Introduction

Reduction mammoplasty can be performed with several techniques and pedicles, including superior, inferior, central, superolateral, medial, superomedial, Lejour technique, and Hall-Findlay superomedial pedicle. Superomedial pedicle breast reduction is a versatile and reproducible approach ensuring satisfactory breast shape, but not consistently good long-term outcomes. We report the results of superomedial pedicle breast reduction combined with a hammock-shaped flap, which was added as a technical refinement to enhance pedicle support and preventing ptosis recurrence.

Surgical Technique

Standard reduction landmarks are drawn with the patient standing. The new nipple position is determined by Pitanguy’s maneuver; the superior border of the areola is marked 2 cm above the nipple. The periareolar marking is drawn with a Wise keyhole pattern; the lateral and medial limb of the vertical scar are marked using the Aufricht maneuver. The Wise pattern is completed by marking the superomedial pedicle. Finally, the “hammock” flap is based inferiorly on the inframammary fold (IMF) and fixed to the pectoralis major fascia and the pedicle like a hammock. The flap is based on the inframammary fold (IMF) and fixed to the pectoralis major fascia and the pedicle like a hammock. Preoperative and postoperative measurements included sternal notch-to-superior areola border length, nipple-to-IMF length, and lower pole convexity. Patients rated their satisfaction with breast shape, size, nipple-areola complex position, and lower pole projection at 12 months using a condensed form of the BREAST-Q questionnaire.

Results: Esthetic outcomes at 12 and 18 months were good in all patients. There were no complications. Postoperative measurements were stable throughout follow-up. The BREAST-Q scores indicated that most patients were satisfied or very satisfied with their breast(s).

Conclusions: This preliminary series demonstrates that the hammock flap, which is performed with autologous tissue, allows changing IMF position, it is safe, effective, and provides improved pedicle fixation and positioning. This technical refinement seems to afford good long-term outcomes in patients undergoing superomedial pedicle breast reduction and mastopexy.
After flap de-epithelialization, standard superomedial breast reduction is performed by removing only gland and fat tissue around the pedicle up to the superior flap border. Finally, the flap is dissected superiorly, medially, laterally, and inferiorly down to the fascial layer, including the mammary perforators (Fig. 2). After marking the IMF position, the flap is advanced superior and horizontal to the pedicle. Flap shape is adapted to the patient’s requirements and may consist of 2 triangles divided by a central rectangle or of parts of them (Fig. 1). The flap is fixed like a hammock to the pectoralis major fascia at the level of the fourth or fifth rib and to the pedicle using absorbable everting sutures. The NAC may be medialized or lateralized. A drain is placed and the wound is sutured in layers.

METHODS

From January 2017 to June 2018, a hammock-shaped flap was performed in 10 patients undergoing unilateral (n = 7) or esthetic bilateral breast reduction (n = 3). Three parameters—sternal notch-to-superior areola border length, nipple-IMF length, and lower pole convexity—were measured before the procedure and subsequently at 1, 3, 6, 12, and 18 months. Patient satisfaction with breast shape, size, NAC position, and lower pole projection was rated at 12 months using a condensed form of the BREAST-Q questionnaire (Table 1), whose items are scored from 1 (lowest) to 5 (highest).

RESULTS

The follow-up data, 12 months for all patients and 18 months for 6, are reported in Table 2. Sternal notch-to-superior areola border distance, nipple-IMF distance, and lower pole convexity were stable throughout follow-up. All breasts had a natural shape in terms of upper pole fullness and lower pole projection. BREAST-Q scores ranged from 3 to 5 (median, 4), indicating that most patients were satisfied or very satisfied with their breast(s) (Table 1). There were no major complications. One patient required the correction of dog ears on the horizontal scar.

DISCUSSION

Breast reduction is a common procedure that can be performed with a variety of approaches, pedicle types, and skin resection patterns. However, all techniques involve some drawbacks. Most current procedures rely on parenchymal shaping, rather than the realization of a skin brassiere, to obtain long-lasting results. Standard superomedial breast reduction allows significant volume reduction through removal of glandular parenchyma from the lower pole, although it is less effective in oversized breasts.

