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The Descending Genicular Artery Perforator Free Flap as a Reliable Flap: Literature Review

Authors : Doran C. Kalmin

Abstract : The descending genicular artery (DGA) perforator free flap provides an alternative to free flap reconstruction based on a review of the literature detailing both anatomical and clinical studies. The descending genicular artery (DGA) supplies skin, muscle, tendon, and bone located around the medial aspect of the knee that has been used in several pioneering reports in reconstructing defects located in various areas throughout the body. After the success of the medial femoral condyle flap in early studies, a small number of studies have been published detailing the use of the DGA in free flap reconstruction. Despite early success in the use of the DGA flap, acceptance within the Plastic and Reconstructive Surgical community has been limited due primarily to anatomical variations of the pedicle. This literature review is aimed at detailing the progression of the DGA perforator free flap and its variations as an alternative and reliable free flap for reconstruction of composite defects with an exploration into both anatomical and clinical studies. A literature review was undertaken, and the progression of the DGA flap is explored from the early review by Acland et al. pioneering the saphenous free flap to exploring modern changes and studies of the anatomy of the DGA. An extensive review of the literature was undertaken that details the anatomy and its variations, approaches to harvesting the flap, the advantages, and disadvantages of the DGA perforator free flap as well as flap outcomes. There are 15 published clinical series of DGA perforator free flaps that incorporate cutaneous, osteoperiosteal, cartilage, osteocutaneous, osteoperiosteal and muscle, osteoperiosteal and subcutaneous and tendocutatenous. The commonest indication for using a DGA free flap was for non-union of bone, particularly that of the scaphoid whereby the medial femoral condyle could be used. In the case series, a success rate of over 90% was established, showing that these early studies have had good success with a wide range of tissue transfers. The greatest limitation is the anatomical variation of the DGA and therefore, the challenges associated with raising the flap. Despite the variation in anatomy and around 10-15% absence of the DGA, the saphenous artery can be used as well as the superior medial genicular artery if the vascular bone is required as part of the flap. Despite only a handful of anatomical and clinical studies describing the DGA perforator free flap, it ultimately provides a reliable flap that can include a variety of composite structure used for reconstruction in almost any area throughout the body. Although it has limitations, it provides a reliable option for free flap reconstruction that can routinely be performed as a single-stage procedure.

Keywords : anatomical study, clinical study, descending genicular artery, literature review, perforator free flap reconstruction
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