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Superior pedicle mammaplasty without parenchymal incisions after massive weight loss

A new technique of mammaplasty

Carlo D’Aniello M.D., Roberto Cuomo M.D., Luca Grimaldi M.D., Andrea sisti M.D., , Juri

5 Tassinari M.D., Matteo Campana M.D., Anna Brafa M.D., Giuseppe Nisi M.D.

Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario Bracci Street n.1, University of
Siena, 53100 Siena (SI), Italy

10 Carlo D’Aniello M.D.: Chief of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario
Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Roberto Cuomo M.D.: Recident of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario
Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Luca Grimaldi M.D.: PhD of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario

15 Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Andrea sisti M.D.: Resident of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario
Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Matteo Campana M.D.: Plastic Surgeon of Unit of Plastic Surgery, Santa Maria Alle Scotte
Hospital, Mario Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

20 Juri Tassinari M.D.: Plastic Surgeon of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital,
Mario Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Anna Brafa M.D.: Plastic Surgeon of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital,
Mario Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Giuseppe Nisi M.D: PhD of Unit of Plastic Surgery, Santa Maria Alle Scotte Hospital, Mario

25 Bracci Street n.1, University of Siena, 53100 Siena (SI), Italy

Corresponding author: Roberto Cuomo MD

Plastic Surgery Division, Department of General and Specialist Surgery

University of Siena, Italy

30 Phone/fax: +39 0577/; E-mail: robertocuomo@outlook.com

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Abstract

Background: After considerable weight loss, the breasts suffer significant deformation. The ptotic breast is characterized by a lack of the superior pole, tissue excess in the inferior pole, down-migration of the nipple-areola complex with a redundancy of skin tissue. The authors describe a mastopexy technique based on a modulated and progressive reshaping, back rotation and suspension of the mammary gland parenchyma without parenchymal incisions.

Methods: From January 2011 to January 2014, 45 patients with bilateral moderate or severe breast ptosis underwent mastopexy with complete detachment of the breast from the pectoralis major muscle and parenchyma plication, without any parenchymal incision. The including criteria for this study was the presence of II-III degree of Regnault of breast ptosis in massive weight loss women. Patients were followed up for 1 year, reporting any complications, and measuring the jugular-NAC (nipple-areola complex) distance. The outcomes were assessed by the patients and by the surgical team.

Results: The aesthetic result was good or excellent in all patients. The new mammary contour and the distance between the jugular fossa and the nipple resulted stable in time with a good filling of the upper pole. No major complications were reported.

Conclusion: This technique gave good breast shape, long-term projection, and upper pole fullness without parenchymal incisions. It restore breast shape and projection especially post-bariatric patients. A similar technique has not yet been described.

Keywords: Autologous mastopexy; Breast ptosis; Breast lift; Mastopexy; Massive weight loss; Breast reshaping

Introduction

Breast ptosis is still a challenge for the surgeon especially in patients with severe or moderate ptosis. Age, history of significant weight loss, higher body mass index, larger bra cup size, number of pregnancies, and smoking history are significant risk factors for breast ptosis.⁽¹⁾

Breast ptosis is currently classified following the Regnault degrees (Table 1, Fig 1).⁽²⁾ Other classification systems were proposed (Table 2-3).^(3,4)

Mastopexy is performed to modify the breast's contour without changing breast volume. Mild ptosis can be corrected with traditional mastopexy techniques, while moderate-severe ptosis with a large excess of skin usually needs implants associated to mastopexy/breast reshaping. Breast augmentation combined with mastopexy is associated with a significantly higher complication rate than augmentation alone. The combination of mastopexy and breast implants has revealed a moderate recurrence of breast ptosis in many patients particularly with use of medium to large implants.⁽⁵⁾ In addition, some patients refuse to put on prosthesis, making the surgeon operate on techniques that preserve maximum breast tissue.

Various types of excision patterns and orientation of pedicles were developed throughout the years, each with flares of popularity at different times.⁽⁶⁻⁸⁾ Swanson analyzed various mastopexy techniques, and he noticed that the main problems were the recurrence of ptosis and unfilled upper pole.^(9,10)

The increased prevalence of successful bariatric surgery procedures over the past two decades has resulted in a variety of body contour deformities in the massive weight loss (MWL) patient that were not commonly seen by plastic surgeons in the past. While the weight loss typically confers significant health benefits, an undesirable consequence is often excessive quantities of hanging, surplus skin.⁽¹¹⁾

Management of the breast following MLW for both reconstructive and aesthetic reasons poses unique challenges that are often inadequately addressed with traditional techniques.^(12,13)

85 The aim of this manuscript is to present a mastopexy technique with only autologous tissue that is able to efficacy fill the upper pole, in the MWL population without parenchymal incisions⁽¹⁴⁾.

