Original Article

“Reverse” Dual-Plane Mammoplasty

G. Esposito¹, G. Gravante², ⁴, M. Marianetti¹ and D. Delogu³

(1) Burn Center, S. Eugenio Hospital, Rome, Italy
(2) University of Tor Vergata in Rome, Rome, Italy
(3) University “La Sapienza” in Rome, Rome, Italy
(4) via U. Maddalena 40/a, 00043, Ciampino, Rome, Italy

Abstract

Background The authors present a new type of dual-plane mammoplasty and preliminary results obtained with it. The technique is aimed at improving the final natural appearance of breasts without adding additional risks of dislocation.

Methods The eligibility criteria specified patients with sufficient breast tissue to disguise the implant, patients with asymmetric hypoplasia, and patients with an intense workout activity. The exclusion criteria specified patients with very little breasts. The technique is based on combined subglandular positioning in the superior part of the breast and retrofascial–precostal positioning in the inferior part.

Results Beginning in January 2000, 57 patients were recruited. No postoperative bleedings, hematomas, or seromas were observed. In 93% of cases, good final shapes were obtained. After 1 year of follow-up evaluation, no displacement, asymmetry, or rupture was recorded. Only three patients (5.3%) showed mild monolateral capsular contractures (Baker II type), which resolved using capsulotomy without prostheses removal.

Conclusions “Reverse” dual-plane mammoplasty is a new technique that gives a good anatomic final appearance with no risk of displacement. The low risk of complications renders it feasible and safe for aesthetic breast augmentation. Further studies are necessary to compare this technique with retroglandular and retropectoral approaches.

Keywords Aesthetic surgery - Augmentation mammoplasty - Breast surgery - Dual-plane technique

Augmentation mammoplasty currently is the most common operation in aesthetic surgery. However, even if increasing success is gained among both surgeons and patients, two important issues still remain unsolved. The first is related to the choice of prostheses
positioning. After long years of discussion about specific advantages and disadvantages, the scientific community has reached the conclusion that no definitive approach is valid for every patient, and that prostheses positioning should be selected according to each person’s own physical characteristics and expectations \[1,5,8\]. The second issue is related to prostheses shape. Initially, manufacturers warned about the retropectoral use of teardrop prosthesis because of the increased risk for displacement and shape modifications attributable to muscular contractions. Round prostheses reduced that risk, and retropectoral placement avoided the superior pole fullness associated with the subglandular approach. Even in this case, however, no definitive conclusions could be reached, and again, the choice was dependent on the surgeon’s experience and preference \[4,9\].

To combine benefits of both retroglandular and retropectoral positionings, the subfascial and dual-plane techniques were introduced \[2,3,6,7\]. The former was used to blunt implant edge visibility, as described with retroglandular implants, and to avoid distortion of shape with muscular contraction, as described with retropectoral implants. The latter consisted of subglandular positioning in the inferior portion of the breast to give a more aesthetic appearance and retropectoral positioning in the superior portion to avoid superior pole fullness. The initial results seemed encouraging \[2,3,6,7\].

In January 2000, the authors developed a different type of dual-plane mammoplasty. To improve the final breast appearance further without adding risks of dislocation, a subglandular approach with teardrop prostheses was used. We termed it “reverse” for the subglandular positioning in the superior part of the breast and the retrofascial placement in the inferior part, contrary to what occurs in the standard dual plane (Fig. 1). We describe the technique and the current results obtained with 57 patients.

Fig. 1 Reverse augmentation mammoplasty involving subglandular positioning in the superior part of the breast (white arrow) and retrofascial–precostal positioning in the inferior part (black arrow).
Materials and Methods

The study patients signed their informed consent after we had explained the experimental nature of the operation. The eligibility criteria specified patients with sufficient breast tissue to disguise the implant, patients affected by asymmetric hypoplasia, and patients with an intense workout activity that could alter prosthesis shape. The exclusion criteria specified patients with very small breasts in which subglandular positioning was not indicated. All patients underwent surgery on an outpatient day surgery basis.

Preoperative Procedure

The superior, inferior, medial, and lateral margins of future pockets were measured preoperatively. Briefly, lateral sternal and anterior axillary lines were drawn and their distance measured. Normally, we used prostheses with a horizontal diameter 1 cm smaller than this distance. Patients desiring greater volumes received those perfectly corresponding to the distance.

Subsequently, a horizontal line passing through both nipples was drawn with the patient’s arms placed in a crossed position (Fig. 2). Selected prostheses were placed over the breast with their vertical diameter halfway over this line. The margins of the future pocket were signed. Necessary modifications of the horizontal line and the pocket’s inferior margin were performed for patients affected by asymmetric bilateral hypoplasia to obtain final symmetry. Oral anticoagulants, when used by the patient, were discontinued 7 days before surgery.

