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Aesthetic Plastic Surgery

Innovative Techniques

Vertical Mammaplasty Marking Using the Key Hole Pattern

Nazim Gumus, Yusuf Kenan Coban, and Mehmet Serdar Demýrkiran

[1]Department of Plastic Surgery, Adana Numune Research Hospital, Adana, Turkey
[2]Department of Plastic Surgery, Medical Faculty of Sütçü İmam University, Kahramanmaras, Turkey

Abstract. Many modifications of the vertical mammaplasty procedure used to shorten the learning curve have been described. The authors advocate marking the breasts for the vertical mammaplasty operation according to the key hole pattern. They have used inverted T techniques on the upper breast and Lejour's vertical mammaplasty on the lower breast. A total of 14 patients who had breast hypertrophy and ptosis underwent operations with this marking modification. The amount of removed breast ranged from 285 to 875 g per breast. Hematoma, skin necrosis, skin dehiscence, loss of nipple–areola sensitivity, and distortion were not observed in these cases.

Key words: Key hole pattern—Mastopexy—Reduction—Vertical mammaplasty

Vertical mammaplasty is one of the best methods for reduction mammaplasty and mastopexy. In contrast to other inverted T techniques, this procedure offers less scar formation, better projection and appearance of the breasts, and lack of submammarian scar formation. As a result, vertical mammaplasty has gained popularity over the past decade, and currently is preferred by many plastic surgeons. This procedure with its many advantages over other techniques has been accepted worldwide. Because of the difficulties in marking and resection with this procedure, many surgeons still are not eager to perform the technique. Several vertical mammaplasty modifications have been published recently to give the learning curve extra momentum [1,5,6,10]. However, there still are difficulties in marking and resection with the vertical mammaplasty operation. The learning curve is believed to be long, and cosmetic outcomes may be inconsistent, although modifications to simplify the procedure have been proposed [4].

The literature shows that it is possible sometimes to combine two different methods to obtain better results than achieved by each method separately [12]. Several methods that modify the vertical mammaplasty technique make it easier to perform. One of these, described by Hall-Findlay [6], which includes a medial or lateral dermoglandular pedicle without skin undermining and pectoralis fascia sutures.

The evolution in techniques for vertical mammaplasty has reduced complication rates [3]. Reduction in skin undermining and avoidance of liposuction have dramatically decreased minor complication rates. The most difficult aspect in vertical mammaplasty is the lack of a simple pattern to follow such as those for the McKissock or Strombeck techniques [11]. This may be the case because the technique can be used for small reductions or reduction weights of more than 2 kg per breast.

A more reliable marking method for vertical mammaplasty is needed. In this article, we describe a new adaptation and a combination of two different marking methods for the technique.

Methods

Markings

The patient stands preoperatively in the upright position. Meridian and midline stripes of breast are marked from the middle point of the clavicle to the nipple–areola, and from the sternum to the umblicus. These markings then are extended to the upper abdomen (Figs 1d, e, f; 2d, e; and 3a, b, 4a, b). The planned nipple location is determined to be at or just below the inframammary fold on the midaxial line. The distance between the suprasternal notch and the

Correspondence to Yusuf Kenan Coban, Sutcuimam University School of Medicine; *email:* kenancoban@ksu.edu.tr

