

A RARE VARIANT OF A COMMON ARTERIAL TRUNK FOR THE CIRCUMFLEX FEMORAL ARTERIES

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In *Homo sapiens*, the main stem artery supplying arterial branches to deep structures of the proximal thigh and hip joint is the profunda femoris artery (deep femoral artery). Typically, the proximal portion of this artery has one or two branches (lateral circumflex femoral artery and / or medial circumflex femoral artery) that supply deep structures in the proximal part of the thigh and hip joint (acetabular branches of the medial circumflex femoral artery) and as far distally as the knee joint (descending branch of the lateral circumflex femoral artery). The published literature provides insights into observed variations in the origin of the lateral and medial circumflex femoral arteries (Williams et al., 1934; Beer, 1965; Chang et al., 1965; Müller, 1967; Gremigni, 1968; Krasemann, 1972; Bloda E. et al., 1982; Penteado, 1983; Lippert and Pabst, 1985; Siddharth et al., 1985; Massoud and Fletcher, 1997). On rare occasions, these circumflex femoral arteries arise from a common arterial trunk. The focus of this study is an observed rare isolated common arterial trunk for the circumflex femoral arteries with unreported characteristics that may be of importance to clinicians.

The circumflex femoral arteries are variable in their origin. Each circumflex femoral artery may either arise separately from the femoral artery and the profunda femoris artery or vica versa. In contrast, both circumflex femoral arteries may arise from either the femoral artery or from the profunda femoris artery. Despite the origin of each circumflex femoral artery,

the structures they supply remain fairly consistent. The two branches (ascending and descending) of the medial circumflex femoral artery provides the main blood supply to the proximal portion of the adductor muscles but its' main distribution is in the posterior aspects of the thigh and the hip joint (Woodburne, 1969). Thus, knowledge of known variations of this vessel (including its origin) is important in reconstructive surgeries, diseases, and injuries of the hip joint and posterior region of the thigh. The lateral circumflex femoral artery has three branches 1) the ascending branch that forms an anastomoses with the superior gluteal artery and supplies the gluteus medius and minimus muscles; 2) the transverse branch that anastomoses with at least three additional arteries (medial circumflex femoral, inferior gluteal, and first perforating); and 3) the descending branch that supplies the vastus lateralis and anastomoses with the descending genicular artery and the superior lateral genicular artery (Woodburne, 1969). It is very rare, however, for both circumflex femoral arteries to arise from an isolated common arterial trunk.

A rare common arterial trunk may arise from either the femoral artery or the profunda femoris artery. Herein, we report several unique observations for a rare common arterial trunk of the circumflex femoral arteries. Our observations include the percent frequency of occurrences, an aspect of origin from the femoral artery, and the proximal to distal relationship to the bifurcation of the femoral and profunda femoris

Table 1. Six published reports (Adachi 1928, Lippert and Pabst 1985, Massoud and Fletcher 1997, Siddharth et al. 1985, Williams et al. 1934, and Vazquez et al. 2007) provide data comparable to our study (OSU-CHS). Six variables were observed in our specimen (OSU-CHS) and compared to similar data in published reports. The variables include A) number of specimens observed, B) type of specimen (medical images = arteriogram or cadaveric) observed, C) frequencies of occurrences for a common arterial trunk for the circumflex femoral arteries, D) site of origin for the common arterial trunk (femoral or profunda femoris), E) aspect of origin on main-stem artery (lateral and medial), and F) origin of common trunk in relation to bifurcation of femoral and profunda femoris arteries (distal, proximal). Dashed lines indicate no data was reported.

Author	Variables					
	A	B	C	D	E	F
Our results, 2010	> 200	Cadaver	0.50	Femoral	Lateral	Proximal
Adachi 1928	367	Cadaver	0.80	---	---	---
Lippert and Pabst 1985	---	Cadaver	1.00	---	---	---
Massoud and Fletcher 1997	188	Image	1.00	---	---	---
Siddharth et al. 1985	100	Cadaver	5.00	---	---	---
Williams et al. 1934	481	Cadaver	1.00-3.00	---	---	---
Vazquez et al. 2007	186	Cadaver	14.2	---	---	---

arteries (Table 1). The morphology (outside diameter and length) of the arterial trunk was determined as well. From 2003 to 2009, we collected data on the variation of the origins of the circumflex femoral arteries from more than 200 lower limbs of embalmed cadaveric specimens. The data was from routine dissections for the gross anatomy course at Oklahoma State University Center for Health Sciences (OSU-CHS) as well as from cadaveric specimens associated with special dissections to train advanced medical students and clinicians.

From the dissections, we observed the lower left limb of a cadaveric specimen with a very large, elongate common arterial trunk that gave rise to both the lateral and the medial circumflex femoral arteries. The arterial trunk branched from the lateral aspect of the femoral artery well above the origin of the profunda femoris artery but inferior to the inguinal ligament (Figure 1). Previous reports on a common arterial trunk for the circumflex femoral arteries, described a small, very short arterial trunk that arose

from the medial or the anterior aspect of the profunda femoris artery (Lippert and Pabst, 1985; Siddharth et al., 1985). The percent frequency of occurrence for a common arterial trunk of the circumflex femoral arteries ranges from 1.0-5.0 percent (Adachi 1928, Lippert and Pabst 1985, Massoud and Fletcher 1997, Siddharth et al. 1985, and Williams et al. 1934) for specimens studied. Based on over 200 lower limbs examined, we observed a common arterial trunk for the circumflex femoral arteries in one limb of a single specimen (0.5 percent of cadavers), which is lower than that reported in the literature. Two additional attributes of this common arterial trunk are reported for the first time: 1) it arises from the lateral aspect of the femoral artery and 2) it is large in diameter and elongate.