![Preoperative drawings.](image)

**Fig. 2** Preoperative drawings. *White line:* horizontal line passing through nipples with arms horizontally raised (crosslike position). *Yellow lines:* horizontal lines passing through nipples with arms along the body (lower one) and vertically raised (higher one). *Black lines:* pocket’s margins (see text for explanation).

Operative Technique
Pocket Creation (Superior, Lateral, and Medial Border)

An inferior semicircular incision 2 to 3 mm within the external rim of the areola was used. Dissection proceeded through breast tissue until the pectoral muscle sheath was reached. A pocket then was created with scissors and finger dissection, spreading devices, or a sponge on a stick. Superiorly, according to preoperative markings, it reached approximately the third or fourth rib. Medial dissection of the pocket was taken down until preoperative markings were reached, approximately corresponding to the lateral sternal border. The lateral dissection was taken approximately to the anterior axillary line according to preoperative markings. Once the superior, medial, and lateral parts of the pocket were ready, dissection was taken down to the lower border of the pectoral muscle (Fig. 3).

![Fig. 3](image) Dissection taken down to reach the lower border of the pectoral muscle.

Tunnel Creation (Inferior Border of the Pocket)

A small incision (3 cm wide) was made on the midclavicular line where the inferior fibers of the major pectoral muscle gradually evolve into a thin connective tissue. Through this incision, finger dissection reached the precostal sheath (Fig. 4) and, without opening it, continued caudally on this plane until the inferior preoperative markings were reached. This maneuver created a tunnel that extended over the precostal sheath approximately 3 to 4 cm beyond the inferior border of the major pectoral muscle. We had, at this point, most of the pocket located over the pectoral muscle and the tunnel deep over the precostal sheath. Both joined together medially and laterally (Fig. 5). The tunnel’s medial border consisted superiorly of the pectoral muscle insertion fibers, and inferiorly of the dense connective tissue covering the precostal sheath. Some of the muscular insertion fibers were sectioned to about 2 cm for better lodging of the prosthesis. The tunnel’s lateral border consisted of the dense connective tissue over the precostal sheath.
Fig. 4 Dissection of the “tunnel” over the precostal sheath to create the lower part of the pocket.

Fig. 5 Right breast view from the patient’s right shoulder. Two little pockets, one superficial and one deep (over the precostal sheath), joining together medially and laterally. White asterisk: medial border of the tunnel.

Meticulous hemostasis using electrocautery was obtained. Usually, dissection was performed on one side. A few sponges were placed in the pocket, and then the other side was dissected. When we returned to the first side, small bleeders occasionally were apparent and cauterized. Teardrop-shaped prostheses (Mentor Corporation, Santa Barbara, CA: McGhan Style 410 Soft Touch “L” series) then were inserted. Finger dissection further extended the pocket’s margin only if necessary to improve the final appearance of the breast. Usually, no drains
were left in place.

The incision was closed in layers (superficial fascia and subcutaneous tissue with interrupted absorbable sutures and skin with continuous nonabsorbable subcuticular suture). A compressive dressing was maintained for 24 h.

**Postoperative Care**

We usually prescribed postoperative antibiotics for the first 3 days after surgery, and pain medications (usually ketorolac) as required by patient. Aspirin and ibuprofen were avoided for the first 2 weeks. An elastic bra, forcing the prostheses to lie down, was required for 9 days after the operation. Although the patient could return to work in approximately 3 days, physical exercise (especially workout) was avoided for the first 3 weeks. Follow-up care consisted of outpatient visits 2 and 10 days after the operation, then after 1, 3, and 12 months. During this period, patients were instructed and solicited to call surgeons when they had severe pain not responding to pain medication, significantly more swelling or pain on one side than the other, increasing firmness of one or both breasts and a chest wrap that seemed too tight. The continuous subcuticular sutures were removed after 10 days. Patients were instructed to massage their breasts after the second week, avoiding round movements, to minimize the likelihood of capsular contracture.

Primary end points in this study included final shape (evaluated by patient judgment and two plastic surgeons independently in relation to the study), capsular contracture, prosthetic displacements, asymmetry and rupture. Secondary end points were the operating time and the presence of postoperative infections, seromas, or hematomas.

---

**Results**

We operated 57 patients starting on January 2002. The etiology was moderate hypotrophy for 32 patients, hypotrophy after breast-feeding for 8 patients, tuberous breasts for 2 patients and different degrees of breast asymmetry for 15 patients. The mean age of patients was 32 years (range, 22–67 years). The mean operating time was 95 min (range, 70–150 min). Results were compared with both retroglandular and retropectoral approaches for augmentation mammaplasty (Table 1).

