



# Breast Reduction: Wise Pattern Techniques

Steven P. Davison and Mark W. Clemens

## INTRODUCTION

Reduction mammoplasty is a challenging combination of aesthetic and functional reconstructive plastic surgery. In breast reduction, a technique that provides a safe and predictable result with nipple–areolar preservation is paramount. The preferred technique is ideally versatile and predictable. The end result should be judged on volume, scar pattern, shape, symmetry, and nipple position with projection. The American Society of Plastic Surgeons reports a 25% increase in reduction mammoplasty over the last 4 years. Over 105 000 breast reductions were performed in 2004.<sup>1</sup> This trend is likely to continue as the incidence of obesity in the general population rises. Rohrich et al.<sup>2</sup> have previously reported that the inferior pedicle and Wise pattern techniques were the most popular, based on a survey of Board-certified plastic surgeons. We believe the most common technique for breast reduction surgery remains the inferior pedicle with an inverted-T or Wise skin pattern. This chapter addresses the versatility of the Wise inverted-T technique skin pattern by giving particular attention to its variety of applications.

## Historical background

There are two components to breast reduction: the pedicle, and the skin excision. Although related, they are independent of each other.<sup>3–5</sup> The Wise pattern skin excision has been described with a variety of pedicles.

At the turn of the century, most incisions and breast reductions were oriented as vertical-only or horizontal-only. The first breast reductions using a vertical incision with a short horizontal component were described by Lexer in 1925.<sup>6</sup> The Wise keyhole pattern was introduced in 1956, to answer unpredictability concerns raised by limited incision techniques.<sup>7</sup> The Wise pattern or inverted-T gained

much support in the United States, where surgeons were more likely to functionally address moderate to severe mammary hypertrophy. Limited vertical incision techniques tended to predominate in South America and Western Europe, where surgeons were more likely to cosmetically address smaller-volume breast reductions. Surveys among reduction mammoplasty patients indicate that in the United States today, the major concerns revolve around the burden of heavy breasts, and less on aesthetic scars.<sup>8</sup> At our institution, we used the Wise pattern with 133 superomedial-based pedicles and nine free nipples.<sup>9</sup> Average excisions were 1188 g and 1929 g, respectively.

Wise produced a predictable pattern for breast reduction by creating a technique that allowed for three-dimensional control of the breast. Today, there are various pedicles that use the inverted-T pattern skin incision, among them the inferior pedicle, the McKissock vertical bipedicle, and the superomedial, superolateral, and medial pedicles. The idea of a dermoglandular pedicle was introduced when Strombeck in 1960 first used a horizontal bipedicle of dermis and subcutaneous tissue to transpose the nipple–areolar complex superiorly with consistent safety.<sup>10</sup> In 1973, Weiner et al.<sup>11</sup> described a single superior dermal pedicle. Orlando and Guthrie<sup>12</sup> followed in 1975 with a description of the superomedial dermoglandular pedicle. This technique was further popularized by Hauben, who described the associated safety and speed of this particular design.<sup>13,14</sup> Nevertheless, the inferior pedicle technique had been the predominant method used for reduction mammoplasty at our institution.<sup>15</sup> Described in 1972, the McKissock technique involves a central breast reduced around a vertical bipedicle. The vertical limbs are established by breast meridians with the medial and lateral dermoglandular wedges plus portions of the upper flap removed down to fascia, creating a ‘bucket handle’ as part of the reduction. The inferior pedicle breast

reduction relies on a mostly dominant inferior blood supply based on parenchyma and chest wall musculature.

Breast reductions have been classically described by their pedicles (e.g., McKissock, inferior pedicle, etc.) yet this has been interchanged with the terminology Wise pattern.<sup>2</sup> **These are two separate entities.**

### Pedicle type

The underlying goal of the pedicle is to provide blood supply to the nipple. The secondary rule is to provide the volume of breast tissue in the correct position so the reduction achieves a pleasing shape, i.e., a round, projecting breast with a superior fullness. Bottoming-out of the pedicle or a flat mound are compromised results. **Getting the pedicle correct is what dictates the volume of breast size.**

### Skin pattern

The type of skin pattern is a separate entity from the pedicle. The Wise pattern, discussed here, has been used with a number of pedicles, including the McKissock,<sup>15</sup> the inferior pedicle, and the superomedial dermatoglandular pedicle.

Calvin Johnson, when he described open rhinoplasty, discussed the bony framework of the nose and the soft tissue envelope.<sup>16</sup> He described the soft tissue forming to the framework, often shrinking to it. The breast reduction skin envelope is analogous, but the inverse. We believe that the soft tissue envelope or skin molds the pedicle shape. It is similar in that manner to a bra: too small or tight an envelope and the breast flattens; too large and it becomes ptotic. **Getting the envelope correct is critical to shape.**

## INDICATIONS AND CONTRAINDICATIONS

The indications for Wise pattern breast reductions are the same as for most breast reductions that include complaints of macromastia, brassiere shoulder grooving, upper back pain, neck pain, and inframammary intertrigo. Contraindications include any previous chest scars which interfere with skin flaps or the chosen pedicle, which may compromise the blood supply. For mammoplasty reoperations it is critical for the surgeon to be aware of the previously used pedicle orientation. Our current preference is for a superomedial pedicle with Wise pattern.

