Aesth Plast Surg (2017) 41:773–781
DOI 10.1007/s00266-017-0867-2

ORIGINAL ARTICLE BREAST SURGERY

Reduction Mammaplasty for Breast Symmetrisation in Implant-Based Reconstructions

Fabrizio De Biasio[1] · Nicola Zingaretti[1] · Francesca De Lorenzi[2] · Michele Riccio[3] · Luca Vaienti[4] · Pier Camillo Parodi[1]

Received: 3 January 2017 / Accepted: 21 March 2017 / Published online: 3 April 2017

Abstract

Background Healthy breast surgery constitutes an important step to achieve symmetry in unilateral implant-based reconstructions. We analysed long-term results of breast symmetry obtained with reduction mammaplasties, and we evaluated whether different glandular pedicles may better preserve long-term stability.

Method Between 2006 and 2012, 90 patients underwent mastectomy and immediate reconstruction with tissue expanders and simultaneous contralateral reduction mammaplasty. In 30 patients, a superior nipple–areola pedicle was harvested (GROUP A), in another 30 patients a medial pedicle was performed (GROUP B), and an inferior pedicle was used in the remaining 30 women (GROUP C). An objective evaluation of the reconstructed breast and the reduced one was performed at 1 and 24 months after surgery. One-way ANOVA and Tukey's HSD tests were used for analysis. Furthermore, three independent plastic surgeons filled out a questionnaire to assess aesthetic results.

Results Measurements of the reconstructed breasts showed similar variations between 1- and 24-month evaluations within the three groups with no significant difference (P value >0.05). Measurements of the reduced breast at the 1- and 24-month follow-up (Tukey's test) revealed significant differences among the three groups. Patients from GROUP C showed a significantly higher decrease in Δ nipple–lower clavicle margin distance and Δ nipple–inframammary fold compared to GROUP A and B (P value = 0.01). Surgeons' assessments revealed no statistically significant difference between the three groups.

Conclusion Superior or medial pedicle reduction mammaplasties seem to better preserve breast shape and position, and they maintain a more similar appearance to the contralateral prosthetic breast over time.

Level of Evidence IV This journal requires that authors assign a level of evidence to each article. For a full description of these Evidence-Based Medicine ratings, please refer to the Table of Contents or the online Instructions to Authors www.springer.com/00266.

Keywords Contralateral breast reduction · Implant breast reconstruction · Breast symmetry · Unilateral mastectomy

✉ Nicola Zingaretti
zingarettin@gmail.com

[1] Department of Plastic and Reconstructive Surgery, Breast Unit, University of Udine, C/o Ospedale "S. Maria Della Misericordia", Piazzale Santa Maria Della Misericordia 15, 33100 Udine, Italy

[2] Department of Plastic and Reconstructive Surgery, European Institute of Oncology, Milan, Italy

[3] Department of Reconstructive Plastic Surgery-Hand Surgery, Breast Unit, AOU "Ospedali Riuniti", Ancona, Italy

[4] Department of Plastic Surgery, IRCCS Policlinico San Donato, University of Milan, Milan, Italy

Introduction

Nowadays, symmetrisation procedures of the contralateral healthy breast (reduction mammaplasty, mastopexy and augmentation) are an essential part of postmastectomy reconstructions. They may allow the surgeon to reach the final goal of breast symmetry.

Even though contralateral procedures are performed to improve symmetry, in cases of unilateral implant-based reconstruction, an asymmetry between the two breasts

usually occurs over time and it is unavoidable, since the implant and the natural breast parenchyma act differently [1].

At our centre the most frequent procedures on the healthy breast are reduction mammaplasties followed by mastopexies, augmentations are rare. Among different techniques of reduction, relying on different dermo-glandular flaps, skin incisions and suspension sutures, we have observed a different stability of the results over time, depending on the chosen technique itself. In our opinion, these considerations could be of great relevance when planning unilateral implant reconstruction and contralateral breast symmetrisation.

The aim of this study is to evaluate breast symmetry in the long term in cases of postmastectomy unilateral implant reconstruction and contralateral reduction mammaplasty. The secondary endpoint is to evaluate whether different glandular pedicles may better preserve stability over time.

