

The medial-central septum based mammoplasty: A reliable technique to preserve nipple-areola complex sensitivity in post bariatric patients

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Abstract

Introduction: Massive weight loss is associated with the ptosis of the breast, loss of the upper pole fullness, medialization of the nipples and volume depletion. Post bariatric patients often need breast reshaping with mastopexy or breast reduction. We report the author's experience with the medial central septum based mammoplasty for breast reshaping after massive weight loss.

Methods: We retrospectively reviewed the records of 85 women who underwent a medial-central septum based mammoplasty, analyzing patients (age, BMI, comorbidities) and operation specific characteristics' (surgical technique, complications) to identify the advantages and the drawbacks of the adopted technique. All the procedures were performed at a single institution by the senior author of this article.

Results: 85 patients were included in the review, in total 170 medial-central septum based mammoplasty were performed over a five years period. Early complications, as hematoma and seroma occurred in 2 patients. No total or partial nipple-areola losses were recorded and the viability of the nipple-areola complex (NAC) was excellent in all the treated patients. Sensation was retained in all breasts. Nine patients showed delayed wound healing at the joint of the T scar; in 5 patients we observed spreading scars.

Conclusion: The medial-central septum based mammoplasty seems to be an effective and safe choice for breast reshaping after massive weight loss, as none of our patients experienced nipple loss and all of them reported good nipple sensation. Moreover, the technique is versatile and can be applied to patients with hypertrophic breasts or gigantomastia.

KEYWORDS

breast reduction, mastopexy, post-bariatric surgery, septum-based mammoplasty

1 | INTRODUCTION

In the postbariatric breast, massive weight loss is associated with the ptosis of the breast, a loss of upper pole fullness, a medialization of the nipples, volume depletion, and the presence of the lateral chest wall disturbance. According to the Pittsburgh rating scale, postbariatric patients often need breast reshaping with mastopexy or breast reduction.

Successful breast reduction or mastopexy involve resection and remodeling of the breast parenchyma, including the creation of a pedicle to maintain blood supply to the nipple-areola complex (NAC). The design of the pedicle should be based on thorough knowledge of the blood supply, which deserves the same diligence as flap surgery.¹ Reliable NAC flaps are based on anatomically-defined arterial and venous territories. The arterial network of the breast has been described in several detailed anatomic studies²⁻⁴ The description of the breast septum, which includes the arteries and nerves of the NAC, is the most important contribution to the breast anatomy.³

The aim of this article is to report the author's experience with the medial-central septum based mammoplasty for breast reshaping after massive weight loss, evaluating whether the technique described could be reliable to obtain the reduction in the volume of the breast, to preserve blood supply and innervation to the nipple-areola complex, to lift the nipple-areola complex to a higher position on the breast mound, to create an aesthetic shape that is stable over time.

2 | MATERIALS AND METHODS

2.1 | Patients

A retrospective analysis was performed including postbariatric patients undergoing breast reduction surgery between January 2012 and December 2016 at our institution. We analyzed the records of 85 patients operated by the senior author of this article. The patients' demographic properties and breast measurements were recorded preoperatively. Exclusion criteria consisted of a history of breast cancer, a prior breast operation, treatment with any systemic immunodeficiency or immunosuppressive medications.

All of the patients underwent a medial-central septum based mammoplasty. In all cases, the breast reshaping was performed after almost 1 year since the stabilization of the weight loss. The duration of the operation was measured from tracing the lines of incision until the last suture was completed.

The follow-up period ranged from 12 months to 5 years with a mean of 36.8 months. Early and late complications were evaluated postoperatively. Operative complications were ranked according to the Clavien-Dindo classification.⁵

Breast-Q questionnaire was administered to the treated patients to assess their satisfaction with the results 12 months postoperatively. Patients were interviewed about their satisfaction with shape, reduction degree, scar length and visibility, nipple sensation.

Sensitivity was assessed by the same examiner. Five points were tested on each. These points include the nipple and four cardinal points on the areola at 12, 3, 6, and 9 o'clock. Pressure thresholds were measured with Semmes-Weinstein monofilaments.

2.2 | Surgical technique

The patient is marked in the standing position preoperatively. The midline, inframammary fold, and the axis of the breast are drawn. The Pitanguy point, or the position of the new nipple-areola, is determined by placing the index finger, slightly below the inframammary fold and is marked on the breast. The periareolar marking is drawn as a mosque-shaped pattern freehand. The base width of the mosque-shape can be 6 or 8 or 10 cm depending on the breast volume. After the lower hands are joined together, a circumference of 16-18 cm is obtained that will match a 4.5-5 cm diameter areola. The vertical incision lines are marked by rotating the breast superolaterally and then superomedially. The medial pedicle is designed, with a base width of 10-12 cm.

