

The “Octopus Head” Dermoglandular Flap: A Novel Technique for Breast Tissue Rearranging after Implant Removal

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Background: Patients with previous breast augmentation may need implant removal for mechanical complications or other causes. After prosthesis removal, the residual parenchyma can be reshaped through a mastopexy with rearrangement of breast tissue. Several techniques have been described in the literature, but none of them can be considered the gold standard. In this study, we present our preliminary experience in breast tissue rearranging after implant removal through a novel technique: the “octopus head” dermoglandular flap.

Methods: From January 2019 to October 2022, nine patients (18 breasts) underwent implant removal and simultaneous breast remodeling with the tissue obtained from the dermoglandular excess of the breast and shaped like an octopus head. Patient’s demographic and clinical characteristics, postoperative complications, and patient-reported satisfaction were recorded.

Results: Mean age was 46.7 years. Body mass index ranged between 22.5 and 27.6 kg per m². The majority of patients had moderate ptosis (67%). Breast implants were removed due to bilateral capsular contracture (n = 3), unilateral implant rupture with contralateral capsular contracture (n = 2), bilateral implant rupture (n = 3), and unilateral periprosthetic seroma (n = 1). We observed two minor complications: one postoperative hemorrhage with subsequent hematoma that was managed conservatively, and one nipple–areola complex malposition that underwent revision surgery. All patients were satisfied with the aesthetic and functional result.

Conclusions: The octopus head dermoglandular flap has proved to be a safe and reliable option for breast tissue rearranging after implant removal, providing a good and stable cosmetic result, a low complication rate, and high patient-reported satisfaction. (*Plast Reconstr Surg Glob Open* 2024; 12:e5882; doi: 10.1097/GOX.0000000000005882; Published online 11 June 2024.)

INTRODUCTION

Patients who undergo breast augmentation may need implant explantation for mechanical complications or other causes, even after a long time since implant positioning.^{1,2}

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With prosthesis removal, especially after the fifth or sixth decade of life, the residual breast usually loses its tridimensional shape and fullness and seems ptotic, with a flattened upper pole, a lack of projection, and redundant skin.

Nevertheless, many patients do not ask for new implant placement after implant removal because they desire a more “natural” appearance of their breast. Moreover, due to the emerging fear of breast implant-associated anaplastic large cell lymphoma and breast implant-associated squamous cell carcinoma,^{3,4} more and more patients are seeking consultations asking for implant removal and looking for alternative (not implant-based) techniques for breast reshaping that allow us to reconstitute the breast mound and upper pole fullness.

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In the literature, several methods are described for implantless autologous breast mound restoration, varying from fat grafting to dermoglandular flaps and combined approaches.^{5–10} Breast mastopexy combined with an autologous dermoglandular flap is one of the most used techniques; it allows us to remodel the breast through the dermoglandular tissue obtained from the portion that is usually resected in breast reduction procedures, rearranging the residual native breast tissue into a pleasing form. Many types of dermoglandular flaps have been described, differing in skin incision pattern, flap pedicle, and shape, but none of them can be considered the gold standard.^{11–17} The aim of this study was to present our experience in breast autologous reshaping after implant removal through the novel “octopus head” dermoglandular flap technique.

METHODS

Study Design and Data Collection

In this study, we analyzed nine patients (18 breasts) who underwent bilateral implant removal and simultaneous breast reshaping through the octopus head dermoglandular flap technique at the author’s institution, from January 2019 to October 2022.

Demographical, clinical, and surgical characteristics of patients were recorded. Postoperative complications and patient-reported satisfaction were evaluated as well. Clinical pictures were collected preoperatively and during the follow-up period (range 6–36 months). Descriptive statistics were carried out through mean, SD, and range for continuous variables, and frequency and percentage for categorical variables.

