

Chapter 9. Revision Breast Augmentation

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Stretch Deformity/ Wrinkling Rippling

There are a number of consistent complications in secondary breast surgery that remain the primary drivers for revision. These include Capsular Contracture, Malposition, Wrinkling and Rippling and Stretch Deformity of the lower pole. Many of the methods of repair are similar and will be shown, clarified, and presented.

INCISION PLANNING

1. The incision planning for revisional breast surgery for these conditions depends on a variety of factors such as prior incision placement, and whether there are additional complications or deformities present, but in general an inframammary approach is preferred. With an accompanying stretch deformity present it is usually beneficial to resect redundant lower pole skin to help restore symmetry to the contralateral side and the optimal nipple to fold proportions, and to have equal distances from the nipple to inframammary fold (IMF) bilaterally. A minimum of a 7-cm-long incision is typical to facilitate exposure and perform the procedure well, particularly if an acellular dermal matrix is used (Fig. 9-1).

Definitions and Semantics

Stretch deformity resulting in a “bottoming out” appearance of the breast is defined by an increase in distance from a preoperative nipple to IMF (N-IMF) distance to postoperative distance, with the fold remaining in its prior exact position from the time of the primary operation (Fig. 9-2).

Fold malposition occurs when the implant drops down below the prior IMF location (since the primary operation). This will also result in an increase in the new N-IMF distance; however, the scar rides up on the lower

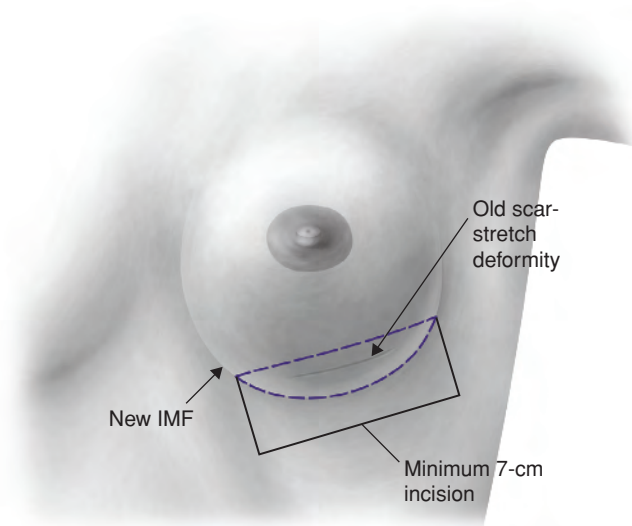


Figure 9-1

pole of the breast if an inframammary incision was previously used. (see Fold Malposition.)

Surgical techniques for correction of all three of these complications: Bottoming out/stretch, wrinkling/rippling, and capsular contracture are essentially the same. When approaching patients with these complications, it is important to do as much as we can surgically to improve the result so as to decrease the chance of further recurrence or incomplete correction. Therefore, changing planes to add more coverage over the device, exchanging saline for silicone devices, and using standard techniques are all important. Acellular dermis is often helpful in further supporting the soft tissues as an internal hammock or sling as well as providing a tenting effect over the device to decrease visibility.

The technical differences when correcting or improving these problems will be specifically addressed in each section of this chapter, but because the overall techniques are nearly identical they will be presented together with variances noted.

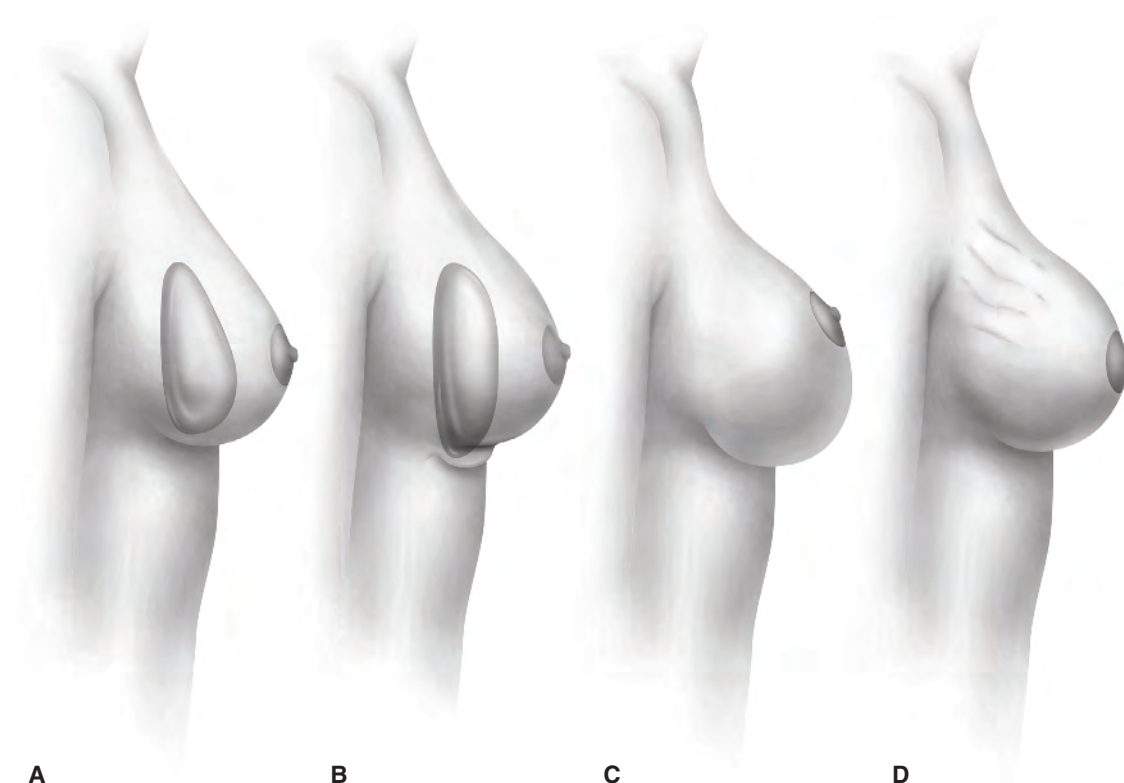


Figure 9-2. A. Normal implant position. B. Fold malposition. C. Lower pole stretch deformity. D. Wrinkling and rippling.

2. After defining the exact nature of the deformity, and these key relationships, incision planning is performed to set the final incision in the new IMF. The new implant size and shape may also play a part in the new IMF position. These relationships of implant size range and ideal N-IMF have been determined. A 7-cm incision, or larger if a skin resection is planned, is then confirmed intraoperatively with the skin on maximal stretch.

INITIAL DISSECTION

1. **Instruments:** Five specialized instruments are recommended for this procedure. These include a double-ended breast retractor, an implant spatula, a fiberoptic nonserrated lighted retractor with smoke evacuation capability, a monopolar hand-switching electrocautery, and a good overhead lighting or fiberoptic headlight (Fig. 9-3).
2. **Markings/landmarks:** The incision is made ellipsing the prior incision, in the planned location of the prior IMF, or other ideal planned location based upon the new implant to IMF measurement guidelines (Fig. 9-4A,B).
3. The length of the incision is somewhat dependent on the style and size of implant. However, for these revision procedures and in particular when using acellular dermis as a support, reinforcement, or as a hammock or sling internally, the procedure can be likened to operating through a “mail slot”

(Fig. 9-5A,B). The greater the visibility, the easier and more efficient may the technique be performed.

4. **Details of procedure:** Capsular contracture and wrinkling/rippling procedures

The skin incision is made with a #15 blade scalpel and initial dissection is carried through the dermis with electrocautery. Vessels encountered including perforators are prospectively cauterized. Next, for prior sub-muscular implants, with the original implant left in position, dissection is carried down to the superficial breast capsule. Dissection is then initiated in the cranial direction and to the caudal border of pectoralis major muscle. In the instance of capsular contracture or an older calcified capsule, all of the capsular tissue or capsule below the border of the pectoralis major is resected. In the case of wrinkling and no contracture, it is preferable to keep the capsule intact to provide an additional layer of support and thickness anteriorly. Radial capsulotomy is then performed with preparation of the pocket symmetrically as needed. New implants are then placed, or alternatively a trial implant may be used while an acellular dermis is sewn into position with protection of the device with a spatula retractor. The acellular dermis is then further inset at the IMF and its sling effect supports the implant, decreasing visible wrinkling. Both experimentally and clinically, the capsule does not appear to form on the deep surface or underneath acellular dermal tissue and

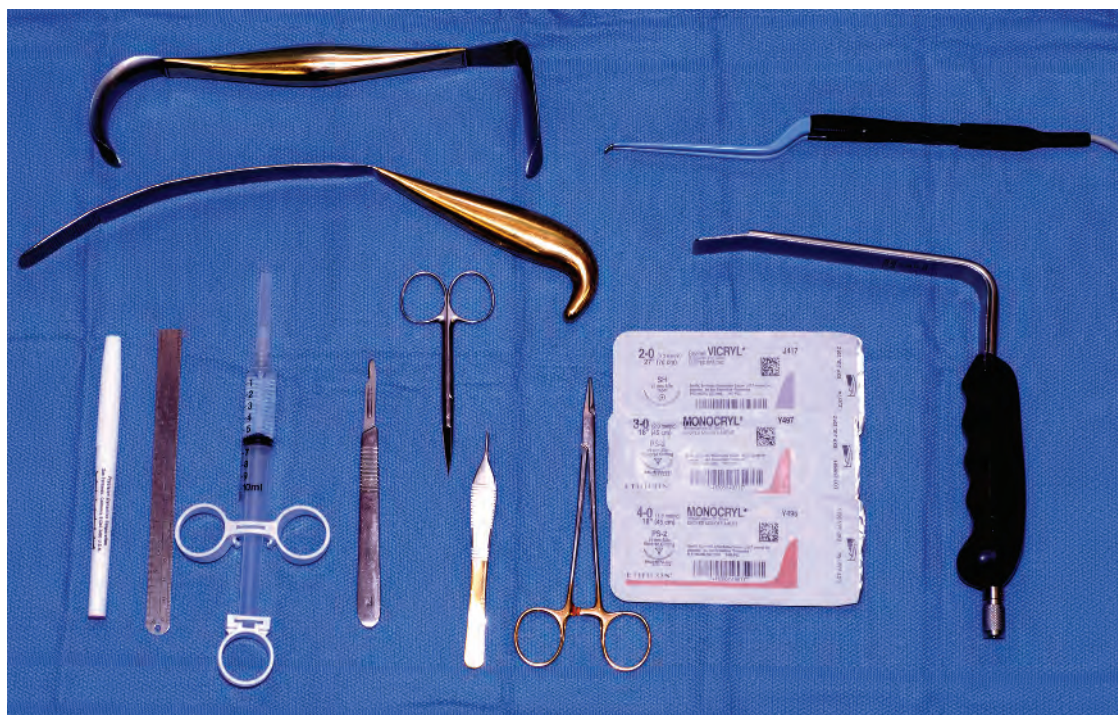


Figure 9-3

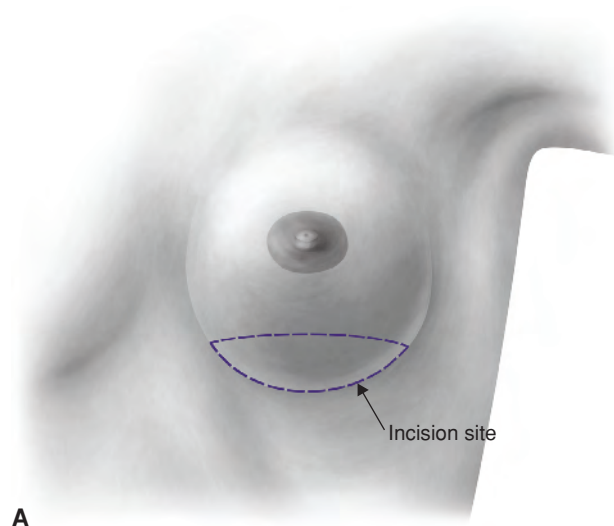
thus circumferential capsular contracture is inhibited (Figs. 9-6A–D; and 9-7A,B).