Table 1.Regnault's classification of breast ptosis.⁽²⁾

True ptosis	Minor ptosis (1st degree)	Nipple at inframammary fold
	Moderate ptosis (2nd degree)	Nipple below inframammary fold, but above lower breast contour
	Severe ptosis (3rd degree)	Nipple below inframammary fold and at lower breast contour
Glandular ptosis (partial ptosis)		Nipple above inframammary fold, but breast hangs below fold
Pseudoptosis		Nipple above inframammary fold, but breast is hypoplastic and hangs below fold

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Table 2.Kirwan's classification of breast ptosis.⁽⁴⁾ IMC=intra-mammary-crease

Stage A	Nipple position 2 cm above the IMC
Stage B	Nipple position 1 cm above the IMC
Stage C	Nipple position even with IMC
Stage D	Nipple position 1 cm below the IMC
Stage E	Nipple position 2 cm below the IMC
Stage F	Nipple position more than 2 cm below the IMC

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Table 3. The Pittsburgh Rating Scale of breast deformities after bariatric weight loss.⁽³⁾

Grade	Scale
0	Normal
1	Ptosis grade I/II or severe macromastia
2	Ptosis grade III or moderate volume loss or constricted breast
3	Severe lateral roll and/or severe volume loss with loose skin

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Materials and methods

All patients gave written informed consent to participate in this study. The same senior surgeon (CD) performed all surgeries. Surgery is usually performed under general anesthesia to avoid extensive infiltration of the breast, which may affect intraoperative evaluation of size and shape

Patients

From January 2011 to January 2014, 45 patients have been treated with this technique (mammaplasty with superior pedicle flap). They were ex-obese patients (average age 47.2 years) with bilateral breast ptosis (Table 4). Average BMI (body mass index) was 25.5 (range 24.5-28). The range of distance between jugular fossa and nipple was 28-39.5 cm (average 32.6 cm). The range of distance between nipple and inframammary fold was 12-18 cm (average 13 cm).

The inclusion criteria were:

- Ex-obese patients with breast ptosis after weight loss
- Grade II or III of breast ptosis (following Regnault classification)⁽²⁾
- Sufficient mammary parenchyma to perform the mammaplasty
- BMI and weight stable for 6 months at least

The exclusion criteria were:

- Breast ptosis with insufficient parenchyma (in such case we indicated breast implant)
- BMI/weight unstable

All patients were evaluated through pre-operative and 1 year post-operative photographic study (central, lateral and oblique).

Clinical documentation was obtained by sequential photographs using identical camera settings, lighting, and patient positioning. Clinical assessments, compared with baseline preoperative

photos, were performed independently by two masked physician assessors preoperatively and postoperatively at 12 months.

The grade of subsequent breast ptosis was evaluated measuring the jugular notch to nipple distance.

The patients were asked to evaluate and fill a chart on the selected outcome parameters using

130 a 6-point Likert scale (Table 5, 0-not satisfied to 5-very satisfied). The outcome parameters evaluated were:

scar quality, breast shape, asymmetry correction, overall ptosis correction, sensibility of the NAC.

Surgical technique

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1- Pre-operative drawings (Fig 2) follow classic pattern of upper pedicle breast lift with identification of the new position of the nipple-areola complex and the amount of skin to remove.^(15,16)

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2- After the maneuver of Schwartzman⁽¹⁷⁾ (fig4.A) and removal of excess skin (Fig4.B), incision of inframammary fold and on the BD and CE lines. Complete dissection of the gland from the pectoralis muscle fascia. At the end of the dissection, the operator “can hold the breast in his own hand” (Fig4.C).

3- Complete dissection of the breast parenchyma from the lower pole residual skin until breast equator (Fig4.D).

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4- The lower pole of breast parenchyma is rolled back on itself, suspended to the back, and fixed to the upper pole with three stitches (Fig 3-4.F,4.G). During this phase, a distance of 6-7 cm from the bottom edge of the areola to the front of plication line of the parenchyma is maintained (Fig4.F). Furthermore, at this time, the projection of the breast can be increased, narrowing the width of the flap

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5- Redon’s (15 fr) drainages are inserted, one in each breast, therefore skin synthesis is carried out (Fig 4.G).

6- Cyanoacrylate skin adhesive is used to ensure and stabilize wound closures.

7- A compressive dressing is carried out.

Table 4. Patients' data. NAC= nipple–areola complex.