Patient Selection

The technique was performed in patients without any prosthetic complication who desired to remove their breast implants for psychological reasons or in patients with previous mechanical complications (eg, capsular contracture, implant rupture, periprosthetic seroma) who refused the positioning of new ones after explantation. Nonobese patients with mild-to-severe ptotic breasts according to Regnault classification¹⁸ and/or skin envelope redundancy were considered eligible for the technique, regardless of the previous implant volume and shape. Particularly, inclusion criteria were a sternal notch-nipple distance of more than 21 cm; an areola-inframammary fold distance of more than 6 cm; and a preoperative thickness of dermoglandular flaps, assessed with pinch test, greater than 1 cm. Obesity and smoking were considered contraindications for the procedure (Table 1).

Surgical Technique

Patients were marked preoperatively in upright position, as in a classical Wise pattern reduction mammoplasty. At first, a 38- to 42-mm cookie-cutter was used to mark the new areola. Epidermal incisions were made along the marks. The area between the preoperative markings and the new areolar perimeter was de-epithelialized. Next, a full-thickness incision was made at the inframammary fold

Takeaways

Question: After implant removal, the residual breast loses its tridimensional shape and seems ptotic, with a lack of projection and redundant skin. The residual parenchyma can be reshaped through a mastopexy with breast tissue rearranging. Several techniques have been described, but none of them can be considered the gold standard.

Findings: The “octopus head” dermoglandular flap has proven to be a reliable option for breast tissue rearranging after implant removal, providing a good cosmetic result, with enhanced breast projection and upper pole fullness and a low complication rate.

Meaning: The octopus head dermoglandular flap is a valid technique for breast tissue rearranging after implant removal.

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Patient refusing new implants	BMI > 30
Mild-to-severe breast ptosis and/or skin redundancy	Smoking
Areola-IMF distance > 6 cm	
Sternal notch-nipple distance >21 cm	
Preoperative flap thickness >1 cm	

and along the transverse and vertical limbs of the Wise pattern. A superiorly based nipple-bearing dermoglandular flap was elevated and the implant, together with the periprosthetic capsule, was delivered (Fig. 1). The nipple-areola complex (NAC) was sutured upward in its new position. Thus, the two horizontal limbs of the dermoglandular flap were folded and sutured to the vertical limb with 3/0 absorbable sutures, about 2–3 cm inferiorly to the lower edge of the areola, and then turned inside-out like a “sock.” Hence, the horizontal limbs were sutured together in the midline with 3/0 absorbable sutures in the posterior aspect of the flap, which was finally assembled as a “sphere” (the “octopus head”). At this point, the apex of the octopus head flap was anchored cranially to the pectoralis major fascia at the level of the second intercostal space with 2/0 absorbable sutures (Fig. 2). [See Video (online), which displays the octopus head dermoglandular flap operative technique.] Intraoperatively, if concerns arose regarding the viability of flap’s most distal elements due to an excessive length-to-width ratio, a tissue resection on the horizontal branches of the flap was performed before the octopus head assembly to reach a correct proportion between flap’s dimensions.

At the end of the procedure, a suction drain was placed over the muscle fascia, and surgical wounds were closed in layers in a standard inverted-T fashion (Fig. 3). A compression bra was worn immediately after surgery and kept for 1 month postoperatively.

In case of doubts regarding the final postoperative position of the inframammary scar, a variation of this technique can be performed to ensure a precise placement of the horizontal scar along the preexisting inframammary

