''Flip-Flap'' Mastopexy

Robert S. Flowers, M.D., and Eugene M. Smith, Jr., M.D.

Honolulu, Hawaii, USA

Abstract. The ''flip-flap'' mastopexy modifies the McKissock vertical bipedicle design by creating a wide superiorly based flap of breast tissue deep to the vertical bipedicle. Transposition of this flap up and beneath the upper breast, with suture anchoring to the pectoralis fascia at the level of the second rib, restores upper breast fullness, decreases mastopexy-wrecking lower breast bulk, and provides a pleasant forward thrust of the nipple–areolar complex. The ''flip-flap'' is effective for improving the long-term aesthetic outcome for both reduction mammaplasty and mastopexies of moderate- to full-sized breasts.

Key words: Mastopexy—Mammaplasty—Breast ptosis—Augmentation—Reduction

Mastopexy and breast reduction are popular plastic surgery operations but their long-term results leave much to be desired. Contour and position early after surgery are often good, but the breasts progressively sag until they have a shape and position not very different from those prior to surgery. These ''dermal'' or ''skin brassiere'' mastopexies and breast reductions, supported mainly by distensible skin flaps, deteriorate rapidly over ensuing months. The outcome is a breast with the same shape and much the same ptosis except for the superiorly relocated nipple–areolar complex (Fig. 1). The nipple is now on the cephalad portion of the breast, superior to the center of breast mass, and inappropriately pointing in an upward direction (Fig. 2).

There are many techniques and variations for mastopexy and breast reduction [1–18]. Common among them are the superiorly based dermal pedicle, the vertical bipedicle dermal flap, the inferior pyramidal, free nipple graft techniques, and Benelli modifications of the old ''donut'' mastopexy [3–7,11–18]. Many of these present-day mastopexy surgical procedures rely on some type of decorticated dermal pedicle or pedicles to maximize vascular supply to the nipple–areolar complex but do not relocate the *mastopexy ''wrecking''* breast mass from the caudal pole to fill out the deficient upper breast.

The problem with mastopexy techniques that rely on the integrity of the dermis or skin flaps to hold and retain the breast in an elevated position is that the stretching of skin allows the breast to droop again in relatively few months. Most mastopexies and breast reduction operations leave heavy breast bulk remaining in the lower pole of the breast. The thrust of that bulk eventually causes ''restretching'' of skin which is already ''programmed'' to expand and accommodate breast enlargement (Fig. 3). This manifests as recurrent ptosis, typically apparent within a year after mastopexy. Secondary skin resections temporarily restore breast contour, but regression rapidly recurs.

A similar outcome plagues breasts subjected to reduction mammaplasty. As in the ptotic breast, the bulk of the tissue of most large pendulous breasts is centered in the lower pole with deficiency in the upper breast. Breast reduction, like mastopexy, leads to the lower pole mass thrusting against the lateral supporting flaps of the lifted breast and stretches them sufficiently to recreate the preoperative ptotic posture. This results in ptosis of the caudal breast, while the nipple–areolar complex occupies a position above the center of the breast mass, pointing pitifully toward the sky.

Since the offending force responsible for stretching of elastic skin flaps is bulk in the lower breast pole, a reasonable solution is to relocate and secure tissue from the caudal breast into the upper chest where there is usually deficiency. This relocation of breast tissue from inferior to superior has several desirable benefits. The deficient superior pole gets augmented in a nonrelapsing fashion, and the skin of the lower breast heals subject to minimal

Correspondence to Dr. R.S. Flowers, 677 Ala Moana Boulevard, Suite 1011, Honolulu, HI 96813, USA

