This wenche thikke and wel ygrown was, with camus nose and yen greye as glas, with buttokes brode, and brestes rounde and hye, but right fair was hir heer, I wol nat lie.

(Chaucer G, Donaldson ET. Chaucer’s poetry: an anthology for the modern reader. New York: Ronald Press; 1958:133.)

Though written in Middle English and dating back to c1387–1400, this excerpt from the Reeve’s Tale clearly conveys that Chaucer’s youthful character Malyne, with her “rounde and hye” breasts, is particularly attractive to her suitors. In their pursuit of the aesthetic breast, plastic surgeons have relied heavily on the mastopexy, an operation often referred to by the lay public as the “breast lift.” In performing mastopexies, plastic surgeons address breast ptosis, a word whose etymologic root is Greek for “falling.” What was true in Chaucer’s time still holds today: that the “falling” or sagging breast is not the aesthetic ideal. Techniques for addressing the ptotic breast were borne from reduction mammaplasty procedures, essentially exchanging significant parenchymal resections for parenchymal reshaping and redraping the skin envelope. It is not surprising to note the confusion among patients between what is a breast reduction and what is truly a mastopexy. In fact, even among plastic surgeons there are gray areas between the two operations. For example, the patient with primarily breast skin excess and a much more minor component of glandular excess would likely benefit from a small

**SYNOPSIS**

- Breast ptosis is a common problem caused by several different factors: pregnancy, weight changes, aging, delayed effect of breast implants and developmental deformities.
- Mastopexy and augmentation-mastopexy techniques are varied and can be applied to different breast shape deformities.
- Mastopexy techniques can be periareolar, vertical or based on the inverted-T techniques, as well as being performed in some instances by liposuction alone.
- Preoperative deflation prior to mastopexy or augmentation-mastopexy is a safe and effective technique that offers the patient and surgeon many benefits.

**Introduction**

The desire for the aesthetic breast has long been captivating to humankind, and its allure permeates many feminine descriptions in classic literature. In the ‘Reeve’s Tale’, from his novel *The Canterbury Tales*, Geoffrey Chaucer describes Malyne, the young and lusty daughter of the miller Symkyn, as follows:
parenchymal reduction in addition to skin resection and parenchymal redistribution. But does that constitute reduction mammoplasty? Mastopexy is a parenchymal reshaping that may or may not require a small parenchymal reduction. Reduction mammoplasties always require parenchymal reduction. What defines the difference between mastopexy and reduction mammoplasty, is whether the patient truly exhibits symptoms of macromastia – the affirmative being the case of a reduction mammoplasty. The issue is further confused from a general standpoint when you consider that some plastic surgeons treat breast ptosis with augmentation alone or in combination with mastopexy in certain instances. Plastic surgeons must be clear that ptosis as a separate entity from macromastia and gigantomastia is treated differently from cases of macromastia or gigantomastia that happen to have ptosis. Typically, the ptotic breast has a paucity of breast parenchyma in relation to a lax, excessive skin envelope. Contrarily, the cardinal finding of the hypertrophic breasts seen in cases of macromastia, gigantomastia, etc., is a predominance of parenchyma without skin excess. The vast majority of patients undergoing surgical intervention to treat ptosis of the breast are treated with skin resection and redraping over a repositioned breast mound – the operation that is the mastopexy.

**Basic science/disease process**

The pathophysiology of breast ptosis is multifaceted – but can be conceptualized as being the result of the combination of expansion and aging, or separately as a result of a congenital deformity. In its classic description, breast ptosis is the result of inadequate parenchyma or parenchymal maldistribution in the face of excess, lax skin and connective tissues. The ligaments described by Sir Astley Cooper run from the pectoralis muscular fascia, through breast parenchyma, and insert into the dermis (Fig. 7.1). Parenchymal changes with aging (accentuated by the case of the patient with an implant), weight changes in the obese, and pregnancy, are also accompanied by specific alterations in the integrity of Cooper’s ligaments, the breast’s fascial components, and the overlying skin. These processes essentially function as tissue expansion, as the parenchyma ebbs and flows with the tides of hormonal fluctuations in pregnancy or menopause, or with the weight fluctuations in the obese having lost massive amounts of weight, or with the expanded breast that is created with a breast implant. The skin becomes thin and stretched, and supporting structures, such as Cooper’s ligaments and the superficial and deep layers of the superficial breast fascia, lose their inherent elasticity. The breast parenchyma, once held in place on the chest wall by and within these structures, becomes mobile and descends with the constant pull of gravity. Adding the effects of time with aging only exacerbates these
pathophysiologic changes. The loss of elastic recoil of the skin and connective tissue, coupled with involutional atrophy of the parenchymal mound, results in an unshapely, falling, and unaesthetic breast.

Breast ptosis in its various degrees is defined by its anatomic relationship to the inframammary fold. The original classification scheme for breast ptosis was set forth by Regnault, who in 1976 described the degrees of breast ptosis (Fig. 7.2). Grade I ptosis, or mild ptosis, was defined as having the nipple within 1 cm of the inframammary fold and being above the lower pole of the breast. Grade II, or moderate, breast ptosis exists when the nipple is 1–3 cm below the inframammary fold but still is above the lower pole of the breast. In Grade III (severe) ptosis, the nipple is more than 3 cm below the inframammary fold and is situated below the lower breast contour. There is a fourth category of breast ptosis, commonly known as glandular or pseudoptosis, in which the nipple rests above the inframammary fold but the majority of breast tissue rests below and gives the appearance of ptosis.

An additional caveat to the Regnault classification was submitted by Brink, which takes into account other causes of the ptotic breast, such as parenchymal maldistribution, and posits an algorithm by which they can be surgically addressed (Table 7.1, Fig. 7.3). One example of such parenchymal maldistribution is the tuberous breast deformity, also known as the tubular breast or constricted breast, which manifests as a high inframammary fold, hypoplastic lower pole, and nipple-areolar complex resting on the inferior-most aspect of the breast. Other classic features of the tuberous breast include herniation of the nipple-areolar complex as well as a constriction of the base of the breast. The tuberous breast deformity consists of a spectrum of different presentations to include some or all of these findings, the more severe cases representing the more challenging cases to correct (Fig. 7.4). Tuberous breasts can occur unilaterally, with the contralateral breast being unaffected, or can present to similar or vastly different degrees in bilateral cases. There are three classes of tuberous breast as described by Grolleau (Fig. 7.5). Type I deformities manifest as deficiency only in the lower medial quadrant, leaving the inferomedial shaped like an italic S and the inferolateral aspect comparably oversized. Both the inferomedial and inferolateral quadrants are deficient in the type II anomaly, leaving a paucity of skin in the infraareolar segment, which causes the areola to point downward. Finally, in a type III deformity, all four quadrants are deficient, and the breast base is constricted both horizontally and vertically. Von Heimburg describes a second classification scheme for the tuberous breast deformity (Table 7.2). In von Heimburg class I tuberous breasts, there is parenchymal hypoplasia of the inferomedial breast quadrant, similar to that described by Grolleau. The von Heimburg class II tuberous breast is also similar in description to Grolleau’s classification, with hypoplasia of the inferomedial and inferolateral breast parenchyma, and an adequate amount of periareolar skin. The third class of tuberous breast described by von Heimburg manifests as hypoplastic parenchyma inferomedially and inferolaterally, but with limited or inadequate periareolar skin. The fourth and final class of tuberous breast deformity described by von Heimburg is presents with hypoplastic parenchyma in all four breast quadrants. Various techniques, such as periareolar nipple-areolar reduction, radial scoring, dermoglandular flaps, autologous and alloplastic augmentation, and tissue expansion, among others, have been used for the correction of this...
Table 7.1 Procedural specifics for forms of breast ptosis

<table>
<thead>
<tr>
<th></th>
<th>Infra- mammary fold position</th>
<th>Parenchymal position</th>
<th>Nipple–areola position</th>
<th>Nipple to fold distance</th>
<th>Clavicle to nipple distance</th>
<th>Clavicle to fold distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>True ptosis</td>
<td>Fixed normal</td>
<td>Fixed rotated</td>
<td>Low downward pointing</td>
<td>Unchanged normal</td>
<td>Elongated</td>
<td>Unchanged normal</td>
</tr>
<tr>
<td>Glandular ptosis</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Common</td>
<td>Mobile descended</td>
<td>Mobile descended</td>
<td>Low forward pointing</td>
<td>Elongated</td>
<td>Elongated</td>
<td>Elongated</td>
</tr>
<tr>
<td>Uncommon</td>
<td>Fixed normal</td>
<td>Mobile descended</td>
<td>Low relative to fold</td>
<td>Elongated</td>
<td>Normal to elongated</td>
<td>Unchanged Normal</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parenchymal maldistribution</td>
<td>Fixed high</td>
<td>Fixed high</td>
<td>Normal downward pointing</td>
<td>Short</td>
<td>Normal</td>
<td>Short</td>
</tr>
<tr>
<td>Pseudoptosis[^1]</td>
<td>Variable, usually low[^1]</td>
<td>Mobile re-descended</td>
<td>Surgically fixed</td>
<td>Elongated</td>
<td>Surgically fixed</td>
<td>Variable, usually elongated [^1]</td>
</tr>
</tbody>
</table>

\[^1\]Pseudoptosis is most common after corrective procedures for glandular ptosis where the fold has descended preoperatively. (From: Brink RR. Management of true ptosis of the breast. Plast Reconstr Surg 1993; 91:657–662.)