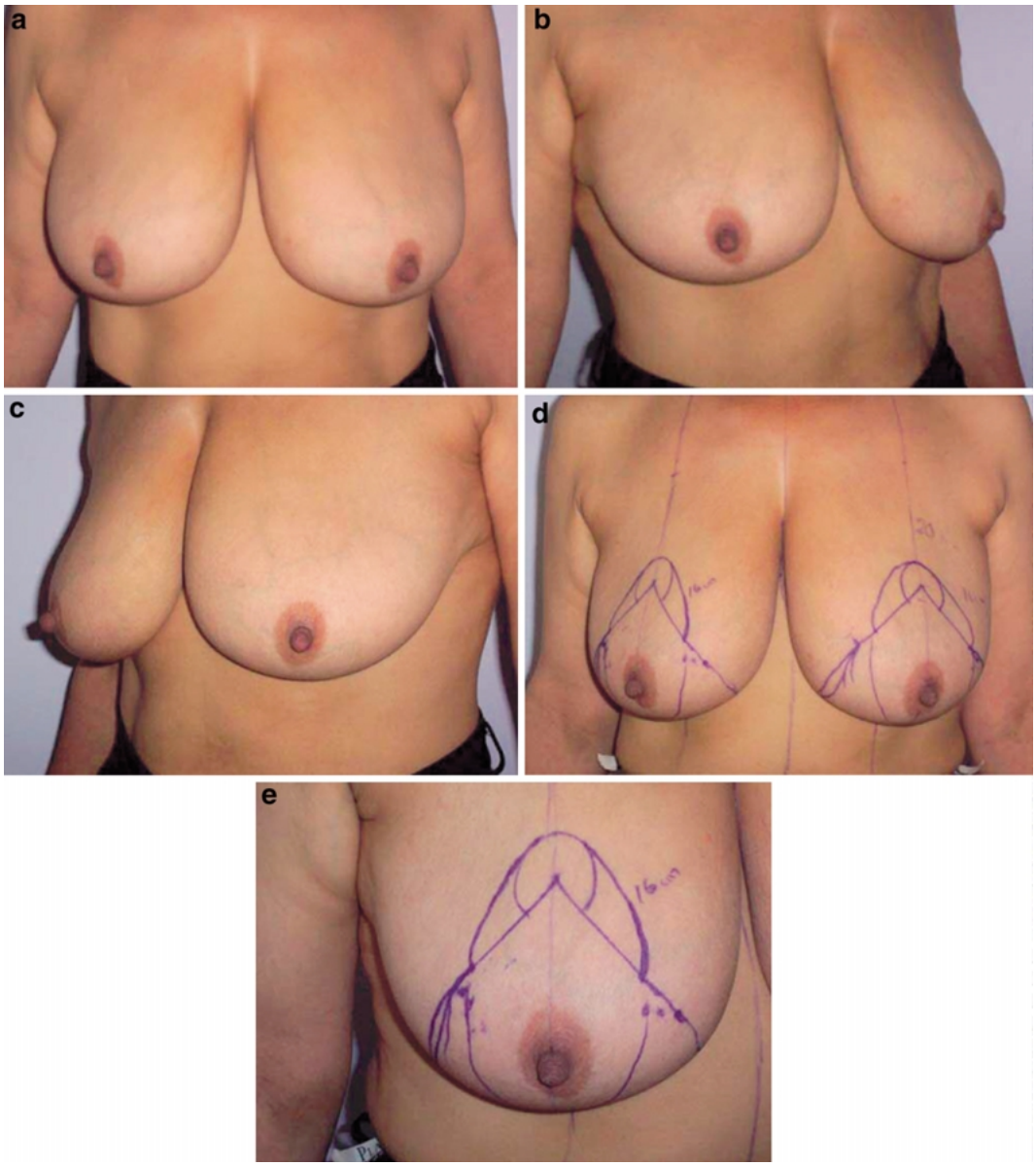

Fig. 1. (**a**) A 45-year-old woman who had breast hypertrophy and ptosis underwent a vertical reduction mammaplasty marked by the key hole pattern. (**b**) Left lateral view. (**c**) Right lateral view. (**d**) Appearance with the markings on the breasts. (**e**) The upper breast marking is similar to the Wise pattern and then a mosque-shaped new areola is replaced. Lateral and medial excision lines of the key hole pattern are marked from the medial and lateral sides of the breast. (**f**) Lower marking of the breast. (**g**) Early postoperative result for breast. No skin was undermined, and liposuction was not performed. From each breast, 675 g of breast tissue was removed. (**h**) Appearance of the breast 1 year later. (**i**) Right lateral view. (**j**) Left lateral view.

new nipple–areola is approximately 20 to 22 cm (Figs. 1e; 2e; and 3b).

