

A Morphometric Study of the Femoral Nerve in the Thigh Region of the Malaysian Cadavers

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Abstract

Introduction: The femoral nerve is one of the vital nerves of the thigh region, which has importance in various fields of clinical areas, as well as in the field of Anatomy and the research areas. Femoral nerve blockade plays an important role in surgical interventions of the anterior thigh. Although the femoral nerve is superficial and easier to identify, a profound knowledge regarding the dimensions of the nerve is inevitable to perform successful surgeries and blockades.

Objective: The describing study was an attempt to analyze the different dimensions of the femoral nerve in the thigh region of the Malaysian cadavers with relevant clinical implications, as there is a paucity of these studies involving Malaysian cadavers has been reported. **Methods:** This study had been conducted with the involvement of 78 adult lower limb specimens (cadaveric and disarticulated) of both genders and different ethnicity. **Result:** The average length of the femoral nerve from the inguinal ligament (IL) till its division and the width at the IL resembled the previous studies conducted on other geographical locations. The width at the division was similar to that of the IL level. The thickness at the IL was 1.32 ± 0.21 (right) and 1.29 ± 0.17 (left); and at the division was 1.50 ± 0.196 (right) and 1.43 ± 0.16 (left). The circumference of the nerve at the IL was 25.44 ± 1.26 (right) and 25.98 ± 0.89 (left); and that at the division was 25.65 ± 1.32 (right) and 25.66 ± 1.25 (left). **Conclusion:** The knowledge of the morphometric anatomy of the femoral nerve in the thigh region will not only assist neurologists and future researchers but also facilitate clinicians to prevent misdiagnoses and iatrogenic neurological damage.

Keywords: Femoral nerve, Length, Width, Thickness, Circumference.

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INTRODUCTION

The femoral nerve is the nerve of the extensor compartment of thigh [1]. It is the largest derivative of the lumbar plexus and arises from the dorsal divisions of the ventral rami (VRi) of L2-L4 spinal nerves [2]. The nerve arises in the abdomen within the fibers of the psoas major muscle (PMM) and passes downwards through the fibers of the PMM, emerges from the lower part of its lateral border, and descends in the groove formed between it and the iliacus muscle (IM), deep to the fascia iliaca [3, 4]. It leaves the abdomen by travelling through the gap between the IL and the superior margin of the pelvis and enters the femoral triangle on the anteromedial

aspect of thigh [1]. At the base of the triangle, it lies on the IM, approximately a finger's breadth lateral to the femoral artery, being separated from the vessel by a portion of PMM [5]. Ellis (2006) specified that it exits below the IL lying 0.5 inches (12 mm) lateral to the femoral pulse [6]. The nerve is enclosed by two different fascial layers, the fascia lata and fascia iliaca, however, it remains uncovered by the femoral sheath. Whereas, the femoral vessels are covered only by the fascia lata, making the nerve to lie in a different tissue plane to that of the vessels [7]. Conventionally, approximately 2 cm below the IL, it ends by dividing into the anterior and the posterior divisions, which are separated by the lateral circumflex femoral artery [2, 8].

In the abdomen, the nerve gives few small muscular branches to the IM, and a vascular branch for the upper part of the femoral artery which may also be given in the thigh [4]. In the thigh, the anterior division gives off motor branches to provide innervation to the sartorius and pectineus muscles; and cutaneous branches, the intermediate cutaneous nerve of the thigh for the skin over the front of the thigh till the front of knee and the medial cutaneous nerve of the thigh for the skin over the medial aspect of the lower 2/3 thigh as far as the knee [4,5]. The posterior branch gives motor branches for the to the quadriceps femoris and the articularis genu, the latter is provided by a branch from the nerve to the vastus intermedius; a cutaneous branch, the saphenous nerve, the largest cutaneous branch arising from the femoral nerve to supply the skin over the medial side of the leg and medial side of the foot up to the ball of the big toe; and the articular branches for the hip joint arising from the branch to the rectus femoris and the knee joint through all the nerves to three vasti [2,5]. The muscles innervating by the femoral nerve are the prime movers for the thigh flexion and leg extension at the knee joint that are critical for the standing and stepping functions [9].

In this study, we aimed to analyze the different dimensions of the femoral nerve in the thigh region of the Malaysian cadavers with relevant clinical implications, as there is a paucity of these studies in the medical literature involving the Malaysian cadavers.