Fig. 7.3 (A–D) Different types of breast ptosis. IMF, inframammary fold. (Redrawn after Brink RR. Management of true ptosis of the breast. Plast Reconstr Surg 1993; 91:657–662.)
Fig. 7.4 (Top) Normal breast development with forward and peripheral expansion. (Bottom) Development of a tuberous breast, with limited peripheral expansion and exaggerated forward expansion. (Redrawn from: Grolleau JL, Lanfrey E, Lavigne B, et al. Breast base anomalies: treatment strategy for tuberous breasts, minor deformities, and asymmetry. Plast Reconstr Surg 1999; 104(7):2040–2048.)
Fig. 7.5 Classification system for breast base anomalies. Type I breasts have hypoplasia of the lower medial quadrant. Type II breasts have hypoplasia of both lower quadrants. Type III breasts have hypoplasia of all four quadrants. (Redrawn from: Grolleau JL, Lanfrey E, Lavigne B, et al. Breast base anomalies: treatment strategy for tuberous breasts, minor deformities, and asymmetry. Plast Reconstr Surg 1999; 104(7):2040–2048.)

<table>
<thead>
<tr>
<th>Class</th>
<th>Anatomic features</th>
</tr>
</thead>
<tbody>
<tr>
<td>von Heimburg class I</td>
<td>Hypoplasia of lower medial quadrant</td>
</tr>
<tr>
<td>von Heimburg class II</td>
<td>Hypoplasia of both lower quadrants</td>
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<tr>
<td></td>
<td>with adequate areolar skin</td>
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<tr>
<td>von Heimburg class III</td>
<td>Hypoplasia of both lower quadrants</td>
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<tr>
<td></td>
<td>with limited areolar skin</td>
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<tr>
<td>von Heimburg class IV</td>
<td>Hypoplasia of all quadrants</td>
</tr>
</tbody>
</table>


Diagnosis and patient presentation

Patient evaluation

Most patients present for consultations with certain notions as to what they should expect from the operation itself. These predetermined ideas often come from surfing the internet and perusing before-and-after photographic images, in addition to talking to other people who have undergone mastopexy. Analysis by the patient can take into account how pretty or aesthetic the breast is postoperatively, as well as some or all of the aspects a plastic surgeon might evaluate, such as the breast shape, position on the chest wall, nipple areolar complex position on the breast mound, and scarring. Often, this can be helpful during the patient evaluation, answering some preliminary questions and setting a conceptual basis upon which the surgeon can explain the rationale for the technique to be implemented. In cases where patient expectations are out of line with a reasonable outcome, the predetermined notions must be addressed and misunderstandings must be resolved preoperatively. For example, the patient with very large, ptotic breasts desiring to maintain her large breast size in addition to having the breasts be replaced to a more uplifted position will be uniformly disappointed. Without a reduction, the results in this type of patient will not only likely be inadequate with regard to the degree of lift but also with regard to the longevity of the lifted result. So patient expectations are a key component of the patient analysis, and questions to assess these predetermined notions during the evaluation can be helpful to the patient and the surgeon.

Many patients are initially seen requesting implants, thinking that the implants lift the breast. Implants never lift the breasts in and of themselves, and this part of the consultation can be confusing to patients because this counters their preconceived notions. On the contrary,
other patients present desiring a breast lift but are advised to get implants by surgeons who may not be confident in their ability to achieve a long-lasting and well-shaped mastopexy. The end result can be an implant breast construct that is too large for the patient’s frame and fails to satisfy the patient’s goals.

We find that one of the most helpful questions that can be posed to a patient is “can you make your breasts look the way you want them to in a bra?” If the answer is yes, then perhaps a mastopexy alone is the best recommendation. If the answer is no, and the patient relies on adding volume by stuffing or padding, then adding an implant may be necessary. Of course, combinations of small reductions and implants – the “Addition/Subtraction Concept” – can be a very satisfactory approach.

Discussing the typical pattern of the incisions and the expected scars is important. Patients will often have in mind a smaller scar pattern, hoping for a “lollipop” or “doughnut” lift, instead of the “anchor” scar. These patients may even accept a suboptimal mastopexy in order to avoid additional scar placement. However, if you as a surgeon agree to meet these types of demands, then you should also be aware that if the patient is unhappy later with the result of this trade-off, they may forget about the conversation about shorter scars for a more limited result! The plastic surgeon must take into account the degree of skin laxity, the excess amount of skin in relation to the parenchyma, the position or malposition of the parenchyma, and degree of nipple-areolar complex elevation anticipated – and then incorporate that physical examination information with the patient’s history of chest or breast surgery, the patient’s history of scarring, including hypertrophic scarring or keloid formation, the patient’s desires with regard to scar placement, and the surgeon’s experience and technical ability to achieve the most aesthetic and durable result.

Measurements are another key component to the diagnosis and treatment of the patient with breast ptosis. Such marks, such as the sternal notch to nipple distance, define current nipple position on the breast and chest wall and can help define symmetry. The nipple to inframammary fold distance quantitates the skin of the lower breast pole, as well as assisting in defining symmetry. The breast base diameter gives a width of the breast on the chest wall, allowing for implant selection in the case where mastopexy is to be performed in conjunction with augmentation. These measurements, in addition to the classification of the degree of ptosis, can be quite useful in planning, as well as achieving an aesthetic result.

Preoperative breast imaging, in the form of high-resolution digital color photography is another important tool for documentation to demonstrate the degree of preoperative ptosis, as well as the degree of improvement postoperatively. The advent of three-dimensional imaging and computerized image-enhancing software has diversified the options for plastic surgeons to demonstrate to patients the implant sizes, asymmetries, and expected outcomes during consultations, as well as their postoperative improvement. Some of these concepts are covered in greater detail in Chapter 2.

A careful conversation describing the rationale of the pattern to be used and the expected scars can go a long way toward warding off disappointment in the postoperative period. Further, specific counseling as far as the risks, benefits, and alternatives to the proposed surgical intervention should be documented as part of the informed consent. It is often useful to have the patient come back for a second visit prior to surgery, especially in cases where the operation may be delayed for any reason. At that time, the details of the previous evaluation, having been documented in detail, can be easily covered again and any new concerns can be raised and addressed. We use an interactive computerized consultation system that allows the patient to revisit the consultation as well as teaching materials online using any internet connection as often as they wish.

**Patient selection**

The majority of patients presenting for mastopexy procedures typically fall into three categories: those who indeed would benefit from mastopexy, those who need an augmentation with mastopexy, and those who need a formal reduction mammoplasty. The analysis of the quality and amount of skin in relation to the mass and anatomic distribution of the breast parenchyma usually dictates which procedure is necessary. The ideal mastopexy patient has a normal volume of breast parenchyma and a minimal-to-moderate excess of skin that is
of good quality. When patients present with minimal glandular mass and breast ptosis, consideration must be given to the skin amount and quality – as this patient will likely need a mastopexy in addition to an augmentation with an implant, either as combined or staged operations. Conversely, the patient who presents with an overabundance of parenchyma and ptosis will need a breast reduction.

Part of the informed consent process and patient evaluation is a determination of the patient’s surgical risk. Risk factors for surgery, such as age, history of recent weight loss, cardiopulmonary health, medications and recent changes to medication regimen, history of stroke, hepatic or renal insufficiency, abnormal bleeding or clotting tendencies, and possibilities the patient is or may become pregnant, etc., must be thoroughly completed and documented. The patient’s breast history is important to acquire and completely document and discuss. Any history of breast changes/masses, nipple-areolar changes or discharge, mammography, previous breast surgery, pregnancies and breast-feeding, radiation therapy to the chest or breast, and personal or family history of breast cancer must be explored with the patient in detail. It is the practice of the authors to have patients over 35 years of age obtain a recent mammogram, unless a normal one has been documented in the year prior, before proceeding with surgery.

**Treatment/surgical technique**

The vast array of surgical options and approaches for mastopexy is best condensed into a classification scheme based on scar pattern. Generally, mastopexy techniques are described by the scar pattern from the skin reduction. There are four basic scar patterns for mastopexy techniques: periareolar, vertical, J or L, and inverted-T. More specifically, however, each of these broad categories of scar pattern has techniques within them that cross the boundaries of this basic classification scheme. This comes as a direct result of the multiple modifications of each technique that surgeons have developed in an attempt to reduce scarring, yet still address the degree of glandular ptosis in relation to the degree of skin quality and excess. The basic tenets for implementation and application of each of the mastopexy techniques, as well as their inherent risk-benefit analysis, are detailed in the following sections, in which the specifics of the techniques are also discussed.

**Periareolar techniques**

Generally, the periareolar technique is best-suited for patients with mild to moderate breast ptosis and in whom the parenchyma is adequate from a volume standpoint. Firmer parenchyma is preferable to softer tissues in implementing this technique. The incisions for this technique range from a superior crescent of excised skin to a complete donut. Patients who present with mild to moderate breast ptosis but with inadequate parenchymal volume can be treated with an implant via the periareolar technique. The obvious advantage of the periareolar technique, be it for mastopexy, augmentation, or augmentation-mastopexy, which is described later in the chapter, is that the incision is camouflaged in the aesthetic transition from breast skin to the skin of the nipple-areola. Disadvantages of periareolar techniques relate to precise skin excision and ultimately a limited degree of cephalic nipple-areolar complex movement. Other disadvantages include possible scar widening and decreased breast projection. Removal of too much skin leads to an unaesthetic widening of the areola. Widened scars are multifactorial in nature and can be the result of excessive tension on the closure, which can result from the weight of the implant or aggressive skin excision. The patient’s skin quality, such as its thickness, elasticity, and degree of aging/damage, can also contribute to widened periareolar scars. Achieving a well-hidden scar and appropriate nipple areolar elevation at the expense of creating an aesthetically-flat, misshapen breast is also not ideal and should be avoided or corrected when possible. Loss of projection with the periareolar techniques, however, can be used to achieve goal the aesthetic in some cases, such as the tuberous breast deformity, but caution must be taken to avoid flattening of the breast.