Lower Pole Stretch Deformity

Preoperative markings are confirmed, with redundant skin planned out in the resection in the new IMF. The skin incision is made by deepithelializing the redundant skin in the lower pole. A skin incision is then made at the inferior most portion of the incision retaining the deepithelialized component above. The initial dissection is carried through the dermis with the electrocautery. Vessels encountered including perforators are prospectively

cauterized. Next, if an acellular dermis is to be used, with the implant left in position, dissection is carried cephalad to the inferior border of pectoralis major. Capsulotomy is then performed in the region of the fold, estimating the redundant amount of capsule to be resected. The acellular dermis is then sutured into position along the inferior pectoralis margin, and on top of and anterior to the fresh capsular surface, and finally inset into the region of the IMF. The redundant deepithelialized dermis may be used to further support the IMF region.

5. **Pitfalls:** It is very common when addressing a complication and revising to create a new problem or deformity

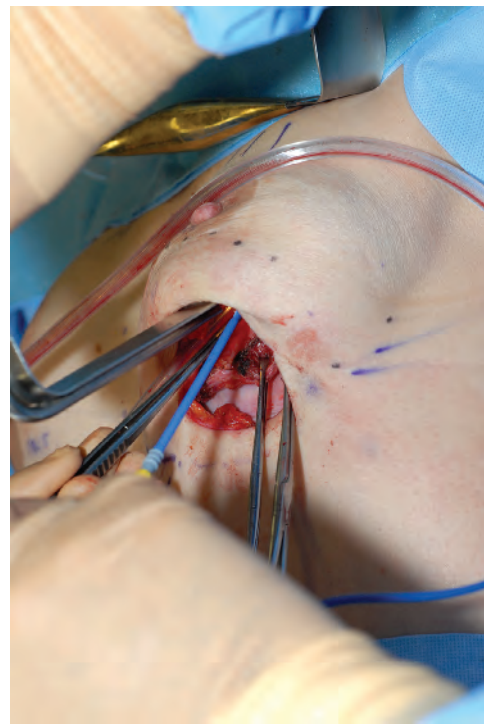


A

Figure 9-4



B



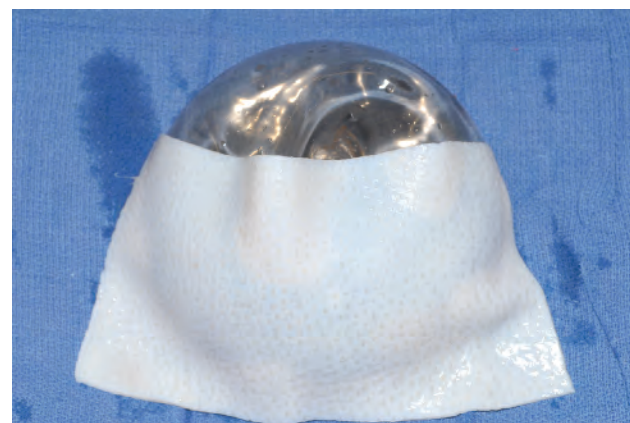
A
Figure 9-5

B



A

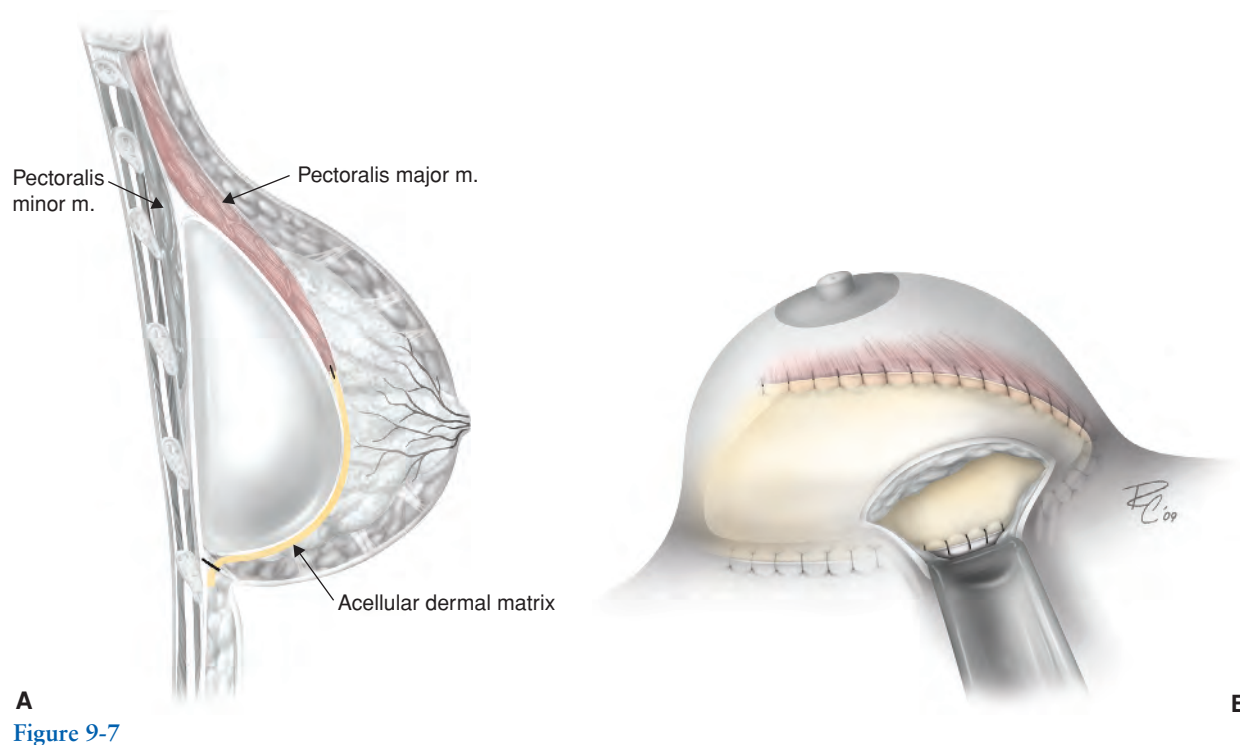
B



C

D

Figure 9-6



while trying to correct or enhance another. Take care not to overdissect the medial and lateral pockets or to create a symmastia or lateral malposition. Standard revision techniques—particularly for wrinkling/rippling, stretch deformities, and capsular contracture—have a very high recurrence rates, thus reinforcing the soft tissues with acellular dermis or placing this material as an interposition will provide the best alternative to decrease further recurrence or incomplete, suboptimal repairs.

6. **Pearls:** Keeping the implant in position as long as possible initially greatly facilitates the capsular dissection and defining pectoralis muscle border. A spatula retractor is particularly helpful during this initial dissection as well. Estimating the redundant skin and capsule that has stretched is sometimes tricky and can be facilitated by knowing the ideal N-IMF relationships with specific volume of implants. The new acellular dermal materials provide a significant adjunct and further reinforce the soft tissues in minimizing further deformity, as well as decreasing recurrent capsular contracture.

POCKET PREPARATION AND CAPSULAR FLAP DISSECTION

1. The implant is manually displaced cephalad and an approximate level of the new, revised, or planned location of the new IMF is determined and a capsulotomy performed. The free edge of the capsule is left intact, and the redundant lower capsule below the fold is resected.

2. The new location of the IMF may be estimated with the patient in an upright or partial upright position, with her implant or an implant trial in position and the fold marked internally with methylene blue and a 22-gauge needle.

3. If the patient has a concurrent capsular contracture or calcification, or at the surgeon's discretion, the anterior capsule is resected to the inferior border of the pectoralis major muscle, or completely. If this is undertaken, strong consideration for acellular dermal support should be made, which will further define and support the fold, support the weight of the device, decrease future stretch deformity, provide additional coverage in the often thinned lower breast pole, and decrease circumferential capsule formation.

If there is no evidence of capsular contraction, capsulotomy at the apex of the pocket may be performed and the vascularized capsule used as an additional layer of support for the device. Dissection is then carried out superficial to the capsule to the lower pectoralis margin and acellular dermis sewn to the muscle border similar to using this material in a breast reconstruction model.

4. **Pitfalls:** These three complications are among the most difficult to treat in breast surgery. Every technique to decrease recurrence and minimize or eliminate the deformity should be considered including exchanging saline for gel devices, capsular flaps, or neosubpectoral pockets, and adding acellular dermal tissue. In addition, all materials do not have the same elasticity so it is important to understand the specific characteristics of the material you are using.

5. **Pearls:** Adequate incision size is critical. When resecting additional skin for bottoming out deformities, incision length is not an issue but in other instances, a minimum of 7 cm should be planned. Keeping the original implant in position for the early portion of the dissection greatly facilitates the procedure. Ideal N-IMF folds may also be estimated preoperatively based on the final implant size chosen, specifically determining the distance on stretch.

CLOSURE

1. The standard inframammary closure may then be performed in three layers closing the superficial fascia with a running or interrupted absorbable suture such as 3-0 Vicryl followed by a subdermal 3-0 Monocryl suture and a running 4-0 Monocryl subcuticular suture as previously described. The new 2-0 or 3-0 Monoderm quill suture may also be used subcutaneously in a running two-layer fashion, which expedites the closure. In the bottoming out deformity the deepithelialized dermis may also be used to support the closure.
2. Wound care—the incision is covered with steri-strips or a sterile band aid gel strip that provides epithelial hydration and a waterproof barrier may be used.

SPECIAL TECHNIQUES

Capsular Contraction

The surgical approach and correction of capsular contracture is similar to those previously described and used for correcting wrinkling and rippling. The important difference is in the pathology of the capsule. In general capsular tissue should be looked at as “pathologic” often formed by Biofilm or a subclinical infection and should be removed with total capsulectomy or near total when possible. Verses say in a stretch deformity where the redundant capsule may be used for further support. With capsular contracture the capsule should be removed (Figure 9-8) and high consideration for replacement with an acellular dermis particularly in multiple recurrent capsules. The abnormal capsule may then be “replaced” with an acellular dermis as a pectoral extension similar to its use in breast reconstruction (Figure 9-9).

Dissection for Capsular Contracture Cases

The skin incision is made with a #15 blade scalpel and initial dissection is carried through the dermis with electrocautery. For prior submuscular implants, with the original implant left in position as long as possible with dissection carried down to the superficial breast capsule. Dissection is then initiated in the cranial direction and to

