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Mastoplasty: The Triple-Flap Interposition Technique

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Abstract. The unfavorable breast contours resulting from a reductive mastoplasty and mastopexy influenced the authors into developing a technique that provided reduction of the breast base and axillary pole, convenient medial position of the lateral pole, and substantial conification of the breast tissue to help project the areolomamillary complex to the apex of that cone. From March 1987 to December 1994, 205 operations were performed with this technique, which consists of the construction of three glandular flaps and maximum preservation of the skin covering. The results obtained proved to be very satisfactory and more lasting.

Key words: Mastoplasty—Breast conification—Glanduloadipose flap

Introduction

According to our experience, the first concern of patients after a breast operation is the quality and position of the scar, the second being the new contour of the breast.

The senior author's first mastoplasties were performed in 1984 when he used Pitanguy's [37] technique, besides others which resulted in minimal scarring as the Arié-Pitanguy [38] and the lozenge [42] procedure (Table 1).

Three years later and agreeing with the information published in the world literature concerning the resulting contour of operated breasts, we concluded that most of the cases did not attend to the patients' or our own expectations, sometimes not even at the immediate postoperative stage.

It is our belief that few techniques guarantee a conical breast, since most produce a rounded shape [12,23,30,34,35,37,40].

Procedures that do not provide adequate resection of the breast base and/or do not place the lateral pole in a medial position result in too-large-based breasts [18,23,35–37,40]. Others do not adequately treat the axillary pole [19,35,37,38,47]. But the untoward occurrence common to most techniques is that the breast tends to resume its previous shape in the late postoperative period [18,20,23,25,27,30,35,37,40,41,47].

In pursuit of a solution to these problems, in 1987 we set to work on the development of a technique that would guarantee a conical-shaped breast and would facilitate placing the areolomamillary complex on the apex of this cone; a technique that would reduce, when necessary, the mammary base and the axillary pole, and place the lateral pole on a more medial position; a technique that would easily correct asymmetries and prevent recurrence of the previous conformation: in short, a universal technique with a wide range of indications for all types of skin resection and maximal preservation of the skin covering to unload its breast sustenance support.

These were the target advantages when we conceived the three glandular flaps—central, lateral, and medial—called the triple-flap interposition (TFI) technique.

Materials and Methods

TFI was applied to 205 consecutives cases between March 1987 and December 1994.

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4.6.82.

Table 1. Other techniques, January 1984–February 1987

Technique	No. of patients	Percentage
Pitanguy	28	73.68
Arié–Pitanguy	7	18.42
Lozenge	3	7.90

Table 2. Age groups of patients, March 1987–December 1994

Age group	No. of patients	Percentage
11–19	17	8.29
20–29	47	23.90
30–39	77	37.57
40–49	44	21.46
50–59	14	6.83
60–70	4	1.95

The age of the patients varied between 13 and 74 years, with predominance of the 30–39 age group (Table 2).

Of the 205 cases, 101 (49.27%) were hypertrophic breasts with ptosis and 49 (23.91%) hypotrophic with ptosis. Indications are shown in Table 3.

Skin marking, incisions, and skin removal depend on the skin conditions and breast volume.

Considering the most frequent indications and expectations of the patients concerning the resulting scar, we prefer skin resections that produce minimal scarring such as with the lozenge (42) (Fig. 1), Peixoto's [35], and circumferential [5,13,43] (Fig. 2) techniques (Table 4).

After skin incision, decortication is carried out for protection of the areolar complex and future central flap irrigation [46]. The skin-glandular undermining of the inferior hemisphere begins on the decorticated area, and extends to the axillary region when necessary. This undermining should be carried out between the glandular and the areolar tissue [2] (Fig. 3).

The breast base is undermined from the pectoral fascia, and when reaching the parasternal region this should be done in a careful manner to preserve the rami perforantes (II, III, IV) of the internal thoracic artery. The breast tissue is raised and two vertical incisions converging downward are carried out to create the central vertical flap with an base pedicle adequate to its extension [1,18,49]. This flap is irrigated by the II rami perforanti of the internal thoracic artery [1].

Two glandular tissue flaps corresponding to the medial and lateral pillars of the breast are posteriorly created [21] (Fig. 4). The medial horizontal flap is irrigated mostly by the III and IV rami perforante of the internal thoracic artery and the lateral horizontal flap is vascularized by ramifications of the lateral thoracic artery and rami acromialis (Fig. 5).

Table 3. Preoperative diagnosis

	No. of patients	Percentage
Breast hypertrophy		
Grade I	6	2.92
Grade II	11	5.37
Grade III	6	2.92
Hypertrophy + ptosis	101	49.27
Hypotrophy + ptosis	49	23.91
Reduction mammoplasty sequela	23	11.22
Augmentation mammoplasty sequelae	7	3.42
Tubular breast	2	0.97

Table 4. Skin resection

	No. of patients	Percentage
Pitanguy	15	7.32
Peixoto	93	45.37
Lozenge	87	42.44
Periareolar	10	4.87

After comparing the total breast volume bilaterally, the glandular tissue is resected in a rhomboid [39] or oblique [35] manner. Thus, if the breast has a large base, it is easier to narrow and/or reduce the height of the projection of the new breast cone. The association of both types of resection also achieves the results desired (Table 5).