**Table 1** Advantages and disadvantages of retroglandular and retropectoral mammaplasty ([1,3]) and reverse dual-plane approaches

<table>
<thead>
<tr>
<th>Approach</th>
<th>Retropectoral</th>
<th>Retroglandular</th>
<th>“Reverse” dual plane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long surgery time (periareolar approach)</td>
<td>+</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Possibility of avoiding general anesthesia</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Risk of postoperative bleeding</td>
<td>++</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>
In 93% of cases, good final shapes were obtained according to the judgment of patients and surgeons (Figs. 6–9). Even in cases of breast asymmetry, our technique gave good aesthetic results. We observed no postoperative bleeding, hematomas or seromas. After 1 year of follow-up evaluation, we did not record any displacement, asymmetry or rupture. Only three patients (5.3%) showed mild monolateral capsular contractures (Baker II type), which resolved after capsulotomy without prostheses removal.

<table>
<thead>
<tr>
<th>Postoperative pain</th>
<th>++</th>
<th>–</th>
<th>–</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of longer postoperative stay</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Risk of inadequate aesthetic appearance</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Risk of visible prostheses margins</td>
<td>–</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Risk of rippling or wrinkling of implants</td>
<td>–</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Mammographic difficulties</td>
<td>–</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Associate ptosis correction</td>
<td>–</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Risk of prostheses displacement</td>
<td>+</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Working out problems</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Risk of inadequate asymmetry correction</td>
<td>++</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Capsular contracture</td>
<td>–</td>
<td>++</td>
<td>+</td>
</tr>
</tbody>
</table>

++, strong association; +, association; –, no association

Fig. 8 A 28-year-old woman affected by severe hypotrophy. Preoperative view.
Discussion

Although many approaches for prostheses placement are used around the world, no definitive agreement exists about the perfect technique. In the beginning, retropectoral and retroglandular approaches were used widely and surgeons demonstrated the specific advantages and disadvantages of each [1,8]. Years later, the subfascial pocket for breast augmentation was described as a way to blunt implant edge visibility of the retroglandular implants and to avoid distortion shape with muscular contractions specific to retropectoral implants [3]. Further evolution of this technique led to endoscopic placement of the implant with small and aesthetic incisions [2]. Finally, the “dual-plane” concept of breast augmentation was introduced to combine benefits of both retroglandular and retropectoral positionings. The initial results were promising [6,7].

Despite all these possibilities, there is still no single best answer valid for every patient, and the physical characteristics of each person dictate the choice. For this reason, every approach must be balanced according to the patient’s characteristics and requirements.

Searching for the perfect augmentation mammoplasty technique, we developed the “reverse dual-plane” technique. This approach aimed to overcome specific disadvantages and combine advantages of subglandular and retropectoral positionings. Table 1 compares results obtained with those described for retroglandular and retropectoral approaches. The main characteristic of the “reverse” dual-plane technique is a more anatomic appearance of the final enhanced breast with no risk of prosthetic displacement.

The anatomic appearance achieved by our technique derives from three factors. First, the implant is subglandular in the superior portion behind only the tissue to be augmented. For women with adequate breast tissue, subglandular placement is likely to yield the most

Fig. 9 Postoperative results at 1 year.
natural-looking result and to avoid the circular-shaped breasts frequently seen with retropectoral operations. Second, prostheses are of the teardrop type. Breasts of white women closely resemble the teardrop shape with a more horizontal, medial, and lateral development than that of Asian (conic) or African women (ptotic). Furthermore, the vertical height limitation of teardrop-shaped prostheses limits skin tension on the superior part of the breast and does not require retropectoral positioning to avoid superior pole fullness. Third, the peculiar inferior part of the pocket (tunnel) specific to this technique is subfascial and lessens tension on the overlying skin.

The lack of risk for displacement derives from two factors. The peculiar tunnel (pocket’s inferior border) adds stability to prostheses because it creates a stable floor for implants and the overlying fibers of the pectoralis muscle (medial border, partially sectioned fibers) give additional firmness, creating a sort of “natural bra” for implants. Furthermore, teardrop prostheses, with their larger inferior horizontal core, are less unstable than round types.

The learning curve for operation was short (5 to 6 operations) and consisted mainly of the time required to learn the technique for tunnel creation. The low complication rate observed (only 5.3% for Baker II type capsular contractures) renders this operation feasible and safe.

Conclusion

“Reverse” dual-plane mammoplasty is a new technique for aesthetic breast augmentation with good final breast appearance and no additional risks of displacement. The low risk of complications renders it feasible and safe. Further studies are necessary to compare and validate it against retroglandular and retropectoral approaches.

References


9. Young VL, Watson ME: Breast implant research: Where we have been, where we are, where we need to go. Clin Plast Surg 28:451–483, 2001