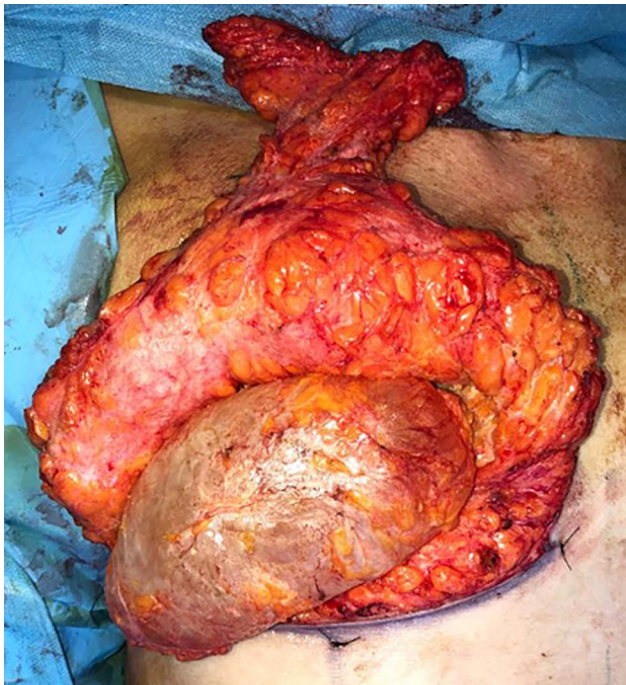


Fig. 1. Intraoperative photograph showing implant removal. After flap elevation, the implant is exposed and removed together with its capsule.

sulcus. In this case, a tailor-tuck flap was harvested intraoperatively as follows: two incisions along the vertical limbs of the marking, measuring 6–8 cm, were performed first. The implant was then removed through this surgical access. The patient was placed in a semisitting position. At this point, the marking that was previously determined with the implant in place was checked again. The final position of the inframammary scar was re-marked to coincide with the existing inframammary crease, and a three-point stitch was temporarily put to simultaneously catch the middle point of the sulcus and two symmetrical points located 6–8 cm apart from the inferior edge of the NAC, on the vertical limbs of the marking. Thus, the vertical amount of resection was determined again *à la demande* and re-marked, the skin of the dermoglandular flap was de-epithelialized, and the horizontal limbs of the flap were incised. Finally, the procedure proceeded as described above.

Postoperative Imaging

All patients underwent postoperative breast ultrasound at least 6 months after surgery to assess dermoglandular flap viability and to detect potential fat necrosis.

RESULTS

The mean age was 46.7 years (range 31–66, SD 11.3). Body mass index ranged between 22.5 and 27.6 kg per m² (mean 25.9, SD 1.6). The majority of patients (six out of nine; 67%) had a moderate ptosis, whereas three (33%) had a mild ptosis. Breast implants were removed for the following reasons: bilateral capsular contracture (n = 3),

unilateral implant rupture with contralateral capsular contracture (n = 2), bilateral implant rupture (n = 3), and unilateral periprosthetic seroma (n = 1). The mean volume of removed implants was 286.4 mL (range 185–375, SD 58.7), and the average operating time was 222.2 minutes (range 180–320, SD 43.7). No major complications occurred in the postoperative time. We observed two minor complications: one case of hematoma that was managed conservatively in the outpatient setting and one case of NAC malposition that was treated surgically (Table 2). During the follow-up period (range 6–36 months), all patients were fully satisfied with the aesthetic and functional result of the surgery (Figs. 4 and 5). No difficulties were found in breast ultrasound interpretation for cancer screening after the surgery. None of the patients showed any sign of fat necrosis at the postoperative breast ultrasound performed at least 6 months after surgery.

DISCUSSION

Breast implant explantation is becoming a common procedure in patients who underwent previous breast augmentation, even after a long time since the first surgery.¹⁹ Implant removal may be required for mechanical complications, such as capsular contracture or implant rupture, or may be requested by the patient, even in absence of any adverse event, due to the emerging fear regarding breast implant-associated anaplastic large cell lymphoma, breast implant-associated squamous cell carcinoma and other chronic pathologies related to implant positioning such as breast implant illness and autoimmune syndrome induced by adjuvants.^{3,4,20,21} After implant removal, surgeons have to face a complex secondary deformity consisting of a sagging, ptotic breast that has lost its tridimensional shape and volume and seems empty and flattened. Moreover, there is often a residual redundancy of the skin envelope due to both the effect of skin expansion previously exerted by the implant itself²² and the physiological process of aging.²³

Various options for autologous breast volume replacement and/or breast reshaping are currently available to manage this condition, ranging from fat grafting to dermoglandular flaps and combined techniques. Table 3 shows the already published techniques for breast rearranging with dermoglandular flaps after implant removal.