Materials and Methods

Between January 2006 and May 2012, 258 consecutive patients underwent unilateral skin sparing mastectomy, immediate reconstruction with an expander and simultaneous reduction mammaplasty of the healthy breast at our institute. Among them, 98 underwent a superior pedicle reduction [2] (Wise excision pattern), 84 patients a medial pedicle reduction [3] (Wise excision pattern) and 76 patients an inferior pedicled procedure [2] (Wise excision pattern).We included in our study population patients aged between 35 and 65 years old, normal weight (BMI ranging between 18.5 and 24.9 kg/m^2), who underwent the same surgical procedure (unilateral mastectomy, immediate reconstruction with a tissue expander and contralateral reduction mammaplasty), with a similar follow-up. Exclusion criteria included BMI < 18.5 kg/m^2 and BMI > 24.9 kg/m^2, diabetes, chronic liver diseases, coagulopathies, and/or anticoagulant therapy, adjuvant chemotherapy and/or radiotherapy, postoperative complications (haematoma, seroma, implant rotation or displacement, necrosis of the mastectomy flaps or liponecrosis).

So far, according to our criteria, the study population included 101 patients: 37 patients underwent a superior pedicle reduction (GROUP A), 34 women a medial pedicle reduction (GROUP B) and 30 an inferior pedicle procedure (GROUP C). Data from the first 30 patients of each group were analysed for intergroup comparison. Therefore, the final study population consisted of 90 patients (30 women in each study group).

Mean age at surgery was 49 years. Mean weight of the reduction specimen was 295 g (range 180–520).

Tissue expanders were left in place for a mean time of 15 weeks (range 13–19), and replacement with the final prosthesis was performed after a mean period of 19 weeks (range 17–25) (Table 1).

Mean volume of the definitive prosthesis was 390 cc (range 240–575). In all patients, anatomical textured silicone gel implants (Mentor) were placed in the sub-pectoral pocket.

The study population was prospectively followed. One month after surgery, an objective evaluation of the reduced breast was performed. Multiple measurements were taken, including the distance between the nipple and lower clavicle margin and the distance between the nipple and the inframammary fold (along the mammary meridian), using an ordinary ruler (Fig. 1). Pictures where collected at 1 month postoperatively. Twenty-four months after the primary surgery, the same measurements of the reduced breast were taken and similar photographic data were collected.

Evaluation of the reconstructed breast with the definitive implant was similarly performed at 1 and 24 months after definitive prosthesis implantation. For objective measurements, the point of maximum implant projection (where the nipple–areola complex would presumably be reconstructed after 3 months) was identified and the distances between this point to the inframammary fold and the lower clavicle margin were measured with an ordinary ruler (Fig. 1). Photographic documentation of every reconstructive breast was collected at the 1- and 24-month follow-ups.

Our institutional ethics committee approved the study design. A written informed consent was obtained from all patients in the study.

Statistical Analysis

Intergroup comparison was performed using a one-way ANOVA test, whereas the Tukey's HSD test was used for the detection of the group causing the difference. $P < 0.05$ was accepted as the level of statistical significance.

Data were analysed using SPSS version 22.0 (IBM statistics for Windows version 22, IBM Corporation, Armonk, New York, USA).

Questionnaire

Three independent plastic surgeons not belonging to our surgical team were asked to fill in a questionnaire during follow-up visits and/or relying on photographic material (at 1 and 24 months postoperatively). The questionnaires aimed to evaluate the aesthetic outcomes, and they have been used in other studies to assess cosmetics after breast surgery [4, 5].

Table 1 Patient demographics, time mammary expanders were left in place, size of final prostheses and mean volume of excised tissue

	Superior pedicle	Medial pedicle	Inferior pedicle
No. of patients	30	30	30
Patient age (average, year)	48.2	50.6	47.3
BMI (preop) (average, kg/m^2)	21.7	22.4	21.3
BMI (24 months after the last operation) (average, kg/m^2)	21.9	22.8	21.4
Mammary expander in place (mean time, months)	15.3	14.7	15.1
Size of final prostheses (average, cc)	385.6	402.3	383.6
Mean volume of excised tissue (average, g)	291.8	298.7	293.5

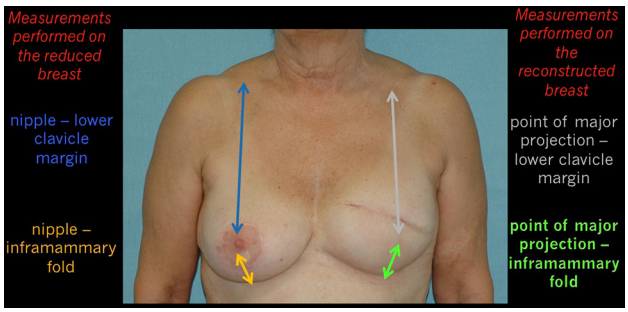

Fig. 1 Objective evaluation (1 and 24 months after surgery) based on multiple measurements of the reduced and reconstructed breasts, measured with an ordinary ruler

Five parameters are included in the questionnaire:

1. Shape of the reduced breast not wearing a bra.
2. Symmetry between breasts not wearing a bra.
3. Glandular tissue defects on the reduced breast.
4. Position/distortion of NAC of the reduced breast.
5. Scar quality and/or retraction of the reduced breast.

