Mastopexy with and without augmentation

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History

The goal of a mastopexy procedure is to improve breast ptosis by lifting the breast including the gland and the nipple. Aging, gravity, and breast feeding contribute to breast ptosis by stretching the skin and increasing skin redundancy. This may be accompanied by atrophy of the breast gland further exaggerating the ptosis. Correction can be done through a variety of incisions depending on the extent of nipple and/or glandular ptosis. Regnault categorized ptosis by assessing the nipple position relative to the inframammary fold. However, ptosis can be further and more accurately defined by assessing the extent of breast gland below the inframammary fold while also assessing the nipple position on the gland.

Most mastopexy techniques are derived from breast reduction procedures. Breast reduction has a long history dating back to the 1800s. Kraske was the first to reduce the breast and skin horizontally and vertically resulting in the inverted T closure that we continue to use today. Wise developed a template pattern to mark the breast skin that facilitated reliable results with an inverted T closure. Goulian described a mastopexy technique that used a similar template device and inverted T closure, but skin undermining was avoided with the hope of providing a longer lasting result. Whidden developed the tailor-tack mastopexy which used sutures to temporarily reshape the skin envelope prior to marking the breast in order to individualize the skin resection. These early techniques relied on skin to support the breast gland and they were prone to recurrent ptosis. More recent techniques have included glandular reshaping in addition to excision of the redundant skin envelope to produce longer lasting results.

Attempts to minimize scarring led to the development of circumareolar and vertical techniques for mastopexy. The circumareolar technique was first described by Bartels and then popularized by Benelli and Goes. However, this technique often led to a flattened breast with pleating of the skin and stretching of the areola. Spear developed criteria for patient selection for this technique to help limit these complications. The vertical technique was first described by Lassus and then popularized by Lejour. This technique created pillars of breast gland used to reshape and support the breast. Modifications have included a small horizontal skin excision along the inframammary fold as described by Marchac and creation of an inferior glandular flap based on the chest wall used for autaugmentation as described by Graf and Biggs.

Mastopexy with augmentation in a single stage was first described by Gonzales-Ulloa. Performing a simultaneous augmentation and mastopexy can put the nipple areolar complex at risk for vascular compromise. This significant risk has prompted some surgeons to perform this procedure in two stages, especially in cases of severe ptosis such as massive weight loss patients. However, in more moderate cases, mastopexy with augmentation can be performed safely in a single stage. Patients must be aware that there is a high incidence of revision when combining mastopexy with augmentation. Fortunately, adding an implant typically helps fill the skin envelope, reducing the extent of mastopexy required.

Physical evaluation

- Measure breast width and upper pole pinch thickness.
- Assess for nipple ptosis by noting nipple position relative to inframammary fold.
- Assess for glandular ptosis by measuring centimeters of breast hanging below the inframammary fold.
- Assess for presence of unpigmented skin below the areola with the patient upright on frontal view.
- Assess overall breast skin quality, skin stretch, masses, and previous scars.
- Assess for any chest wall abnormalities such as pectus excavatum, pectus carinatum, thoracic hypoplasia, etc.
- Assess for any evidence of a tuberous breast deformity including constriction of the breast in the horizontal or vertical dimensions and herniation of the areola.
- Take note of asymmetries preoperatively including inframammary folds, breast volume, nipple position, ptosis, and chest wall.

Technical steps

Mastopexy without augmentation and mastopexy with augmentation are really two different procedures and we will address them separately, although some principles do overlap. Both procedures aim to raise the breast gland and the nipple...
in relation to the chest wall. Mastopexy with augmentation is more complicated since there are more variables related to implant selection and position. In addition, mastopexy with augmentation is more likely to disrupt the blood supply to the nipple due to more extensive undermining and it is more likely to require revision.

Mastopexy refers to a variety of procedures in our hands. We use circumareolar, circumvertical, and Wise pattern techniques. We decide on the type of mastopexy based on the amount of skin excess and the degree of nipple ptosis. We most frequently use the circumvertical technique (incorporating circumareolar and vertical skin incisions) with a superior pedicle for the nipple as described in detail below.

Preoperative assessment

A detailed breast history is required regarding previous breast surgery, current bra size, changes in breast size due to childbirth or breast feeding, family history of breast disease, and mammographic screening (recommended after age 40, but earlier in patients with significant family history). Patient goals need to be clarified. Specifically, volume goals and desired breast shape should be discussed. Patients who desire upper pole fullness and/or volume beyond their current size should consider augmentation in addition to mastopexy. An extensive discussion of risks such as scars, loss of nipple sensation, inability to breast feed, postoperative asymmetry, recurrent ptosis, and nipple necrosis should be included. Implant related risks should also be discussed.