Patients	Age (years)	PreviousBariatricSurgeries	Amount of weight loss (kg)	Previous Body Contouring Surgeries	BMI pre-mammoplasty (kg/m ²)	Complications	Jugulum-NAC distance pre-op. (cm)	Jugulum-NAC distance immediately post-op. (cm)	Jugulum-NAC distance 1 year post-op. (cm)
1	45	Gastric Bypass	87	Abdominoplasty, Medial Thigh Lift, Brachioplasty	24.9	None	30	23.5	24
2	52	Gastric Bypass	60	Abdominoplasty	25.4	None	36.5	25	26
3	41	Sleeve Gastrectomy	45	Abdominoplasty	28	None	28.5	24	25
4	53	Gastric Bypass	60	Abdominoplasty	25.2	None	29	24	24.5
5	48	Gastric Bypass	51	Brachioplasty, Abdominoplasty	27	None	34	25	25.5
6	51	GastricBanding	42	Abdominoplasty	26.4	None	37	24.5	26
7	53	Gastric Bypass	47	Abdominoplasty	26.2	None	34	23	24
8	63	Gastric Bypass	47	Abdominoplasty, MedialThigh Lift	26.4	Hypertrophic Scar	31	23	25
9	36	Gastric Bypass	69	Brachioplasty, Abdominoplasty, Medial Thigh Lift	25.6	None	28	24	25.5
10	34	Sleeve Gastrectomy	40	Abdominoplasty, Brachioplasty	25.1	None	31	23.5	25
11	36	Gastric Bypass	59	MedialThigh Lift, Brachioplasty	25.1	None	38.5	25	27
12	45	Gastric Bypass	65	Abdominoplasty	25.6	Hypertrophic Scar	37	25	27
13	50	Gastric Bypass	56	Abdominoplasty	26	None	34	24	27
14	45	Gastric Banning	67	Abdominoplasty	24.9	None	29.5	24.5	26
15	50	Gastric Banning	43	Abdominoplasty	25	None	29.5	24	25
16	38	Gastric Bypass	64	Abdominoplasty	25.9	None	28	23	24
17	43	Gastric Bypass	50	Brachioplasty	25.2	None	30	23.5	24.5
18	51	Gastric Bypass	47	Brachioplasty	26.1	None	30	24	26
19	54	Sleeve Gastrectomy	53	Abdominoplasty, Brachioplasty, Medial Thigh Lift	26	None	33.5	24	25
20	45	Gastric Bypass	40	Abdominoplasty	27.4	None	31	25	25.5
21	49	Gastric Bypass	55	Abdominoplasty	25.3	None	29	24	24.5
22	50	Sleeve Gastrectomy	67	Abdominoplasty , Brachioplasty, Medial Thigh Lift	24.9	None	36	25	26
23	50	Sleeve Gastrectomy	70	Abdominoplasty	24.5	None	34.5	25	26.5
24	41	Sleeve Gastrectomy	46	Abdominoplasty	26.3	None	30.5	25	26
25	45	Gastric Bypass	39	Abdominoplasty, Brachioplasty	25	None	31	24.5	25
26	56	Gastric Bypass	44	Brachioplasty, Abdominoplasty	25.2	None	29.5	24.5	25.5
27	39	Gastric Bypass	51	Abdominoplasty	25.2	None	39.5	24.5	26
28	50	Gastric Bypass	53	Abdominoplasty, Brachioplasty	25.4	Hypertrophic Scar	37.5	25	27
29	52	Gastric Bypass	55	Abdominoplasty, Lower Body Lifting	25	None	37	25	26.5
30	47	Sleeve Gastrectomy	49	Abdominoplasty	25.7	None	35.5	24	25.5
31	49	Gastric Banning	62	Abdominoplasty, Brachioplasty	25.7	None	28.5	23	24
32	50	Gastric Banning	64	Abdominoplasty, Brachioplasty Medial Thigh Lift	25.9	None	31	24	25.5
33	53	Gastric Bypass	50	MedialThigh Lift, Abdominoplasty	24.9	None	28	23	25

34	38	Sleeve Gastrectomy	45	Abdominoplasty	25	None	33.5	24.5	25
35	59	Gastric Bypass	56	Abdominoplasty	25.1	None	29	23	24
36	43	Gastric Bypass	58	Abdominoplasty, MedialThigh Lift	25	None	30.5	23	24
37	44	Gastric Bypass	47	Abdominoplasty	25.5	None	33	23.5	24.5
38	49	Gastric Bypass	49	Brachioplasty, Abdominoplasty	26	None	38	24	26
39	51	Sleeve Gastrectomy	58	Abdominoplasty, Brachioplasty	25.3	Hypertrophic Scar	29.5	24.5	26
40	50	Gastric Banding	55	Abdominoplasty	25.7	None	31	23.5	25.5
41	47	Gastric Bypass	57	Abdominoplasty, MedialThigh Lift	25.6	None	34	24	26
42	39	Gastric Banding	53	Abdominoplasty	25	None	38	24.5	25.5
43	48	Gastric Bypass	59	Abdominoplasty, Brachioplasty	25.3	None	37.5	24.5	25.5
44	44	Sleeve Gastrectomy	50	Abdominoplasty	25.9	None	35	24	26
45	50	Gastric Bypass	60	Abdominoplasty, Brachioplasty	24.8	None	33.5	23.5	25

Table 5. 6-point Likert scale (0-not satisfied to 5-very satisfied).

Scar quality						Breast shape						Asimmetry correction						Overall ptosis correction						Sensibility of the NAC					
0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5	0	1	2	3	4	5

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Results

The distance between the jugular fossa and the nipple–areola complex (NAC) was restored in a range of 23-25 cm (average 24.1 cm). It had a reduction of 0.5-2 cm (average: 1.31 cm) to 1 year and then remained stable in the follow-up. Representative cases are shown (Figures 5 and 6).