For each parameter, a 1–4 scale was used for scoring, 4 being excellent, 3 good, 2 sufficient and 1 insufficient. The paired samples Student's t test was used: $P < 0.05$ and $P < 0.01$ were considered significant.

Results

Patients' demographics are reported in Table 1.

Descriptive results, tests for mean differences and effect sizes specific to the three groups are shown in Table 2.

Measurements of the reconstructed breast showed similar variations between the 24th and 1st month (Δ) postoperatively in all groups: a mean decrease of 1.1 cm of the distance between the point of maximum projection of the reconstructed breast and the lower clavicle margin (range 0.7–1.6) and a mean decrease of 0.9 cm of the distance between the point of maximum projection and the inframammary fold (range 0.7–1.4) (Fig. 2) (P value > 0.05 at Tukey's test).

Measurement of the reduced breast showed significant differences within the three groups at the 24th and 1st month (Δ) postoperatively. A mean decrease of 1.5 cm (range 1.2–1.9) of the distance between the nipple and the lower clavicle margin and a mean increase in the distance between the nipple and the inframammary fold of 3.3 cm (range 1.7–3.9) were recorded in GROUP C (inferior pedicle). In GROUP A (superior pedicle), the reduction of the distance between the nipple and the clavicle was 0.8 cm in average (range 0.5–1.3) and the increase in the distance between the nipple and the inframammary fold was 1.6 cm in average (range 1.4–1.9). In GROUP B (medial pedicle), the reduction of the distance between the nipple and the clavicle was an average of 1 cm (range 0.7–1.9) and the increase in the distance between the nipple and the inframammary fold was 2.4 cm in average (range 1.5–3.2). Significant differences exist between GROUP A, B and C with regard to decreased Δ nipple–lower clavicle margin length and increased Δ nipple–inframammary fold length of reduced breasts (P value $= 0.01$) (Table 3). Patients from GROUP C showed a significantly higher decrease of Δ nipple–lower clavicle margin distance and Δ nipple–inframammary fold compared to GROUP A and B (P value $= 0.01$) (Table 4).

Surgeons' assessments are shown in Table 5, detailing the average score for every single parameter. There were no significant differences between the three groups: superior versus medial ($P = 0.35$), superior versus inferior ($P = 0.3$), medial vs inferior ($P = 0.08$).

Higher scores were achieved for question no. 2 (symmetry of the breasts not wearing a bra), no. 3 (glandular tissue defects at the reduced breast) and question no. 5 (scar quality). The lowest scores were regarding question no. 1 (breast shape without a bra).

Discussion

In unilateral postmastectomy implant-based reconstructions, symmetrisation mammaplasties are crucial to achieve final symmetry. Two populations of women are

Table 2 Descriptive data

Measurements performed on the reconstructed breasts		Mean ± SD	*P* value
Δ point of major projection–lower clavicle margin (cm) (24th–1st month)	Inferior	1.10 ± 0.25	0.04
	Superior	1.11 ± 0.33	0.06
	Medial	1.16 ± 0.31	0.05
	Total	1.12 ± 0.30	0.03
Δ point of major projection–inframammary fold (cm) (24th–1st month)	Inferior	0.93 ± 0.14	0.02
	Superior	0.99 ± 0.21	0.03
	Medial	0.89 ± 0.19	0.03
	Total	0.94 ± 0.19	0.02
Measurements performed on the reduced breasts		**Mean ± SD**	***P* value**
Δ nipple–lower clavicle margin (cm) (24th–1st month)	Inferior	1.52 ± 0.21	0.03
	Superior	0.83 ± 0.23	0.04
	Medial	1.02 ± 0.34	0.06
	Total	1.12 ± 0.39	0.04
Δ nipple–inframammary fold (cm) (24th–1st month)	Inferior	3.28 ± 0.53	0.09
	Superior	1.60 ± 0.14	0.02
	Medial	2.39 ± 0.45	0.08
	Total	2.42 ± 0.79	0.08

candidates for contralateral mammaplasty: women who undergo surgery on the healthy breast at the same time of immediate reconstruction to improve or fix a pre-existing dysmorphic feature; secondly, women who undergo symmetrisation mammaplasties to achieve symmetry between the healthy breast and the newly reconstructed one [6].