METHODOLOGY & MATERIALS

This was a cross sectional & observational study and was conducted in the Faculty of Medicine of AIMST University, Kedah, Malaysia and University Kebangsaan Malaysia (UKM), Selangor, Malaysia during the period from June 2018 to February 2019. The present study had been carried out on 78 properly embalmed adult lower limb specimens (12 cadavers and 54 disarticulated lower limbs) of both genders, of which there were 4 disarticulated female lower limbs and the rest were male specimens; and of different ethnicity. The studying specimens had been obtained from the units of Anatomy, AIMST University, Kedah, Malaysia; University Kebangsaan Malaysia (UKM), Selangor, Malaysia.

These were the following criteria to be eligible for our study: a) Properly embalmed and well-preserved specimens; b) Adult lower limb specimens; c) The specimens of both genders and different ethnicity were included in the study; And a) Distorted limbs; b) Disrupted nerves at any level of their course; c) Destroyed surrounding structures such as muscles, vessels were excluded from our study.

Procedures for the preservation of specimens: All the specimens were properly embalmed by 10% Formalin solution, phenol, alcohol, and glycerin.

Methods of exposure: The limbs were dissected in accordance with Cunningham's Manual of Practical Anatomy, and the research sections were appropriately exposed. All measurements were taken in accordance with the following description, with particular attention to any relevant bone landmarks and the surrounding tissues and nerves.

Methods of dissection: To expose the femoral nerve, the cadavers and the disarticulated lower limbs were placed on the dissecting table, keeping them in the supine position and facing the front of thigh superiorly. The IL was identified making a line bridging the anterior-superior iliac spine (ASIS) and pubic tubercle. An oblique incision was made along the IL joining the ASIS and pubic symphysis (PS). A transverse incision was made at the junction of the upper 1/3 and lower 2/3 of the front of the thigh. Then the medial ends of these two incisions were joined by a longitudinal incision [10]. The skin and superficial fascia were removed in series to expose the femoral triangle. The dissection was then deepened and the femoral nerve was exposed by opening the fascia iliaca [11].

Parameters:

1. Length of the femoral nerve from the lower border of IL till its division (mm) - (right and left sides). [Figure 1.1]
2. Width (diameter) of the femoral nerve at the level of lower border of IL (mm) - (right and left sides). [Figure 1.2]
3. Width (diameter) of the femoral nerve at the level of division (mm) - (right and left sides). [Figure 1.3]
4. Thickness of the femoral nerve at the level of lower border of IL (mm) - (right and left sides). [Figure 2.1]
5. Thickness of the femoral nerve at the level of division (mm) - (right and left sides). [Figure 2.2]
6. Circumference of the femoral nerve at the level of lower border of IL (mm) - (right and left sides). [Figure 3.1]
7. Circumference of the femoral nerve at the level of division (mm) - (right and left sides). [Figure 3.2]
8. Relation of the femoral nerve in the femoral triangle with other structures - (right and left sides). [Figure 4]
9. Distance between the ASIS and PS (mm) - (right and left sides). [Figure 5.1]
10. Distance between ASIS and the lateral edge of the femoral nerve at the lower border of IL (mm) - (right and left sides). [Figure 5.2]
11. Distance between the PS and the medial edge of the femoral nerve at the lower border of IL (mm) - (right and left sides). [Figure 5.3]
12. Distance between the midpoint of the femoral artery and midpoint of the femoral nerve at the

lower border of IL (mm) - (right and left sides).
[Figure 5.4]

Methods of studying parameters:

Measurement of length of the femoral nerve from the lower border of IL till its division:

For taking this measurement, the lower border of IL, as well as the level of division of the nerve, was marked precisely by colourful pins. Then the distance between the pins was recorded by Digital vernier caliper (DVC). [Figure 1.1]



Figure 1.1: Measurement of the length of the femoral nerve from the lower border of IL till its division

Measurement of the width (diameter) of the femoral nerve at the level of the lower border of IL

After marking the medial and lateral edges of the femoral nerve at the lower border of IL, the distance was measured and recorded as well by DVC. [Figure 1.2]



Figure 1.2: Measurement of the width (diameter) of the femoral nerve at the level of the lower border of IL

Measurement of the width (diameter) of the femoral nerve at the level of division

The medial and lateral edges of the femoral nerve at the level of the division were pointed, and the distance between the edges was measured and recorded by DVC. [Figure 1.3]



