

Autologous Breast Reconstruction with Bilateral Stacked Free Flaps in Massive Weight Loss Patients

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Summary: Patients with a history of massive weight loss who are undergoing autologous breast reconstruction after mastectomy represent a unique surgical challenge. Although these patients often have an abundance of excess skin, it may be difficult to acquire sufficient tissue volume for adequate reconstruction of bilateral breasts using single flap techniques due to the paucity of subcutaneous fat. Stacked flap techniques have emerged as an effective method in thinner patients with suboptimal fat distribution who desire autologous breast reconstruction. This can serve as an ideal strategy, specifically in this patient population, when it serves the dual function of providing adequate volume for bilateral breast reconstruction and the secondary benefit of removing the excess skin present after massive weight loss. In this article, we discuss surgical techniques used during two cases of bilateral stacked flap breast reconstruction in cancer patients subsequent to massive weight loss. (*Plast Reconstr Surg Glob Open* 2022;10:e4186; doi: [10.1097/GOX.0000000000004186](https://doi.org/10.1097/GOX.0000000000004186); Published online 11 March 2022.)

Breast anatomy following massive weight loss (MWL) is characterized by a decrease in skin elasticity, glandular tissue mass, and Cooper's ligament tensility, which results in a loss of superior pole fullness, total breast volume, and ptosis.¹ Improvement of the breast aesthetic after MWL is often achieved through mastopexy, auto-augmentation, and/or fat grafting²⁻⁴; however, technical reports describing breast reconstruction following MWL remain scarce.

Autologous breast reconstruction may be considered as an optimal reconstructive modality in the setting of MWL when flap harvest performs the dual functions of reconstruction and body contouring. Stacked flaps have emerged as an effective method for reconstruction in patients with variable or suboptimal fat distribution. Here we present our experience with bilateral stacked free flap breast reconstruction in the setting of MWL.

CASE 1

A 49-year-old BRCA1 (+) woman with a history of MWL [113 lbs (51.3kg), 44.1% of body weight] after gastric bypass surgery presented to our clinic desiring breast

reconstruction following prophylactic skin-sparing bilateral mastectomy. Preoperative examination revealed significant asymmetry in breast size and inframammary fold position, loss of projection, decreased superior pole fullness, and grade II ptosis. The breast skin, abdomen, and thighs carried significant skin redundancy and laxity (Fig. 1A). The patient wore a size 36C brassiere and desired a size 36D following reconstruction.

Prepectoral tissue expanders were placed to optimize the skin envelope before tissue transfer. Over two months, the patient underwent serial expansion to a final volume of 400mL bilaterally, achieving significant improvement in breast envelope symmetry. A preoperative nutritional evaluation and computed tomography angiography of the abdomen and bilateral lower extremities were performed for perforator mapping and optimization of flap design, which demonstrated 2.5mm dominant perforators for both the bilateral deep inferior epigastric perforator (DIEP) and bilateral profunda artery perforator flaps. At four months following mastectomy, the patient underwent bilateral stacked flap breast reconstruction with deep inferior epigastric perforator and vertical profunda artery perforator (vPAP) free flaps.

During flap inset, the DIEP flaps (107.5g and 143.5g) were used to reconstruct the superior breast poles, and vPAP flaps (519g and 614g) were positioned for reconstruction of the inferior poles. The anterograde and retrograde internal mammary arteries and veins were used as recipient vessels for microvascular anastomosis. The majority of the flaps were buried, leaving small central skin paddles of each of four flaps for flap monitoring and future nipple-areolar complex reconstruction.