The approach used to treat our 10 patients combines a superomedial pedicle and an inferior advancement flap that ensures pedicle maintenance over time (Figs. 3 and 4). The tissue hammock is not harvested from the pedicle, but through a dermoglandular flap supplied by the internal mammary perforators; pedicle and flap are separate but interconnected. The hammock flap combined with superomedial pedicle breast reduction enables IMF and NAC repositioning and lower pole rearrangement; it achieves symmetry with the contralateral breast and also enhances NAC projection, although it has not been developed for this purpose. It is suitable to treat contralateral healthy breasts in oncological patients, to achieve bilateral esthetic reduction (albeit not in excess of 1,000 g) and to correct moderate-to-severe ptosis (grade 3–4). A further advantage is that the hammock is obtained from autologous tissue.

Although none of our patients required oncoplastic reduction, the approach is likely to be successful in selected tumors of the lateral quadrants. The flap, which consists of a lateral triangle and a central rectangle, may be employed to fill and reshape the lateral breast, whereas it is unsuitable in patients with inferior, medial, or superomedial tumors.
We propose the hammock flap as a novel approach to obtain breasts with a natural shape in patients with a wide range of projection and shape requirements. The technique uses autologous tissue, which is versatile and easily reproducible. Posis recurrence was not observed and revision surgery was never required. Dog ear formation in one patient was most likely related to her obesity rather than to the surgical technique. Breast appearance and projection outcomes at 12 and 18 months are good to excellent.

**CONCLUSIONS**

The “hammock” flap enhances breast shape and contour and improves long-term pedicle support in superioromedial breast reduction without use of heterologous tissue. Its shape can be adapted to the patient’s needs. Most patients were satisfied or very satisfied with 12- and 18-month outcomes. None experienced a recurrence of ptosis. The technique can be used to treat moderate-to-severe breast ptosis in esthetic and reconstructive surgery. Mastopexy patients are also expected to benefit. Investigation of a larger sample with mastopexy patients is clearly warranted.

Angelica Aquinati, MD
Department of Reconstructive and Hand Surgery
Azienda Ospedali Riuniti via Conca 71
60100 Ancona, Italy
E-mail: angelicaaquinati@gmail.com

---

Table 1. BREAST-Q Scores

| Patient No., Type of Procedure | Satisfaction or Dissatisfaction with Intimate or Sexual Activities, Social or Leisure Activities, or Professional or Job-related Activities | Comfortable/Uncomfortable | Satisfaction/Dissatisfaction with the General Appearance of the Breast(s) | Importance of Breast Size to People in Patient’s Life |
|-------------------------------|-------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------|----------------------------------------------------|
| 1, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 2, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 3, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 4, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 5, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 6, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 7, Unilateral                 |                                                                                                 |                          |                                                                     |                                                    |
| 8, Bilateral                  |                                                                                                 |                          |                                                                     |                                                    |
| 9, Bilateral                  |                                                                                                 |                          |                                                                     |                                                    |
| 10, Bilateral                 |                                                                                                 |                          |                                                                     |                                                    |

Table 2. Preoperative and Follow-up Data of the 10 Patients Included in the Study