Figure 1.3: Measurement of the width (diameter) of the femoral nerve at the level of division

Measurement of the thickness of the femoral nerve at the lower border of IL

The Thickness of the nerve at the lower border of IL was measured by DVC. [Figure 2.1]

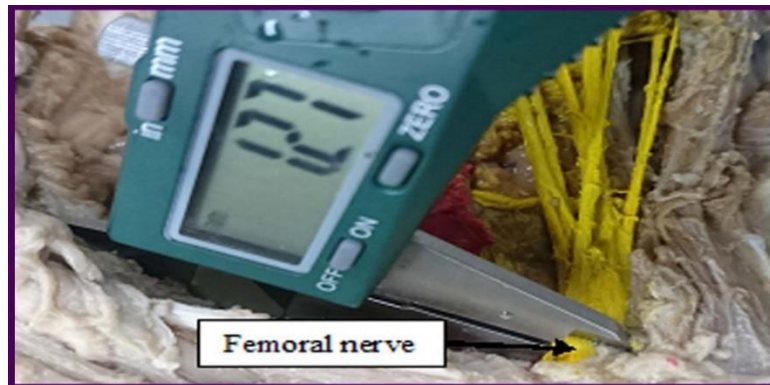


Figure 2.1: Measurement of the thickness of the femoral nerve at the lower border of IL

Measurement of the thickness of the femoral nerve at the level of division

The thickness of the nerve at the level of the division was recorded by DVC. [Figure 2.2]

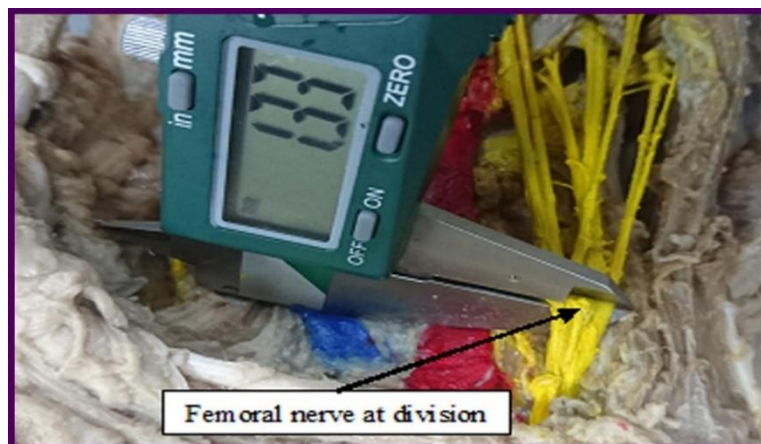


Figure 2.2: Measurement of the thickness of the femoral nerve at the level of division

Measurement of the circumference of the femoral nerve at the lower border of IL

The femoral nerve at the lower border of IL was identified carefully and the circumference was recorded by a thread. The marked area of the thread was measured by DVC. [Figure 3.1]

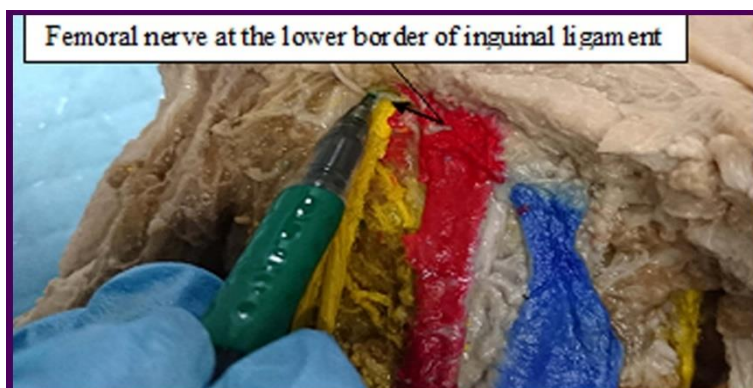


Figure 3.1: Measurement of the circumference of the femoral nerve at the lower border of IL

Measurement of the circumference of the femoral nerve at the level of division

The circumference of femoral nerve at the level of the division was identified carefully and the circumference was recorded by a thread. The marked area of the thread had been measured by DVC. [Figure 3.2]

