



ELSEVIER



Review

# Descending genicular artery. Branching patterns and measuring parameters: A systematic review and meta-analysis of several anatomical studies



Thomas Ziegler \*, Lars-Peter Kamolz, Anna Vasilyeva, Michael Schintler, Maximilian Neuwirth, Daryousch Parvizi

Division of Plastic, Aesthetic and Reconstructive Surgery, Department of Surgery, Medical University of Graz, Auenbruggerplatz 29/4, 8036 Graz, Austria

Received 4 November 2017; accepted 10 March 2018

## KEYWORDS

Descending genicular artery;  
Medial femoral condyle free flap;  
Vascular anatomy;  
Bone grafting

**Summary Background:** The medial femoral condyle (MFC) flap is based on the descending genicular artery (DGA), which is a vessel with different variations in its course and branching patterns. Many studies have dealt with the vascular anatomy of the MFC. However, the results of the investigations differ markedly.

**Methods:** The authors performed a systematic literature search in MEDLINE for articles published until May 2017 on the vascular anatomy of the DGA. After the screening, 23 relevant studies with a similar topic were included into this comprehensive analysis.

**Results:** The systematic review examined the lengths and diameters of the individual arteries with regard to the vascularized bone flap of the MFC. The DGA is present in 94% of cases with an average length of 1.8 cm. In 63% of the investigated cases, the DGA divides into three terminal branches. The articular branch has an average length of 7.7 cm, the saphenous branch has a length of 10.7 cm, and the muscular branch has a length of 3.2 cm.

Role and contribution of each author: Thomas Ziegler: Implementation and evaluation of statistics, creation of graphics, literature research, selection of studies, conception and preparation of the manuscript, drafting of the article, and proofreading and revising for important content. Final approval of the submitted version. Lars-Peter Kamolz: Study design, conception and preparation of the manuscript, and proofreading and revising for important content. Final approval of the submitted version. Anna Vasilyeva: Execution of an anatomical study, conception and preparation of the manuscript, and proofreading and revising for important content. Final approval of the submitted version. Michael Schintler: Conception and preparation of the manuscript and proofreading and revising for important content. Final approval of the submitted version. Maximilian Neuwirth: Conception and preparation of the manuscript and proofreading and revising for important content. Final approval of the submitted version. Daryousch Parvizi: Analysis and interpretation of data, conception and preparation of the manuscript, and proofreading and revising for important content. Final approval of the submitted version. The authors consulted writing assistance from Eveline Jandl.

\* Corresponding author. Division of Plastic, Aesthetic and Reconstructive Surgery, Department of Surgery, Medical University of Graz, Auenbruggerplatz 29/4, 8036 Graz, Austria.

E-mail address: [thomas-ziegler@gmx.at](mailto:thomas-ziegler@gmx.at) (T. Ziegler).

<https://doi.org/10.1016/j.bjps.2018.03.005>

1748-6815/© 2018 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

**Conclusion:** To ensure a secured survival of this free flap, a detailed understanding of the convoluted vascular anatomy above the MFC is necessary. We recommend the Dubois classification for a systematic classification of the anatomical patterns of the DGA. We present a summary of all anatomical studies dealing with the vascular supply to the MFC and the DGA to date.

© 2018 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.

## Contents

Introduction .....	967
Methods .....	969
Study selection .....	969
Data extraction and management .....	970
Quality assessment .....	970
Statistical analysis .....	970
Results .....	970
Dubois classification .....	971
Descending genicular artery and superior medial genicular artery .....	971
Distal branches of the DGA .....	971
Discussion .....	972
Conflict of interest statement .....	973
Acknowledgments .....	973
References .....	973

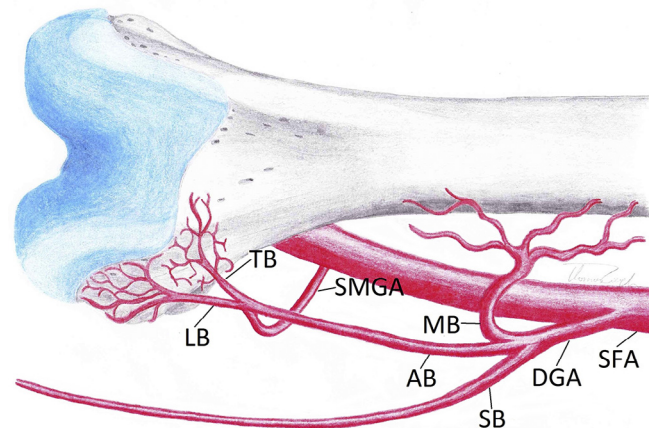
## Introduction

With the introduction of vascularized bone flaps such as the free fibula flap in 1975 by Taylor et al.,<sup>1</sup> a new era began in the therapy of severe bone defects. Around the same time in 1981, Acland et al.<sup>2</sup> first described a free flap designed around the medial knee area – the fasciocutaneous saphenous flap based on the saphenous branch of the descending genicular artery (DGA). The first free vascularized medial femoral condyle (MFC) flap harvest was finally performed by Sakai et al.<sup>3</sup> in 1991. They also discussed the possibility of harvesting a corticoperiosteal flap pedicled on the DGA.

The DGA generally arises from the superficial femoral artery (SFA) just before it passes through the opening of the adductor magnus tendon and finally divides into the muscular branch (MB), articular branch (AB), and saphenous branch (SB).<sup>4</sup>

The skin above the inside of the knee receives blood supply from two sources: the DGA and the SB. A vascularized bone flap can be based on either the DGA or the superior medial genicular artery (SMGA) exiting medially from the popliteal artery, thus further distal (Figure 1). If the latter is the case, then it usually results in a shorter pedicle. In the absence of the DGA, the skin perforators are produced only by the SB and the SFA itself. In this case, the SMGA completely takes over the nutrition of the periosteum and the bone on the medial side of the knee.

Traditionally, the harvest of an MFC flap includes the periosteum and the underlying cortical layer of the bone, the so-called cambium.<sup>3,5-9</sup> The result is a thin, pliable flap that can be wrapped around nonunion sites with little or no bone structure deficit. In most of the previous studies,<sup>10-14</sup> however, the MFC flap was harvested as a corticocancellous semistructural flap with the medullary bone. It can also be



**Figure 1** The DGA originates from the superficial femoral artery (SFA) at the height of the Hunter's canal and divides into three branches. The muscular branch (MB) runs into the vastus medialis muscle. The saphenous branch (SB) proceeds underneath the sartorius muscle accompanied by the saphenous nerve and provides the skin above the inside of the limb. The articular branch (AB) runs toward the medial condyle, divides into the longitudinal branch (LB) and transversal branch (TB), and is responsible for the perfusion of the periosteum and bone. The superior medial genicular artery (SMGA), which originates directly from the popliteal artery, also supplies the condyle.

performed as a compound flap with a skin island based on the SB similar to the saphenous flap.

There are several publications that describe the use of the MFC flap for covering nonunions and avascular necrosis as well as for reconstructing defects in the scaphoid,<sup>11</sup> lunatum,<sup>10</sup> clavicle,<sup>15</sup> naviculare,<sup>16</sup> tibia,<sup>14</sup> and thumb.<sup>17</sup>

Download English Version:

<https://daneshyari.com/en/article/8806546>

Download Persian Version:

<https://daneshyari.com/article/8806546>

[Daneshyari.com](https://daneshyari.com)