ASIS. This knowledge minimizes the risk of iatrogenic injury for the various surgeries involving LFCN.

Conclusion

The results of this study on the morphological features and variations of the LFCN in human cadavers provide understanding of its variability for further studies in the region. Meralgia paresthetica, a condition characterized by tingling, numbness, and burning pain in the lateral aspect of the thigh, is caused by compression of the lateral femoral cutaneous nerve. Treatment for this disorder includes conservative and operative approaches; the latter is considered if conservative therapy fails. The distance of 3 cm or more is suggested from the ASIS when operating to prevent injury to the LFCN. The purpose of this study was to evaluate the outcome of surgical decompression of the LFCN for the treatment of persistent MP with preservation of sensation along the distribution of the LFCN and conserving this nerve for various surgical procedures like anterior approach of hip replacement surgery etc.

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