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Operative Technique

# Lumbar Artery Perforator Flap: Video Surgical Sequence

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The lumbar artery perforator (LAP) flap was initially described in 2003 as a useful alternative to breast reconstruction in patients with unavailable abdominal tissue.[1] Initial case series have since detailed the safety of this flap[2–5] and helped better characterize the anatomy.[4,6–9] We present our approach to LAP flaps in an effort to provide a videographic description detailing procedural steps as well as pearls for success.

The patient in the video is a 63-year-old woman with a history of bilateral breast cancer treated with bilateral mastectomies and bilateral tissue expander placement. She underwent subsequent right radiation and, as a result, desired autologous reconstruction. With a history of prior abdominoplasty precluding use of the deep inferior epigastric perforator (DIEP) flap and limited excess thigh tissue, she was an ideal candidate for the LAP flap. Although she was thin, she carried adequate tissue in the lumbar and flank region, which tends to be common in the body type that often seeks an abdominoplasty. We designed our markings to capture the lumbar perforator, typically arising from L3 or L4, found cranial to the iliac crest and 7–10 cm lateral to midline.[6–9] Laterally, the markings are merged with the abdominoplasty scar. Once prone, intraoperative Doppler confirmation is used to confirm general location of the perforator. Ipsilateral flap placement was planned and resulted in a natural esthetic breast contour with the superior pole filled with the beveled gluteal fat (**Video 1**). (**See Video** [online], which displays unilateral lumbar artery flap and the operating-room sequencing.)

The procedure involved two position changes and was sequenced to minimize ischemia time (Table 1). A composite deep inferior epigastric arterial/venous graft was used to increase the LAP flap pedicle length. This also helps avoid the significant size mismatch between the LAP artery and the internal mammary artery, which leads to variable laminar flow and increased risk of thrombosis. Use of the composite graft permits pedicle dissection to stop at the transverse process, yielding an average pedicle length of 4.2 cm.[4] Stopping at the transverse process helps limit the potential for donor site complications. Caudally, the composite graft was harvested at its takeoff from the external iliac vessels as would be done in a standard DIEP flap pedicle dissection. The cranial length was based on arterial size match to the anticipated LAP artery and vein. Once prone, dissection of the LAP flap proceeded from medial to lateral in a suprafascial plane. The perforator was tightly encased in fascia, with a sensory superior cluneal nerve lying immediately medial to and obscuring it. The perforators are not as easily identifiable as the perforators in a DIEP flap dissection. The perforators arise from the groove between the erector spinae muscles and the quadratus lumborum muscle, and we find this a useful intraoperative landmark. Once identified, the fascia between the erector spinae and quadratus lumborum was released. The pedicle was then followed as it courses on the quadratus lumborum muscle. The pedicle itself was encased in fascia, and its vein was large and friable; this sometimes necessitates harvest with the intact fascia. We have found that after all the anastomoses are complete, sometimes this fascia can be a source of constriction leading to an increased risk of vasospasm. In an effort to mitigate this, when present, we routinely perform fascial release under direct microscopic visualization.

Once the LAP flap is harvested, one team performed a rapid multilayered closure with progressive tension sutures and drain placement to avoid the high risk of seroma. The other team simultaneously performed the anastomoses between the LAP pedicle and the cranial aspect of the composite graft. This ensured that the LAP flap was ready for anastomosis to the internal mammary vessels via its composite graft by the time the donor site was closed, and the patient was repositioned into supine position, thus minimizing ischemia time. The anastomosis to the internal mammary vessels then proceeded smoothly, mimicking DIEP flap anastomosis, and the flap inset required little manipulation.

The LAP flap is an excellent, albeit technically challenging, option for autologous breast reconstruction.

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*Received for publication August 15, 2019; accepted January 13, 2020.*



DOI: 10.1097/GOX.0000000000002680; *Published online 7 April 2020.)*

**Disclosure:** *The authors have no financial interest to declare in relation to the content of this article.*

Related Digital Media are available in the full-text version of the article on www.PRSGlobalOpen.com.

**Table 1. Lumbar Artery Perforator Flap Surgical Sequence with Position Changes**

| | Patient Position | Procedures Performed | Time |
|---|---|---|---|
| Step 1 | Supine | Internal mammary vessel preparation | 34 minutes |
| | | Harvest of a composite DIEA/V graft | |
| Repositioning | | | 30 minutes |
| Step 2 | Prone | LAP harvest and donor site closure | 90 minutes |
| | | Anastomosis of DIEA/V composite graft to the LAP pedicle on a back table. | 84 minutes |
| | | Back closure and repositioning performed simultaneously | ischemia time |
| Repositioning | | | |
| Step 3 | Supine | Anastomosis of the LAP flap via the composite DIEA/V graft to the internal mammary vessels | |
| | | Flap inset | 35 minutes |

Proficiency in complex perforator dissection and supermicrosurgery techniques are helpful. In the patient with a prior abdominoplasty, it provides an esthetic donor site, allowing for completion of a circumferential body lift.

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