Superior Pedicle Technique of Reduction Mammaplasty: A Stepwise Approach

Meghan H. Nadeau, MD; Daniel J. Gould, MD, PhD; Luis H. Macias, MD; Michelle A. Spring, MD; and W. Grant Stevens, MD

Abstract
Numerous surgical options for breast reduction have been described, but in the current healthcare environment, efficiency is of the utmost importance. In this Featured Operative Technique, the authors describe an efficient, reproducible, and simple method for minimal to moderate reduction mammaplasty that utilizes a superior pedicle. The surgical maneuvers were developed and conveyed to the senior author (W.G.S.) by Dr John Bostwick. This approach preserves superior and medial breast fullness while providing appropriate resection of the breast parenchyma to ameliorate symptoms and produce a smaller, lifted breast with a more youthful appearance. The surgical technique maintains a reliable blood supply to the nipple-areola complex (NAC) from the internal mammary artery and its perforators, and involves minimal transposition of the NAC. The authors reviewed the charts of 62 consecutive patients who underwent this procedure and found the complication rate to be 11.3%. Complications included 1 hematoma, 1 standing cone deformity, 3 soft-tissue infections, 8 incisional breakdowns, and 1 unilateral necrosis of the NAC.

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Reduction mammaplasty has long been the mainstay of treatment for symptomatic macromastia.1 Established correlations exist between mammary hypertrophy and numerous health and quality-of-life concerns, including neck and shoulder pain, headaches, numbness and tingling in the hands, shoulder notching or grooving from the bra straps, and intertriginous infections.2-5 In addition, mammary hypertrophy may cause considerable social embarrassment and psychological distress.5-6

Many studies have demonstrated significant decreases in symptoms and improvements in quality of life and psychosocial well-being after reduction mammaplasty.3,7 According to the American Society for Aesthetic Plastic Surgery,6 110,438 breast reductions were performed in 2012, representing an increase of 4% from 2011. In recent years, many breast reductions have been performed successfully in the outpatient setting and have been safely combined with additional procedures.8-11 Numerous surgical approaches utilizing different skin reduction patterns and a variety of parenchymal or dermal supports for the nipple-areola complex (NAC) have been described for reduction mammaplasty.12,13 However, 2 treatment goals pertain to all reduction mammaplasty procedures: (1) to decrease the severity and number of associated health concerns, and (2) to create a smaller, more youthful, aesthetically pleasing breast.

For many patients, surgical breast reduction is covered by health insurance. With most insurance companies, coverage decisions are based on a comparison of the estimated tissue resection weight and the patient’s body surface area. However, several authors have noted that resection weight does not correlate with symptom relief.2,7,14 Clinical findings of comparable symptom relief and quality-of-life
benefits with smaller breast reductions support the establishment of an efficient and simple approach to reduction mammoplasty that maintains superior fullness.

In this article, we describe a straightforward stepwise approach to breast reduction that involves a superior pedicle. These procedures were introduced by Bostwick and subsequently were described by Jones and Hall-Findlay. We recommend this procedure for minimal or moderate reductions (i.e., resection weight <600 g).

**PATIENT SELECTION AND PREOPERATIVE ASSESSMENT**

Patients with grade 1, 2, or 3 ptosis and an estimated resection weight of ≤600 g were considered candidates in our practice for breast reduction with a superior pedicle. All patients aged ≥30 years received a mammogram preoperatively. Patients aged <30 years with a strong family history of breast cancer also underwent preoperative imaging. Patients were instructed to stop smoking from at least 2 weeks preoperatively through 2 weeks postoperatively.

**SURGICAL TECHNIQUE**

The complete procedure for reduction mammoplasty can be described in 17 steps, as presented in Table 1. A video that demonstrates the surgical process may be viewed at www.aestheticsurgeryjournal.com or www.surgery.org/videos.

Preoperative markings are made with the patient standing. The inframammary fold, breast meridian, and transposition of the inframammary fold onto the anterior breast skin are marked bilaterally. An inverted T excision also is marked. The initial markings for the vertical limbs are usually 8 cm and subsequently are adjusted for each patient. Two of the 8 cm becomes the inferior portion of the new NAC, and the other 6 cm becomes the distance from the areola to the inframammary fold. The distances from the sternal notch to the proposed nipple position, the proposed nipple position to the midline, and the top of the breast to the proposed nipple position are measured, and markings are adjusted as necessary (Figure 1).