Autologous fat grafting has proven to be a safe and viable technique for breast volume restoration. However, although large-volume single-session fat grafting has been successfully described,^{5,6,24} breast augmentation with fat transfer usually requires multiple sessions of fat injection to obtain the desired breast volume.²⁵ Moreover, the long-term result is potentially unstable and unpredictable due to a variable rate of fat reabsorption, ranging from 40% to 60%.²⁶ Finally, the procedure is associated with potential complications such as oil cysts, calcifications, and palpable nodules,²⁷ and does not allow for correcting breast ptosis.

Conversely, breast reshaping through a dermoglandular flap is a feasible option in case of concomitant breast ptosis that overcomes the drawbacks of fat grafting and allows for rearranging the breast, increasing upper pole fullness,

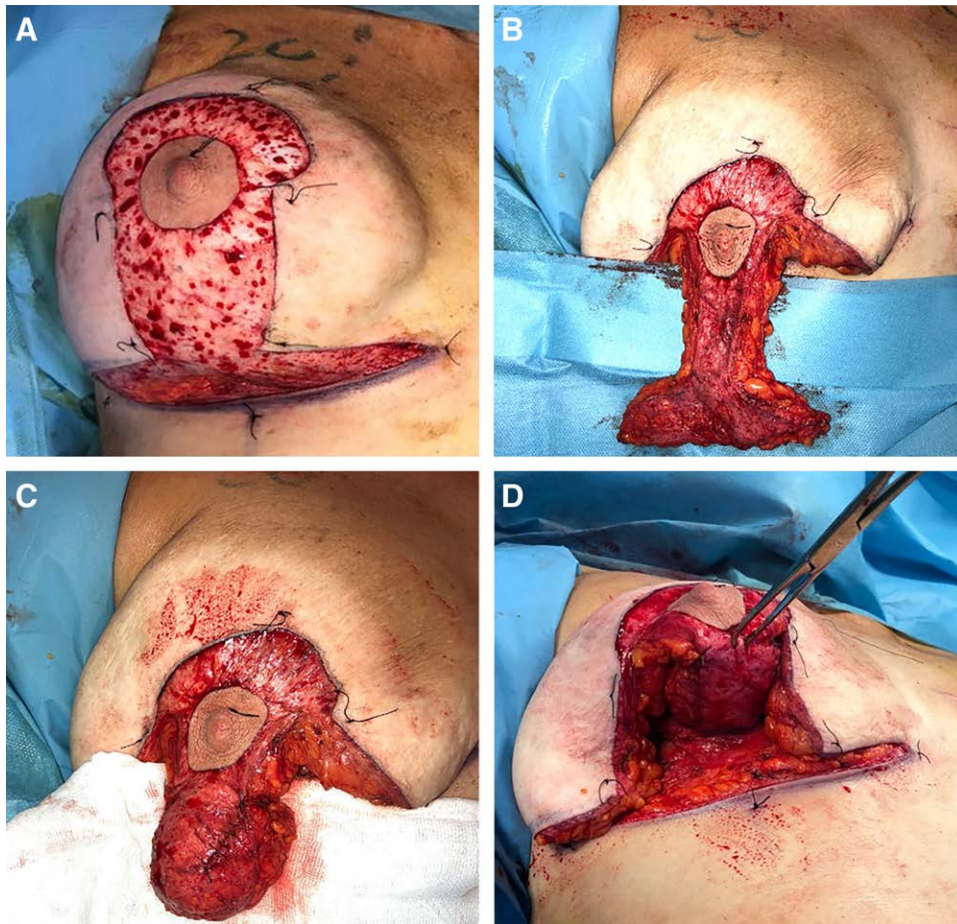


Fig. 2. Clinical photographs of the surgical technique (frontal view). A, De-epithelization of the dermoglandular flap. B, The flap is incised peripherally and elevated, being detached from the underlying implant. C, The flap is assembled as an “octopus head.” D, The flap is anchored cranially to the pectoralis major fascia.



