

# Variability of the femoral circumflex arteries

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## Abstract

62 femoral triangles were dissected and the origins of the femoral circumflex vessels and the deep femoral artery were demonstrated. Variability in the origins of the femoral circumflex vessels was analysed and a significant difference between the origins was identified.

**Key words:** Common femoral artery, Deep femoral artery, Medial femoral circumflex artery, Lateral femoral circumflex artery.

## Introduction

A thorough knowledge of the anatomy of the deep femoral artery and the femoral circumflex arteries is important during surgical procedures in trauma and vascular diseases in the region of the upper thigh (1, 2, 3). The extensive anastomosis formed by the branches of these vessels play an important role in the arterial supply of the proximal femur (4, 5, 6). A number of anatomical variations in the origin of these arteries have been described (7, 8, 9). The objective of this study was to analyse and compare the pattern of origin of the medial femoral circumflex (MFC) and the lateral femoral circumflex (LFC) arteries and to relate the difference to the morphogenesis of these arteries.

## Method

62 femoral triangles of 17 males and 14 females obtained from 31 cadavers were dissected in the Department of Anatomy of the Faculty of Medicine Colombo. The femoral artery was identified and the origins of the deep femoral and the circumflex femoral arteries and their

relative positions were demonstrated in all the specimens. The findings were tabulated and the difference in percentages of origins statistically analysed.

## Results

the variability of the origin of the femoral circumflex arteries is shown in Table 1.

In 22 limbs (35.4%) the medial femoral circumflex (MFC) arose from the common femoral artery either proximal to or at the same level as the origin of the deep femoral artery. None of the MFC arose distal to the origin of the deep femoral artery.

In 40 limbs (64.5%) the MFC arose from the deep femoral artery.

In 53 limbs (85.4%) the lateral femoral circumflex (LFC) arose from the deep femoral artery. In the 9 limbs (14.6%) where the LFC arose from the common femoral artery it did so between the origins of the MFC and the deep femoral arteries.

In 3 limbs (4.5%) where all three arteries arose from the common femoral, they did so at the same level.

## Discussion

Studies on the morphogenesis of the femoral circumflex arteries and the deep femoral artery (11) revealed that

1. the first branch of the femoral artery to appear is the lateral femoral circumflex (LFC) artery.
2. the deep femoral artery develops next usually as a branch of the lateral femoral

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circumflex artery or as a direct branch of the common femoral artery.

3. the medial femoral circumflex appears (MFC) later from the profundofemoral trunk or from the common femoral artery.

This is supported by Adachi (9, 10) who considers the circumflex arteries as the main branches of the femoral artery and the deep femoral artery as a subsidiary branch linked with the circumflex arteries.

In the present study the MFC originated from the deep femoral artery in 40 (64.5%) of the specimens and from the common femoral artery in 22 (35.4%) (Table 1), results similar to the findings of 63% and 37% by Siddartha *et al.* (12).

The incidence of the variable patterns of deep femoral origin of the MFC recorded by Clark and Colborw (13) was 53% and by Lipshutz (14) was 59%.

The origin of the LFC is less variable. In the present study it was seen arising from the femoral artery in 53 (85.4%) and from the common femoral artery in 9 (14.5%) of specimens. Siddartha has reported a similar incidence of 70% and 30% respectively (12).

As the study of the origins of the both femoral circumflex arteries was carried out on the same limbs the difference in the percentages of the deep femoral origin of these arteries was compared. The observed difference between the

percentages (20.9) was analysed using the standard error of differences in the percentage (15) and was shown to be statistically significant ( $0.01 < p < 0.05$ ).

The greater variability of MFC may be attributed to its late origin in morphogenesis (11). The fact that the LFC arises in a majority from the deep femoral artery shows that LFC can serve as a major source of collateral circulation to the deep system by way of its ascending branch which anastomoses with the branches of the inferior gluteal artery (5, 6, 7). This anastomosis may play an important role in occlusive lesions of the common femoral artery.

### Conclusions

In this study it was identified

1. that the incidence of the variability of the origin of the MFC and LFC is comparable to that reported in previous studies
2. that the origin of the MFC is significantly more variable when compared to that of the LFC.

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Table 1. Variability of the origin of the circumflex femoral arteries \*

Artery	Origin	Number	%
MFC	Deep femoral	40	64.5
MFC	Common femoral	22	35.4
LFC	Deep femoral	53	85.4
LFC	Common femoral	09	14.5
Both MFC and LFC	Deep femoral	34	54.8
Both MFC and LFC	Common femoral	03	4.8

(\* total number of limbs 62)