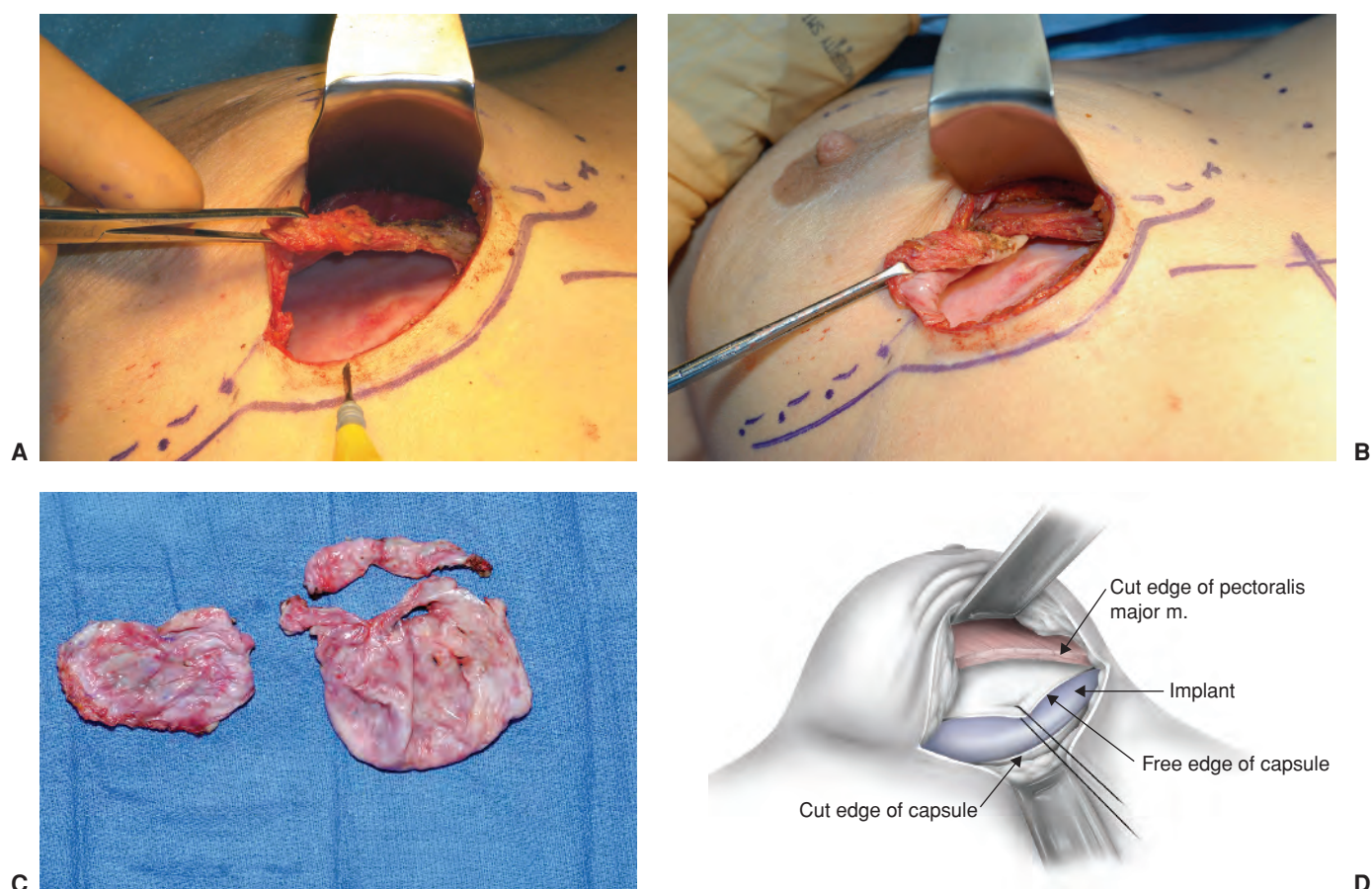


Figure 9-8

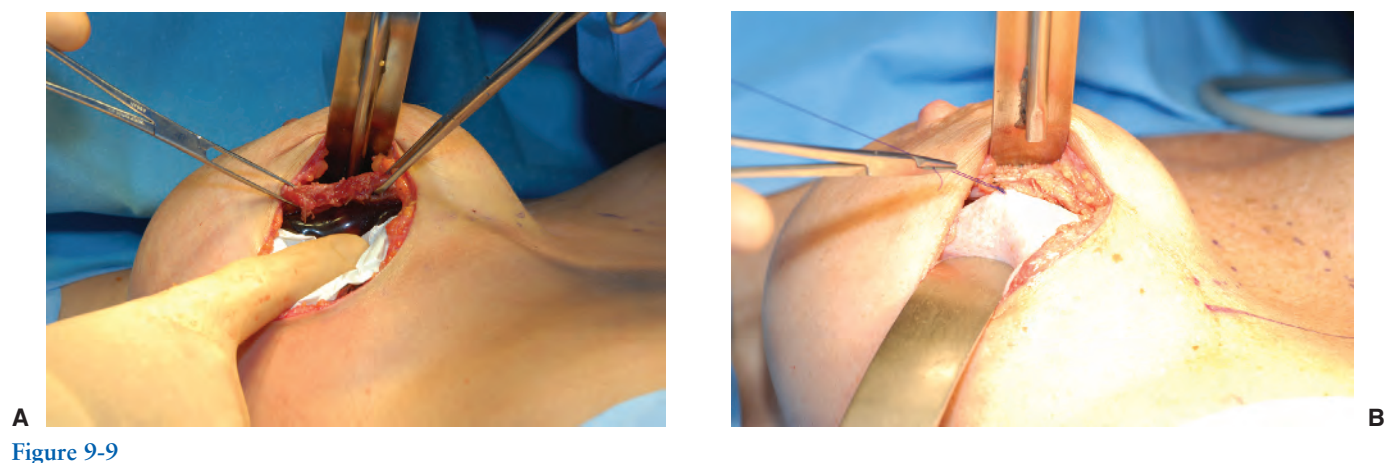


Figure 9-9

the caudal border of pectoralis major muscle. Dissection continues deep to the muscle with all of the capsular tissue or as much as possible resected (Fig. 9-8A-D).

In the case of a prior subglandular implant, total capsulectomy with implant removal is recommended and a site change typically performed with or without addition of an acellular dermis as a pectoral extension.

Insetting and closure is performed as described above in the Stretch deformity section.

*no pitfalls or pearls here . . . go right in to the Capsular flap section

Capsular Flap—Neosubpectoral Pocket

Background: The capsular flap, or neosubpectoral pocket, is a powerful tool in revision breast surgery and should be a part of the surgical armamentarium of all plastic surgeons. It is used in situations in which a patient has had a prior breast augmentation in the submuscular position, and is most helpful in patients with medial malposition (symmastia), inframammary fold or lateral malpositions. A new space is made superficial to or on top of the prior breast capsule and back beneath the pectoralis muscle, the capsule is collapsed, and a new implant is inserted into a new partial submuscular virgin pocket.

1. **Incision Planning:** The prior incision if periareolar or a new inframammary incision is made ellipsing the prior scar. Again, an adequate incision length is imperative to adequate visualization: a minimum of 7 cm.
2. **Details of the Procedure:** As previously discussed, keeping the prior implant in position as long as technically possible is important. Dissection is carried down to the anterior capsular surface with Bovie cautery. Elevation of the subcutaneous space is then performed with the aid of double-ended retractors. Upon reaching the inferior edge of the pectoralis major muscle, a new dissection plane between the capsular surface and beneath the muscle is made. Pushing down on the capsule and underlying implant with a moistened Ray-Tec sponge and stroking the dissection plane

with the cautery in the blended coagulation mode with pressure and tension helps to develop the tissue planes. Rotate back and forth medially and laterally with adequate visualization; lighted retractors are critical. Upon reaching the apex of the implant, capsulotomy near the IMF is performed and the implant removed. If a ruptured gel implant is suspected, it is helpful to preoperatively place a large OpSite or Ioban sticky drape to avoid silicone contact with the skin.

Alice clamps may then be placed on the muscle edge, and the new pocket is completed cranially. Care is taken not to overdissect the neopocket, particularly if a new shaped, textured implant is to be placed. Resection of redundant capsule at the fold is undertaken to keep the capsule tight against the chest with minimal redundant or extra tissue. The new device is then placed and positioned into the new partial submuscular pocket above and on top of the prior anterior capsule.

3. **Pitfalls:** Early capsulotomy and removal of the implant makes the surgical dissection more difficult. Using the cutting current versus coagulation mode will increase the chance of an inadvertent capsulotomy, dramatically affects the ease of the procedure if a ruptured implant is present. Early overdissection of the new space defeats the purpose and power of the procedure to hold the implant in position and help avoid future malposition. If a severe capsular contraction or calcification is present, this procedure should not be performed and the capsule should be resected.
4. **Pearls:** This is a very powerful procedure to learn and use. More advanced techniques include rotating the flaps for coverage and using the posterior capsule or only partial portions of the capsule to define the medial or lateral borders versus elevating the entire capsular surface. If an implant is in the subglandular space, a portion of the capsule may be retained for coverage but a completely new submuscular pocket is made verses using a capsular flap or neosubpectoral pocket technique.

Subglandular Coverage for Wrinkling/Rippling

In cases where a patient will not accept a submuscular implant or where there is no muscle from prior surgery or congenital absence, there are some alternatives. This technique may not produce as significant an improvement as the pectoral extension, reconstructive technique but still may provide improvement. Again minimizing the inherent device wrinkling using an implant with a higher fill volume will provide an advantage. In addition, the acellular dermis may be inset either prepectorally or intracapsular, but sutured to the chest wall and placed on some tension to provide for less visible wrinkling through the material versus what the onlay may provide on its own just from the thickness and barrier of the material itself. In these instances an 8×16 cm piece or larger may be oriented vertically and positioned over the

device. The medial aspect of the breast typically is the thinnest and thus the material may be placed more medial to maximize coverage, although this may vary patient to patient.

1. **Pitfalls:** There are not sufficient patient data to advocate this approach but it may be beneficial in providing some coverage and improvement in patients with marked thinning. There are relatively few alternatives except for autologous tissue transfer or fat grafting. Simple onlay alone may not provide adequate coverage or cosmetic improvement.
2. **Pearls:** Secure the acellular dermis to the chest wall to provide a tenting effect. Drains and adequate filling of the space on some tension are important to increase adherence and integration and revascularization of the matrix material.

Malposition

MEDIAL/SYMMASTIA

Implant malpositioning can be a source of significant deformity following breast augmentation. Malposition can be superior, inferior, lateral, or medial to the breast mound. When malposition is medial to the mound, it is described by a special term: symmastia (Fig. 9-10).

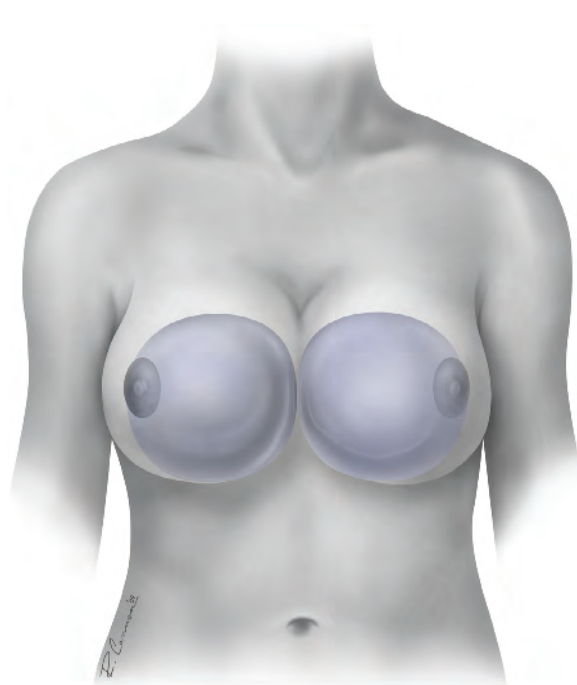


Figure 9-10

Symmastia can occur in a variety of severities. In its most mild, two separate implant pockets remain, but one or both implant pockets cross the midline. (Fig. 9-11A–B). In more severe situations, presternal skin is tented at the mid-

line, and in the most severe situations, the left and right breast implants share a common pocket (Figs. 9-12A–F).

Thin and attenuated tissues put patients at risk for this malady. Even mild forms of pectus excavatum can substantially increase the risk by allowing passive medial migration due to the angle and forces upon the rib cage. On the surgeon's part, excessive medial dissection or division of the pectoralis origins can be contributory.

The problem seems to be more frequently found with implants that were too large for the patient's breast, as defined by published tissue-based planning systems. Symmastia also appears to be more commonly related to incisions that limited surgeon visualization, such as a peri-areolar incision in the setting of a small areola.

The surgeon should be alert to identify that the most severe symmastia cases frequently include concomitant inferior malposition.

Treatment options depend upon the current and proposed pocket location of the device (Fig. 9-13). If the device is subglandular, the problem is most expediently resolved with a conversion to a new partial retropectoral pocket (if there is concomitant inferior malposition) or dual plane (if tissue pinch at inframammary fold (IMF) >5 mm and without inferior malposition). Although one could choose to allow the implants to remain in the subglandular pocket with either a capsulorraphy or creation of a neosubglandular pocket, the ease, durability, and predictability of a site change to a retropectoral pocket makes that a frequent choice.

If submuscular already, options are remaining submuscular or creating a new subglandular pocket. Although converting to a subglandular pocket is tempting, the surgeon should remind himself or herself of the myriad of advantages offered by the submuscular pocket, particularly for the patient with symmastia, in that frequently these patients are thin and benefit from tissue coverage, and because the muscle almost by definition is no longer attached to the sternum.