In the first subgroup of patients, surgery of the healthy breast has relevant psychological implications: the achievement of a long wish for aesthetic improvement gives these patients strength and motivation to deal with the long path of breast cancer treatment, with an impressive endurance and sometimes even with a positive attitude [7, 8].

In the second subgroup of patients, surgery of the healthy breast is accepted to achieve satisfactory aesthetic results, and the possibility of histological examination of the reduction specimen is welcomed. Relying on these observations, in our experience we received positive feedback and great acceptance of surgery on the healthy breast, despite the surgical risks and complications inherent to any surgery and the inevitable presence of multiple scars of both breasts.

Surgery of the healthy breast can be suggested with different timing. Some authors believe that both mastectomy and the contralateral symmetrisation should be performed during the same surgery, the reduced breast being the model for the future breast reconstruction once the tissue expander is removed [9, 10]. Others prefer to postpone symmetrisation surgery to when the definitive implant has settled down and has reached its final shape and position. Therefore, it can be used as a guide for the contralateral breast [10].

We do support simultaneous reduction mammaplasty at the time of mastectomy, using the reduced breast as a guide for the implant choice; in fact, our data showed that the reduced breast undergoes significant changes over time, more significant than those occurring in the breast reconstructed with the prosthesis. Therefore, when the expander is removed, the choice of the definitive implant (volume, shape and position) is guided by the previously reduced breast, which has reached its final shape and position in the mean time. It is not possible if mammaplasty of the healthy breast is performed at the same time of expander–definitive implant change. In this case, implant choice may take into account the variables correlated with the healthy and reconstructive breast and it is more challenging.

Among the broad spectrum of surgical techniques for breast reduction [11–13] in cancer patients, the choice should rely on the patient's oncologic status and expected appearance of the reconstructed breast. The reconstructed mound often significantly differs from a natural breast with regard to morphology (i.e. deficit of projection in the areolar area) and morpho-dynamic characteristics. Patient's preferences should also be considered with regard to volume, shape and position of the reduced or lifted breast and scar patterns. These factors may affect the choice of skin incisions, the selection of dermo-glandular pedicles for nipple areola complex transposition and the remodelling of the mammary cone.