Fig. 1. A–C. Examples of mastopexy outcomes from traditional Non-''flip-flap'' techniques done elsewhere. Note the tissue deficiency of the upper breasts, the excess of recurrent breast ptosis, and nipple–areolar complexes that are not centered on the breast mound and inappropriately point superiorly.
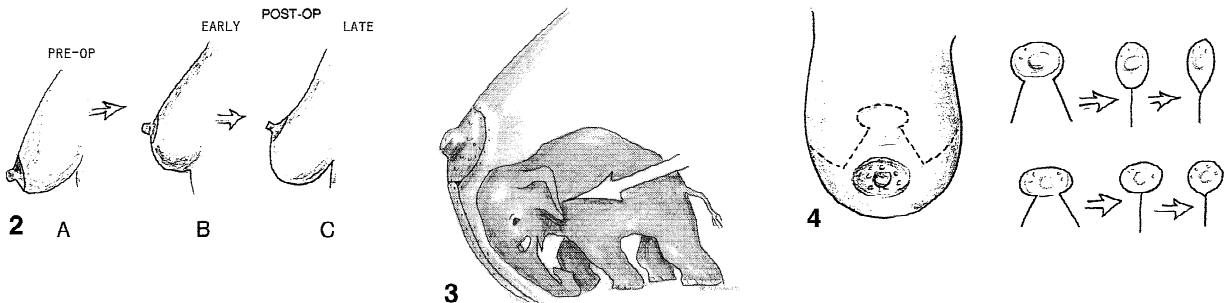

Fig. 2. Drawing showing typical outcome with traditional mastopexy. A Typical preoperative breast shape. B Typical early (weeks to months) postoperative breast shape. C Common late (months to years) postoperative shape showing recurrence of the premastopexy shape, with nipple–areolar complex pointing superiorly.

Fig. 3. Drawing metaphorically depicting the effect of persisting breast tissue in the lower breast following mastopexy. This lower breast tissue mass exerts immense pressure on the lower breast support, causing stretching of the skin, recurrence of breast ptosis, and a persisting superiorly positioned nipple–areolar complex that inappropriately points superiorly.

Fig. 4. The surgical areolar design should be a horizontal ellipse, which facilitates a circular shape after wound healing. An initial round design commonly yields an abnormal appearing vertical oval after wound healing and scar contracture.

tension, which not only decreases skin stretching but also allows a more comfortable closure with more favorable scarring. Breast tissue truly relocates to the upper chest instead of just being ''shoved'' in that direction by tight lateral flaps. The nipple–areolar complex gets a forward thrust by its position above the bend of the transposed breast pedicle, and the nipple complex remains centered over the circular mound of breast bulk even after many years. In the case of sagging degenerative breasts with little breast tissue, simultaneous augmentation, especially by placing implants behind the muscle, obviates the requirement for ''flip-flap'' mastopexy.

Patients and Methods

Patient Selection

The ideal mastopexy patient for this procedure is one with moderate to full breasts and accompanying ptosis sufficient to displace the nipple a minimum of 1.5 or, preferably, 2 in. (3–5 cm) below its desired location. If less, the scars are likely to weigh more negatively than the positive effect of improved shape. When there is a minimal ptosis, the transverse inframammary incision is sometimes unnecessary—leaving only a ''lollipop''-shape scar. If a person has sagging degenerative or atrophic breasts with little breast tissue, simultaneous augmentation, especially by placing implants behind the muscle, often obviates the requirement for ''flip-flap'' mastopexy. When the implant's placement is retromammary and there is significant breast tissue, the ''flip-flap'' mastopexy is still beneficial.

