The Superomedial Pedicle Wise-Pattern Breast Reduction: Reproducible, Reliable, and Resilient

Rodger H. Brown, MD¹ Richard Siy, MD¹ Khurram Khan, BS² Shayan Izaddoost, MD¹

¹Division of Plastic and Reconstructive Surgery, Baylor College of Medicine, Houston, Texas

²Baylor College of Medicine, Houston, Texas

Address for correspondence Rodger H. Brown, MD, Division of Plastic and Reconstructive Surgery, Baylor College of Medicine, Specialty Care Center, 1977 Butler Blvd., Suite E6.100, Houston, TX 77030 (e-mail: Rb140110@bcm.edu).

Semin Plast Surg 2015;29:94–101.

Abstract

Keywords

- breast reduction
- superomedial pedicle
- Wise-pattern
- reduction
- mammoplasty

The combination of the superomedial pedicle with the traditional Wise-pattern skin resection has gained increasing popularity for its versatility and ability to achieve significant reduction of breast parenchyma and skin envelope with improved contour and lasting results. Here the authors review the pertinent anatomy and discuss their surgical technique and its benefits. In addition, a retrospective chart review of 80 patients (151 breasts) who underwent superomedial pedicle Wise-pattern breast reduction between 2010 and 2014 was performed. Mean specimen weights and complication rates, including seroma, delayed wound healing, nipple loss, infection, and reoperation were calculated for the cohort.

Breast reduction remains a commonly performed operation, with more than 122,000 breast reductions performed in 2013 per the American Society for Aesthetic Plastic Surgery. With obesity rates continuing to rise in the United States population, more women are seeking breast reduction to free themselves from the mastalgia, neck pain, shoulder pain, and intertrigo that often hinders their daily activities.^{1,2} With demand on the rise, increasing pressure is placed on the plastic surgeon to perform consistent, safe, and complication-free results as well as aesthetic results.

As the surgery has evolved, a variety of pedicle and skin resection patterns have been described in an attempt to sculpt the ptotic, heavy breast into the patient's aesthetic and functional ideal. Originally described in the context of vertical reduction, the superomedial pedicle has gained acceptance combined with the traditional Wise-pattern resection. In this retrospective chart review, we share our experience with the superomedial pedicle Wise-pattern reduction and discuss the merits of the technique.

Pertinent Anatomy

The vascular anatomy of the breast has been well described, with rich and widely anastomosing superficial and deep plexuses stemming from its mesenchymal origin.³ Use of

the superomedial pedicle takes full advantage of the typical dominance of the perforators branching off the internal mammary arteries and provides excellent blood supply to the nipple.⁴ These perforators run in the superficial subcutaneous tissue radially, ~1 cm deep to the skin, toward the nipple. This superficial location allows for undermining of the distal pedicle and/or dermal scoring to assist in rotation without jeopardizing vascularity. Venous drainage is provided by the subdermal plexus, with large veins often visible beneath the skin in reduction patients with attenuated skin.

Although no clear difference has been proven in postoperative nipple sensation using various pedicles, it is clear that avoiding exposure of the pectoralis fascia and maintaining a full-thickness pedicle allows for protection of the deep branch of the fourth intercostal nerve, traditionally thought to be dominant in nipple innervation.^{5–8} However, overlapping innervation from the medial intercostal and supraclavicular branches is likely equally important in maintaining postoperative tactile, as well as erogenous sensation with better results in more broadly based pedicles. Similar conclusions may be drawn about postoperative lactation potential, with a direct correlation between the amount of parenchyma left in continuity with the nipple and subsequent ability to breastfeed.

Methods and Surgical Technique

The charts of all patients that underwent superomedial pedicle Wise-pattern breast reductions by the two senior authors (RHB, SAI) were reviewed. Charts were analyzed for the incidence of delayed wound healing, nipple necrosis, infection, seroma, reoperation, and palpable/symptomatic fat necrosis. Submitted specimen weights were recorded.