If one does choose to move the implant to the subglandular position, they should be cautioned to leave a very



A



B

Figure 9-11

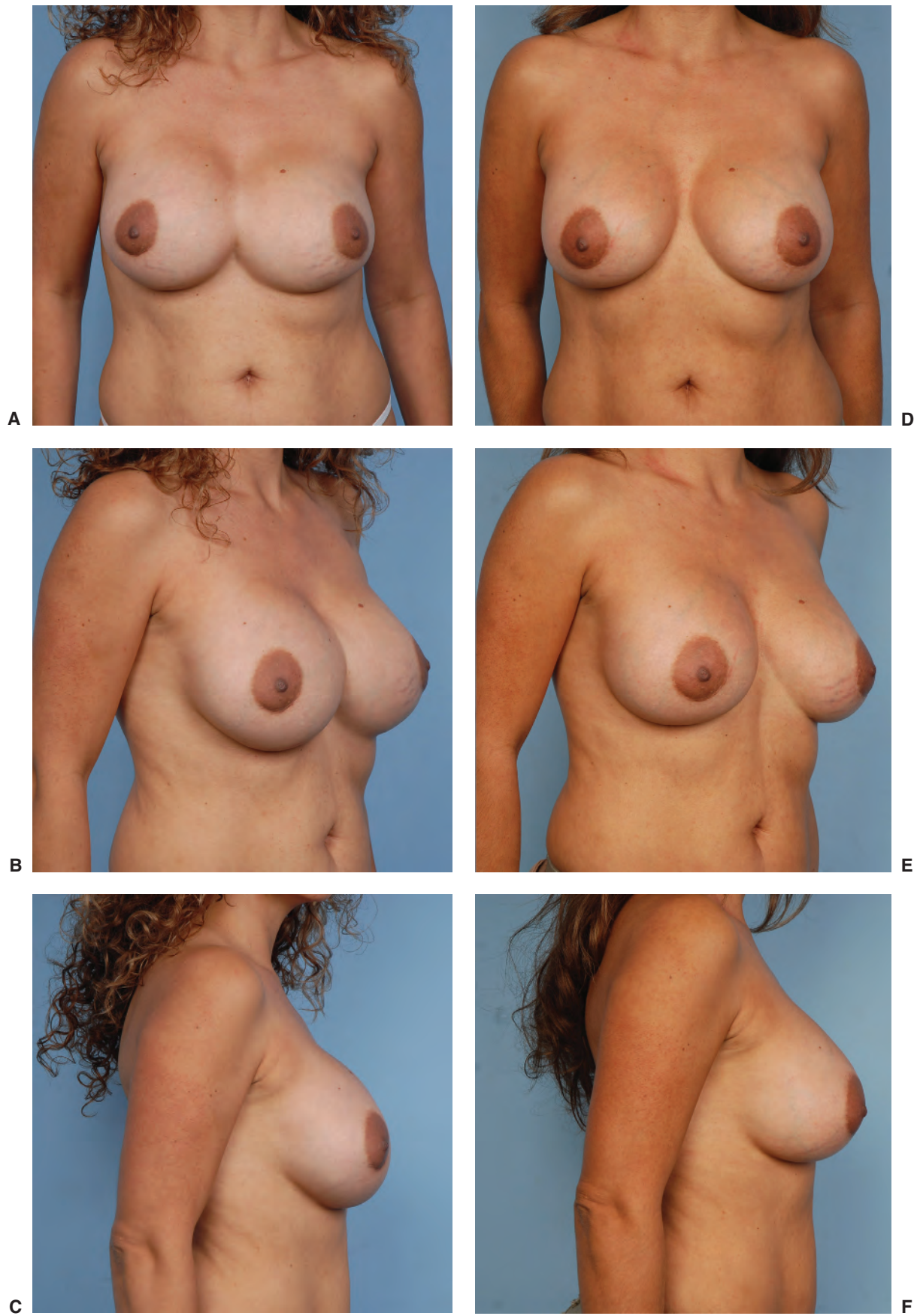


Figure 9-12 Patient with severe symmastia that was noted immediately after her primary augmentation. In her case, the implant pockets communicated over the sternum. She also had 3 cm of inferior malposition. She is shown corrected after creation of a neo-subpectoral pocket through the periareolar incision.



Figure 9-13

wide intramammary distance. For if there is a submuscular symmastia, then by definition the pectoralis is no longer attached to the lateral border of the sternum. Unless the dissection stops lateral to the sternum, one may find the new subglandular pocket ultimately communicating with the submuscular pocket that created the symmastia.

Most frequently, tissue coverage is such a priority that submuscular symmastia is retained as submuscular, either by leaving the implant in the existing pocket and closing off its medial extent with a capsulorraphy or by creating an entirely new pocket between the anterior capsule wall and the overlying breast/muscle tissue, known as a neosubpectoral pocket.

Capsulorraphy can be difficult in cases of symmastia because both the anterior and posterior capsular walls are often very thin overlying the sternum, which is the area in which the repair must be the strongest. The capsule overlying the sternum itself is particularly thin, and unlike capsule overlying costal cartilage, the sternum is too thick to pass a needle through. Capsulorraphy also demands that sutures be placed in precise, regular locations in order to create a smooth and accurate boundary, which is very difficult to do when tissues are thin and inconsistent.

On the other hand, the neosubpectoral pocket is a new pocket that is behind the muscle and gland, but in front of the old capsule. Its perimeter margins are defined by the dense adhesions between capsule and overlying tissue. The smoothness and extent of the pocket is created simply by surgeon dissection. Sutures are used to obliterate the old capsular space, but they can be placed at irregular intervals, allowing the surgeon to choose locations in which the tissue quality is best.

Because the edges are not defined by multiple sutures, there is less puckering seen right after surgery, and generally the result looks better sooner. There appears to be less discomfort, perhaps because of fewer sutures around the sensitive chest tissues.

INCISION PLANNING

Symmastia can occur following transaxillary, transumbilical, periareolar, and inframammary approaches. Neosubpectoral pockets for the treatment of symmastia have not been described with the TUBA incision. If the previous incision was inframammary, then that incision is frequently used again. One distinct situation in which this does not occur is when the old IMF incision was made too low, so that it would, therefore, be impossible to use it to create a neo subpectoral pocket with a nipple–inframammary fold (N-IMF) distance shorter than its location would define.

If the previous incision was periareolar, and the areola is of adequate diameter to allow excellent visualization and access, then that is frequently used. Overall, the operation is easiest with a large periareolar incision, as the surgeon is dissecting “from atop the mountain,” looking down with excellent visualization and proximity to the farthest margins of the pocket. Although the inframammary incision is always enlargeable, it can sometimes be difficult to see over “the equator” of the implant (in such cases the implant is left in place for countertension as long as possible, and then it is removed and the dissection is continued without the implant in place).

DISSECTION

1. **Instruments:** The critical instruments are a double-ended retractor, extended-tip electrocautery, and a spatula retractor with which to retract against the implant and/or capsule.
2. **Markings/landmarks:** The goal is to reestablish the native boundaries of the breasts. Occasional this can be seen as a “double-bubble” overlying the malpositioned implant. More commonly, these borders are totally distorted. The surgeon is left, therefore, with two means to make the markings: the sternum and the position of the entire IMF from sternum to lateral breast border that is suitable for the chosen implant.

Once the new implant size is determined (see section on Device Selection in this chapter), an IMF should be marked from a distance to the nipple at 7 cm for 200 cc, 8 cm for 300 cc, and 9 cm for 400 cc. These lines should be drawn onto the breast and blended to the lateral border of the breast and centrally to the lateralmost sternal border. Err on the side of creating too wide of an IMD to ensure adequate presternal skin with no implant deep to it. Mark each interspace at the lateral sternal border and ensure that the proposed IMD is no narrower than it.

3. **Details of Procedure:** Either a periareolar or IM incision is made. Dissection is carried through the soft tissue to the implant capsule, and dissection occurs between the anterior capsular wall and the

parenchyma, as if one were performing an anterior capsulectomy. When the capsule is thin, the dissection is more difficult. This is often the case with enlarged pockets of symmastia (as opposed to contracted pockets, which are usually thick). Be patient and take care not to make tears in the capsule, although so long as the disruptions are not so large that they fundamentally destroy the ability to create a bona fide space in front of it, then small rents are acceptable. In fact, they provide an opportunity for visualization of sutures that tack the front wall of the back wall, and allow drainage of fluid from the collapsed implant space.

The dissection is easiest in the lower area of the breast where, gland in front of the capsule. As one proceeds superiorly and starts dissection under the muscle, the dissection often becomes more difficult (Fig. 9-14). The capsule often becomes notably thinner and more adherent to the muscle than in areas beneath the gland. Just slow down, and reposition the retractor and make good use of counter tension. If it proves impossible to stay in this plane and not damage the muscle or capsule, then one can make a long horizontal capsulotomy, thereby allowing the more inferior portion of the implant to be in the neosubpectoral pocket and the superior portion to be within the old capsular pocket (Fig. 9-15).

All dissection should stop short of your expected limitations of the pocket; you should plan to enlarge it later, which can be performed easily and accurately (Figs. 9-16 and 9-17).

Then perform a capsulotomy of sufficient size to remove the implant. Plan your capsulotomy around

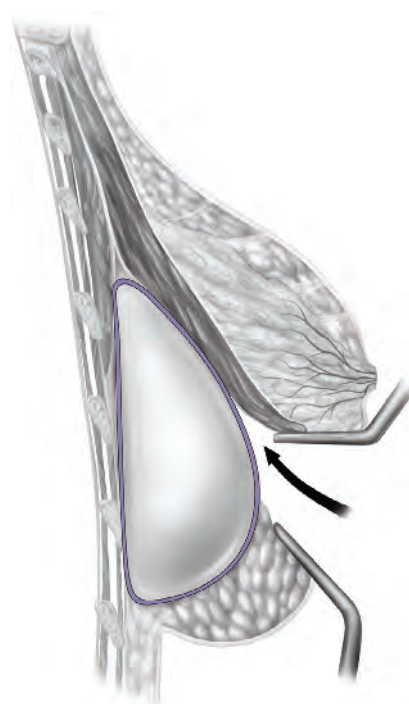


Figure 9-14 Dissection starts identically to a capsulectomy. The only difference is shown in Figure 9-16: dissection is intentionally incomplete.

adjacent holes that were inadvertently made in the capsule, or in such a location that you will have good visualization into the pocket of any areas where you want to put in quilting sutures to sew the front capsular wall to the back wall to obliterate the old pocket

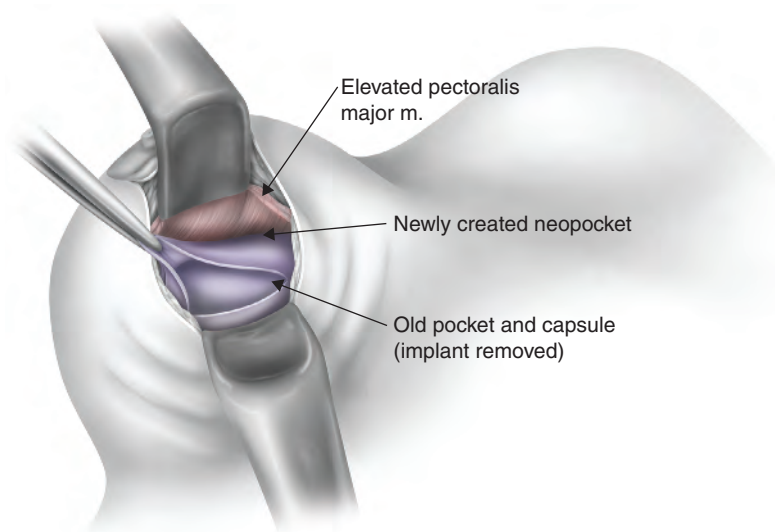


Figure 9-15 The layers involved in this operation are demonstrated. After dissection anterior to the capsular front wall, the implant is removed, the front wall is tacked to the back wall, and the implant is placed in the newly created neopocket.

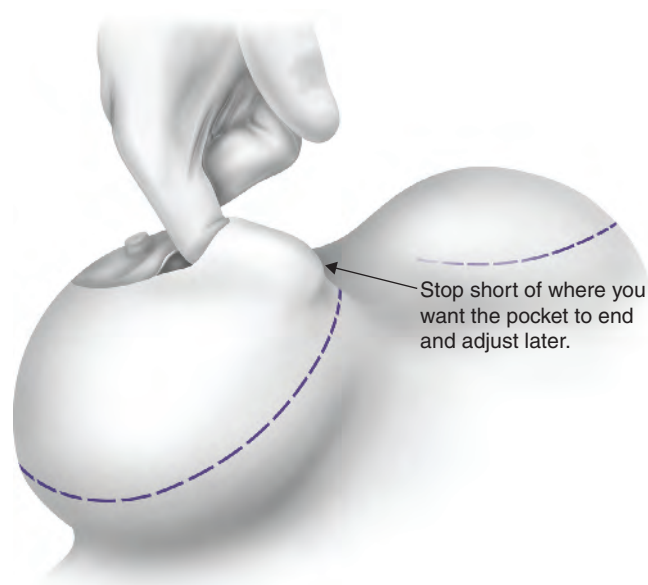


Figure 9-16 The neosubpectoral pocket is a procedure that makes a smaller pocket. The dotted line indicates the borders for the new pocket.