Fig. 3. Final on-table result after skin closure in inverted-T fashion, showing the difference between the right breast (operated side) and the left breast (nonoperated side with the implant still in place).

and enhancing projection, thanks to the remodeling of the residual parenchyma. Many dermoglandular flaps have been described in the literature, differing in flap pedicle

and shape. However, the majority of these techniques have been previously used in the context of mastopexy, but a few publications on their use after implant removal are available.^{7-10,28-30} The majority of them reported the use of inferior-based dermoglandular flaps (Gurunluoglu et al,⁷ Hönig et al,⁹ Graf et al,¹⁰ Khan et al,²⁸ Papadopoulos et al,²⁹ Kirwan et al³⁰). Only Calobrace et al⁸ described the use of a superior-based dermoglandular flap.

One of the main concerns regarding breast remodeling with a dermoglandular flap after implant explantation is represented by the vascular supply of the chosen flap.

In fact, after breast augmentation, vascularity of the NAC is preserved, thanks to medial and lateral perforators from the internal mammary and lateral thoracic arteries, respectively.²² However, during the pocket creation at the time of primary surgery, the pectoralis major muscle is detached from the costal plane (in case of submuscular or dual plane breast augmentation): this maneuver causes the interruption of intercostal perforators, leading to an unpredictable vascularization of central-posterior pedicles. Alternatively, the glandular tissue is detached from the pectoralis major muscle (in case of subglandular

Table 2. Detailed Characteristics of the Patient Sample

Pt	Age	BMI	Ptosis Degree	Implant Size (Right – Left)	Operating Time	Major Complications	Minor Complications
1	31	25.7	Moderate	185 cc–320 mL	320'	N/A	N/A
2	44	24.4	Mild	240 cc–240 mL	195'	N/A	Hematoma
3	53	27.2	Moderate	375 cc–375 mL	240'	N/A	N/A
4	35	22.5	Mild	240 cc–240 mL	195'	N/A	N/A
5	49	26.8	Moderate	320 cc–320 mL	225'	N/A	NAC malposition
6	66	27.6	Moderate	260 cc–260 mL	190'	N/A	N/A
7	59	26.6	Moderate	220 cc–220 mL	180'	N/A	N/A
8	43	25.6	Mild	320 cc–320 mL	205'	N/A	N/A
9	40	26.5	Moderate	350 cc–350 mL	250'	N/A	N/A