The ideal reduction mammaplasty candidate is one with large heavy breasts that have dropped considerably, leaving the breasts' upper poles deficient, while great mass exists in the lower breasts. In the type of breast hypertrophy with fullness present on the upper chest wall and throughout the rest of the breast, there is no need for the ''flip-flap'' breast tissue relocation.
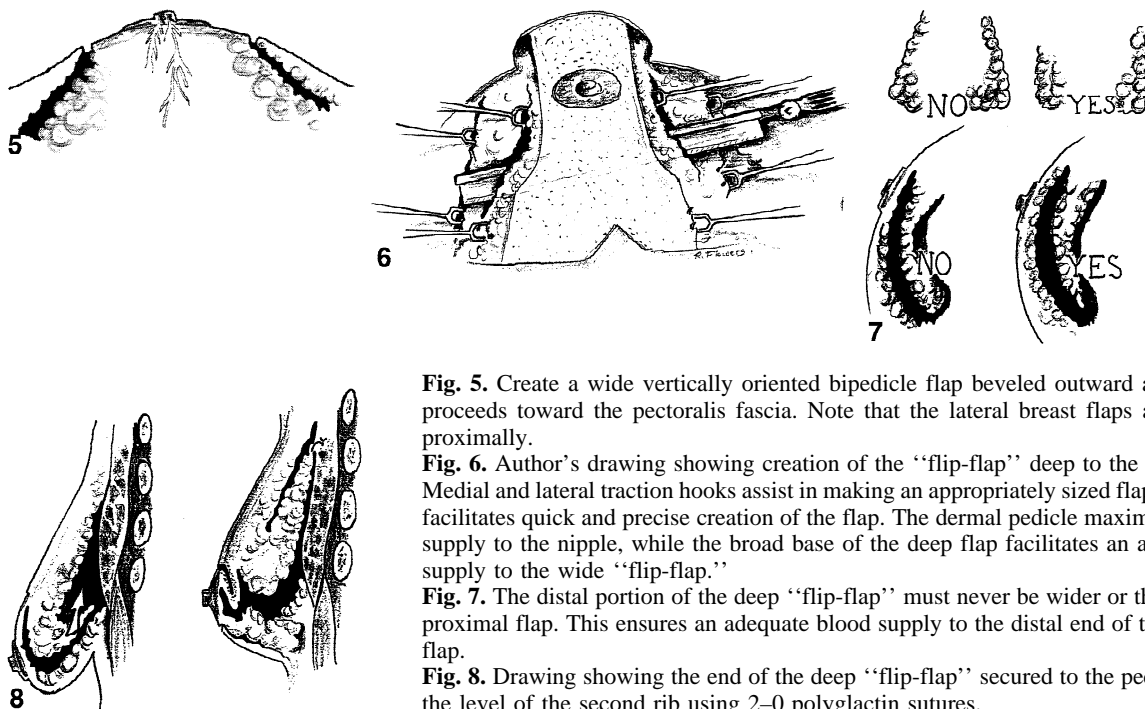
Fig. 5. Create a wide vertically oriented bipedicle flap beveled outward as the incision proceeds toward the pectoralis fascia. Note that the lateral breast flaps are also wider proximally.

Fig. 6. Author's drawing showing creation of the ''flip-flap'' deep to the bipedicle flap. Medial and lateral traction hooks assist in making an appropriately sized flap. A long knife facilitates quick and precise creation of the flap. The dermal pedicle maximizes the blood supply to the nipple, while the broad base of the deep flap facilitates an adequate blood supply to the wide ''flip-flap.''

Fig. 7. The distal portion of the deep ''flip-flap'' must never be wider or thicker than the proximal flap. This ensures an adequate blood supply to the distal end of the deep breast flap.

Fig. 8. Drawing showing the end of the deep ''flip-flap'' secured to the pectoral fascia at the level of the second rib using 2–0 polyglactin sutures.

Technique

Sit patients upright for their preoperative marking. Once again, the best candidates for mastopexy typically need their nipples raised a minimum of 3.5 cm and, preferably, more. The position of the new areola is selected in relation to the inframammary crease, with the caudal border of the new areola even with, or up to 1 cm above, the crease. When breast mass is being reduced, the nipple is marked lower since the nipple will ''spring'' upward after reduction of the breast weight. Lift the breast manually to estimate the new nipple location after significant reduction of tissue.

A marking wire is extremely helpful for sizing and shaping the areola recipient area to avoid pigment beyond the incisional border. The vertical border of the pedicles range from 5 to 8 cm, with an average of 6–7 cm, depending on the anticipated breast size at the completion of the procedure. The width of the keyhole is determined by the size of the breasts and the amount of skin to be reduced. ''Map mileage indicators'' are helpful at this stage to assure that the flaps are slightly longer than the inframammary line wherever possible [1]. Length is variable as needed to create the proper combined medial and lateral skin flap lengths. We prefer a horizontal ellipse areolar design, which becomes a circle postoperatively from a degree of vertical wound scar contracture, as opposed to a round design, which becomes vertically oval after surgery and scar contracture (Fig. 4).

Prepare and drape the patient in the normal sterile fashion. Next use a circular ''cookie cutter'' instrument with a typical diameter of 38 mm to mark the nipple–areolar complex incision. Decorticate the skin within the keyhole area marks, peripheral to the circular nipple areolar marks and inferiorly to the caudal breast. The nipple–areolar complex remains intact and attached. We always leave a caudally based triangular flap of nondecorticated skin to reduce closure tension. Make full-thickness incisions at the edge of the lateral and medial skin flaps extending to the 9 and 3 o'clock positions on the nipple–areolar recipient area, creating a vertical bipedicle decorticated flap similar to that described by McKissock [14]. Bevel these vertical incisions down to the pectoralis fascia, maintaining a broad width of the deep breast mass (Fig. 5). Elevate deep breast tissue from the pectoralis fascia to a level above the second rib, but minimally elevate tissue caudally. The medial and lateral flaps thus include breast tissue, which helps preserve an adequate blood supply. A large pocket beneath the breast tissue extends the width of the hemithorax in the upper two-thirds of the breast. Then fashion a wide, superiorly based, flap deep to the vertically oriented bipedicle flap. Lateral and medial traction using double-prong hooks helps in creating a proper ''flip-flap'' (Fig. 6). A Blair knife or long scalpel is convenient to develop the flap, taking care that the proximal thickness of the flap is as great as or greater than its distal thickness and that the base is as wide as or far wider than its distal end (Fig. 7).