The operation truly begins in the preoperative area with markings in the standing position (► **Figs. 1–3**). Standard breast landmarks are drawn including the sternal notch, chest midline, inframammary fold (IMF), breast meridian, which may not coincide with the preoperative nipple position, and the breast meridian at the IMF. The arms may be raised to help delineate the lateral border of the breast in those with a significant excess lateral chest tissue. The Pitanguy point, or the anterior projection of the IMF onto the breast meridian, is marked by direct palpation or using a flexible ruler positioned under the breast.

Nine or 10-cm vertical limbs are drawn from this point, generally using an angle of divergence to create an equilateral triangle. Longer vertical limbs are required than those generally used with inferior pedicle reductions to accommodate the increased projection achieved with the superomedial pedicle. The angle may be manipulated for especially wide breasts, to remove pigmented areolar skin, or to further cone the breast. By only marking a triangle preoperatively, as opposed to the entire keyhole pattern, the position of the nipple–areolar complex (NAC) may subsequently be decided intraoperatively after resection and tailor tacking. Although this may add 15 to 20 minutes to the operative time, it allows for more exact placement of the NAC on the reduced breast mound and essentially eliminates postoperative nipple malposition or asymmetry.

The vertical limbs are then connected to the medial and lateral inframammary fold marking with smooth, curvilinear lines, with care taken to avoid extending onto the visible

Fig. 1 Anteroposterior view of preoperative markings.

Fig. 2 Lateral view of preoperative markings.

medial portion of the breast. The lateral incision is curved slightly upward at the most lateral aspect to allow further reduction of the lateral aspect of the breast, reduce dog-ear creation, and shape the lateral breast.

The patient is then positioned supine with arms abducted on the operating room table. The pedicle is marked starting superiorly at the apex of the triangle, extending inferiorly almost parallel to the lateral vertical limb, forming a smooth U around the NAC, and terminating at the junction of the medial vertical and horizontal limbs. A breast tourniquet is applied. The cookie cutter is used to mark the new desired NAC circumference. The pedicle and new NAC are incised, and the pedicle is de-epithelialized. The breast tourniquet is released to allow for isolation of the pedicle. The assistant is directed to maintain the breast in a straight position on the chest wall, and the pedicle is created using the cautery to dissect straight down to the chest wall. All the remaining

Fig. 3 Oblique view of preoperative markings.

breast tissue within the Wise pattern is resected en bloc down to just above the pectoralis fascia. No undermining of the medial, lateral, or superior breast is needed. The pedicle is then rotated into the apex of the vertical limbs to assess rotation. Rotation may be difficult in more ptotic breasts where the NAC sits more than 2 to 4 cm inferior to the bottom of the vertical limbs. Undermining of the deep surface of the distal pedicle at the chest wall and/or scoring of the dermis along the inferomedial vertical limb may be used to improve the arc of rotation as needed (►Fig. 4). The skin is then tailor-tacked with staples and the patient raised to a seated position to assess symmetry and volume. Additional volume may be removed if further reduction is needed, by thinning of the deep side of the pedicle or thinning of the lateral flap. The new nipple position is marked in the sitting position with the cookie cutter centered at, or just below, the most projecting point of the breast.

Closure is started with a trifurcation suture, coning the breast and minimizing lateral standing cutaneous deformities by advancing the lateral flap medially. A closed suction drain is placed at the IMF per surgeon discretion. The marked area for the new NAC is incised and de-epithelialized. Cruciate

Fig. 4 Intraoperative view after isolation of pedicle and specimen resection. In this patient, the full length of dermis at the pedicle base was scored to assist in rotation without compromising pedicle vascularity.

incisions are made through the dermis, and the NAC is delivered. It is important not to perform full-thickness resection of the skin and subcutaneous tissue in this location, as the medial half of this circle is part of the superomedial pedicle. The superior most point of the vertical limbs is closed first with a 3-0 Monocryl (Ethicon Inc., Somerville, NJ) deep dermal suture to set the new areolar circumference. Sutures are then placed at the 12, 3, and 6 o'clock positions of the nipple to assist in symmetric, centric inset. The remaining skin incisions are closed with 3-0 Monocryl dermal sutures and running 4-0 Monocryl subcuticular. The breasts and drain sites are then dressed per surgeon preference.