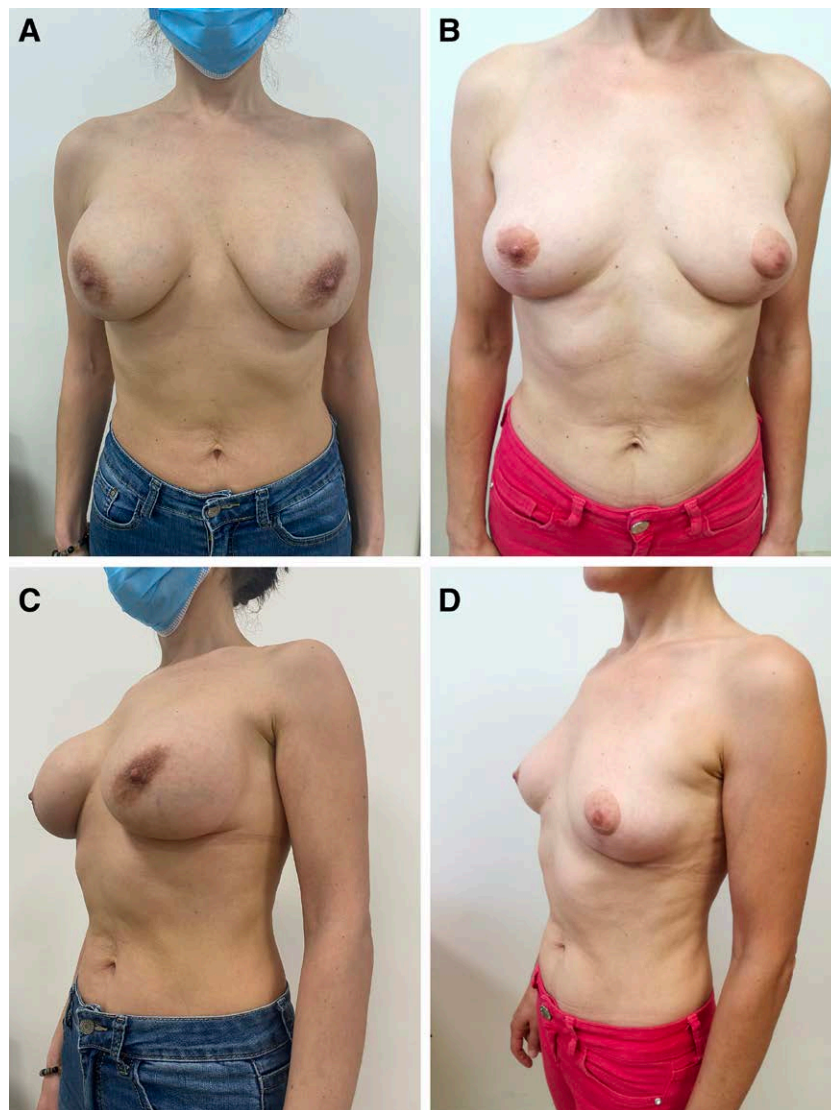


Fig. 4. A 44-year-old patient with left intracapsular implant rupture who underwent bilateral implant removal (volume: 240 mL) and BAA with the octopus head dermoglandular flap. A, Preoperative frontal view. B, Postoperative frontal view 18 months after surgery. C, Preoperative three-quarter view. D, Postoperative three-quarter view 18 months after surgery.