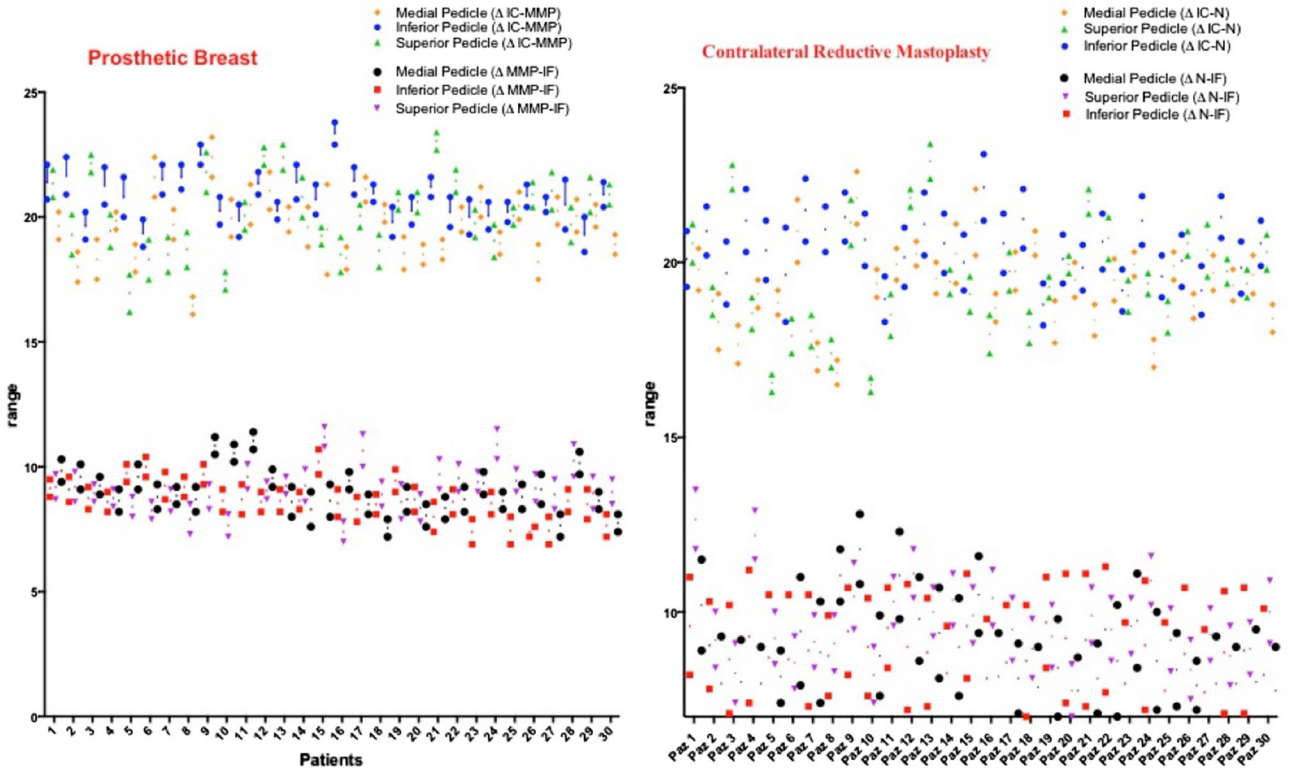

Fig. 2 *On the left* measurements conducted on the prosthetic breast; this chart shows the similar variations between the 1st and 24th month in all three groups of patients. (Δ IC-MMP: difference between 24th and 1st month of inferior clavicle margin and major projecting point of the mammary cone distance; Δ MMP-IF: difference between 24th and 1st month of major projecting point of the mammary cone and inframammary fold distance). *On the right* measurements conducted on the contralateral reductive mastoplasty; this chart shows the difference variations between the 1st and 24th month in all three groups of patients: women who underwent reductive mastoplasty using the inferior pedicle had significantly higher reduction in the nipple–clavicle distance as compared to all the other groups and had a significantly higher increase in the nipple–inframammary fold distance. (Δ IC-N: difference between 24th and 1st month of inferior clavicle margin and nipple distance; Δ N-IF: difference between 24th and 1st month of nipple and inframammary fold distance)

The choice of different dermo-glandular pedicles should always consider the necessity of removing specific areas of the healthy tissue for diagnostic purposes and the expected final appearance of the reconstructed breast, often characterised by the lack of central projection and a large implant base.

In our study, the Wise pattern was chosen for the reconstructive side in cases of large and ptotic breasts requiring extensive skin reduction. It allowed an improvement of the final shape of the reconstructed mound, mimicking a reduced breast.

Our data confirm that different dermo-glandular pedicles result in different levels of stability of the breast shape over time. Previous studies have demonstrated that the reduction technique influences the durability of the aesthetic outcomes [12, 14, 15]. In our series, a gradual significant increase in the distance between the areola and the inframammary fold (bottoming-out effect) was maximum in GROUP C (inferior pedicle) and minimum in GROUP A and B (respectively, superior and medial pedicles). Thus, the superior–medial pedicles show better long-lasting results (see Fig. 3).

Although inferior pedicled mammaplasties are very popular [16], the technique is frequently associated with "bottoming out" (pseudoptosis) and "star-gazing" (upward rotation of the nipple–areola complex) phenomena [14]. Surgical tricks have been developed to solve the problem, including the internal suspension of the inferior pedicle, dermal flaps, fascial and muscular flaps [14–18]. If no restriction exists in the choice of the glandular pedicle (i.e. not too ptotic breasts or the necessity of glandular removal in the upper quadrants), our findings should be taken into consideration, given that the contralateral breast is reconstructed with an implant and sagging is therefore an unlikely occurrence.

On the contrary, superior or medial pedicled reduction mammaplasties seem to better maintain shape and position over time and therefore look more similar to the contralateral prosthetic breast. A lower incidence of glandular ptosis was recorded in our series. This is probably due to