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Regarding the patients' satisfaction, the analysis of the Likert chart showed that 95.6% of patients are satisfied. The highest scores were for postoperative breast shape (86% > 4 points) and for asymmetry correction (81% > 4 points). Only 5.7% of patients reported a negative evaluation of the scar.

The physicians' clinical evaluation of the photographs made 1 year after the operation was good to excellent compared to the preoperative deformity.

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A single post-operation complication was reported, represented by hypertrophic scar in two patients.

There were no other complications. The recovery period lasted 2-3 days, and starting from the second day the compressive medication was substituted with a bra with an inferior reinforcement, to wear during the entire 24-hour period for at least three months.

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Discussion

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Superior peduncle mammaplasty corrects ptosis while increasing the projection and apparent volume of the breast. The concept of autoaugmentation/mammaplasty/mastopexy/breast reshaping has a long history.

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In the past years numerous techniques of mastopexy have been described in the literature. The most cited (and one of the oldest) is the Ribeiro's technique⁽¹⁸⁾. This is an inferior pedicle technique used primarily for aesthetic purposes. Subsequently to Ribeiro's technique, other no-implant breast reshaping techniques were described, but all of them determined incisions to the breast parenchyma^(13,19-34) (Table 6). In addition, several articles have claimed to increase upper pole fullness or breast projection without an implant.⁽¹⁰⁾

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Treatment of the post-bariatric breast is fundamentally a breast reshaping, and the favorite technique is mastopexy with parenchymal remodeling and augmentation with autologous tissue.⁽³⁵⁾ Breast reshaping in post-bariatric patients is particularly challenging because of severe tissue atrophy and skin excess. The histological alterations confer the highest clinical consequences to this area: highest degrees of true ptosis, deflated and flattened glands, and totally inelastic covering tissues.⁽³⁶⁾

MWL is a significant risk factor for wound complications in the body contouring population. Method and amount of weight loss are also significant factors in predicting complications.⁽³⁷⁾ Only a clear knowledge of surgical techniques available today can guarantee an effective treatment.

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Colwell et al.⁽³⁸⁾ and Migliori et al.⁽³⁶⁾ proposed treatment algorithms based on breast volume, the degree of ptosis and the amount of volume loss, in order to identify the appropriate technique needed

to achieve the desired esthetic outcome in this complex patient population.

To address the MWL breast deformity, several specific techniques have been devised to correct breast ptosis, restore upper pole fullness, redefine the lateral border of the breast, and reshape the parenchyma into a more youthful contour (table 6).^(13,38) Fundamental concepts include increasing volume of the breast by utilizing excess axillary tissue (lateral thoracic/spiral/intercostal artery perforator flap) or implants, modification of existing superomedial pedicle techniques to maximize breast volume, and increasing breast parenchymal support with suture fixation and dermal suspension. Surgeon's preference of technique and/or patient preference of scar may further modify treatment choices.⁽³⁸⁾

If the patient has sufficient breast volume, glandular flap can be raised to create support for the ptotic breast.

In this paper, the authors describe a superior pedicle mastopexy: glandular flap is rolled back and sutured on itself, not to the fascia, to obtain a more natural result. This results in a more consistent filling of the upper pole of the breast. Moreover, no incisions on the breast parenchyma itself are made. Other superior-pedicle mastopexy techniques require incisions on breast parenchyma.^(27,39)

Without incisions to the parenchyma we can:

- reduce parenchymal scars
- reduce risk of cyst formation
- Reduce the risk of bleeding
- Reduce false positives in case of breast cancer and reducing the use of more radiodiagnostic examinations such as magnetic nuclear resonance⁽¹⁴⁾

Breast complications after other surgical techniques included delayed healing, unfavorable scarring, seromas, hematomas, infection, skin necrosis, and nipple loss.⁽¹³⁾ In our series, we reported only two cases of hypertrophic scarring.

In our opinion, this technique of breast autoaugmentation after MWL is less invasive and requires a shorter operative time compared with the perforator artery based flaps, and still provides an excellent

cosmetic result. Despite the effect of gravity on the breast is unavoidable, our results after a year of follow-up are satisfactory.

