Superior Pedicle Autoaugmentation Mastopexy: A Review of 34 Consecutive Patients

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Abstract

Background: The ptotic breast deformity results from two synergistic forces: involution of breast parenchyma leading to a loss of volume, along with a converse laxity of the skin envelope, which becomes inelastic and accommodating. As the breast tissue descends inferiorly on the chest wall with gravity, there is an apparent volume loss in the upper pole and the central breast, and the lower pole becomes fuller and often wider.

Objectives: The authors propose a technique whereby the superior pedicle vertical mammaplasty technique originally described by Lassus is modified to include transposition of glandular tissue to restore central mound projection while simultaneously narrowing the lower breast base and raising the inframammary crease.

Method: From 2003 to 2007, 34 patients underwent a superior pedicle autoaugmentation mammaplasty. Ages ranged from 22 to 47 years. The mean follow-up period was 24 months. Patients were selected preoperatively based on the presence of wide, low-lying breasts lacking central projection. In all cases, the patients expressed a desire to have a more youthful breast without the presence of an implant. The breast tissue usually retained in an inferior breast reduction was elevated on a superior dermal pedicle blood supply and transposed into a prepectoral pocket under the central breast. The medial and lateral pillars were then sutured together to narrow the breast base.

Results: All patients tolerated their procedure well. Two patients developed seromas that were percutaneously drained in the office. All 34 patients stated that they were very satisfied with the shape and size of their breasts postoperatively. No patient desired subsequent breast augmentation.

Conclusions: Modifying the vertical-scar mastopexy originally described by Lassus and later refined by Lejour, Hall-Findlay, and de la Plaza et al, the authors have created a dermoglandular extension of the superior pedicle that can be transposed behind the nipple-areolar complex. This restores central mound projection while also narrowing the lower breast base and raising the inframammary crease. In carefully selected patients with low-lying, wide breasts who do not desire breast augmentation without a prosthetic, this technique can be employed to reliably recreate a more youthful breast shape.

Ptotic breast deformities result from two synergistic forces: involution of breast parenchyma, which leads to a loss of volume, and a concurrent progressive laxity as the skin envelope becomes inelastic and accommodating. The net effect is a breast that is low in profile with a nipple-areolar complex (NAC) that tends to descend caudal to the inframammary crease. The goals of a conventional mastopexy as described by previous authors[1-4] are to raise the central mound of the breast, redrape the skin envelope, and place the NAC in a more optimal position relative to the inframammary crease. Various permutations of skin incisions and pedicle designs have been described as a means of achieving these goals. A prosthetic implant may be placed in conjunction with a traditional mastopexy, as prescribed by the underlying morphology of the breast vis-à-vis the expectations of the patient.

In recent years, several authors[5-7] have proposed glandular rearrangement as a means of optimizing central mound projection and upper pole fullness. In the properly selected patient, these techniques may obviate the need for a prosthetic implant. We propose a technique utilizing a superior dermoglandular pedicle via a vertical skin incision, whereby a swath of parenchyma from the inferior portion of the breast is transposed to a prepectoral pocket. In contrast to previously described techniques, the pedicle

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This article was presented at the American Society of Plastic Surgery Annual Meeting, October 31, 2008, Chicago, Illinois.

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includes parenchyma adjacent to the inframammary crease, which facilitates narrowing of the breast base as well as raising of the inframammary crease. The net effect is a more youthfully shaped, conical breast that is superiorly repositioned on the chest wall and has increased projection of the central mound with an NAC that is appropriately situated at the apex of the mound.

METHODS
Patients

From 2003 to 2007, 34 patients underwent a superior pedicle autoaugmentation mammaplasty performed by the senior author (LC). Ages ranged from 22 to 47 years. The mean follow-up period was 24 months (range, 14-50 months). Patients were selected preoperatively based on presence of wide, low-lying breasts lacking central projection. In all cases, patients expressed a desire to have a more youthful breast without the addition of an implant.

Surgical Technique

The operation followed the lineage of the Lassus vertical incision mastopexy, with the addition of the glandular transposition. With the patient standing upright, the skin markings began with transposition of the inframammary crease onto the anterior surface of the breast, denoting the new position of the NAC. This new nipple position was confirmed with the patient in the supine position. The point could then be adjusted to ensure its location at the apex of the breast mound. On the basis of experience, we allowed that the new nipple position could be 0 to 1 cm inferior to the transposed inframammary crease. An areola with a 2-cm radius was centered around this point.

Next, the vertical midline of the chest and the vertical axis of the breasts were marked. The intraoperative orientation of the vertical incisions was based on these reference marks. The width between the vertical incisions (and therefore the width of the dermal portion of the dermoglandular pedicle) was determined by the amount of skin that could be excised and closed without tension. Once this width and the position of the NAC had been verified, the pattern of the incision was drawn based on the Wise-pattern keyhole template. The vertical limbs tapered inferiorly to meet at the meridian of the breast, 2 to 6 cm above the position of the original inframammary crease (Figure 1).