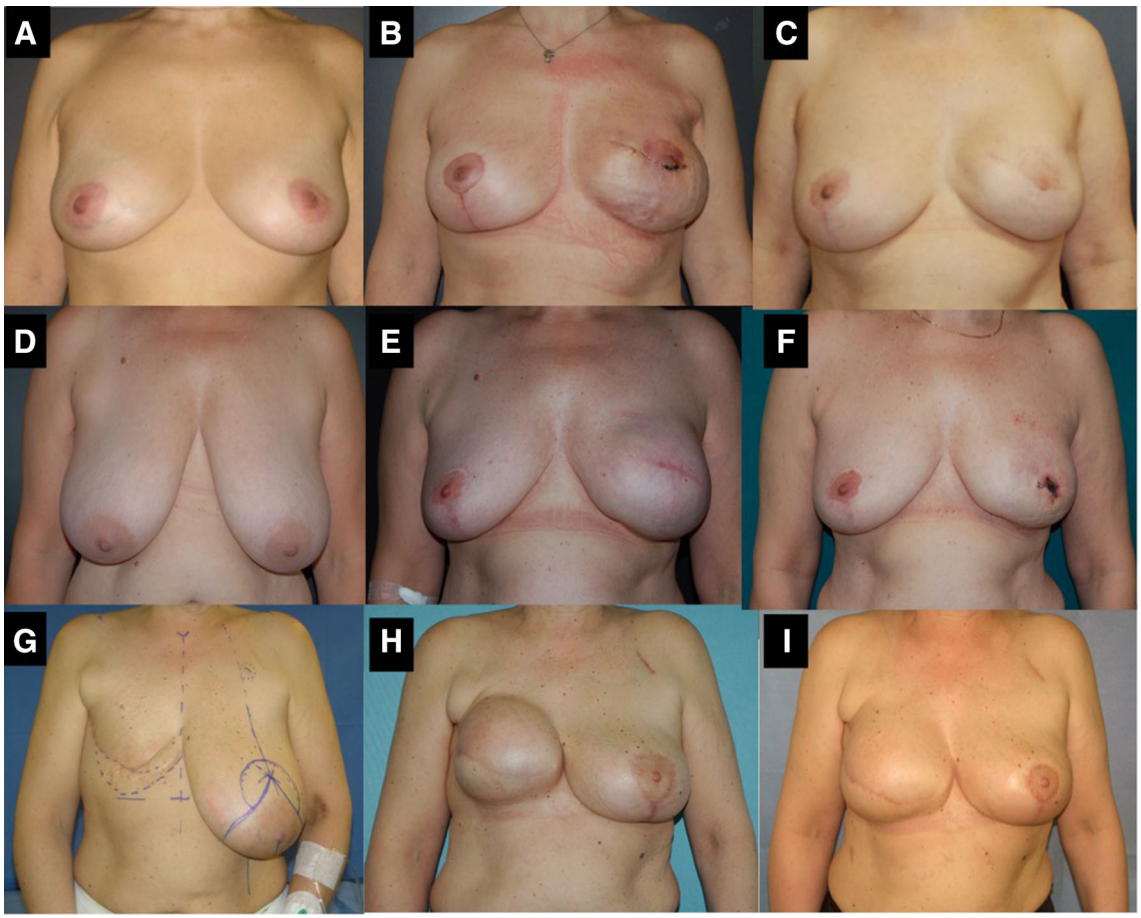

Fig. 3 **a–c** Preoperative view of a 54-year-old patient who underwent left nipple sparing mastectomy, reconstruction with a tissue expander and contralateral superior pedicled reduction mammaplasty (**a**). Two-month postoperative view (**b**). Result at 24 months after left replacement of tissue expander with permanent prosthesis (**c**). **d–f** Preoperative view of a 47-year-old patient who underwent left radical mastectomy, insertion of mammary expander and simultaneous reductive mammaplasty (using a medial pedicle) (**d**). Mammary expander was left in place for 16 weeks (**e**), and replacement with the final prosthesis was performed after 17 weeks. Postoperative view 24 months after surgery, one month after left nipple reconstruction (**f**). **g–i** A 43-year-old patient who underwent right modified radical mastectomy and expander reconstruction and simultaneous inferior pedicled reduction of the healthy breast (**g**). Six-month (**h**) follow-up with the right definitive implant in place. Five months after primary surgery, we replace the expander with the definitive prosthesis (**i**). In these photographs, we can see the "bottoming out" and star-gazing" phenomena: this patient, 6 months after surgery (**h**), has a nipple–inframammary fold distance of about 6.9 cm and a nipple–lower clavicle margin distance of 21.4 cm; after a period of 24 months (**i**) the first distance was 9.6 cm ($\Delta = 2.7$ cm) and the second was 19.7 cm ($\Delta = 1.7$ cm)

the possibility of having a solid parenchyma structure thanks to multi-layered sutures of the mammary pillars, the "hammock" technique or an inferiorly based dermal adipose flap [14–18]. In our hands, we could not reach the same result by performing inferior pedicled techniques and their variations.

With regard to cosmetic outcomes, good aesthetic results and surgeons' satisfaction were achieved in the three groups. The surgeons' assessments (at 2-year follow-up) showed no statistically significant differences between the groups ($P > 0.05$). However, the lowest scores were recorded for question no. 1 (breast shape without a bra) and no. 4 (position of nipple areola complex of the reduced breast) in GROUP C (inferior pedicle); it was probably due to the "bottoming out" and "star-gazing" phenomena.

The surgeons' overall satisfaction rate was higher, but not significantly, for GROUP A and B in comparison with GROUP C.

