

MEDIAL PEDICLE BREAST REDUCTION

Lee L.Q. Pu, Jeng-Yee Lin

Breast reduction surgery can be performed for either functional or cosmetic reasons. Besides several functional improvements for back, neck, and shoulder pain and to eliminate skin rashes under the breast, four primary goals to achieve optimal size, shape, symmetry, and scarring should be applied to each type of breast reduction. The size of the breasts after breast reduction should be in proportion to the patient's body habit. The shape after breast reduction should be cosmetically pleasing and long lasting. Although exact symmetry may be hard to achieve, most women desire more symmetrical breasts after reduction. It is also quite desirable to have minimal scarring after any type of breast reduction. Asian women are particularly conscious of whether scars will be visible on their breasts.

The classic inverted-T inferior pedicle technique is still the most commonly performed breast reduction procedure for women worldwide. However, there are a number of long-term sequelae associated with this type of breast reduction, such as an unsightly scar and the potential for bottoming-out of the breast. Therefore plastic surgeons have made great efforts to develop a better breast reduction technique to improve overall long-term outcome after breast reduction with less visible scars for women with macromastia.

Vertical breast reduction was advocated by Lejour¹; the procedure has been popularized by Hall-Findlay.^{2,3} However, the medial pedicle vertical breast reduction has been criticized by many plastic surgeons, especially in North America, for its inconsistent cosmetic outcome and higher revision rate.⁴⁻⁷ In addition, the learning curve for medial pedicle vertical breast reduction appears to be longer, because many intraoperative adjustments must be done by the surgeon to produce a cosmetically acceptable final result.

Since most Asian women have relatively smaller breasts with less stretched skin than Western women, the medial pedicle vertical breast reduction can be the procedure of choice for this unique group of patients. In this chapter, we introduce our preferred technique for medial pedicle vertical breast reduction, emphasizing patient selection and several technical refinements.

ANATOMY

The breast is an ectodermal structure contained in a superficial fascial system. It is formed by approximately 20 to 25 individual lobules that connect to the nipple. The blood supply comes in from several directions. The main blood supply to the breast is based on medial branches of the internal mammary artery. These branches supply the medially based pedicle. The medial pedicle receives its blood supply from the

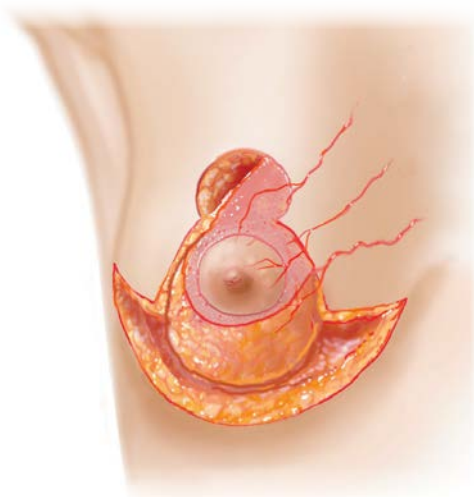


Fig. 57-1 The blood supply to the medial pedicle.

perforators of the internal mammary vessels. These perforators in general provide a robust blood supply to the pedicle, so necrosis of the nipple-areola complex is rare after breast reduction, as long as an adequate pedicle width is maintained (Fig. 57-1).

In addition, the lower medial branch of the internal mammary artery penetrates the pectoralis fascia just about 2 to 4 cm above the inframammary fold (IMF) in the breast meridian. This vessel can supply an inferiorly or centrally based pedicle. The higher medial branch of the internal mammary artery runs superficial to the breast on either side of the breast meridian. It can supply the superiorly based pedicle. Laterally, the breast receives its blood supply from the branches of the lateral thoracic artery, which also enter the breast superficially and may supply a laterally based pedicle.

The veins of the breast rarely accompany the arteries. Much of the breast is drained by a superficial venous system that lies just under the dermis. Because Asians typically have a thicker dermal layer, these veins can appear less conspicuous in Asian women. Innervation of the breast is based on the medial and lateral branches of the second to sixth intercostal nerves. These branches enter the breast superiorly through the pectoralis major muscle. The nipple is primarily innervated by the medial and lateral branches of the fourth intercostal nerve. However, the third and fifth intercostal nerves contribute as well.⁸

INDICATIONS AND PATIENT SELECTION

As in any other plastic surgical procedure, patient selection is critical to the success of the medial pedicle vertical breast reduction. This procedure is not indicated for all patients⁹; in general, younger women with good breast skin quality (no stretch marks) and reasonably round breast shape are good candidates for this type of breast reduction (Fig. 57-2). The overall amount of breast tissue reduction may not be the critical issue, although the average weight of this type of breast reduction is usually between 300 and 500 g. The distance between the nipples to the IMF of the breast should be less than 10 cm for such a breast reduction to be successful. Box 57-1 summarizes the general indications for the medial pedicle vertical breast reduction.