Prophylactic antibiotics are administered intravenously, and sequential compression devices are placed before the induction of anesthesia. The patient is positioned supine with the arms abducted on the operating table. The breasts are injected with a solution of 250 mL of normal saline, 30 mL of 2% plain lidocaine, and 1 mL of epinephrine. Care should be taken to avoid the superior pole and central parenchyma. The proposed areola is marked with a 42-mm-diameter cookie cutter while an assistant places tension on the base of the breast (Figure 2A). A partial-thickness incision is made at the NAC, and the remaining skin incisions are full thickness (Figure 2B,C). The skin immediately adjacent to the NAC is deepithelialized with a no. 10 scalpel blade in a triangular pattern (Figure 3). The surgeon’s nondominant hand stabilizes the superior pole of the breast, exposing the incision at the inferior pole. This incision is carried cranially to the level of the deepithelialized triangle surrounding the NAC at the plane of subcutaneous tissue over the fascia of the pectoralis major (Figure 4). A thin layer of subcutaneous tissue is left on the chest wall to promote lymphatic drainage and to decrease fluid production postoperatively.

The breast is pulled laterally by means of a Kocher clamp on the deepithelialized dermis, and a surgical assistant holds the clamp in place. The medial pillar of the breast and the inferior portion of the deepithelialized triangle are dissected directly downward to the chest wall (Figure 5). The breast is held medially by the surgical assistant, and an incision is made to a depth of 2 cm. The scalpel then is angled cranially to resect the lateral parenchyma (Figure 6). This resection can be carried as cranially as necessary to resect the appropriate volume for each patient because the blood supply is not dependent on lateral vessels. The parenchymal specimen then is passed off the sterile field and weighed (Figure 7). The vertical alignment of the breast is maintained with adhesives on the back of the areola (Figure 8). The vertical and horizontal dimensions of the breast are assessed with the patient lying supine (Figure 9).The surgeon then makes an incision through the dermis inferior to the areola, excising the areola with a minimal margin of surrounding skin (Figure 10). The areola is reapproximated with a skin suture (Figure 11). A suction drain is placed in the submuscular plane, and the incisions are closed in layers. The skin is redraped, and the Foley catheter is reinserted through the incision (Figure 12). The patient is discharged from the hospital on postoperative day 2.

**Table 1. Steps for Breast Reduction Utilizing a Superior Pedicle**

<table>
<thead>
<tr>
<th>Step</th>
<th>Details</th>
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<tbody>
<tr>
<td>1</td>
<td>Mark the patient preoperatively</td>
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<tr>
<td>2</td>
<td>Perform tumescent injection, excluding the central mound and superior breast</td>
</tr>
<tr>
<td>3</td>
<td>Prepare and drape the patient</td>
</tr>
<tr>
<td>4</td>
<td>Mark incision site of the NAC and the deepithelialization area.</td>
</tr>
<tr>
<td>5</td>
<td>Make all incisions</td>
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<tr>
<td>6</td>
<td>Deepithelialize the triangle surrounding the NAC</td>
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<tr>
<td>7</td>
<td>Dissect inferior incision to the level of the deepithelialized tissue along the chest wall</td>
</tr>
<tr>
<td>8</td>
<td>Dissect the medial breast pillar</td>
</tr>
<tr>
<td>9</td>
<td>Dissect the lateral breast pillar</td>
</tr>
<tr>
<td>10</td>
<td>Pass specimen off sterile field for weighing</td>
</tr>
<tr>
<td>11</td>
<td>Release through dermis superior to nipple</td>
</tr>
<tr>
<td>12</td>
<td>Dissect caudal portion of the vertical limb until the flap reaches the inset medially and laterally</td>
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<tr>
<td>13</td>
<td>Achieve hemostasis</td>
</tr>
<tr>
<td>14</td>
<td>Consider drain placement</td>
</tr>
<tr>
<td>15</td>
<td>Perform temporary closure with staples</td>
</tr>
<tr>
<td>16</td>
<td>Apply cookie cutter to mark skin excision for final position of NAC</td>
</tr>
<tr>
<td>17</td>
<td>Perform wound closure in layers</td>
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</tbody>
</table>

NAC, nipple-areola complex.
Figure 1. This 43-year-old woman presented with breast hypertrophy and was marked preoperatively for reduction mammaplasty.

Figure 2. (A) Preoperative markings for reduction of the nipple-areola complex (blue circles) and areas of deepithelialization (dotted lines) of the patient featured in Figure 1. (B) Actual full-thickness incisions. (C) Illustration of markings and incisions.
Figure 3. A triangular area surrounding the nipple-areola complex is deepithelialized, as (A) photographed intraoperatively (same patient featured in Figure 1) and (B) illustrated. (C) The completed deepithelialization.
Figure 4. Intraoperative view of the patient featured in Figure 1 depicts (A) resection of the parenchyma inferiorly in the superficial subcutaneous tissue parallel to the chest wall. (B) Illustration of the resection.

