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**SMALL SAPHENOUS VEIN – PECULIARITIES OF ORIGIN AND DRAINAGE**

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*We investigated the anatomical variability of the small saphenous vein in cadavers using the classical dissection methods.*

**Key words:** *small saphenous vein, saphenopopliteal junction.*

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**МАЛАЯ ПОДКОЖНАЯ ВЕНА НОГИ – ОСОБЕННОСТИ ПРОИСХОЖДЕНИЯ И ДРЕНАЖА**

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*Мы исследовали анатомическую изменчивость малой подкожной вены ноги на трупах, используя классические методы диссекции.*

**Ключевые слова:** *малая подкожная вена, сафено-поплитеальное соустье.*

The superficial venous system of the lower limb includes great and small saphenous veins and their highly variable anatomy make them to be a subject of interest.

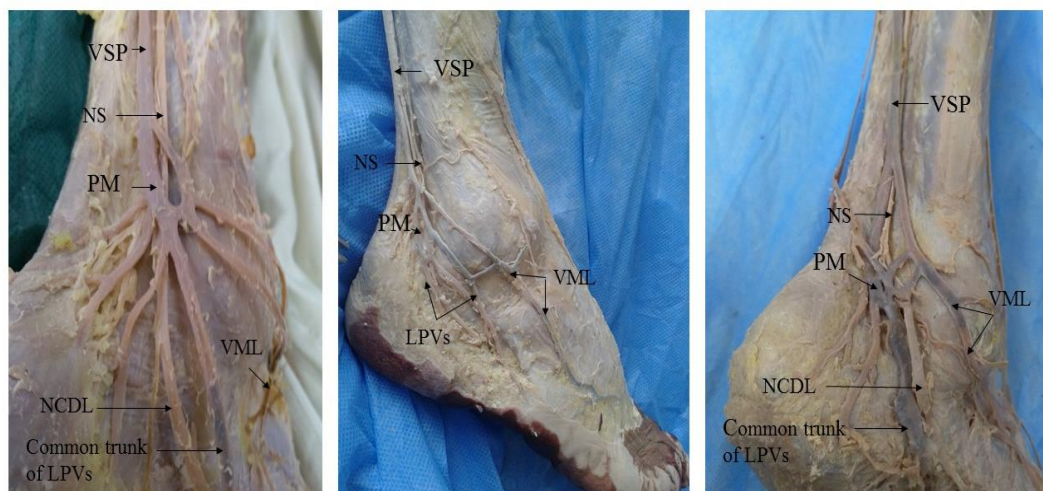
Small saphenous vein (SSV), one of two superficial veins of the lower extremity, lies in the saphenous compartment bordered by the saphenous and muscular fasciae [1]. It begins behind the lateral malleolus as the continuation of the lateral marginal vein and ascends along the lateral border of the Achilles tendon together with the sural nerve. Running upward, the small saphenous vein crosses the tendon and reaches the middle of the back of the leg, then it perforates the deep fascia and ends in the popliteal vein between two heads of the gastrocnemius.

Both the origin and termination of the small saphenous vein had highly variable anatomy. The origin of the SSV is often a plexus [2], but its terminal part drains in the popliteal vein, forming the saphenopopliteal junction, in 60% of cases [3]. In other 30% of cases, the blood flows via the communicating veins to the system of the great saphenous vein, in the last 10% of cases it flows via the gastrocnemius and perforating veins into the deep venous system [3].

**Materials and methods.** Twenty-four formalized lower limbs were dissected in order to investigate the anatomical variability of the small saphenous vein. The study was performed at the Department of Anatomy and Clinical Anatomy of „Nicolae Testemitanu” State University of Medicine and Pharmacy. The observed anatomical variants were recorded and photographed.

**Results and discussion** The origin of the SSV was examined in only 18 of the 24 small saphenous veins included in the research. The origin was represented by the lateral malleolar plexus formed by the lateral marginal vein

