

The terminology of perforator artery according to basic and clinical anatomy points of view

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Abstract

Background: Perforator flap has become popular over last decade. Many new perforator flaps described in the literature but there is a problem about standardization in terminology. Standardization of terminology is essential as communication tool in all the medical fields. Therefore, it was important to define what is perforator artery according to basic and clinical anatomy points of view.

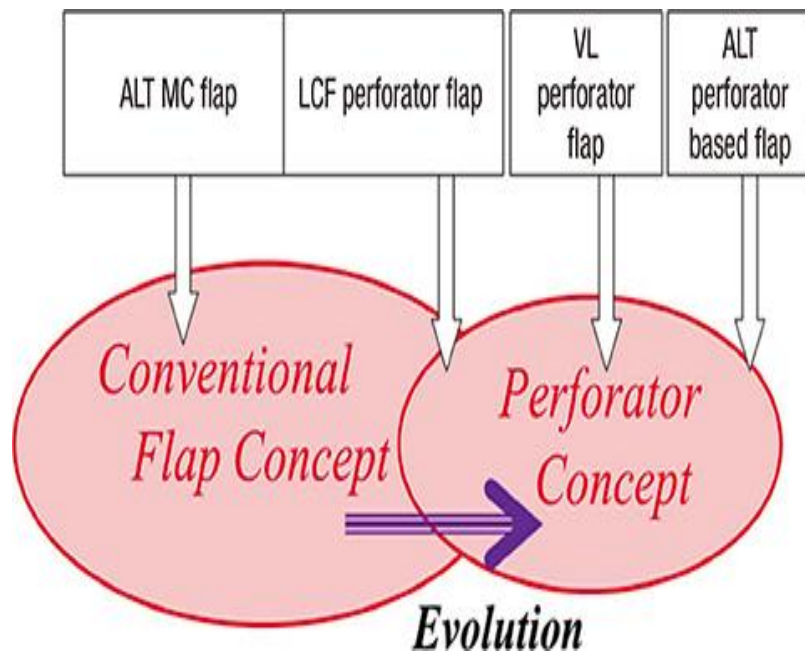
Methods and results: Literature study is used to define what is perforator artery. Perforator artery is called perforantes in Latin anatomical nomenclature and perforating anatomy in clinical term. Both have definition as vessel that has its origin in one of the axial vessels of the body and that passes through certain structural elements of body. In basic anatomical, perforantes or perforating artery is classified easily such as first perforating artery, second perforating artery and third perforating artery. In clinical anatomy, there are many perforating artery classification such as Hallock's and Nakajima's classification. Hallock divided into direct and indirect perforating vessel related with deep fascia while Nakajima classified deep fascia perforators into six patterns of vascular supply

Conclusion: There is no differences of perforator artery definition, but there is differences of perforator artery classification between basic and clinical anatomy points of view.

Keyword: terminology, perforator artery, basic anatomy, clinical anatomy

Background:

Perforator flap has become popular over last decade. Many new perforator flaps described in the literature but there is a problem about standardization in terminology. Multiple advantages is discovered in perforator flaps(See Picture below).

