

---

# Discussion

---

## Efficacy of Venous Supercharging of the Deep Inferior Epigastric Perforator Flap in a Rat Model

*Discussion by Phillip N. Blondeel, M.D., Ph.D.*

*Gent, Belgium*

The work of Geoff Hallock and David Rice is unique in that they describe the only animal model for rectus abdominis perforator flaps in rats. They have shown that valuable information can be learned about the physiology of blood flow in perforator flaps. Unfortunately, the rat model cannot be extrapolated to the deep inferior epigastric perforator (DIEP) flap in humans. In a rat, there is a clear dominance of the superficial inferior epigastric system in the lower abdomen in relation to the deep system. Almost no rectus abdominis perforators can be found in the lower abdomen. On the other hand, there is always a relatively large superior epigastric system. In the more proximal part of the abdomen, large perforators of the superior epigastric artery can be found and dissected, as shown in this article. The fact that more flaps survived when the inferior superficial epigastric vein was used shows that the superficial system in a rat is more important than the deep system.

The safety and, therefore, the success rate lie in the surgeon's ability to recognize the anatomical variability between different species as well as between different individuals of the same species. For example, in the rat, the skin and subcutaneous tissues are drained by the inferior superficial epigastric system. Although there may be some differences in the vascular anatomy of different rats, this type of vascularization is pretty much standard. In humans, much more anatomical variability is observed, both in the arterial system and the venous drainage. Although the inferior superficial epigastric artery can be found in many cases, its caliber, flow, and branching are often insufficient to provide adequate irrigation of an en-

tire DIEP flap. In more than 90 percent of cases, the large perforators of the deep inferior epigastric system need to be used if a large DIEP flap across the midline needs to be harvested.

The same is not always true for the venous drainage. In more than 80 percent of our patients who had not undergone previous abdominal surgery, a decent superficial epigastric vein could be found at the level of the lower incision of the DIEP flaps. This vein is always capable of draining the entire flap without the need of the deep epigastric venous system. Although this vein is present most of the time, we still prefer to use the deep venous system, because it makes the microsurgical anastomosis and consequent shaping much easier. The superficial system is used only in cases of inadequate venous drainage by the deep system or in case of revision and thrombosis of the deep system. Between the extremes of having a dominant superficial arterial and venous system with no deep perforators at all and cases where there is no superficial system and a clear dominance of the deep inferior epigastric perforators, there is a wide range of differences in vascular anatomy. This variability is very individual, and it is up to the surgeon to find out before he or she starts surgery (or sometimes during surgery) which vessels to choose to ensure adequate perfusion of the flap.

*Phillip N. Blondeel, M.D., Ph.D.  
Kliniek voor Plastische Heelkunde  
Universitair Ziekenhuis Gent  
De Pintelaan 185  
B-9000 Gent, Belgium  
phillip.blondeel@ugent.be*

Received for publication March 7, 2005.

DOI: 10.1097/01.prs.0000175221.84548.12