After the submammary fold is marked, the lateral and medial excision points are determined using the inverted T technique. Lateral and medial vertical markings of skin resection are made while the breasts are pushed medially and then laterally, with the lines crossing directly upward from the upper abdomen to the lower breast sites. These two lines are joined in a curved fashion 2 to 4 cm above the submammary fold on the lower breast. We advocate using Lejour's procedure for marking the lower breast (Fig. 1f). While the upper breast being marked, the angle of the vertical limbs is determined as previously using the key hole pattern. With the breast skin tightly hold by the thumb and index finger of one hand, the angle points are marked approximately 7 cm below the new nipple site, which must be equidistant from the breast meridian. Then, the new nipple–areolas and angle points are joined by a curved line through the lower breast marking (Figs. 1e; 2e; and 3b). The angle points also can be joined in the manner of a "key hole pattern" to the lateral and medial excision marks. A mosque-shaped new areolar line starts with one

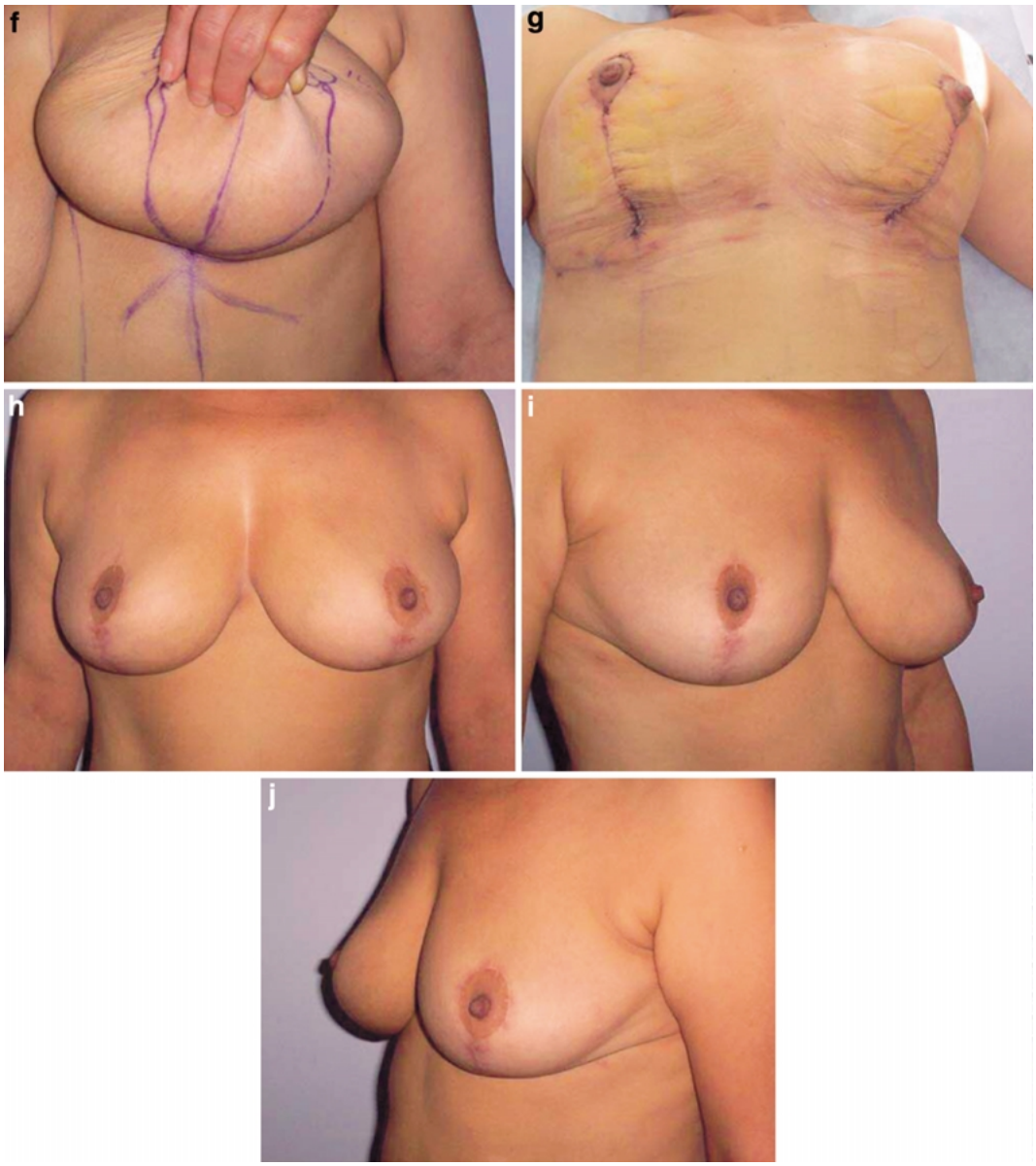

Fig. 1. Continued

vertical limb, then crosses over the midline 2 cm above the new nipple point and ends on the opposite to vertical limb. The length of this shape is approximately 14 to 16 cm. Breast volume varies from woman to woman, and because of these shape differences with different lower markings, the marking strategy for the areola must be calculated individually. We think 4 to 5 cm of areolar diameter is reasonable for periareolar marking. Figure 5a–d shows the diagramatic representation of the marking and execution of the technique.