The pedicle is first de-epithelialized.⁶ A moderate glandular resection of the upper pole is made safely in a cranial direction. The hole created at the new areola site is large enough for the pedicle to fit through without any tightness during the closure. Upper breast quadrants are undermined until the level of the second intercostal artery perforator is reached to allow a better location of the pedicle (from 9 to 2 o'clock) (see Figure 1).

The NAC flap is created and easily transferred with a rotation of 90° to the new areola hole, without any risk of torsion. In the medial central septum based mammoplasty technique, a column of breast gland tissue between the nipple-areola and the pectoralis muscle is kept intact and remains connected with the pectoralis perforators and with the medial breast pillar by a medial glandular pedicle.

Next, the lateral and medial pillars are created separating the skin and the fat tissue from the underlying glandular tissue through the two vertical incisions. This dissection reaches the medial and lateral borders of the breast and is performed more laterally and cranially until the level of the areolar opening is reached.

The breast is now cone-shaped by closing the pillars with three or four vertical interrupted 3-0 vicryl sutures placed about 1-2 cm deep the skin surface. The breast tissue is also sutured up to the chest wall at the level of the 5th or 6th rib.

Closure is started with a trifurcation suture, minimizing lateral standing cutaneous deformities by advancing the lateral flap medially. The inverted T closure is designed at the end of the surgery and any redundant skin in the inferior pole of the breast is excised.

Skin closure is performed with two layers using interrupted 3-0 monocryl in the deep dermis and a running subcuticular 4-0 monocryl suture.

Rarely, one suction drain is left in place in each breast, as no dead space result at the end of the surgical procedure. The drains are removed 1-2 days later.

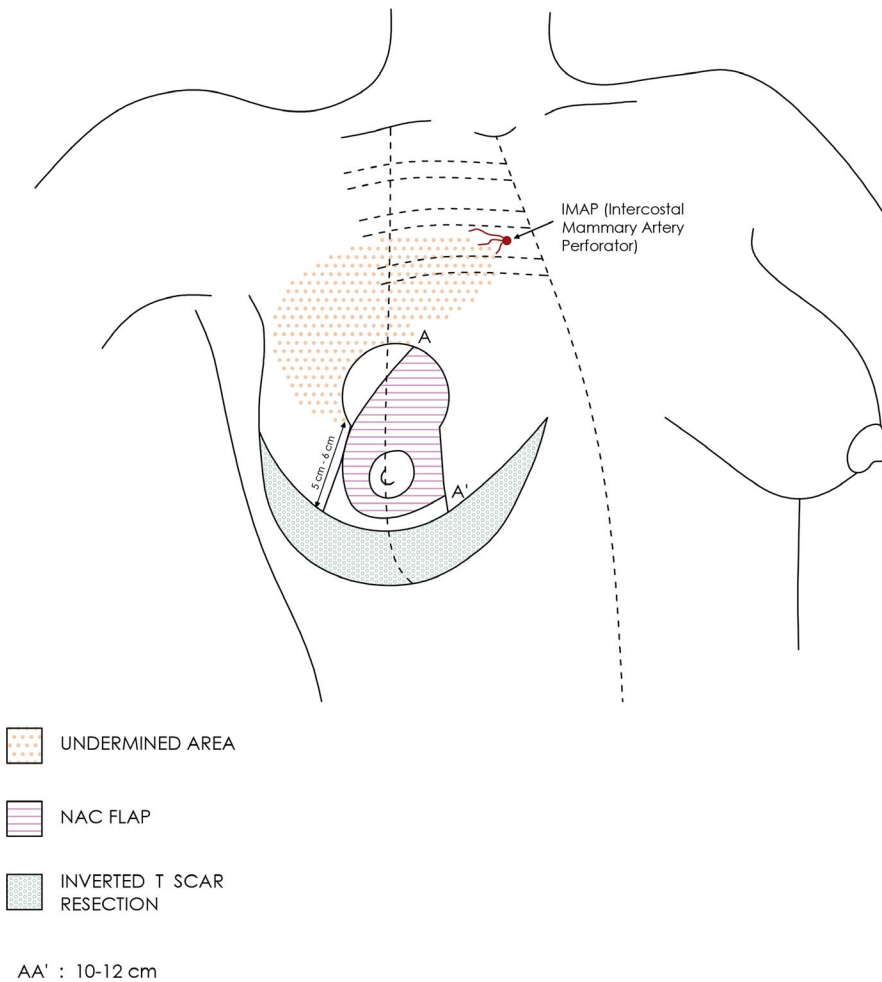


FIGURE 1 Preoperative markings
[Color figure can be viewed at wileyonlinelibrary.com]