Measurements and assessments as listed above should be performed during the initial consultation. Assessment of the frontal view is critical in terms of decision making. In patients where skin is visible below the areola on frontal view, simple augmentation without mastopexy may be enough to give an excellent result. For patients without skin visible below the areola or for patients that desire more complete elevation of the breast, mastopexy will be required regardless of whether an implant is used. In the massive weight loss patient, ptosis may be so severe that mastopexy with augmentation should be done in two stages.

Marking

The patient is marked while standing, often times the day prior to surgery. Midline, bilateral breast meridians, and inframammary folds are marked (Fig. 48.1). Nipple height is usually set at or just above the level of the inframammary fold in mastopexy patients, but up to 4 cm higher than the fold in mastopexy with augmentation patients in order to center the nipple and breast over the implant. Based around the selected nipple position, a circumareolar pattern is drawn either free hand or using the circular portion of a Wise pattern ring. The superior aspect of the circumareolar marking should be 2 cm above the new nipple position. The lateral, medial, and inferior markings should skirt the areola creating an oval that includes the existing areola.

The breast is then displaced medially and laterally to place the vertical markings in line with the breast meridian (which was marked earlier on the chest wall below the inframammary fold). A horizontal line is then placed to join the vertical markings approximately 2–4 cm above the inframammary fold.

Mastopexy procedure

The areola is incised at a diameter of 38 to 50 mm, but most often at a diameter of 42 mm. The circumvertical incisions are made along the preoperative markings. The intervening skin is de-epithelialized. Skin along the lower half of the breast is then widely undermined leaving approximately 5 mm of fat on the skin flaps to preserve blood supply, similar to mastectomy skin flaps. Skin is undermined laterally, medially, and inferiorly down to the inframammary fold. Dissection is continued deep to the breast gland over the pectoralis major muscle along the lower half of the breast in order to deliver the lower pole of the breast through the vertical incision (Fig. 48.2).

After delivery of the lower pole of the breast, the gland is displaced medially and laterally and marked in line with the breast meridian marking on the chest wall. This defines a wedge of lower pole breast tissue. This wedge can either be excised and discarded or used to autoaugment the breast. For autoaugmentation, the wedge is completely separated from the breast gland medially and freed from the pectoralis major muscle if not already done so. A partial thickness incision is made along the lateral aspect of the wedge. The lateral aspect of the wedge remains in continuity with the lateral aspect of the breast gland in order to preserve its blood supply. Further dissection of the central breast between the gland and the pectoralis muscle is then performed to create space for the autoaugmentation wedge. The wedge is rotated into this space and secured to the pectoralis major fascia with 2-0 PDS suture. The medial and lateral breast gland pillars are then united along the meridian of the breast with three or four interrupted 2-0 PDS sutures effectively narrowing the breast, increasing projection, and raising the inframammary fold.

The overlying vertical skin incision is then closed temporarily with staples. The diameter of the circumareolar aperture should measure less than 6 cm in order to avoid pleating of the skin around the areola during closure and to avoid excessive stretching of the areola. If the diameter is larger than 6 cm, additional skin is excised from the vertical lower pole of the breast to narrow the circumareolar aperture.

The patient is placed in the sitting position to assess for symmetry, nipple position, shape, volume, and skin excess. Additional tailor tacking of the skin is performed to reduce the skin envelope if necessary. We almost always add a horizontal excision of skin along the inframammary fold at this time in order to avoid a dog ear from the vertical incision and to reduce the nipple to fold distance. We typically aim for a nipple to fold distance of at least 6–8 cm (Fig. 48.3).

The circumareolar skin edges are undermined by approximately 1 cm in a superficial plane just deep to the dermis in order to avoid compromising blood supply to the nipple. The circumareolar incision is closed to the areola with an interlocking purse string suture of Cortex CV-3 or CV-4 (as described by Hammond) followed by interrupted
and running dermal 3-0 Monocryl. The vertical and horizontal incisions are closed with interrupted and running 3-0 Monocryl. Incisions are dressed with either Dermabond or Tegaderm.