Operative Technique and Postoperative Management

Periareolar deepithelization and incision of lateral and medial skin lines are performed as previously described. A superiorly based dermoglandular flap around the nipple–areolar complex is created, and skin marking incisions are deepened to the pectoralis fascia inferior of the nipple–areolar complex flap. The central part of the breast is resected with its glandular attachments up to the pectoralis fascia. Then two skin hooks are inserted into the right and left inferior borders of the skin excision lines while these hooks are pulling the lateral and medial flaps.

Resection of the breast tissue is accomplished at the skin border to the submammary fold. After the excision of the inferior central breast, the lateral portions of the gland are removed in an oblique plane from the upper medial to the lower lateral site, which starts vertically and then moves up horizontally by use of the ''inverted T technique.'' Excision of the breast tissue must be performed excessively in the

Fig. 2. (**a**) Preoperative appearance of a 23-year-old patient with hypertrophic breasts. (**b**) The same patient, right lateral view. (**c**) The same patient, left lateral view. (**d**) Appearance of the markings on the breasts. (**e**) Appearance of the markings on the breast. (**f**) Patient 8 months later. Excision of 860 g from the left breast and 820 g from the right breast was performed. (**g**) Right lateral view. (**h**) Left lateral view.

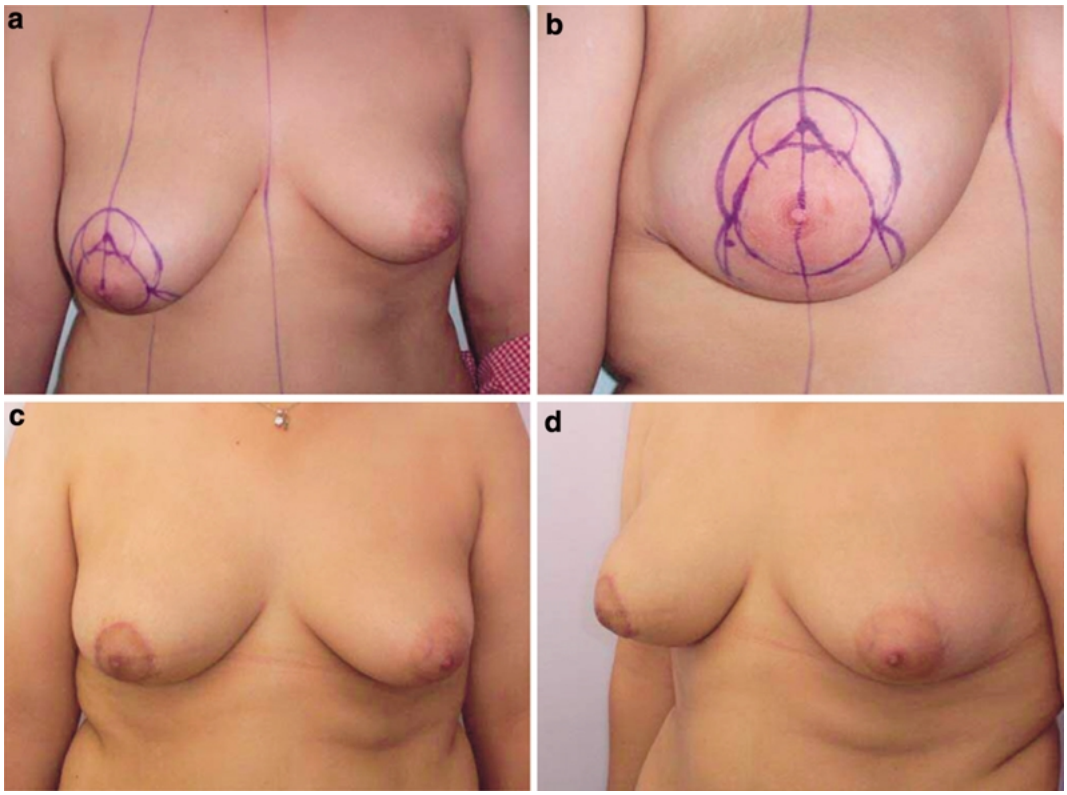

Fig. 3. (**a**) A 21-year-old patient with severe asymmetric breasts. Preoperative appearance of the markings. (**b**) Marking of the upper breast. (**c**) Appearance of the breasts 10 months after the operation in which 285 g of breast tissue was resected from the right breast. Right lateral view. (**d**) Left lateral view.