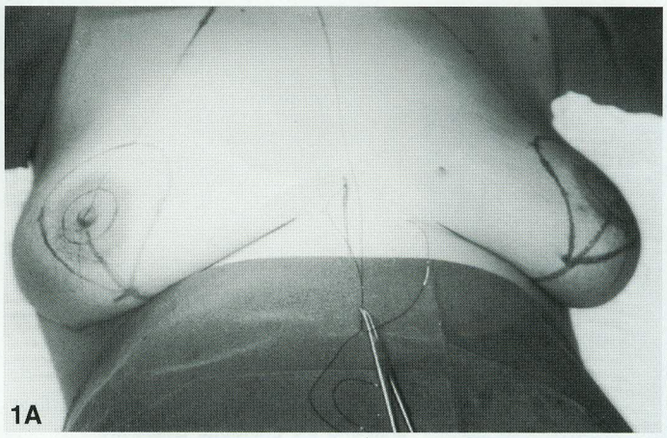
Glanduloadipose breast tissue was seen in 60% of the cases (Table 6) and the volume resected varied between 0 to 1055 g, an average of 210 g.

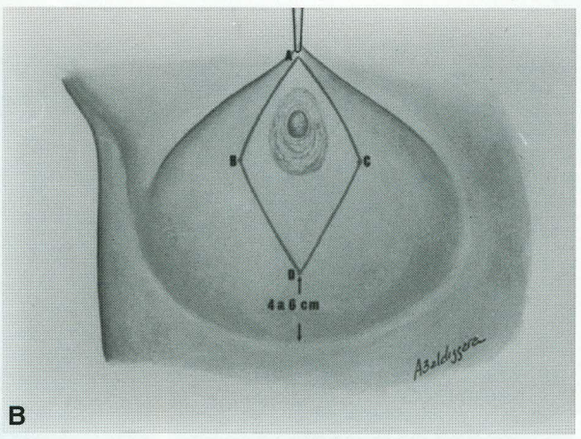
Tissue resection should be less than the fluid volume planned, since during the shaping of the breast and flap transposition, it is possible to resect any remnant quantities.

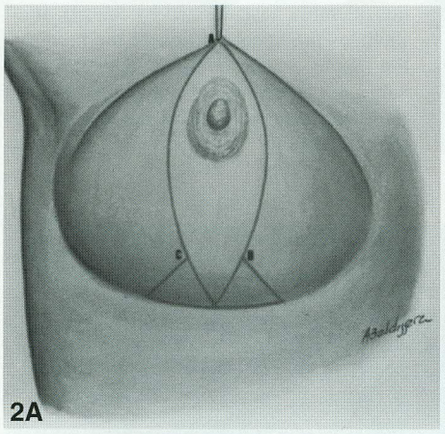
Following careful hemostasis the breast is raised by a hook placed at the apex, thus remaining throughout shaping the breast.

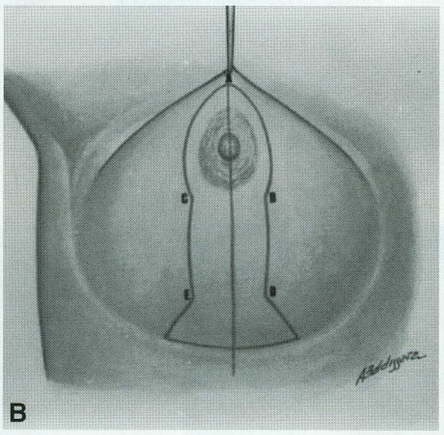
The distal extremity of the central flap is sutured to the fascia pectoralis with three 2-0 mononylon stitches. The adequate length of the flap will prevent downward traction of the areolar complex (Fig. 6). The main purpose of this flap is to provide projection of the areolar complex and prevent a flattened aspect [29,31,45] (Fig. 7).

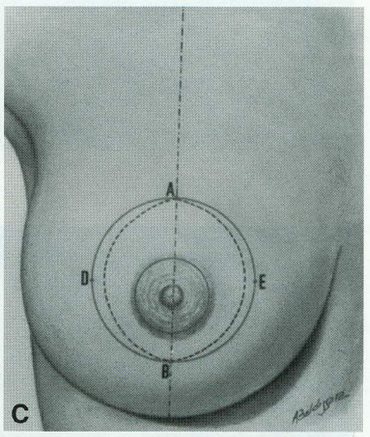
The two medial and lateral horizontal flaps are rotated toward the hemiclavicular line and is reefing transposed one over the other (Fig. 8). The placement of these flaps will determine the contour of the lower breast hemisphere, shape the lateral and medial poles, and narrow the base as well as define the new submammary fold, besides helping to correct important breast asymmetries (Fig. 9).