Small, mildly ptotic breasts with adequate parenchyma respond best to these techniques. Modifications can be made, however, to accommodate moderate degrees of breast ptosis as well as inadequate parenchymal volume using periareolar mastopexy approaches. Typically, the modification required is the addition of a small implant to replace the lacking parenchyma, simultaneously filling the skin envelope. This results in an
aesthetic breast mound, though it often can also result in a low-set nipple-areolar complex on the breast. Excising skin around the nipple-areolar complex at the same operative setting elevates the nipple-areolar complex to a more aesthetic location and completes the periareolar mastopexy. Usually, the amount of lift obtained is limited to 1–2 cm.

In an effort to limit complications associated with periareolar mastopexy techniques, Spear et al. designed a series of rules to follow.\textsuperscript{16,17}

Rule 1: \(D_{\text{outside}} \leq D_{\text{original}} + (D_{\text{original}} - D_{\text{inside}})\). The amount of non-pigmented skin excised should be less than the amount of pigmented skin excised. In doing so, there will be no undue tension on the new areola that could cause subsequent widening. This should prevent a postoperative areola larger than the original. The distance from the edge of the areola to the outer diameter located on the normal breast skin should roughly equal the distance to the inner diameter, which should be located within the areola.

Rule 2: \(D_{\text{outside}} < 2 \times D_{\text{inside}}\). The design of the outside diameter should be no more than two times the inside diameter in order to minimize the discrepancy in circle sizes, thereby reducing tension on the closure. This should prevent against an overly-ambitious plan to remove skin, and, as a result, limit the risk of poor scars and overly-flattened breasts. Keep in mind, however, that some leeway exists in the case of skin envelope laxity, the degree of which is ultimately a judgment call.

Rule 3: \(D_{\text{final}} = \frac{3}{2} (D_{\text{outside}} + D_{\text{inside}})\). This final rule helps predict the final areolar size, which is particularly useful in asymmetry cases, as well as those in whom no round block suture is employed (Fig. 7.6).

Concentric mastopexy without parenchymal reshaping

The amount of skin to be excised is determined by the position of the nipple-areolar complex. One must take care to excise only the amount of skin necessary to raise the nipple-areolar complex to the proper level for correction of the ptosis. Consideration must be given to any excess areola that is to be removed. The lines of excision are marked on the breast with the patient in a sitting or standing position in the preoperative area. Symmetry is checked by comparing sternal notch to nipple distance and sternum to nipple distance. In the operating room, the amount of the areola that is to remain is marked on the stretched breast with an areolar marker. The skin between these two marks is infiltrated with 0.5% lidocaine with 1:200,000 epinephrine to facilitate de-epithelialization. Once the skin is removed, the edge of the dermis can be elevated. At the same time, the remaining skin around the exposed dermis can be elevated off the gland for a short distance superiorly. The freed dermis can then be tacked to the gland under the elevated skin, giving additional support to the breast. A purse string suture of 4-0 Gore-Tex or Mersilene is then placed in the deep dermis of the skin edge. This is then cinched to the approximate size of the areola and tied. The areola is then approximated to the skin with half-buried horizontal mattress sutures, followed by a running, subcuticular 4-0 Monocryl or polydioxanone closure.

Periareolar Benelli mastopexy

The Benelli mastopexy technique is an extension of the donut mastopexy that was borne from dissatisfaction with the limitations of the simpler periareolar methods.
of mastopexy.\textsuperscript{18,19} The Benelli modifications allow the periareolar technique to be used to treat larger breasts with increasing degrees of ptosis. This technique can be combined with reduction techniques when necessary to ensure the best possible result while remaining true to the idea of a minimal scar. The fundamental concept behind the Benelli mastopexy is treatment of the skin and the gland as two separate components. The glandular tissue of the breast is accessed through the periareolar incision and separated from the overlying skin component. Superior, medial, and lateral dermoglandular flaps are created, with resection of intervening tissues and thinning of the flaps as is indicated for cases of macromastia. Glandular reassembly consists of reducing the glandular width, tightening the lower pole, and coning the breast construct by crisscrossing the medial and lateral dermoglandular flaps. The skin envelope is redraped over this newly formed glandular scaffold. A round block cerclage stitch is used as in the donut mastopexy to help control tension at the areola-skin junction. As can be seen, this technique allows precise shaping of the breast by the inverted T type of incision through the gland, while requiring no additional incisions in the skin.

Because this technique affords access to the gland, and thus more flexibility in reshaping the gland, the indications for this procedure can be broadened to include patients with larger breasts or greater degrees of ptosis while still satisfying the requirement of minimal scars. It can be used on breasts with minimal glandular tissue by forgoing the glandular incision in favor of plication while simultaneously adding an implant. It can be used as described for larger breasts requiring a modest degree of reduction. This technique, however, is not recommended for breasts that are mainly fat or have a large amount of skin excess, especially if skin is of poor quality. Also, this technique is not indicated in large breasts for which a formal reduction may be the more appropriate procedure. The main advantages are the improved ability to shape the gland and recontour the breast and the commitment to minimizing the scar. The disadvantages of this technique include those of the donut and crescent mastopexies. In addition, care must be taken on incision and reconstruction of the gland to avoid damage to the vascular supply of the gland and overlying skin. There is a significant learning curve associated with Benelli’s technique. If there is an over-resection of skin or inadequate glandular support, the breast has a marked tendency toward a flattened appearance along with widening of the nipple-areola complex.

**Technique**

Preoperative marking is initiated by marking the midline and the estimated meridian of the newly shaped breast with the patient in the upright position. The new meridian is often medial to the breast meridian approximately 6 cm from the midline. The future superior border of the areola, point A, is marked on the meridian approximately 2 cm above the anterior projection of the inframammary fold. The future inferior border of the areola, point B, is marked on the patient supine approximately 5–12 cm above the inframammary fold on the basis of the estimated final breast volume and the expected skin retraction. The medial and lateral limits of the new areola, points C and D, are marked on the basis of estimates of the final breast volume. These limits are equidistant from the previously-marked meridian, and point C averages 8–12 cm from the midline (Fig. 7.7). The opposite breast is marked with reference to the already marked breast. The preoperative markings are verified by pinching together the superior and inferior

\begin{figure}[h]
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\includegraphics[width=\textwidth]{Fig_7.7}
\caption{Fig. 7.7 Markings for Benelli mastopexy. (A) Future superior point of the nipple; (B) future inferior point of the nipple; (C) medial limit of the nipple; (D) lateral limit of the nipple. Point C averages 8–12 cm from the midline. S is the point where the breast meridian intersects the inframammary fold. (Redrawn after: Benelli L. A new periareolar mammoplasty: the “round block” technique. Aesthetic Plast Surg 1990; 14:93–100.)}
\end{figure}
points and then the medial and lateral points, ensuring that enough skin will remain to adequately cover the breast tissue without tension.

Infiltration with dilute saline (1000 mL), epinephrine (0.25 mg) and lidocaine 2% (20 mL) is performed subcutaneously in the area that will be detached. The ellipse and surrounding 3 cm is not infiltrated to preserve vascularity of the skin edges. The prepectoral area is also infiltrated. The desired areolar diameter is marked, and the periareolar ellipse is de-epithelialized. The de-epithelialized dermis is incised from the 2-o’clock to the 10-o’clock position. The dissection is extended toward the inframammary fold in the subcutaneous plane (Fig. 7.8). The dissection continues to the upper outer quadrant of the breast and becomes more superficial to preserve the vessels coming from the lateral thoracic artery.

Glandular dissection is then initiated with a semicircular incision approximately 3 cm from the inferior areola edge to preserve innervation and blood supply to the areola. Dissection is continued to the prepectoral space in the avascular central space, preserving the peripheral blood supply. The inferior glandular flap is then cut vertically beyond the breast meridian up to the fascia. Four flaps will have thus been created: a superior dermoglandular flap supporting the areola, a glandular medial flap, a glandular lateral flap, and the detached skin flap (Fig. 7.9). These glandular flaps will be reassembled and repositioned to decrease the base of the breast, thus promoting the lifted appearance. If necessary, these flaps can be trimmed to reduce unwanted fullness. Volume reduction should be performed at the distal ends of the flaps to limit their length.

Once the appropriate resection is complete, the gland is initially lifted by placing a stitch in the glandular tissue of the superior flap and fixing this to the pectoralis fascia (Fig. 7.10). This should elevate the areola and cause an exaggerated convexity in the superior pole of the breast (Fig. 7.11). This exaggerated convexity will disappear within a few weeks secondary to gravity and the weight of the breast. Next, the medial and lateral flaps are folded over one another and sutured in place. Because most ptosis involves a lateral migration of the breast, the goal here is to medialize the breast. Therefore, the crisscross mastopexy is begun by rotating and folding the medial flap behind the areola, fixing its distal portion to the pectoralis muscle with superficial stitches (Fig. 7.12). The lateral flap is then crossed over and fixed to the medial flap (Fig. 7.13). The movement of these flaps reduces the base of the breast, forming a glandular cone on which to place the areola. If the gland requires no resection, a plication invagination can be performed to achieve an elevated conical breast shape (Fig. 7.14). The areola is fixated to the superior border of the ellipse through a 1-cm dermal incision made near the superior skin edge. This allows the knot to be buried and the areola to be supported without tension on the skin (Fig. 7.15). Support for the breast shape is achieved by full-breast lacing. Braided polyester suture on a long straight needle is used for the large inverted sutures along the underside of the gland. The superior stitch should pass through the superior dermoglandular flap, allowing control of the anterior projection of the nipple-areola complex. These full-breast lacing sutures should be applied without tension, their goal being to provide passive support of the newly formed conical breast. Tying these lacing sutures overly tight can result in glandular necrosis. The skin is redraped over the breast, and a round block cerclage stitch is passed in the deep
dermis in pursestring fashion (Fig. 7.16). It is then cinched around a tube of the desired diameter, ensuring even distribution of the skin pleats. The block stitch is then tied, burying the knot in the previously formed dermal window. Further regulation of the projection of the areola is accomplished by an inverted dermoareolar stitch that takes a large vertical bite in the areola and a large horizontal bite in the dermal ellipse. This helps distribute any remaining deep pleats evenly around the areola. A diametrical transareolar U suture is placed to serve as a barrier and help prevent areola protrusion (Fig. 7.17). It can also be used to give a circular shape to the areola in those patients in whom it tends to be ovoid.
A 4-0 Vicryl intradermal suture around the areola completes the procedure.