Partial thickness incisions were made around the existing areola, as well as the proposed perimeter of the new areola. Full-thickness skin incisions were made along each vertical limb. Partial-thickness skin incisions were made along the markings of the new areolar position. Full-thickness skin incisions were also made along each limb of the lower skin markings. The entire area between these incisions was then deepithelialized (Figure 2).

The full-thickness skin incisions made in the vertical limbs were further carried down through the breast parenchyma,
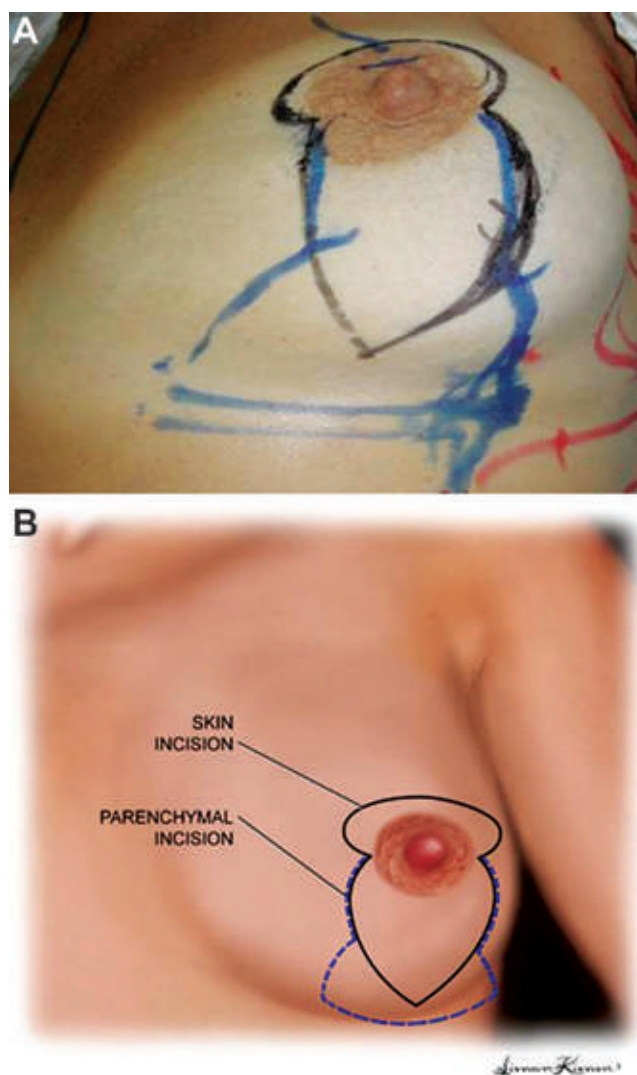

Figure 1. Preoperative skin markings are shown (A, B). The black lines denote the design of the vertical-incision mastopexy. The blue lines signify the distal extent of the glandular portion of the pedicle. Reprinted with permission from Simon Kimm.

parallel to one another in the space down to the pectoralis fascia, thereby creating the beginning of the superior-based dermoglandular pedicle. The remaining breast parenchyma on either side of this dissection became the medial and lateral pillars that would be approximated during the closure.

The distal portion of the dermoglandular flap encompassed a wider tongue of breast parenchyma extending to the inframammary fold (IMF) and then extending along the IMF medially and laterally (Figure 3). By virtue of elevating this strictly glandular portion of the flap immediately deep to the dermis and along the crease, the original inframammary crease was obliterated. The caudal border of the vertical pillars created earlier became the inferior-most extent of the glandular tissue, thereby constituting the new, elevated IMF. The distance between the six

Figure 2. The skin is incised along the previously marked black lines and deepithelialized.

Figure 3. The fully elevated superior dermoglandular pedicle. The flap encompasses the entire inferior pole of the breast, thereby obliterating the previous inframammary crease. The flap is seen in situ (inset). The length of the lateral wings of the flap is not to exceed three times their base width.

o'clock position of the areola at the apex of the vertical limb and the most inferior point of the vertical limb at the six o'clock position of the new IMF dictated the true areola-to-IMF distance. Therefore, the length of the vertical limb could be manipulated to be between 5 and 7 cm, depending on the ultimate size of the breast.

The superior-based dermoglandular pedicle was then elevated off the pectoralis fascia (Figure 4A). During elevation of the flap, the lateral wings that comprise the distal flap were inspected. If there was evidence of inadequate perfusion or venous congestion, the flap was tailored and

trimmed to the senior surgeon's satisfaction. The principles of the 1:3 length-to-base ratio that apply to skin flaps were similarly applied to the dermoglandular flap as a guide to the dimensions of the lateral wings. Then, in the same prepectoral plane, a small pocket was created subjacent to the NAC. The NAC was then provisionally stapled into position along its superior border and the flap was rotated 180 degrees into the newly created pocket (Figure 4B). Once in position, the areola was closed and the dermal portion of the flap was then secured to the pectoralis fascia with 3-0 Ethibond Excel sutures (Ethicon, Inc, Somerville, New Jersey); care was taken not to distort the six o'clock position of the areola (Figure 4C,D). This glandular rearrangement maximized central mound projection without use of an implant.