### Anatomy and advantages of superomedial pedicle technique

The blood supply is as reliable as the inferior or central pedicle as it originates from the internal mammary perforators. In larger reductions, feathering of the pedicle can extend the perforators from the lateral thoracic artery and associated lateral intercostal and thoracoacromial vessels.<sup>9</sup> Flaring away from the pedicle also allows for the acquisition of the lateral rami of the fourth intercostal nerve. Additional sensory contributions may be made by the third and fifth intercostal nerves.<sup>17</sup> Objectively, the medial or supero-

medial pedicle techniques compare favorably in postoperative breast sensitivity with the inferior pedicle.

The superomedial pedicle has a better superior blood supply owing to its shorter length compared to an inferiorly based pedicle in an equivalently sized breast. Despite very large reductions, Finger and associates showed that the mean length of the superomedial pedicle was 11.6 cm, and Hall-Findlay utilized the superomedial glandular technique extensively in a wide range of mammoplasties.<sup>5,18</sup> With an inferior pedicle technique, the distance from the nipple to inframammary fold could be closer to 16–19 cm for a similar-sized reduction and potentially necessitate a free nipple graft. The arc of rotation is favorable and the pedicle needs to be rotated no more than 110°.

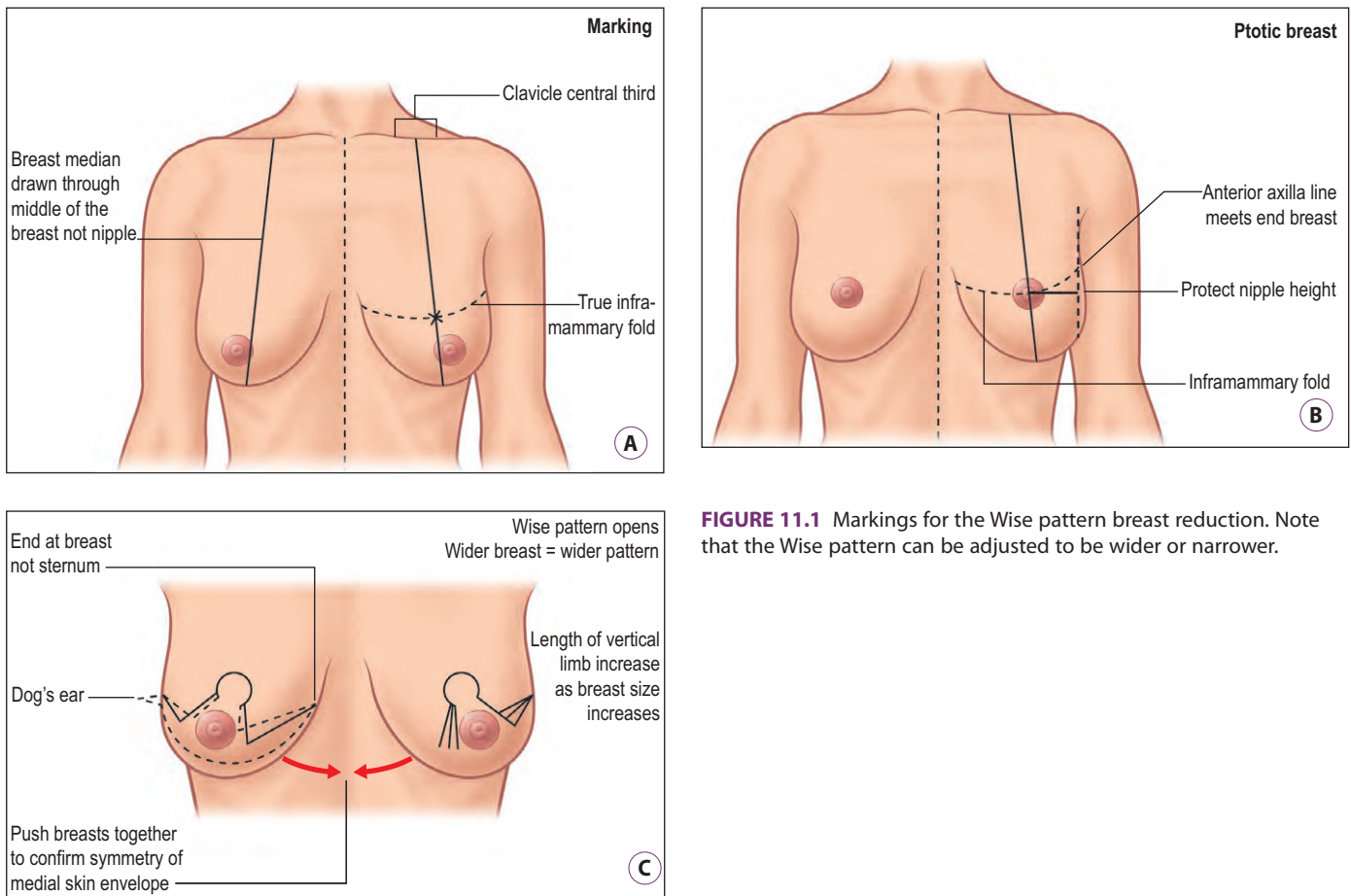
The skin excision pattern is not dictated by the amount of breast tissue to be removed. In our experience, varying amounts of breast parenchyma can be excised for the same skin patterns. This highlights the principle that it is the amount of excess skin that influences the pattern of excision and not the size of the breast reduction. It is the final size that dictates the amount of skin to be left and, conversely, the amount removed. Using the superomedial technique, the progressive skin excision from circumvertical to a short transverse scar or Wise pattern allows the surgeon to achieve a more ideal breast in one operation.