Dressings consist of wet compresses on the areola and dry compresses on the detached skin, held in place by an adhesive bandage of moderate compression to reduce hematoma risk. These are removed on postoperative day 2, along with any drains and replaced with a sterile, ultrathin, semi-occlusive polyurethane foam adhesive.


Fig. 7.13 Benelli mastopexy. Lateral flap is affixed to the medial flap. (Redrawn after Benelli LC. Periareolar Benelli mastopexy and reduction. In: Spear SL, ed. Surgery of the breast: principles and art. Philadelphia: Lippincott-Raven; 1998:685.)


Fig. 7.15 Benelli mastopexy. Fixation of areola to the superior border of the ellipse. (Redrawn after Benelli LC. Periareolar Benelli mastopexy and reduction. In: Spear SL, ed. Surgery of the breast: principles and art. Philadelphia: Lippincott-Raven; 1998:685.)
projection for the majority of patients for >5 years postoperatively.\textsuperscript{22}

The primary indication for this method is the correction of ptosis or a slight reduction of hypertrophy with or without ptosis. Reductions from each breast ideally should be no more than 500 g. Better aesthetic results can be obtained in younger patients with firmer tissue, more elastic skin, and little fatty tissue. Obesity, as in all periareolar techniques, can be regarded as a contraindication. The main advantages of this technique have much to do with the addition of a mesh layer. The mesh causes a fibrotic reaction that serves to support the breast for a longer time during the healing and cicatrization process. Whereas this goal necessitates a more rigid postoperative breast, which can last for up to 2 months, the gland ultimately does regain its elastic consistency and normal movement. By the time the mesh is absorbed (in the case of mixed or woven meshes) or integrated (in the case of biologic meshes), the cicatrization that has occurred is strong enough to enable the breast to maintain its new shape against its own weight and the effects of gravity. Breast palpation is normal, and no mesh can be felt by either patient or physician after healing is complete. The main disadvantages of this procedure are the increased technical difficulty and the steep learning curve, in addition to mesh-related complications, such as infection, palpability, retraction, skin necrosis, or extrusion. Although Goes indicates minimal rates of mesh-related complications, there are many opportunities for the inexperienced surgeon to get into trouble. Extreme vigilance in
excising the skin flaps and optimal retraction with meticulous placement and securing of the mesh are imperative to prevent suboptimal results and potentially disastrous outcomes.

**Technique**

The technique is begun with the preoperative marking. Four cardinal points are determined (Fig. 7.18). It is important to ensure that enough skin is left to cover the newly formed breast mound. Point A is the level of the top of the new areola. Point B marks the distance from the inframammary fold to the bottom of the new areola (average 7 cm). Point C is the distance from the medial breast border to the medial aspect of the new areola at the level of the nipple (average 9 cm). Point D is the distance from the anterior axillary line to the lateral aspect of the new areola at the level of the nipple (average 12 cm). The area between the areolar and the skin marking is de-epithelialized. An incision is made along the outer ellipse, and the skin flap is developed. The superior dissection proceeds along the base; the thickness of the subcutaneous fat tissue is progressively increased as one gets closer to the base of the breast. Undermining continues over the pectoral fascia for approximately 5 cm superiorly and then inferiorly under the gland approximately one third of the way into the retromammary space. Care should be taken to identify and preserve all perforating vessels (Fig. 7.19). Once the skin and the gland are separated, wedges of tissue can be removed superiorly and inferiorly to accomplish any needed reduction of breast tissue. The base of the mammary gland should not be disturbed. To reassemble the gland, any superior excisional defect is closed, and the gland is fixed to the thorax in a way that fills and elevates the upper pole of the breast (Fig. 7.20). The lower hemisphere excisional defect is then closed and secured to the intramammary connective ligaments and the anterior pectoral fascia. The dermal flap, which has been undermined to the areola, is gently stretched over the gland; it is attached inferiorly to the anterior...
Dressings consist of triangular pieces of Micropore tape covering the whole gland, which is left in place for 20 days. Tegaderm also works well for this purpose. Suction drains are removed after approximately 5 days.

pectoral fascia when possible and superiorly to the connective ligaments. This dermal component is the so-called internal skin lining (Fig. 7.21). Next, the mixed mesh (polyglactin mesh with Dacron filaments), woven mesh (polyglactin/polypropylene), or biologic mesh is applied over the dermal flap as a brassiere. It is used to give an ideal shape to the parenchymal cone and to elevate the breast slightly. It is sutured to the anterior pectoral fascia. Overcorrection of the breast mound is not necessary and in fact is detrimental because there is no postoperative settling of the breast tissue. The external skin lining is brought up over the breast mound and closed around the areola with a circular continuous deep intradermal suture of Mersilene 2-0 on a straight needle. A continuous, intradermal Monocryl 4-0 suture is used to fix the areola skin to the external skin lining.

Fig. 7.20 Goes technique. Lines of resection from the superior and inferior hemispheres to narrow the base. Note that mastopexy alone, these regions can simply be imbricated rather than resected. (Redrawn after Goes JC. Periareolar mastopexy and reduction with mesh support. In: Spear SL, ed. Surgery of the breast: principles and art. Philadelphia: Lippincott-Raven; 1998:697.)

Fig. 7.21 Goes technique. (A) The breast projects anteriorly and superiorly after formation of the cone and reinforcement of the breast with mesh. (B) Schematic for the placement of mesh. The polyglactin-Dacron composite mesh of Goes’ original description is replaced with a Vicryl-Prolene composite. (Redrawn after Goes JC. Periareolar mastopexy and reduction with mesh support. In: Spear SL, ed. Surgery of the breast: principles and art. Philadelphia: Lippincott-Raven; 1998:697.)

Dressings consist of triangular pieces of Micropore tape covering the whole gland, which is left in place for 20 days. Tegaderm also works well for this purpose. Suction drains are removed after approximately 5 days.
**Vertical/short scar techniques**

As the degree of the breast ptosis increases, so does the total length of the incision necessary to correct it. The logical extension of the periareolar scar is the addition of a vertical component. We believe that some type of parenchymal reconstruction is necessary to create a long-lasting result in mastopexy. There are specific cases where a surgeon may elect not to perform parenchymal remodeling, such as in an contralateral mastopexy for symmetry in breast reconstruction, where follow-up imaging may be a concern. In such cases, the surgeon may select to perform a skin tightening procedure alone by de-epithelializing in the pattern of Wise or in a vertical pattern.

**Lassus vertical scar technique**

Claude Lassus developed a technique for reduction and mastopexy combining four principles: a central wedge resection to reduce the size of the breast, if needed; transposition of the areola on a superiorly-based flap; no undermining of the skin; and addition of a vertical scar component.\(^{23-26}\)

The best candidate for this procedure is a young woman with good skin elasticity, a firm, glandular breast, and breasts that are not excessively large or ptotic. Lassus cites numerous advantages of this technique. First, the central vertical wedge resection, when necessary, does not impair the blood supply to the gland. Because there is no undermining of the skin from the gland or the gland from the muscle, the vascular perforators are not disturbed, theoretically eliminating the possibility of skin or glandular necrosis. In addition, the use of a superiorly based pedicle to transpose the nipple-areola complex preserves most of the neurovascular supply of the areola, thereby reducing the occurrence of necrosis or decreased nipple sensation. If, however, the nipple-areola complex has to be elevated more than 10 cm, a lateral pedicle as advocated by Skoog is used.\(^{27}\) A superior pedicle flap would necessarily have to be folded over onto itself, increasing the risk for venous congestion and possible areolar necrosis. Because no undermining is performed, the risk for necrosis of skin and areola is decreased. By joining composite blocks of skin, fat, and gland to shape the breast, subsequent healing produces a solid, fibrous band the thickness of the breast. This becomes the main breast support, ensuring projection helping maintain long-lasting results. Also, because there is no undermining, drains are usually not necessary. A disadvantage of the procedure is the visible vertical scar. Although some would argue that a vertical scar in the standing position may be hidden, and that most of the time it vanishes over the years – it is still a scar on the breast and many woman are not willing to accept this. The patient must also be made aware that the early postoperative breast shape will be less than aesthetically-pleasing and that it may take several months for the breasts to obtain their final shape. Some women may not psychologically be able to wait 3 months or more to obtain a result they can accept. In addition, an important aspect of the procedure is an “adjust as you go” philosophy. Thus, there is an inherent need to remove sutures and revise the breast shape using multiple excisions. Some surgeons may find this removal and replacement of suture lines frustrating. Also, one must be careful not to handle the tissue too aggressively while making these fine adjustments, which can result in problems with wound healing.

**Lejour vertical scar technique**

Madeleine Lejour derived her variation of the vertical scar technique by modifying concepts from Lassus, Marchac, Arie and Pitanguy.\(^{5,23,24,28-32}\) This technique uses adjustable markings, a superior pedicle for the areola, and central pedicle reduction where necessary, with lower pole skin undermining. Lejour’s modifications can be described by the following three principles: wide lower pole skin undermining to promote skin retraction and to reduce the amount of scarring; over-correction of the deformity to promote better late results; and liposuction of the breast to facilitate molding and to remove unnecessary fat tissue, which has a tendency to resorb if the patient loses weight and thereby contribute to recurrent ptosis.

