

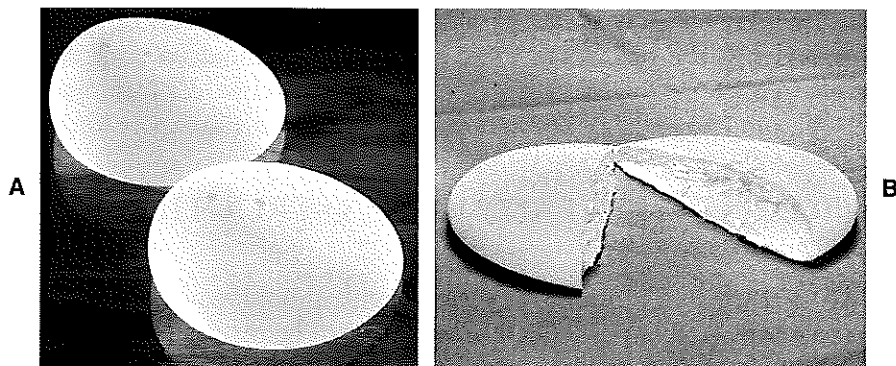
# Breast Reconstruction

Maurizio Nava, MD; Andrea Spano, MD; Angela Pennati, MD;  
Umberto Cortinovis, MD; Stefano Bonomi, MD; Phillip Blondeel, MD, PhD

Breast reconstruction using textured implant devices filled with highly cohesive silicone gel is effective for both immediate and delayed reconstruction following mastectomy. Reproducing breast projection and recreating the inframammary fold are the greatest technical challenges of reconstructing the breast, and biodimensional cohesive gel prostheses are capable of achieving good projection and ptosis.

## HISTORY

In 1963 mammary prostheses became commercially available as rounded devices filled with silicone gel, and saline-filled implants were launched a few years later in 1965. The Becker permanent expander (Mentor, Santa Barbara, CA) has been in use for almost 2 decades and has the advantage of permitting gradual tissue expansion without a need for subsequent replacement. The round Becker implant has historically been the most popular round prosthesis for breast reconstruction even though it has some shortcomings such as a limited ability to expand the lower portion of the breast, a possibility of subcutaneous rippling (most evident in the upper quadrants), and a lack of a natural ptotic shape. However today, with the introduction of the contoured-shaped Becker expander implant, these problems have been overcome. To address the most difficult aspects of breast reconstruction such as creating a natural breast contour, textured, anatomic implant designs were introduced (Fig. 1).



**FIG. 1** A, Anatomic, textured implants filled with highly cohesive silicone gel. B, A textured implant filled with highly cohesive silicone gel shows no silicone leakage after being ruptured.

During the past decade, breast reconstruction techniques have focused on contour rather than just volume replacement. Anatomically shaped devices can be used with these techniques for both one-stage and two-stage procedures. Single-stage reconstruction with implants is an option only for some patients. For all other cases two-stage implant reconstruction may provide a more natural appearance than using an implant alone. If a mastectomy has been performed previously, a two-stage delayed reconstruction should take place.

## **TIMING OF BREAST RECONSTRUCTION**

### **Immediate Reconstruction**

Immediate breast reconstruction should be offered to most patients undergoing mastectomy. It does not affect the chances of carcinoma recurrence, and it does not make detection of local carcinoma recurrence more difficult. Many factors influence the choice of using autologous tissue or implants for reconstruction; the most important factors to consider are chemotherapy and chest wall irradiation. Chemotherapy can be started after the mastectomy wounds are healed, although there is inevitably an increased risk of septic complications that might necessitate removing an implant. Autologous reconstruction is a good choice for immediate reconstruction when postoperative chest wall irradiation is planned. Other factors influencing the decision to use autologous tissue or an implant are the age and physical status of the patient. Immediate prosthesis insertion avoids additional costs of further hospitalization, and reconstruction using an implant adds only 60 to 90 minutes to the operating time. Immediate breast reconstruction benefits patients psychologically and improves their quality of life. A poor prognosis in itself is not a contraindication to breast reconstruction, although reconstruction should be undertaken cautiously in patients considered to be at a particularly high risk for local recurrence.

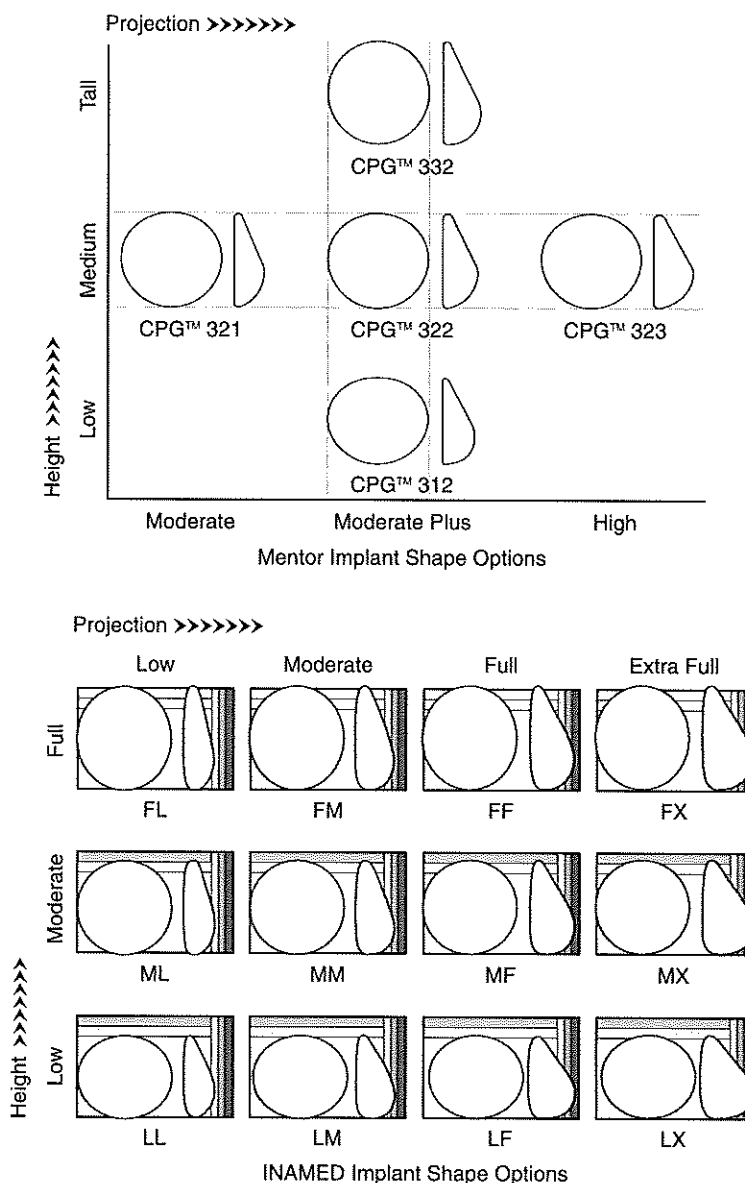
### **Delayed Reconstruction**

The primary indication for delayed breast reconstruction is a previous mastectomy. The requirements for successful reconstruction in this context are generally more rigorous than those for immediate reconstruction. The patient's oncologic status should be confirmed before discussing reconstruction to ensure there is no evidence of local or distant disease recurrence. The tissues of the chest wall must be carefully examined, giving attention to the quality of skin, scars, and the pectoralis major muscle. If the chest wall musculature is severely atrophic and associated with thin, tight skin, implant insertion is contraindicated. Previous chest wall irradiation is not an absolute contraindication for using an implant, but the risk of ischemic complications indicates that an autologous reconstruction may be preferable. Large breasts are a relative contraindication to implant reconstruction because of volume limitations using tissue expansion techniques.