Fig. 57-2 This Asian woman is a good candidate for a medial pedicle vertical breast reduction. In general, patients should be relatively young with good breast skin quality and a reasonably rounded breast shape.

Box 57-1 Good Candidates for Medial Pedicle Breast Reduction

- Younger, healthy women (less than 35 years old)
- Good breast skin quality (no stretch marks)
- Reasonably round breast shape (no grade 3 ptosis)
- Moderate-sized breast reduction (less than 500 g)
- Relatively short distance from nipple to IMF (less than 10 cm)

PREOPERATIVE ASSESSMENT AND SPECIAL CONSIDERATIONS

Unlike the classic inverted-T inferior pedicle technique, the medial pedicle vertical breast reduction procedure requires some special considerations and more intraoperative adjustments. For example, the new nipple position should be placed lower during preoperative marking. In the vertical technique there is a general tendency to place the nipple too high and to produce more upper pole fullness. Therefore the surgeon should be careful to avoid creating high-riding nipples and to inform the patient that she may temporarily have upper pole fullness postoperatively.

The new IMF should be placed higher than the actual IMF so that the distance between the nipple and the IMF can be shortened. This distance can be shortened further by a running subcuticular closure. However, the distance between the nipple and the new IMF will never be 5 to 6 cm, as after the classic inverted-T inferior pedicle breast reduction. Very often it will be about 7 to 8 cm so that an optimal breast shape can be maintained after reduction.

The management of the excess tissue in the lower pole of the breast can be critical to the success of the medial pedicle vertical procedure. The surgeon should pay attention to this important issue and develop a strategy or technique to properly remove the extra tissue in this part of the breast (Box 57-2).

Box 57-2 Special Considerations for Medial Pedicle Breast Reduction

- Place new nipple position low
- Create a new but higher IMF
- Make appropriate intraoperative adjustments
- Shorten the vertical distance during closure
- Manage excess tissue in the lower pole
- Inform the patient that she may have temporary upper pole fullness

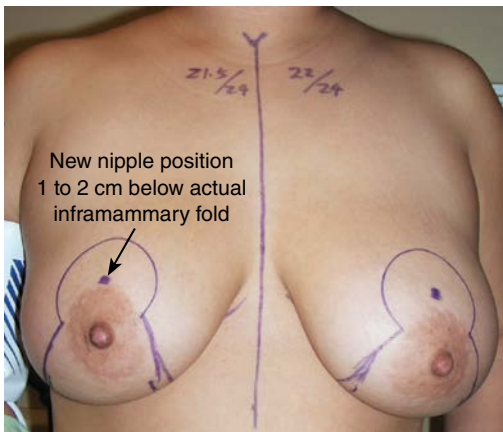


Fig. 57-3 Preoperative marking of the medial pedicle vertical breast reduction with the patient upright. Note that the new nipple position should be 1 to 2 cm below the level of the IMF, depending on the amount of reduction required.

PREOPERATIVE AND INTRAOPERATIVE MARKINGS

The marking of the patient's breasts for a medial pedicle vertical breast reduction has two essential components: the patient is marked in an upright position preoperatively and in a supine position on the operating table, usually under general anesthesia. The new nipple position should be determined first. However, unlike the inverted-T inferior pedicle breast reduction, the new nipple position should be set at a level at least 1 to 2 cm below the level of the IMF to avoid a high-riding nipple position after breast reduction. In addition, if the patient has good upper pole fullness, the new nipple position should be marked lower than intended to avoid a high-riding nipple. The circle around the new nipple position is marked with a Wise-pattern marker. This would make the diameter of the circle about 42 mm. The level of the new IMF is determined to be about 2 cm above the actual IMF. After this, the medial and lateral borders of the resection are marked by rotating the breast both medially and laterally in reference to the midline of the breast (Fig. 57-3).