The Lejour technique can be used either as a reduction technique or as a mastopexy technique; therefore, it is applicable to many breast sizes and skin qualities. The author points to many advantages of this technique.\(^{33}\) First, by detachment of the skin from the lower portion of the breast and use of strong subglandular sutures to reshape the gland, postoperative stability is
enhanced. Also, the redraped skin can retract over the gland without pressure from the weight of the gland acting against the contraction forces. By performing minimal skin excision, one can avoid over-resection, which can lead to widening of scars and wound complications. The remaining skin is gathered into fine wrinkles to reduce the length of the closure. These wrinkles flatten within a few weeks to months. The resulting scar is limited to the periareolar region with a vertical limb that does not cross the inframammary fold. Nipple sensitivity is preserved by superior pedicle techniques, especially when the base of the upper pedicle is large (as with this technique). Liposuction, which is used when volume reduction of the breast is necessary, is considered by Lejour to be advantageous because it helps make the breast softer, more pliable, and easier to shape. It protects nerves, vessels, parenchyma, and connective tissue while removing breast volume. Suction can be used at the end of the procedure to decrease any tension on the closure. Any noted asymmetry can be corrected before leaving the operating room. Finally, because liposuction removes more fat than other tissue, the resulting breast is less susceptible to recurrent ptosis in cases when the patient experiences subsequent weight loss. This contributes to the stability of the final breast shape. As with the Lassus technique, the major drawback is the amount of time postoperatively before the final result can be realized and appreciated. Both the surgeon and the patient must have patience while the skin retracts, the wrinkles flatten, and the overcorrected breast, with its superior bulge and inferior flatness, evolves to an aesthetically pleasing breast. The author notes that some skin redundancy occasionally remains, which necessitates excision by a horizontal approach. Although this horizontal incision is small, it does add a horizontal component to the resulting scar.

**Grotting sculpted vertical pillar mastopexy**

With increasingly better results being shown with the vertical techniques of mastopexy and reduction, the authors developed a modification of the vertical technique to produce a beautiful shape with short scars that also minimized complications. The current preferred method has the latitude to allow resection of glandular tissue, if desired, and also the insertion of an implant in either the subglandular or the subpectoral plane if more volume is required. The markings are performed with the patient in the standing position with the arms hanging at the sides. The inframammary fold is marked on both sides. Next, the future nipple position is determined using a combination of reference points. The inframammary fold in transposed onto the anterior surface of the breast. Typically, this point is about 2 cm lower than the point chosen for inverted T techniques. Then, the lower pole breast tissue is gathered to simulate the mastopexy in order to determine if the nipple seems to elevate to the marked point of transposition. Next, the point is cross-checked against the midhumeral line. The sternal notch to new nipple position is measured, and this typically is 20–23 cm (Fig. 7.22). Symmetry between the sides is checked, and, if any measurements are significantly disparate, then appropriate adjustments are made. An important consideration is parenchymal volume asymmetry. In cases where this exists, it is often necessary to mark the A point a centimeter or so lower on the larger side than the smaller side, in order to account for skin recoil after tissue resection. Final nipple position is usually determined intraoperatively after completing the vertical closure.

**Hints and Tips 1**

Multiple reference points should be used preoperatively to estimate the final placement of the nipple areolar complex. However, it is the intraoperative assessment after closure of the vertical pillars where the final position of the nipple areolar complex is determined.

The next mark is the breast meridian, marked on its anterior surface. The midpoint of the inframammary fold is measured and will be the reference point for creating the marks for the medial and lateral pillars that will approximate at this point after completing the vertical closure. It is preferable to use the standard superior pedicle for the nipple-areolar complex, but if the density of the gland or distance of elevation appears restrictive, the superomedial pedicle recommended by Elizabeth Hall-Findlay is used. The medial and lateral pillar lines are drawn by manually distracting the breast tissue medially and laterally. These marks are joined inferiorly by a parabolic line whose lowest-point of the curve is
Fig. 7.22 (A–H) Authors’ preferred modification of vertical technique, preoperative markings. The midline and inframammary folds are marked. Point A, the transposed location of the inframammary fold, is marked on the breast anteriorly, as is the breast meridian. The breast is then manually distracted laterally and then medially to estimate and mark the medial and lateral vertical limbs, respectively. Points C and D are the cephalic extents of these vertical limbs and will become the bottom of the new areola. Often the vertical limbs can be manually approximated to simulate the mastopexy. The upper curved line represents the new areola boundary and is usually 12–14 cm in length.
Approximately 2–3 cm above the inframammary fold (Fig. 7.23), superiorly, the vertical lines are curved up to the new nipple point. Small inflections of the lines to create a mosque-dome effect can be used to accentuate the future 6-o’clock position on the areolar closure if desired. The top of the vertical closure at this point is pinched approximated to ensure adequate skin will remain for closure. From the top of the vertical closure, one measures down 5–6 cm and makes another mark that will represent the approximate position of the new inframammary fold. The breast tissue below that point will comprise the bottom of the future superiorly-based dermoglandular flap (if the intention of the surgeon is to autologously-augment the patient) or be resected (as in small reductions, with or without an implant). Preaxillary fullnesses and lateral chest rolls may need liposuction to contour and should be marked.

Hints and Tips 2

Contouring the preaxillary fullness and lateral chest rolls with liposuction is an option to further improve breast aesthetics when fatty excess exists in these areas at the same time as the mastopexy procedure. The results are improved and patients appreciate it.

Flap design depends on the need to augment the upper pole of the breast. As mentioned, though, in cases where a small amount of parenchymal reduction is required, this flap represents a readily available source for removal. The volume to be left behind is again approximated, and the resulting shape is visualized (Fig. 7.24). If tissue is to be removed (small reduction), the lines should anticipate that, but similarly, if an implant is to be added, the final tension on the closure is a critical factor. The lines are adjusted in or out on the basis of those factors. It is also preferable to mark on the skin surface any inferior glandular tissue that will be resected, much the same way as one would mark this in an inverted-T reduction.

Technique

Once general anesthesia is satisfactorily induced, we ensure proper positioning on the operating room table. The patient’s body should be centered on the operating room table, and the arms should be properly secured and padded to allow the patient to be sat up and the surgeon assess the result intraoperatively. After the patient is prepped and draped, pendulum sutures are placed at the sternal notch and xiphoid areas to enable symmetry later in the operation. Simulated mastopexies using skin staples or Adair clamps can be performed at this point to ensure adequate tissue will remain for vertical pillar closure. The nipple areola is marked with an appropriate sized nipple marker, and then lidocaine 0.5% with epinephrine 1:200 000 is infiltrated in the intended lines of incision, areas to be de-epithelialized, as well as beneath the gland. In a straightforward mastopexy, the superiorly-based inferior flap will be completely de-epithelialized and folded underneath the nipple-areola complex to fill the upper pole. It is often necessary to resect the base of the pillars at a level that measures approximately 6 cm from the top of the vertical limb down to the pectoral muscle beneath it. Appropriate projection of the gland left behind prevents recurrence of ptosis. After de-epithelialization of the periareolar skin and that between the medial and lateral pillar marks, the lower pole of the breast is undermined in the subcutaneous plane over that portion of the breast to be resected inferiorly, if any (Fig. 7.25). The gland is then undermined at the level of the pectoralis fascia from the inframammary fold inferiorly to the superior...
pole to establish space into which to fold the superiorly based inferior flap. At this point, the bases of the pillars can be trimmed if needed. If this is not the case, then not much medial or lateral undermining is necessary. The flap is sutured into an appropriate position. If no flap is used and the tissue is resected between the medial and lateral pillars, then a suture is used from the undersurface of the gland beneath the nipple-areola complex to the pectoral fascia as high up in the upper pole as possible. This imparts roundness and fullness to the upper pole. In cases where no implant is planned, a “lateral shaping suture” is used to bring the lateral parenchyma at the anterior axillary fold toward the midline of the breast to form an aesthetic curve to the lateral portion of the breast. The medial and lateral pillars are then simply reapproximated with 2-0 Vicryl sutures in the parenchyma and 3-0 polydioxanone as a layered and running skin closure. The nipple-areola complex is exteriorized in its virtual position with the patient sitting up in the operating room (Fig. 7.26). The
“on the table” shape is usually one of a flattened lower pole and a rounded upper pole with the nipple pointing slightly inferiorly, creating the so-called “upside-down breast” (Fig. 7.27). The use of Tegaderm to support the final shape is an important aspect of postoperative care (Fig. 7.28). It should be left on for up to 2 weeks, at which point a bra should be used day and night for 6–8 weeks (Figs 7.29, 7.30).

Authors’ preferred technique for augmentation mastopexy

Augmentation mastopexy is the combination of augmentation techniques with mastopexy techniques for the correction of ptosis. Because ptosis is the result of deficient glandular tissue, excess skin with nipple malposition, or more commonly a combination of both, it makes sense that correction of this deformity would combine a technique that increases breast volume (augmentation) with a technique that decreases the skin envelope and allows repositioning of the nipple-areolar complex (mastopexy). These techniques are by no means for everyone, but they should be included in the plastic surgeon’s choice of techniques for the correction of breast ptosis. Many patients want the lift but also prefer the shape created by the breast implant.

Any of the previously discussed mastopexy techniques can be combined with augmentation. The chosen combination will depend on the patient’s presenting complaints and anatomy. In general, this technique is most useful for those women with a deficit of glandular tissue regardless of the size of the skin envelope. Another good indication is asymmetry when one breast is hypoplastic and the other is ptotic.

