

Stacked Lateral Thigh Perforator Flap as a Novel Option for Autologous Breast Reconstruction

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Background: Autologous breast reconstruction using perforator flaps offers excellent outcomes, minimizes donor-site morbidity, and allows for precise donor-site selection. The deep inferior epigastric artery perforator, profunda artery perforator, and gluteal artery perforator flaps along with the stacked flap technique are the most common options. This study reports the first series of the stacked lateral thigh perforator flap.

Methods: A retrospective review of all stacked lateral thigh perforator flaps done by a single group of surgeons was performed. Demographics, flap weights, complications, indications, and surgical technique were tabulated for each patient.

Results: Eight female patients with a history of breast cancer underwent delayed unilateral breast reconstruction with stacked lateral thigh perforator flaps for a total of 16 flaps. Mean patient age, body mass index, flap weight, and stacked flap weight were 47.3 years, 26.2 kg/m², 333.1 g, and 666.1 g, respectively. Microsurgical revascularization was completed in antegrade and retrograde fashion to the internal mammary vasculature. Flap survival was 100 percent and one subsequent flap revision was performed. Two patients developed a seroma at the donor site. Indications included insufficient abdominal tissue, prominent lateral thigh lipodystrophy, prior abdominal surgery, and failed prior abdominally based autologous reconstruction.

Conclusions: This series demonstrates that the lateral thigh perforator flap is a reliable and effective option for a stacked breast reconstruction. Its ease of harvest (stemming from reliable anatomy), straightforward dissection, and intraoperative positioning make it an appealing flap option. The stacked lateral thigh perforator flap allows the reconstructive surgeon to tailor breast reconstruction to the patient, focusing on body habitus and minimizing morbidity. (*Plast. Reconstr. Surg.* 143: 1601, 2019.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, IV.

Autologous breast reconstruction using perforator flaps offers excellent long-term aesthetic outcomes, minimizes donor-site morbidity, and allows for precise donor-site selection. Currently, the deep inferior epigastric artery perforator flap is the gold standard in autologous breast reconstruction: abdominal tissue volume is usually sufficient, scarring is aesthetically acceptable, and intraoperative body repositioning is not required.^{1,2} When challenges such as insufficient tissue or prior operations exclude the abdomen as a potential donor site, alternate donor sites

(including the buttock and thigh) and stacked flaps can be considered. The lateral thigh perforator flap is an emerging candidate for autologous breast reconstruction first described by Allen.³ The lateral thigh perforator flap is based on consistent and reliable septocutaneous vessels arising from the ascending branch of the lateral circumflex artery, and the donor-site location obviates the need for intraoperative repositioning. The flap is also versatile in size and weight, with an average skin paddle size of 20 to 26 × 8 to 9 cm, pedicle lengths of up to 10 cm, and weights ranging from 233 to 624 g.⁴⁻⁶

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However, the lateral thigh perforator flap is limited by the volume of soft tissue available for use as a single donor flap, providing enough for a small to moderate-size breast reconstruction.⁵ An option to mitigate insufficient volume from a single flap is stacking, or the use of two independent flaps as a single reconstruction unit. Stacking is an effective method for surgeons to maintain a strictly autologous reconstruction while providing additional volume and maintaining donor-site symmetry.⁷⁻¹⁶ Our group has used the lateral thigh perforator flap in a stacked fashion, where both lateral thighs were used to reconstruct a single breast in women undergoing unilateral reconstruction with unsuitable abdominal donor sites and prominent “saddlebag” donor sites. This is the first reported series of stacked lateral thigh perforator flaps.

PATIENTS AND METHODS

Eight stacked lateral thigh perforator flaps were performed on eight female patients for

unilateral breast reconstruction from June of 2015 to November of 2015. Data points were documented for each patient, including demographics, mastectomy resection weights, flap dimensions and weights, indications, complications, and surgical details. All patients underwent preoperative imaging using computed tomographic angiography and Doppler ultrasound, which allowed for flaps to be designed based on septocutaneous perforators corresponding to preoperative imaging. Immediate postoperative complications including flap failure, infection, wound dehiscence, seroma, hematoma, and donor-site morbidity were recorded.