Throughout closure, the nipple is inspected for evidence of vascular congestion or ischemia. Conversion to a free nipple graft may be required if the arc of rotation approaches 180 degrees or the nipple shows evidence of ischemia/congestion. In these situations, the pedicle can be trimmed back to well-vascularized tissue and used as a bed for grafting without losing the aesthetic benefits of the superomedial pedicle.

Results

Seventy-nine patients (141 breasts) underwent superomedial pedicle Wise-pattern breast reductions between the years of 2010 and 2014 with seven breasts reduced for symmetry in the context of contralateral reconstruction (►Figs. 5–8). Specimens for patients not requiring free nipple grafting ($n = 74$) weighed 953 g on average, with a maximum weight of 2500 g. Of the 141 breasts (►Table 1), 4 breasts (2.9%) required reoperation: 2 for seroma (1 of which occurred in an irradiated breast), 1 for secondary closure, and 1 for fat necrosis on a repeat reduction. There was one total nipple necrosis (0.7%) and one superficial necrosis that healed with dressing changes without pigmentation changes. Three (2.1%) breasts had minor delayed wound healing (< 1 month

Fig. 5 Patient presented with initial sternal notch-nipple distance of 40 cm bilaterally with a nipple-inframammary fold of 20 cm on the right and 19 on the left. Shown preoperatively and 9 months postoperatively after removal of 1595 g on the right and 1685 g on the left, moving the nipple 19 cm superiorly.

of dressing changes) and one breast required over a month of dressing changes. There were two minor infections (1.4%) treated on an outpatient basis. All patients experienced resolution of their preoperative symptoms. The overall complication rate was 9.2%, with the major complication rate (total nipple necrosis, major delayed wound healing, reoperation) 4.2% and minor complication rate 5% (►Table 2). Ten breasts required free nipple grafts with specimen weights ranging 1079 to 2972 g (average 1912 g), and all had uneventful postoperative courses (►Fig. 6).

Discussion

Many reduction mammoplasty techniques have been described, but the essential goals, as described by Lassus, have remained the same: a reduction in volume of the breasts, establishment of a natural appearing shape, and minimal scarring and change over time. In addition, the ideal tech-

nique should be consistently reproducible and teachable to the next generation of surgeons. Although plastic surgeons most commonly perform breast reduction with an inferior pedicle, a variety of pedicles for nipple perfusion should be maintained in the plastic surgeon's armamentarium to address reductions of various sizes and to allow for facile oncoplastic reconstruction of lumpectomy defects throughout the breast.⁹

First described in the setting of vertical reductions, the superomedial pedicle, as modified from Hall-Findlay's medial or superior pedicle-based reduction described in 1999, has gained popularity as a means to decrease operative times, improve superior pole fullness, and reduce the tendency of pseudoptosis/bottoming-out classically associated with the inferior pedicle.¹⁰ It has been described with the use of circumvertical/lollipop, circumvertical with short transverse, and classic Wise-pattern skin resections.¹¹ Use of the superomedial pedicle has also been well-described in mastopexy

Fig. 6 Preoperative and 1-year postoperative result after reduction with free nipple grafting. Specimen weights 2972 g on left and 2936 g on right.

and has shown utility in the massive weight loss patient with minor modification, making it a versatile pedicle to use in a variety of patients.¹² Increased use of this technique has given rise to comparative studies between superomedial and other pedicles in breast reduction. A recent cohort study, which compared superomedial pedicle vertical pattern reduction and inferior pedicle Wise-pattern resections in cohorts matched by age, comorbidity, and weight of reduction including reductions of up to 2 kg per breast, showed equivalence in complication rates between the two methods and decreased operative times favoring superomedial pedicle use.⁹ Many patients who require significant reduction in the skin envelope are not ideal candidates for vertical reduction, as they are often left with redundant skin at the inferior end of the incision that does not flatten with time. Use of vertical skin resection techniques also poses a significant learning curve for residents and young surgeons, with significant experience needed to make the required subjective assessments of desired nipple position, amount of tension for pillar plication, and the extent of both horizontal/vertical skin resection.