Low molecular weight heparin, the application during the intra and postoperative time of elasto-compressive garments and an early mobilization are enough to avoid thromboembolic events.

The patients are instructed to wear a sports bra night and day for 1 month.

3 | RESULTS

A medial-central septum based mammoplasty was performed on 170 breasts in 85 patients. The average age was 56 years old (range from 49 to 65). The mean body mass index was 29.8 kg/m² (range from 27.5 to 32.8 kg/m²). Average sternum to nipple distance was 31cm preoperatively (22-38 cm). Submitted tissue weights were recorded with a mean weight of 418.6g. The duration of the operation was 160 ± 47 minutes (see Figures 2 and 3).

Early complications as hematoma and seroma occurred in 2 patients. There was 1 case of fatty tissue necrosis. In 5 patients, breasts showed markedly spreading scars, possibly due to the tension. In these cases, reoperation was performed to reduce the areolar size by excision of the widened areola with an additional purse-string suture (grade IIIa complication). Wound healing problems (n = 9/10.59%) at the joint of the T shaped scar were the most

frequent type of Grade I complications. Revision operation under general anesthesia to evacuate a hematoma or to excise areas of fat necrosis were the main causes that patients were assigned to the group of a Grade IIIB complication.

There were no total or partial nipple-areola losses, and the viability of the nipple-areola complex was excellent in all treated patients.

The sensation was retained in all breasts, as assessed by light touch and patient response during follow up visit. In the majority of mastopexy or moderate breast reduction, near complete nipple sensitivity was present in the immediate postoperative period. The other patients reached very good sensitivity in a mean of 4 months.

The overall satisfaction and satisfaction with shape, ptosis degree was rated as "good" or "very good" (Tables 1, 2 and 3).

4 | DISCUSSION

Breast reshaping in postbariatric patients is a challenge based on the complexity and the variability in the anatomy of the weight loss breasts and on the real expectations of the patients.⁷

Satisfactory volume reduction and lifting of the nipple-areola complex are the primary goals of the operation, along with creating an aesthetically pleasing breast shape and a viable and sensitive



FIGURE 2 A, A 38-year-old patient with a 40-kg weight loss after sleeve gastrectomy presented for breast reshaping. She underwent a medial-central septum-based mammoplasty. Preoperative views. B, Results at 18 mo postoperatively [Color figure can be viewed at wileyonlinelibrary.com]