RESULTS

Eight female patients with a history of breast cancer underwent unilateral breast reconstruction with stacked lateral thigh perforator flaps for a total of 16 flaps. Stacked flaps were anastomosed to anterograde and retrograde internal mammary

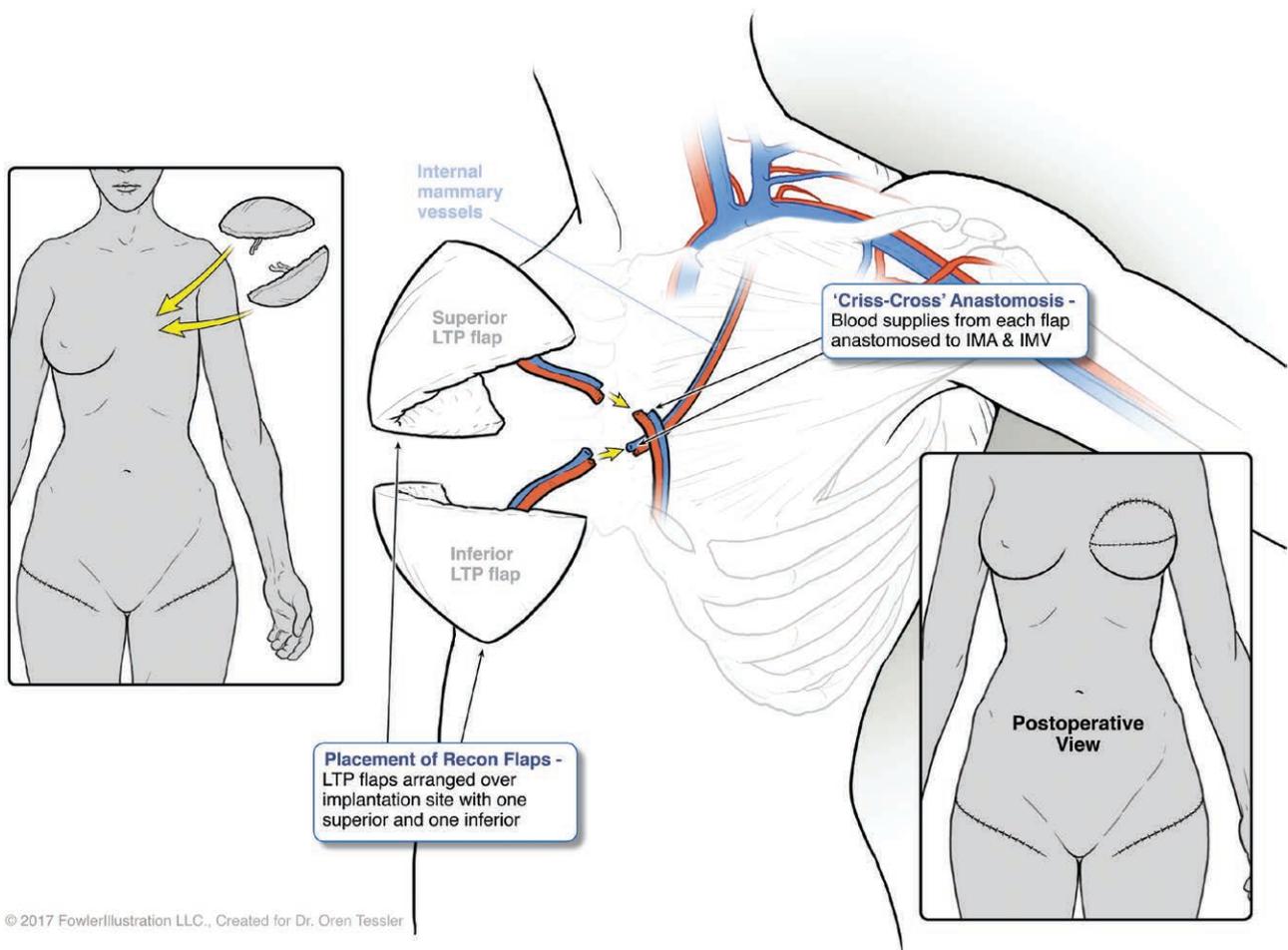


Fig. 1. Unilateral breast reconstruction using a lateral thigh perforator (LTP) flap in stacked fashion. IMA, inferior mammary artery; IMV, inferior mammary vein. (©2017 Fowler Illustration LLC.)