(Fig. 9-18). A smooth implant will remove easily, but if it is an aggressively textured implant, use caution when removing it, as adherence to the overlying capsule can lead to destroying your well-dissected capsule during removal.

A series of sutures is placed from within the old capsule between the front wall and back wall of the pocket. Although it is true that the pressure of the implant on top of the capsule will help to compress and obliterate that space, since there will no longer be implant over the sternum, there is otherwise nothing to press the old capsule and hence the skin flat onto

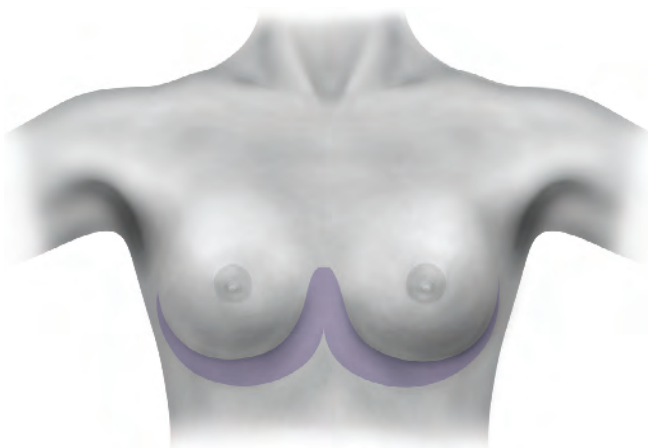


Figure 9-17 The lavender shaded areas represents where the medially and inferiorly malpositioned implant had been located prior to repair with the neosubpectoral pocket.

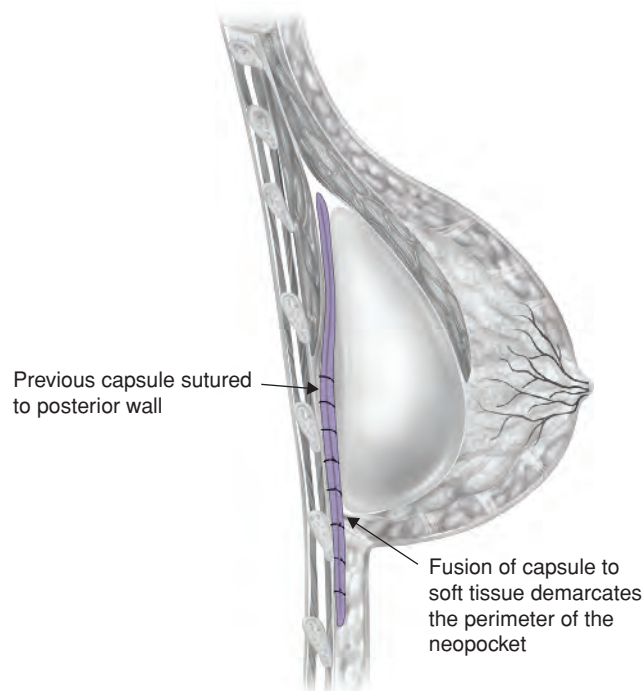


Figure 9-18 The sagittal view of the patient in 9-17 shows how the neosubpectoral pocket can correct inferior malposition. The dissection stopped at the desired inferior location of the new pocket. The dense fusion of capsule to tissue holds this secure. In cases of weakened tissue, an ADM such as Strattice(TM) has been used in this position as an onlay for reinforcement.

the sternum. Even where the implant is pushing down on the capsule, sutures may help to obliterate the space, preventing seroma formation, and preventing shearing of the front wall relative to the back wall, which could allow shifting of the pocket and, therefore, of the implant itself.

Prior to placing these sutures, some method should be employed to “freshen up” the surfaces of the capsule, such as rubbing it with a cautery scratch pad, desiccating with a cautery, or using a PlasmaJet. The old space should also be well-irrigated with antibiotic irrigation to reduce the likelihood of contaminating the new implant pocket with pathogens from the old capsular space.

In areas in which the neo pocket does not extend as wide as the old pocket (medially with symmastia, and often inferior as well) (Fig. 9-19) the sutures must be placed from within the old pocket. But in areas in which there is dissection over the front wall, sutures can be placed from outside the front wall, taking bites of the underlying posterior capsule. Unlike a capsulorraphy in which sutures must be placed in a particular location, these are spread apart randomly and placed

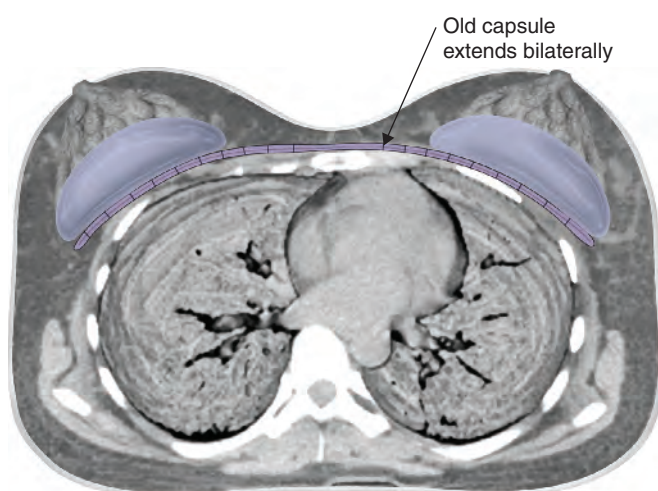


Figure 9-19 Axial view of the abdomen illustrates how the neosubpectoral pocket treated the symmastia. The excessive medial extent of the pocket is collapsed and the front and back walls are sewn together. The medial and lateral extends of the precapsular dissection limit the medial and lateral borders of the new pocket.

until the surgeon is satisfied that there is a firm fusion between the front and back walls, forming a stable support for the posterior wall of the new capsule.

This is repeated on the other side, and then implant sizers are placed. Ideally, the pocket would have been underdissected. Using the spatula retractor to move the implant, the cautery is used for small, precise, incremental enlargements until a pocket minimally large to accommodate the implant is made. Very small amounts of this dissection can create large shifts in the pocket, so these adjustments should be made in the smallest possible increments.

An additional optional step at this point is to laminate the repair with a strip of acellular dermal matrix, such as Strattice. If the tissues are very thin and weak, as may be evidenced by multiple rents from the initial dissection or failing to hold the sutures that had been placed, or if the new pocket was inadvertently overdissected, sewing a strip of Strattice appears to be very helpful.

A drain is placed, the pocket is irrigated with Adam's solution, gloves are changed, the implants are placed, and the incision is closed.

4. **Pitfalls:** Although not a pitfall per se, a disappointment not uncommonly encountered is that some patients want an implant that compromises the chances of successful correction. They may be disappointed if the implant is too small and they would certainly be disappointed if the symmastia recurred; this must be discussed to absolute satisfaction preoperatively.

Some women with extreme inferomedial symmastia have substantial skin excess and webbing that becomes revealed after the successful correction of the symmastia. Although the problem that led to the operation may have been corrected, because of its location, this skin excess is extremely difficult if not impossible to correct, even with substantial scars. Raising this as a possibility when it can be foreseen would be prescient on the part of the surgeon.

If you do not secure the front wall to the back wall, the weight of the implant in the new precapsular pocket can cause the front wall to shear inferiorly relative to the posterior wall. There is a tendency to advance the anterior wall cephalad relative to the posterior wall, thereby inadvertently raising the IMF.

If you do not leave some openings in the anterior wall, fluid could be trapped or a seroma could form within the old space.

The neosubpectoral pocket can fail to fix symmastia if any of the following occur: the implant is so large that it re-creates the deformity by again stretching tissues; if the new pocket itself is over dissected; if the capsule tears at its fusion point with the overlying soft tissue; or if the capsule itself tears substantially somewhere along the old anterior wall and thereby allows the entire pocket to migrate. Usually the capsular tissue is sufficiently robust such that this does not occur. Consider obtaining consent from patients for the use of Strattice to laminate the medial and/or inferior margins of the pocket if you suspect that the capsular tissue might be too weak to support the borders of the neosubpectoral pocket, and make a final determination intraoperatively.

5. **Pearls:** This is not a “repair” so much as it is the creation of a new pocket, the borders of which are defined by the intimate adherence between capsule and overlying gland/muscle. Once you overdissect, it is extremely difficult to place sutures and gain the strength that the fusion alone provided. In addition, once the implant is removed and the front wall is sewn to the back wall, the external skin markings with which you were guiding your dissection often appears to change in location. So *under dissect*, and expect to go back and finish off the pocket with the sizer in place after the pocket has been obliterated.

Do not worry about creating little rents in the capsule as you are dissecting, as these will serve as spaces from which air and fluid can leave the old capsular space. You can also use these to see the posterior wall when placing quilting sutures, rather than placing sutures through the anterior capsular wall and blindly taking bites of posterior wall. In fact, it is helpful to create additional 3 or 4 mm “mini-capsulotomies” where you want to place your sutures to more safely and strongly place the quilting sutures.

POCKET PREPARATION

Implant Considerations

Many of these patients developed their problem because their breast implant(s) exceeded the weight and dimensions that could be supported by their tissue. Unless it is obvious that there was overt overdissection and that the implant was of the proper size for the patient, the implant size should be reduced. In the ideal situation, one would look back at original preoperative measurements to determine the ideal size for the patient. When no records are available, sometimes the implants size is determined intraoperatively. Many patients with symmastia put pressure on even the correcting surgeon to place an implant large enough to reduce the likelihood of a recurrence-free repair. The surgeon must be insistent with these patients about the

need not to put stress on tissues that have proved themselves to be weak, and he or she should not proceed unless the patient has accepted the implant size that the surgeon feels is best for minimizing the chances of recurrence.

Both smooth and textured implants can be used. Smooth implants may have some advantages for ease of insertion and a lesser propensity to have palpable folds, but aggressively textured implants may be more likely to remain in place and not migrate out of position. There is no consensus of opinions about this choice, and texturing should be discussed between doctor and patient.

Closure

The deep layer is closed with a waterproof layer of running absorbable sutures, and the remaining layers are closed according to the surgeon's usual preference.

Inframammary Fold Malposition

INCISION PLANNING

1. Although prior vertical or existing scars may be used, similar to other breast revision procedures, the inframammary approach is preferred in most patients. A minimum of a 7-cm-long incision is typical to facilitate exposure and perform the procedure well, particularly if an acellular dermal matrix is used (Fig. 9-20).

Definitions and Semantics

Stretch deformity of the lower pole, giving the appearance of “bottoming out” of the breast, is defined by an increase from a preoperative nipple–inframammary fold (N-IMF) distance to postoperative distance, with the fold remaining in its exact position from the time of the primary operation (Fig. 9-21).