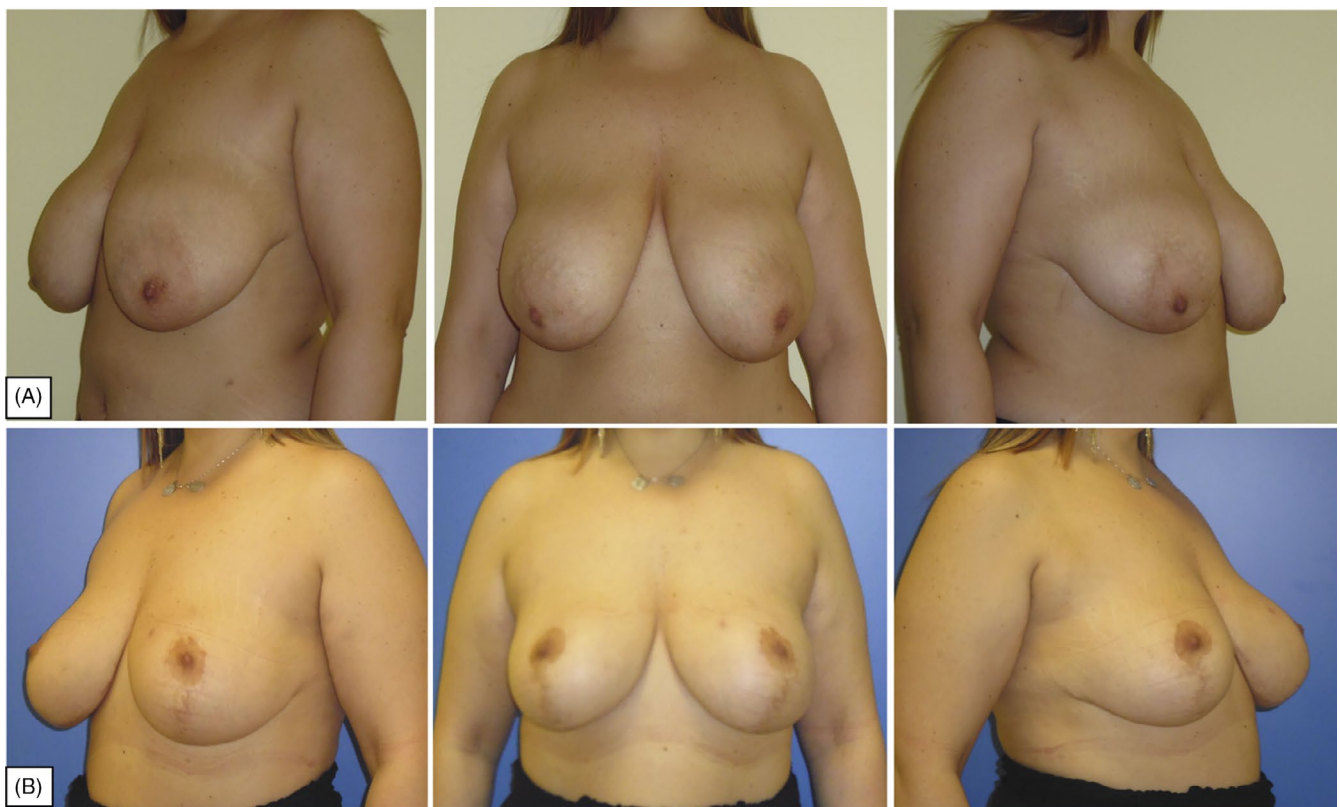


FIGURE 3 A, A 49-year-old patient with a 35-kg weight loss after gastric bypass surgery presented for breast reduction. She underwent a medial-central septum-based mammoplasty. Preoperative views. B, Results at 2 y postoperatively [Color figure can be viewed at wileyonlinelibrary.com]

Grade	Definition
Grade I	Deviations from the normal postoperative course without the need for additional pharmacological treatments or operative interventions Allowed are drugs as antiemetics, antipyretics, analgetics, diuretics, electrolytes, physiotherapy, and rheological therapy. Included are also wound infections opened at the bedside
Grade II	Requiring additional pharmacologic treatment with drugs other than drugs as antiemetics, antipyretics, analgetics, diuretics, electrolytes, physiotherapy, and rheological therapy, also including blood transfusions and total parenteral nutrition
Grade III	Need for operative intervention
Grade IIIA	No general anesthesia needed
Grade IIIB	Need for general anesthesia
Grade IV	Life-threatening complication (including CNS complications) requiring intensive care unit management
Grade IVA	Single organ failure (including dialysis)
Grade IVB	Multiorgan failure
Grade V	Death due to the intervention
Suffix "d"	If the patient suffers from a complication at the time of discharge, the suffix "d" (for "disability") is added to the respective grade of complication. Follow-up is recommended

TABLE 1 Clavien-Dindo classification⁵⁻²¹

Patient's comment	Shape	Symmetry	Position of NAP	Sensation of NAP
Excellent	12%	16%	5%	38%
Good	64%	56%	64%	52%
Poor	20%	25%	27%	7%
Bad	4%	3%	4%	3%

TABLE 2 Patient's satisfaction scale with aesthetics

NAC. Many mastopexy techniques have been described in the literature. The availability of numerous different techniques for mastopexy and the abundance of reports of modifications over the last decade are clear indications that none of these techniques have proven to be ideal.

The risk of inadequate blood supply to the NAC is just one of the disadvantages and problems that have been reported about the superior dermal pedicle technique with a vertical scar. Other problems include kinking of the pedicle in the very fibrous breast, an ill-defined inframammary fold, and poor nipple areola sensitivity.^{8,9} Mastopexy with an inferior pedicle solves this problem, but bottoming out and a boxy shape are the major drawbacks. Modifications have been reported by Hammond et al,¹⁰ Skoog and Hall-Findlay¹¹ but none of these techniques relies on specific anatomical structures.

