Circumvertical Reduction Mastoplasty

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**Background:** Circumvertical reduction mastoplasty combines periareolar and vertical techniques for the treatment of large breast hypertrophies.

**Objective:** The advantage of circumvertical reduction mastoplasty over the periareolar technique is the occurrence of fewer wrinkles. Its advantage over the vertical technique is a shorter scar that does not extend beyond the new inframammary crease.

**Methods:** In this technique, the areola is transposed attached to the gland and glandular removal is performed as a wedge excision in the lower quadrant and inferior portions of the lateral and medial quadrants. Liposuction is rarely required but may be useful at the end of the procedure and in cases with small asymmetries.

**Results:** Once the surgery is complete, a uniform and harmonious distribution of wrinkles is observed. Postoperative follow-up of 62 patients, ranging from 1 to 6 years, revealed resections of up to 1000 g per breast. All results were satisfactory.

**Conclusions:** Circumvertical reduction mastoplasty offers a reliable and easily performed approach to breast reduction, which is appropriate for removal of between 400 and 1000 g per breast.

The periareolar and vertical techniques for reduction mastoplasty represent similar approaches to skin resection. In both techniques, surgeons may perform the glandular removal and the nipple-areolar transposition in a variety of ways.

The periareolar technique has been reported to be indicated for minor to moderate hypertrophies in which limited skin resection is necessary. As glandular hypertrophy increases, so does the amount of skin requiring resection. This large resection will lead to substantial postoperative periareolar wrinkling. Attempts to remove too much skin will result in visible pleats, as is seen in postoperative pictures found in the literature.\(^1\)

The vertical technique permits a wide resection of skin because it allows for periareolar and lower-quadrant skin resection. However, a drawback of the procedure in cases of large mammary hypertrophies is the tendency of the scars to extend past the inframammary fold and onto the abdominal skin. To avoid this problem, the scars can be horizontally extended at the inferior part near the completion of the surgery.\(^2-4\) As Lassus\(^5\) notes in his last paper, the inferior extent of the preoperative marking should stop 4 to 6 cm above the inframammary crease. Lejour\(^6\) relies on skin retraction in her technique. When this is not effective, she performs a horizontal extension in secondary touch-ups. Several articles have been published with variations on the periareolar and vertical techniques.
Many of the authors refer to minor or moderate breast reductions and mastopexies, but few allude to large reduction mastoplasty.

This article presents the basic concepts that have served as my guides for planning reduction surgery. The first principle is that the glandular resection shapes and defines the breast form. The second is that the areolas should be transposed, if possible, without major traction or rotation. The third is that it is preferable to avoid totally undermining the mammary skin and dissecting the breast's superior base. The gland should be removed, if possible, from the inferior half of the breast so that lactation is maximally preserved for nulliparous women. The final vertical scar should not extend beyond the new inframammary fold, and an acceptable result must be seen at the end of the surgery.

Method
Preoperative marking
The preoperative marking is versatile, allowing adaptation to every breast shape, resection technique, and skin type. With the patient standing, the new superior areolar border position is marked. This position is 3 to 4 cm higher than the anterior transposition of the inframammary fold. The amount of skin to be resected also varies. Marking continues with a periareolar ellipse having a diameter between 10 and 16 cm. The ellipse converges laterally and downward, toward a point 2 to 4 cm above the inframammary fold; this will determine the location of the new inframammary fold. If the glandular volume is large, the location of the new inframammary fold must be placed higher, 3 to 4 cm above the crease. For moderate hypertrophies, the distance should be 1 to 2 cm.

Surgical technique
All cases are handled on an outpatient basis. Each treatment is performed with the patient under sedation and local anesthesia. The local anesthetic consists of 25 mL of lidocaine 2%, 25 mL of bupivacaine 0.5%, 1 mL of epinephrine, and 450 mL of Ringer's lactate solution.

