International Journal of Research in Medical Sciences
*Chauhan PR et al. Int J Res Med Sci. 2015 May;3(5):1066-1069*
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: 10.5455/2320-6012.ijrms20150507

**Research Article**

# Cadaveric study: study of lateral circumflex femoral arterial origin in Rajkot

**Pradip Rameshbhai Chauhan[1]*, Khima P. Dangar[1], Ashish J. Rathwa[1,2], Monika A. Adhvaryu[1,3], Alpa P. Chauhan[1,4], Suresh P. Rathod[1]**

[1]Department of Anatomy, Pandit Dindayal Upadhyay Government Medical College, Rajkot-360001, Gujarat, India
[2]Department of Anatomy, GMERS Medical College, Junagadh, Gujarat, India
[3]Department of Anatomy, M.P. Shah Medical College, Jamnagar, Gujarat, India
[4]Department of Anatomy, GMERS Medical College, Gandhinagar, Gujarat, India

**Received:** 24 February 2015
**Revised:** 03 March 2015
**Accepted:** 24 March 2015

***Correspondence:**
Dr. Pradip Rameshbhai Chauhan,
E-mail: prajjawalitresearch@gmail.com



## ABSTRACT

**Background:** Lateral circumflex femoral artery contributes cruciate, trochanteric and knee joint anastomosis. In addition Lateral circumflex femoral artery flaps are used for the reconstruction of large tissue loss in the head and neck region, aortopopliteal bypass, coronary artery bypass grafting and extracranial intracranial bypass surgery. This work was carried out (a) to study the origin of lateral circumflex femoral artery and (b) to measure and compare (between male and female) the circumference at its origin.
**Methods:** In this cross sectional study, 51 femoral triangles from 26 (18 male and 08 female) human adult cadavers were dissected and studied at P.D.U. government medical college, Rajkot, Gujarat. Site of origin of lateral circumflex femoral artery was identified and noted. The distance of origin of the artery from the origin of profunda femoris artery was measured and noted. Circumference at the level of origin was measured and diameter was calculated. Collected data was analysed by standard statistical formulas with the help of Microsoft excel 2013 and Epi info 7™ software.
**Results:** 90.19% lateral circumflex femoral arteries originated from the profunda femoris artery and remaining 9.81% from the femoral artery. The mean distance of origin of the artery from the origin of profunda femoris artery was 18.44 mm. Lateral circumflex femoral artery circumference and diameter were significantly different between male and female (95% confidence interval, P <0.05).
**Conclusion:** In this presented study maximum distance of origin of the artery from the origin was 65 mm while minimum distance of origin was 6 mm. In addition difference in circumference of the artery was statistically significant.

**Keywords:** Lateral circumflex femoral artery, Profunda femoris artery, Femoral artery, circumference, Diameter

## INTRODUCTION

The lateral circumflex femoral artery is a laterally running branch of profunda femoris artery given off near the root of the profunda. It passes between the divisions of the femoral nerve to divide into ascending, transverse and descending branches.[1]

Lateral circumflex femoral artery gives branches for trochanteric anastomosis (ascending branch), cruciate

anastomosis (Descending branch) and anastomosis around the knee joint (a twig from descending branch).[1]

Lateral circumflex femoral artery flaps are used for the reconstruction of large tissue loss in the head and neck region, aortopopliteal bypass, coronary artery bypass grafting and extracranial intracranial bypass surgery.[2-7]

***Aims and objectives***

Present work was carried out to study the origin of Lateral circumflex femoral artery; and to compare the circumference of the artery between male and female. For these aims following objectives were followed

- To identify the site of origin of lateral circumflex femoral artery.
- To measure the distance of origin of lateral circumflex femoral artery from the origin of profunda femoris artery
- To measure the lateral circumflex femoral artery circumference
- To calculate diameter of the lateral circumflex femoral artery

## METHODS

A cross sectional study was conducted at Pandit Dindayal Upadhyay government medical college, Rajkot, Gujarat (India) during 2011 to 2013.

51 femoral triangles from 26 (18 male and 08 female) adult human cadavers were dissected and studied during regular dissection classes at P.D.U. Government medical college, Rajkot. Femoral artery and its branches were dissected (Figure 1). Lateral circumflex femoral artery and the site of its origin was identified (Figure 1).


**Figure 1: Left side lateral circumflex femoral artery originating from the profunda femoris artery.**

Distance of origin of the lateral circumflex femoral artery from the origin of profunda femoris artery was measured with measure tap in millimetres. Circumference of lateral circumflex femoral artery at the level of its origin was measured in millimetres by measure tap. All measurements were taken three times by two independent observers and averages of these measurements were considered for calculation to avoid instrument and observer bias.

Lateral circumflex femoral artery diameter was calculated with the help of following mathematical equation: Diameter of lateral circumflex femoral artery = (Circumference of lateral circumflex femoral artery ÷ 3.14).

Collected data was noted in pretested form. Data was calculated and analysed by standard statistical formulas with the help of Microsoft excel 2013 and Epi info 7™ software.