## **INDICATIONS FOR IMPLANT RECONSTRUCTION**

### **One-Stage Reconstruction**

One-stage reconstruction is suitable for patients with small breasts and minimal ptosis, because a permanent cohesive gel-filled prosthesis can be inserted without preliminary tissue expansion. Anatomic, textured implants filled with highly cohesive silicone gel have enhanced durability, reduced incidence of capsule formation, and less tendency to migrate within the chest wall; they also have less tendency for gravity to pull the con-



**FIG. 2** Anatomic, textured implants filled with highly cohesive silicone gel are available in a variety of shapes.

tents of the implant into the lower pole than implants filled with noncohesive gel or saline. Innovations in the design of textured implants filled with highly cohesive silicone gel emphasize breast shape and permit reconstruction of breasts with a more natural feel and appearance. These implants are available in a broad range of specifications for base width, height, and projection (Fig. 2).

Because of the variety of options offered, implants can be tailored to each patient, and surgeons can precisely plan a three-dimensional reconstruction. Matching a reconstructed breast to the contralateral breast is also easier when there are a number of implant sizes to choose from. Newer techniques permit breast reconstruction increasingly based on aesthetic considerations and the expectations of patients. The one-stage reconstruction procedure, even for a medium-large breast, can be completed using a new technique called a skin reducing mastectomy.

## Two-Stage Reconstruction

Two-stage reconstruction is appropriate for patients with medium to ptotic breasts. The use of temporary expanders with complementary permanent prostheses has greatly advanced the field of prosthetic breast reconstruction. Anatomic, textured expanders permit rapid expansion with lower pressures in the implant. Compared with round and smooth implants, they are less likely to migrate and result in a chest wall deformity. It is also easy to achieve a good inframammary fold with lower pole definition. Most devices have an integral injection port that does not require an additional procedure for removal. Expandable, saline-filled gel implants have been developed to provide more natural projection and give improved contour to the upper breast. Following tissue expansion, the tissue expander must be replaced with a cohesive gel-filled prosthesis.

## PREOPERATIVE PLANNING

### Mastectomy

A modified radical mastectomy preserves the mammary skin envelope and the underlying subcutaneous tissue. The nipple-areola complex (usually with a surrounding ellipse of skin) is removed, along with the glandular tissue and the fascial attachments of the breast.

From a reconstructive point of view, certain anatomic features are critical for optimal results:

1. Preservation of the inframammary fold frame
2. Integrity of the pectoralis major muscle
3. Quality and tension of the skin flaps
4. Preservation of the nipple-areola complex (if a nipple-sparing mastectomy can be performed adequately and there are no oncological contraindications)

For cases in which the inframammary fold must be sacrificed, a new fold can be fashioned at the time of reconstruction or during subsequent surgery for implant revision. There must be sufficient skin to allow primary closure without tension following insertion of the implant. When a tissue expander is used, it is inflated minimally at the time of initial placement to avoid excessive tension on the skin, subcutaneous tissues, or pectoral muscles. The upper mastectomy flap can be undermined superiorly if necessary, but it is preferable to avoid dissection of the lower flap beyond the inframammary fold.

It is unnecessary to remove the fascia over the pectoralis major muscle, although this structure should be excised if a tumor is attached. The pectoralis major and serratus anterior muscles are preserved, whereas the pectoralis minor can be excised or divided to facilitate access to level III nodes lying medial to the muscle. If a skin-sparing mastectomy is performed, the skin of the breast is preserved except for the nipple-areola complex, and there will be an opportunity to perform a one-stage reconstruction or a two-stage, short-term expansion procedure. If a nipple-sparing mastectomy can be performed, there will be no need to reconstruct the nipple-areola complex after breast reconstruction.

### Design

It is important to plan the operation using a geometric approach; the overall shape and contour of the new breast will relate to three parameters: width, height, and projection (Fig. 3). The patient should stand in front of the surgeon with her hands on her flanks while the preoperative markings are carefully planned (Fig. 4).

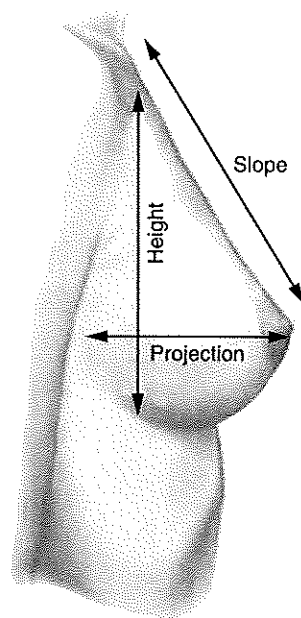


FIG. 3 Three-dimensional shape of the breast.

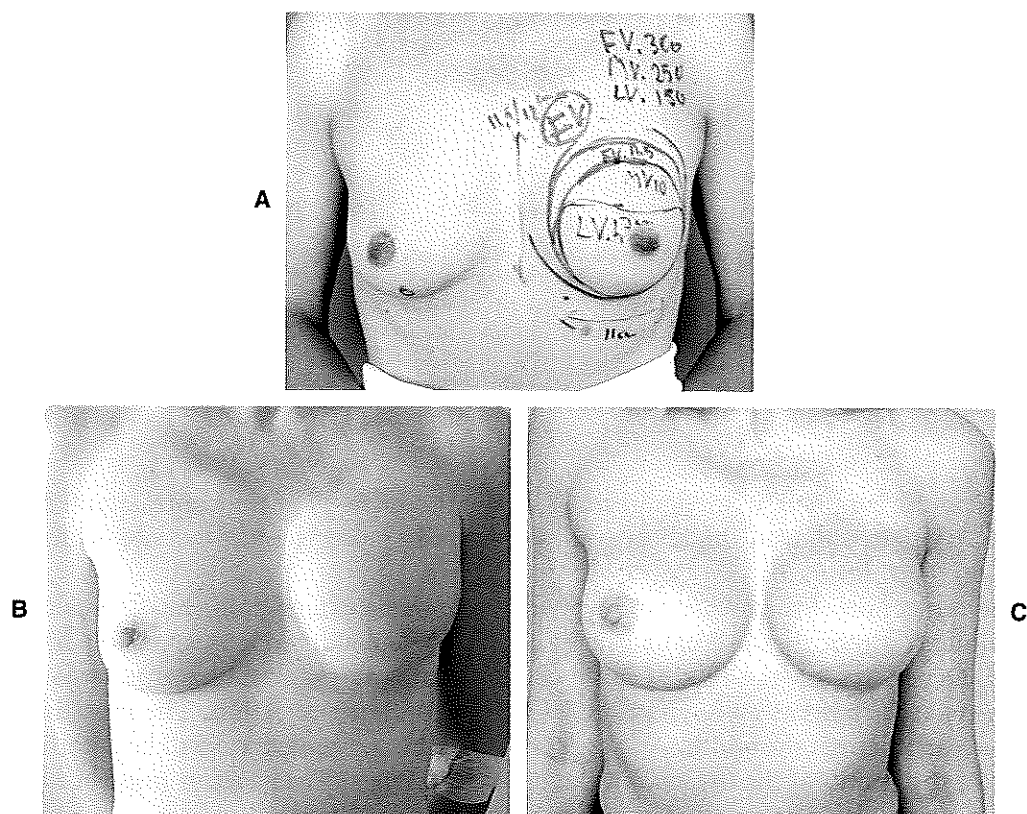


FIG. 4 First-stage immediate reconstruction (expander insertion). A, Preoperative markings. B, Before expander removal and contralateral augmentation. C, 1-year follow-up.