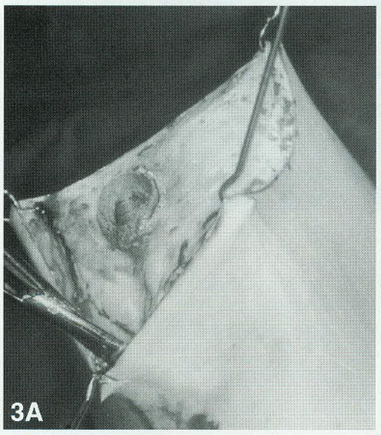


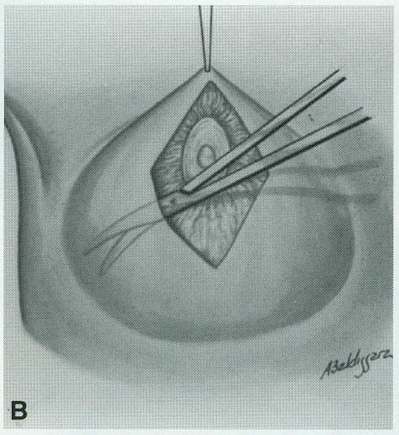


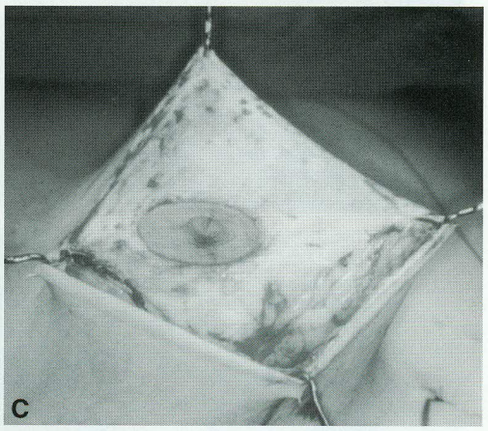


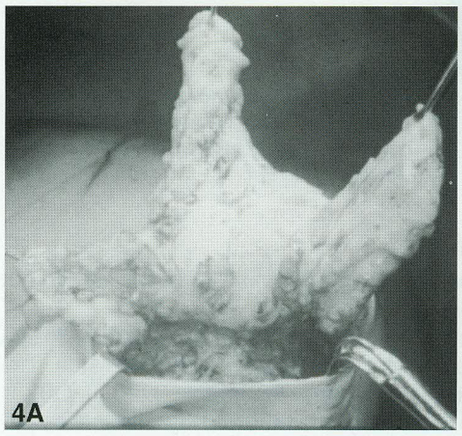












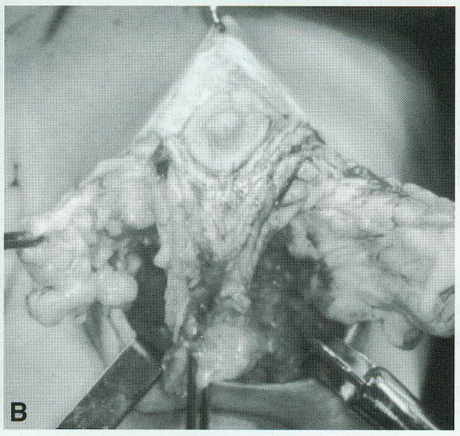


Fig. 1. Outline of incisions. Lozenge marking.
Fig. 2. Outline of circumferential incisions. Diagram showing three marking examples used in this technique.
Fig. 3. Skin–glandular undermining.
Fig. 4. Central, medial, and lateral flaps.

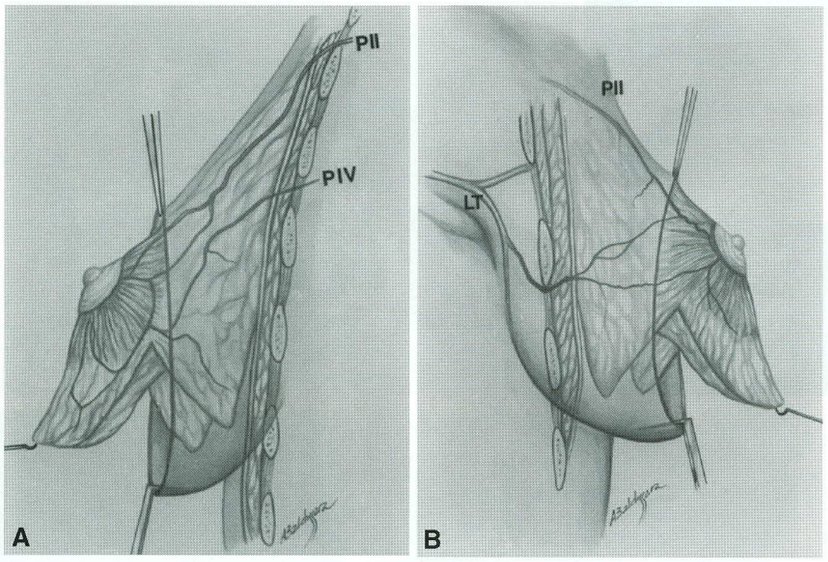
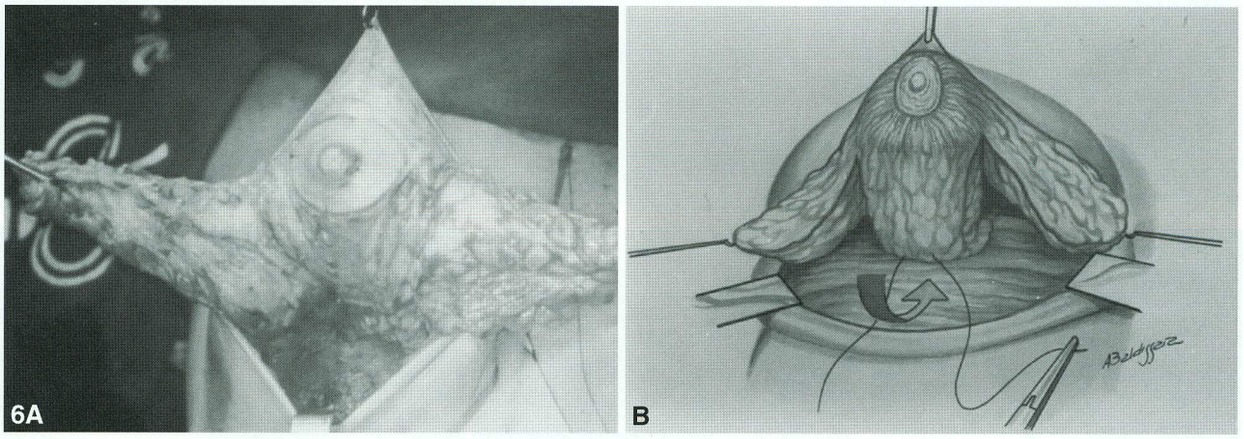