## RESULTS

Site of origin: Lateral circumflex femoral artery was originating from profunda femoris artery and femoral artery in 90.19% (46 out of 51) limbs and 9.81% (5 out of 51) limbs respectively. In the present study 3 left and 2 right side limbs exhibited Lateral circumflex femoral artery originating from the femoral artery.

Distance of origin of lateral circumflex femoral artery [when originates from profunda femoris artery (46 out of 51)] was measured from the origin of profunda femoris artery. In the present study mean distance of origin of Lateral circumflex femoral artery from the origin of profunda femoris artery was 18.44 mm.

Present work found no significant difference in the mean distance of origin (from the origin of profunda femoris artery) of Lateral circumflex femoral artery between the right (17.58 mm) and the left side (18.58 mm). The Lateral circumflex femoral artery was more commonly originating in the range of 11-20 mm (19 out of 46) distal to the origin of profunda femoris artery (Table 1).

**Table 1: Distance of origin of lateral circumflex femoral artery from the origin of profunda femoris artery.**

| Distance of origin (mm) | Right | Left | Total n (%) |
|---|---|---|---|
| 0-10 | 6 | 6 | 12 (26.09%) |
| 11-20 | 10 | 9 | 19 (41.30%) |
| 21-30 | 5 | 3 | 8 (17.39%) |
| 31-40 | 1 | 2 | 3 (6.52%) |
| 41-50 | 1 | 1 | 2 (4.35%) |
| 51-60 | 1 | 0 | 1 (2.17%) |
| 61-70 | 0 | 1 | 1 (2.17%) |
| **Total** | 24 | 22 | 46 |

The maximum distance of origin 65 mm was found in left side limb of male cadaver. Whereas minimum distance of origin was 6 mm identified in both male and female on both sides.

When the lateral circumflex femoral artery originated from the femoral artery (5 out of 51 limbs) its origin was 6, 8, 8, 10 and 36 mm proximal to the origin of profunda femoris artery origin respectively.

Circumference and diameter: Lateral circumflex femoral artery circumference difference among male and female was statistically significant (95% confidence interval, two tailed unpaired t-test, P = 0.0344, Table 2). And lateral circumflex femoral artery diameter difference among male and female was statistically significant (95% confidence interval, two tailed unpaired t-test, P = 0.0345, Table 2).

**Table 2: Gender wise lateral circumflex femoral artery circumference and diameter.**

| Lateral circumflex femoral artery | Circumference (mm) | | Diameter (mm) | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| Mean | 18.16 | 15.31 | 5.78 | 4.88 |
| Median | 18.00 | 15.00 | 5.73 | 4.78 |
| Mode | 18.00 | 17.00 | 5.73 | 5.41 |
| Standard deviation | 4.19 | 3.71 | 1.33 | 1.18 |
| Standard error | 0.68 | 1.03 | 0.22 | 0.33 |
| Range | 23.00 | 13.00 | 7.32 | 4.14 |
| Minimum | 11.00 | 9.00 | 3.50 | 2.87 |
| Maximum | 34.00 | 22.00 | 10.83 | 7.01 |
| Count | 36 | 15 | 36 | 15 |
| Confidence level (95.0%) | 1.38 | 2.24 | 0.44 | 0.71 |

**Table 3: Side wise lateral circumflex femoral artery circumference and diameter.**

| Lateral circumflex femoral artery | Circumference (mm) | | Diameter (mm) | |
|---|---|---|---|---|
| | Right | Left | Right | Left |
| Mean | 18.23 | 16.60 | 5.81 | 5.29 |
| Median | 17.50 | 17.00 | 5.57 | 5.41 |
| Mode | 16.00 | 18.00 | 5.10 | 5.73 |
| Standard deviation | 4.54 | 3.79 | 1.44 | 1.21 |
| Standard error | 0.89 | 0.76 | 0.28 | 0.24 |
| Range | 22.00 | 14.00 | 7.01 | 4.46 |
| Minimum | 12.00 | 9.00 | 3.82 | 2.87 |
| Maximum | 34.00 | 23.00 | 10.83 | 7.32 |
| Count | 26.00 | 25.00 | 26.00 | 25.00 |
| Confidence level (95.0%) | 1.83 | 1.56 | 0.58 | 0.50 |

There was no significant difference in the lateral circumflex femoral artery circumference between right and left side (95% confidence interval, two tailed paired t-test, P = 0.1706, Table 3). There was no significant difference in the calculated lateral circumflex femoral artery diameter between right and left side (95% confidence interval, two tailed unpaired t-test, p = 0.1699, Table 3).

Largest lateral circumflex femoral artery (circumference 34 mm, diameter 10.83 mm) was distinguished in the right limb of male cadaver. And the smallest (circumference 9 mm, diameter 2.87 mm) was distinguished in left limb of female cadaver.

## DISCUSSION

In the presented study frequency of the lateral circumflex femoral artery originating from the femoral artery was correspondent to the results of previous studies which reported lateral circumflex femoral artery originating from femoral artery in 5-20% limbs (Table 4).