The advantages and disadvantages of the mastopexy techniques remain the same, as already noted. However, the added benefits and risks of augmentation mammoplasty must now be considered. Advantages include improved fill of the skin envelope by virtue of the implant, particularly in the superior and superomedial aspects of the breasts. The risks include an increased chance of wound problems and dehiscence because of the added weight of the implant. This creates increased tension on the suture lines, especially in the face of over resection of the skin flaps by the surgeon’s incorrectly estimating the final breast volume in light of the implant. The increased risk for wound problems and dehiscence can be lessened if the surgeon is vigilant and keeps skin resection to a minimum at the beginning of the procedure. Additional skin resection can always be performed at the end of the procedure on the basis of the final volume of the breast with the implant in place. There are also the inherent risks of the implants (malpositioning, leakage, rupture, capsular contracture) and the patient’s perceived risks of silicone. The patient has the choice of silicone gel or saline implants if concurrent mastopexy is to be performed. Implant selection for augmentation-mastopexy is different than in
augmentation without mastopexy. In general, we scale down the base diameter and projection of implants chosen for augmentation-mastopexy. Selecting a textured surface device may assist in avoiding malposition, especially when the subglandular plane is chosen. If the parenchymal volume is deficient in the upper pole (<3 cm pinch thickness), then we prefer a subpectoral placement. The augmentation-mastopexy is also an excellent situation to improve breast shape, especially in cases of asymmetry. Usually, the ptotic breast has excess lower pole volume and is deficient in the superior pole. Often the asymmetry exists in the lower pole of the breast. A technique we have found quite helpful in cases such as these is to reduce the lower pole parenchyma and augment the breast with an implant – what we call the “Addition–Subtraction Concept.” This concept can be applied to several areas of aesthetic and reconstructive plastic surgery and is particularly apropos in the setting of breast ptosis and asymmetry. We find it useful in asymmetry cases to perform a differential lower pole parenchymal resection, followed by placement of an implant to improve upper pole fill and elevate the upper breast border. Even in the symmetric patient, it is often necessary to reduce the lower pole and add an implant to improve breast shape and upper pole fill.

**Hints and Tips 3**

Lower pole excess and upper pole deficiency are typical findings in breast ptosis. Often asymmetries exist as well, with asymmetry existing in the lower pole tissues. Lower pole parenchymal resections (asymmetric resections in asymmetry cases, symmetric resections in cases of symmetry) combined with implant augmentations, the “Addition–Subtraction Concept” can be employed to achieve beautiful breast shape and treat these areas of excess and deficiency simultaneously.

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*Fig. 7.29 (A–C) Preoperative views of a 31-year-old patient with moderate to severe ptosis. (D–F) Postoperative views after vertical mastopexy via the authors’ technique.*
Again, the implant is placed in the subglandular or subpectoral position based on the adequacy of the available parenchyma as determined by skin pinch thickness of >3 cm. A further variation on this technique is to use autologous fat grafts in the upper pole to improve upper pole fill in cases where the patient does not desire an implant.

**Technique**

Augmentation mammoplasty proceeds with marking and incisions according to the mastopexy technique chosen. Once the breast tissue or muscle is exposed, the pocket for the implant, either submuscular or subglandular, can be formed and the implant inserted. The mastopexy can then be completed.

There is one final point that should be carefully considered before augmentation mastopexy, especially in women with severe ptosis in whom a formal Wise-pattern mastopexy is planned – the blood and nerve supply to the nipple-areolar complex and the skin flaps. Surgeons must remain cognizant of the perfusion and innervation in relation to the incisions made for both the augmentation and the mastopexy portions of the procedure. Whereas the neurovascular supply is usually not compromised by formal mastopexy alone, the addition of the augmentation procedure may cause significant alteration in blood supply. Any mastopexy technique that requires wide undermining of skin flaps (e.g. Goes or Benelli techniques) should not be combined with subglandular augmentation because this would almost certainly result in glandular necrosis. With the combination...
of these two procedures, there is the possibility of a denervated or devascularized nipple-areola complex, breast tissue, or skin flap.

Hints and Tips 4

Careful attention must always be paid to the perfusion and innervation of the breast in mastopexy and augmentation-mastopexy procedures. Whereas the neurovascular supply is usually not compromised by formal mastopexy alone, the addition of the augmentation procedure may cause significant alteration in blood supply. However, mastopexy techniques that require extensive undermining can jeopardize perfusion and should be implemented carefully.

One should undermine judiciously and carefully evaluate the mastopexy technique as it is being performed to help avoid these potential complications. Should there be a suggestion of nipple or skin flap compromise at the conclusion of the procedure, then there are steps that can be taken in an attempt to reverse this process. These include removing the periareolar skin sutures to allow relaxation of the tissues and increased blood supply to the nipple-areola complex. Removal of the implant may be necessary to reduce tension on both the skin flaps and the nipple-areolar complex. This too can sometimes allow increased blood flow to the tissues. Loss of the nipple is a devastating complication for both the patient and the surgeon, and aggressive measures must be undertaken when there is concern about its viability. Nerve damage is difficult to assess immediately postoperatively. Therefore, one must perform careful and well thought out dissection in an attempt to minimize damage to these structures. In one’s enthusiasm to treat severe degrees of ptosis, one should not lose sight of the main goal, which is the formation of a well-shaped, well-proportioned, viable breast with intact sensation. Most of the time, this goal can be achieved with proper selection of patients and careful planning and execution of the surgical technique, much to the delight of the patient and the satisfaction of the surgeon (Fig. 7.31).

Mastopexy post-explantation

A woman may request explantation of her breast implants for many reasons. Some women have concerns about the safety of silicone; some have implants that have ruptured or leaked; some have disfiguring or painful capsular contractures; some have malpositioned implants that have not responded to subsequent attempts at correction, and some have implants that have become infected. Other women may present with unaesthetic implant visibility, whereas some may complain of palpability and desire explantation. Finally, there are those women who after many years no longer wish to be as large as they are.

When an implant is removed, the breast may assume an excessively lax and ptotic position. Often, there will also be a maldistribution of glandular tissue with inferior pole deformities. The potential for this post-explantation result should be included when the explantation procedure is discussed with a patient. The surgeon should also be prepared to discuss procedures that are available to help reshape the remaining breast tissue. This discussion should include realistic expectations of what can be accomplished along with the possibility of needing additional scars to achieve an optimal breast shape. If additional scarring is not acceptable, the patient must be made aware of the probability of a suboptimal result. The surgeon should ascertain the patient’s motivation for removal and post-removal expectations. If a woman has had an implant rupture, whether it is silicone or saline, she may merely wish to have it replaced with the same type of implant; if she had silicone implants, she may wish to have both implants removed and replaced with saline, or vice versa. Those women with capsular contractures may opt for replacement, but there are those patients who just want the implants removed. This is similar to those women with malpositioned implants that have not responded to secondary or even tertiary procedures. Then there are those women who for one reason or another, mostly because of changes in body image, decide after many years to have their implants removed. These women all have the option of explantation alone, explantation with replacement, or explantation with some type of concurrent mastopexy procedure. The women with only one option are those with an infected implant. These women require explantation, irrigation, and drainage. Implant replacement or mastopexy procedures must be postponed until the infection has resolved and the tissues have healed. One other group of women needs to be mentioned here, and these are
under sterile conditions after first placing local anesthetic, which is 1% lidocaine with epinephrine 1:200,000, in the lower pole of the breast (Fig. 7.32). A sterile 18-gauge needle is then attached to sterile suction tubing, and, after allowing analgesia to take effect, the needle is placed through the anesthetized skin, subcutaneous tissue, and parenchyma, into the implant. The right hand guides the needle, holding it in place within the implant cavity, while the left hand compresses the implant and displaces it inferiorly (Fig. 7.33). There are several benefits that this technique affords the patient and surgeon. First, the actual volumes within each implant can be directly measured, thereby

women who have had implants placed secondary to reconstruction after mastectomy. These women have one other option on explantation, that being reconstruction with autologous tissue (e.g. latissimus dorsi flap, TRAM flap). This subject is beyond the scope of this chapter and is not discussed. The reader is referred to the chapters on breast reconstruction in this book. Our discussion here focuses on those women who wish to have explantation with mastopexy.

A particularly useful technique in the case where mastopexy is planned post-explantation of saline-filled implants is the intentional deflation of the implants preoperatively. We perform this technique in the office

Fig. 7.31 (A,B) Preoperative views of a 44-year-old female post-lapband and a 60 lb weight loss. She had previously-placed oversized subpectoral implants. (C,D) Postoperative views after bilateral removal of implants and replacement with subglandularly-placed silicone gel implants in combination with parenchymal resection (Addition–Subtraction Concept).
Fig. 7.32 (A,B) Preoperative saline implant deflation. Local anesthetic (1% lidocaine with epinephrine 1:200,000) is infiltrated into the lower pole of the breast, and then the area is prepped with Betadine solution. A sterile 18-gauge needle is attached to sterile suction tubing, and, after allowing analgesia to take effect, the needle is placed through the anesthetized skin, subcutaneous tissue, and parenchyma, into the implant.

Fig. 7.33 Preoperative saline implant deflation. The right hand guides the needle, holding it in place within the implant cavity, while the left hand compresses the implant and displaces it inferiorly.

giving the patient and surgeon a true reference for implant size selection in cases where implant removal and replacement, with or without mastopexy, is being considered. This is particularly helpful in cases where the patient is not sure of the volumes or when autoinflation of the implants is suspected. Additionally, the preoperative deflation allows the patient to assess how much residual parenchymal volume she has without the implant fill. We recommend deflation approximately one month ahead of the planned surgery to allow the tissues to recoil from the burgeoning and stretch caused by the implant. During this time, we also have the patients evaluate their deflated breasts in a bra to see if they are happy with how much tissue remains. If they are dissatisfied, then an implant will most likely be required in addition to the mastopexy. Often, however, women are very satisfied and frequently happy to be relieved of the volume of the implants.