Fig. 5. **(A)** Medial view: the skin surface area and the glandular tissue are considerably vascularized by the pII. It includes the upper portion of the breast, the nipple–areolar complex, and the subjacent anteromedial region. **(B)** Lateral view: vascular network of the lateral thoracic artery.



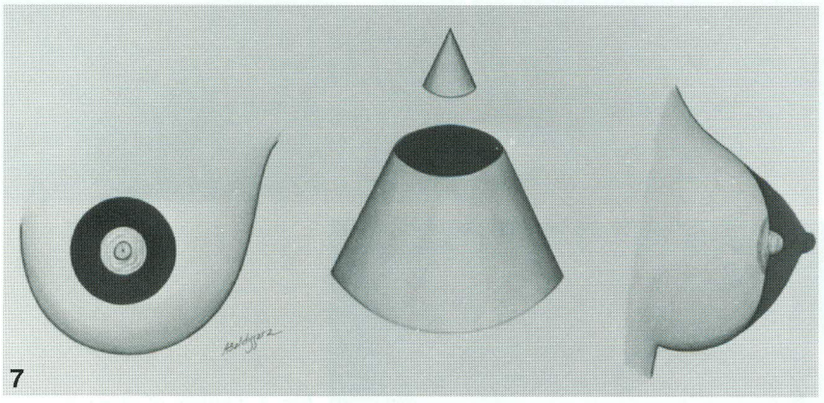


Fig. 6. Fixation of the central flap.
Fig. 7. Resections of circumareolar skin have a truncating effect on breast contour. (From Ref. [31].)

Placement of the medial and lateral flaps depends on the need to provide more volume to either of these segments. Generally the medial flap is deeply secured to the basis of the lateral flap that is rotated over that flap and sutured over its surface with 2-0 mononylon. Minor irregularities are corrected by trimming the fat tissue with scissors. If necessary, segment plicatures are carried out with 4-0 mononylon.

Skin resection is carried out in such a way that closure of the wound borders is undergone with no tension. The skin is distributed around the nipple with 8 Gillies stitches of 6.0 mononylon, followed by continuous su-

Table 5. Glandular resection

	No. of patients	Percentage
Rhomboid	49	23.93
Breast base	64	31.21
Association of both	64	31.21
No resection	28	13.65

Table 6. Breast tissue

	No. of patients	Percentage
Glandular	44	21.47
Adipose	38	18.53
Mixed	123	60.00

ture with 4.0 thread. We usually suture the vertical incision, and the horizontal when present, with subcutaneous interrupted stitches of 4.0 mononylon and then with continuous intradermic with the same thread (Fig. 10).

We use suction drainage in all cases due to the wide undermining.

After covering the incisions with micropore dressing, a brassiere made of the same material is placed without tension to avoid epidermolysis, thus decreasing the load sustained by the internal stitches. We advise patients the uninterrupted use of an adequate brassiere for at least 60 days.

Complications

While in the initial development phase of this procedure, we noticed three cases of partial steatonecrosis and one total steatonecrosis in the area of the vertical central flap. Since then we always plan a wider flap base.

Three other cases presented hardening of the lateral flap region that represented steatonecrosis nodulations over these areas due to excessive manipulation.

Seroma was an early find in one case; it was treated with transcutaneous punctures in the lateral pole and reduced after 2 postoperative days.

All complications related to wound healing resolved per se or by means of outpatient procedures (Table 7).

Discussion

The insufficient conification of the breast tissue produced by the various existing techniques led us to consider that the breast shape should result from an approach of its content, shaped independently of the resection performed on the skin coverage [6]. The cutaneous continent should simply cover the content already shaped, with no traction or tension, thus preserving the ideal conditions for convenient scars [7–9] (Fig. 11).

