

# Subsartorial Vessels as Replacement Names for Superficial Femoral Vessels

MIKAEL HÄGGSTRÖM

## ABSTRACT

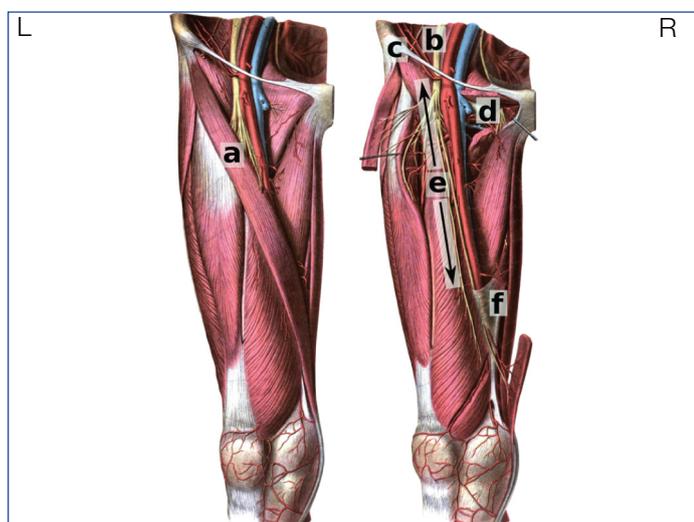
The term “superficial femoral vein” has appeared for the segment of the femoral vein distally to the branching point of the deep femoral vein. This term is discouraged because thrombus formation in this vein is actually a deep vein thrombosis and therefore referring to it as “superficial” causes many cases of untreated deep vein thrombosis. Despite discouragement, the term continues to be used. It is hereby suggested that this segment of the femoral vein be termed the “subsartorial vein” and likewise for the artery that runs parallel to it. This approach avoids the false impression of it being a superficial vein, while at the same time being more specific than simply referring to it as the femoral vein.

**Keywords:** Deep femoral artery, Deep femoral vein, Deep vein thrombosis, Femoral artery, Femoral vein, Ultrasonography

## INTRODUCTION

### Usage of the term “Superficial Femoral Vessels”

The conventional anatomy of the major vessels of the thigh consists of a femoral artery and vein on each lower limb, which run parallel to each other. Proximally they are continuous with the external iliac artery and vein by the inguinal ligament as the border and distally they are continuous with the popliteal artery and vein, with the adductor canal as the border [Table/Fig-1].



**[Table/Fig-1]:** Anatomy of the thigh, where the right image is cleared from the overlying sartorius muscle: a: Sartorius muscle; b: External iliac artery and vein; c: Inguinal ligament; d: Branching points of the deep femoral artery and vein; e: Femoral artery and vein; f: Adductor canal. (Adapted from Sobotta's Human Anatomy 1908, Public Domain by expired copyright.)

The international standard on human anatomic terminology, Terminologia Anatomica, does not distinguish any subsections of the femoral artery or vein [1]. Still, in clinical practice, the “common femoral artery and vein” have appeared as terms for the segment of the femoral artery and vein, respectively, that is proximal to the branching point of the deep femoral artery and vein (arteria and vena profunda femoris). Subsequently, the terms “superficial femoral artery and vein” have appeared for the segment of the femoral artery and vein, respectively, that is distal to the branching point of the deep femoral artery and vein. However, the usage of “superficial femoral vein” is particularly discouraged, primarily because its usage in radiological reports gives a false impression to clinicians that

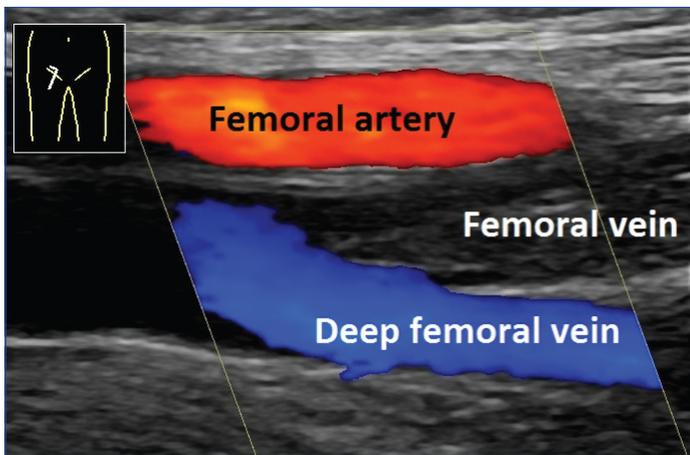
any thrombus detected therein would not require anticoagulants (because thrombi in superficial veins in general do not require anticoagulants), while in fact this segment belongs to the deep venous system and necessitates anticoagulation treatment. Usage of the term thereby causes a significant amount of undertreatment of potentially harmful thrombi of the lower limbs [2,3]. It has therefore been recommended to use the term “common femoral vein” for the segment that is proximal to the deep femoral vein, but to strictly adhere to simply femoral vein for the distal segment [3].