We then turn the flap under the upper breast and secure it in place with five large absorbable sutures (such as 2–0 polyglactin) to anchor the distal end of the deep flap to the pectoralis fascia at approximately the level of the second rib. Five such sutures are usually sufficient (Fig. 8). Deepen the incision at the junction of skin and decorticated dermis along the upper areolar and the caudal portions of the breast. Secure the nipple–areolar com-
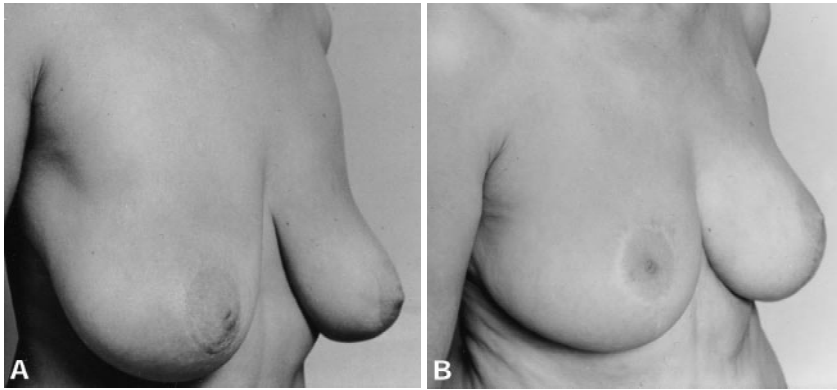
Fig. 9. A Preoperative view of a ''flip-flap'' mastopexy candidate. **B** Ten-year postoperative view following ''flip-flap'' mastopexy (without reduction).
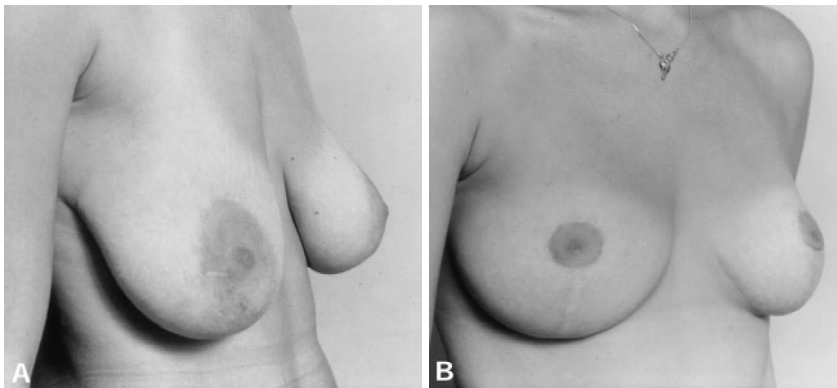

Fig. 10. A Preoperative view of a ''flip-flap'' reduction mastopexy candidate. **B** One-year postoperative view following ''flip-flap'' reduction mammaplasty.

plex at the superiormost portion of the deepithelialized skin using an absorbable suture of the surgeons choice. We prefer to close the dermis with buried 4–0 and 5–0 polyglactin and running 5–0 nylon sutures.

In reduction operations the breast tissue deep to the vertical decorticated dermis pedicle and superficial to the deep superiorly based ''flip-flap'' lends itself to volume reduction, as does tissue in the lateral and medial breast. In the pure mastopexy and mastopexy with minimal breast tissue reduction, we often undermine the vertical pedicle from the cephalad border of the nipple to the end of the decorticated pedicle, leaving only several millimeters of subcutaneous and breast tissue beneath the dermal pedicle.

Results

All patients selected for mastopexy needed their nipples raised a minimum of 3.5 cm. All patients undergoing simultaneous breast reduction displayed signs and symptoms of breast hypertrophy. All patients had ptosis with considerable skin excess and a nipple located at or below the level of the inframammary crease.