Table 7. Complications

	No. of patients	Percentage
Hematoma	1	0.48
Seroma	1	0.48
Partial vertical flap steatonecrosis	3	1.46
Partial lateral flap steatonecrosis	3	1.46
Temporary decrease in CAM sensitivity	25	12.19
Hypertrophic or keloid scarring	3	1.46
Partial skin dehiscence	2	0.97
Infection	4	1.95

When used in narrow based or slightly wide breasts, standard techniques may produce good results [4,16,25,32,33,53]. However, large-based breasts or with an excess volume have less chance of achieving similar results since the methods that approximate the pillars [37–39] do not yield a satisfactory approach [30,35,37,40,41,47,50].

The wide cutaneous–glandular undermining proposed by this technique allows complete visualization and manipulation of the various breast segments and consequently favors the treatment proposed (Fig. 12).

The use of the three adipose–glandular flaps is based on the anatomical evidence of axial vascularization of these segments [1,2,14,49].

The breast usually tends to relapse into its previous configuration [23,41,42,49], a fact rarely observed with the TFI technique since interposition of the flaps promotes reformulation of the Cooper ligament system [51] and thus is liberated from what could be called the "structural mammary memory."

We agree with authors who believe that a well-defined superior base of adequate length guarantees flap survival [1,41]. This is supported by the low rate of complications observed and by the study of various techniques that also propose the use of a superior based flap [11,22].

Some authors [3,10,17,24,28,49] pursue similar results by increasing the number of flaps to be constructed. However, authors proposing no undermining of the breast base [26,37–39] or those who use inferior-based flaps are confronted with ptosed breasts and a superior pole with insufficient volume [28,30,41,42,44] (Fig. 13).

The substantial freedom residing in flap rotation and advancement provided by the TFI technique allows reshaping the most difficult breasts and correcting extensive asymmetries, be they of a constitutional nature or resulting from previous operations [35,37,41].

With this technique it is possible to bring the breast to a more medial position by simply modifying the order or extent of the flaps created (Fig. 14).

Large underminings in adipose breasts are avoided to prevent further reduction of the breast volume in the late postoperative period due to this delicate tissue [39]. On the other hand, patients with large hypertrophies or gigantomastia should receive similar care so that the blood