The first step is de-epithelialization of the periareolar skin within the marking (Figure 1). Next, the skin is resected from the inferior part of the gland in the medial and lateral quadrants, along the entire extension of the gland to be removed (Figure 2). The inferior aspect of the gland is then elevated from the pectoralis muscle, marked, and resected in the lower-central quadrant and at the inferior medial and lateral quadrants (Figures 3 and 4). After the resection, a vertical or oblique sectioning of the gland may be performed. To prevent flatness of the gland and to secure the projection, the lateral pillar is sutured to the medial pillar with 3 to 4 Vicryl 3-0 sutures (ETHICON, Inc., Somerville, N J) in 2 to 3 layers (Figure 5). The new inferior border of the gland is sutured to the pectoralis fascia at a site superior to the preexisting inframammary fold (Figure 6); this forms the new position of the inframammary fold.

A guide stitch is placed 6 to 8 cm above the location of the new inframammary fold to connect the medial and lateral flaps at the location of the inferior border of the new areola. This should establish a round superior figure and an elliptical inferior one (Figure 7). Another suture anchors the areola to the superior aspect of the de-epithelialized skin at the new nipple position. A second suture secures the areola to the guide stitch, forming the inferior limits of the new areola. The vertical wound is closed with sutures, as proposed by Ersek and Ersek. This symmetrically approximates the medial and lateral skin flaps. The inframammary fold is now relocated superiorly. A drain is placed, and Steri-strips (3M, St. Paul, M N) are applied along the edges of the wounds, offering support for at least 7 days.

Indications and limits
In my experience, the periareolar technique is the ideal approach to skin resections measuring no more than 10 cm in horizontal diameter. This corresponds to breast hypertrophies requiring less than 400 g of tissue removal from each breast.

When the amount of skin to be resected measures more than 10 cm in horizontal diameter, I prefer the circumvertical technique. This is applicable to moderate and large breast hypertrophies, requiring removal of 400 to 1000 g per side. Periareolar reduction in these larger breasts generates noticeable pleats. Larger hypertrophies involving the removal of more than 1000 g per breast were also performed, but the results were unacceptable.

The original circumvertical technique has been modified to remove 1 to 3 cm less horizontal periareolar skin. This reduces the tension on the final skin closure. In large breasts, when the removal of mammary tissue surpasses 1000 g or when there is a marked skin laxity or redundancy, I prefer an inverted T-technique with a lateral or inferior pedicle for the areolar transposition.

Results
In a 1- to 8-year follow-up of 72 cases, I found no noticeable circumareolar pleats and observed no scars extend-
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Figure 1. The periareolar skin is de-epidermized.

Figure 2. When the lateral and medial skin is dissected and the base is separated from the pectoral, the gland comes out.

Figure 3. The resection area is marked.

Figure 4. The gland is removed in 3 blocks.

Figure 5. The lateral pillars are sutured in 3 layers to project the central part.

Figure 6. The new inferior border is sutured to the pectoral to fix the gland in a new position.

Figure 7. The skin is sutured 7 cm from the inferior angle, forming 2 figures: the superior circle and the inferior ellipse.

Figure 8. The vertical incision and areola are closed with Vicryl 5-0 sutures (ETHICON, Inc., Somerville, N.J.). The skin between the 2 lines that belonged to the gland is now thoracic.
ing beyond the inframammary fold. Six patients required revision of the vertical scar, and 2 patients required revision of the circumareolar scar. Minor distortion of the areola has rarely been observed and has not been the cause of any patient complaints.