While the patient is in the supine position, the nipple-areola complex is marked with either a 38 or 42 mm cookie cutter. The pedicle is then designed with the pedicle width between 6 and 8 cm, depending on the breast size the surgeon wants to achieve after breast reduction. It is important to leave at least 1 cm of breast tissue away from the proposed upper border of the nipple-areola complex to avoid cutting into it. Ideally, the width of the pedicle should be marked in such a way that half of it is within the areolar opening and the other half within the area bounded by medial and lateral pillars (Fig. 57-4). After the pedicle is marked, the new circle of the proposed nipple-areola complex and the medial and lateral markings of the proposed resected area in the breast are tested for easy approximation without tension. We have observed that there is a higher proportion of pliable fat component and less firm glandular component in the

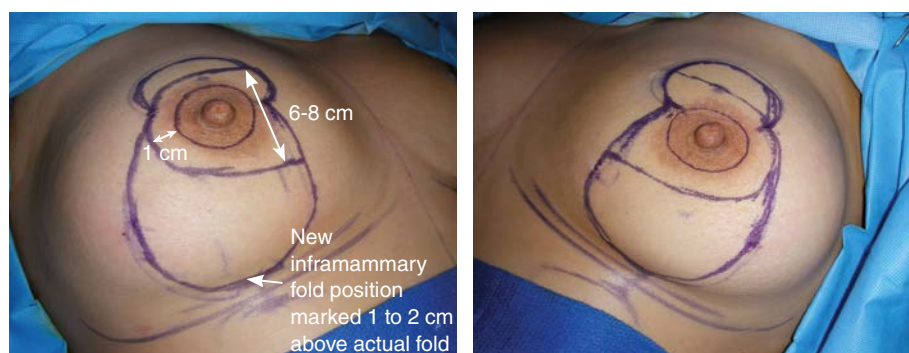


Fig. 57-4 Intraoperative marking of the pedicle and the new level of the IMF with the patient in the supine position. The new level should be 1 to 2 cm above the actual level of the present IMF, depending on the amount of reduction required.

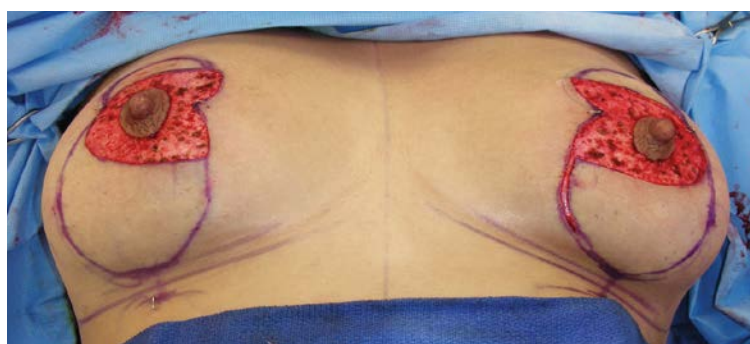


Fig. 57-5 Intraoperative view showing completion of deepithelialization over the pedicle.

breasts of Asian women, as well as a thicker dermis layer. Therefore the design of skin resection between the medial and lateral pillars should be more conservative initially and can be adjusted for resection later at the time of wound closure.

SURGICAL TECHNIQUE

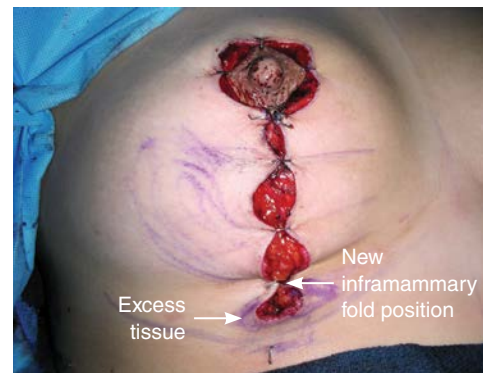
For medial pedicle vertical breast reduction, the area of deepithelialization over the pedicle is much smaller than for the classic inverted-T inferior pedicle breast reduction. Therefore deepithelialization can be quickly performed over the pedicle with either a knife or scissors, depending on surgeon preference (Fig. 57-5).

The lower portion of the breast tissue below the pedicle and the skin are resected first. Resection can be performed quickly down to the base of the breast, in close proximity to the pectoral fascia, but it should not include the fascia to better preserve nipple sensation. Caution must be exercised to preserve ample tissue in the medial aspect of the breast. The superior portion of the breast tissue above the pedicle along with the skin is excised accordingly, and the medial pedicle can then be elevated. The surgeon should ensure that the pedicle has adequate bulk of breast tissue in terms of width and thickness so that an adequate blood supply can be maintained to the nipple-areola complex. Additional resections of the breast tissue should be performed both laterally to remove excess breast tissues and superiorly to remove some deep breast tissue, so that the pedicle can be rotated into the new position without too much tension (Fig. 57-6). Frequently the pedicle can be debulked further to make its inset easier. Compared with the inverted-T inferior pedicle technique, the resection of breast tissue can be performed relatively fast.



Fig. 57-6 Intraoperative view showing completion of right breast resection before pedicle inset and vertical closure.

Fig. 57-7 Intraoperative view showing temporary completion of pedicle inset and vertical closure. In this breast, the new IMF position has been determined and the excess tissue in the lower pole of the breast is outlined.



