

Pedicled Perforator Flaps: A New Principle in Reconstructive Surgery

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Background: In the evolution of flap physiology and reconstruction, there has been a trend of decreased donor-site morbidity. In this article, the chronology of flap reconstruction is discussed, with particular emphasis on the current state of nonmicrosurgical perforator based flaps.

Methods: A literature search was conducted to study the evolution of flap physiology and reconstruction. Using this database, the authors describe the evolution of pedicled perforator flap reconstruction. Various examples of perforator-based flaps are discussed in this article.

Results: The literature review identified examples of scenarios where pedicled perforator flaps from various regions of the body are viable options. Several clinical cases are presented with respect to each region.

Conclusion: Pedicled perforator flaps are a new concept in nonmicrosurgical perforator flap reconstruction. (*Plast. Reconstr. Surg.* 125: 201, 2010.)

In the evolution of reconstructive flap surgery, Littler¹ and McGregor² described the first concepts in flap physiology for reconstruction. These first flaps were described as random flaps. The first axial pattern flaps described were the inferior superficial epigastric artery flap described by Shaw and the groin flap described by McGregor and Jackson.^{3,4} Mathes and Nahai classified the vascular anatomy of muscle flaps that also supplied the overlying skin.⁵ However, myocutaneous flaps such as the vertical rectus abdominis flap may cause morbidity when the entire muscle is used for flap elevation. The advent of perforator flap techniques by Koshima and Soeda⁶ in 1989 and followed by Allen and Treece⁷ in 1994 sparked a major shift in the thought process of reconstructive surgery. Flaps that were originally thought of as having a musculocutaneous pedicle were redesigned to exclude the muscle. The transverse rectus abdominis musculocutaneous flap progressed into the deep inferior epigastric perforator flap and the rectus muscle was spared. The muscle, once thought to be critical for pedicle creation, was preserved and flaps were designed with only the perforating vessels and vascular pedicle, eliminating the morbidity and functional deficit associated with muscle loss.

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Although these concepts were initially used in microsurgical free flap surgery, their applications are widespread. This development has led to new classifications for perforator flaps. The original classifications of Cormack and Lamberty⁸ and Mathes and Nahai⁵ were now obsolete, given these new techniques. The “Gent” Consensus on Perforator Flap Terminology brought some level of standardization.⁹ This evolution has led to a multitude of descriptions regarding perforator flaps, with new flaps and applications being introduced in the literature routinely. Nonetheless, the majority of reconstructive surgeons in practice are not routinely using perforator flap principles or techniques.

Perforator concepts in microsurgical free flap surgery can be applied in pedicled flaps for reconstruction. It is a natural progression that a perforator flap originally harvested for a microsurgical free flap can be easily harvested as a pedicled perforator flap. By eliminating the microsurgical component, these applications can be widespread and the potential risk of flap loss diminished. The principle would allow for perforator flap design that the nonmicrosurgical reconstructive surgeon can use.

The consequence of muscle loss and donor-site morbidity with a myocutaneous flap is still

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