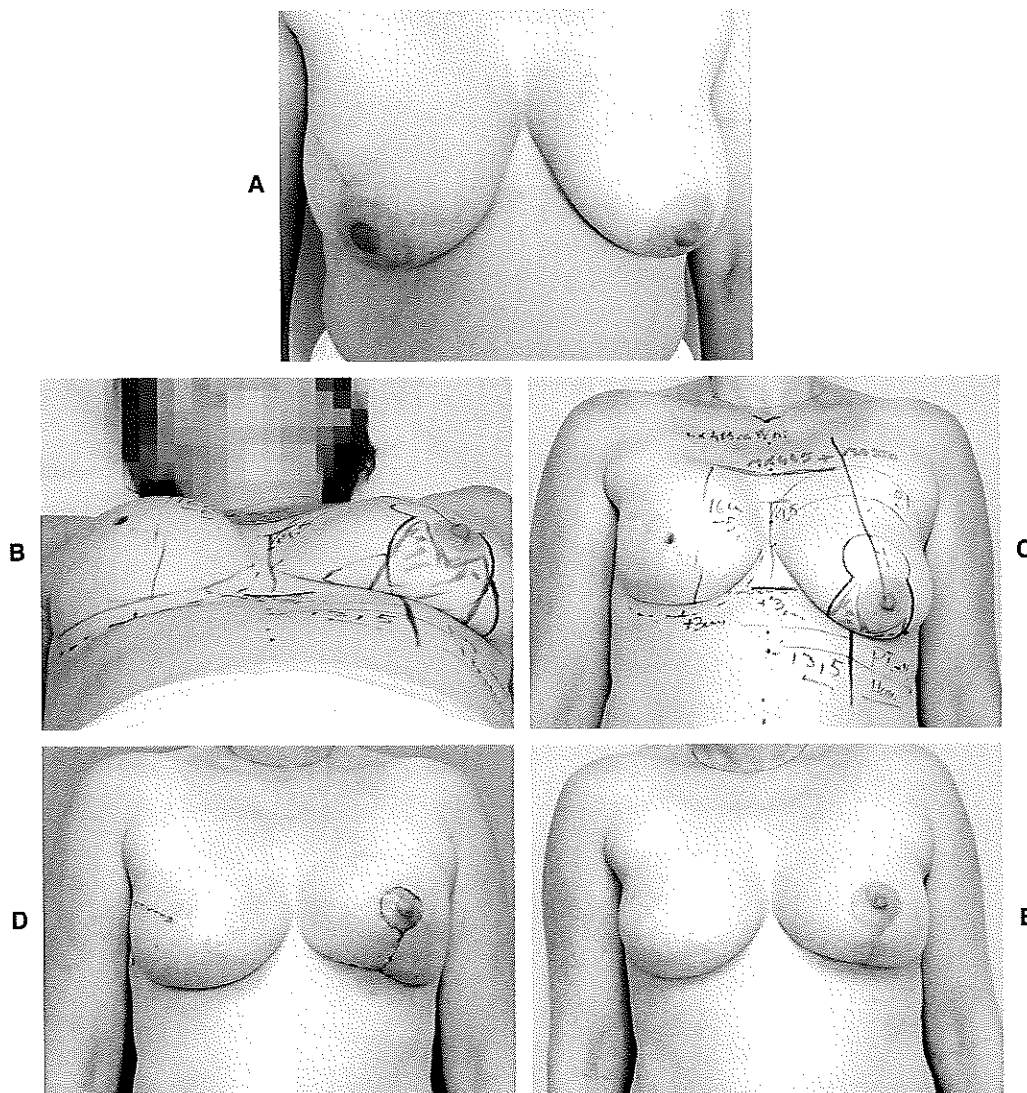
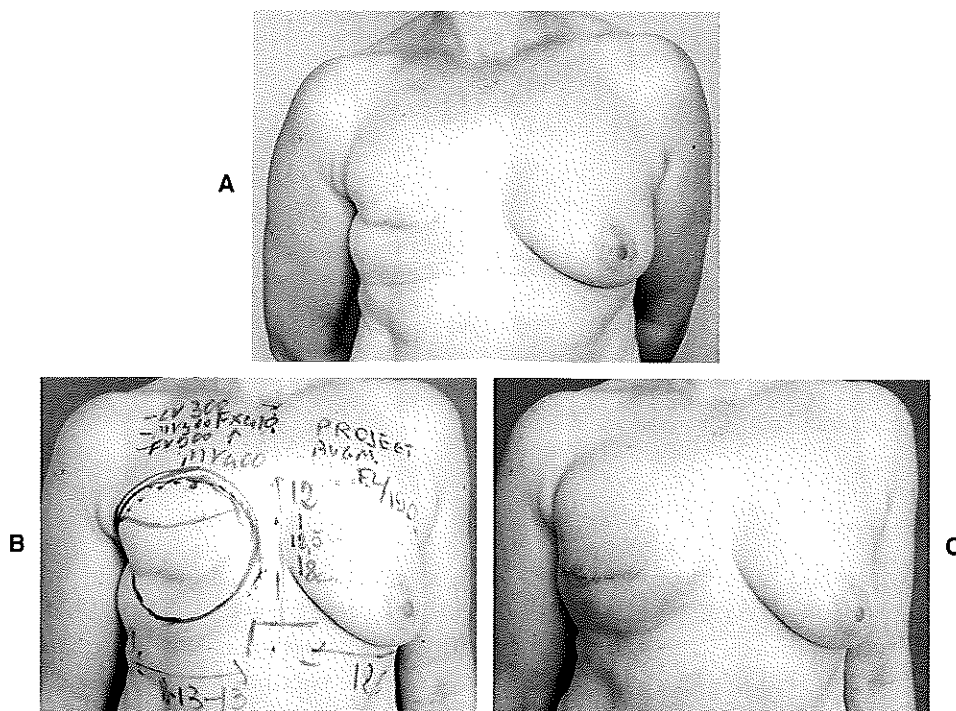


FIG. 5 Second-stage immediate reconstruction (implant insertion) and contralateral mastopexy. A, Preoperatively. B and C, Markings for expander removal and contralateral mastopexy. D, Postoperative result. E, 9-month follow-up.

Base width and height are determined by the dimensions of the contralateral breast and are measured out on the chest wall corresponding precisely to the site of implant insertion (Figs. 5 and 6).

The projection of the breast can be predicted to some extent from the dimensions of the implant, although the final result will only be apparent once expansion has occurred. Depending on the final volume of inflation, a permanent anatomic prosthesis can be selected that has an appropriate width, height, and projection. The most important measurement is the width. An appropriate height and projection will be determined based on the health of the breast and the patient's wishes. The surgeon must be able to think in three dimensions when planning breast reconstruction.

If an expander will be used, the surface markings of the subpectoral pocket can be outlined on the chest wall using the manufacturer's templates to select a low-, medium-,



**FIG. 6** First-stage delayed reconstruction (expander insertion). **A**, Preoperatively. **B**, Preoperative markings. **C**, Postoperative result.

or full-shape expandable prosthesis. When the opposite breast is very large or will be augmented, then an expander one size bigger should be chosen.

The lower border of the pocket should lie just at the level of the submammary crease. The submuscular pocket will have the same dimensions as the selected expander and will reflect the base width and height of the contralateral breast. However, for delayed reconstruction, very large expanders should be avoided because they may be incompatible with chest wall dimensions. A template is positioned on the chest wall in line with the inframammary crease (Fig. 6).