| Patient No., Type of Procedure | Sternal Notch-to-superior Areola Border Distance | N-IMF Distance | Lower Pole Convexity |
|-------------------------------|-----------------------------------------------|----------------|----------------------|
| 1, Unilateral                 | Preoperative = 37 cm 1-mo F/U = 22 cm 18-mo F/U = 22 cm | Preoperative = 14 cm 1-mo F/U = 10 cm 18-mo F/U = 10 cm | 55%—stable throughout F/U |
| 2, Unilateral                 | Preoperative = 34 cm 1-mo F/U = 21 cm 18-mo F/U = 21 cm | Preoperative = 13 cm 1-mo F/U = 9 cm 18-mo F/U = 9 cm | 55%—stable throughout F/U |
| 3, Unilateral                 | Preoperative = 30 cm 1-mo F/U = 19 cm 18-mo F/U = 19 cm | Preoperative = 9 cm 1-mo F/U = 7 cm 18-mo F/U = 7 cm | 55%—stable throughout F/U |
| 4, Unilateral                 | Preoperative = 35 cm 1-mo F/U = 20 cm 18-mo F/U = 20 cm | Preoperative = 12 cm 1-mo F/U = 9.5 cm 18-mo F/U = 9.5 cm | 55%—stable throughout F/U |
| 5, Unilateral                 | Preoperative = 34 cm 1-mo F/U = 21 cm 18-mo F/U = 21 cm | Preoperative = 11 cm 1-mo F/U = 9 cm 18-mo F/U = 9 cm | 50%—stable throughout F/U |
| 6, Unilateral                 | Preoperative = 36 cm 1-mo F/U = 20 cm 18-mo F/U = 20 cm | Preoperative = 11 cm 1-mo F/U = 8.5 cm 18-mo F/U = 8.5 cm | 55%—stable throughout F/U |
| 7, Unilateral                 | Preoperative = 38 cm 1-mo F/U = 22 cm 18-mo F/U = 22 cm | Preoperative = 12 cm 1-mo F/U = 10 cm 18-mo F/U = 10 cm | 55%—stable throughout F/U |
| 8, Bilateral                  | Preoperative = 32 cm 1-mo F/U = 20 cm 18-mo F/U = 20 cm | Preoperative = 12 cm 1-mo F/U = 8 cm 18-mo F/U = 8 cm | 55%—stable throughout F/U |
| 9, Bilateral                  | Preoperative = 37 cm 1-mo F/U = 19 cm 18-mo F/U = 19 cm | Preoperative = 10 cm 1-mo F/U = 8 cm 18-mo F/U = 8 cm | 50%—stable throughout F/U |
| 10, Bilateral                 | Preoperative = 31 cm 1-mo F/U = 19 cm 18-mo F/U = 19 cm | Preoperative = 11 cm 1-mo F/U = 7 cm 18-mo F/U = 7 cm | 55%—stable throughout F/U |

F/U, follow-up; N, nipple.

---
REFERENCES

1. Zavrides H. The Classic pitanguy technique and its modifications in mammoplasty: ten years of experiences. Ann Plast Surg. 2017;79:433–437.

2. Hammond DC, O’Connor EA, Knoll GM. The short-scar peri-areolar inferior pedicle reduction technique in severe mammary hypertrophy. Plast Reconstr Surg. 2015;135:34–40.

3. Kim YS, Hwang K, Kim JH, et al. Central pedicle reduction mammoplasty with a vertical scar: a technical modification. J Plast Reconstr Hand Surg. 2017;51:436–445.

4. Cárdenas–Camarena L. Reduction mammoplasty with superolateral dermoglandular pedicle. Ann Plast Surg. 2009;63:255–261.

5. Pu LL. Achieving an optimal outcome for medial pedicle vertical breast reduction. Ann Plast Surg. 2014;73(Suppl 1):S57–S62.

6. Lugo LM, Prada M, Kohanzadeh S, et al. Surgical outcomes of gigantomastia breast reduction superomedial pedicle technique: a 12-year retrospective study. Ann Plast Surg. 2013;70:533–537.

7. Davison SP, Mesbahi AN, Ducic I, et al. The versatility of the superomedial pedicle with various skin reduction patterns. Plast Reconstr Surg. 2007;120:1466–1476.

8. Lejour M. Vertical mammoplasty: update and appraisal of late results. Plast Reconstr Surg. 1999;104:771–781; discussion 782.

9. Hall-Findlay EJ. A simplified vertical reduction mammoplasty: shortening the learning curve. Plast Reconstr Surg. 1999;104:748–759; discussion 760.

10. Graf R, Ricardo Dall Oglio Tolazzi A, Balbinot P, et al. Influence of the pectoralis major muscle sling in chest wall-based flap suspension after vertical mammoplasty: ten-year follow-up. Aesthet Surg J. 2016;36:1113–1121.

11. Cohen WA, Mundy LR, Ballard TN, et al. The BREAST-Q in surgical research: a review of the literature 2009-2015. J Plast Reconstr Aesthet Surg. 2016;69:149–162.

12. Pérez-Macías JM. Long-lasting evolution of ptosis control after reduction mammoplasty using the hammock technique. Aesthetic Plast Surg. 2007;31:266–274.

13. Mallucci P, Branford OA. Population analysis of the perfect breast: a morphometric analysis. Plast Reconstr Surg. 2014;134:438–447.

14. Bonomi S, Salval A, Settembrini F, et al. Inferiorly based parenchymal flap mammoplasty: a safe, reliable and versatile technique for breast reduction and mastopexy. Plast Reconstr Surg. 2012;130:116e–125e.