The inferior pedicle Wise-pattern reduction has been, and still is, the most widely used technique in the United States. It

is founded on easy, reproducible, teachable markings that yield consistent results. Many surgeons also prefer the Wise-pattern technique in larger breasts because there will be no excess, redundant skin at the IMF that must be observed for some time, and may never completely resolve. Although it has its benefits, this technique also has some downsides. By using the inferior pedicle, you are relying on the skin envelope to hold up the weight of the inferior breast tissue and shape the breast. Many times, the surgeon creates a short, tight lower pole of the breast during the reduction to help prevent early bottoming-out. This yields a breast shape that is unnatural in the early postoperative period. Despite this, the breast usually continues to bottom-out over time, and the long-term result is usually a breast with pseudoptosis in the end.

Combining the two techniques and using the superomedial pedicle with a Wise-pattern skin resection can take advantage of the benefits of each, while eliminating some of the downsides. The superomedial pedicle brings with it the ability to have improved upper pole fullness and breast shape, while the Wise-pattern skin resection allows for its reproducible, standardized, easily taught markings, and elimination of excess skin in both the vertical and horizontal

Fig. 7 Preoperative and 10 weeks postoperative result after reduction of 710 g on left and 950 g on right.

dimensions. It allows for improved on-table, early postoperation, as well as long-term, contour with increased superomedial fullness and subsequent maintenance of a natural breast shape and less bottoming-out.⁹ Durability in the cosmetic result and NAC vascularity is increased by maintenance of the majority of the superior breast parenchyma and using the internal mammary artery perforators for blood supply. There is no need to thin the lateral and medial flaps extensively to allow for tightly wrapping them over the inferior pedicle. This yields lateral and medial flaps that are much thicker with better blood supply than the thinner flaps seen with inferior pedicle reductions. This may lead to decreased rates of wound-healing problems at the trifurcation and along the IMF incision.

In addition, operative times can be reduced with this technique for multiple reasons. The surface area of the pedicle that requires de-epithelialization is significantly less. The total distance of pedicle border to be isolated from the surrounding parenchyma is decreased. There is no significant thinning/flap creation or superior undermining, and the resection can be done in one en bloc piece. All these reduced or eliminated steps can reduce the operative time.

In contrast to the lateral pedicle, and to a lesser extent the inferior as well, the superomedial pedicle allows for more freedom in contouring the lateral breast without the need for liposuction. The lateral breast can be more freely sculpted in terms of overall volume, as it is often where resection is needed most. Compared with the superior pedicle, which can boast a similar mechanical advantage of resistance to bottoming-out, the superomedial pedicle creates less tension on the areola after elevation, especially in large, dense breasts requiring greater than 4 cm of elevation.¹³

Critics of the superomedial pedicle claim that the technique is not as useful in very large reductions because of the amount of parenchyma retained within the pedicle itself. Although this may be true in the case of vertical pattern reductions, use of the Wise pattern allows for significant reduction with en bloc resection of the inferior breast tissue, as well as thinning of the lateral flap and distal pedicle if needed. In their matched cohort study, Antony et al found that no significant differences were observed in the complication rates between large reductions, defined as >1000 g per breast, and small reductions, defined as <1000 g per breast,

Fig. 8 Preoperative and 1 week postoperative result after reduction of 1260 g on left and 1325 g on right.

Table 1 Patient data

No. of patients	74
No. of breasts	141
Minimum specimen weight	206 g
Maximum specimen weight	2500 g
Average weight	953 g

Table 2 Complications

	No (%)
Seroma	3 (2.1%)
Minor delayed wound healing	3 (2.1%)
Major delayed wound healing	1 (0.7%)
Minor infection	2 (1.4%)
Partial nipple necrosis	1 (0.7%)
Total nipple necrosis	1 (0.7%)
Reoperation	4 (2.9%)
Total minor	7 (5%)
Total major	6 (4.2%)

concluding that superomedial pedicle breast reduction may be used for breast reductions of more than 1000 g per breast.¹¹ We had numerous patients in our series with over 1000 g reductions with low complication rates as well.

Conclusion

The combination of the superomedial pedicle and the Wise-pattern skin resection allows for consistent, reproducible results with easily learned markings and a robust blood supply to both the nipple and the skin flaps. It improves both short- and long-term aesthetic outcomes and yields a low risk of complications, even in large reductions.

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