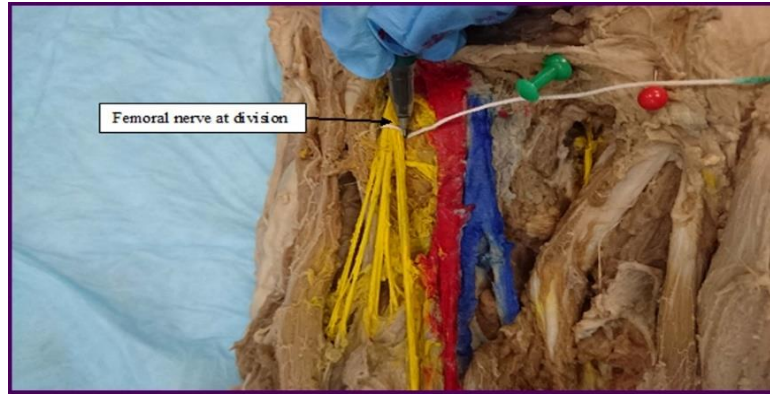


Figure 3.2: Measurement of the circumference of the femoral nerve at the level of division

Relation of the nerve in the femoral triangle with other structures

The location of the nerve in the femoral triangle and its relation with the other structures had been observed. In addition, the vital contents of the femoral triangle had been colored properly and photographs were taken. [Figure 4]

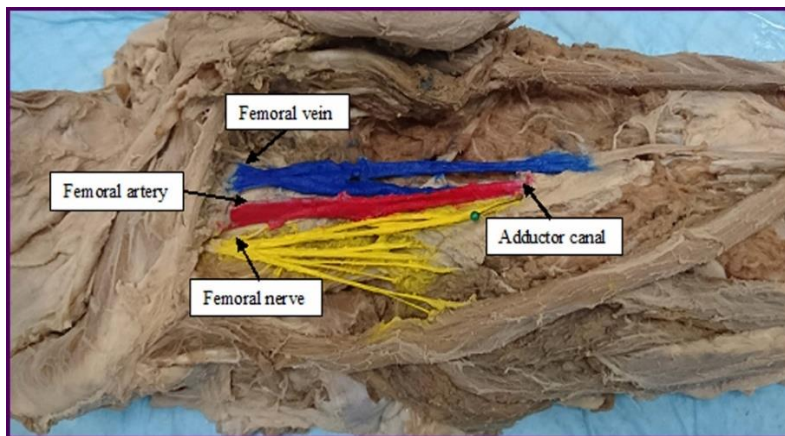


Figure 4: Relation of the nerve in the femoral triangle with other structures

Measurement of the distance between the ASIS and PS

The ASIS and the PS were palpated carefully and were marked by colourful pins. The distance was measured by DVC. [Figure 5.1]

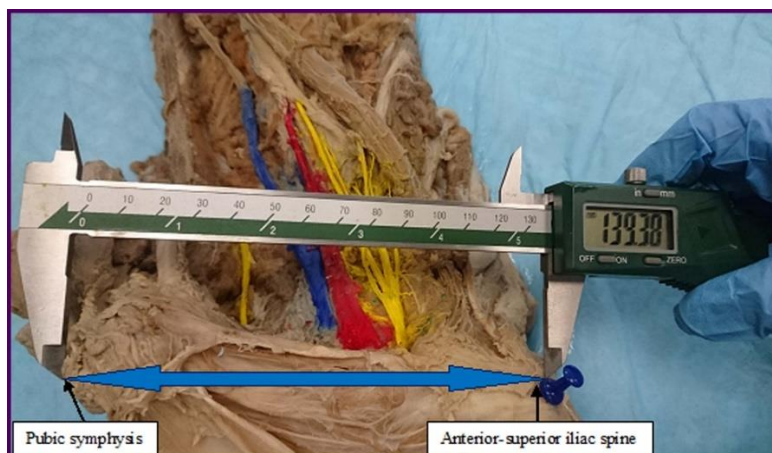


Figure 5.1: Measurement of the distance between the ASIS and PS

Measurement of the distance between the ASIS and the lateral edge of the femoral nerve at the lower border of IL

The ASIS was palpated and marked by a colourful pin, then the lateral edge of the femoral nerve was marked by another colourful pin. Then the distance between both the pins was then measured by DVC. [Figure 5.2]



Figure 5.2: Measurement of the distance between the ASIS and the lateral edge of the femoral nerve at the lower border of IL

Measurement of the distance between the PS and the medial edge of the femoral nerve at the lower border of IL

The PS was identified by palpation. The medial edge of the femoral nerve was also marked by a colorful pin. The distance between both the points was measured by DVC. [Figure 5.3]