The superomedial pedicle inherently provides a substantial amount of superomedial fullness by preserving the upper-inner quadrant of the breast. Although this was not measured objectively, we believe it accentuates this area and resists the glandular bottoming-out phenomenon associated with the inferior pedicle. The inferior pedicle technique attempts to raise the inferior breast tissue superiorly while basing it inferiorly, thereby involving two inherently opposing vectors. Attempts to support the pedicle with suturing have had moderate success. Results of a study by Hsia and Thomson<sup>19</sup> comparing breast shape preferences between plastic surgeons, lay people, and patients seeking breast augmentation showed that the latter two groups preferred a convex breast shape, or a fuller superior pole. In patients seeking breast reduction, we find a similar preference for superior fullness and also elimination of inferolateral excess.

### Free nipple reduction

When does a surgeon decide to perform a free nipple reduction with the Wise pattern skin excision? Historically, with the inferior pedicle it was the length of the pedicle. A greater than 19 cm pedicle length dictated a free nipple. With the superomedial technique, we use the sternal to nipple distance as a guide. At 39–41 cm, it is difficult to reduce the pedicle size sufficiently while preserving blood flow to create a significant reduction. Interestingly, the more ptotic and atrophic the breast, the more likely it is that the superomedial glandular pedicle will rotate and add to the reduction.

Free nipple transfers are accomplished using the same Wise pattern excision. The nipple is transferred in the



**FIGURE 11.1** Markings for the Wise pattern breast reduction. Note that the Wise pattern can be adjusted to be wider or narrower.

standard fashion onto a modified superomedial pedicle that maintains the normal width but does not extend in length to the original nipple–areolar complex. Enough length is maintained to rotate the pedicle toward the new location of the nipple–areolar complex. Free nipple grafts are placed directly on the de-epithelialized pedicle.