### Need for a Specific Name

Despite repeated recommendations against its usage, the term “superficial femoral vein” keeps appearing in modern literature, often without caution in regard to its potential consequences, particularly in books related to vascular surgery and sonography [4-7]. This popularity of the term indicates a clinical importance of having a specific name for the vessel segment at hand. Examples of usage of this segment of the femoral vein in vascular surgery include the creation arteriovenous fistulas for haemodialysis treatments [8]. The segment can also be used as an arterial substitute, including proximal aortic anastomoses [9]. In addition, surgical correction of incompetent venous valves in this segment improves the course of primary (not post-thrombotic) chronic venous insufficiency [10].

Also, a Deep Vein Thrombosis (DVT) of the common femoral vein has a worse prognosis than in the more distal segment of the femoral vein, conferring a higher indication for performing invasive catheter-based therapies to remove the thrombi [11]. Those performing and reporting on ultrasonography examinations for DVTs in the more distal segment therefore need to express this location [Table/Fig-2], yet currently lack an appropriate term as specific as “superficial femoral vein” because simply mentioning the femoral vein does not distinguish this segment from the common femoral vein. A better report could be variants of “in the femoral vein, distally to the branching point of the deep femoral vein”, but such reports become inconveniently long.

Furthermore, the unspecific nature of the term “femoral vessel” may give a false implication of referring to any vessel of the femur region. It may for example not sound incorrect to state that the deep femoral vein would be a femoral vein, although this name is in fact not terminologically correct. This unspecific nature of the term femoral vessel is likely contributing to the fact that discouragement alone is insufficient to prevent usage of the term “superficial femoral vein”.

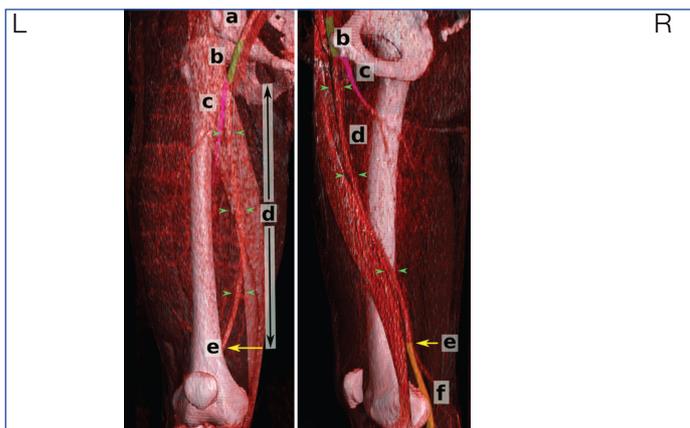


**[Table/Fig-2]:** Ultrasonography of the femoral vein, showing a thrombus just distally to the branching point of the deep femoral vein, appearing as hyperechogenic (brighter) and with absence of flow on Doppler mode.

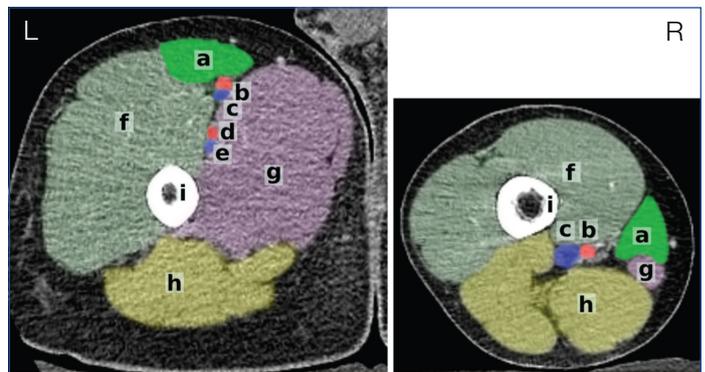
\*Ultrasonography and computed tomography images are own works, with written informed consents from subjects

### Intuitiveness of Subsartorial Vein

In the anatomical aspect of the femoral artery and vein distally to the branching points of the deep femoral vessels, the most distinctive feature is that they almost immediately pass underneath the sartorius muscle, in a canal between thigh muscles that is also referred to as the subsartorial canal (or Hunter's canal). The term subsartorial is derived from Latin, where sub- means "under" or "beneath" and "sartorial" refers to the sartorius muscle. This passage through the subsartorial canal distinguishes the femoral artery and vein from the deep femoral vessels, which run deeper into the thigh [Table/Fig-3,4]. Even the most distal femoral artery and vein remain underneath the sartorius muscle and in close proximity to it, all the way to the adductor canal, where the vessels beyond are by definition termed the popliteal artery and vein. It is thereby anatomically intuitive to use the term "subsartorial artery" (Latin: arteria subsartoralis) and "subsartorial vein" (Latin: vena subsartoralis) for the segment of the femoral artery and vein, respectively, that is located distally to the branching point of the deep femoral vessels.