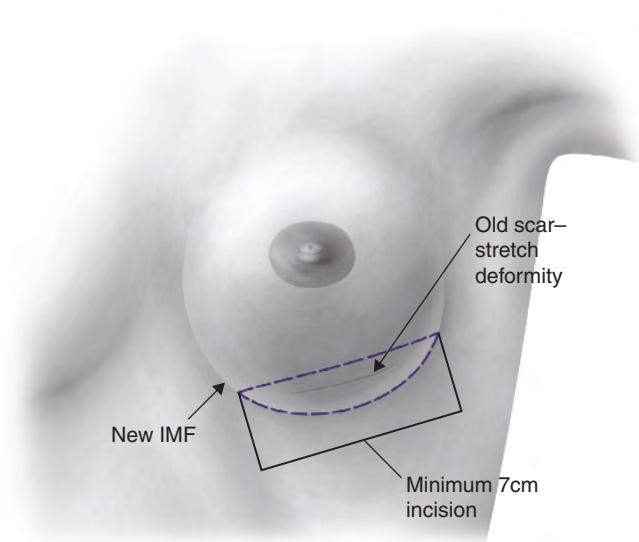


Figure 9-20

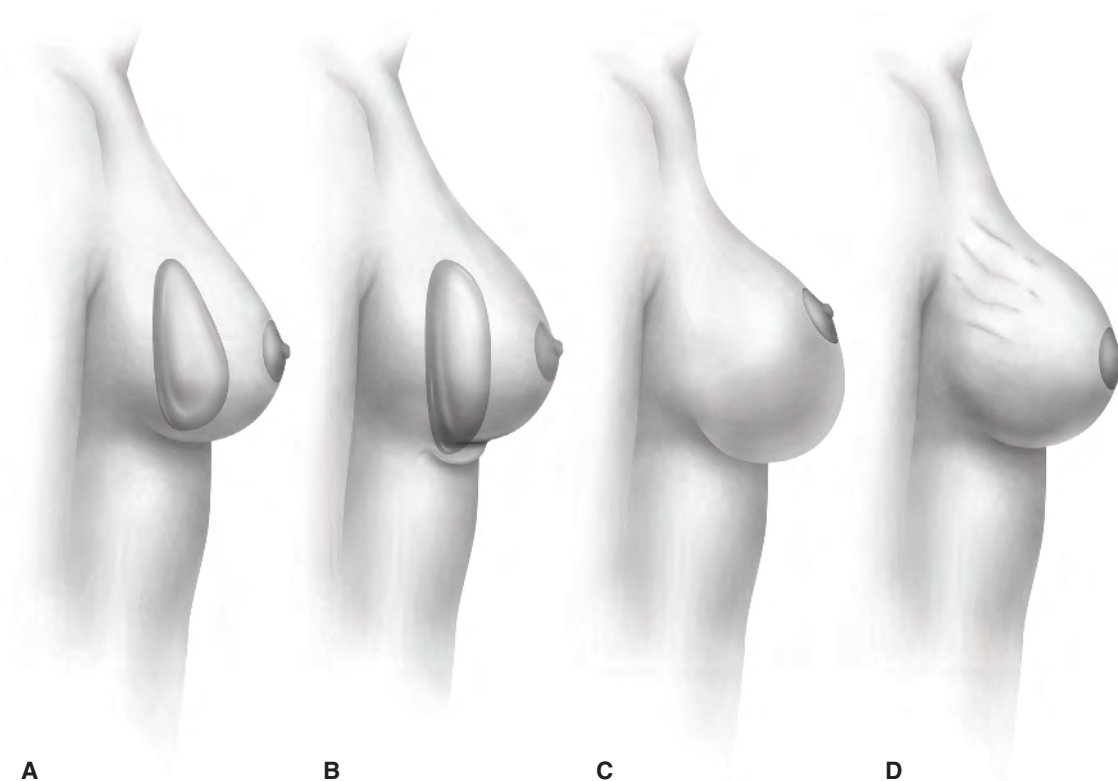


Figure 9-21 A. Normal implant position. B. Fold malposition. C. Lower pole stretch deformity. D. Wrinkling and rippling.

This is different from a fold malposition which occurs when the implant drops down below the initial IMF location that was present preoperatively or set at the first operation. This does result in an increase in the new N-IMF distance; however, the fold itself, where the breast attaches to the chest wall, has dropped and the IMF scar rides up on the lower pole of the breast if an inframammary incision was previously used (Figs. 9-22A–D and 9-23A–D). Both stretch deformity and fold malposition give the breast a “bottoming out” appearance which is why these definitions are preferable and more specific.

2. After defining the exact nature of the deformity, and these key relationships, incision planning is performed to set the final incision in the IMF. The new implant size and shape may also play a part in the new IMF position. These relationships of implant size range and ideal N-IMF have been determined. A minimum length of 7 cm incision is required and this length may be longer if a skin resection is planned. This is confirmed intraoperatively with the skin at maximal stretch (see Fig. 9-20).

INITIAL DISSECTION

1. **Instruments:** Five specialized instruments are recommended for this procedure. These include a double-ended breast retractor, an implant spatula, a fiberoptic nonserrated lighted retractor with smoke evacuation capability, a monopolar hand-switching electrocautery, and a good overhead lighting or fiberoptic headlight (shown prior).
2. **Markings/landmarks:** The incision is made precisely in the planned location of the prior IMF or ideal planned location based upon the new implant to IMF measurement guidelines (Fig. 9-24).
3. The length of the incision is somewhat dependent on the style and size of implant. However, for these revision procedures and in particular when using acellular dermis as a support, reinforcement, or as a hammock or sling internally, the procedure can be likened to operating through a “mail slot.” The greater the visibility, the easier and more efficient the technique (Fig. 9-25A,B).

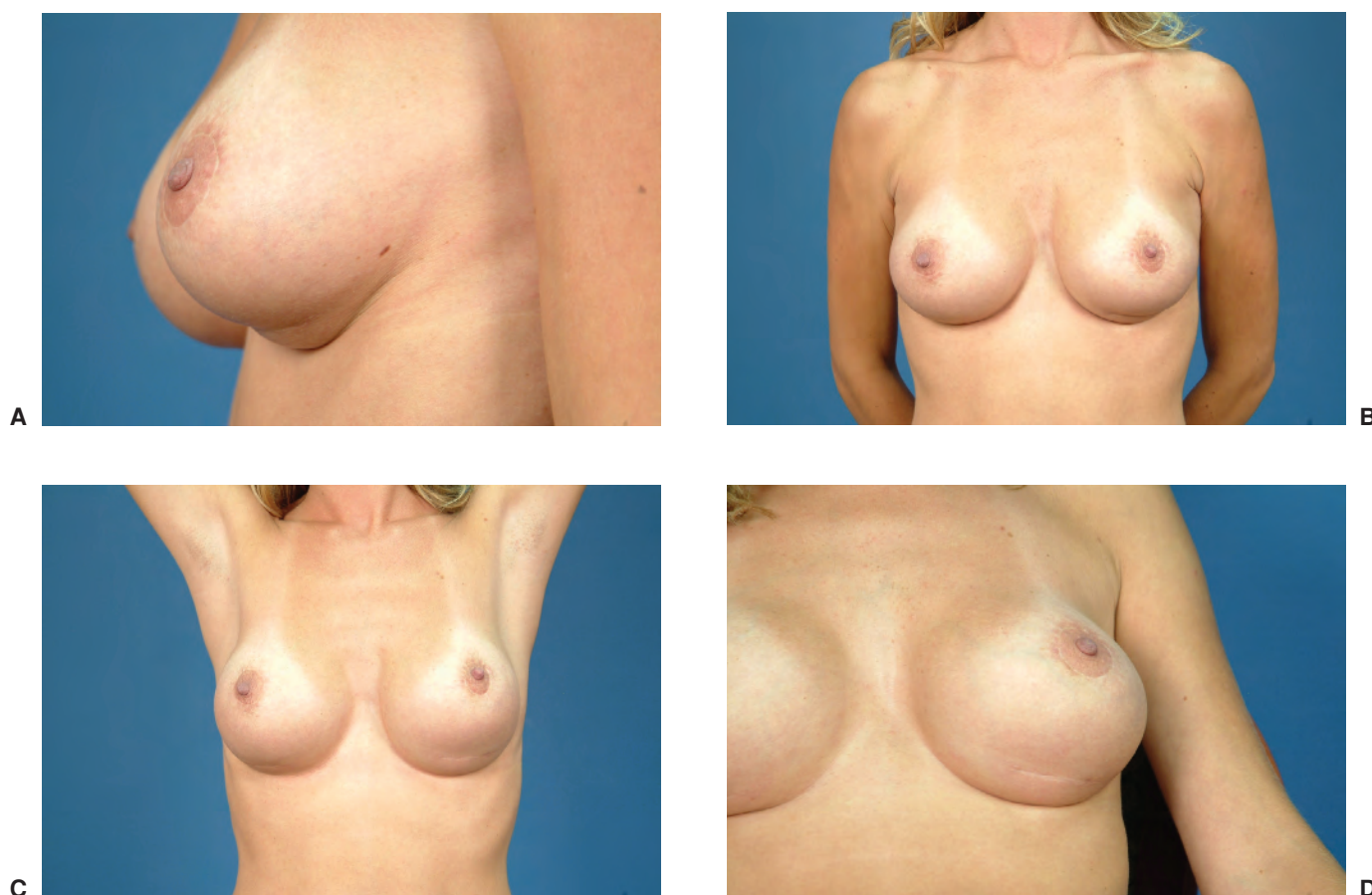


Figure 9-22

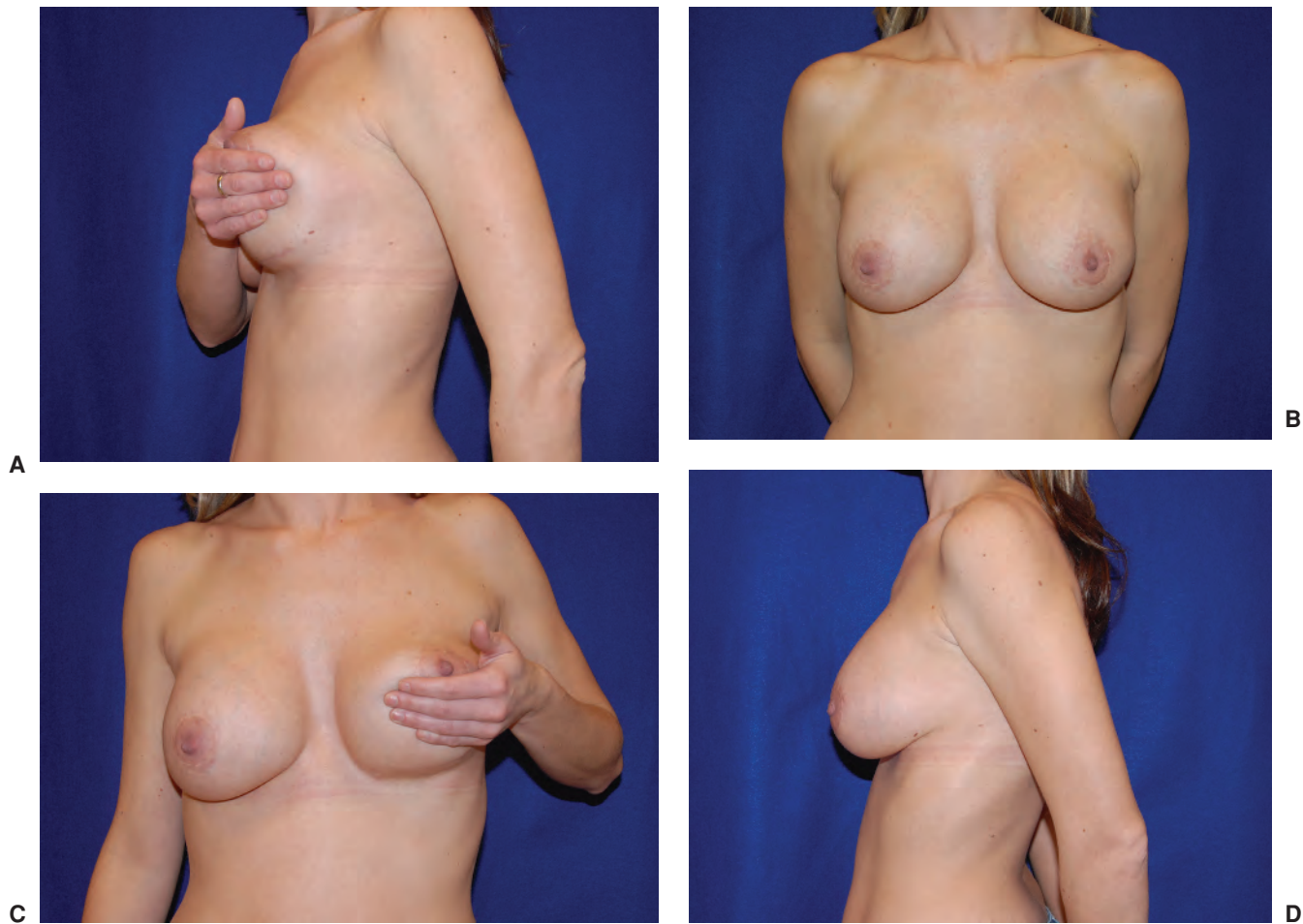


Figure 9-23. Postoperative Photographs

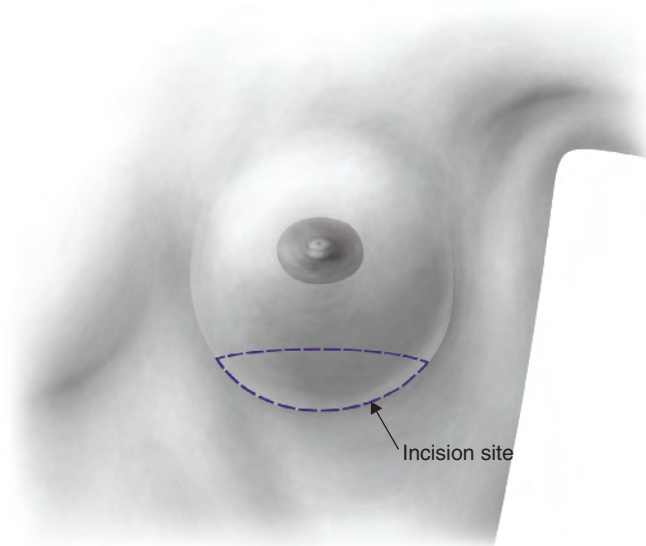


Figure 9-24

4. **Details of procedure:** The skin incision is made and initial dissection is carried through the dermis with electrocautery. Vessels encountered including perforators are prospectively cauterized. Next, with the implant left in position, dissection is carried down to the superficial breast capsule and the inferior extent of the malposed pocket is defined (Fig. 9-26).
5. **Pitfalls:** It is very common when addressing a complication and performing a revision to create a new problem or deformity while trying to correct or enhance another, that is, creating a fold malposition while correcting a capsular contracture. The surgeon must be cognizant of this with great attention to detail to avoid this problem. Accordingly, it is important to do everything we can to avoid another revision for these patients. Standard revisions have a very high recurrence rate, particularly for fold malposition, thus reinforcing the soft tissues with acellular dermis and fine attention to detail may be critical.