## OPERATIVE APPROACH

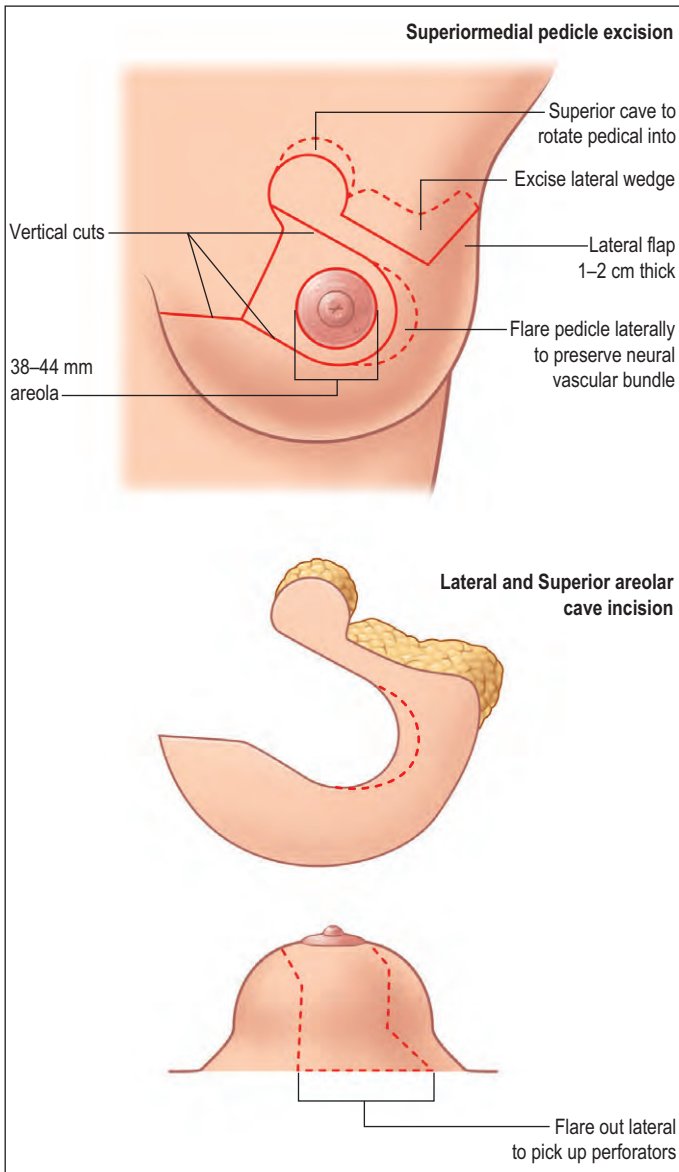
### Marking – the Wise wire pattern

The Wise wire pattern is an invaluable tool (Fig. 11.1). However, it is only a tool if it can be modified and applied to a variety of breast types. There is a tendency among residents to use it as it comes, without widening or closing it. This should be performed to accommodate the pattern to breast size. The size of the nipple–areolar keyhole is dictated by the size of the nipple cutter ring – 38, 42, or 45 mm – the surgeon might use. The circle can be drawn inside or outside the wire. The limbs of the wire are graduated, allowing the vertical to be modified to final breast size: 6–6.5 cm for an approximate C cup to 7.5 cm for a D cup, to 8 cm for DD. The wire pattern can be expanded for a broad breast and narrowed for the thin-based breast. To

check and compare the length of the medial limbs for symmetry, the breasts can be approximated together.

Reductions larger than 1000 g with excess skin are performed using the superomedial pedicle with a Wise pattern excision. The preoperative markings are drawn with the patient in the standing position. Breast meridians are determined using the suprasternal notch and acromion to measure the meridian of each breast. A vertical line is drawn through the center of the breast, usually but not necessarily through the nipple–areolar complex. The infra-mammary fold is marked. Nipple placement is then marked along the breast meridians at the level of the fold.

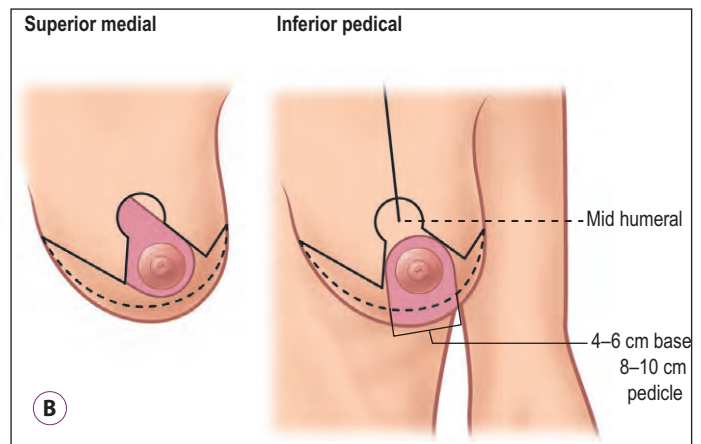
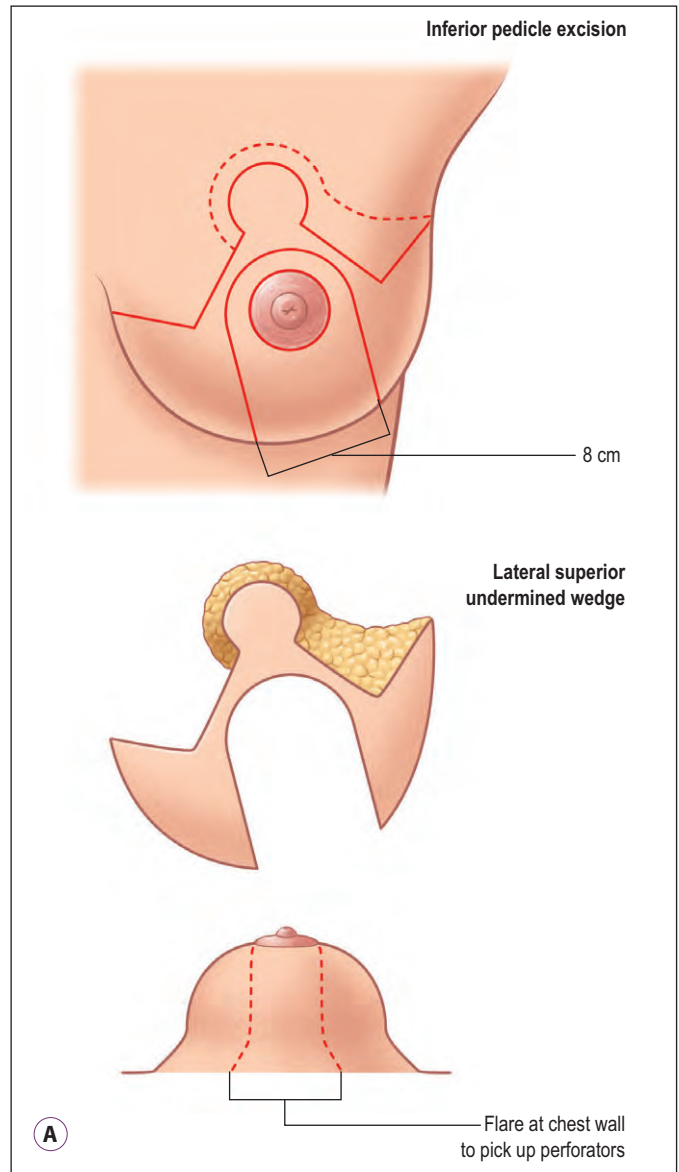
The nipple to sternal notch distance on larger reductions is in the range of 22–26 cm. Another guide to nipple height is either midhumeral, or estimated by folding the breast skin and looking for the maximum height of the mound. The length of skin from the areola to the bottom of the Wise pattern is marked at 6–8 cm. If the breast is large, a longer vertical limb of 7–8 cm is selected in order to avoid pulling the abdominal skin and the final scar superiorly onto the breast. Often the medial skin contracts less than the lateral, so any length discrepancy should favor a longer lateral limb. On average for our reductions, a C cup breast corresponds to 6.5–7 cm, D cup to 7.5 cm, and D+