**Mastopexy with augmentation procedure**

In contrast, the mastopexy with augmentation procedure follows a more conservative path. The areola is incised as described above. Only the circumareolar incision is made at the start of the procedure, the vertical component is left intact. The vertical skin incisions are not made until after the implant is placed in order to avoid resection of skin. The intervening skin between the areola and the circumareolar incision is de-epithelialized. A periareolar incision just below the areola is made through the breast gland to create the implant cavity. In the rare case where the surgeon is confident that a vertical skin incision is going to be required, a vertical incision through the breast gland can be used to create the implant cavity since this radial incision through the gland is less likely to disrupt the blood supply to the nipple.

A subpectoral or subglandular pocket is created. For subpectoral pockets, we prefer a dual-plane with release of the pectoralis major origin along the ribs inferiorly and creation of a subglandular pocket over the muscle inferior to the level of the nipple. A sizer is used when significant breast asymmetry is noted preoperatively or when a decision regarding implant size needs to be made. At the time of writing (2007), we most often use smooth round saline or silicone implants. The breast gland is closed over the implant with interrupted 2-0 PDS sutures.

Similar to the procedure described above for the mastopexy only patients, the circumareolar aperture is measured and compared to the contralateral side. Adjustments in the skin envelope are made as needed. Typically, only a small amount of vertical skin needs to be excised and this is usually done in the shape of a "V" with the tip of the "V" pointing at the inframammary fold and the open ends of the "V" joining the circumareolar incision. Skin and areolar closure are performed similar to the mastopexy only patients. A representative patient before and after surgery is shown in Fig. 48.4.
Fig. 48.3 Technique of circumareolar mastopexy on the same patient as Fig. 48.1, left breast. A. The lower pole breast skin has been undermined and breast gland has been delivered. The lower pole breast gland is displaced laterally and marked in line with the breast meridian marking on the chest wall below the inframammary fold. B. The breast gland is then displaced medially and marked similarly in line with the stable breast meridian marking on the chest wall. This defines a wedge of lower pole breast gland which is then freed from the surrounding tissue except laterally where it remains connected to the remainder of the breast gland. C. A subglandular pocket is created to accept the wedge of breast gland and a suture is placed through the pectoralis major fascia. D. The wedge of breast tissue is rotated medially and superiorly into the pocket and secured with the suture. E. Lateral and medial pillars were created by separating the wedge from the adjacent tissues. The pillars are approximated to each other with suture. F. The resulting breast shape is narrowed, lifted, and more projecting.
Fig. 48.3  A. Vertical closure is tailor-tacked. B. Distance of 6 cm is marked inferiorly from the areola/skin margin to decide on redundant skin along the inframammary fold. C. The ellipse of skin to be excised along the inframammary fold to remove the dog ear and decrease the nipple to fold distance. D. The patient is placed in the sitting position to confirm the planned skin resection along the inframammary fold. Areola aperture is also measured and compared to the contralateral side at this point. E. Patient in sitting position after excision of inframammary fold skin bilaterally and closure. Notice that there is absolutely no breast ptosis.
Postoperative care

Patients are placed in a soft sports bra with a front zipper immediately after surgery. The sports bra is continued for comfort as tolerated for 1–2 weeks. In those cases where anatomic implants are used, a strap is placed superior to the implants to prevent rotation for 1–2 weeks. In cases where the inframammary fold is significantly elevated or where concern for implant bottoming out exists, an underwire bra is used instead of the sports bra starting on post-operative day one. Patients are allowed to shower the night of their surgery. Patients are instructed to avoid heavy exercise or lifting for 2 weeks after surgery.

Complications

Complications from mastopexy may include bleeding, infection, skin dehiscence, skin necrosis, hypertrophic scars, loss of nipple sensation, inability to breast feed, nipple malposition, recurrent ptosis, and nipple necrosis. We treat most skin dehiscence or necrosis with conservative wound care. Scarring is treated with postoperative adhesive taping or silicone sheeting. Asymmetry is not a complication, but patients may complain about it. We usually address this concern by noting the preoperative asymmetries during the initial assessment and again postoperatively by looking at preoperative pictures. If significant, the asymmetry may require revision. Nipple malposition and recurrent ptosis also may require surgical revision.

Mastopexy with augmentation has the same set of complications as mastopexy alone, however, additional implant related complications must be considered as well including implant malposition, rupture, and capsular contracture. Also, revision rates for mastopexy with augmentation are usually higher than revision rates for mastopexy alone due to the multiple variables when combining these procedures. In our recent series including 23 primary mastopexy with augmentation patients, the revision rate was 8.7% and the complication rate was 17%.