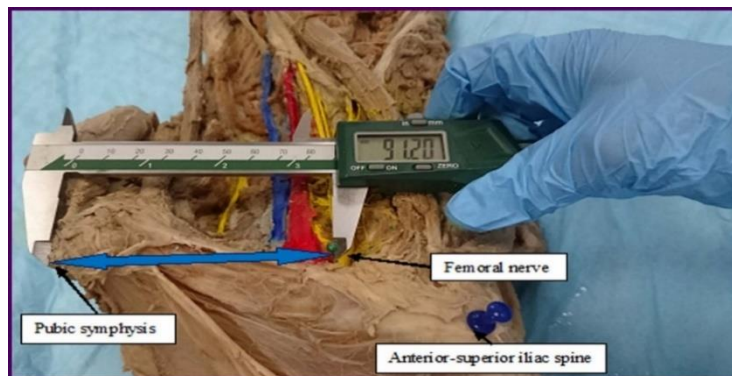


Figure 5.3: Measurement of the distance between the PS and the medial edge of the femoral nerve at the lower border of IL

Measurement of the Distance between the midpoint of the femoral artery and midpoint of the femoral nerve at the lower border of IL

The midpoint of the femoral artery and midpoint of the femoral nerve were marked by colorful pins, and the distance was measured by DVC. [Figure 5.4]



Figure 5.4: Measurement of the Distance between the midpoint of the femoral artery and midpoint of the femoral nerve at the lower border of IL

Statistical Analysis: All the data have been analyzed statistically by using SPSS 22nd version. Mean and standard deviation had been calculated properly for all the studying parameters and the mean values for the right

and left sides were compared by independent samples ‘t’ test, predicting statistically significant differences between the mean values of right and left lower limbs for the same parameter, because the examined nerves were

obtained from different cadaveric and disarticulated lower limbs of different heights, genders and ethnicity.

RESULTS

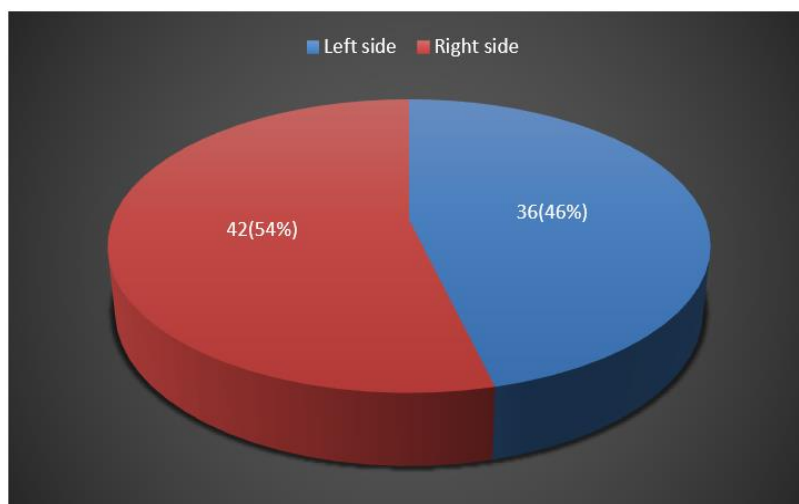


Figure 6: Distribution of lower limb specimens

The pie chart shows that amongst the aforementioned 78 lower limb specimens, 42 were of the right side and remaining 36 were of the left side. All the studied femoral nerves were properly dissected. The surrounding structures such as the blood vessels,

muscles, and other nerves were intact. The bony landmarks were easily identifiable. Special care had been taken to find out any variation if there was any, but no such case was detected.

Table 1.1: Length of the femoral nerve from the lower border of IL till division

Limb type	Length of the femoral nerve from the lower border of IL till division		
	Mean	SD	Sig. 2-tailed
Right	22.71 mm	2.72	0.89
Left	22.63 mm	2.16	

As per Table 1.1, the mean length of the femoral nerve from the lower border of IL till its division was found as 22.71 mm \pm 2.72 and 22.63 mm \pm 2.16 for the right and left sides, respectively. The minimum values were 17.69 mm for the right and 18.21 mm for the left

sides, and the maximum values were 27.31 mm for the right and 26.38 mm for the left sides. The 'p' value was >0.05 (0.89), which indicates of having no statistically significant difference between the mean values of right and left sides.