**FIGURE 11.2** Diagram outlining the resection in the superomedial glandular pedicle – note that the majority of the removal is lateral.

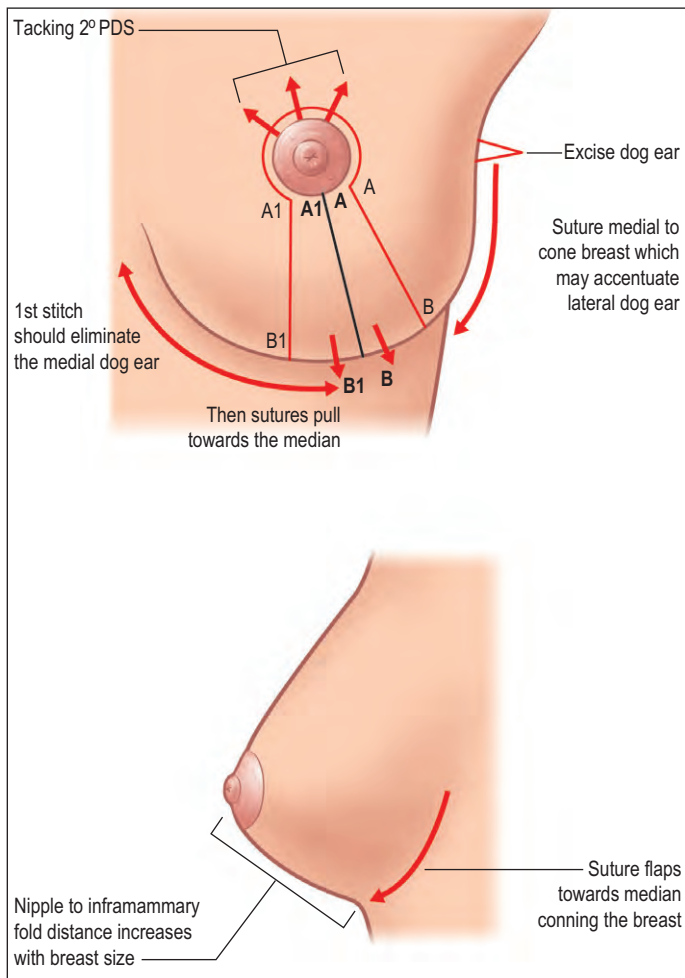
cup to 7.5–8 cm. The superomedial pedicle is then marked 6–8 cm wide (Fig. 11.2). The longer the pedicle and the wider the base, the larger will be the reduced breast.

The majority of the reduction comes from the inferolateral portion of the breast, and care is taken to avoid parenchymal excision from beneath the superomedial flap. A wedge of tissue is excised as an arc above the areola to provide space to rotate the pedicle, and is removed en bloc with the main specimen (Fig. 11.3). The superomedial pedicle is flared at the chest wall to maximize the intercostal perforators. The pedicle is then fixed by the skin envelope, not sutures. A set-up suture is placed at the T junction of the skin flaps with the inframammary fold. This suture is classically placed at the meridian of the breast. However, if it is moved 1–2 cm medially, greater coning of the breast is achieved.



**FIGURE 11.3** Diagram outlining the resection in the inferior pedicle. The bulk of the tissue is removed from under the skin flaps.





**FIGURE 11.4** Diagram of the closure of the Wise pattern. Coning of the breast helps the shape.

Irrelevant of pedicle type, closure of the Wise skin pattern sets up the shape; a T-junction suture positions the flaps. The medial junction where the sternal skin meets the inframammary fold (IMF) is carefully sewn to eliminate a dog-ear. However, laterally we force the dog-ear to the axilla and extend the incision to eliminate it. Patients are uniformly unhappy with a dog-ear medially and better accept a larger scar, especially when combined with anterior axillary line liposuction. The shape of the breast should not be compromised to shorten the length of the axillary scar.

The medial and lateral skin flaps are sewn towards the meridian with some tension. The oblique suture bites with 2/0 PDS are greater at the edges and become progressively more neutral toward the T junction. This cones the breast, creating a pleasing round profile. Laterally, it defines the breast from the axilla.