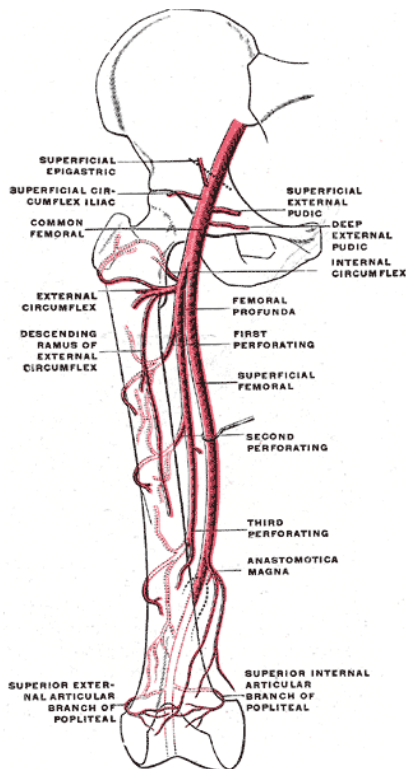


Picture 1. Flap evolution

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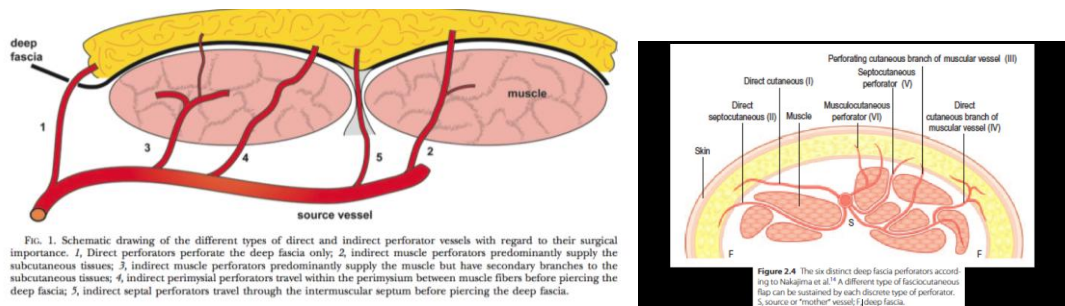
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Literature study is used to define what is perforator artery. Perforator artery is called perforantes in Latin anatomical nomenclature and perforating anatomy in clinical term. Both have definition as vessel that has its origin in one of the axial vessels of the body and that passes through certain structural elements of body . In basic anatomical, perforantes or perforating artery is classified easily such as first perforating artery, second perforating artery and third perforating arter (see picture 2).



Picture 2. Perforating artery in basic anatomy

In clinical anatomy, there are many perforating artery classification such as Hallock's and Nakajima's classification. Hallock divided into direct and indirect perforating vessel related with deep fascia while Nakajima classified deep fascia perforators into six patterns of vascular supply (see picture 3).



Picture 3. Pattern of perforator artery by Nakajima's Classification

Taylor & Palmer (1987) created the concept of angiosomes or vascular territories and choke vessel in clinical setting. Wei et al. (11) also defined perforating vessels as those of which the source artery is deep and the branch that carries blood directly to the fasciocutaneous tissues, in its course to reach the skin, passes through the overhanging muscular tissue without exclusively following the intermuscular septum. By this definition, only musculocutaneous perforators are considered true perforator. Hallock (2003) defines a perforator as any vessel that enters the superficial plane through a defined fenestration in the deep fascia, regardless of origin. Hallock discerns direct and indirect perforators according to the distinct origin of their

vascular supply and the structures they traverse before piercing the deep fascia (see picture 4).

TABLE I
Examples of Correct Abbreviations and Terminology of Muscular and Septal Perforator Flaps

Flap/Abbreviation	Flap/Full Name	Nutrient Artery
Muscle perforator flaps		
DIEP	Deep inferior epigastric perforator	Deep inferior epigastric vessels
TAP	Thoracodorsal artery perforator	Thoracodorsal vessels
SGAP	Superior gluteal artery perforator	Superior gluteal vessels
IGAP	Inferior gluteal artery perforator	Inferior gluteal vessels
IMAP	Internal mammary artery perforator	Internal mammary vessels
ICAP	Intercostal perforator	Intercostal vessels
PLP	Paralumbar perforator	Paralumbar perforating vessels
GP	Gracilis perforator	Medial circumflex femoris vessels
TFLP	Tensor fasciae latae perforator	Transverse branch of the lateral circumflex femoris vessels
ALTP	Anterolateral thigh perforator	Descending branch of the lateral circumflex femoris vessels
AMTP	Anteromedial thigh perforator	Innominate branch of the descending branch of the lateral circumflex femoris vessels
SAP	Sural artery perforator	Sural vessels
PTAP	Posterior tibial artery perforator	Posterior tibial vessels
ATAP	Anterior tibial artery perforator	Anterior tibial vessels
Septal perforator flaps		
RAP	Radial artery perforator	Radial vessels
AP	Adductor perforator	Medial circumflex femoris vessels
AMTP	Anteromedial thigh perforator	Innominate branch of the descending branch of the lateral circumflex femoris vessels (if perforator runs only in septum)
ALTP	Anterolateral thigh perforator	Descending branch of the circumflex femoris lateralis vessels (if perforator runs only in the septum)

Picture 4. Name of perforator artery in clinical setting

Conclusion

Standardization of terminology is essential when surgeons are communicating with each other and discussing anatomy, preoperative planning, intraoperative surgical techniques, and postoperative care. The definitions and terminology of perforating artery in clinical anatomy setting can be reviewed in basic anatomy setting to improve nomenclature of nomina anatomica