Using a digital dial caliper (Ultra-Cal Mark III accurate to $\pm 0.001\text{mm}$), we measured the outside diameter of the common arterial trunk (7.48 mm) and profunda femoris arteries (7.75 mm) at their proximal ends.

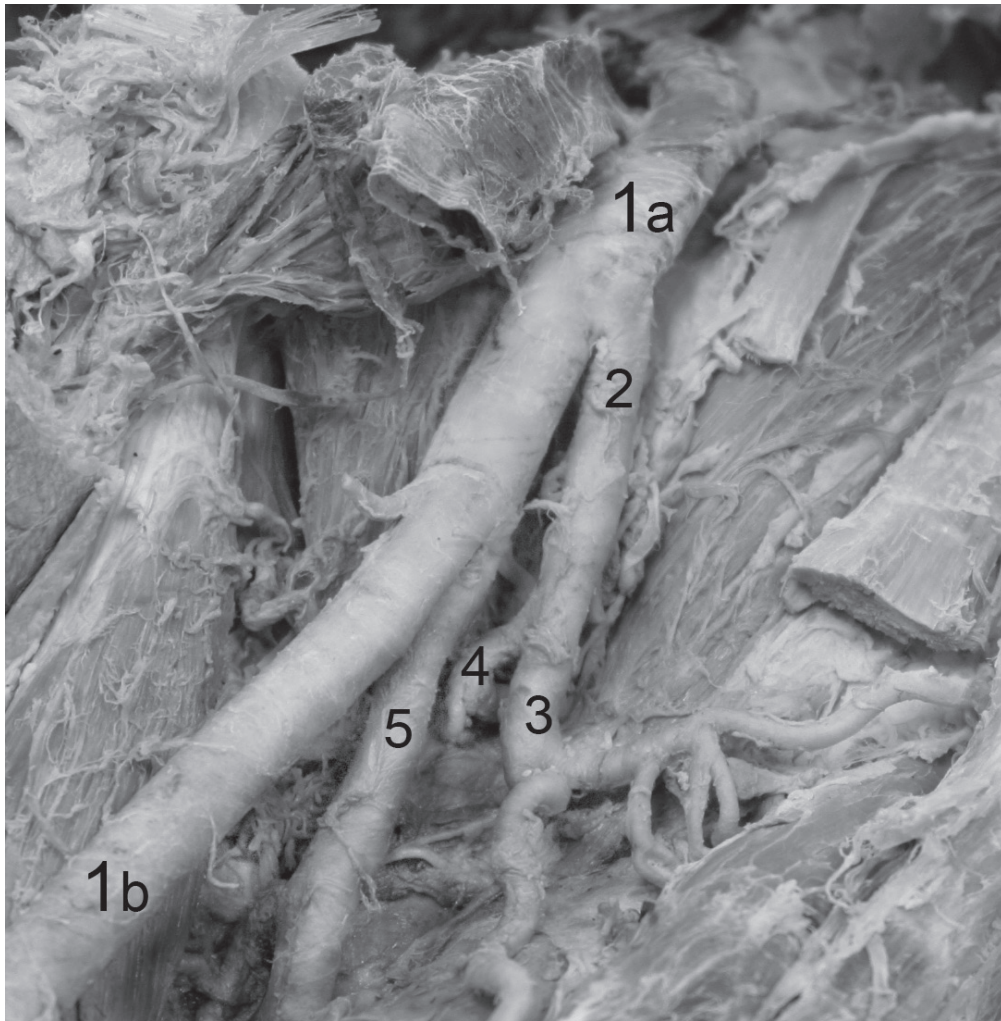


Figure 1. Left lower limb with specimen in supine position, showing variation in the origins of the branches of the femoral artery (top is superior, bottom is inferior, left is medial, right is lateral); 1a, proximal portion of femoral artery; 1b, femoral artery distal to the deep femoral artery; 2, arterial trunk for lateral and medial circumflex femoral arteries; 3, lateral circumflex femoral artery (ascending and descending branches visible); 4, medial circumflex femoral artery; and 5, deep femoral artery.

The length of this arterial trunk (35.60 mm) was measured from its proximal end distally to the origins of the lateral and the medial circumflex femoral arteries. The diameter of an artery from an embalmed cadaveric specimen will not compare, in morphology, directly to that of a living patient (e.g., angiograph) but relative comparisons can be useful to surgeons (Siddharth et al., 1985). Unfortunately, data on the length and caliber for a common arterial trunk for the circum-

flex femoral arteries are rare. The right lower limb of the same cadaveric specimen did not possess a common arterial trunk for the circumflex femoral arteries. This limb had a medial circumflex femoral artery that arose from the femoral artery superior to the origin of the profunda femoris, whereas the lateral circumflex femoral artery arose from the profunda femoris artery. This variation is commonly observed and has been reported in about 20 percent of cadaveric specimens (Woodburne, 1969).

ACKNOWLEDGMENTS

We thank the medical students in anatomy classes 2003-2009 at OSU-CHS for their careful dissections of cadaveric specimens, which provided the data of the lower limbs in this report. Mr. Thom Garrison is appreciated for his care of the cadaver specimens at OSU-CHS.

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Received: March 3, 2010; Accepted November 28, 2010.