As with mastopexy procedures in general, the most important component in determining the ability to reshape the gland is the amount of glandular tissue available. In those women with minimal glandular tissue, explantation followed by mastopexy procedures alone will produce a suboptimal result. These women may best be served by some type of augmentation mastopexy procedure. Another option for patients with silicone gel implants would be just to perform the explantation and then allow the skin envelope to

Hints and Tips 5

The intentional preoperative deflation of saline-filled implants prior to mastopexy or augmentation-mastopexy is a safe procedure that is very beneficial to both patient and surgeon in several ways.
contract, a concept similar to that for the preoperative saline implant deflation technique described above. Some of these women may obtain significant improvement after contraction is allowed to take place. For them, a simple nipple-areola complex repositioning procedure may be all that is required to achieve a satisfactory result. Whichever procedure is chosen for reshaping, the neurovascular supply for the nipple-areolar complex must always be considered. The mastopexy procedure chosen must always take into consideration possible alterations to the nerves and vessels secondary to the original augmentation. In some patients, especially when there is little native breast tissue, it may be prudent to perform mastopexy as a delayed operation.

The next issue that needs to be addressed is whether to perform capsulectomy or capsulotomy. Although there are many differing opinions among surgeons and many special situations, in general, capsulectomy should be performed in patients with ruptured silicone gel implants, in patients with severe capsular contracture, or when the capsule contains large amounts of calcium deposits. Otherwise, the capsule, with or without additional capsulotomy incisions, may be left in place to add bulk to the glandular reconstruction.

**Technique**

Before removal of the implant, the new areolar border is marked. De-epithelialization is performed on the basis of the mastopexy technique. Any of the previously discussed mastopexy procedures may be used. It is usually easier to perform the initial mastopexy maneuvers with the implant in place, and this is the method we prefer. An incision is usually made in the inframammary fold, but a periareolar incision can occasionally be used to gain access to the implant or capsule. If the implant to be removed is silicone and there is suspected leakage of the implant, the capsule is left intact. Dissection proceeds on its anterior surface followed by posterior release from the pectoralis muscle or chest wall, depending on where the implant was originally placed. Dissection is with a combination of cautery and blunt technique. In dissecting anteriorly over the capsule in a submuscularly placed implant, one should take care to avoid the thoracoacromial artery because cautery-induced muscle contraction brings the artery close to the dissection plane. Once the capsule is freed, it is removed totally and intact. The pocket is then visualized and palpated. Any lumps or irregularities are excised for biopsy. The pocket is then irrigated, and the mastopexy portion of the procedure is begun. If the implant to be removed is silicone without evidence of leakage or if it is a saline implant, a total capsulectomy is usually not necessary. An exception to this is the silicone implant that is subsequently found to be ruptured. In addition, if the capsule is calcified to such an extent that leaving it in place would distort the subsequent breast reshaping, a partial capsulectomy is in order. If the capsule is to be left in place, dissection should proceed through the tissues to the capsule. The capsule can be opened and the implant delivered. The capsule should be palpated for calcifications and irregularities, and, if these are found, a partial capsulectomy can be performed. Reshaping of the gland can then be accomplished. Drains are placed, and the skin envelope is closed. The nipple is repositioned and sutured in place.

When sufficient glandular tissue is available, mastopexy after explantation often yields an aesthetically pleasing breast shape. This is most often accomplished by use of a superiorly based dermoglandular flap that is folded back on itself to establish projection and upper pole fill.

**Inverted-T technique**

The inverted-T or keyhole closure is the technique most-familiar to plastic surgeons trained in the USA. The Wise pattern vertical scar with long horizontal scar is based on the reduction technique of the same name. Regardless of the name, the long horizontal component allows adequate resection of the skin envelope in extremely ptotic breasts. The inverted T-scar technique is reserved for those women with moderate to severe breast ptosis with a large excess of skin and a moderate amount of glandular tissue. This technique uses the same markings as traditional reduction techniques. However, a reduction procedure is usually not required for mastopexy in these patients. The advantages of this technique are the ability to excise all excess skin and the ability to see the final shape of the breast while the patient is still on the operating table. This allows final adjustments to
shape and symmetry to be made before the end of the procedure and decreases the chance that a subsequent revision will be necessary.

The major disadvantage of this procedure is the increased length of the incisions, which increases the length of subsequent scars. The horizontal component usually runs from the most medial aspect of the breast to the most lateral aspect. In no patient should the medial incisions meet or be within 1–2 cm of midline. The risk for hypertrophic scarring is greatly increased in this area, and lengthening the medial extent of these incisions should be avoided. Another potential disadvantage is that the shape of the new breast is supported mainly by the skin envelope. There are no pillars or intraglandular sutures to help support the newly formed breast shape. This lack of internal support increases the chance of recurrent ptosis during the subsequent months and years.

**Technique**

Markings proceed with the standard Wise pattern. First, the meridian line of the breast is marked. The new position of the nipple is marked along this line at the anterior projection of the inframammary fold. A wire keyhole pattern is spread to allow it to just encompass the original areola. The superior aspect of the pattern is placed approximately 2 cm above the location of the projected nipple position. These markings can be checked by bringing these points together with infolding of the central and inferior skin and assessing tension. Some tension is necessary to compensate for the inevitable postoperative relaxation of skin support; however, it should not be so great as to risk ischemia or wound problems or to cause an unnatural tightness to the base of the breast. These vertically-oriented markings are extended laterally and medially on the breast to converge with the inframammary fold.

In the operating room, the portion of the areola to be preserved is marked with an areolar marking device of the appropriate diameter. The area within the marks is de-epithelialized. Transdermal incisions are made along the upper portion of what would be the vertical bipedicle flap of a reduction mammoplasty on either side of the nipple-areola complex. If there is an abundance of de-epithelialized breast tissue below the inframammary fold, dissection of the gland off the pectoralis muscle is undertaken starting from the inframammary fold and proceeding upward to establish a superiorly based dermoglandular pedicle. The dissection continues until the pocket can accept the excess inferior glandular tissue. This tissue is folded behind the breast and attached to the pectoralis fascia high enough to eliminate gross glandular redundancy. Skin closure is accomplished in standard fashion with little or no further undermining. The nipple-areola complex is positioned and sutured into place (Fig. 7.34).

**Postoperative care**

Management of the post-mastopexy in the perioperative period has many facets, ranging from medication administration to dressing and drain use to activity limitations and even what type of bra to use. It is typical in the practice of these authors not to continue antibiotic prophylaxis postoperatively after routine mastopexy. Perioperative intravenous antibiotics covering skin flora, such as the first generation cephalosporin cefazolin or alternative in the case of allergy, are given less than an hour prior to incision and are typically all that is required. Postoperative narcotic analgesics are typically used as needed within the first week or two after surgery, counseling the patients on side-effects such as sedation and constipation, among others, and recommendations for care in those circumstances are given in a preoperative packet. Antiemetics, such as the selective 5-HT3 receptor antagonist ondansetron or the phenothiazine H-1 receptor antagonist promethazine, are usually used for postoperative nausea and vomiting. It is the practice of the authors to dress the breasts in Tegaderms applied without stretch to decrease shear forces and blistering. The Tegaderms have aperture at the nipples that allows oozing to drain out onto gauze pads held in place by a postoperative brassiere. These Tegaderms are left in place for 2 weeks after surgery. Scar care is begun at 3 weeks after surgery, counseling the patients on side-effects such as sedation and constipation, among others, and recommendations for care in those circumstances are given in a preoperative packet. Antiemetics, such as the selective 5-HT3 receptor antagonist ondansetron or the phenothiazine H-1 receptor antagonist promethazine, are usually used for postoperative nausea and vomiting. It is the practice of the authors to dress the breasts in Tegaderms applied without stretch to decrease shear forces and blistering. The Tegaderms have aperture at the nipples that allows oozing to drain out onto gauze pads held in place by a postoperative brassiere. These Tegaderms are left in place for 2 weeks after surgery. Scar care is begun at 3 weeks after surgery, with over-the-counter scar treatments that are then transitioned to silicone sheeting, which is continued for up to a year or more as indicated. Drains are rarely used in typical mastopexy cases. Postoperative brassieres are used for at least 8 weeks after surgery, in an effort to support the new breast as the
postoperative edema begins to egress. Exercise by the patient is minimal in the first week or so after surgery, which is typical while postoperative pain begins to improve. During the second week, mild activities such as walking can be initiated. During the third week, elliptical trainers or stationary bicycles can be used without the adjunctive use of the upper body lever arms that are available at some gymnasiums. Full-on running or activities that tend to cause vigorous up and down motion of the new breasts are restricted until 8 weeks postoperatively. Though exceptions can sometimes be made in certain circumstances, rigorous adherence to minimizing pectoralis muscle activity in augmentation mastopexy patients, especially reoperative cases, must be maintained to protect the integrity of the internal sutures against the weight of the implant. Capsular displacement or massage exercises are not recommended in cases where textured devices are used or reoperative cases.

**Outcomes, prognosis, complications**

Although most mastopexy procedures produce a higher-positioned and shapely breast that pleases most patients, there are complications that may require revisional procedures. These include nipple loss, unacceptable scars, flap necrosis, nipple malposition, and cosmetic disappointments. In the event of any of these complications, secondary procedures to correct any shortcomings should be made available to the patient. The primary goal, however, is to avoid any of these adverse sequelae.