Closure of the breast after inset of the pedicle can also be performed quickly. Once the periphery of the new nipple-areola complex is approximated with 2-0 PDS suture, the pedicle can be rotated into the new position and the nipple-areola complex can be approximated to the adjacent breast skin with skin staples. The medial and lateral pillar closure is then performed with 2-0 PDS sutures in an interrupted fashion, starting from the base of the pedicle. In general, only three sutures are needed to approximate the medial and lateral pillars. After both medial and lateral pillars are closed, the skin can be approximated with skin staples.

At this point, the position of the new IMF can be determined. The excess breast tissue in the lower pole of the breast located at the lower end of the vertical incision is identified and marked (Fig. 57-7). The patient is moved to an upright position, and both breasts are assessed for their symmetry, size, shape, and projection. We prefer to aggressively defat the tissue marked in the lower pole down to just a few millimeters of subcutaneous fat. We place a purse-string suture with 3-0 Monocryl to evenly fold excess skin together⁹ (Fig. 57-8). A few simple interrupted approximations with 5-0 chromic suture can also be added to create a smoother closure. Liposuction may be required to remove excess fat in the lateral area of the breast, especially in an obese patient. The vertical incision is usually closed in two layers: the deep dermal layer is approximated with several simple interrupted 3-0 Monocryl sutures, and the final skin closure is performed with 3-0 Monocryl sutures in the subcuticular fashion. During vertical skin closure, some additional shortening can be achieved for the vertical distance (Fig. 57-9).

The final closure after medial pedicle vertical breast reduction has to look good on the operating table. If for some reason there is more excess tissue in the lower pole of the breast, and the closure in the lower pole of the breast after aggressive defatting and a purse-string suture does not appear to be satisfactory,



Fig. 57-8 Completion of the closure. Note that the excess subcutaneous tissue in the lower pole of the breast has been removed by defatting and the excess skin has been approximated with a purse-string suture. The contour of the lower pole after surgery appears to be satisfactory.

Fig. 57-9 Immediate results after bilateral medial pedicle vertical breast reductions in the same patient. The contour of the lower pole for both breasts appears to be satisfactory on the operating table.



an L-shaped or a short inverted-T skin incision can be added at this point to improve the appearance of the closure in the lower pole of the breast, since more lower pole excess tissue can be removed in this way. However, adding an L-shaped or inverted-T incision may only be indicated for larger breast reduction or when one side of the breast is much larger than the other side.

POSTOPERATIVE CARE

After surgery, sterile strips are placed tightly at the lower pole of the breasts to flatten the closure in this area. The rest of the incision is also covered with sterile strips, and a surgical bra is put on the patient. She will wear a supportive surgical bra for 2 to 3 weeks until the incision has healed and will then convert to a new bra with no underwires. We do not use drains for this type of breast reduction. This is in contrast to an inferior pedicle breast reduction, where drains are routinely placed for 24 hours. We frequently perform medial pedicle vertical breast reduction procedures in an outpatient setting.

RESULTS

Both functional and cosmetic improvement can be achieved with a medial pedicle breast reduction. The total healing time is quicker and problems related to wound healing occur less frequently. The scar is usually well tolerated by Asian patients. The overall patient satisfaction is high, and the need for minor revision has occurred in about 5% in our series.



Fig. 57-10

This 36-year-old woman of Korean descent desired breast reduction for symptomatic macromastia. Because of her good skin quality and the favorable shape of her breasts, she was offered a medial pedicle vertical breast reduction. Her surgery went well, and the total amount of breast tissue removed from her right breast was 305 g and from the left breast 320 g. She is shown preoperatively and 4 months postoperatively. Her postoperative course was uneventful; all incisions healed primarily and no hypertrophic scars developed. The patient is quite happy with the overall cosmetic appearance and functional improvement of her breast reduction.