vessels at the third intercostal space (Fig. 1). All eight patients underwent delayed reconstruction with a mean 8.7-month follow-up. Patients underwent second-stage reconstruction 3 months after initial surgery. In general, the position and skin paddle of the inferior flap were designed to provide a sling in the inferior pole of the breast. The superior flap was inset beneath the superior mastectomy flap and the skin paddle was trimmed as needed to provide an adequate breast envelope and to maintain an adequate paddle to allow clinical monitoring of all flaps in the immediate postoperative period.

The mean patient age was 47.3 years (range, 45 to 64 years) and the mean body mass index was 26.2 kg/m² (range, 20.9 to 32.6 kg/m²). Two patients were current smokers, and five patients noted significant alcohol use. A survey of relevant medical comorbidities revealed one patient with hypertension, one with a hypercoagulable disorder, and two who underwent radiation therapy for breast cancer. Mastectomy specimen weights were recorded for only five of eight patients, yielding an average mastectomy weight of 576.8 g (range, 221 to 826 g). Mean flap weight was 333.1 g (range, 218 to 410 g), and mean stacked weight was 636.9 g (range, 481 to 779 g). The primary indications for using the lateral thigh perforator flap included insufficient abdominal wall tissue in four patients, absent deep inferior epigastric vessels secondary to prior surgical procedures unrelated to their reconstruction in one patient, and failed transverse rectus abdominis musculocutaneous flaps in three patients. A representative patient undergoing left stacked lateral thigh perforator flap breast reconstruction and right mastopexy for symmetry is presented (Figs. 2 through 4).

Two patients developed a seroma at the donor site. There was no partial flap loss and no evidence of fat necrosis noted in follow-up examinations. Only one patient underwent a subsequent flap revision. Flap survival was 100 percent, with no return to the operating room in the immediate postoperative period. Of note, there was sufficient volume in final results.

DISCUSSION

The lateral thigh perforator flap is emerging as a reliable secondary option for breast reconstruction when abdominally based flaps cannot be harvested. Its consistent anatomy based on septocutaneous perforators emerging from the ascending branch of the lateral circumflex femoral



Fig. 2. Representative patient before undergoing unilateral stacked lateral thigh perforator flap breast reconstruction of the left breast with grade II ptosis of the right breast.

artery allows for simple preoperative assessment and intraoperative dissection. Deep inferior epigastric artery–protocol computed tomographic angiography imaging can also be used to assess the presence of lateral thigh perforators in preparation for the lateral thigh perforator flap.⁵ This is of particular interest because the lateral thigh perforator flap can serve as a lifeboat intraoperatively or in a delayed manner without the need for additional imaging.



Fig. 3. Representative patient following breast reconstruction with the stacked lateral thigh perforator flap, following a second-stage procedure for symmetry with skin paddles of superior and inferior flaps present on the left breast.



Fig. 4. Representative lateral thigh perforator flap donor sites shown postoperatively from the anterior view.

Postoperative complications were limited to donor-site seroma and wound dehiscence. The average individual flap size corresponded to approximately 55 percent of the average total mastectomy resection weight, necessitating two flaps in a stacked manner for single breast reconstruction. Although one of the limitations of stacked flaps is the need for recipient vessels, Stalder et al. demonstrated that the retrograde internal mammary system is an effective and reliable option that decreases surgical time and facilitates flap inset.^{17–19}

When the patient prefers to have autologous breast reconstruction, stacked lateral thigh perforator flaps should be considered an effective and viable option if the patient's body habitus consists of excess lateral hip adiposity. The lateral thigh perforator flap has an anatomically reliable vascular supply that allows for a straightforward dissection; provides adequate volume and shape; and decreases operative time, as three surgical teams can work simultaneously. The addition of the stacked lateral thigh perforator flap to the perforator flap collection allows the reconstructive surgeon to truly tailor breast reconstruction to the patient while focusing on body habitus and minimizing donor-site deformity.

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