225 The evaluation of the results scales showed a satisfactory volume, a satisfactory shape (more natural) also during follow up. Not least, this technique avoids the cost of breast implant which are not used. Furthermore, free fat grafting should be considered as an adjunct to breast autoaugmentation and mastopexy procedures.⁽⁴⁰⁾

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Table 6. Technical Options for Breast Reshaping following Massive Weight Loss. MWL= massive weight loss. LICAP=lateral intercostal artery perforator. ICAP=intercostal artery perforator

Author	Year	Surgical technique
Hurwitz DJ ⁽²⁵⁾	2004	Spiral Flap. This lift is a reverse abdominoplasty that ends along the inframammary fold incision of the Wise pattern mastopexy and continues laterally to along the back roll. Excess tissue from the epigastrium and lateral back roll is deepithelialized and used for augmentation
Hurwitz DJ ⁽²⁴⁾	2006	
Rubin JP ⁽³¹⁾	2006	
Rubin JP ⁽³³⁾	2008	
Rubin JP ⁽³²⁾	2009	Dermal suspension and total parenchymal reshaping. The technique eliminates the lateral axillary roll deformity while using this tissue to augment breast volume
Kwei S ⁽²⁶⁾	2006	
Losken A ⁽²⁷⁾	2007	
Graf RM ⁽²²⁾	2008	
Hamdi M ⁽²³⁾	2009	ICAP flap (perforator-based harvesting technique)
Modolin M ⁽⁴¹⁾	2010	Superomedial pedicle: The rotation advancement technique
Migliori F ⁽⁴²⁾	2010	Extended chest wall-based flap associated with a loop of pectoralis muscle
Akyurek M ⁽¹⁹⁾	2011	LICAP flap (perforator-based harvesting technique)
Skychta P ⁽³⁴⁾	2011	Inferior Pedicle Flap. The technique included a dermo-lipo glandular flap pedicled on the inframammary fold together with a superior flap containing the nipple-areola complex
Persichetti P ⁽³⁰⁾	2012	“Upside-Down” Augmentation Mastopexy (breast lifting and breast implants)
Patel NB ⁽²⁹⁾	2015	Autoaugmentation using a LICAP flap secured with a pectoralis muscle sling, along with mastopexy based on vertical scar principles (perforator-based harvesting technique), resulting in an L-shaped final scar
Miotto GC ⁽²⁸⁾	2015	Islanded pedicled superior epigastric artery perforator flap mastopexy (perforator-based harvesting technique)
		Anterior ICAP flap autologous augmentation combined with inverted T-mastopexy (perforator-based harvesting technique)
		Extended Fasciocutaneous Flap for Autologous Augmentation Mastopexy With Upper Body Lift (perforator-based harvesting technique)
		The Circumrotational Technique (combination of central mound and superomedial pedicles)

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Conclusions

From our experience, the mammaplasty with superior pedicle flap allows to obtain a natural breast shape with an improvement of the superior pole, a good projection and improved definition of the inframammary fold. The choice of superior pedicle based autoaugmentation in patients with a sufficient glandular volume allows to excellent and durable results.

This technique addresses the empty upper pole of the ptotic breast and gives the appearance of an augmented breast. Preoperative marking is simple and can be modified at the time of surgery. The reshaping of the breast after massive weight loss does not necessarily require the use of breast implants, but can be carried out with excellent results using the autologous-tissue of the patient.

This technique is less invasive, has fewer complications, has a good speed of execution, does not expose us to the risks and costs of the use of prostheses, with a very satisfactory filling of the upper pole of the breast, without incisions to the parenchyma.

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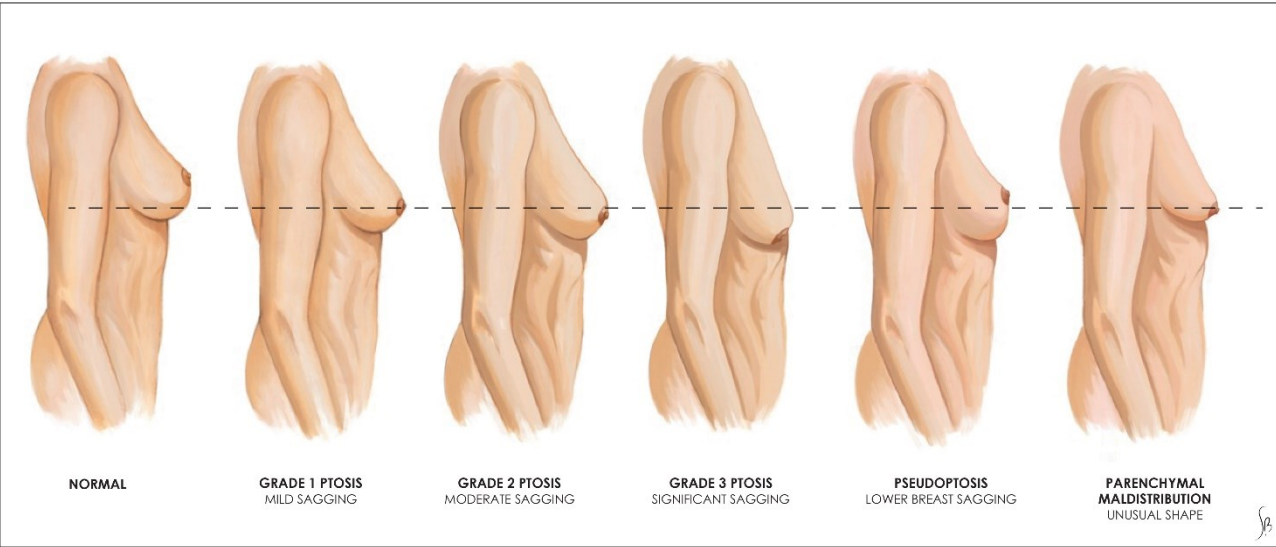