Closure of the breast began with approximation of the medial and lateral pillars in two rows with 3-0 Ethibond Excel sutures (Figure 5). The inferior margin of the pillars became the new inframammary crease. The skin from the inferior aspect of the preoperative breast was redraped over this new crease; 3-0 Vicryl sutures (Ethicon, Inc) were placed to secure the loose dermis to the underlying pectoralis and abdominal fascia, to eliminate the dead space along the old IMF. This also allowed the breast parenchyma to be precisely positioned on the chest wall, further stabilizing the position of the new IMF, which was 1 to 3 cm superior to the obliterated IMF.

Final contouring was performed with liposuction of the axilla and the tail of the breast, to create a sharper inflection between the lateral breast and chest wall, as well as along the old IMF and upper abdomen. One drain was placed in each breast along the new IMF into the axilla, and the vertical incision was closed separately from the circumareolar incision.

A compressive foam dressing was applied around the inferolateral perimeter of the breast to facilitate obliteration of any dead space and provide external support for the creation of the new inframammary crease.

RESULTS

In each of the 34 patients, an improvement in breast position, central projection, and overall shape was achieved that was satisfactory to both patient and surgeon. The skin overlying the site of the old IMF adhered to the chest wall in all patients and none of the patients required scar revision. No recurrent ptosis was noted during the mean follow-up period of 24 months (Figures 6-9).

No patients progressed to an implant augmentation mammaplasty subsequent to the mastopexy. Two patients had postoperative seromas that were managed with office aspirations. One patient returned to the operating room two months after surgery for chronic drainage from the vertical incision and was found to have a nidus of fat necrosis that originated from the lateral wing of the transposed dermoglandular flap. The area of necrosis was likely a result of an underperfused distal flap that was unrecognized at the time of the original operation. This area was
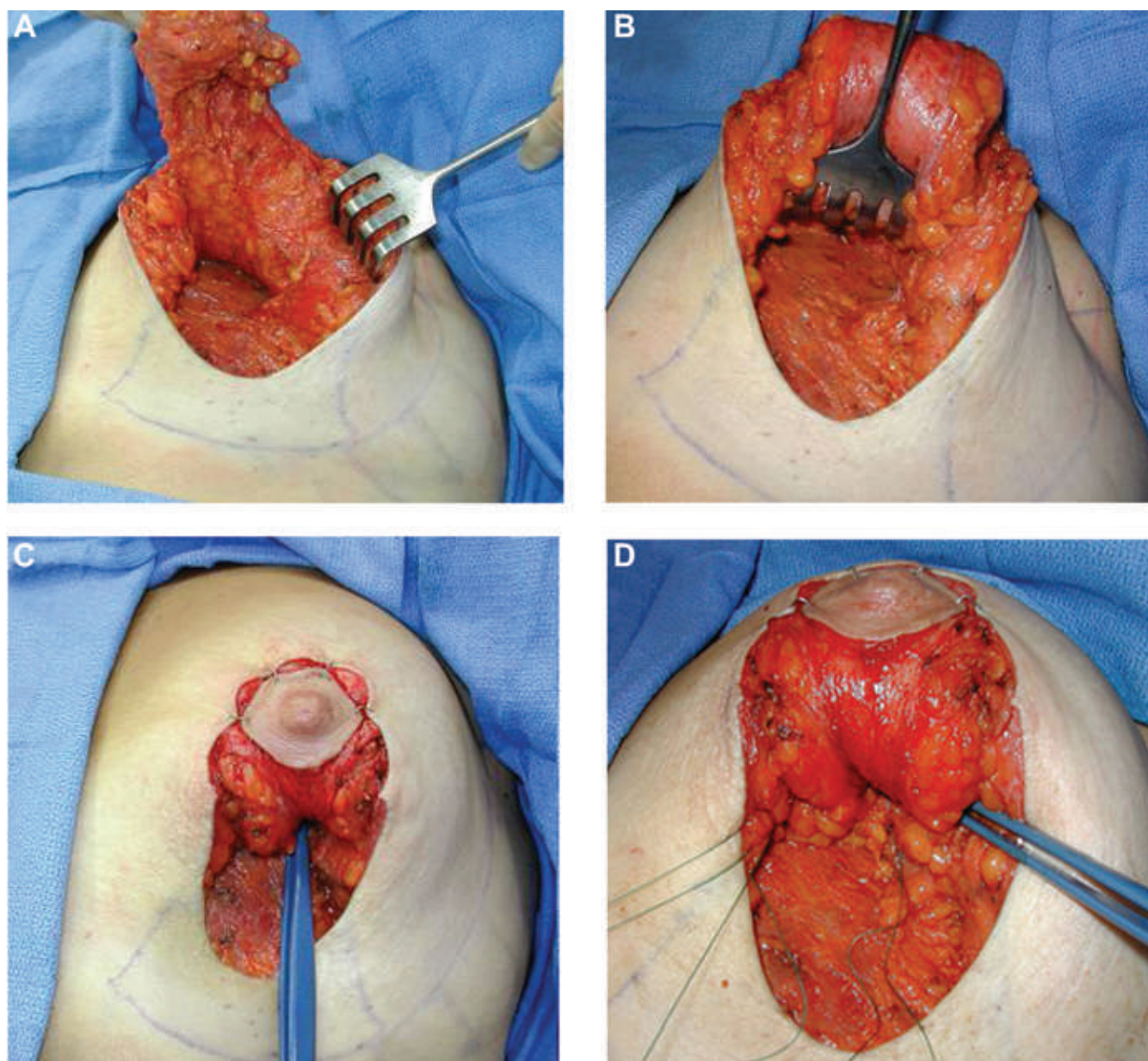
Figure 4. The flap is elevated off of the pectoralis fascia (A) and rotated 180 degrees into the prepectoral pocket (B). The areola is closed with provision skin staples (C). The dermoglandular pedicle is secured in position on the pectoralis fascia with sutures (D).