lateral rather than the medial part to provide the medial fullness of the breast. Prepectoral dissection is performed under the nipple–areolar flap to create a tunnel toward the second intercostal space. In this area, a very gentle dissection must be performed to avoid unnecessary dissection of the breast. Excision of the central breast tissue varies with breast volume in each case. The superiorly pedicled areolar flap can be thinned up to a thickness of 2 to 3 cm. The areolar flap is sutured to the pectoralis muscle in the deep plane. Glandular stitching between two lateral pillars creates a temporal upper bulging and lends a more conical appearance to the breast tissue. Subcutaneous suturing wrinkles overlying skin. Also, subcuticular skin stitching gathers the vertical suture line. Excision and closure of the breast is performed according to the technique described by Lejour [8,9]. Primary skin excision is performed in the submammary fold at the end of the operation if the skin cannot be pushed adequately. A hemovac drain is placed under the breast tissue and removed the next day. The patients wear elastic brassieres for the next 2 months.

Results

A total of 14 patients with breast hypertrophy and ptosis were treated over a period of 2 years (Figs. 1a, b, c; 2a, b, c). One patient with asymmetric breasts underwent a unilateral reduction procedure using the same technique, and another patient who had ptosis bilaterally underwent mastopexy without resection of breast tissue (Figs. 3a, c, d; 4a, b, c). The amount of breast tissue removed ranged from 285 to 875 g per breast (Fig. 1g). Hematoma, skin necrosis, skin dehiscence, loss of nipple–areola sensitivity, and distortion were not observed in our study. In one case, minimal glandular ptosis occurred after the mastopexy operation, and another case had delayed healing of the vertical suture in a reduction mammaplasty (Fig. 4d, e, f). Good breast appearance, projection, and symmetry were provided in the remainder of our cases (Figs. 1 h, i, j; 2f, g, h; 3c, d). No complications related to sensibility or hypertrophic scarring were seen.

Discussion

Since 1989, superior pedicle vertical scar mammaplasty, as described by Lejour, has been used by many surgeons. This evolving technique has a long learning curve. For consistent results with this technique, we have made modifications, which include marking, excision, and closure techniques. The inframammary fold, breast axis, and medial–lateral limbs are