The nipple–areolar complex is inset to give it support. One potential disadvantage of the superomedial glandular pedicle is that it is a short pedicle with a medially placed nipple which can be difficult to rotate. To facilitate this and avoid inverting the nipple, the dermal bridge of the de-epithelialized pedicle is incised (Fig. 11.4). This is possible in the superomedial glandular technique, as the pedicle is

shorter, which should augment the amount of blood coming in from the base. To cut the dermal pedicle in the inferior or McKissock pattern would be closer to heresy.

The nipple–areolar complex is supported by three to four 2/0 PDS deep dermal sutures, or breast capsule sutures placed at the 3, 9, and 12 o'clock positions. This restricts tension on the scar as the reduction heals, ultimately minimizing hypertrophic scar formation.

If an inferior pedicle is chosen for some reason, such as previous inferior reduction, or the need to include a superior cyst or mass. An inferior pedicle is created 3 or 4 cm in either direction from the breast meridian. The de-epithelialization is extended 2 cm above the nipple–areolar complex. Therefore, the total pedicle is 8–10 cm long.

## OPTIMIZING OUTCOMES

One of the most time-consuming parts of a reduction is de-epithelialization. The other is sitting the patient up to confirm volume, symmetry, and nipple position. The predictability of the Wise pattern, with the on-table reproducibility of the superomedial glandular pedicle, allows a minimum of up/down positioning. We recommend closing the first breast, then tailor-tacking the second breast and sitting the patient up at this point. This allows volume and symmetry adjustments. Liposuction can be used to reduce the size of the lateral first breast if needed. The second side is then reopened and changes made, before proceeding to final closure.

## Sutures and scars

Although absorbable sutures, both braided and monofilament, have made an enormous contribution to plastic closures, they come with a price. They are absorbed by an inflammatory process and cause localized skin reactions. We find that Vicryl sutures spit excessively. PDS 2/0 is used for deep tension sutures. Limited 3/0 Monocryl sutures are used for deep dermis closure. Note that excessive suture use leads to spitting later, but without the skin reaction of the braided sutures. In patients prone to poor scarring, we now use a 4/0 Prolene running subcuticular suture which is left in place beyond the 8 weeks needed for maximal wound strength.<sup>20</sup> The nipple–areolar complex is inset with a circumareolar Monocryl or simple interrupted Prolene sutures. A loop of Prolene is left out to facilitate easy removal.

## COMPLICATIONS AND SIDE EFFECTS

Commonly described reduction mammoplasty complications include reduced sensation in the nipple–areolar complex, complete or partial loss of the nipple–areolar complex, delayed healing, fat necrosis, nipple retraction, hypertrophic scars, dog-ears, infection, and hematoma. Some or all of these occurrences may require a secondary operation. For all women considering reduction mammoplasty, a detailed informed consent should include a discussion of these possible complications as well as a questionnaire to

ascertain the importance of future breastfeeding, nipple sensation, hypopigmentation of the nipple, hypertrophic and keloid scars. Incidences differ in the literature with respect to which pedicle was utilized. Revision rate is a very important marker of a reduction technique. At our institution, for 133 Wise pattern superomedial-based pedicles and nine free nipples, results were an overall 4.6% revision rate, for hematomas (1.4%), contour improvements (1.4%), and revision of the surgical scar (1.8%).<sup>9</sup> No nipple losses were observed. We have found immediate treatment with hyperbaric oxygen to be beneficial in selected patients when nipple ischemia is suspected early; however, large prospective studies are still required to completely elucidate its role. At our institution we have observed a link between sickle cell trait and flap necrosis in a breast reduction patient.<sup>21</sup> Risk factors associated with flap survival, such as smoking, obesity, radiation, and diabetes, should be well addressed preoperatively.

## POSTOPERATIVE CARE

The postoperative care following reduction mammoplasty is generally routine. Steri-strips are usually placed along the incisions and women are instructed to wear a compressive breast garment. The compressive garment or bra is worn 23 hours a day for 4–6 weeks. Drains are usually inserted and removed after 24 hours. Sometimes the drains will remain in place for 2–3 days if the output is elevated. Women are instructed to shower on postoperative day 2 or 3. Activity restrictions are necessary for the first 6 weeks following the operation. Women are encouraged to refrain from any strenuous or bouncing activities, such as aerobic exercise, jogging, or running. After 6 weeks they can resume all normal activities.

## CONCLUSIONS: WISE PATTERN

The key advantages of a Wise pattern, and specifically when combined with a superomedial pedicle, are:

**CASE 11.2** Surgical procedure. Photo of the superomedial pedicle. Width of the superomedial pedicle prior to excision of breast parenchyma.