debrided, and the patient healed without further sequelae. There were no complications related to the NAC. It should be noted that all 34 patients were nonsmokers and had body mass indexes (BMI) of less than 25.

At the one- and two-year postoperative visits, the patients were asked to grade their satisfaction with the procedure as (1) very satisfied, (2) satisfied, (3) mostly satisfied, or (4) not satisfied. Similarly, at one- and two-year follow-up visits, each patient was asked whether her preoperative expectations were met. They rated their expectations as (1) completely met, (2) somewhat met, or (3) not met. At each of the time points, all 34 patients expressed that they were either very satisfied (91%) or satisfied (9%) and that their expectations were either completely (94%) or somewhat (6%) met.

DISCUSSION

The cumulative lifetime effects of gravity on the breast are remarkable: the skin envelope becomes progressively more lax and accommodating, while Cooper's ligaments
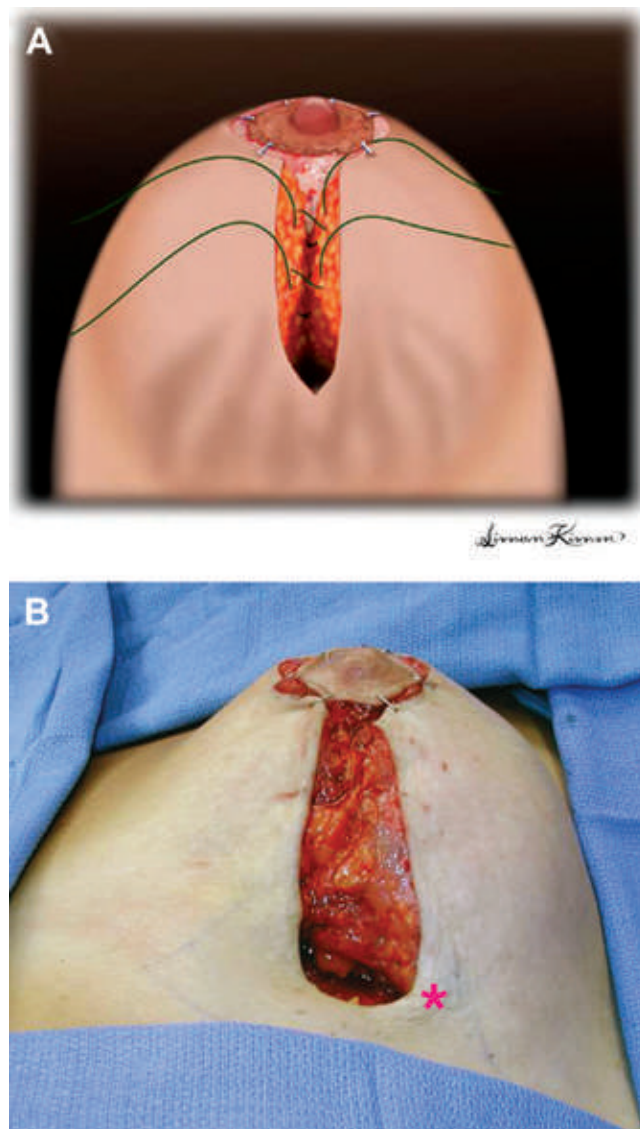
Figure 5. Closure of the vertical pillars results in narrowing of the breast base, as well as raising of the inframammary crease (A, B). The caudal margin of the pillars (*) will become the position of the new inframammary crease. Reprinted with permission from Simon Kimm (A).

become similarly elongated and inelastic. These changes are further compounded by the effects of pregnancy, lactation, weight change, and age-related glandular involution. As the breast descends inferiorly on the chest wall, upper pole volume is lost, and the lower aspect of the breast becomes fuller and often wider.