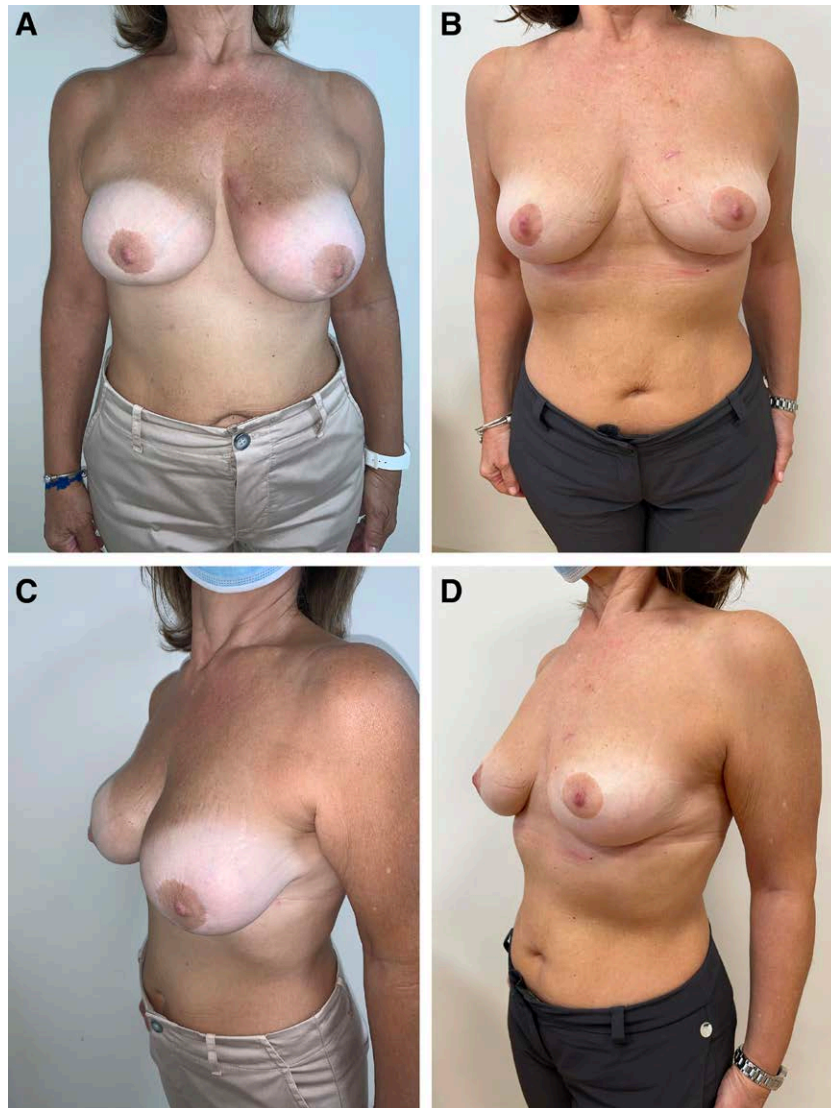


Fig. 5. Clinical pictures of a 59-year-old patient with a right extracapsular implant rupture and silicone bleeding who underwent bilateral implant explantation (volume: 220 mL) and BAA with the octopus head dermoglandular flap. A, Preoperative frontal view. B, Postoperative frontal view at 27 months. C, Preoperative three-quarter view. D, Postoperative three-quarter view at 27 months.

breast augmentation): in this case, the interruption of intercostal perforators in combination with thoracoacromial ones and the complete separation of the dermoglandular tissue from the anterior surface of the muscle, makes it actually impossible to harvest a central-posterior pedicle. Moreover, although it is demonstrated that a short preexisting inframammary scar does not preclude the use of inferior-based pedicles,⁷ a previous breast augmentation through a large inframammary fold incision may jeopardize the flap's vascular supply.

Finally, even if the vascular supply to the central-posterior and inferior pedicles had been spared during the first surgery or had been reprinted through a process of neo-angiogenesis, intraoperative capsulectomy and implant removal could cause secondary vessel damage leading to a risk of postoperative vascular impairment of the flap.

Differently from the majority of the published reports on the use of breast dermoglandular flaps in explant patients, our technique is based on a superior-pedicle flap, that relies on the vascular supply provided by the internal mammary system.³¹ We make use of a Wise pattern design following the concept that the implant that is going to be removed simulates the exceeding breast parenchyma of a breast hypertrophy. If compared with the flap described by Calobrace et al, our superior-based flap is not harvested “as it is,” but is assembled as a sphere, thus simulating a “living” implant, before its fixation to the pectoralis major fascia.

With inferior-based or central-based dermoglandular flaps the breast gains projection and upper pole fullness, but these techniques do not allow prevention of long-term ptosis of the residual parenchyma because the skin holds the entire breast weight.³² Moreover, the inferior pedicle

Table 3. Previously Published Articles Describing Techniques for Breast Tissue Rearranging after Implant Removal