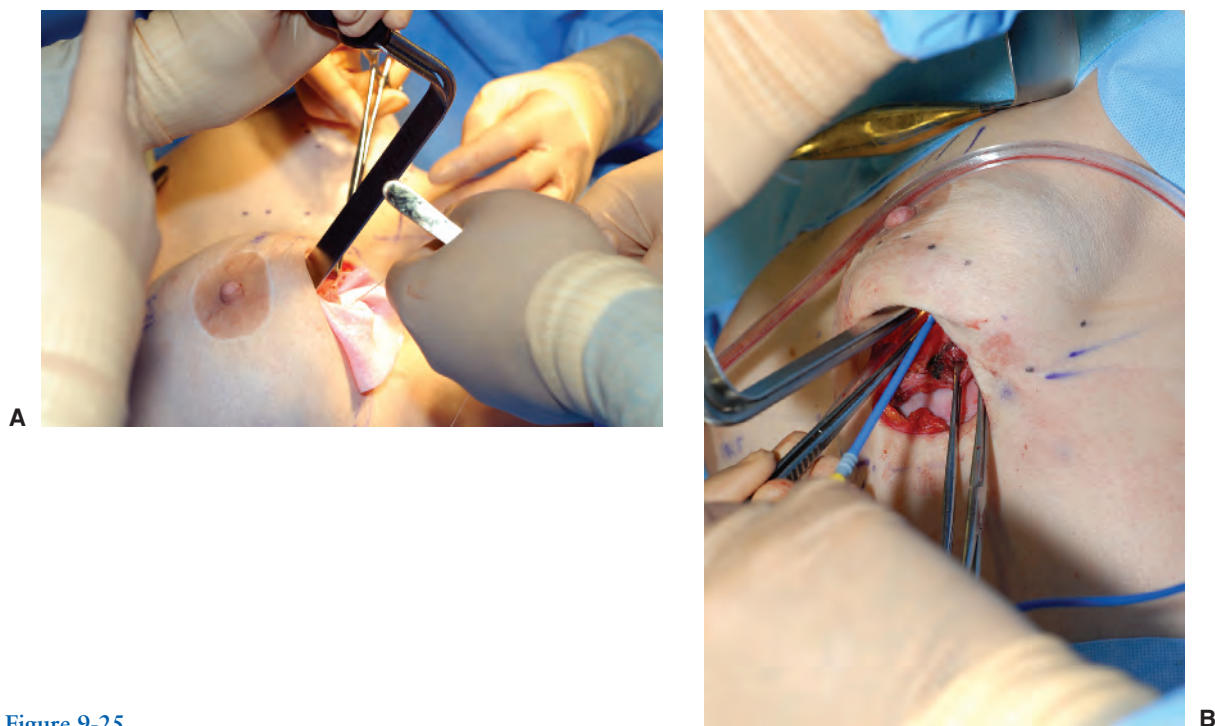


Figure 9-25

Take care to accurately mark the patient in the holding area and then confirm these markings intraoperatively prior to beginning the procedure. Push down on the implant with the patient supine to determine the maximum extent of the fold malposition deformity.

6. **Pearls:** Keeping the implant in position as long as possible initially greatly facilitates the capsular dissection. This is true when dissecting up to define the pectoralis major as well as defining the redundant capsule that has descended below the IMF. In addition, spatula retractor is particularly helpful during this initial dissection.



Figure 9-26

POCKET PREPARATION AND CAPSULAR FLAP DISSECTION

1. The implant is manually displaced cephalad and an approximate level of the new, revised, or planned location of the new IMF is determined and a capsulotomy performed. The free edge of the capsule is left intact, and the redundant lower capsule below the fold is resected to provide fresh virgin tissue.
2. The new location of the IMF may be estimated with the patient in an upright or partial upright position, with her implant or an implant trial in position and the fold marked internally with methylene blue and a 22-gauge needle.
3. If the patient has a concurrent capsular contracture or calcification, or at the surgeon's discretion, the anterior capsule may be resected to the inferior border of the pectoralis major muscle. If this is performed, strong consideration for acellular dermal support should be made, which will further define and support the fold, support the weight of the device to decrease future stretch deformity, in addition to providing additional coverage in the often thinned lower breast pole. If there is no evidence of capsular contraction, capsulotomy at the apex of the pocket may be performed and the vascularized capsule used as an additional layer of support for the device. Dissection is then carried out superficial to the capsule to the lower pectoralis margin, and acellular dermis sewn to the muscle border similar to use

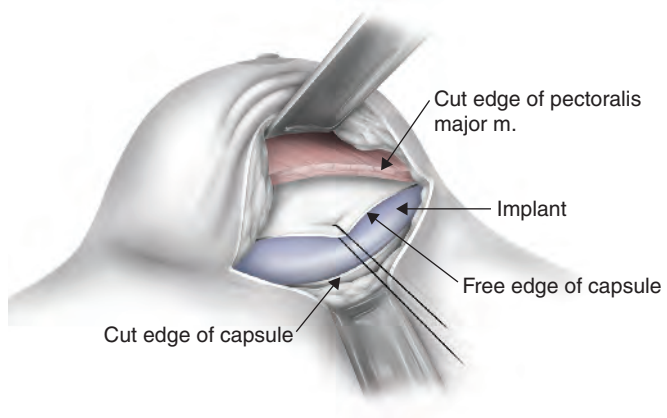


Figure 9-27

of this material in a breast reconstruction model (Figs. 9-27 and 9-28).

4. **Pitfalls:** It may be difficult to properly determine the new “ideal” IMF location. It may take multiple attempts to determine this position. Capsulotomy and capsulectomy may be performed at the incorrect level leaving too much redundancy (not a problem) or shorting, that is, not leaving enough capsule to redrape over the lower pole of the device. It is better to leave too much capsule and make the capsulotomy lower than you estimate initially and just resect more or overlap the tissue swinging it inside the pocket. In

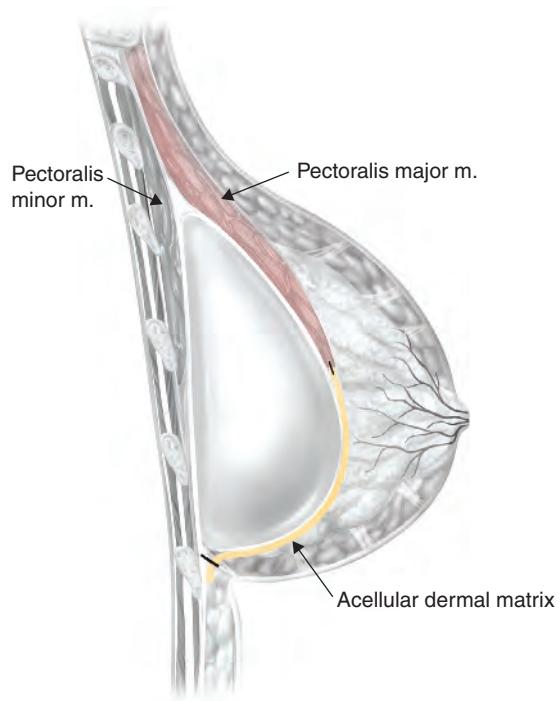


Figure 9-28

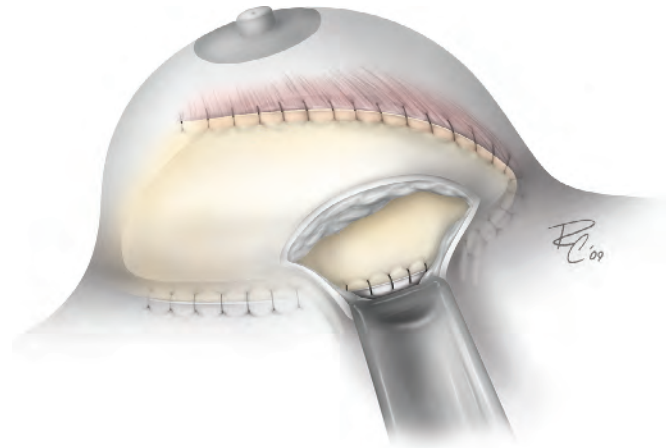


Figure 9-29

addition all acellular dermal materials have different properties. For instance, Strattice is much stiffer, less elastic in comparison to Alloderm, so if this material is used, it should not be overly tight or over-corrected but instead the surgeon should see the final result and implant position in the sitting position intraoperatively (Figs. 9-28 and 9-29).

5. **Pearls:** Try using methylene blue to help you mark and estimate the new IMF position and redefine the fold. Place the final implant or a trial sizer in position and sit the patient up to help determine the new “ideal” fold position. Ideal N-IMF folds may also be estimated preoperatively based on the final implant size chosen, specifically determining the N-IMF distance on stretch.

CAPSULAR FLAP AND ACELLULAR DERMIS SUPPORT INSERTION

1. The capsule, if preserved as an additional layer of support, is then inset into the new IMF location after the final implant is placed. The acellular dermis is inset superficial to the capsular flap and further inset to support the new IMF.
2. Closing off the original redundant pocket in the prior area of fold malposition is then performed, effectively eliminating the prior space. Multiple layer fascial and skin closure is then performed in multiple layers, over a drain which is brought out lateral to the incision. Finally, the patient is positioned upright on the operating table just prior to final closure to assure fold symmetry.
3. **Pitfalls:** If a trial implant or protected final device is not used when suturing this material into position along the pectoralis border, bowstringing or over-tightening creating an overly flat appearance may occur. Some minimal stretch of the material will occur, dependent on the specific type utilized. Damage to the

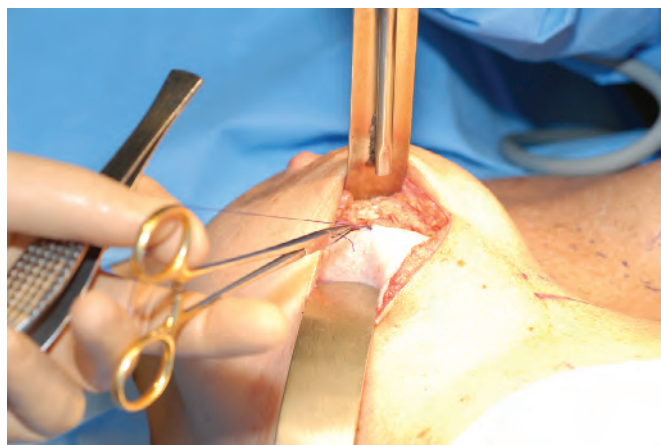


Figure 9-30



Figure 9-31

implant may also occur if not protected and without special attention made at closure.