During my initial experience with the circumvertical technique, there were several complaints. The first was from a patient who underwent a 2200-g reduction from each breast; this patient had partial necrosis of one areola. In another case, a patient developed fat necrosis. In 2 other patients, moderate hematomas needed to be evacuated. In the cases in which the resected tissue amounted to more than 1000 g per side, each of 3 patients had immediate postoperative dehiscence of the vertical scar. This may have been due to excessive thinning of the lateral skin, which weakened its blood supply. To address these problems, the technique has been modified to leave a thicker subcutaneous layer; this has prevented dehiscences at the vertical suture.
Discussion

Many of the articles written on reduction mastoplasty refer to variations on the vertical technique described by Lassus\textsuperscript{2-5} and Lejour\textsuperscript{6,12-18} and make use of some of these principles for mastopexies. Benelli,\textsuperscript{1} in his periareolar technique, removes the periareolar skin and closes the wound with a pursestring suture, leaving some initial pleats around the areola. In cases of gigantomastias, he describes a periareolar and vertical scar to address the excess skin by means of excision of a cutaneous-glandular triangle, located under the areola. Unfortunately, he does not present any preoperative or postoperative case information. In the technique advocated by Lassus\textsuperscript{3} for resection of a vertical ellipse without any undermining of the skin, the final vertical scar is large and can cross the inframammary fold. In a recent article, Lassus\textsuperscript{5} describes modifying the incisions to avoid crossing the inframammary fold. In the patient photographs shown in his article, however, the scar traverses the inframammary fold. Lejour\textsuperscript{17} follows the same method as Lassus,\textsuperscript{5} but her markings assure an areola without pleats, because the vertical scar will smooth with time as a result of skin contraction, as depicted by Peixoto\textsuperscript{19-21}. When the circumvertical technique is used, the final vertical scar does not cross the inframammary fold and the pleats are evenly distributed around the areola and the vertical wound. In this technique, no noticeable pleats are seen when the surgery is completed, and it is not necessary to wait for skin retraction to observe an acceptable result.

Only the Lassus\textsuperscript{2-5} and Lejour\textsuperscript{6,12-18} technique has been reported to be successful in large glandular removals. Other authors have described the use of this technique in minor or moderate hypertrophies or for mastopexies.\textsuperscript{7} The glandular resection in the circumvertical technique\textsuperscript{16} is performed at the inferior pole and in the inferior part of the lateral and medial quadrants. No liposuction is used to reduce the glandular volume, but it may help at the end of the surgery to achieve proper symmetry. In extremely round hypertrophies, when the gland is overprojecting, the glandular removal is performed at the base of the gland. In underprojecting hypertrophies, the resection is performed mostly in the lateral quadrants, leaving the central quadrant to increase glandular projection.

The nipple-areola complex is transposed in a superior pedicle by Lassus,\textsuperscript{2-5} Lejour,\textsuperscript{6,12-18} and Loomis.\textsuperscript{8} In patients with significant ptosis, the pedicle must be thin enough to be able to fold onto itself. In contrast, in the circumvertical technique, I leave the superior pedicle attached to the gland.

Compared to the complication and revision rates described in articles by Lassus,\textsuperscript{2-5} Lejour,\textsuperscript{6,12-18} Leone et al,\textsuperscript{9} and M enke et al,\textsuperscript{22} who used a periareolar and vertical technique, there are fewer problems with my technique. This
may be due to selection bias, however, since I do not redo
gigantomastias. It is well known that the larger the hyper-
trophy and the greater the areolar transposition, the
greater the rate of complications and revisions.

Conclusions

The circumvertical technique is useful in the removal of
400 to 1000 g of breast tissue in moderate and large
hypertrophies. It is an intermediate method as well as an
alternative to the periareolar and the vertical techniques
and has advantages over these other approaches.

This technique is ideal for young women because it does
not distort the anatomy and does not alter the potential
for future lactation. Similarly, there are no flaps for areo-
lar transposition, there is a harmonious distribution of
the skin pleats, there are short vertical scars, and the final
result is observed at the end of the surgery, making the
need for postoperative revisions unnecessary. Circum-
vertical reduction mastoplasty provides a good alterna-
tive approach for the treatment of moderate and large
hypertrophies (Figures 9-11).

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