**[Table/Fig-3]:** Volume rendered computed tomography images of the thigh, segmented to highlight the femoral artery and the sartorius muscle, in frontal (left) and medial (right) projection. a) External iliac artery and vein; b) Common femoral artery and vein (veins become very faint distally in these images, but run parallel to their arterial counterparts); c) Deep femoral artery; d) Femoral artery distally to the branching point of the deep femoral artery, also marked by arrowheads; e) Location of the adductor canal; f) Popliteal artery.



**[Table/Fig-4]:** Computed tomography images in the horizontal plane through the thigh. Left image is just distally to the branching point of the deep femoral vessels, and the right image is just proximally to the level of the adductor canal: a) Sartorius vein; b) Femoral artery; c) Femoral vein; d) Deep femoral artery; e) Deep femoral vein; f) Anterior compartment (includes the sartorius muscle); g) Medial compartment; h) Posterior compartment; i) Femur.

The term subsartorial vein has previously been used for a small vein between the femoral and greater saphenous veins [12]. However, this vessel is not included in Terminologia Anatomica either [1] and the clinical situations where this small vessel requires mentioning are very rare. It is therefore insignificant enough to be called the "small subsartorial vein", without needing to apply "great" for its larger counterpart.

In clinical practice, there should be at least a local clinical consensus before using the terms "subsartorial artery and vein" while not being well established in literature and international standards, but it reasonably confers a vast improvement compared to using the terms "superficial femoral artery and vein", while at the same time providing a more specific term than "femoral artery and vein" alone.

### REFERENCES

- [1] TerminologiaAnatomica. Item: A12.3.11.023.[Cited 2018Dec15]. Available from: <http://terminologia-anatomica.org/en/Terms/View?sitemapItemId=197&defaultSearch={%22page%22:25}>
- [2] Kitchens CS. How I treat superficial venous thrombosis. *Blood*. 2010;117(1):39-44. PMID 20980677.
- [3] Thiagarajah R, Venkatanarasimha N, Freeman S. Use of the term "superficial femoral vein" in ultrasound. *J Clin Ultrasound*. 2011;39(1):32-34. PMID 20957733.
- [4] Schrope B. Surgical and interventional ultrasound. New York: McGraw-Hill Education Medical; 2014. Page 186.
- [5] Tibbs DJ. Varicose Veins and Related Disorders. Burlington: Elsevier Science; 2013. Page 466.
- [6] Lefebvre C. Atlas of cardiovascular emergencies. New York: McGraw-Hill; 2015. Page 51 and 68.
- [7] Moore EE, Feliciano DV, Mattox KL, Demetriades D, Inaba K. Trauma. New York: McGraw Hill Education; 2017. Page 852.
- [8] Gradman WS, Cohen W, Haji-Aghaie M. Arteriovenous fistula construction in the thigh with transposed superficial femoral vein: Our initial experience. *J Vasc Surg*. 2001;33(5):968-75. PMID: 11331836
- [9] Franke S, Voit R. The superficial femoral vein as arterial substitute in infections of the aortiliac region. *Ann Vasc Surg*. 1997;11(4):406-12. PMID: 9236999
- [10] Makarova NP, Lurie F, Hmelniker SM. Does surgical correction of the superficial femoral vein valve change the course of varicose disease? *J Vasc Surg*. 2001;33(2):361-68. PMID: 11174790
- [11] Jenkins JS, Michael P. Deep venous thrombosis: an interventionalist's approach. *Ochsner J*. 2014;14(4):633- 40. PMC 4295740. PMID 25598728.
- [12] Sherman RS. Varicose veins: further findings based on anatomic and surgical dissections. *Ann Surg*. 1949;130(2):218-32. PMC 1616302.PMID 17859423.

#### PARTICULARS OF CONTRIBUTORS:

1. Physician, Department of Radiology, NU Hospital Group, Trollhättan, Västra Götaland, Sweden.

#### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mikael Häggström,  
Stjärngatan 10A lgh 1201, Uddevalla, Västra Götaland, Sweden.  
E-mail: haggstrom.mikael@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Nov 23, 2018**

Date of Peer Review: **Dec 11, 2018**

Date of Acceptance: **Dec 24, 2018**

Date of Publishing: **Jan 01, 2019**