Table 1.2: Width (diameter) of the femoral nerve at the level of lower border of IL (mm) - (right and left sides)

Limb type	Width of the femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	7.67 mm	0.73	0.28
Left	7.86 mm	0.75	

The average width (diameter) of the femoral nerve at the lower border of IL was 7.67 mm \pm 0.73 (right side) and 7.86 mm \pm 0.75 (left side). The minimum values were 6.15 mm for the right and 6.25 mm for the left sides; and the maximum values were 9.20 mm for the

right and 9.45 mm for the left sides. The 'p' value was >0.05 (0.28), so there was no statistically significant difference between the mean values of right and left sides (Table 1.2).

Table 1.3: Width (diameter) of the femoral nerve at the level of division (mm) - (right and left sides)

Limb type	Width of the femoral nerve at the level of division		
	Mean	SD	Sig. 2-tailed
Right	7.47 mm	0.75	0.40
Left	7.33 mm	0.76	

The mean diameter of the nerve was found to be 7.47 mm \pm 0.75 for the right and 7.33 mm \pm 0.76 for the left sides. The minimum values were 6.17 mm and 6.03 mm for the right and left sides, respectively; while the

maximum values were 9.10 mm and 9.05 mm for the right and left sides, respectively. The 'p' value was >0.05 (0.40), which means the average values of both sides were not statistically different (Table 1.3).

Table 2.1: Thickness of the femoral nerve at the level of lower border of IL (mm) - (right and left sides)

Limb type	Thickness of the femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	1.32 mm	0.21	0.51
Left	1.29 mm	0.17	

According to table 2.1, the mean thickness of the nerve at the lower border of IL was 1.32 mm \pm 0.21 and 1.29 mm \pm 0.17 on right and left sides, respectively. The minimum values were 1.05 mm (right) and 1.03 mm

(left), and the maximum values were 1.85 mm (right) and 1.72 mm (left). The 'p' value was >0.05 (0.51), which reflects of having no statistically significant difference between the mean values of both sides.

Table 2.2: Thickness of the femoral nerve at the level of division (mm) - (right and left sides)

Limb type	Thickness of the femoral nerve at the level of division		
	Mean	SD	Sig. 2-tailed
Right	1.50 mm	0.196	0.07
Left	1.43 mm	0.16	

Table 2.2 shows that the average thicknesses of the femoral nerve at the level of the division were 1.50 mm \pm 0.196 and 1.43 mm \pm 0.16 on the right and left sides, respectively. In addition, the minimum and maximum values for the right side were 1.16 mm and

1.93 mm, respectively; while for the left side were 1.04 mm and 1.73 mm, respectively. The 'p' value was >0.05 (0.07), which means of having no statistically significant difference between the average values of right and left sides.

Table 3.1: Circumference of the femoral nerve at the level of lower border of IL (mm) - (right and left sides)

Limb type	Circumference of the femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	25.44 mm	1.26	0.035
Left	25.98 mm	0.89	

The mean circumference of the femoral nerve at the lower border of IL was 25.44 mm \pm 1.26 for the right side (22.40 - 28.40 mm) and 25.98 mm \pm 0.89 (24.60 - 28.16 mm) for the left side. The 'p' value was <0.05

(0.035), so there was a statistically significant difference between the mean values of right and left sides (Table 3.1).

Table 3.2: Circumference of the femoral nerve at the level of division (mm) - (right and left sides)

Limb type	Circumference of the femoral nerve at the level of division		
	Mean	SD	Sig. 2-tailed
Right	25.65 mm	1.32	0.98
Left	25.66 mm	1.25	

The average circumference of the femoral nerve at the level of the division was found as 25.65 mm \pm 1.32 (22.02 - 27.74 mm) and 25.66 mm \pm 1.25 (22.45 - 28.08 mm) for the right and left sides, respectively. The 'p'

value was >0.05 (0.98), which reflects of having no statistically significant difference between the mean values of both sides (Table 3.2).

Table 4.1: Distance between ASIS and PS (mm) - (right and left sides)

Limb type	Distance between ASIS and PS		
	Mean	SD	Sig. 2-tailed
Right	139.68 mm	6.05	0.17
Left	137.94 mm	4.99	

As described in table 4.1, the mean values for the distance between ASIS and PS were 139.68 mm \pm

6.05 and 137.94 mm \pm 4.99 for the right and left sides, respectively. The ranges were 124.50 mm - 148.59 mm

(right) and 128.85 mm - 148.07 mm (left). The 'p' value was >0.05 (0.17), which indicates there was no

statistically significant difference between the mean values of both sides.