A variety of mastopexy techniques have been described to address these changes. Some rely primarily on skin redraping to hold the breast in a more cephalad position while also recreating a more youthful shape. However, such techniques do not address the underlying glandular

changes and are prone to pseudoptosis.[8,9] More recently, several authors have advocated glandular repositioning through a vertical scar.

Cerqueira's mastopexy technique incorporates an inverted, triangular-shaped superior dermoglandular pedicle with a distal flap that is sutured underneath the pectoralis muscle.[11] More recently, de la Plaza et al[12] described a J-incision to transpose lower breast tissue superiorly. With both these techniques, the amount of transposed breast tissue is less than with our proposed method because tissue from the IMF is not incorporated as part of the flap. The benefits conferred by glandular transposition are therefore not maximized. The gland is narrowed and inferior tissue is transposed, but the inferiorly positioned IMF remains unchanged.

Graf et al[9] have popularized an inferior-based glandular flap that is transposed into a subareolar pocket to improve central mound fullness. However, to maintain position of this flap, it is passed beneath a sling of pectoralis muscle.[13] One theoretical disadvantage of this technique is that this sling of muscle may passively or actively constrict the base of the flap. In addition, placement of breast parenchyma deep to a sling of muscle may obscure mammographic imaging and even alter tumor propagation. These scenarios are speculative and have not been elucidated in the literature. Furthermore, this technique does not alter the position of the IMF.

There are several key benefits to designing a dermoglandular flap that incorporates tissue from the inferior margin of the breast. The added glandular bulk that is transposed from the inferior breast to the central mound will further improve projection. Also, the design of the flap is such that closure of the donor site leads to a new cephalad inframammary crease. This effectively raises the breast mound superiorly on the chest wall, with the IMF moving 1 to 3 cm cephalad accordingly.

Similar to other glandular rearrangement mastopexies, closure of the medial and lateral pillars helps hold the flap in proper position.[11-13] This maneuver also narrows the breast base diameter, helping to create a more youthful, conical breast. Therefore, it is the parenchyma and not the skin envelope that plays the dominant role in maintaining breast shape and position of the IMF (Figure 7).