The superiorly based ''flip-flap'' technique was used in 124 patients, with a follow-up range of 12 months to 21 years. Two of the first cases developed localized breast tissue necrosis from the flip-flap procedure. Necrosis was attributed to faulty flap design due to a thick

distal portion of the flap or a proximal flap too narrow to provide adequate blood supply to the distal flap (Fig. 7). Since the development of a wide superiorly based flap with a distal thickness limited to 1.5 to 2.0 cm 20 years ago, no patient developed breast tissue necrosis. There were no cases requiring secondary skin resection. No patients required blood transfusions. Most patients had outpatient surgery in an outpatient facility (Figs. 9–10).

Discussion

Creating a deep superiorly based flap that relocates the lower breast tissue bulk to the upper portion of the breast is a safe and useful technique. By transposing lower breast tissue into the upper breast at the level of the second rib, most unwanted long-term side effects of mastopexy and reduction mammaplasty are avoidable. If the bulk of breast tissue is still located in the inferior portion of the breast following mastopexy, the skin ultimately stretches and the breast eventually approaches its preoperative shape and position with nipple complex relocated too far superiorly. The flip-flap operation diminished caudal bulk while simultaneously correcting the deficiency of fullness in the upper pole of the breasts. The nipples retain their proper central breast mass location and do not redirect or migrate superiorly on the breast. The vertical dermal bipedicle adequately maintains the blood supply to the nipple–areolar complex without nipple, areolar, or lateral flap necrosis.

This ''flip-flap'' technique is effective for patients with large or medium-sized ptotic breasts. It is less desirable for smaller breasts since there is minimal tissue and difficulty fashioning a meaningful deep flap. Our operation respects common surgical goals and guidelines for reduction mammaplasty, including safe transposition of the nipple–areolar complex, adequate reduction of volume, comfortable closure, and aesthetically pleasing results. The additional benefit of our technique is non-recurrence of ptosis. Although not specifically documented in all cases, tactile sensitivity of the breasts does not seem to vary from other techniques.

The cause or recurrence of breast ptosis following mastopexy is faulty structural design in the operations in common use today. Each relies on the elastic skin and dermis to suspend the breast and hold it in an unnatural position. Gravity and the thrust of the lower breast bulk ultimately exert their effect on the supporting skin, and ptotic and sagging breasts typically recur with time, with the nipple relocating too high on the breast (Fig. 3). Cooper's ligaments are typically attenuated prior to mastopexy and provide little breast support. Most breasts descend on the chest wall or develop a caudal posture by the time their host comes in for mastopexy or reduction, so most presenting patients have tissue deficiency in the upper portions of the breast overlying the upper chest wall. Breast fullness in the upper chest wall is aesthetically and functionally pleasing, while sagging breast tissue is generally considered unattractive, and upward-pointing nipple–areolar complexes on the upper pole of the breast are both deforming and bizarre in appearance. The ''flip-flap'' mastopexy redistributes breast tissue superiorly and minimizes stress on the inferior breast skin, maintaining an attractive breast shape with an appropriately positioned nipple–areolar complex.

Many surgeons appreciate that small ptotic or atrophic breasts usually benefit from simultaneous or delayed augmentation combined with mastopexy [7,16]. After augmentation mastopexy, there is typically a visual deficiency of the upper breast present after a year with submammary implants, providing that there is no capsule contracture. Combined retropectoral breast augmentation with or without the ''flip-flap'' mastopexy properly addresses this condition. Retropectoral placement of implants creates a fullness to the upper breast and often compensates for relative deficiency of the upper poles of the breast. But be careful to keep the retropectoral position sufficiently low so the lower breast is not deficient and droopy, while the upper pole is full and nice. Retropectoral augmentation alone without adequate reduction of the inferior breast does not solve the problem of persisting bulk in the area of the lower pole of the larger breast and may well lead to compromise of the lateral supporting breast flaps. Such situations also commonly result in ''double-bubble'' deformities.

The ''flip-flap'' mastopexy satisfies the objectives of relocating the breast tissue superiorly while simultaneously reducing tension on the skin flaps allowing faster and less complicated healing. This technique is a safe and effective method for reduction of large breasts and an excellent treatment for medium- to large-sized ptotic breasts.

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