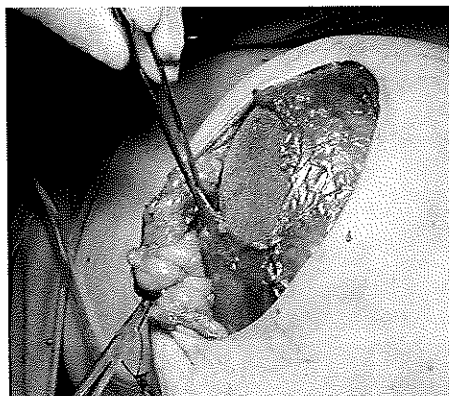
The final expander volume after inflation should correspond to its capacity, and the expander may be overfilled if necessary. Ideally, the final volume adjustment should be carried out only after any contralateral surgery is performed and the final size of the reconstructed breast can be determined intraoperatively.

## OPERATIVE TECHNIQUE

### One-Stage Breast Reconstruction

#### *Intraoperative Planning*

The patient must be correctly positioned on the operating table. Though initially in the supine position, the patient's position will be changed after mastectomy and before final reconstruction. The patient's arms should lie at an angle of 60 degrees to the body on the operating table, thus completely relaxing the pectoralis major muscle and facilitating blunt dissection of the submuscular pocket. The contralateral breast should be exposed because it is a useful guide to form the subpectoral pocket and determine the appropriate position of the inframammary fold.



**FIG. 7** The serratus muscle is used to cover the lateral border of the implant.

### ***Surgical Steps***

1. Preparation of a submuscular pocket. The mastectomy incision should be chosen with input from the oncologist who is performing the breast ablation. The serratus muscle or the serratus fascia, if well represented, is dissected to cover the lateral part of the implant (Fig. 7). From the lateral border of the pectoralis major muscle dissection is performed beneath the pectoralis major muscle superiorly, medially, and inferiorly. Then the sternal attachments of the pectoralis major are dissected from the second intercostal space to the inferior edge of the pocket. Finally, the lowermost attachments of the pectoralis major and the serratus anterior muscles are dissected at the level of the contralateral inframammary fold. The pocket ideally should be completely submuscular, except at the inframammary fold where it should extend into the deep fascial layer, avoiding direct continuity with the mastectomy site.
2. Insertion of two suction drains. Drains should be placed in the submuscular pocket and axilla following axillary dissection.
3. Insertion of the correctly oriented prosthesis. Attention should be paid to filling the lower pole of the breast.
4. Closure of the muscular pocket. Interrupted sutures can be inserted before placement of the prosthesis to minimize the risk of needle puncture.
5. Closure of subcutaneous tissues and skin.

### **Two-Stage Breast Reconstruction: Immediate *Intraoperative Planning for Insertion of Expander (First Stage)***

The position of the patient is the same as described previously for one-stage breast reconstruction.

### ***Surgical Steps***

1. Preparation of a submuscular pocket. An incision is made along the lateral border of the pectoralis major muscle. Progressive dissection is performed beneath the pectoralis major muscle superiorly, medially, and inferiorly. The inferior part of the dissection can include the anterior rectus sheath and the aponeurosis of the external oblique muscle and continue beneath the serratus anterior muscle. Then the sternal attachments of the pectoralis major are dissected from the second intercostal space to the inferior edge of the pocket, and the lowermost attachments of the pectoralis



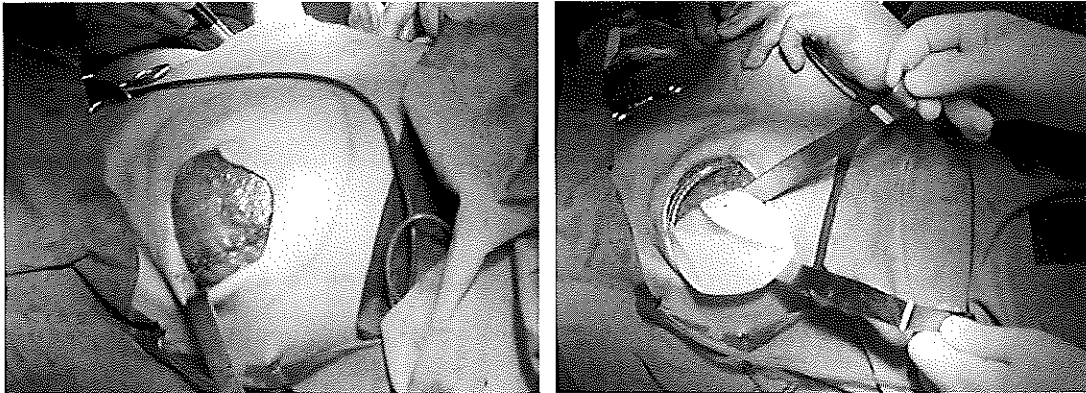


FIG. 8 Expander insertion.

major and the serratus anterior muscle are dissected at the level of the contralateral inframammary fold. Ideally the pocket should be completely submuscular, except at the inframammary fold where it should extend into the deep fascial layer, avoiding direct continuity with the mastectomy site.

2. Preparation of the expander. Any air in the inner expansion chamber of the expander must be completely evacuated. The expander is partially inflated with saline to ensure there is no leakage. A small amount of saline (up to 20% final volume) is left within the prosthesis because partial inflation will aid insertion. Then the prosthesis is immersed in povidone iodine solution.
3. Insertion of two suction drains. Drains should be placed in the submuscular pocket and axilla following axillary dissection.
4. Insertion of the partially inflated and correctly oriented prosthesis. Attention should be paid to filling the lower pole of the breast (Fig. 8).
5. Closure of the submuscular pocket. Interrupted sutures can be inserted before placement of the prosthesis to minimize the risk of needle puncture.
6. Closure of subcutaneous tissues and skin.
7. Inflation of the expander. The expander is inflated with 200 to 300 ml of saline. Initial expansion is desirable provided there is no skin tension.

### **Two-Stage Breast Reconstruction: Delayed *Intraoperative Planning for Insertion of Expander (First Stage)***

The patient is positioned on the table supine with her arms out on a board, and the level of the inframammary fold is marked. The surgeon checks the chosen expander size in relation to the thorax and the contralateral breast. The volume and shape of the latter can be modified at the time of reconstruction, which demands careful planning involving both patient and surgeon.

#### ***Surgical Steps***

1. Skin incision. The incision is placed toward the upper lateral portion of the mastectomy scar. The pectoralis major muscle is incised either along its free lateral edge, or more centrally along the line of the muscle fibers.

2. Preparation of the submuscular pocket. Progressive dissection is performed deep to the pectoralis major muscle superiorly, medially, and inferiorly. The medial and lowermost attachments of the pectoralis major are dissected from the level of the fourth rib to the level of the sixth and seventh ribs. Any constricted scar tissue in the inframammary region is excised.

The remaining steps are similar to those described previously for immediate implant reconstruction. The wound is closed with absorbable sutures.

### ***Breast Reconstruction After Expansion (Second Stage)***

The second stage of reconstruction is identical for immediate and delayed procedures and should be undertaken at least 6 months after final expander inflation. The delay allows for stabilization and improves the potential ptosis achievable with expansion. In this stage, the temporary tissue expander is removed and is replaced with a permanent implant. Furthermore, minor refinements can be made to the reconstructed breast such as enlarging the pocket and contouring the breast. Experience is required for choosing an appropriate size and shape of prosthesis, but using textured implants filled with highly cohesive silicone gel makes this selection process easier.