Figure 1

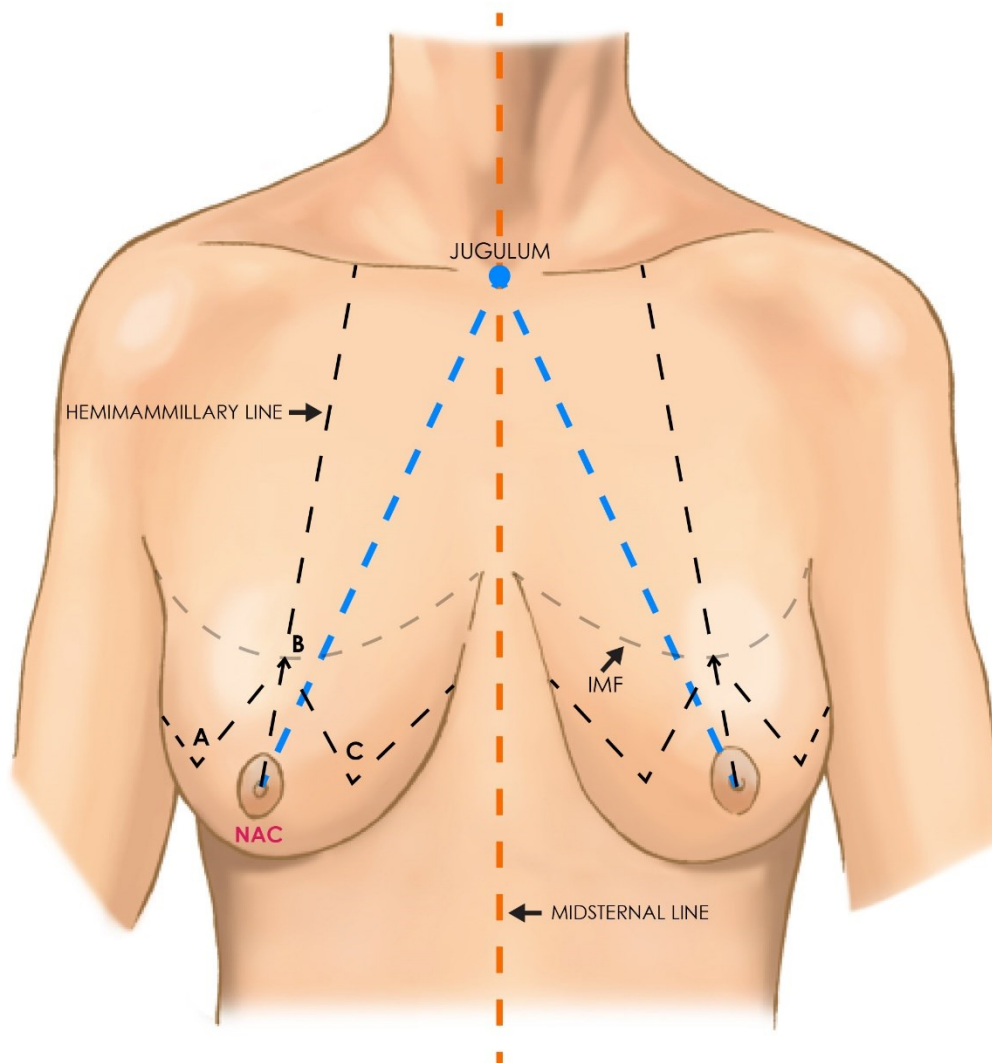


Figure 2

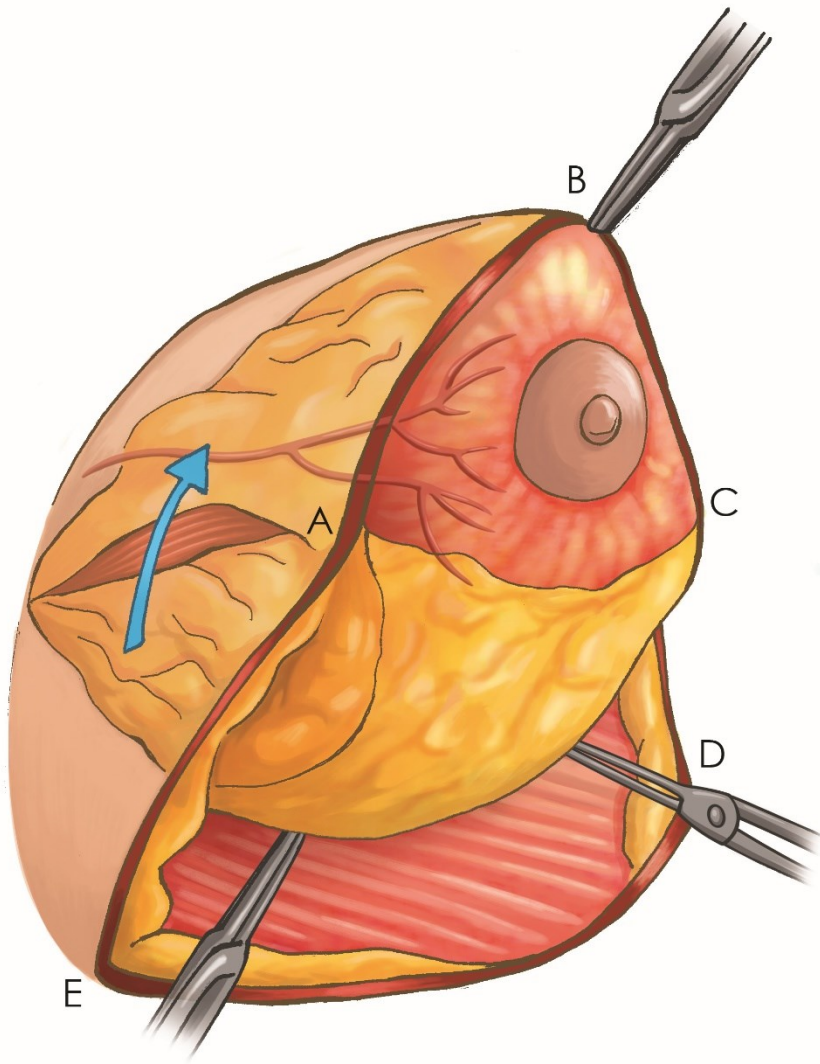