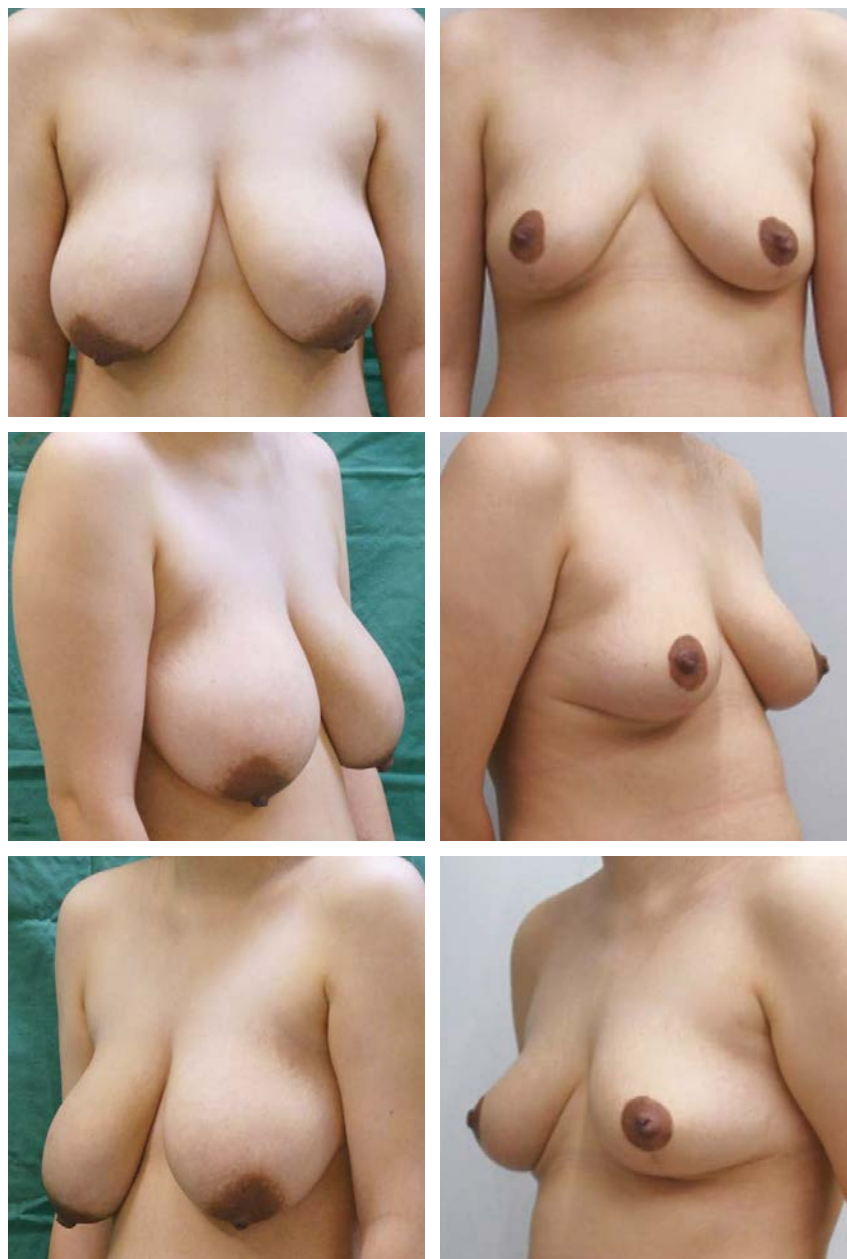


Fig. 57-11

This 32-year-old woman of Chinese descent had macromastia with breast ptosis that was exacerbated after she gave birth. Although stretch marks and moderate laxity of her breast skin was noticeable, a medial pedicle vertical breast reduction was planned because she requested a shorter scar. The amount of breast tissue removed from her right breast was 420 g and from her left breast was 425 g. Her postoperative recovery was quite uneventful. One year postoperatively, she has a good aesthetic outcome and breast symmetry.