#### **INTRAOPERATIVE PLANNING FOR PROSTHESIS INSERTION**

The results of previous augmentation, reduction, or mastopexy procedures modify the surgical approach to the final postmastectomy reconstruction. Both breasts should be visible in the operative field, and the level of the contralateral inframammary fold should be marked.

#### **SURGICAL STEPS**

1. Skin incision. To remove the expander, the skin incision is placed toward the lateral end of the postmastectomy scar, and an incision is made either along the free edge of the pectoralis major muscle, or in the line of its muscle fibers.
2. Removal of the temporary tissue expander (Fig. 9).
3. Preparation of the pocket. A pocket is prepared for the final prosthesis using a complete capsulectomy. A complete capsulectomy, except for the aspect that extends onto the thoracic wall, allows a better distribution of the expanded skin over the implant. Extending the lower pole of the new breast is accomplished using a combination of radial and transverse scoring.
4. Creation of the inframammary fold (Fig. 10). Following capsulectomy, the superficial fascia is divided at the level of the inframammary fold, which is marked by needles inserted through the skin into the pouch. The lower edge of the superficial fascia is sutured to the chest wall musculature with continuous sutures of a strong absorbable material (1/0 sutures).
5. Insertion of drains.
6. Insertion of the permanent prosthesis (Fig. 11). Following insertion of the prosthesis, it is important to check the final result by elevating the patient to a sitting position.
7. Closure of the wound. The wound is closed in two layers using soluble suture material.

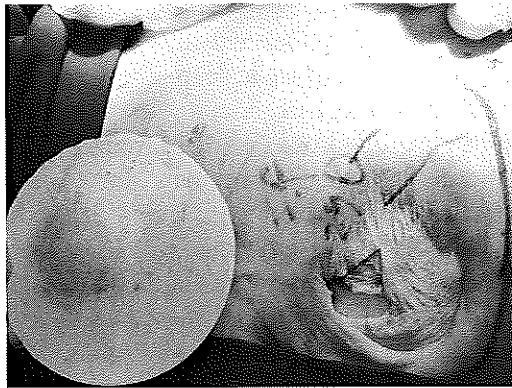


FIG. 9 Expander removal.

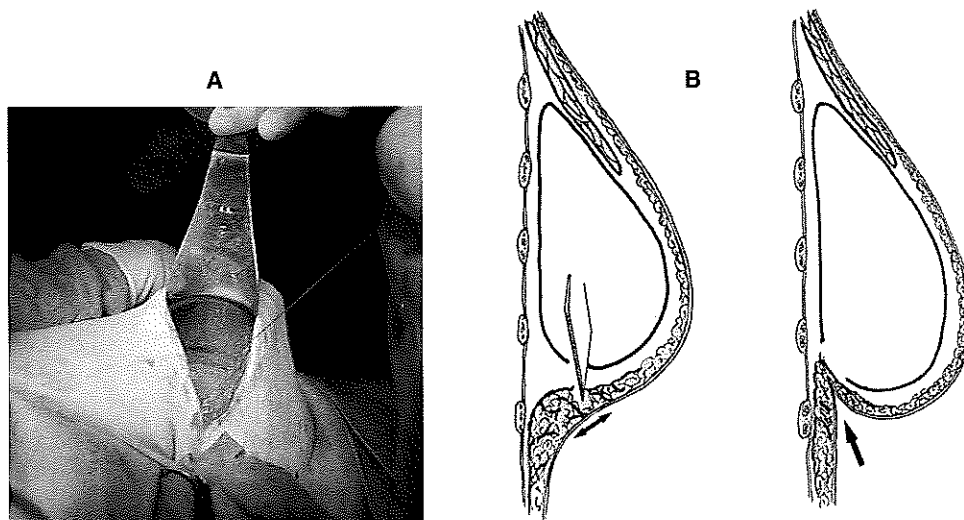


FIG. 10 A, Creating a new inframammary fold. B, Technique for defining the inframammary fold.

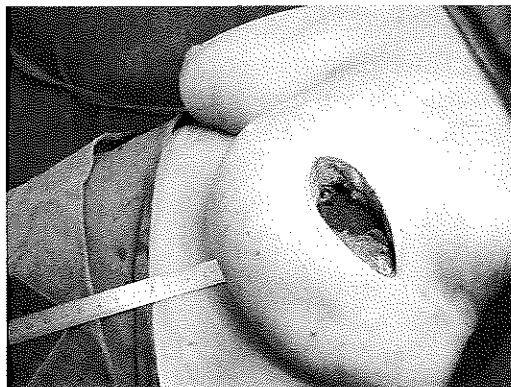


FIG. 11 Replacement of expander with a permanent, anatomic implant filled with highly cohesive silicone gel.

## POSTOPERATIVE CARE

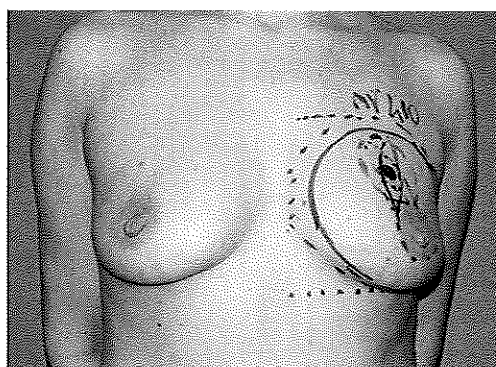
Prophylactic antibiotics are administered to avoid staphylococcal infection. Compared with a transverse rectus abdominis muscle (TRAM) flap or a deep inferior epigastric perforator (DIEP) flap, postoperative pain and discomfort is generally of short duration using the procedure described here and can be controlled with routine analgesia. Drains are removed when daily volumes are less than 30 to 40 ml. The mean duration of the hospital stay is less than 5 days with immediate reconstruction and 2 to 4 days with delayed reconstruction. A short period of hospitalization is required when exchanging a temporary implant with a permanent one. Applying bandages can help enhance the inframammary fold, but only surgical correction will create a durable fold. A well-fitting sports bra should be worn following reconstruction and contralateral mastopexy or reduction. Intensive exercise should be avoided for 2 to 3 weeks, although arm and shoulder mobilization is important following formal axillary dissection. Inflation of the prosthesis should be carried out weekly, ideally in a designated outpatient area. The rate of inflation is governed by patient comfort; excessive expansion can produce local pain and discomfort. Expansion takes place over 4 to 8 weeks, and a temporary tissue expander should not be replaced with a permanent implant within 6 months. This allows time for the tissues to adapt and for capsule formation to stabilize. Furthermore, tissues in the lower pole of the breast are stretched by gravitational forces.

## COMPLICATIONS

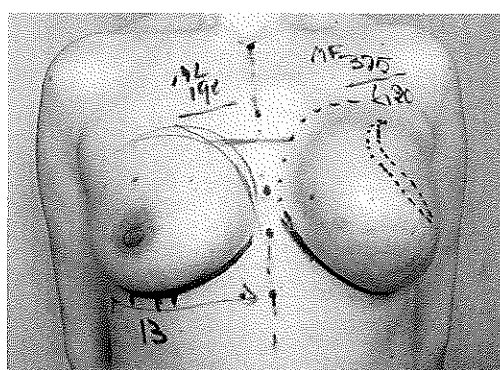
Immediate complications are hematoma formation, skin necrosis, and pain. Adjuvant therapies, including chemotherapy and radiotherapy, can delay wound healing and postpone any planned program of expansion. Later complications include infection, implant extrusion, and capsular contracture. Complications are generally more common with immediate reconstruction than with delayed reconstruction when adjuvant treatments are performed around the time of immediate reconstruction. High-dose chemotherapy can compromise the immune system and influence healing processes. Radiotherapy impairs the ability of the skin to act as a natural barrier to exogenous insults. Irradiation induces excessive fibrosis and reduces tissue oxygen levels, thus promoting excessive capsular reaction. Pressure sores can develop in the lower pole of the breast when the skin is damaged by radiation.