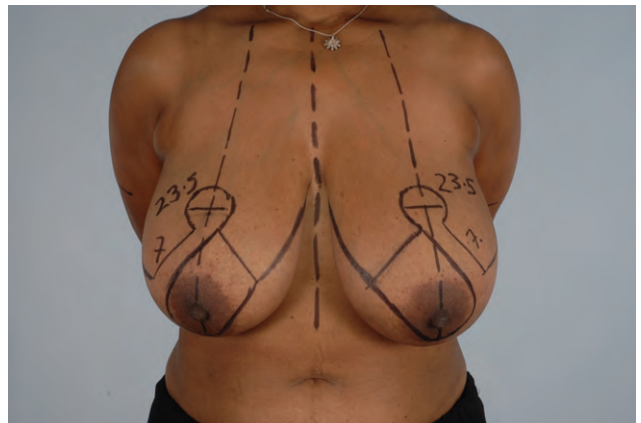


- Adaptability. The Wise pattern as a skin excision scar can be applied to a variety of pedicle or free nipple reductions.
- Shape. The skin pattern can be used to cone and shape the breast.
- Reproducibility and predictability. This pattern features an advantage in the learning curve and ability to teach.
- Progressive. The Wise pattern can be used with increasing degrees of ptosis, skin excess, and breast volume.

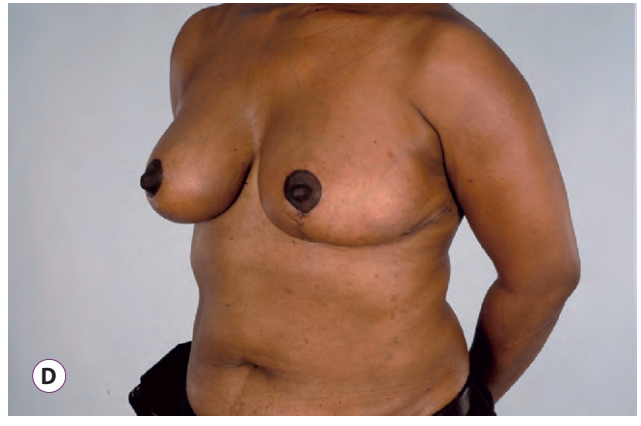
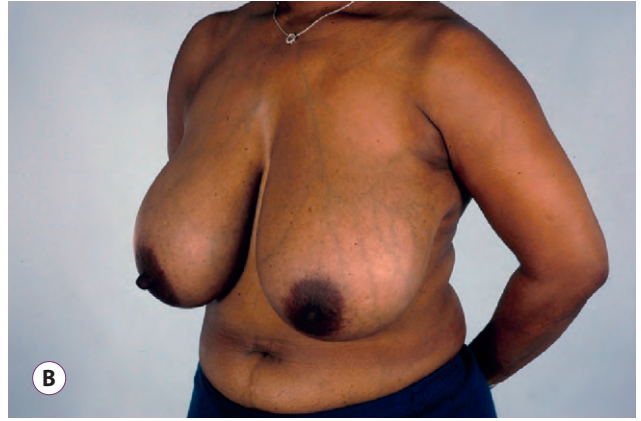
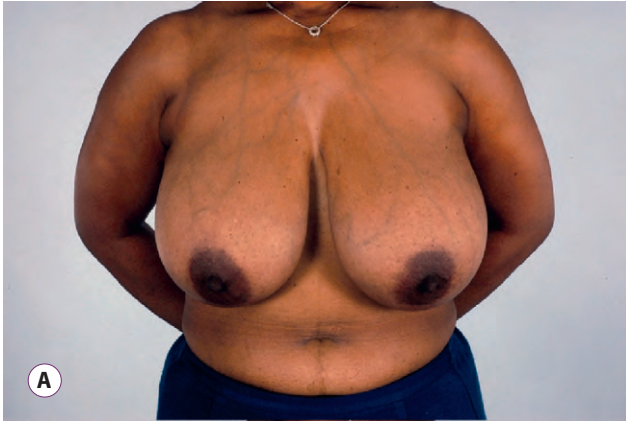
**CASE 11.1** Surgical procedure. Photo of surgical excision of skin flaps with a superomedial pedicle pattern. Excision of an arc of tissue above the areola to create space for the new position of the nipple–areolar complex. Note that the bulk of the tissue is removed laterally.