It is important to mention several caveats regarding the proposed technique. As with many mastopexy techniques, superior pole breast fullness will not be maximized without the use of an implant. Furthermore, only a moderate amount of superior transposition of the NAC can be accomplished with a superior pedicle mastopexy, so this technique is not appropriate for patients who require more than 10 cm of superior movement of their NAC because of concerns regarding NAC viability. Last, patients with poor skin elasticity are not good candidates for this approach. Because of the minimal amount of skin excision compared with conventional Wise pattern resections, a certain amount of skin recoil is necessary to allow the breast mound to redrape appropriately. Also, the reset IMF relies
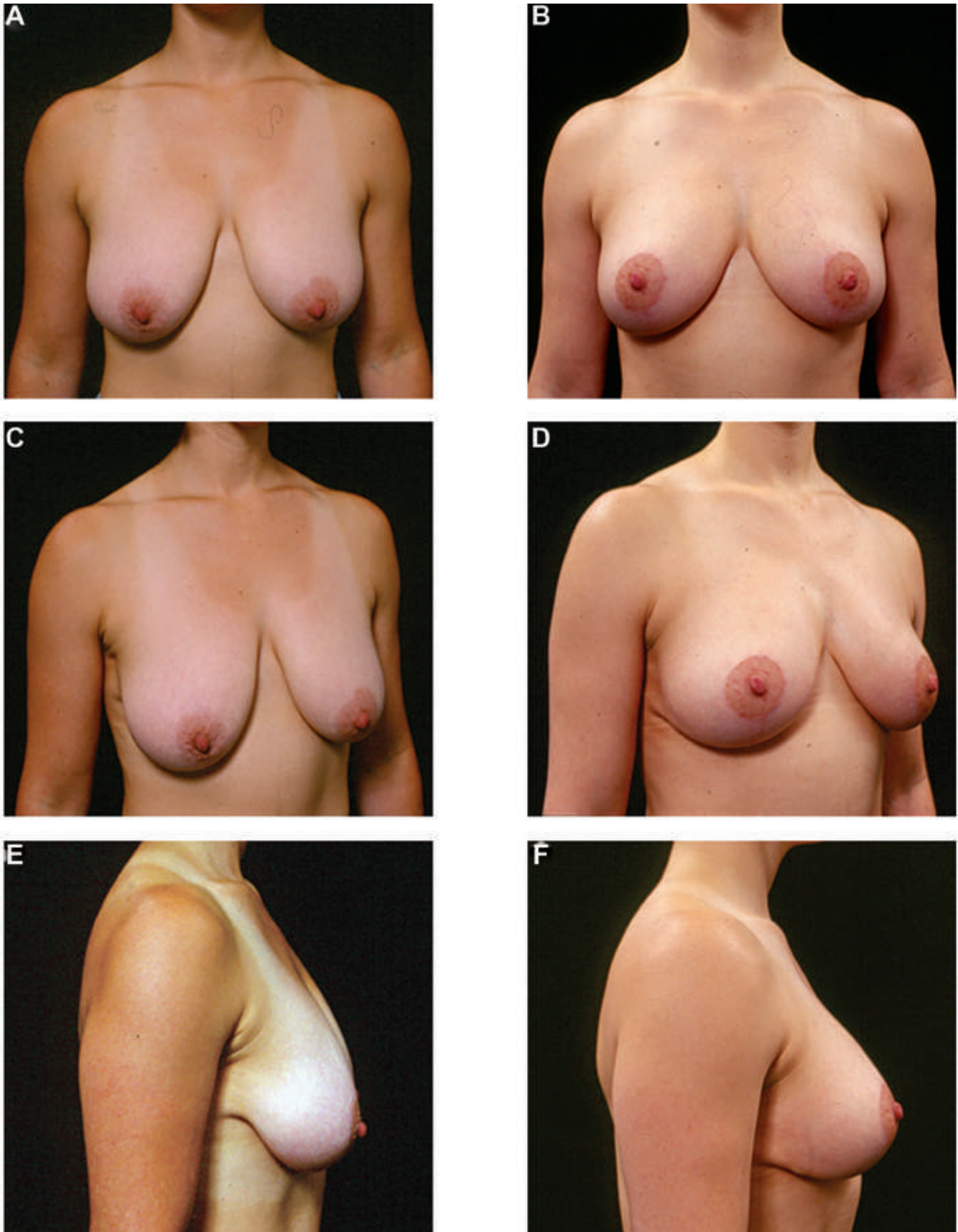
Figure 6. A 22-year-old nulliparous woman with severe congenital breast ptosis developed at puberty. The patient is shown preoperatively (A, C, E) and two years after superior autoaugmentation mastopexy (B, D, F).