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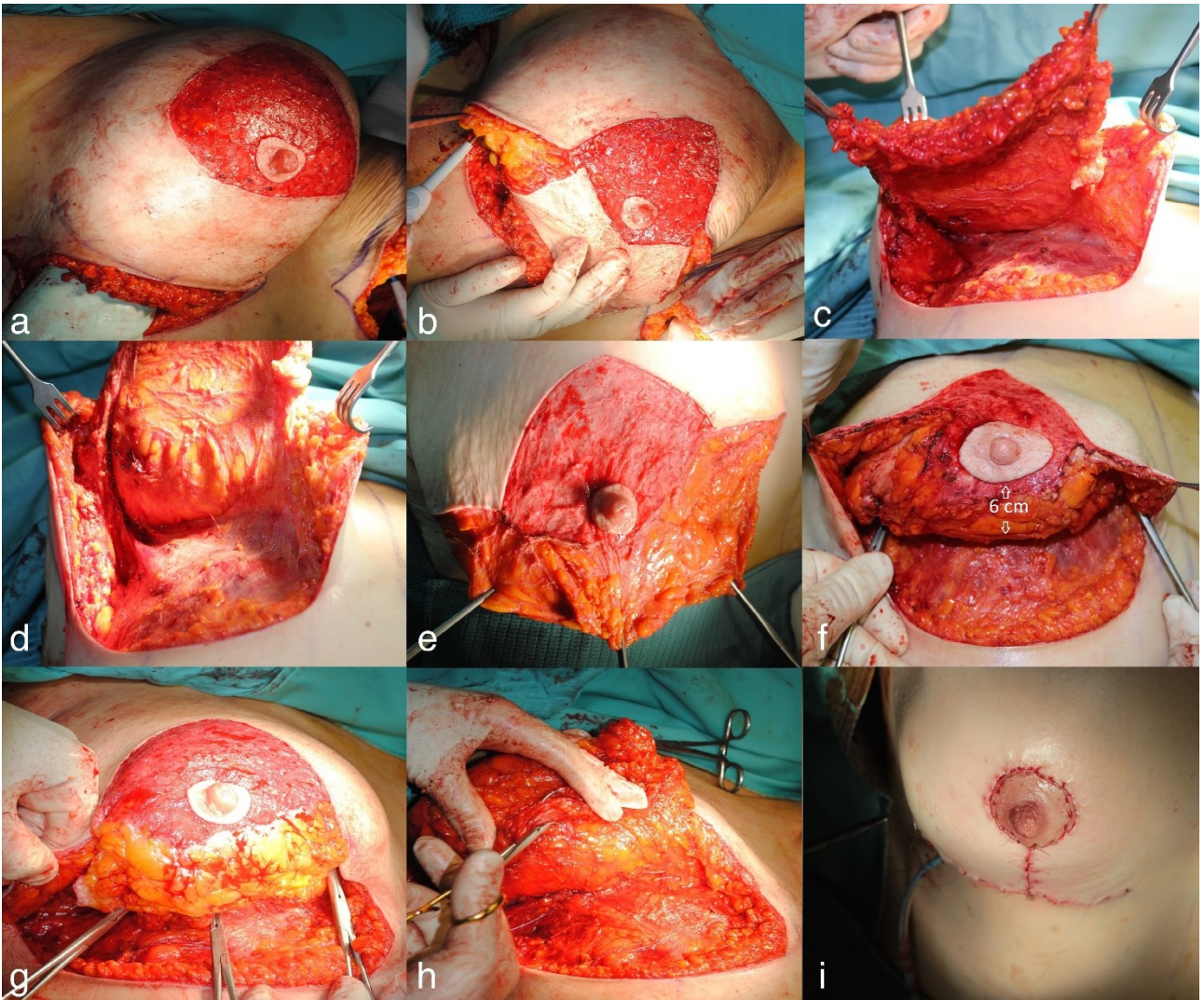