Limitations of the Study

This study has some limitations to point out.

No preoperative measurements of the healthy breast exist to objectively evaluate the grade of ptosis. We do expect that more ptotic breasts have been corrected using

Table 3 Intergroup comparison of mean reduction of the distance (in cm) in different groups between 24th and 1st month (Δ) (ANOVA)

Measurements performed on the reconstructed breasts		Sum of squares	Mean square	*F*-ratio	*P* value
Δ point of major projection–lower clavicle margin (cm) (24th–1st month)	Between groups	0.073	0.03	0.39	0.67
	Within groups	8.02	0.09		
	Total	8.09			
Δ point of major projection–inframammary fold (cm) (24th–1st month)	Between groups	0.14	0.07	2.00	0.14
	Within groups	3.09	0.03		
	Total	3.23			

Measurements performed on the reduced breasts		Sum of squares	Mean square	*F*-ratio	*P* value
Δ nipple–lower clavicle margin (cm) (24th–1st month)	Between groups	7.58	3.79	51.13	0.01
	Within groups	6.45	0.07		
	Total	14.03			
Δ nipple–inframammary fold (cm) (24th–1st month)	Between groups	42.05	21.02	124.56	0.01
	Within groups	14.68	0.16		
	Total	56.73			

Table 4 Between-group comparisons (Tukey's HSD test)

Measurements performed on the reconstructed breasts			Mean difference	Std. error	*P* value
Δ point of major projection–lower clavicle margin (cm) (24th–1st month)	Inferior	Superior	−0.01	0.07	0.99
		Medial	−0.06	0.07	0.69
	Superior	Inferior	0.00	0.07	0.99
		Medial	−0.05	0.07	0.75
	Medial	Inferior	0.06	0.07	0.69
		Superior	0.05	0.07	0.75
Δ point of major projection–inframammary fold (cm) (24th–1st month)	Inferior	Superior	−0.06	0.04	0.43
		Medial	0.03	0.04	0.73
	Superior	Inferior	0.06	0.04	0.43
		Medial	0.09	0.04	0.12
	Medial	Inferior	−0.03	0.04	0.73
		Superior	−0.09	0.04	0.12

Measurements performed on the reduced breasts			Mean difference	Std. error	*P* value
Δ nipple–lower clavicle margin (cm) (24th–1st month)	Inferior	Superior	0.69*	0.07	0.01
		Medial	0.49*	0.07	0.01
	Superior	Inferior	−0.69*	0.07	0.01
		Medial	−0.19*	0.07	0.02
	Medial	Inferior	−0.49*	0.07	0.01
		Superior	0.19*	0.07	0.02
Δ nipple–inframammary fold (cm) (24th–1st month)	Inferior	Superior	1.67*	0.10	0.01
		Medial	0.88*	0.10	0.01
	Superior	Inferior	−1.67*	0.10	0.01
		Medial	−0.78*	0.10	0.02
	Medial	Inferior	−0.88*	0.10	0.01
		Superior	0.78*	0.10	0.01

* The mean difference is significant at the 0.05 level

Table 5 Surgeons' assessments of aesthetic outcomes 2 years after reconstruction with the final prostheses using superior (italics)/medial (bold)/inferior (bolditalics) pedicle

Surgeons' assessment	Type of pedicle	Mean score (SD) S_1, S_2, S_3
Shape of the reduced breast (not wearing a bra)	Superior	*2.6*
	Medial	**2.6**
	Inferior	***2.3***
Symmetry of breasts (not wearing bra)	Superior	*3.0*
	Medial	**3.0**
	Inferior	***3.0***
Glandular tissue defects on the reduced breast	Superior	*3.0*
	Medial	**3.3**
	Inferior	***3.0***
Position/distortion of NAC (of the reduced breast)	Superior	*3.0*
	Medial	**3.3**
	Inferior	***2.2***
Scar quality and/or retraction of the reduced breast	Superior	*3.3*
	Medial	**3.6**
	Inferior	***2.9***

A four-grade scale was used in each category (4-excellent, 3-good, 2-sufficient, 1-insufficient). S_1: mean score (SD) of surgeon no. 1; S_2: mean score (SD) of surgeon no. 2. S_3: mean score (SD) of surgeon no. 3

inferior pedicled techniques and the initial grade of ptosis may influence ptosis relapse per sé.

The sample population is small, and we are enrolling more patients who are prospectively followed.

BMI variations in the study population have not been recorded. It is quite common for patients to gain weight during and after cancer treatment, and it could have biased the results. A study including only patients with a constant BMI during follow-up is necessary to confirm our conclusions.