Authors	Title	Dermoglandular Flap Characteristics	Journal	Year	DOI/PMID
Rand ³³	Dermal autoaugmentation mastopexy: maintaining maximal volume in primary breast lift surgery and combined with explantation	Infero-centrally based flap anchored to the pectoralis fascia	<i>Plast Reconstr Surg</i>	2022	10.1097/PRS.0000000000000965
Khanet al ²⁸	Mastopexy using de-epithelialised dermoglandular flaps: a case series for maximal volume conservation following breast implants removal	Supero-medially based, inferiorly based, medially based and bipedicle flaps	<i>Eur J Med Res</i>	2022	10.1186/s40001-022-00790-0
Augustini and Calaes ³⁴	Growing demand for silicone breast explants: a new scenario for breast surgery	Inferiorly based flap anchored to the pectoralis fascia	<i>Rev Bras Cir Plást</i>	2022	10.5935/2177-1235.2022RBCP0006
Papadopoulos et al ²⁹	Fat grafting and autoaugmentation mastopexy after breast implant removal: technique and evaluation of outcomes using BREAST-Q	Inferiorly based flap	<i>Aesthet Surg J</i>	2021	10.1093/asj/sjaa347
Calobrace and Gabriel ⁸	Mastopexy with autoaugmentation and fat transfer	Superiorly and inferiorly based flap	<i>Clin Plast Surg</i>	2021	10.1016/j.cps.2020.09.008
Graf et al ¹⁰	breast autoaugmentation (mastopexy and lipofilling): an option for quitting breast implants	Inferiorly based flap anchored to the pectoralis fascia	<i>Aesthetic Plast Surg</i>	2019	10.1007/s00266-019-01387-5
Kirwan et al ³⁰	breast autoaugmentation: a versatile method of breast rehabilitation—a retrospective series of 107 procedures	Inferiorly based flap	<i>Arch Plast Surg</i>	2015	10.5999/aps.2015.42.4.438
Gurunluoglu et al ⁷	Outcomes analysis of patients undergoing autoaugmentation after breast implant removal	Inferiorly based flap anchored to the pectoralis fascia	<i>Plast Reconstr Surg</i>	2014	10.1097/PRS.0b013e31829e7d9e
Gurunluoglu et al ³⁵	Dual pedicle mastopexy technique for reorientation of volume and shape after subglandular and submuscular breast implant removal	Inferiorly based flap	<i>Eplasty</i>	2013	24058719
Hönig et al ⁹	Inferior pedicle autoaugmentation mastopexy after breast implant removal	Inferiorly based flap	<i>Aesthetic Plast Surg</i>	2010	10.1007/s00266-010-9471-4

dermoglandular flap has the disadvantage that in case of a short pedicle, it cannot be folded on itself.¹⁵

With our technique, (1) the residual parenchyma in the upper pole, (2) the nipple-bearing flap, and (3) the octopus head are in continuity, thus determining a cranial fixation of the whole breast instead of the dermoglandular flap alone. In our opinion, this aspect represents the key to provide better long-term results, lower rates of ptosis recurrence, and high patient-reported satisfaction. Additionally, the procedure does not interfere with breast ultrasound interpretation for cancer detection in the post-operative time.

Despite the many advantages of our technique, a crucial aspect for a successful result is represented by a careful patient selection. Patients with mild-to-severe ptosis with a relative redundancy of the skin envelope are the best candidates for the technique. We reported only two minor complications, one consisting of an NAC malposition in a patient that had a moderate-to-severe breast ptosis: in this case, the excessive amount of cranially fixation of the dermoglandular flap needed to give an adequate upper pole fullness, combined with an improper assembly of the octopus head, led to a downward rotation of the NAC. This should be avoided by leaving at least 2–3 cm of “free” vertical limb between the lower edge of the areola and the octopus head, to allow spatial independence between the two components and avoid NAC rotation.

For the above reasons, we believe that with a strict adhesion to the described inclusion criteria and a rigorous respect for the surgical technique, the octopus head dermoglandular flap provides an effective remodeling of the breast mound, with a low number of complications and a pleasing and stable cosmetic result. A drawback of the technique is the inevitable loss of breast volume. However, depending on the patient’s desires, this can be easily overcome with simultaneous or delayed fat grafting.

A limitation of this study is the relatively small number of included patients. Further studies with a larger sample size and a longer follow-up are advisable to obtain representative clinical results with stronger statistical significance.

CONCLUSIONS

Reshaping of the residual breast through a dermoglandular flap is a valid option in case of implant explantation. In our experience, compared with the other techniques described in the literature, the octopus head dermoglandular flap has proven to be a safe and reliable option for breast tissue rearranging after implant removal, providing a good and stable cosmetic result, with enhanced breast projection and upper pole fullness, a low complication rate, and high patient-reported satisfaction.

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DISCLOSURE

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

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