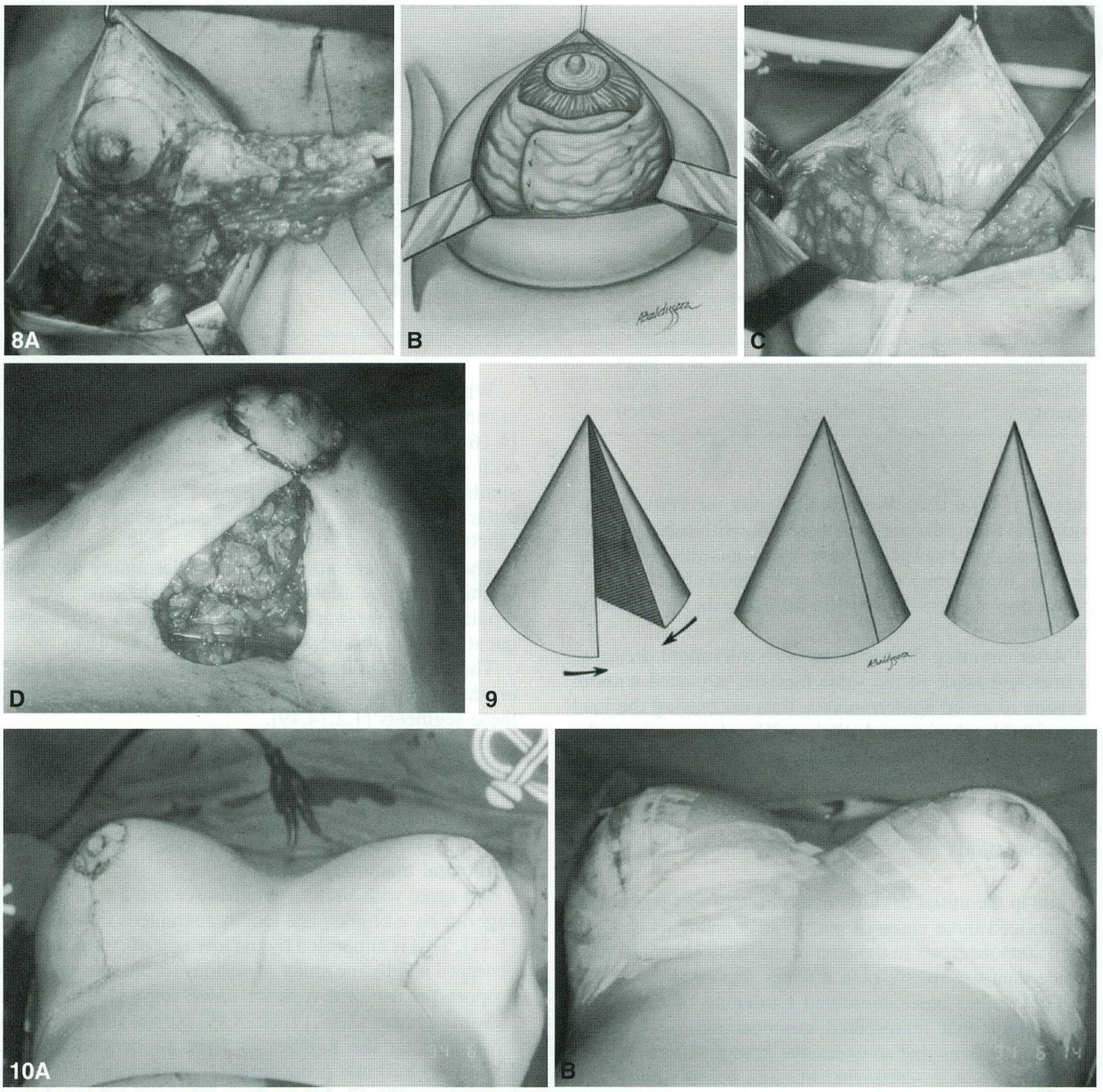


Fig. 8. Shaping the breast. **(A–C)** Interposition of lateral and medial flaps. **(D)** The breast shape is sustained even before being sutured to the skin.
Fig. 9. The unidimensional sector excisions from a cone, when carried out to an extreme, result in a spire shape. (From Ref. [31].)
Fig. 10. **(A)** Completion of subcuticular and intradermal suturing. **(B)** Final result.

supply of glandular and skin segments is preserved [1]. In both situations we preserve a surplus volume, await evolution, and proceed with a secondary reduction if necessary.

The TIR techniques versatility is also evident in relation to breast implants, which receive additional mechanical support and protection, and in cases of eventual pathological findings, which are easily disclosed by the wide undermining and breast exposure.

We consider predetermined patterns to be unnecessary [15,48,52,54] since the areolomammilary complex to be placed on the conical projection apex will be directed to this position by the correct modification of the total breast structure.

The TFI technique contributes to more satisfactory and lasting results and provides a wide range of possibilities that can attend to the various demands and expectations of patients.

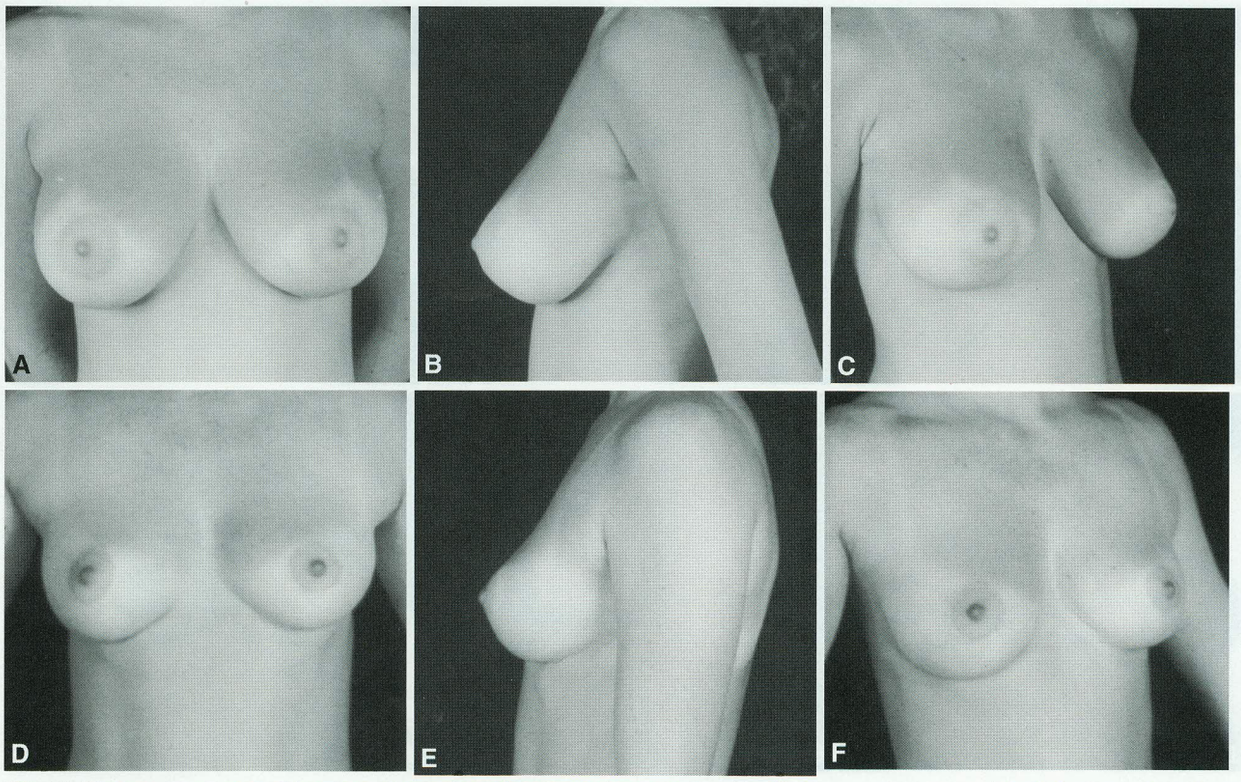


Fig. 11. Twenty-seven-year old patient. Correction of moderate hypertrophy. **(A–C)** Preoperative views; **(D–F)** Postoperative views. Eight years' evolution.