The patient underwent a second stage procedure 3 months postoperatively (Fig. 1B). A Wise-pattern skin

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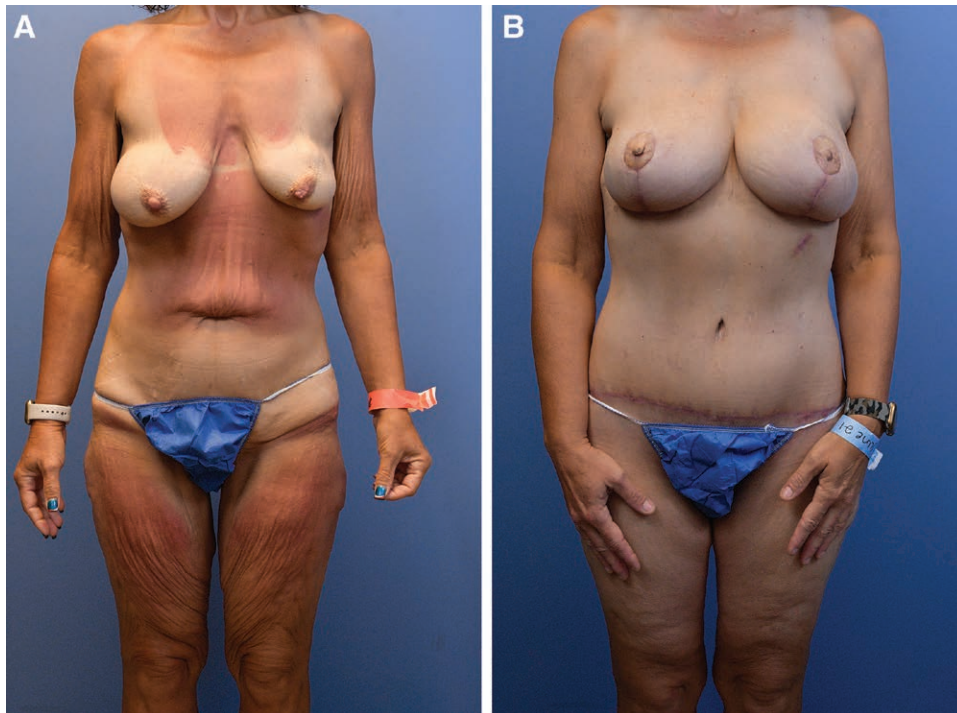


Fig. 1. Case 1 patient. A, Preoperative image demonstrating significant skin laxity, breast asymmetry, volume loss of the superior poles, and ptosis. Analogous tissue findings are observed at the abdominal and lower extremity free flap donor sites, which are relatively lean. B, Final postoperative outcome after bilateral stacked DIEP/vPAP breast reconstruction, with improved contour of abdomen and medial thighs.