Table 4.2: Distance between ASIS and the lateral edge of femoral nerve at the lower border of IL (mm)

Limb type	Distance between ASIS and the lateral edge of femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	41.52 mm	4.55	0.07
Left	43.28 mm	3.75	

The average values were 41.52 mm ± 4.55 (right) and 43.28 mm ± 3.75 (left). For the right side, the range was 33.57 mm - 49.42 mm and for the left side, the range was 34.36 mm - 49.04 mm. The 'p' value was

>0.05 (0.07), so there was no statistically significant difference between the mean values of both sides (Table 4.2).

Table 4.3: Distance between PS and the medial edge of femoral nerve at the lower border of IL (mm)

Limb type	Distance between PS and the medial edge of femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	91.56 mm	5.00	0.54
Left	90.85 mm	5.10	

As showed in the table 4.3, the mean distance between the PS and the medial edge of femoral nerve was found to be 91.56 mm ± 5.00 for the right limbs (82.17 - 98.92 mm) and 90.85 mm ± 5.10 (82.82 - 99.65 mm) for

the left limbs. The 'p' value was >0.05 (0.54), that means the average values of both sides were not statistically different.

Table 4.4: Distance between the midpoint of femoral artery and midpoint of femoral nerve at the lower border of IL (mm)

Limb type	Distance between the midpoint of femoral artery and the midpoint of femoral nerve at the lower border of IL		
	Mean	SD	Sig. 2-tailed
Right	13.73 mm	0.66	0.46
Left	13.63 mm	0.54	

As described in the table 4.4, the average distance between the midpoint of the femoral artery and the midpoint of femoral nerve was 13.73 mm ± 0.66 and 13.63 mm ± 0.54 for the right and left sides, respectively. The ranges were 12.15 - 14.70 mm for the right and 12.62 - 14.55 mm for the left limbs. The 'p' value was >0.05 (0.46), so there was no statistically significant difference between the mean values of right and left sides.

misdiagnoses, iatrogenic neurological damage, and partial or unsuccessful blockades.

DISCUSSION

This study was aimed to record the length, width, thickness of the femoral nerves of thigh region, at different levels in Malaysian cadavers. Additionally, we aimed to document the distances of these nerves from several significant bony landmarks and create a database to support future researchers, anaesthetists, neurologists, and surgeons in their experimental work. Along with examining the topographical anatomy of the aforementioned nerves, the study was aimed to highlight the varied anatomy of these significant thigh-region nerves for anatomists, neurologists, radiologists, surgeons, and anaesthesiologists. In the domains of diagnosis, intervention, and surgery, both the normal and variant anatomical information of the clinically significant nerves will be crucial. It will stop needless

Although numerous cadaveric researches on the nerves of the anterior, medial, and posterior compartments of the thigh that have been published in the literature, there aren't many of these studies that use cadavers from Malaysia. As a result, the findings and observations of the current study will be thoroughly compared in this section to those of earlier researches on Malaysians as well as other groups and to conventional textbooks. The results of this investigation will thereafter be connected to their therapeutic consequences, namely concerning the domains of anesthesiology, surgery, and radiology.

Strandring (2016) mentioned in his book that the length of the femoral nerve in the thigh region before dividing into 2 divisions to be approximately 2 cm [2]. The present study found this average length to be the same. This study also supported the findings of Oyedun *et al.*, (2014), by substantiating the mean diameter of the nerve at the IL level to be 7.23 ± 2.61 mm. They had a range of 3.49 – 11.80 mm [11]. On the contrary, the femoral nerve at the IL level was found to be wider to some extent in another study performed by Vloka *et al.*,

(1999), where the average width (9.8 mm) was greater than that of the present study [12]. This study had included the width of the femoral nerve at the level of division, which was not mentioned in the previous literature. Interestingly, there was a mentionable similarity between the mean diameters of the femoral nerve at the IL and at the division. This study had also measured the thicknesses and circumferences of the femoral nerve at the lower border of IL and at the division, which were found to be identical to each other. In this study, the width, thickness, and circumference of the femoral nerve had been measured at different levels. The knowledge of dimensions at different levels is significant to the surgeons and anaesthetists in order to perform surgeries and blockades.