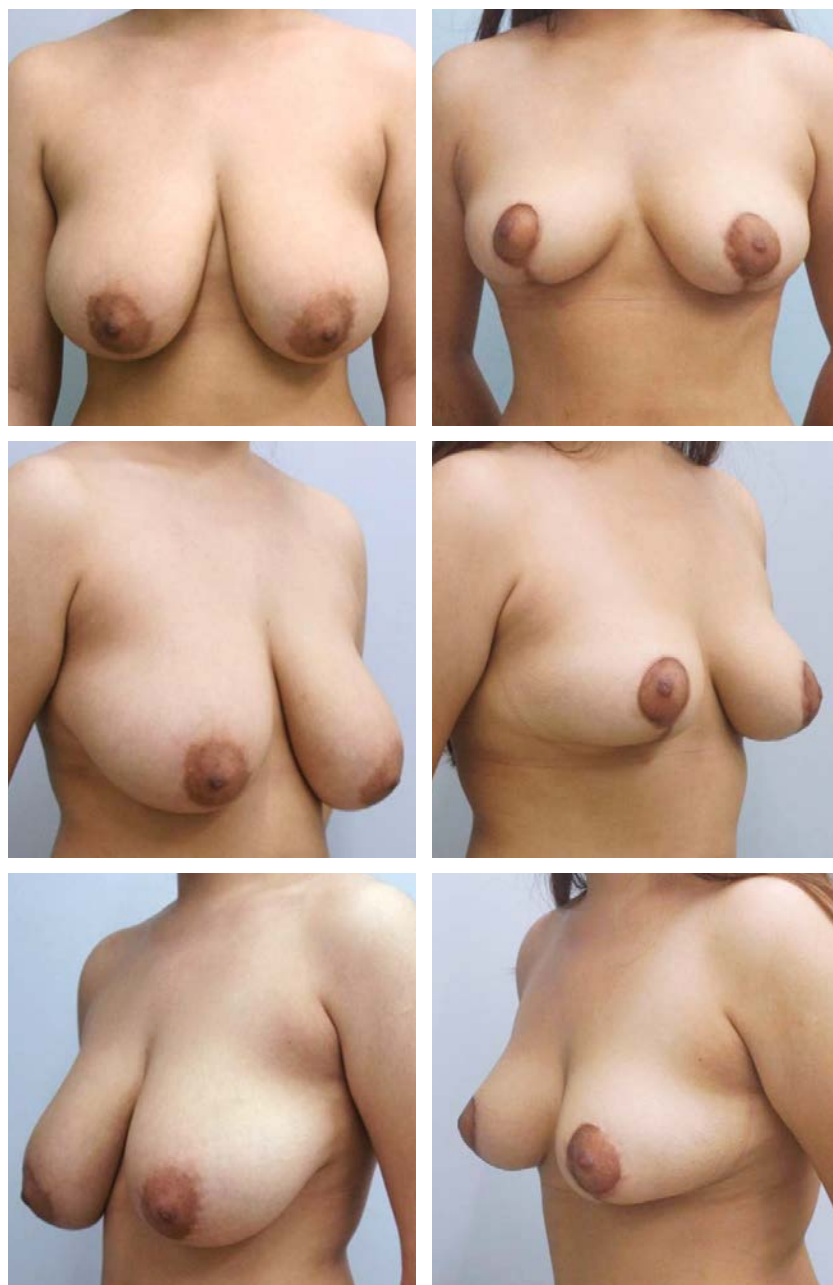


Fig. 57-12

This 20-year-old woman of Chinese decent requested reduction mammoplasty with the shortest possible surgical incision, because she had developed hypertrophic scars elsewhere on her body and felt this would be the case with her breast scars as well. Preoperatively her left breast was noticeably more ptotic than her right breast. A medial pedicle vertical breast reduction was performed; the amount of breast tissue removed from her right breast was 415 g and from her left breast 445 g. Satisfactory contour and good symmetry were achieved, as seen 6 months postoperatively.