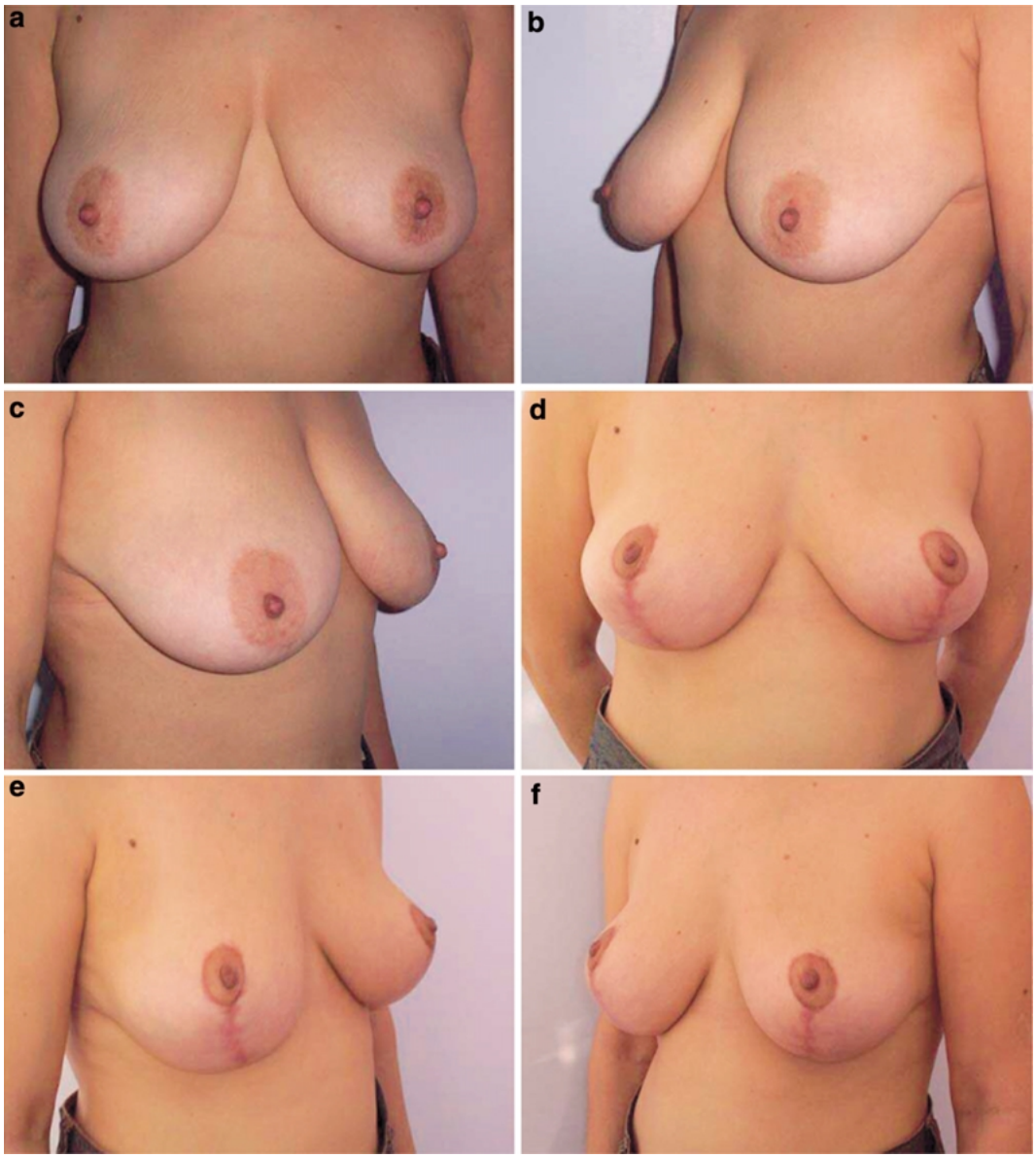

Fig. 4. (**a**) Preoperative appearance of a 40-year-old patient with breasts ptosis. (**b**) The same patient, left lateral view. (**c**) The same patient, right lateral view. (**d**) Postoperative appearance 9 months later. Glandular tissue exicision was not performed, but skin was deepithelized and the lower central breast was repositioned to the upper position. Glandular ptosis was observed 5 months after the operation, which required correction. (**e**) Right lateral view. (**f**) Left lateral view.

important for preoperative markings in vertical mammaplasty. Reduction mammaplasty has traditionally been performed using the Wise pattern of incision.

In this study, we used the key hole pattern in vertical mammaplasty to obtain reliable results. Although our sample size was not large, the aesthetic results were satisfactory. We observed two complications: one related to minimal ptosis and another involving a delayed wound healing problem. The total complication rate was 14.28% in this series. This is an encouraging result, as compared with previous results [3].

We believe that the use of the key hole pattern in vertical mammaplasty provides a consistent estimation for the amount of dermoglandular tissue that should be removed at the inferior pole of the breast. This is very important for vertical mammaplasty because it is generally accepted that a most difficult aspect of the technique is the lack of a simple pattern applicable for all cases ranging from mastopexy to reduction weights exceeding 2 kg per breast [11]. The use of the key hole pattern for marking in a standard Lejour vertical reduction mammaplasty helps the surgeon cope with the skin envelope and parenchymal reduction. Each modification of the vertical mammaplasty since Lassus's first description has made the procedure easier to understand and perform [2,7,9]. We previously used the key hole pattern for