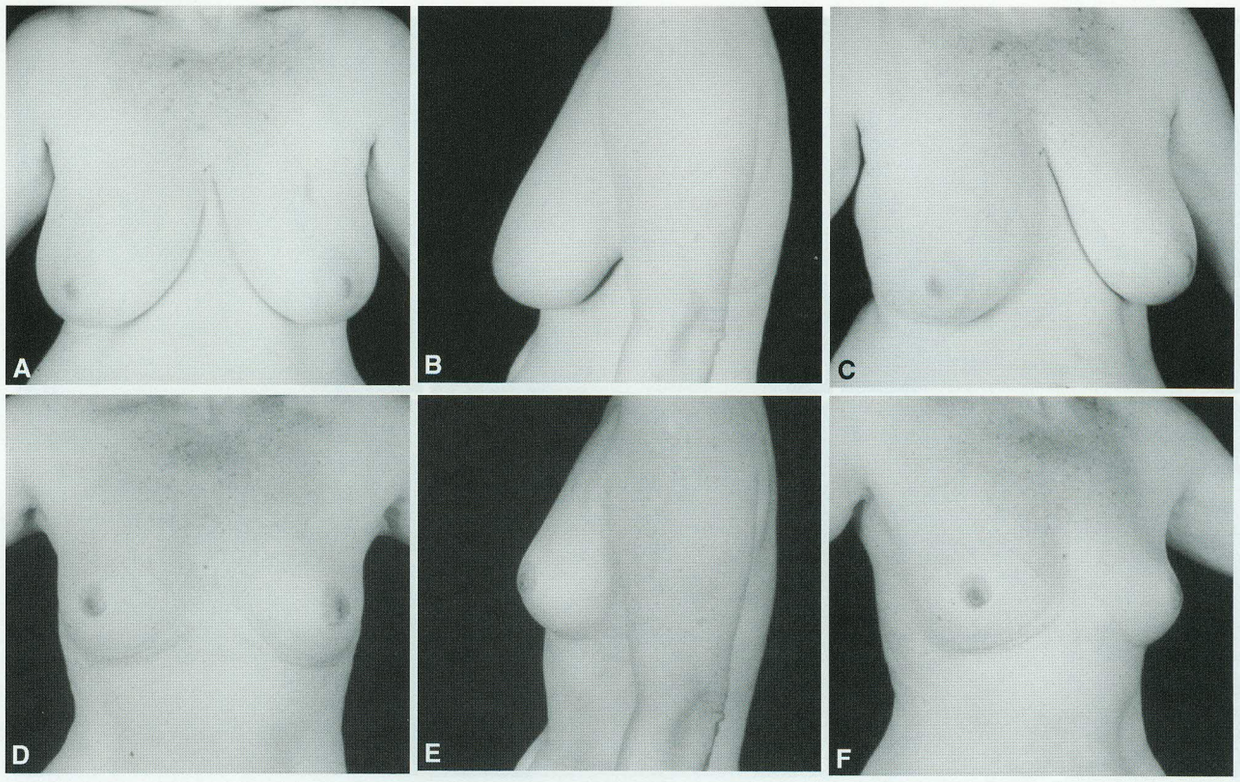


Fig. 12. Fifty-eight-year old patient with moderate macromastia and ptosis. **(A–C)** Peixoto's marking with resulting T scar. **(D–F)** Five-year follow-up.