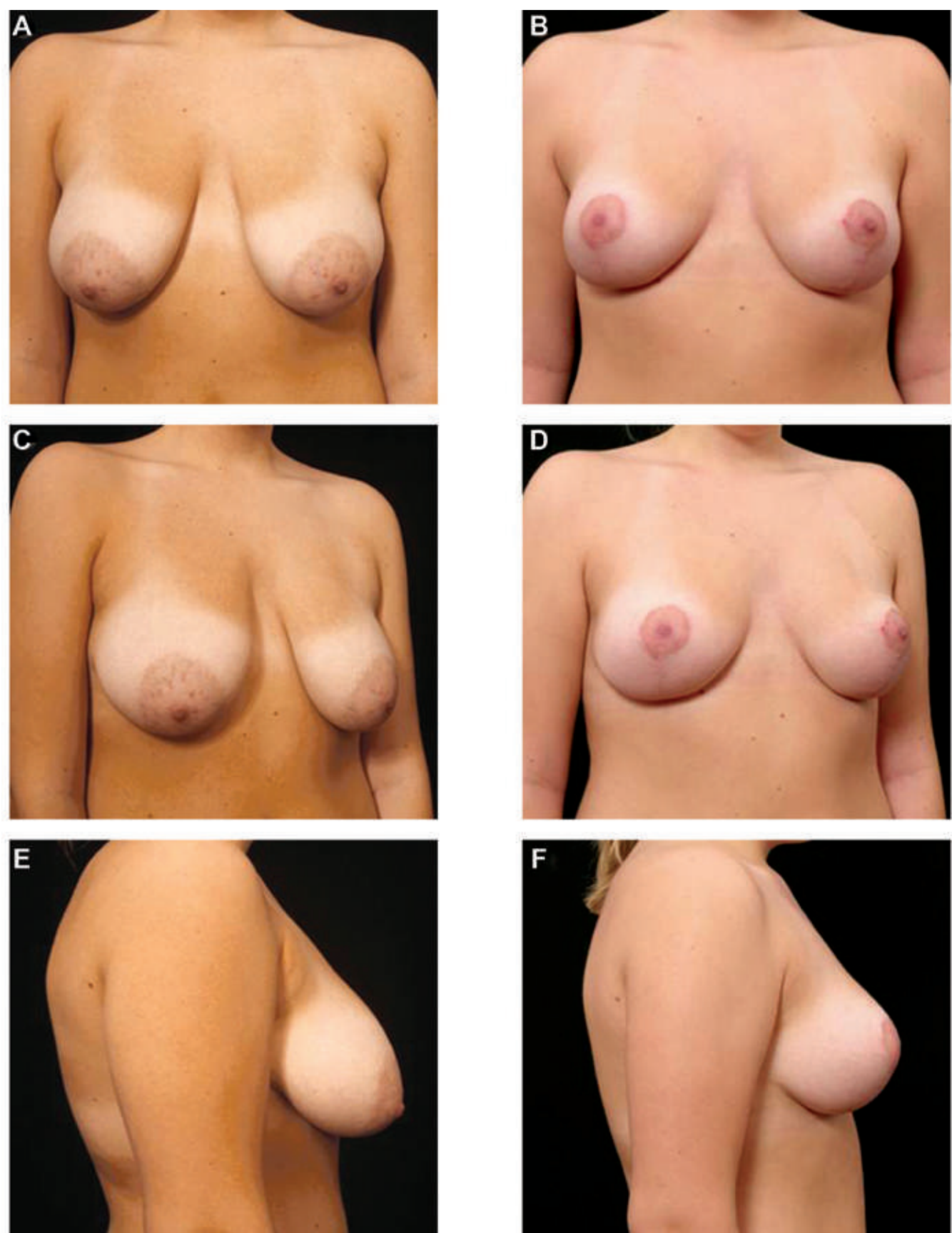
Figure 7. A 20-year-old nulliparous woman with severe congenital breast ptosis developed at puberty. The patient is shown preoperatively (A, C, E) and two years after superior autoaugmentation mastopexy (B, D, F).
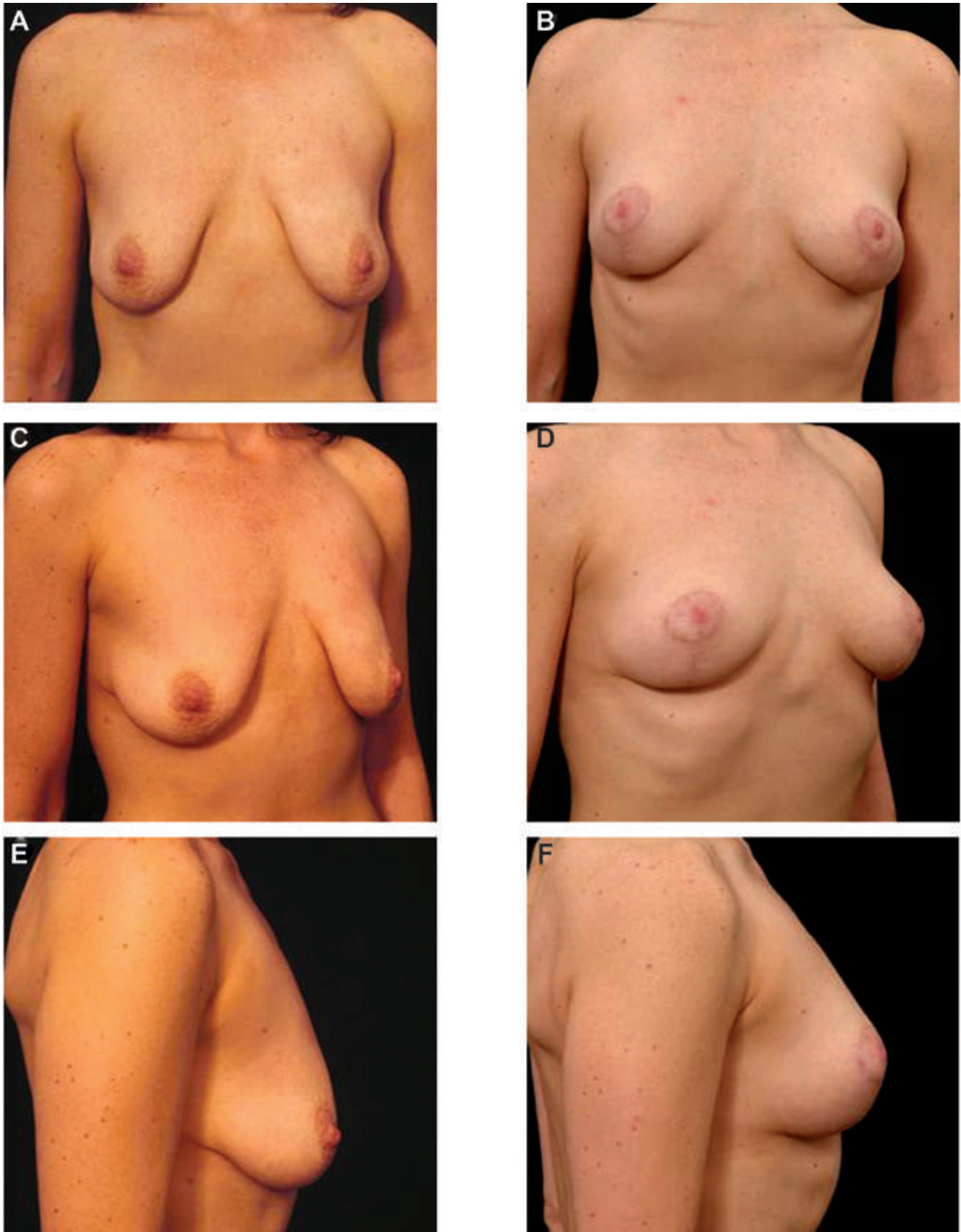
Figure 8. A 32-year-old nulliparous woman with severe acquired breast ptosis. This patient had experienced a 20-pound weight loss prior to surgery. The patient is shown preoperatively (A, C, E) and two years after superior autoaugmentation mastopexy (B, D, F).
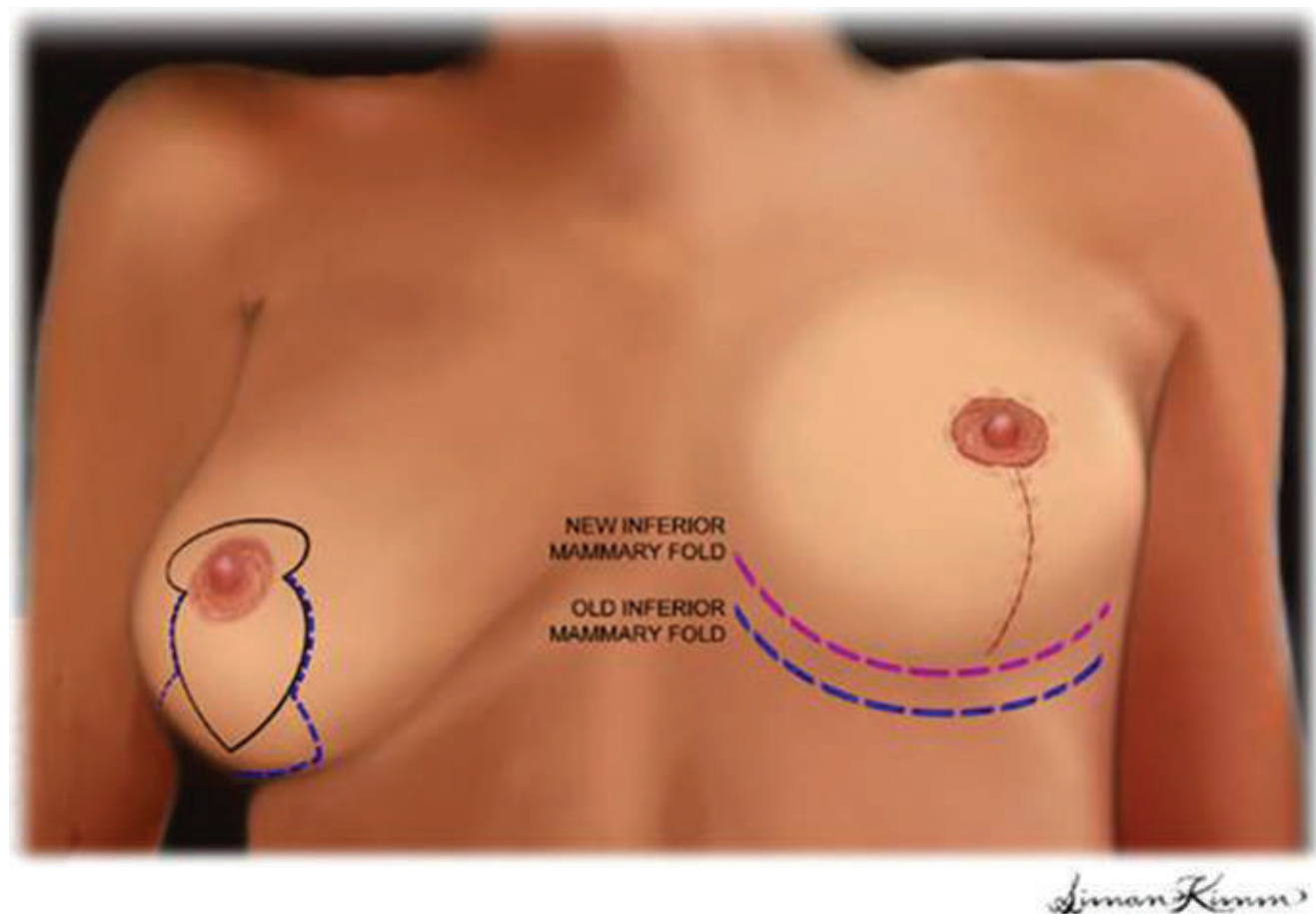
Figure 9. The postoperative result is illustrated. The breast has a narrower base diameter and a higher inframammary crease. Reprinted with permission from Simon Kimm.

on the dermis (which is tacked down to the chest wall) to contract and thereby minimize excess bunching over time.[13] However, in theory, a horizontal incision could be performed to remove the inelastic excessive skin along the old IMF.

CONCLUSIONS

The superior pedicle autoaugmentation mastopexy is a method of breast rejuvenation that builds upon previously described glandular transposition techniques. The design and transposition of the dermoglandular flap, the vertical glandular closure, and the fixation of the reshaped gland along the superiorly positioned IMF effectively narrow the breast base diameter, elevate the inframammary fold, and increase the central projection of the breast. In select patients with adequate breast volume and moderate to good skin elasticity with mild to severe ptosis who do not desire an implant mammaplasty, this technique safely and effectively restores the contour of a youthful-appearing breast. In theory, this procedure can be modified to include a horizontal incision in patients with inelastic excess skin along the old IMF.

Disclosures

Funding

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