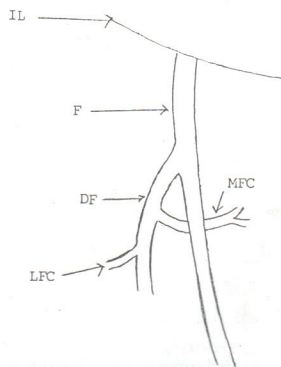
MFC - Medial Femoral circumflex artery

LFC - Lateral Femoral circumflex artery

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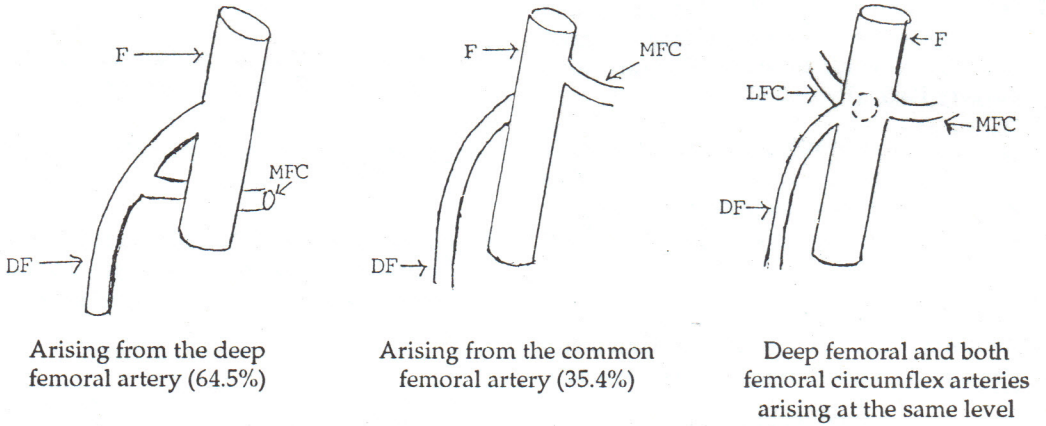
Figure 1

Common pattern of origin of the circumflex femoral arteries.



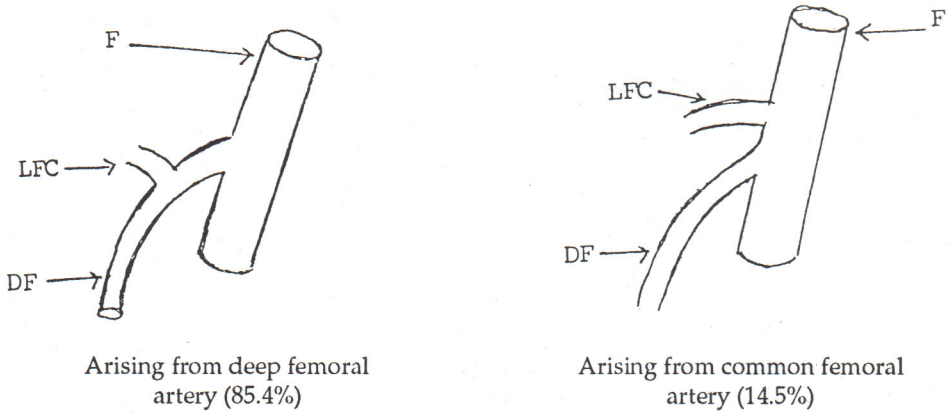
IL, inguinal ligament; F, common femoral artery; DF, deep femoral artery; MFC, medial femoral circumflex artery; LFC, lateral femoral circumflex artery

**Figure 2**  
Types of origin of the medial femoral circumflex artery



F, common femoral artery; DF, deep femoral artery;  
MFC, medial femoral circumflex artery; LFC, lateral femoral circumflex artery

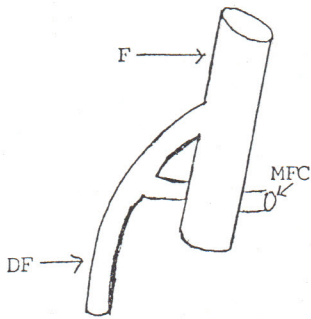
**Figure 3**  
Types of origin of the lateral femoral circumflex artery



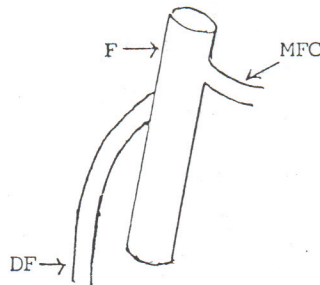
F, common femoral artery; DF, deep femoral artery;  
LFC, lateral femoral circumflex artery

Figure 2

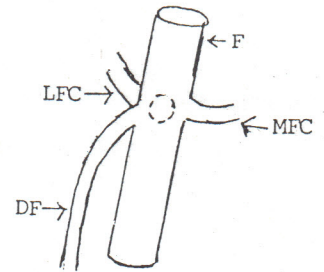
Types of origin of the medial femoral circumflex artery



Arising from the deep femoral artery (64.5%)



Arising from the common femoral artery (35.4%)

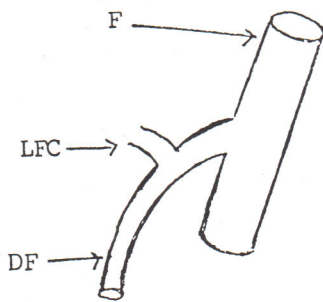


Deep femoral and both femoral circumflex arteries arising at the same level

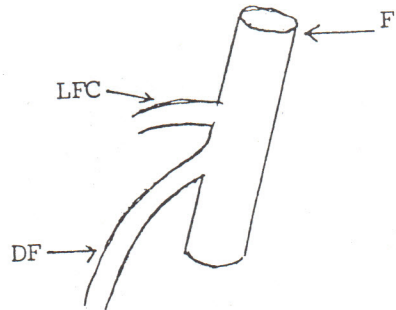
F, common femoral artery; DF, deep femoral artery; MFC, medial femoral circumflex artery; LFC, lateral femoral circumflex artery

Figure 3

Types of origin of the lateral femoral circumflex artery



Arising from deep femoral artery (85.4%)



Arising from common femoral artery (14.5%)

F, common femoral artery; DF, deep femoral artery; LFC, lateral femoral circumflex artery