Persistent infection around the implant mandates removal, and further reconstruction attempts must be deferred until the infection resolves and the wound is completely healed. A partially extruded implant must be removed. The degree of capsular contracture after breast reconstruction is generally greater than that occurring following augmentation. When capsule formation leads to constriction or pain, open capsulotomy is required, sometimes with implant exchange. Infection and capsular contracture are relatively uncommon, but secondary procedures to achieve breast symmetry and optimal shape are often necessary.

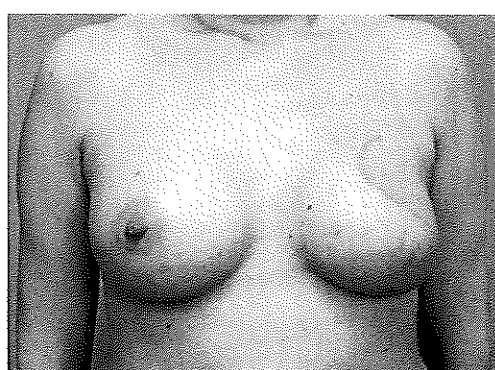
## RESULTS



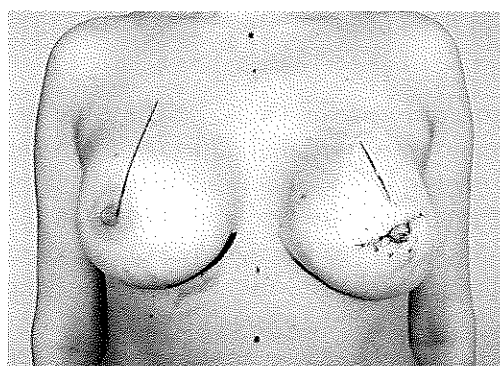
Preoperative markings



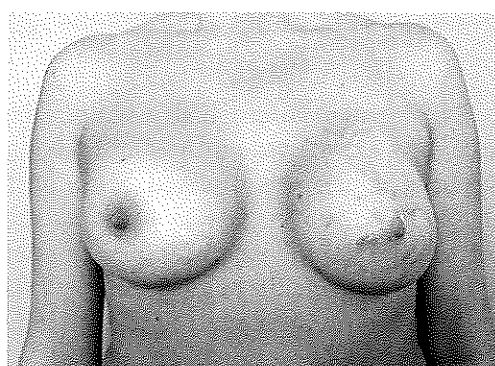
Final implant and contralateral augmentation markings



Immediately after surgery



Nipple reconstruction after 6 months



1 year postoperatively

FIG. 12

This 42-year-old patient had a simple left mastectomy for ductal carcinoma in situ (DCIS). At the time of her mastectomy a two-stage immediate reconstruction was begun. Considering the small size of her left breast, the reconstruction was planned based on a contralateral augmentation to provide the best result. During the first stage a 400 cc expander was inserted. A second stage, left submuscular procedure was performed 6 months later. A 410 cc anatomic, textured implant with highly cohesive gel was inserted. The right breast was augmented with a 220 cc implant. Nipple reconstruction was performed 6 months after insertion of the final implants. Her postoperative results are good.

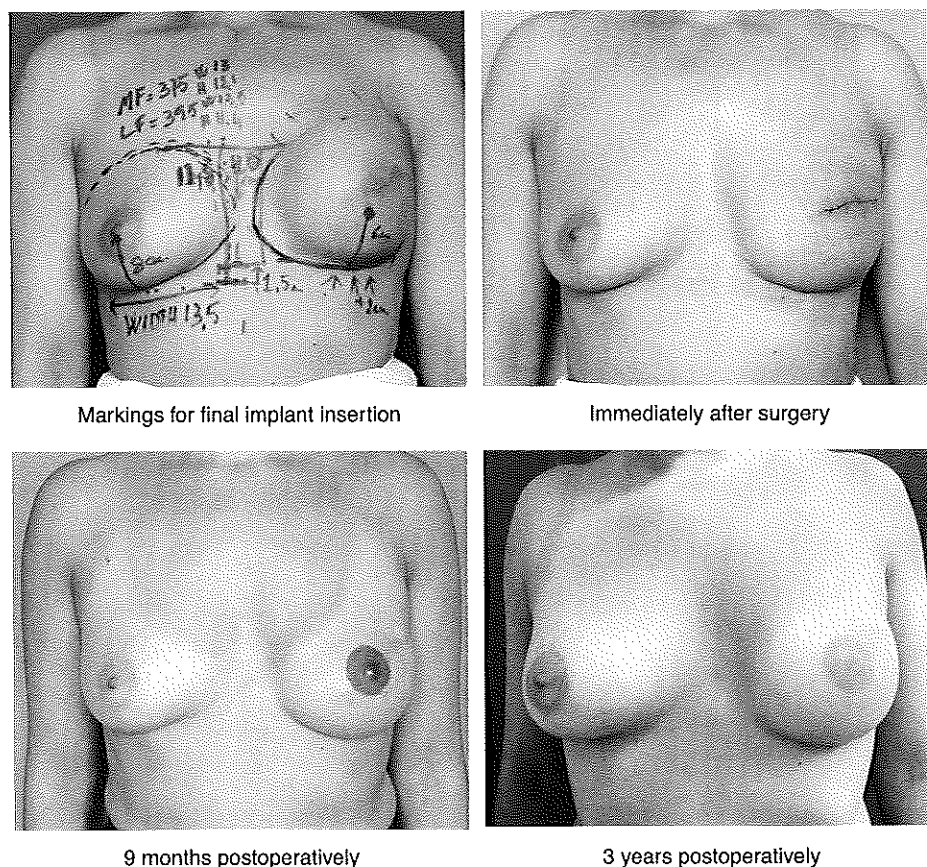
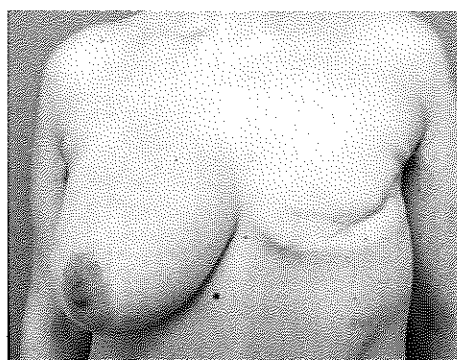
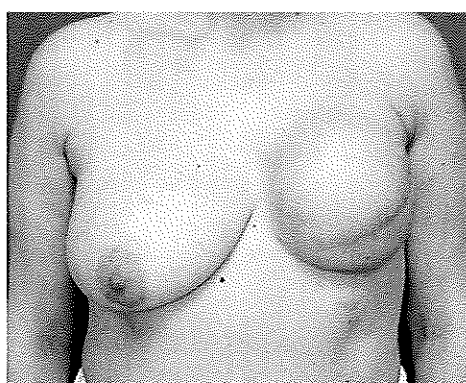


FIG. 13

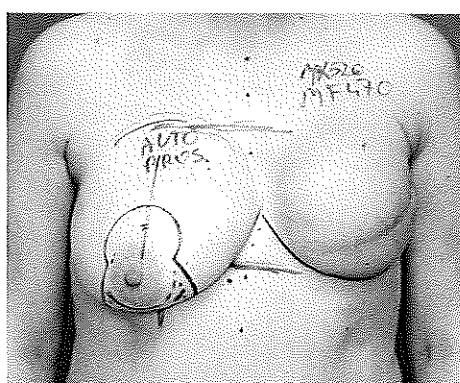
This 34-year-old patient had a simple left mastectomy for DCIs. At the time of the mastectomy a two-stage immediate reconstruction was initiated. During the first stage a 400 cc expander was inserted. Six months later a 375 cc anatomic, textured implant with highly cohesive gel was inserted submuscularly. The size and the shape of the reconstructed left breast eliminated the need for surgery to the right breast. Six months after implant insertion she had nipple reconstruction, and 3 months following nipple reconstruction an areola tattoo was placed.



