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## Variation in the Origin of Lateral Circumflex Femoral Artery – A Case Report

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### ABSTRACT

The knowledge of the variations in the arterial pattern of the lower limb is very important for the vascular surgeons and the intervention radiologists which may be the cause of severe hemorrhage. Variations which involve the Femoral, Profunda femoris or Deep femoral and the Circumflex femoral arteries are important in vascular reconstructive surgeries, in surgical interventions for embolism, catheterization procedures and in raising myocutaneous grafts with pedicles. Variations of the lateral circumflex femoral artery are of much significance in making the antero lateral thigh flaps. Hence, we report here a rare case of an unusually large, Lateral circumflex femoral artery which arose directly from the femoral artery. The lateral circumflex femoral artery did not pass between the two divisions of the femoral nerve but its branches and termination were found to be normal.

**Keywords:** Femoral artery (FA), Deep Femoral Artery (DFA) or Profunda femoris Artery, Lateral Circumflex Femoral Artery (LCFA), Antero lateral thigh flaps.

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## INTRODUCTION

The Lateral Circumflex Femoral Artery (LCFA) is routinely a lateral branch of the Profunda femoris artery near the root. It inclines laterally between the anterior and the posterior divisions of the femoral nerve, posterior to Sartorius & Rectus femoris, then ends by dividing into ascending, transverse and descending branches. The ascending branch runs under tensor fasciae latae & anastomoses with the Superior gluteal and the deep circumflex iliac arteries and supplies the greater trochanter, head and neck of femur. The descending branch runs posterior to rectus femoris, along the anterior border of vastus lateralis, which it supplies and anastomoses with the lateral superior genicular branch of Popliteal artery to take part in anastomoses around the knee joint. The transverse branch which is the smallest, pierces the vastus lateralis and forms the cruciate anastomosis. [1, 2] The LCFA plays a pivotal role in the anterolateral thigh flaps and in the tensor fascia lata myocutaneous flaps. The variations of this artery and its branches are very important for plastic surgeons. The LCFA arises from the Femoral artery in 81.25% patients and from the Profunda femoris artery in 18.75% patients in the Indian population. [3, 4]

### Case Report

During the routine dissection session for first year medical students at Sri Siddhartha Medical College, Tumkur in an embalmed male cadaver aged about 50 years revealed an abnormal size and origin of the LCFA in the right lower limb. The LCFA arose from the postero lateral aspect of the femoral artery, at the same level as the origin of the profunda femoris artery, 5 mm below the inguinal ligament [Fig-1]. The artery was 4cm in length and then it passed downwards, parallel to femoral artery. The diameter of the LCFA was unusually large. It was almost more than the diameter of the profunda femoris artery and the LCFA did not pass between the divisions of the femoral nerve. It gave ascending, transverse and descending branches and in addition to these, it gave several large muscular branches which supplied the vastii muscles.(Fig.2) The medial circumflex femoral artery arose from the Profunda femoris artery, it was normal in its course, size and branching pattern.

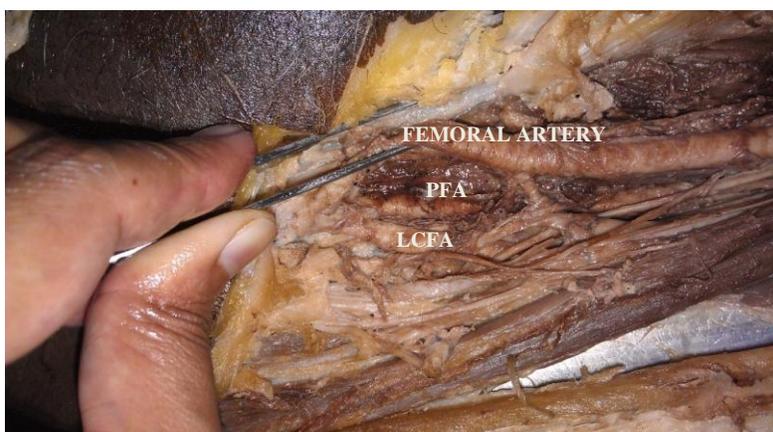


Fig.1 Origin of LCFA & PFA from Femoral Artery at the Same Level

## DISCUSSION

The arterial variations of the lower limb, especially the femoral artery, has gained popularity recently, because of its close association with the repair of femoral hernias and because of its common use in coronary angiographies. These variations may not endanger the life of the patients and they are usually subclinical and are found only during surgeries, autopsies and dissections. [5] Several variations of the femoral artery and the profunda femoris artery had been reported in the past, such as the duplication of the profunda femoris artery and the abnormal course of the profunda femoris, which passed in front of the femoral vein. [6] Knowledge of variations of the circumflex femoral arteries is important when undertaking clinical procedures in the femoral region and in hip joint replacement. [7] Since the 19th century, many different patterns have been proposed to classify their origins. The medial and lateral circumflex femoral arteries have been classified into three different patterns based on the levels of their origin. Distribution related to sex and side has also been studied. Pattern I: Both arteries arise from the Profunda femoris artery (78.8%). This pattern is more frequent in females. Type Ia, Medial circumflex femoral artery origin is proximal to the origin of lateral circumflex femoral artery (53.2%); Type Ib, Lateral circumflex femoral artery origin is proximal to the origin of medial circumflex femoral artery (23.4%); Type Ic, both arteries arise from a common trunk (23.4%). Pattern II: One of the arteries arise from the femoral artery and the other from the profunda femoris artery (20.5%). Type IIa, the medial circumflex femoral artery arises from the femoral artery (77.8%) and Type IIb, the lateral circumflex femoral artery arises from the femoral artery (22.2%). Pattern III: Both arteries arise from the femoral artery (0.5%). [7] In every disposition there is significantly higher prevalence of unilateral rather than bilateral occurrence. Awareness of these variations could avoid unexpected injuries. The arteries of the lower limb develop from the axis artery, which is derived from the fifth lumbar artery. In the developmental process, some of the channels regress and some of them enlarge and form a definitive arterial pattern. The persistence of the channels that are supposed to disappear, lead to various vascular anomalies which may complicate arteriectomies, embolectomies and thromboendarterectomies in cases of atherosclerosis, which are most commonly seen in the lower limb vessels.

As the lateral circumflex femoral artery is very large and unusual in size, it may complicate the procedures of coronary angiography and stent procedures, since the femoral artery was the choice for those procedures. As the artery is big, it may carry a significant amount of blood to the femoral neck and to the muscles and the skin over the thigh. The LCFA system provides a predictable and versatile surplus of tissue necessary to restore functional and structural integrity of the post traumatic lower extremity in a single stage. Microsurgical free-flap surgery has progressed from simply providing wound coverage to restoring a high level of function. [7] It has the advantage of raising the anterolateral thigh flap and since the blood supply is more, there will be less chances of flap necrosis and is the most preferred choice in reconstructive surgeries. [6,8] The versatility of the LCFA system allows utilization of the anterolateral thigh, vastus lateralis, tensor fascia lata, rectus femoris, and iliac crest. Combinations of tissues from this system were employed to restore defects in the patellar tendon, Achilles tendon, extensor hallucis tendon, anterior compartment with/without lateral

compartment muscle , anterior compartment muscle and segmental tibial bone , and composite calcaneus [6] A lateral circumflex femoral arterial (LCFA) system can provide an effective single composite free-tissue transfer for restoration of functional and structural integrity. [9, 10] Hence in conclusion, the LCFA is an important branch of the profunda femoris artery and its variations need great attention. [11]

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