Furthermore, the follow-up is limited at the 24-month assessment. Larger series with longer follow-up are needed to validate the long-lasting technique of breast reduction.

Conclusion

Our series demonstrated that the reduced breast undergoes significant modifications in shape and position over time. They are more significant than those occurring in the reconstructed breast mound with an implant. Therefore, the idea to use the reduced healthy breast as a guide for implant choice represents an adequate motivation to support mastectomy and simultaneous reduction. Techniques using a superior or medial pedicle seem to better preserve the shape and position over time, with an appearance similar to reconstructed breast.

Acknowledgements All authors certify that they have NO affiliations with or involvement in any organisation or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements) or non-financial interest (such as personal or professional relationship, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript. I sincerely thank Domenico Luca Grieco.

References

1. Leone MS, Priano V, Franchelli S, Puggioni V, Merlo DF, Mannucci M, Santi PL (2011) Factors affecting symmetrization of the contralateral breast: a 7-year unilateral postmastectomy breast reconstruction experience. Aesth Plast Surg 35:446–451
2. Bostwick J (1983) Breast reduction. In: Bostwick J (ed) Aesthetic and recostructive surgery. St.Louis, CV Mosby, pp 137–208
3. Davison SP, Mesbahi AN, Ducic I, Sarcia M, Dayan J, Spear SL (2007) The versatility of the superomedial pedicle with various skin reduction patterns. Plast Reconstr Surg 120:1466–1476
4. Zingaretti N, De Lorenzi F, Dell'Antonia F, De Biasio F, Riccio M, Parodi PC (2016) The use of precapsular space in secondary breast reconstruction. Aesth Plast Surg 40:716–723
5. Moustafa A, Fakhr I (2014) Outcome of different oncoplastic surgical (OPs) techniques for centrally located breast cancer (CLBC). J Egypt Natl Canc Inst 26:203–209
6. Semprini G, Cattin F, Vaienti L, Brizzolari M, Cedolini C, Parodi PC (2013) Oncoplastic surgery and cancer relapses: cosmetic and oncological results in 489 patients. The Breast 22:946–951
7. Chang EI, Peled AW, Foster RD, Zeidler KR, Ewing CA, Alvarado M, Hwang ES, Esserman LJ (2012) Evaluating the feasibility of extended partial mastectomy and immediate reduction mammoplasty reconstruction as an alternative to mastectomy. Ann Surg 255:1151–1157
8. Nano MT, Gill PG, Kollias J, Bochner MA, Malycha P, Winefield HR (2005) Psychological impact and cosmetic outcome of surgical breast cancer strategies. ANZ J Surg 75:940–947
9. Salgarello M, Visconti G, Barone-Adesi L, Franceschini G, Masetti R (2015) Controlateral breast symmetrisation in

immediate prosthetic breast reconstruction after unilateral nipple-sparing mastectomy: the tailored reduction/augmentation mammaplasty. Arch Plast Surg 42:302–308
10. Kaviani A, Safavi A (2015) Immediate and delayed contralateral symmetrization in oncoplastic breast reduction: patients' choices and technique formulation. PRS GO 3:e286
11. Purohit S (2008) Reduction mammoplasty. Indian J Plast Surg 41:S64–S79
12. Makboul M, Abdelhaimid MS, Al-Attar GS (2016) Long-term follow-up ad patient satisfaction after reduction mammoplasty: superomedial versus inferior pedicle. Indian J Plast Surg 49:214–219
13. Saleem L, John JR (2013) Unfavourable results following reduction mammoplasty. Indian J Plast Surg 46:401–407
14. Brown R, Izaddoost S, Bullocks JM (2010) Preventing the "bottoming out" and "star-gazing" phenomena in inferior pedicle breast reduction with an acellular dermal matrix internal brasserie. Aesth Plast Surg 34:760–767
15. White DJ, Maxwell GP (2000) Reduction mammoplasty. In: Achauer BM, Eriksson E, Guymon B, Coleman JJ III, Russell RC, Nander Kolh A et al (eds) Plastic surgery indications, operations, and outcomes. Mosby, St Louis, pp 2705–2743
16. Okoro SA, Barone C, Bohnenblust M, Wang HT (2008) Breast reduction trend among plastic surgeons: a national survey. Plast Reconstr Surg 122:1312–1320
17. Widgerow AD (2005) Breast reduction with inferior pedicle fascial suspension. Aesth Plast Surg 29:532–537
18. Perez-Macias JM (2007) Long-lasting evolution of ptosis control after reduction mammaplasty using the hammock technique. Aesth Plast Surg 31:266–274