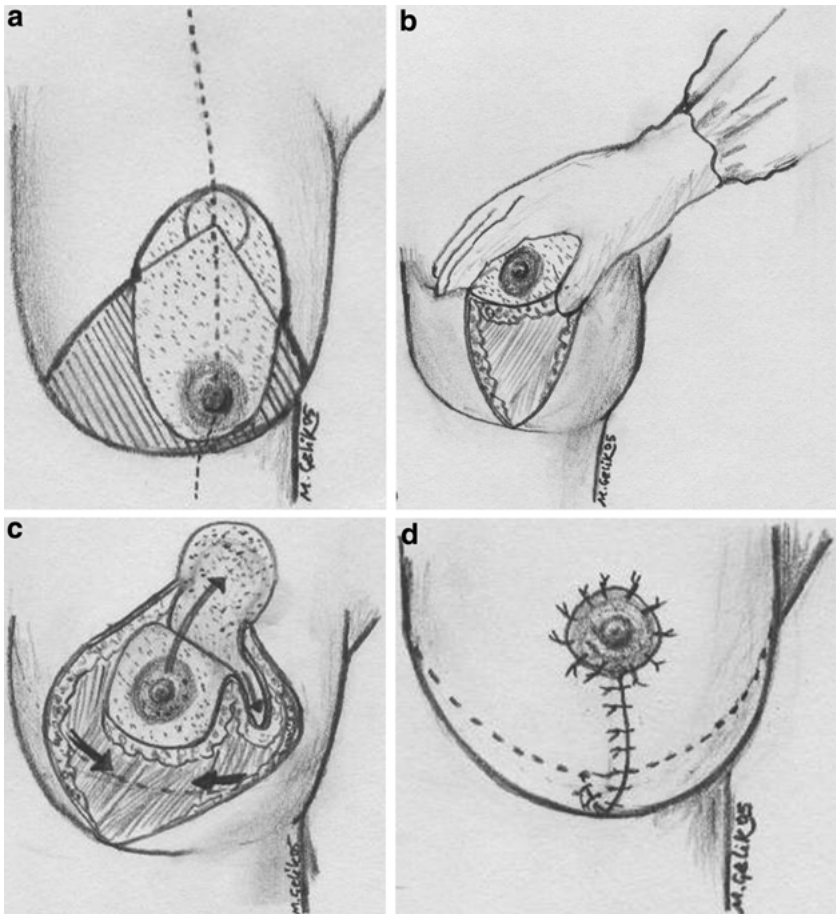

Fig. 5. (**a**) Preoperative markings: Dotted areas represent the superior-based nipple–areolar complex (NAC) flap. Note that the flap's central axis is parallel to the midclavicular line. The areas represented by oblique parellel lines show the dermoglandular resection regions of the breast. The usual flap base widths range from 8 to 12 cm, according to the size of the breast. A base more narrow than 6 cm may jeopardize NAC circulation. (**b**) After the inferior glandular and skin resections the NAC flap can easily be transposed upward. (**c**) The NAC flap's anchorage. (**d**) After suturing, the position of the breast' inferior margin may be 1 to 2 cm lower than the submammarial sulcus when the patient is in the upright position.

breast markings, but afterward used the mosque-shaped areolar line.

Vertical scar breast reduction has been modified by Beer et al. [1] in 2001. In their study, they determined the angle between the two vertical lines on the new nipple site by holding the breasts gently and measuring vertical lines 9 cm long. Additionally, the new areola was inserted intraoperatively on the vertical suture line [1].

We considered that holding the skin of the breast tightly would make the angle wider, creating a more conical breast shape. We also think that an angle pointing 7 cm below the new nipple site is reasonable. Lateral and medial resection areas have been described previously by Beer et al. [1] and Hall-Findlay [6] according to a Wise marking pattern. In their study, Beer et al. [1] advocated central breast wedge resection without resection of lateral and medial pillars. On the other hand, Hall-Findlay [6] recommended vertical reduction mammaplasty using the Wise pattern with en bloc tissue resection, but no skin undermining. We performed glandular resection from the lateral and medial breast according to these two methods with one difference. Our excision line was more vertical than the Wise marking pattern.

The resection of glandular tissue is very important, especially from the triangle formed by the submammary fold, xiphoid, and anterior axillary line. Excessive glandular resection in this triangle is necessary for reshaping of the breast skin. Lejour [8] also advocated the resection of lateral pillars in an oblique line for better projection of the breast. We used Lejour's vertical mammaplasty for the inferior breast marking and resection without undermining and liposuctioning. We believe that using the key hole pattern, which provides for simple marking and resection of tissues, will be helpful for learning and performing vertical mammaplasty.

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