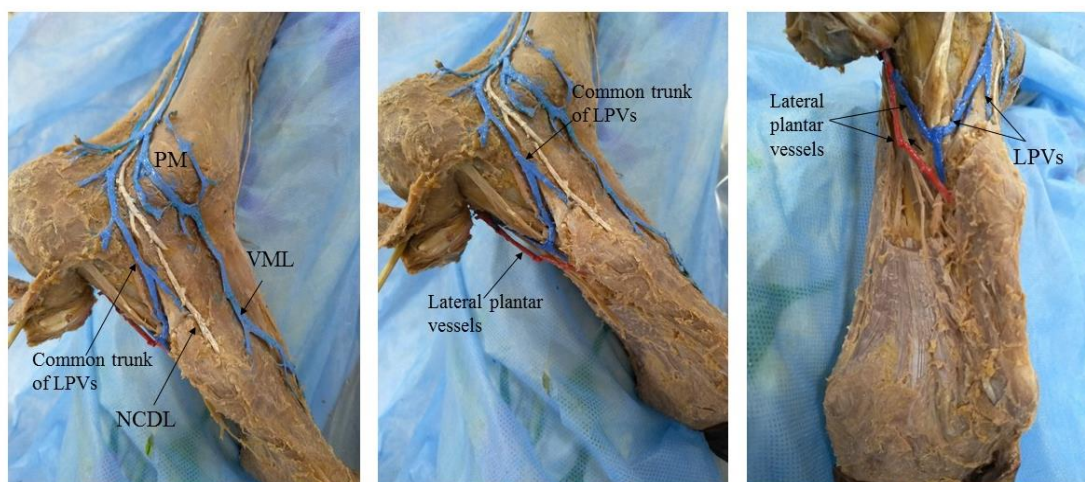
(LMV) and lateral foot perforating veins (LPVs). The lateral malleolar plexus located in the proximity of the lateral malleolus varied in shape and size (figure 1).



*Fig. 1.* Lateral malleolar plexus as the origin of the small saphenous vein  
VSP – vena saphena parva, PM – plexus malleolaris, VML – vena marginalis lateralis, LPVs – lateral perforating veins of the foot, NS – nervus suralis, NCDL – nervus cutaneus dorsalis lateralis.

The lateral marginal vein was present in all cases, even more in two feet of a single male cadaver the LMV was double originating from the double dorsal pedal arch. In front of the lateral malleolus the LMV often divided in 2-3 trunks and the resulting veins surrounded the peroneal malleolus posteriorly and anteriorly to form the plexus around it.

The lateral perforating veins of foot, two in number, derived from the lateral plantar veins and in 66.7% of cases (12 feet) joined into a common trunk giving rise to the main root of the SSV (figure 2). The perforating veins of foot are unique in that they normally direct flow toward the superficial veins, while all others normally direct flow to the deep system [2].



*Fig. 2.* Common trunk of the lateral perforating veins of the foot  
VML – vena marginalis lateralis, PM – plexus malleolaris, LPVs – lateral perforating veins of the foot, NCDL – nervus cutaneus dorsalis lateralis.

Studying the terminal part of the SSV several variants of its drainage were identified: 1) in the popliteal vein forming the saphenopopliteal junction, 2) in the deep veins of the thigh directly or through the perforating veins, 3) in the great saphenous vein via the Giacomini vein, and finally 4) in the gastrocnemius veins (figure 3).

In 45.8% of cases the SSV reached the popliteal fossa, perforated the popliteal fascia and formed the saphenopopliteal junction, in other 50% of cases it ascended proximally on the posterior surfaces of the thigh as the cranial extension of the SSV, and in 4.2% of cases it flowed into the medial gastrocnemius veins.

In 20.8% of cases the SSV drained only into the popliteal vein, in the other 25% it divided into two venous trunks – one formed the saphenopopliteal junction, another continued proximally as cranial extension of the SSV and drained via the perforating veins into the muscular veins of the thigh and / or via the Giacomini vein into the great saphenous vein.

In 29.2% of cases the SSV ascended on the thigh without having any connections with the popliteal vein and drained into the great saphenous vein and into the muscular veins of the region. In other 12.5% of cases it continued only with the Giacomini vein and drained into the great saphenous vein, in the last 8.3% of cases the SSV continued proximally with the deep femoral vein after piercing the adductor magnus muscle.