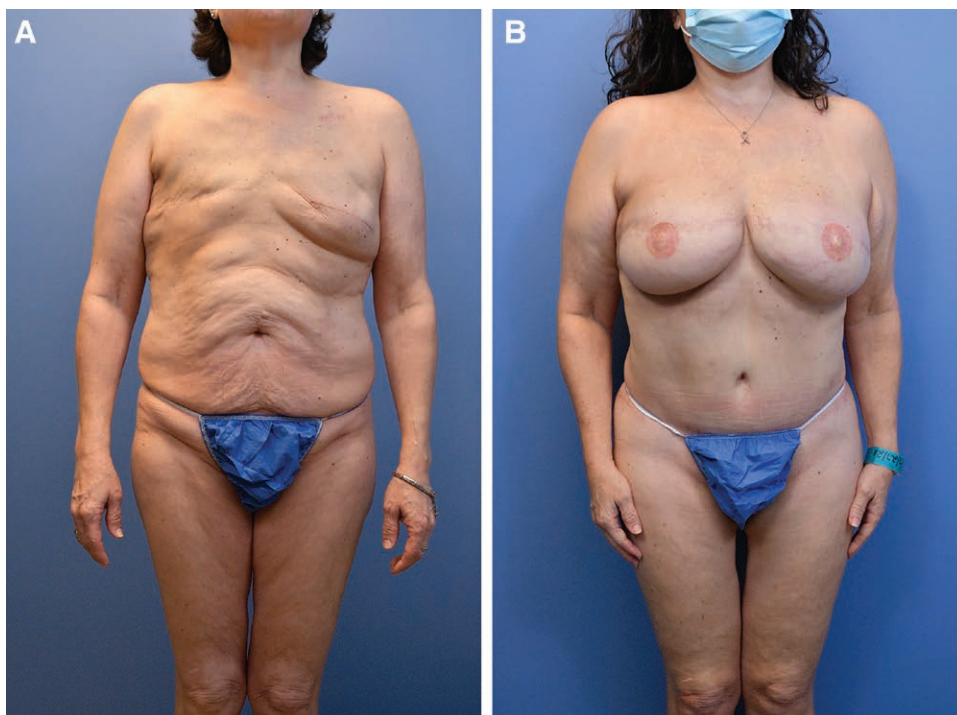


Fig. 2. Case 2 patient. A, Preoperative image demonstrating significant skin laxity in abdomen and thighs along with absent breasts. B, Postoperative image after bilateral stacked DIEP/vPAP breast reconstruction, with improved contour of abdomen and medial thighs.

excision was used to reposition the transferred tissue superiorly and medially. C-V flaps were utilized to recreate bilateral nipples using flap skin paddles. Finally, to achieve better contour of the donor sites, the abdominal scar was revised and lowered, and dog ears were excised from the bilateral thighs.

CASE 2

A 48-year-old woman with a history of MWL greater than 100 lbs presented for autologous breast reconstruction following bilateral mastectomies and postoperative radiation. She had significant excess skin at both her abdomen and medial upper thighs, but only modest adiposity at both locations (Fig. 2A). She was considered a suitable candidate for stacked DIEP and vPAP-based reconstruction.

Before flap inset, the inferior mastectomy skin flap was de-epithelialized and buried to auto-augment the lower pole. The DIEP flaps were utilized to recreate the lower pole skin and volume and secured to the inframammary fold. The superior aspect of the DIEP flaps were then de-epithelialized and buried under the superior mastectomy skin flap. The vPAP flaps were coned and buried under the DIEP flap for additional volume and projection. The anterograde and retrograde internal mammary arteries and veins were used as recipient vessels for microvascular anastomosis. Finally, internal Dopplers were used to monitor the vPAP flaps.

Second stage breast reconstruction was performed 2 months postoperatively and included mobilization of breast flap volume medially and superiorly, excision of minor fat necrosis within the abdominal scar, excision of thigh donor site dog ears, and fat grafting to superomedial pole of bilateral breasts (left: 240 mL; right: 210 mL). Tertiary revisions were performed 7 months later and included bilateral nipple-areolar complex creation, liposuction, and further fat grafting (left: 140 mL; right: 220 mL), as the patient desired additional volume. At 1-year postoperative, the patient had symmetrical breasts and was satisfied with her aesthetic outcome and volume. Furthermore, her abdominal and thigh contours were much improved (Fig. 2B).

DISCUSSION

Few authors have discussed autologous breast reconstruction in MWL patients.⁴⁻⁶ Bauder et al and Dayicioglu et al found no difference in flap survival, fat necrosis, and breast or abdominal wound complications between MWL and matched non-MWL patients.^{1,7} However, MWL patients required more revisions for implant placement, fat grafting, mastopexy, acellular dermal matrix placement, and tissue rearrangement.^{1,8} Our standard approach involves two procedures: the initial stacked flap tissue transfer to address deficiency of subcutaneous fat volume, followed by a second stage procedure in which Wise-pattern skin excision may be used to address excess skin laxity with fat grafting to address any contour asymmetries or volume discrepancies. In Case 1, we also employed the use of bridging prepectoral tissue expanders to help address significant asymmetries between the bilateral skin envelopes.

In addition to augmenting donor tissue volume, simultaneous contouring of the lower extremity with vPAP flaps

provides an additional benefit to the MWL patient.⁹ This approach could be tailored to the patient-specific areas of greatest contouring need. DellaCroce et al have previously utilized stacked DIEP and gluteal artery perforator flaps to provide concomitant circumferential truncal contouring akin to a body lift.¹⁰ Reducing the number of piecemeal operations can also expedite the final reconstructive outcome and decrease the overall surgical burden on the patient.

CONCLUSION

Stacked free flaps may be used as an effective strategy in massive weight loss patients to achieve both adequate tissue volume in bilateral breast reconstruction and the secondary benefit of simultaneous body contouring.

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