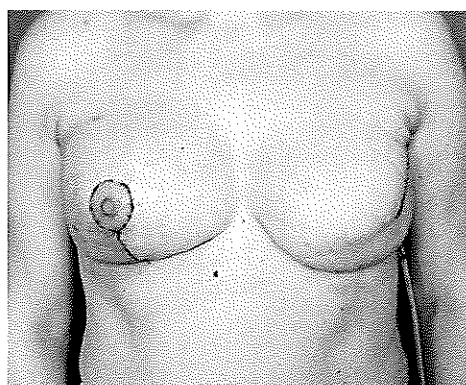
After mastectomy



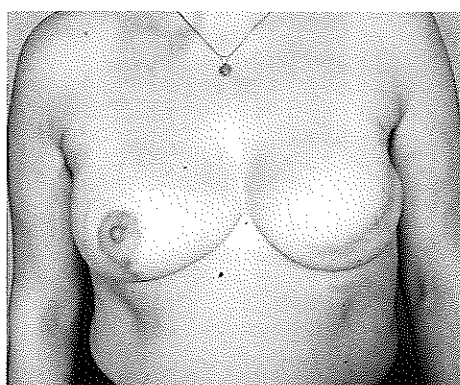
After expander insertion



Final implant and contralateral reduction markings



Immediately after surgery



2 years postoperatively

FIG. 14

This 45-year-old patient had a simple left mastectomy for DCIs. A delayed two-stage reconstruction with contralateral reshaping was begun 4 years after the mastectomy. During the first stage a 500 cc expander was inserted. Six months later a 520 cc, anatomic, textured implant with highly cohesive gel was inserted submuscularly. The contralateral breast was reduced using an autoprosthesis technique whereby an inferior dermal-glandular pedicle was sutured to the pectoralis major to enhance the projection of the central area and to avoid a relapse of ptosis. A superior pedicle was used to supply the nipple-areola complex. The patient did not want nipple and areola reconstruction.



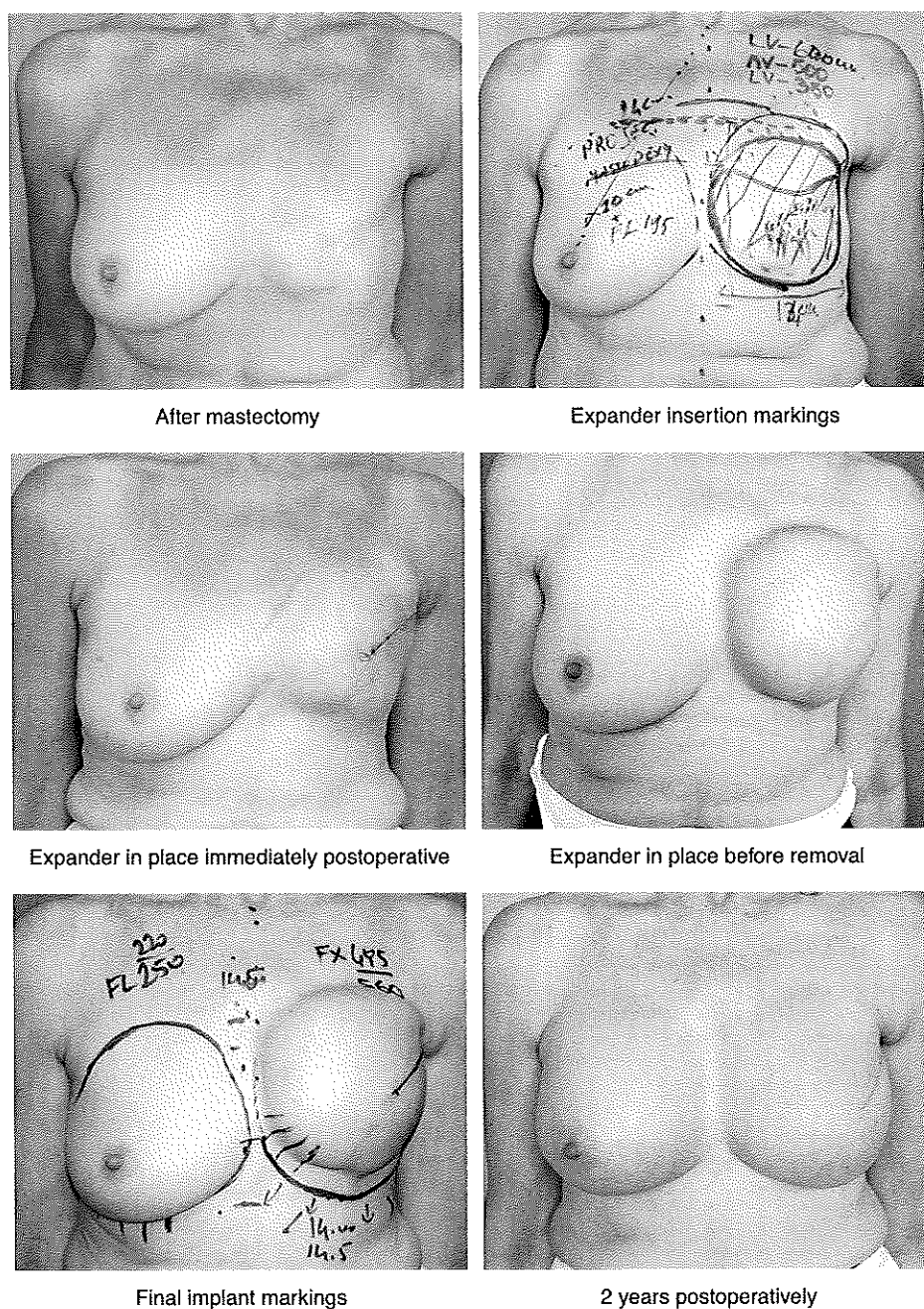
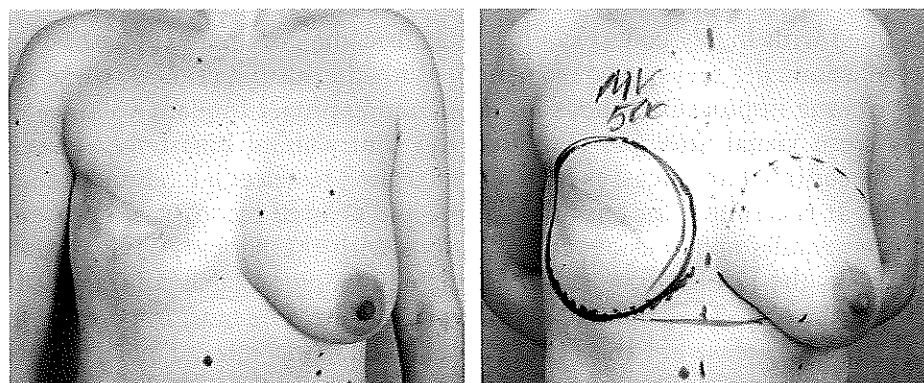


FIG. 15

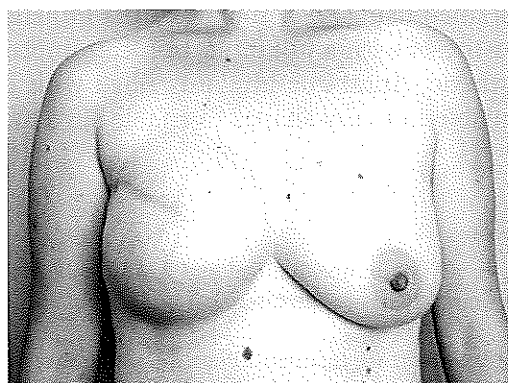
This 62-year-old patient had a left simple mastectomy for DCIs with a two-stage, delayed reconstruction 6 years later. During the first stage a 500 cc, anatomic, medium-profile expander was inserted. Six months later the expander was removed, and a 615 cc, anatomic, textured implant with highly cohesive gel was placed submuscularly. A full-projection implant was used because the contralateral breast was augmented with a 235 cc implant. The patient did not want nipple and areola reconstruction and was satisfied with her postoperative result.