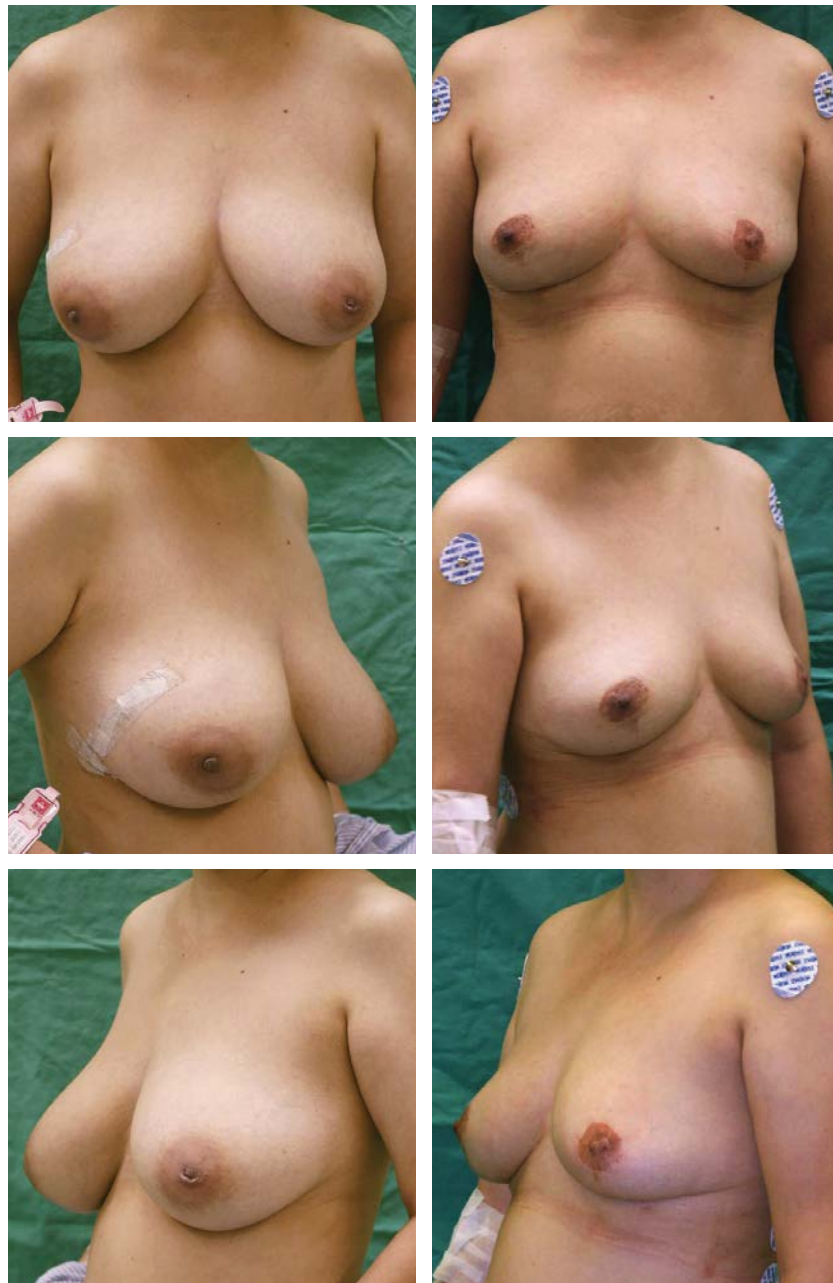


Fig. 57-13

This 36-year-old woman of Chinese descent was diagnosed with a phylloid tumor of the left breast and had undergone a resection earlier. Because of progressive macromastia, she presented requesting substantial reduction of her breasts to relieve her back pain. She has good skin quality and mild skin laxity. A medial pedicle vertical breast reduction was performed; the amount of breast tissue removed from her right breast was 425 g and from her left breast was 415 g. The follow-up photos at 10 months show good healing after her breast reduction, with an optimal aesthetic outcome.

MANAGEMENT OF COMPLICATIONS

Management of complications is critical to ensure an optimal outcome after a medial pedicle vertical breast reduction.^{6,10} In our practice, delayed wound healing in the skin purse-string closure area may occur in about 20% of patients. Management of these minor wounds requires reassurance of the patient and prolonged local wound care. In general, such a wound will heal within 2 to 3 weeks, and no further scarring in the area is observed. Obviously if a prominent scar develops in this area or the contour of the lower breast appears to be less satisfactory to the patient or the surgeon, revision surgery can easily be performed in the office under local anesthesia. However, this kind of revision surgery has been very rare in our practice.

In general, complications after this type of breast reduction are much less common. Depending on the patient's healing potential and the degree of defatting that was performed, some skin necrosis may develop in the area. This can usually be managed with prolonged local wound care and office visits with proper dressing changes. No reoperation is ever required. Occasionally the patient may develop a hematoma or seroma, just as in any type of breast reduction surgery. These complications can be managed accordingly with evacuation of the hematoma or seroma either in the office or in the operating room.

In a medial pedicle vertical breast reduction, the breast is "coned" once the medial and lateral pillars are approximated. Therefore the breast tends to be overprojected immediately after surgery. We have found that with time, the final breast shape with more fullness in the lower pole will be achieved and better aesthetic contour seen after the overall breast parenchyma gradually settles down. However, it may take longer in Asian patients to allow the breast parenchyma to settle down because of the thicker skin of Asians. Revision surgery to improve the breast shape should be postponed for 4 to 6 months until the final contour of the breast is established.

Medial pedicle breast reduction is a parenchymal resection and reshaping operation. The skin gradually adapts to the new breast shape, in contrast to the inverted-T technique in which the skin tries to hold the previous breast shape. The breast shape after a medial pedicle reduction stands the test of time and can be satisfactory in both the short term and long term. In addition, inset of the medial pedicle is easy and adds rotation and coning to the breast tissue, resulting in better projection. Furthermore, the scarring is much less with this procedure and thus there is less need for scar revision, which can be more gratifying in Asian women, who tend to have a higher incidence of hypertrophic scars.

The need for surgical revision to excise additional excess tissue and to improve the contour in the lower pole of the breast has been rare in our experience, since the excess tissue in the lower pole of the breast has been managed with aggressive defatting and purse-string skin closure in the operating room. In general, the purse-string closure site heals quite well and the scar will become flatter and less visible over long-term follow-up.

DISCUSSION

A medial pedicle breast reduction, if performed properly with good patient selection and the use of refined surgical techniques, especially for the management of excess tissue in the lower pole, can provide the patient with a very satisfactory outcome both functionally and cosmetically.³⁻⁶

Clearly, the medial pedicle vertical breast reduction may not be the appropriate procedure for every patient.^{4,10,11} We find that patient selection is the first critical element to ensure the success of such an operation. In contrast to what some authors maintain,^{1-3,12,13} we think that the medial pedicle vertical breast reduction technique is best employed for patients who are relatively young and have breasts with good skin quality.⁹ Although these patients may also have enlarged breasts, the shape of their breasts is basically

maintained with no skin stretch marks. The distance between the nipple and the IMF should be less than 10 cm, and their BMI should be near the normal range. For patients who are relatively older with poor skin quality and elongated breasts, the classic inverted-T inferior pedicle breast reduction is more likely to provide predictable results, although an extended scar and bottoming-out of the lower pole can still result after this type of breast reduction.