**Nipple loss**

Nipple loss is one of the most devastating complications that can happen to both patient and surgeon. The incidence of nipple loss by various techniques is reported...
Outcomes, prognosis, complications

In addition to technical errors, nipple loss can be predicted by a variety of patient factors including smoking, diabetes, obesity, and hypertension. Minimizing risk for this complication begins with proper selection of patients and technique. In high-risk patients (smokers, patients with diabetes or obesity, or those with severe ptosis), a free nipple graft technique is an option that can be considered. This is also a possibility intraoperatively or postoperatively if the viability of the transposed nipple appears compromised. Until approximately 12 h postoperatively, the compromised nipple-areolar complex may be converted to a free nipple graft. This, of course, assumes that a satisfactory dermal bed can be found to accept the nipple graft. After 12 h, conservative treatment of any nipple necrosis should be undertaken, including release of sutures, topical nitropaste or leeches, greasy dressings, hyperbaric oxygen therapy (if available), and appropriate antibiotic therapy. Many times, conservative treatment and closure by secondary intention produce a satisfactory result. Whereas the usual rule with ischemic tissues is early sharp débridement, in nipple necrosis, débridement should be delayed as long as possible. If healing does not produce a satisfactory result, the nipple-areolar complex can be reconstructed by standard reconstruction techniques ranging from simple tattooing of the areola to flap reconstructions of the nipple itself.

Flap necrosis

Flap necrosis can occur by virtue of the flaps used, especially when the inverted-T or Wise-pattern mastopexy technique is used. The lateral flap is most commonly affected secondary to the substantial undermining required in this region to allow proper shaping of the breast. Although excessive tension is thought occasionally to play a small role, most flap loss is primarily ischemic. Treatment is similar to that of the ischemic nipple: greasy dressings, hyperbaric oxygen, or antibiotics. Débridement of large areas of flap necrosis should be undertaken when they are clearly demarcated. Delayed closure can be performed, thereby avoiding weeks or months of caring for an open breast wound. Small areas of skin necrosis (1–2 cm) may be treated conservatively, especially along the inframammary fold.

Nipple malposition

Although there are many formulas and methods to determine nipple position (i.e., sternal notch to nipple distance, inframammary fold to nipple distance, nipple to sternal distance, and mid-humeral position), none is perfect and nipple malposition may occur. This type of result can cause a patient’s disappointment with the procedure no matter how well shaped the newly constructed breast is or how well the incisions have healed. The nipple should be properly situated on the breast, at or near the point of greatest projection, with ample but not an excessive amount of tissue underneath it. When malposition of the nipple occurs, one can attempt to reposition it; however, one should wait at least several months to allow complete healing of the breast and nipple-areolar complex. The tissues should be soft and supple. It is easier to raise the nipple-areolar complex than to lower it. If the nipple-areolar complex is too low, then a small crescent of skin can be removed above it that will result in an elevated nipple-areolar complex. More often, all the incisions must be reopened and the skin envelope tightened.
Nipples that appear too high can be caused by one of two situations. The breast may have bottomed-out—and if this has occurred, a simple tissue resection can be performed inferiorly with use of the already present vertical and horizontal incision sites. If a high-riding nipple is the result of incorrect positioning, this is a more complex problem. One can attempt to lower the nipple by one of a series of maneuvers including V-Y advancement inferiorly, transposition as a flap, or transfer as a graft. Regardless of the method used, a scar superior to the areola will be produced. This scar will be subject to the same potential problems as are other breast scars. In addition, a scar above the nipple-areolar complex, regardless of how well it heals, is not particularly aesthetic and will not be well accepted by the patient.

**Cosmetic disappointments**

Regardless of the technique, the goal of mastopexy is to produce attractive, symmetric, higher-positioned, fuller breasts. In some instances, this goal is not reached. Over-resection, under-resection, and healing complications can contribute to cosmetic disappointments. Under-resection can easily be corrected by additional tissue excision. Over-resection, however, presents a more disturbing problem that may require placement of an implant for correction. Residual tissue deformities secondary to infection, hematoma, or fat necrosis may require additional surgery for excision of resultant lumps and bumps to produce a breast with a soft, smooth contour.

Cosmetic problems may be apparent immediately postoperatively, or they may take weeks and even months to become evident. Although it is not always possible to avoid these cosmetic disappointments, one should do everything one can to keep them from occurring. In the majority of patients, mastopexy is a useful and rewarding procedure for both the patient and the surgeon.

**Other complications**

Complications such as infection and hematoma also may occur, though their incidence is uncommon. The main point for decreasing their incidence is minimizing risk for their occurrence. In the case of hemorrhage, stopping anticoagulants and antiplatelet medications prior to surgery in a timeframe appropriate to the specific medication is helpful in minimizing risk. Often, these medications are held for a week or so postoperatively. Controlling hypertension intraoperatively and postoperatively is also important, as is meticulous hemostasis intraoperatively, in reducing complications from hemorrhage in mastopexy. Should significant hemorrhage occur, early surgical intervention is warranted, with evacuation of hematoma and ensuring hemostasis. Infection is also a relatively infrequent complication due to vigilance in administration of perioperative antibiotics, which is typically one intravenous dose given prior to incision but no longer than one hour prior to incision. Early recognition and appropriate management, whether oral antibiotics or incision and drainage with intravenous antibiotics based on sound surgical principles, represent classic management of infectious complications.

**Secondary procedures**

Secondary procedures are sometimes necessary after mastopexy and related operations, and they may be indicated in cases of infection, hematoma, scarring, or an unacceptable cosmetic result, to name a few. Each complication has its own particular method of management, which have been detailed in their dedicated segments in the preceding section of this chapter. The unifying theme, however, in addressing complications in mastopexy and procedures related to mastopexy, is minimizing risk. Understanding and adhering to sound anatomic and surgical principles is paramount. Thorough history and physicals, and holding or continuing medications that may portend bleeding, wound healing, or other risks, are important in reducing the occurrence of these complications. Discussing with anesthesia providers any concerns, such as controlling blood pressure and redosing antibiotics in a specific timeframe, may reduce risk in certain circumstances. Ultimately, secondary procedures are necessary, but our primary objective is to prevent their occurrence.

From 1989 to 1994, the author has used vertical mammoplasty without a submammary scar for all breast reductions. Using a technique relying on adjustable markings, an upper pedicle for the areola, and a central breast reduction with limited skin undermining, the author achieves a breast whose shape is created by suturing the gland and does not rely on the skin. A personal series of 100 consecutive patients (192 breasts) operated on from 1990 through 1992 is reviewed, and mastopexy was performed in 39 breasts. Among the 153 breasts that required reduction, liposuction was attempted as a complementary procedure before the surgical reduction in the 120 fattest breasts. Between 100 and 1000 cc of fat (mean 300 cc) was suctioned in 86 breasts. This figure represents 50% of the large breasts in patients under 50 years old and 100% of the breasts in patients older than 50 years. There were few complications, and none required early reoperation. This series proves that vertical mammoplasty can be used in all cases of breast reduction, producing consistently good, stable results with limited scars. The adjunctive use of liposuction in fatty breasts can be considered safe and efficient.


In an effort to limit complications associated with periareolar mastopexy techniques, Spear et al. designed a series of rules to follow. Rule 1: $D_{\text{outside}} \leq (D_{\text{original}} + (D_{\text{original}} - D_{\text{inside}}))$. The amount of non-pigmented skin excised should be less than the amount of pigmented skin excised. This should prevent a postoperative areola larger than the original. Rule 2: $D_{\text{outside}} < 2 \times D_{\text{inside}}$. The design of the outside diameter should be no more than two times the inside diameter in order to minimize the discrepancy in circle sizes, thereby reducing tension on the closure. This should prevent an overly ambitious plan to remove skin, and, as a result, limit the risk of poor scars and overly-flattened breasts. Rule 3: $D_{\text{final}} = \frac{1}{2}(D_{\text{outside}} + D_{\text{inside}})$. This final rule helps predict the final areolar size, which is particularly useful in asymmetry cases, as well as those in whom no round block surgery is employed.


The round block acts as a keystone element to support the reshaped breast. The keystone relies on a crisscross mastopexy and by a circular nonresorbable suture of woven nylon included in the periareolar circular dermal scar. The crisscross mastopexy is achieved via dermis-to-dermis, gland-to-gland, and gland-to-musculoperiosteal unions, all of which are fixed definitively with nonresorbable suture. This technique can be used in many different breast cases, such as that for correction of ptosis, hypertrophy, or hypomastia, among others. In cases of hypomastia, the use of the round block technique permits easy access for insertion of the prosthesis as it simultaneously corrects ptosis. In cases of tumor excision, the round block produces a discrete scar and a more regular breast contour. In all types of mammoplasty, the main goal is to limit the scar.


Patients had become more critical about the result of a breast reduction operation over the past 20 years. Natural and lasting shape, as well as minimal residual scarring, is now expected by most of the patients undergoing that surgery. In 1969, the author described a vertical technique that achieved reduction and good shape but the end of the vertical scar could be seen below the brassiere line. In 1977, the author modified the technique by adding a small horizontal scar that eliminated the visible part of the vertical scar. In this article, the author demonstrates that the same technique he described in 1969 and modified in 1977 can produce a single residual vertical scar if properly used.


In 1955, the senior author (Wise) presented a new technique for reduction mammoplasty using special patterning devices, and this publication demonstrates the further experiences of the authors. The author’s technique allows rapid design of skin flaps and predictable size, contour, symmetry, and nipple position, all of which are difficult to achieve using a free-hand design. A four quadrant form is placed after designing and shaping the skin flaps, and the excess breast tissue is removed via wedge-shaped excisions. Care is taken not to remove too much from the central breast axis and the nipple, as well as not to undermine the skin flaps, to maintain perfusion of all these areas. The results allow for correction of varying degrees of ptosis and breast hypertrophy, as evidenced by case examples.