Figure 5. Intraoperative view of the same patient. (A) The medial pillar incision is carried directly downward to the chest wall without undermining. (B) Resection of the inferior parenchyma is carried straight downward to the chest wall at the level of the deepithelialized skin triangle. (C) Illustrations of the dissection and resection.
Figure 6. Intraoperative view of the same patient. (A) The scalpel blade is angled cranially after dissecting to a depth of 2 cm, and the lateral parenchyma are resected. (B) Illustration of these steps. (C) Resection of the lateral parenchyma continues under the skin flap.

Figure 7. (A) Completion of the patient’s parenchymal resection, with the specimen shown. (B) Illustration of the completed resection.
portions of the medial and lateral breast flaps are dissected to achieve a uniform 2-cm thickness (Figure 8). The dissection should extend only as far as necessary to sufficiently advance the medial and lateral flaps for wound closure. It is important to limit this dissection to ensure preservation of the blood supply to the NAC (Figure 9).

Hemostasis is achieved with monopolar electrocautery. If the resection is large, a drain should be inserted and secured to the skin. The breast is then temporarily closed with staples (Figure 10), and the skin resection pattern for the new position of the NAC at the apex of the vertical limb is marked with a cookie cutter (Figure 11). This skin is excised and passed off the sterile field. The breast is closed in layers, the staples are removed (Figure 12), and petrolatum gauze dressing is applied.

**SURGICAL PRECAUTIONS**

Dissection along the chest wall must not extend beyond the deepithelialized triangle surrounding the NAC. This ensures that the superior portion of the central mound remains intact and preserves the large-caliber deep
perforator from the internal thoracic artery that exits the pectoralis major at the fifth and sixth intercostal spaces, just medial to the breast meridian. The blood supply to the NAC is attributed to this vessel in the central mound technique for reduction mammoplasty. Limited cranial dissection of the medial flap plus maintenance of a 2-cm depth enables preservation of the internal mammary branch at the second or third intercostal space, which runs at a depth of approximately 1 cm.\textsuperscript{16-24} The surgical maneuvers described here preserve the perforators medially, superiorly, and in the superior portion of the central mound, thereby ensuring proper blood supply to the NAC.

An obtuse angle at the apex of the vertical limbs is preferred to encourage a conical skin envelope and avoid a flattened or boxy breast shape postoperatively. Usually, the

Figure 9. (A) The patient’s lateral skin-parenchyma flap is dissected only to the extent necessary for wound closure. (B) Flaps are advanced and are clamped with a towel clip. (C) Illustration of advancement of flaps and placement of the first staple.

Figure 10. Intraoperative view shows temporary closure of the patient’s wounds with staples.
initial markings of the vertical limbs create an isosceles triangle with 8-cm arms and a 9-cm base.

OUTCOMES AND COMPLICATIONS

We reviewed the medical records of 62 consecutive patients who underwent breast reduction with this technique. The mean age was 40 years (standard deviation [SD], 12.5 years), and the mean body mass index was 25 kg/m² (SD, 2.9 kg/m²). The most common bra cup size preoperatively was DD (range, D-G; band range, 32-40 in). Preoperatively, the mean distance from the sternal notch to the nipple was 27.6 cm (SD, 2.8 cm). The mean total resection weight was 406 g (SD, 163 g). The mean operating time for patients who underwent reduction mammoplasty utilizing a superior pedicle as the sole procedure was 112 minutes (SD, 21 minutes).

Patients received follow-up for an average of 12 months. The overall complication rate was 11.3%. Minor complications included 1 hematoma, 1 standing cone deformity, 3 infections, and 8 incisional breakdowns. One patient experienced unilateral necrosis of the NAC.

The surgical maneuvers described in this article preserve superior and medial fullness and produce a lifted breast with a youthful appearance. Breast shape is maintained primarily by resecting the parenchyma, and the horizontal septum and superior pole function as a reliable blood supply to the NAC. Representative cases are shown in Figures 13 and 14.

CONCLUSIONS

The described technique is an efficient and simple method to achieve minimal to moderate breast reduction with minimal NAC transposition. The primary surgical goals of symptom relief and improved quality of life are attained by appropriate resection of the breast parenchyma. Moreover, a youthful and aesthetically appealing breast is achieved by maintaining superior and medial fullness and reshaping the breast using the parenchyma and skin envelope for support.

Disclosures

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Figure 13. This 43-year-old woman presented for breast reduction surgery. (A, C) Preoperative images. (B, D) Twenty-three months after reduction mammapasty with the superior pedicle technique. Resection weights: right breast, 258 g; left breast, 286 g.

Figure 14. This 41-year-old woman presented for breast reduction surgery. (A, C) Preoperative images. (B, D) Twelve months after reduction mammaplasty that included the superior pedicle technique. Resection weights: right breast, 646 g; left breast, 885 g.
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REFERENCES