**CASE 11.3** Preoperative markings on a 34-year-old woman with macromastia.

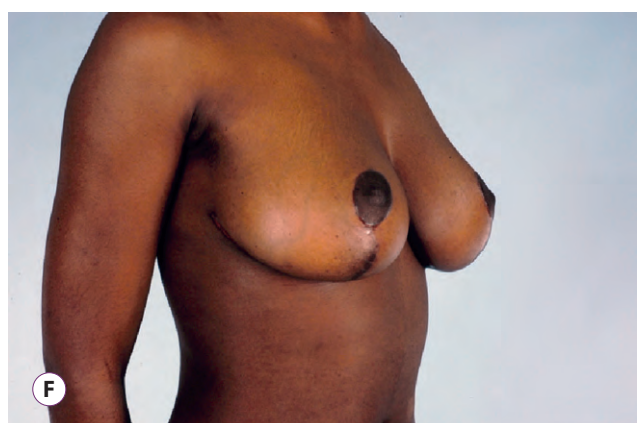
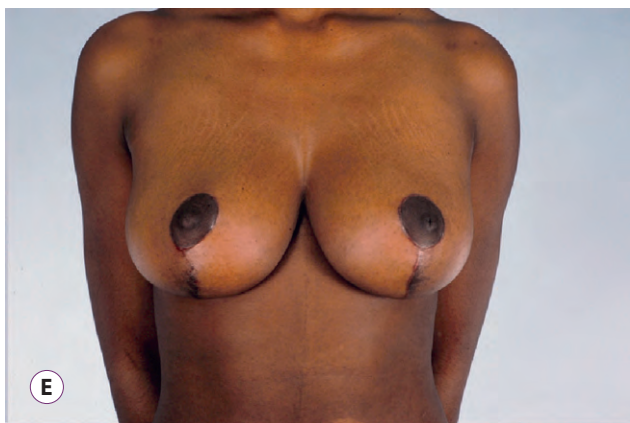
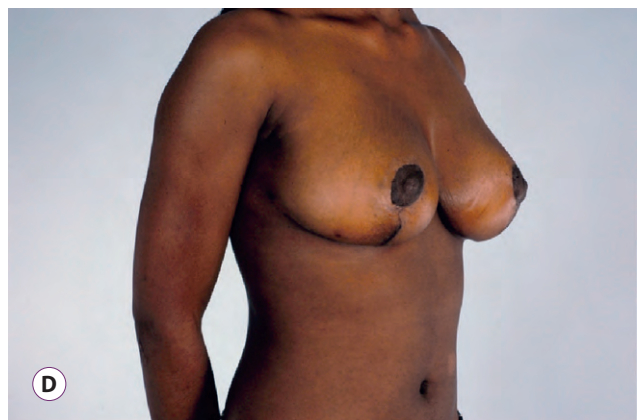
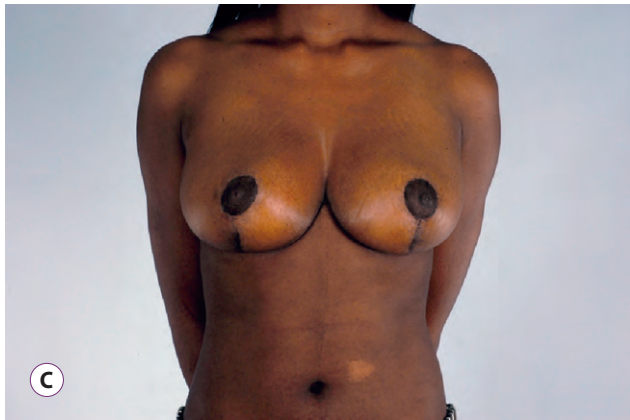
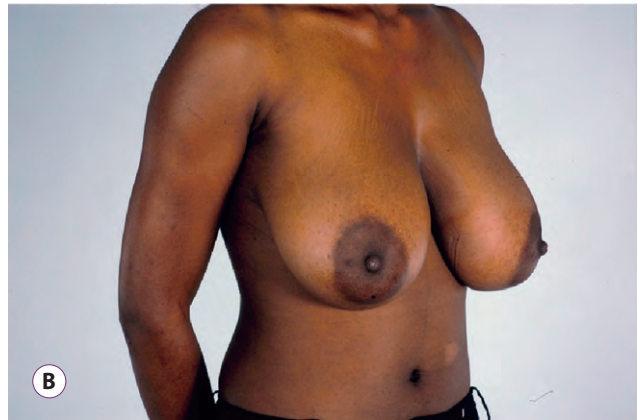


**CASE 11.4 A, B** The 34-year-old woman with macromastia from Case 11.3. **C, D** 7 months post superomedial pedicle Wise pattern breast reduction. Right and left breasts were reduced 950 g and 1100 g, respectively. Patient demonstrates no settling period or tissue adaptation.





**CASE 11.5 A, B** A 24-year-old woman with macromastia. **C, D** 6 months post 800 g breast reduction, and **E, F** 14 months post-reduction.

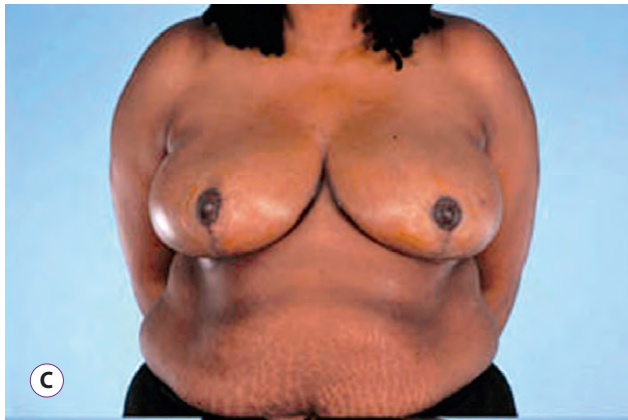




**CASE 11.6 A, B** A 19-year-old woman with macromastia, and **C, D** 1 year after 740 g reduction right breast and 680 g reduction left breast.



**CASE 11.7** A 47-year-old woman with macromastia. **A, B** Preoperative views, and **C, D** 10 months after 1770 g reduction right breast and 1840 g left breast.



**CASE 11.8** A 44-year-old woman with macromastia. **A, B** Preoperative views, and **C, D** 10 months after 565 g reduction right breast and 725 g reduction left breast.



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