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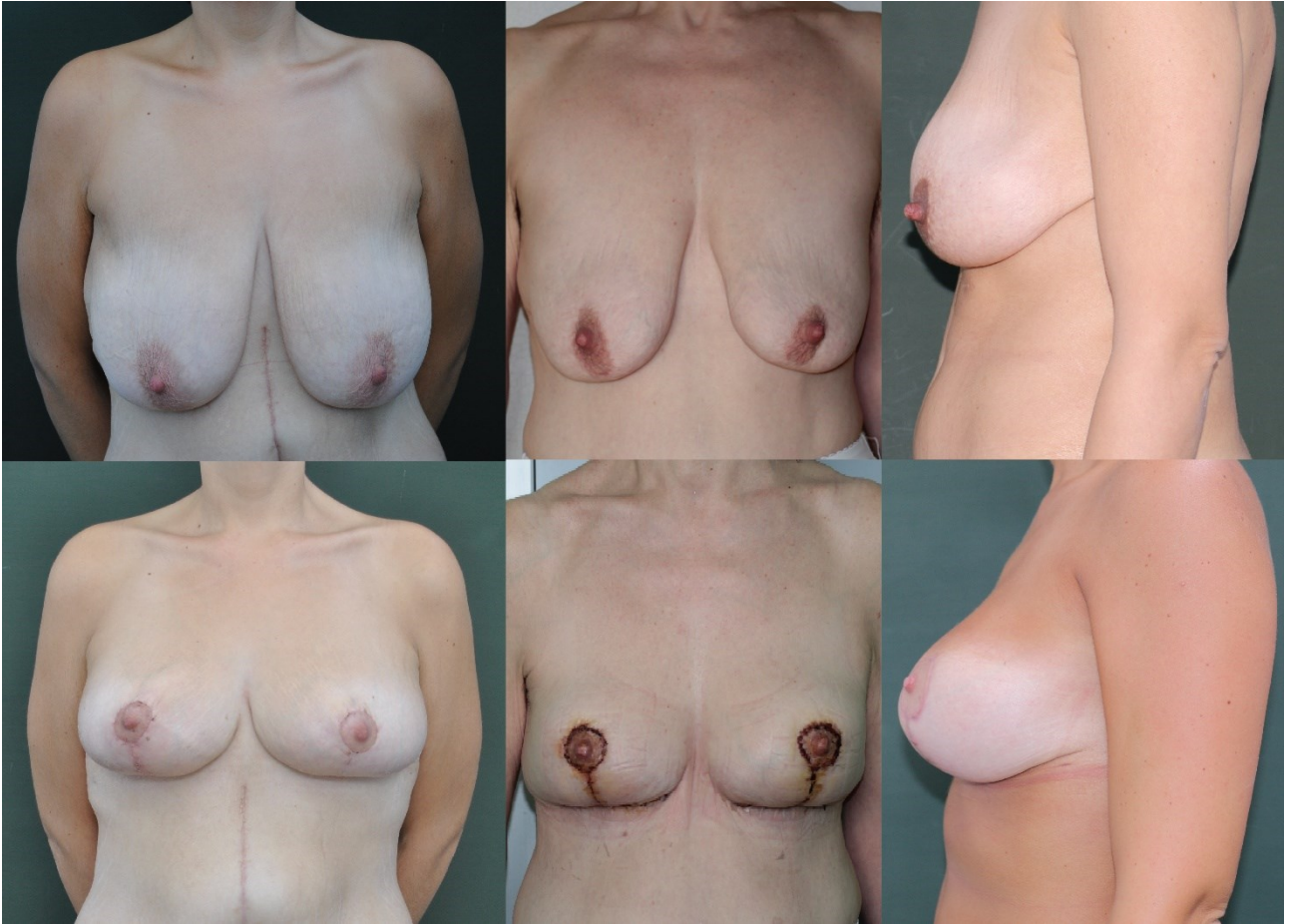


Figure 5



270 *Figure 6*

Figure legend

Figure 1. Regnault classification of breast ptosis

Figure 2. Pre-operative drawings

275 **Figure 3.** The lower pole of breast parenchyma is rolled back on itself, suspended to the back, and fixed to the upper pole edge

Figure 4. Intra-operative pictures

Figure 5. Pre-operative pictures (upper line) and post-operative pictures (below)

Figure 6. Pre-operative pictures (upper line) and post-operative pictures (below)

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