Furthermore, the relation of the nerve at the femoral triangle with other structures matched with the standard textbooks of Anatomy such as Standring (2016), Moore *et al.*, (2018) and Snell (2012) [2,3,13].

In addition, the distances from the easily identifiable bony landmarks are also important to locate the nerve while performing surgeries and giving anaesthetic blocks. The distance between ASIS and PS resembled the study conducted by Gustafson *et al.*, (2009), where the mean value was found as 14.50 ± 1.34 cm (13-16 cm) [9]. They found the femoral nerve near the midpoint between the aforementioned 2 bony landmarks. However, in the present study, the femoral nerve was found to be located more laterally towards the ASIS. In measuring the distance between mid-point of the femoral artery and that of the femoral nerve, the current study showed nearly similar results as the study of Mehmood *et al.*, (2010), in which the mean distance at the mid-IC was 11.0 mm and at the mid-IL was 12.5 mm [14]. In the ultrasound-guided studies, Townsley *et al.*, (2013) found the mean distance as 16.7 ± 0.4 mm. [15] Frković *et al.*, (2015) found it 8.2 - 20.1 mm (median, 13.3 mm), which were in the identical ranges with the present study [16]. These studies proved that the nerve-artery distance differs from the normal values in patients with fracture neck femur [14-16].

The current study had revealed that the dimensions of the femoral nerve at the lower border of IL and at the level of the division were almost similar. The length of the nerve before its division was approximately 2 cm, which supports the findings of Standring (2016) [2]. We found the nerve passing downwards with a lateral inclination towards the ASIS, maintaining a mentionable distance with the PS. It lies just 1-1.5 cm lateral to the femoral artery.

Performing femoral nerve block is one of the simplest peripheral nerve blocks as the nerve is superficially placed and the landmarks are easily identifiable [7]. The blockade is performed on the main stem of the nerve, before its division [8]. Performance of

the femoral block relies upon the palpation and identification of anatomical landmarks. In addition, the nerve is located by identifying the femoral artery pulsations by palpation, nerve stimulation or visualization by ultrasound guidance [15].

All this information, indicates that the femoral block can be performed at any point before its division because as shown in the current study, the dimensions remain almost same till its division. The nerve can be identified by measuring the distances between ASIS and PS. The needle should be inserted 1-2 cm lateral to the femoral pulse [5].

The clinicians, also, must be aware of any variation of the femoral nerve in the thigh region. In some cases, the nerve may divide at a higher level than the conventional site, resulting in a failed or incomplete nerve block [17]. However, in this study, no such variation was found.

The femoral nerve is less likely to get injured in the thigh region as it divides immediately after entering the thigh [1]. It can be injured in abdominopelvic surgeries by getting compressed with the retractors or during extreme abduction of thigh and external rotation of hip in lithotomy position. Therefore, the anatomy of the femoral nerve in the lower abdomen is also necessary to prevent iatrogenic injuries.

Limitations of the study

The sample size was not very rich. The study was performed involving only 4 disarticulated female lower limbs obtained from 2 female cadavers, because of the scarcity of female cadavers. Furthermore, the cadavers were of different races. The comparison between different races of Malaysian population was not carried out. The study had been performed with only 12 cadavers, others were disarticulated lower limbs.

CONCLUSION

The present study aggregated the dimensions and distances from the surrounding bony landmarks, course, and relations of the femoral nerve of the thigh region in the Malaysian cadavers. The unique quality of the study was that it covered all the measureable dimensions of the nerve. Very limited studies have been reported in this area involving Malaysian cadavers. So, this study will provide a quantitative database for the neurologists, surgeons, orthopaedicians, and anaesthesiologists. This study also expanded our knowledge of femoral nerve morphology and clearly demonstrated the topographical anatomy of the nerve in relation to the surrounding bony landmarks. To conclude, it can be comprehended that though femoral nerve is easier to locate and superficially placed, the width, thickness, circumference and relations with the surrounding structures should be clearly known to the surgeons and anaesthetists to perform clinical procedures.

RECOMMENDATIONS

Though many cadaveric studies have been reported on the different nerves of the thigh region, very few studies are there in the medical journals involving Malaysian population. Therefore, there is a mentionable scope for conducting further research in Malaysian cadavers. Studies can be carried out with a greater number of cadavers; especially the female cadavers and comparisons can be done between both genders and different ethnicity.

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