We agree with others that there is a learning curve to perform the medial pedicle vertical breast reduction.^{4,5} The surgeon must first master one technique of breast reduction and then gradually evolve to performing the medial pedicle vertical breast reduction. A number of intraoperative decisions by the surgeon can be critical to ensure an optimal outcome. It is important to be able to remove excess breast tissue in the lower pole right below the new IMF. The excess amount of tissue should be identified first, and careful defatting can be performed to remove subcutaneous tissue in this location. A purse-string suture can then be placed to fold the skin into the new IMF. If the amount of excess tissue below the new IMF is more extensive, an L-shaped skin incision or a short inverted-T skin extension can be added to remove more excess tissue in this location to provide an aesthetically pleasing contour of the lower pole after vertical skin closure.^{4,11,14}

Conventional liposuction can also be performed in the area under the new IMF to remove excess adipose tissues under the skin, as proposed by Hall-Findlay³ and others.⁷ We start skin closure from the lowest part of the wound so that scar length is more easily managed and can be adjusted intraoperatively.

PEARLS FOR SUCCESS

- Proper patient selection is critical to the success of a medial pedicle breast reduction.
- There is a learning curve before one can master the procedure.
- Good pedicle design is essential to ensure adequate blood supply to the pedicle.
- The new nipple position is placed lower than the level of the IMF.
- The new IMF is placed higher than the actual level of the IMF.
- The surgeon should be prepared to perform more intraoperative adjustments than he or she would perform in the inverted-T reduction procedure.
- The vertical distance may need to be shortened during closure.
- The excess tissue in the lower pole of the breast must be effectively managed.
- The patient should be advised to expect temporary upper pole fullness of the breast after surgery.

REFERENCES

1. Lejour M, Abboud M. Vertical mammaplasty and liposuction of the breast. *Plast Reconstr Surg* 94:100-114, 1994.
2. Hall-Findlay E. A simplified vertical reduction mammaplasty: shortening the learning curve. *Plast Reconstr Surg* 104:748-759, 1999.
3. Hall-Findlay E. Vertical breast reduction with a medially-based pedicle. *Aesthet Surg J* 22:185-194, 2002.
4. Karp N. Medial pedicle/vertical breast reduction made easy: the importance of complete inferior glandular resection. *Ann Plast Surg* 52:458-464, 2004.
5. Chen C, White C, Warren S, et al. Simplifying the vertical reduction mammaplasty. *Plast Reconstr Surg* 113:162-172, 2004.
6. Spector J, Kleinerman R, Culliford A, Karp N. The vertical reduction mammaplasty: a prospective analysis of patient outcomes. *Plast Reconstr Surg* 117:374-381, 2006.
7. Akyurek M. Contouring the inferior pole of the breast in vertical mammaplasty: suction-assisted lipectomy versus direct defatting. *Plast Reconstr Surg* 127:1314-1322, 2011.

8. Hall-Findlay EJ. Reduction mammoplasty. In Nahai F, ed. *The Art of Aesthetic Surgery: Principles & Techniques*. St Louis: Quality Medical Publishing, 2005.
9. Pu LL. Achieving an optimal outcome for medial pedicle vertical breast reduction. *Ann Plast Surg* 73(Suppl 1):S57-S62, 2014.
10. Adham M, Sawan K, Lovelace C, et al. Unfavorable outcomes with vertical reduction mammoplasty: part II. *Aesthet Surg J* 31:40-46, 2011.
11. Rinker B. Lowering revision rates in medial pedicle breast reduction by the selective addition of “inverted-T” technique. *Aesthetic Plast Surg* 37:341-348, 2013.
12. Lista F, Ahmad J. Vertical scar reduction mammoplasty: a 15-year experience including a review of 250 consecutive cases. *Plast Reconstr Surg* 117:2152-2165, 2006.
13. Neaman K, Armstrong S, Mendonca S, et al. Vertical reduction mammoplasty utilizing the superomedial pedicle: is it really for everyone? *Aesthet Surg J* 32:718-725, 2012.
14. Kuran I, Tumerdem B. Vertical reduction mammoplasty: preventing skin redundancy at the vertical scar in women with large breasts or poor skin elasticity. *Aesthet Surg J* 27:336-341, 2007.