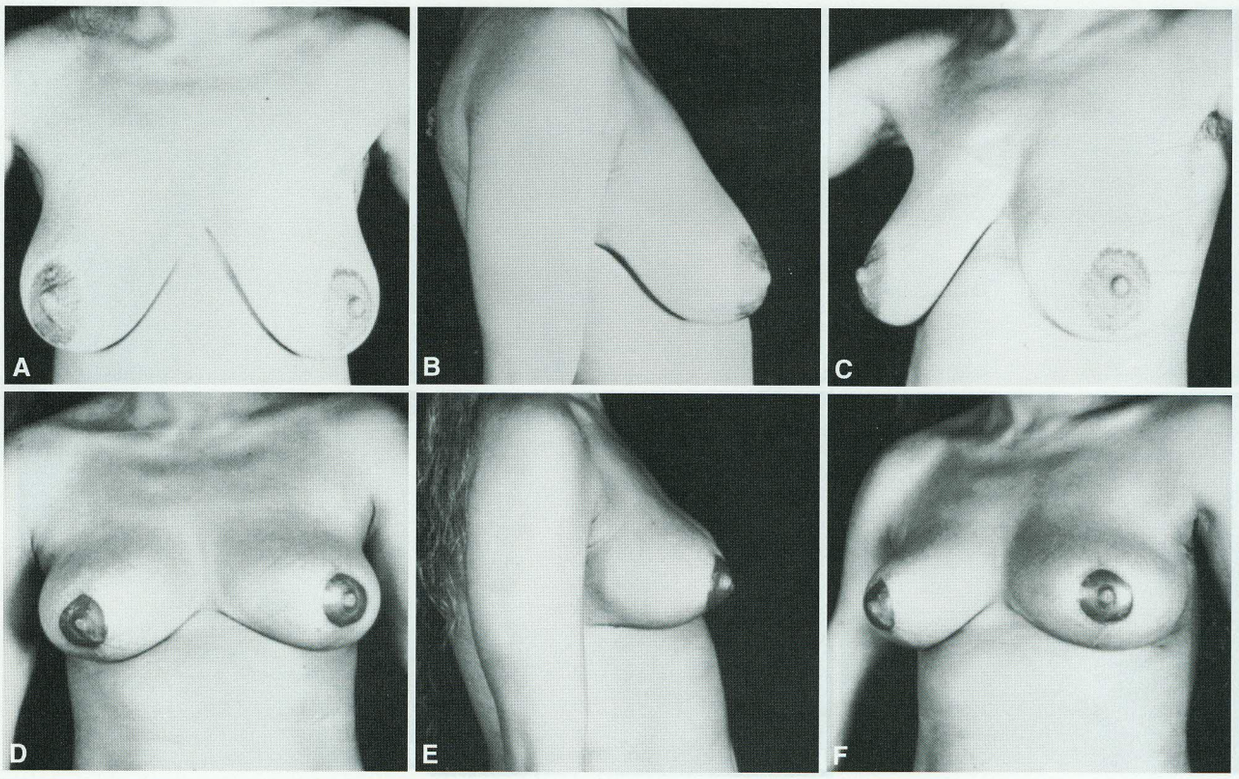


Fig. 13. **(A–C)** Thirty-two-year-old patient with significant breast ptosis. **(D–F)** Sixty days follow-up.

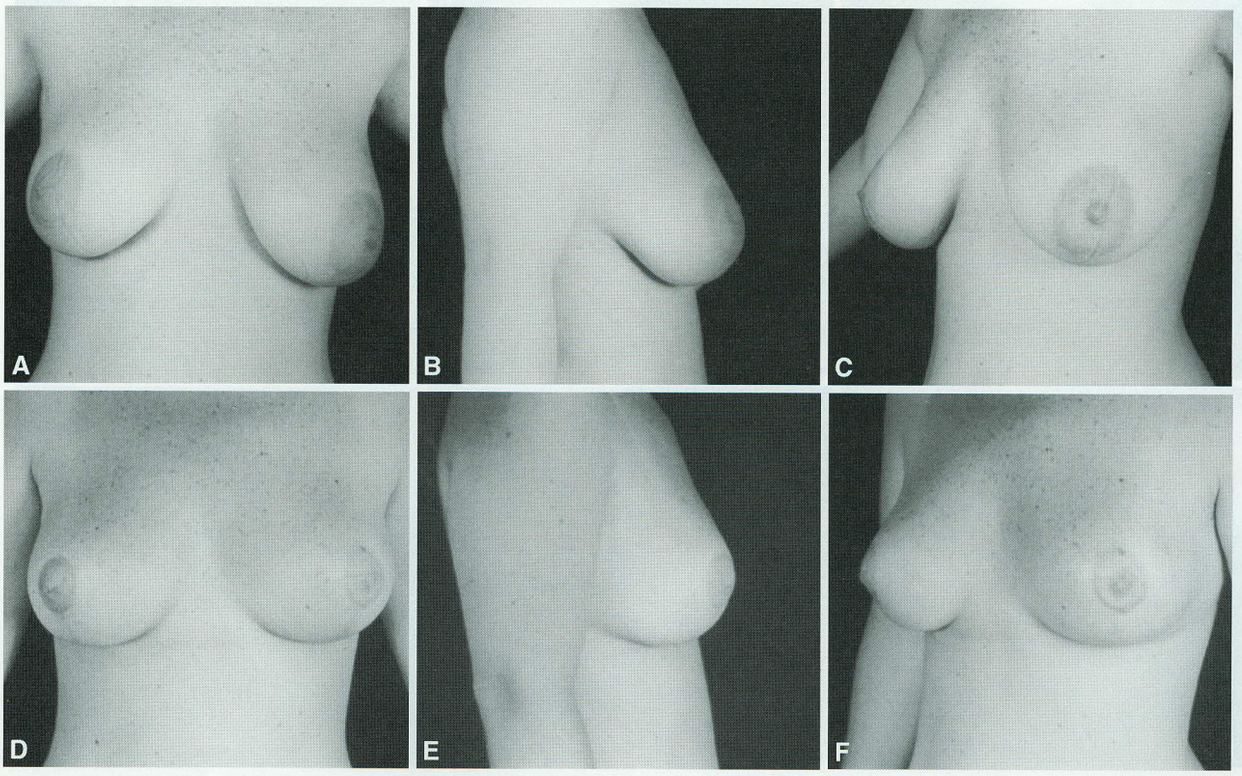


Fig. 14. Twenty-four-year-old patient with moderate breast asymmetry. **(A–C)** Lozenge skin excision. Right breast with resulting vertical scar; left breast with small inverted T scar. **(D–F)** One year's evolution.

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