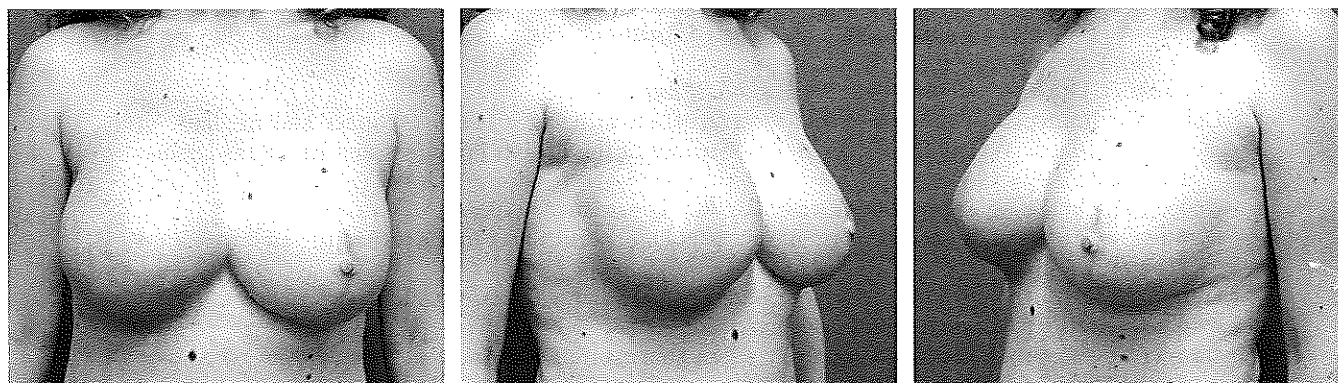


After right mastectomy

Expander insertion markings



Before left mastectomy and removal of right expander



1 year postoperatively

FIG. 16

This 31-year-old patient had a right mastectomy for DCIs with a delayed two-stage reconstruction after 2 years. At the time of the planned reconstruction, the patient showed a BRCA1-positive mutation. Therefore, a 500 cc anatomic expander was inserted, and a prophylactic left mastectomy with immediate one-stage reconstruction was planned for the time of the second stage procedure for the right breast. A 450 cc, submuscular, anatomic, textured implant with highly cohesive gel was inserted on each side. Her postoperative result is acceptable.

## CONCLUSION

Implants filled with highly cohesive silicone gel became commercially available in the 1990s, revolutionizing breast reconstruction. With the introduction of these new implants have come improved methods for determining proper implant volume; we have progressed from visual attempts to match the contralateral breast to a mathematic process. The contralateral breast is carefully measured to select a biodimensionally correct implant. It is essential for both immediate and delayed reconstruction to fully discuss expected results and possible complications with the patient. The surgeon must clearly envision the results to be achieved, including any possible contralateral procedure, to select the correct expander or permanent implant. The most important elements of a reconstructed breast are the inframammary fold, the inferior pole, the superior slope, and the projection. The inframammary fold and the inferior pole are related to accurate preoperative planning and appropriate surgical technique. Good superior slope and projection can be obtained using anatomic, textured implants filled with highly cohesive silicone gel. A prosthesis with a full projection can improve the outcome so that the results are more aesthetic. Anatomic implants filled with highly cohesive silicone gel are commercially available in many shapes to enable surgeons to individualize treatment for each patient.

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### ***Editorial Commentary***

This large European group has considerable experience using cohesive gel implants for immediate breast reconstruction. They start out by discussing the Becker expander permanent implant, which has been a very good appliance for breast reconstruction. It can be controlled in terms of size, and it can be very satisfactory for patients because they are involved in the decision-making. In fact, by using an external port, which in my own practice is frequently used, a patient can actually control the expansion or overexpansion of the appliance as indicated.

This article points out that reconstruction can be carried out relatively quickly using the cohesive implant, and when immediate reconstruction is not possible, the procedure can be carried out at a later date. The authors also point out that it is possible to perform delayed reconstruction by placing an expander first and placing the cohesive gel implant later. However, one point that is stressed, yet sometimes overlooked, is that there must be careful preoperative planning to ensure that the postoperative shape, size, and position are accurately assessed. If this is not carried out, then asymmetry can oc-

cur in all of these areas. When initial expansion of the breast is required, which is often the case in reconstructive techniques, then the necessary expansion should be maintained for 6 weeks before inserting the definitive implant. Once again it must be emphasized that the incision should be large enough for the implant to be placed without undue trauma, otherwise the procedure will undoubtedly result in an implant of an improper shape, which defeats the purpose of the cohesive gel implant.

Again it is stated that if one accepts a cohesive gel implant for use, there is probably a higher risk of capsule formation, and it may be necessary to do an open capsulotomy.

Although at the moment cohesive gel implants come in various sizes, they are obviously not comprehensive in terms of volume or shape. However, it is not inconceivable that in the near future there will be a method of manufacturing implants that can provide an exact match to contralateral breasts. Again, this will depend on popular demand. It is likely that this will be easier to accomplish with cohesive gel implants, because the technology certainly exists, and these implants naturally show greater stability in size and shape than previously used prostheses.

This article gives very good information and surgical steps for using either a one-stage or a two-stage reconstructive procedure. There will be more and more of an effort to produce the perfect breast form for unfortunate patients who have had to undergo a mastectomy.

**Ian T. Jackson, MD**

This excellent article summarizes the indications and techniques of one-stage and two-stage reconstruction using expansion. As in several of the other articles in this collection, the importance of measurement is raised as a method for achieving good results. Dr. Nava's team points out the importance of assessing the critical anatomic features that remain following mastectomy, and how to best use these to the advantage of the patient. The main elements of the preoperative assessment technique are reviewed, and step by step instructions are outlined. This group of authors has outlined the various devices that are marketed in a matrix of products. If most of these products did not exist, a busy surgeon would not miss them. Extremes of shape are problematic over the long run because of the adverse effects of biomechanical forces on tissues, and, in my opinion, they are best avoided. These authors correctly point out that although the goal of reconstruction was originally to create volume in the correct location to simplify the activities of daily living for cancer victims, the state of reconstruction has advanced to the point where we seek to achieve the goal of aesthetic reconstruction. In other words, our goal today is to provide mastectomy patients with breasts that look and feel as real as their natural breasts. This goal is of course not always achievable, but results today are several orders of magnitude better than they were 25 years ago. Further developments will allow even greater satisfaction as we get closer to providing an ideal result in every case.

**Claudio De Lorenzi, BA, MD**