Pearls & pitfalls

Pearls
- The goal of a mastopexy procedure is to improve breast ptosis by lifting the breast including the gland and the nipple.
- Ptosis can be categorized by assessing the extent of breast gland below the inframammary fold while also assessing the nipple position on the gland.
- Patients who desire upper pole fullness and/or volume beyond their current size should consider augmentation in addition to mastopexy.

Pitfalls
- If significant, asymmetry may require revision. Nipple malposition and recurrent ptosis also may require surgical revision.
- The mastopexy with and without augmentation procedure that we have described has limitations.
- It may not be ideal for severely ptotic breasts such as in patients after massive weight loss. These patients may benefit from a more traditional Wise pattern mastopexy with augmentation from autologous tissue at the same stage or augmentation with an implant at a second stage.
### Summary of steps

1. Preoperative assessment. In particular, note asymmetries, ptosis, visible skin below areola. Also, develop a clear understanding of the patient's goals. Specifically, discuss volume and breast shape goals to help decide whether or not to use an implant.

2. Preoperative marking. This is a critical component of the surgery. New nipple height is set at the level of the inframammary fold. Remember that nipple height should be set higher for patients receiving implants in order to center the nipple over the new breast mound.

### Mastopexy procedure steps

3. The areola is marked and incised. Circumvertical incisions are also made at this time. Intervening skin is de-epithelialized.

4. The skin over the lower half of breast is completely undermined at the subcutaneous level leaving approximately 5 mm of fat on the skin.

5. The lower half of the breast gland is delivered through the vertical incision. The lower pole of the breast gland is displaced medially and laterally and then marked with methylene blue where it lines up with the meridian of the breast during displacement. This results in two radial marks on the lower pole of the breast that define a wedge.

6. The wedge is separated from the surrounding tissue except laterally where it remains attached to the lateral part of the breast gland to maintain its blood supply.

7. A subglandular pocket is dissected centrally under the breast over the pectoralis muscle to accept the wedge. The wedge of breast gland is rotated superiorly into this pocket and secured to the pectoralis muscle fascia with 2-0 PDS suture.

8. The medial and lateral pillars of breast gland are sewn together with 2-0 PDS suture to narrow the breast and increase projection.

9. Overlying skin is tailor tacked with staples along the vertical incision.

10. The diameter of the nipple areola complex aperture should be measured and compared to the contralateral side. Each diameter should measure approximately 6 cm. Adjustments can be made by removing skin along the vertical incision.

11. The patient is placed in the sitting position to assess for symmetry, nipple position, shape, volume, and skin excess. Additional tailor tacking is then performed to reduce skin envelope. A horizontal skin excision along the inframammary fold is performed to eliminate the dog ear from the vertical incision if needed.

12. Circumareolar skin edges are undermined by approximately 1 cm at a superficial plane just deep to the dermis. This superficial plane avoids compromising blood supply to the nipple areola complex.

13. The circumareolar closure is performed with an interlocking purse string suture with CV-3 or CV-4 Gortex followed by running dermal 3-0 Monocryl. Vertical and horizontal incisions are closed with running and interrupted 3-0 Monocryl in the dermis.

### Mastopexy with augmentation procedure steps

For mastopexy with augmentation, steps 1–2 and 9–13 are the same as above. However, steps 3–8 are different and listed below:

3. The areola is marked and incised. Circumareolar incisions are made conservatively in order to avoid over resection of skin. Intervening skin is de-epithelialized. Vertical incisions are not made at this time unless the surgeon is certain that skin resection will be required in the vertical dimension.

4. An incision is made through the breast gland in order to create the implant pocket. This incision is typically made along the lower border of the areola. Once again, in cases where a vertical skin excision is certain, a vertical incision through the breast gland can be used instead of a periareolar incision to create the implant pocket.

5. If subpectoral placement of an implant is preferred, the gland is elevated off of the muscle inferior to the level of the nipple. Then the pectoralis major muscle is elevated off of the chest wall and released along the inferior origin. This creates a dual-plane pocket. if a subglandular pocket is preferred, such a pocket is created.

6. An implant is placed into the dual-plane subpectoral pocket or subglandular pocket. A sizer may be useful in cases of significant asymmetry.

7. The breast gland is closed over the implant with interrupted 2-0 PDS suture.

8. Continue to steps 9–13 from mastopexy section above.

### Further reading


Section 11: The breast

Aesthetic Plastic Surgery