Although the mean distance of origin of the artery (18.44 mm) from the origin of profunda femoris artery was less than that of the study of Prakash et al., Dixit et al. and Peera S et al. (Table 4).[8,9,11]

**Table 4: Comparison of other studies for site of origin of lateral circumflex femoral artery.**

| Study | Site of origin | | | Distance of origin mean (mm) |
|---|---|---|---|---|
| | Profunda femoris | Femoral | Others | |
| Prakash et al. (2010)[8] (64 limbs) | 81.25% | 18.75% | - | 25 |
| Dixit DP et al. (2011)[9] (228 limbs) | 75% | 24.1% | 0.87% | 21-30 |
| Suthar K et al. (2013)[10] (50 limbs) | 80% | 20% | - | 18.03 (Right) 19.45 (Left) |
| Peera S et al. (2013)[11] (50 limbs) | 80% | 15% | 5% | 22 |
| Vaishali PA et al. (2014)[12] (108 limbs) | 90.4% (Right) 88% (Left) | 9.6% (Right) 2% (Left) | - | - |
| Present study (51 limbs) | 90.19% | 9.81% | - | 18.44 |

Lateral circumflex femoral artery circumference and diameter difference between male and female was different. That is may be due to all over difference in stature and built between male and female. On the other hand circumference and diameter between right and left side artery were not different statistically.

## CONCLUSION

In this presented study maximum distance of origin of the artery from the origin was 65 mm while minimum distance of origin was 6 mm. In addition difference in circumference of the artery was statistically significant. As well there extensive variation in the size of the lateral circumflex femoral artery was noted. Lateral circumflex femoral artery and its branches supply major areas of the thigh including cutaneous, muscular and articular areas. That makes knowledge of this artery critical for preparing myocutaneous flap from the thigh for various reconstructive surgeries and for interventional clinicians. Therefore variations in the origin and branches of lateral circumflex femoral artery should be extensively investigated and considered.

## ACKNOWLEDGEMENTS

Authors are thankful to the authority of department of anatomy and P.D.U government medical college, Rajkot for providing infrastructure and support for this research project.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: Not required*

## REFERENCES

1. Mahadevan V. Pelvic girdle, gluteal region and thigh. In: Standering S, eds. Gray's Anatomy, The Anatomical Basis of Clinical Practice. 40th ed. India: Elsevier; 2008: 1378-1379.
2. Fernandes R, Lee J. Use of the lateral circumflex femoral artery perforator flap in the reconstruction of gunshot wounds to the face. J Oral Maxillofac Surg. 2007;65(10):1990-7.
3. Valdatta L, Tuinder S, Buoro M, Thione A, Faga A, Putz R. Lateral circumflex femoral arterial system and perforators of the anterolateral thigh flap: an anatomic study. Ann Plast Surg. 2002;49:145-50.
4. Gradman WS. Bypass to the lateral circumflex femoral artery. Ann Vasc Surg. 1992;6:344-6.
5. Sugawara Y, Sato O, Miyata T, Kimura H, Namba T, Makuuchi M. Utilization of the lateral circumflex femoral artery as a midway outflow for aortopopliteal grafting: report of a case. Surg Today. 1998;28:967-70.
6. Fukuda H, Ashida M, Ishii R, Abe S, Ibukuro. Anatomical variants of the lateral femoral circumflex artery: an angiographic study. Surg Radiol Anat. 2005;27:260-4.
7. Başkaya MK, Kiehn MW, Ahmed AS, Ateş Ö, Niemann DB. Alternative vascular graft for extracranial-intracranial bypass surgery: descending branch of the lateral circumflex femoral artery. Neurosurg Focus. 2008;24:1-7.
8. Prakash, Kumari J, Kumar BA, Jose BA, Kumar YS, Singh G. Variations in the origins of the profunda femoris, medial and lateral femoral circumflex arteries: a cadaver study in the Indian population. Roman J Morphol Embryol. 2010;51(1):167-70.
9. Dixit D, Kubavat DM, Rathod SP, Patel MM, Singel TC. A study of variations in the origin of profunda femoris artery and its circumflex branches. 2011;2(4):1084-9.
10. Suthar K, Patil D, Mehta C, Patel V, Prajapati B, Bhatt C. Cadaveric study : morphological study of branches of femoral artery in front of thigh. CIBTech J Surg. 2013;2(2):16-22.
11. Peera SA, Sugavasi R. Morphological study of branches of femoral artery in the femoral triangle- a human cadaveric study. Int J Health Sci Res. 2013;3(12):14-9.
12. Vaishali PA, Laksami R. A study of profunda femoris artery in cadavers. Int J Cur Res Rev. 2014;6(21):41-6.

DOI: 10.5455/2320-6012.ijrms20150507
**Cite this article as:** Chauhan PR, Dangar KP, Rathwa AJ, Adhvaryu MA, AP, Rathod SP. Cadaveric study: study of lateral circumflex femoral arterial origin in Rajkot. Int J Res Med Sci 2015;3:1066-9.