In addition, the women who have undergone bariatric surgery are usually smokers and present metabolic and cardiovascular diseases. Lejour's exhaustive survey¹² shows a high correlation between obesity, breast volume and incidence of postoperative complications (infection, necrosis, shape defects, sensory loss). Therefore the surgeon will have to make an effort to reduce predisposing factors in these increases-risk situations by, first, using adequate surgical techniques.¹³

TABLE 3 Complications of medial-central mammoplasty

Complication (grade)	No. of patients (85)	Percentage (%)
Areola widening or distortion (IIIa)	5	5.89
Weak nipple sensation (6 mo)	0	0
Loss of the nipple-areola complex	0	0
Fat necrosis (IIIb)	1	1.18
Seroma requiring drainage	0	0
Hematoma (IIIb)	2	2.35
Delayed healing (I)	9	10.59

A technique that aims to be safe must maintain the integrity of that central pedicle described by Wuringer^{3,14,15} which constitutes the supporting structure of most of the nipple-areola complex circulation and innervation.¹³ The horizontal septum is a deeply located connective tissue structure; it comes from the pectoral fascia at the level of the fifth rib, extending through the breast up to the nipple. The main supplying vessels (thoracoacromial, internal thoracic, and intercostal arteries) and the main supplying

nerves were found to run along this horizontal septum and the ligaments attached to it.³

We found that is possible to perform safe breast resections or reshaping with a central pedicle regardless of the amount of resection and the risk factors.¹⁴

The medial central glandular technique improves the vascularization of the NAC by preserving the pectoralis perforators to the posterior part of the breast gland. By partially rotating the central glandular column carrying the NAC with the pectoralis perforators as a pivot point a triple vascularization is guaranteed: first by the dermal plexus, by a thick glandular pedicle including the branches of the medial thoracic vessels and finally by a deep vascularization from the pectoralis perforators.^{16,17}

It is true that in our technique we separate the skin and the underlying fat tissue from the breast. But, looking at the embryology of the breast, it is apparent that the ectoderm and the mesoderm are responsible for the genesis of the breast; breast tissue originates from the ectoderm, whereas the skin from the mesoderm. Tissues obtain their vascularity from their origin so that we can safely perform skin undermining from the breast.^{18,19}

As described in the anatomical studies,^{3,14} the anterior ramus of the lateral branches of the fourth intercostal nerve can run very superficial in the breast to reach the NAC. On the other hand, it can also have a very deep course, running on the top of the serratus and pectoralis muscle fascia to penetrate the breast gland from the lower surface and run obliquely through the breast gland to the NAC. As there is no way to predict the course of the nerve through the gland, the use of a medial-central pedicle allow you to include the breast gland tissue around these nerves to achieve the highest rate in preserving nipple sensation. This is why we experienced no loss of nipple's sensation in all treated patients.

Additionally, left untouched the base of the breast to the pectoralis muscle let us rely on the original strength of the connective tissue skeleton of the superficial fascia and the collagen fibers within the breast gland (Cooper's ligaments). This explains the good stability of the shape and aesthetic result of the technique. The resection of glandular tissue cranial to the NAC and the repositioning of the pedicle in a more cranial position is responsible for the improved nipple projection and the rotation of the NAC pedicle gives an elegant curve to the inner quadrants of the breast. Repositioning of glandular tissue in the central part of the breast and closure of both breast pillars below it will create a conic shape of the breast while fixing the gland tissue at the chest wall will reduce the recurrence of breast ptosis.

We also believe that better long-term results can be obtained by using inverted T scar skin closure. The absence of a vertical wrinkled scar decreases the anxiety, worries, and disappointment of the patients. Postbariatric patients are very fragile and many of them come out from a period of depression and very low self-esteem. The horizontal scar is often short, hidden in the inframammary crease and does not show in the medial or lateral portions of the breast. An important precaution is only to not remove too much skin at the beginning of the operation. It is better to remove

the further skin after the shaping because the shape is determined only by the inset of the pedicle and the breast conization and not by the skin.

5 | CONCLUSION

The medial-central septum based mammoplasty is an effective and safe choice for breast reshaping after massive weight loss, as none of our patients experienced nipple loss postoperatively, and all of them reported good nipple sensation subjectively. It is a versatile technique,¹⁹ with high predictability and it can also be applied to patients with hypertrophic breasts or gigantomastia and to contralateral breast reshaping in female candidates having breast reconstruction.

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