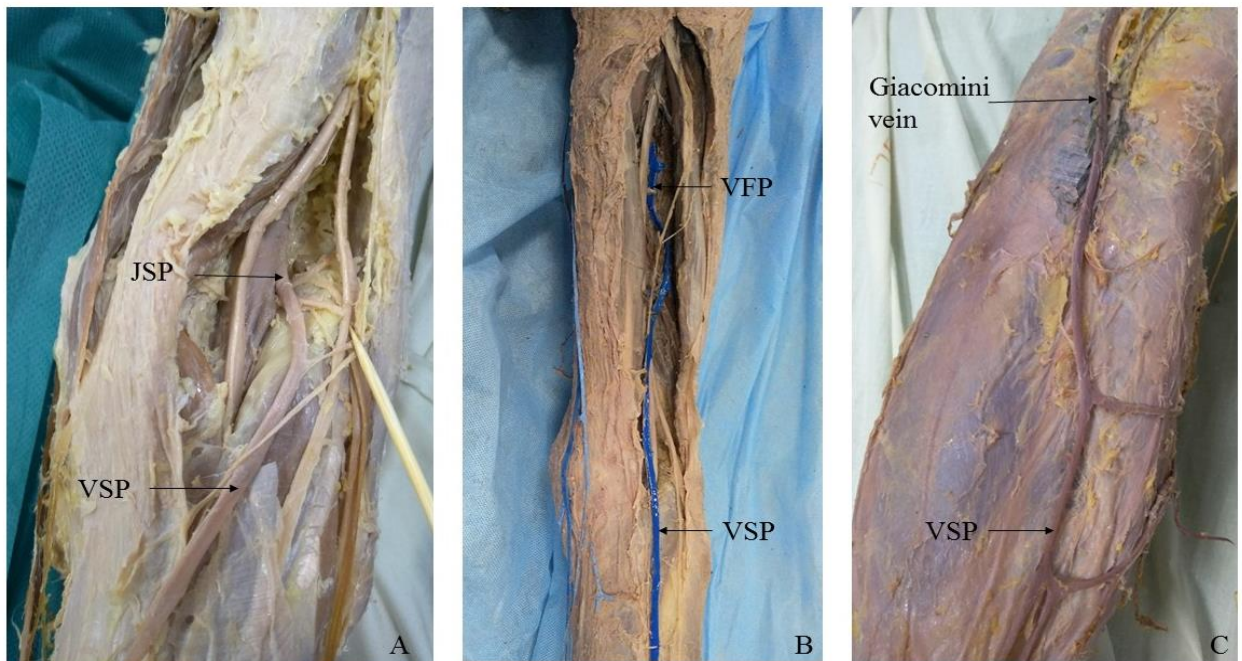


Fig. 3. Variations in the termination of the SSV: A) into the popliteal vein, B) as the deep femoral vein, C) into the great saphenous vein via the Giacomini vein.  
VSP – *vena saphena parva*, JSP – *junctio saphenopoplitea*, VFP – *vena profunda femoris*.

According to the presence or absence of the saphenopopliteal junction (SPJ) we described four variants of the termination of the SSV.

- Type I: the SSV drained into the popliteal vein forming the SPJ (20,8%, n=5).

- Type II: both the SPJ and the cranial extension of the SSV were present (25%, n=6).
- Type III: no SPJ, the SSV continued on the thigh as the cranial extension of the SSV (50%, n=12).
- Type IV: no SPJ, the SSV drained into the medial gastrocnemius veins (4.2%, n=1).

Using a practical and surgical classification Uhl J-F. et al. [4] described five termination types of the SSV according to the presence (A and B) or the absence (C, D and E) of the SPJ.

The other termination types of the SSV are described [5] in the literature, based on data of the embryogenesis of the lower limb vessels: type I – the SSV drains into the popliteal vein (this type has two subtypes); type II – the SSV drains in the thigh veins, or in the deep femoral vein, or in the great saphenous vein (has three subdivisions); type III – the SSV drains in the leg veins without reaching the popliteal fossa (has two subtypes).

Variations in the SSV are very common. The knowledge of the variant origin and termination of the SSV might be of use to vascular surgeons and cardiothoracic surgeons.

## REFERENCES

1. Caggiati, A. The "interfascial" veins of the lower limbs. / In: *Ital J Anat Embryol.* 2005;110 (2 Suppl 1) : 97-102.
2. Uhl, J-F., Lo Vuolo, M., Gillot, C. Anatomy of foot and ankle perforator veins. / In: *Phlebology.* 2017; 24(2):105-112. // Available at: <https://www.phlebology.org/anatomy-of-foot-and-ankle-perforator-veins/>
3. Kachlik, D., Pechacek, V., Baca, V., Musil, V. The superficial venous system of the lower extremity: new nomenclature. / In: *Phlebology.* 2010; 25(3):113-123. // DOI: 10.1258 / phleb. 2009.009046.
4. Uhl, J.-F., Gillot, C. Embryology and three-dimensional anatomy of the superficial venous system of the lower limbs. / In: *Phlebology.* 2007;22:194-206. // DOI: 10.1258/ 026835507782101717.
5. Anbumani, T. L., Anthony Ammal, S., Thamarai Selvi, A. An anatomical study on the variations of short saphenous vein and its termination. / In: *Int J Med Res Health Sci.* 2016; 5(3):28-33