4. **Pearls:** It is best to inset any acellular dermis an initial the distance as far away as possible from the incision, generally the most medial or most lateral aspect. This can be set up with interrupted sutures placed medially, centrally, and then laterally and then run, or the surgeon may start laterally and run medially (Figs. 9-29, 9-30, and 9-31).

CLOSURE

1. The standard inframammary closure may then be performed in three layers, closing the superficial fas-

cia with a running or interrupted absorbable suture such as 3-0 Vicryl followed by a subdermal 3-0 Monocryl suture and a running 4-0 Monocryl subcuticular suture as described previously. The new 2-0 or 3-0 Monoderm quill suture may also be used subcutaneously in a running two-layer fashion.

2. Wound care: The incision is covered with Steri-Strips or a sterile bandage gel strip that provides epithelial hydration, and a waterproof barrier may be used.

Hyperanimation Deformities

Implants are frequently placed at least partially behind the pectoralis major muscle for good reasons. The greater tissue coverage obscures the borders of the implant, making the breast generally look and feel less obviously augmented. There may be advantages in obscuring implant rippling and reducing the incidence of capsular contraction, and it may help with mammography.

But there can be trade-offs. One of the most annoying for patients is the hyperanimation deformity (Fig. 9-32). It is indeed normal for even the nonoperated breast to

move with the arms and with strong contraction of the pectoralis. Some movement is normal and should therefore be expected with any augmentation behind the muscle. This is something that patients should understand preoperatively, and they should select this pocket choice if the trade-offs are acceptable to them. Studies have shown that with adequate preoperative education and accurate dual-plane surgery.

In some patients, however, the movement can be severe and distorting. It is typically difficult to determine the exact cause, but it may be some combination of a number of factors. Intact or irregularly intact pectoralis origins along the inframammary fold (IMF) can lead to inferior flattening with contraction and superolateral implant movement. Division of the pectoralis off the



Figure 9-32 This patient complains of excessively visibly implant edges and animation deformity on full contraction (D). After placement of Strattice (TM) between pectoralis and inframammary fold, the implant edges are less visible, and the animation deformity is reduced (H.)

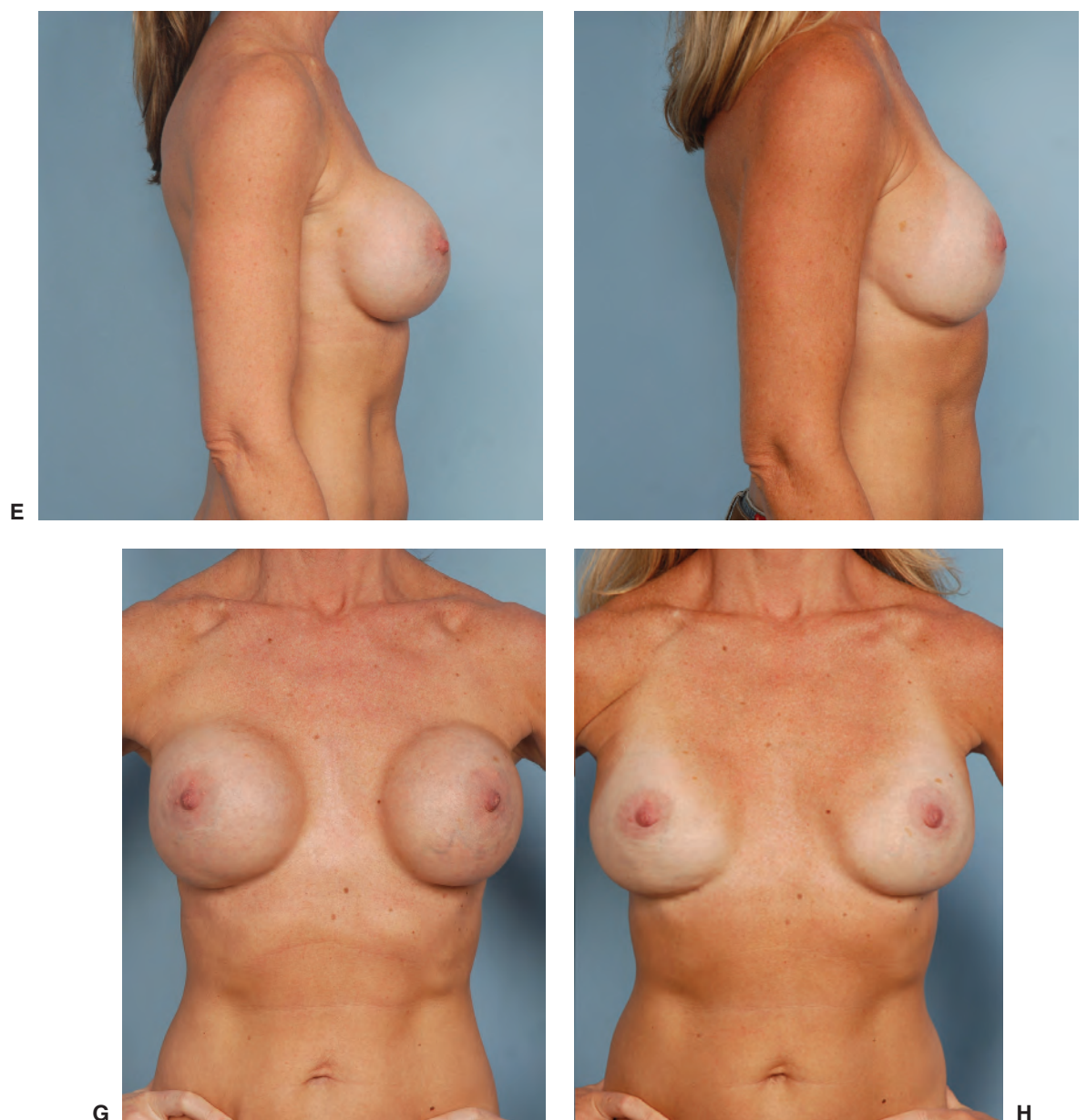


Figure 9-32

sternum, even division one or two interspaces above the medial junction of the IMF with the sternum, can contribute to excessive inferolateral displacement. These patients often have attachment of the caudal cut edge of the pectoralis to the undersurface of the gland, causing an inward pulling of the breast tissues with contraction, which is one of the worst deformities. This type of problem appears to be exaggerated by either planned or inadvertent excessive dissection between the gland and superficial surface of the muscle, thereby allowing the muscle's lower border a greater propensity to slide superior and attach to the deep surface of the gland (Fig. 9-33). The scar that binds the muscle to the gland after dissection does not allow the normal small amount of gliding that occurs in the non-operated breast. This problem is most severe after a

subglandular breast is converted to submuscular, as the entire muscle surface becomes adherent to the deep surface of the gland with scar, thereby preventing sliding between the muscle and gland.

It remains enigmatic that seemingly the same operation can result in significant hyperanimation deformities in one patient and not in another. Certainly, any effects are more notable in the very thin patient, but there must remain other factors that have yet to be formally elucidated.

The simplest solution to end hyperanimation deformities is to switch to a subglandular pocket. But there are many advantages to the submuscular pocket, as stated earlier. And because many patients complaining of hyperanimation have very thin tissue, as a group they often have the most to gain from the use of the submuscular

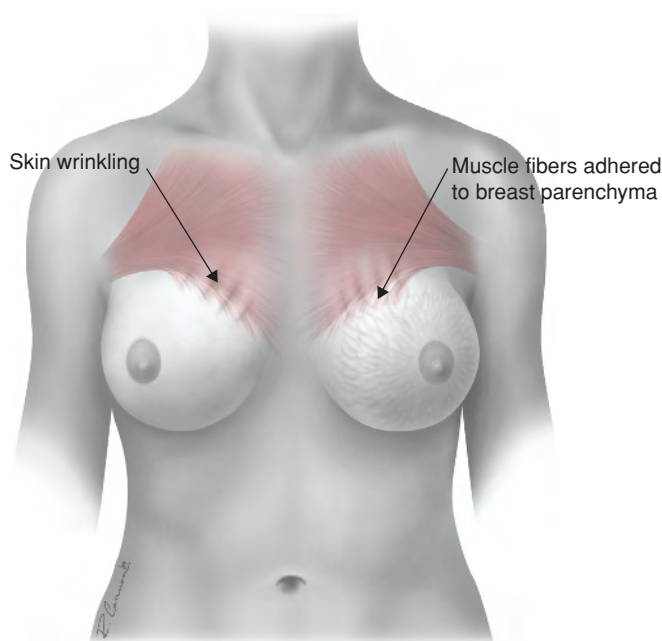


Figure 9-33 Three structures maintain the position of the inferior edge of the pectoralis: the inframammary fold origins, the sternal origins, and the attachments between the pectoralis and overlying gland. The inframammary fold origins are commonly chosen to be released, and slight intentional disruptions of the attachment between muscle and overlying gland are often selectively by conservatively divided. But if these fibers are aggressively divided, or if the patient was ever subglandular, these fibers are no longer able to hold the inferior edge of the pectoralis caudally. Pectoralis origins should never be divided along the alar sternal border. As shown in this illustration, it allows significant superior malposition of the caudal border of the pectoralis and medial implant visibility and traction rippling.

pocket. What was only a deformity under the state of severe contraction can now be a worse deformity of severe implant visibility at all times, even when in repose.

In the case of inferomedial flattening with superolateral displacement due to strong and intact pectoralis origins along the IMF, improvement can usually be made with a release of these fibers. But if these fibers have already been released, and particularly if the muscle is adherent to the overlying gland, something else needs to be done. The use of an acellular dermal matrix to bridge between the caudal edge of muscle and IMF serves as a potent method for solving these problems.

INCISION PLANNING

The surgeon will need wide access to complete this operation, so an inframammary incision is used unless the patient has a very large areola with sufficiently thin parenchyma to allow the surgeon wide and clear visualization and the ability to sew the ADM all along the lower border of the pectoralis and along the IMF.

DISSECTION

Long retractors and long needle holders are essential for this procedure.

1. **Markings/Landmarks:** The existing IMF is marked. If it is malpositioned, a plan should be made to correct it. Every effort should be made to palpate the caudal border of the pectoralis, and dots are placed along the border to trace its outline. By having the patient repeatedly contract and relax, the surgeon should be able to determine if and how far superiorly the pectoralis has been released from the sternum. This space should be drawn out. This should be done during the initial consultation so that the appropriate size of ADM can be ordered (Fig. 9-36). These markings are done again on the morning of surgery to aid in surgical planning.
2. **Details of Procedure:** Make a partial thickness incision along the superior border of the old inframammary scar and dissect full thickness down to the capsule through an incision along the lower edge of the scar (the upper edge of the incision often gets abraded with retractors during this procedure), so use the scar to protect the edge; in the absence of a previous inframammary scar, make one at the appropriate distance from the nipple according to the implant size (eg, 200 cc, 7 cm; 300 cc, 8 cm; 400 cc, 9 cm) in the deepest recess of the IMF.

Carry dissection down to the capsule. Begin a pre-capsular dissection as if you were going to perform a capsulectomy. Continue the dissection up until you reach the entire extent of the caudal border of the muscle. Dissect between the muscle and overlying gland just enough to free up the end of the muscle (Fig. 9-34A–B) this is no more than several centimetres.

Remove the capsule you have now freed up from the lower pole of the implant (Fig. 9-37). The implant is removed. Irrigate with Adams solution and stop all bleeding with electrocautery.

Gloves are changed and the ADM is brought onto the field. Leave it large as it is easiest to trim it later. Lifecell now makes Strattice in three sizes of pre-cut elliptical shapes that are often ideal with little or no trimming necessary. Draw on the skin the location of the caudal border of the pectoralis major muscle, and join this line with the inframammary fold. This will approximate the gap between muscle and fold that the acellular dermal matrix will bridge. There are many methods to sew this in place. One way is to rotate the ADM clockwise and counter-clockwise until it best fits your drawing of the defect. In the worst cases of animation deformity, the muscle may have been divided two or more interspaces along the sternum, so that the medial apex of the gap is not



Figure 9-34 Dissect for just a centimeter or so along the superficial surface of the muscle so that the ADM can overlap the muscle, so that the free edge of the muscle cannot scar up to the overlying gland.

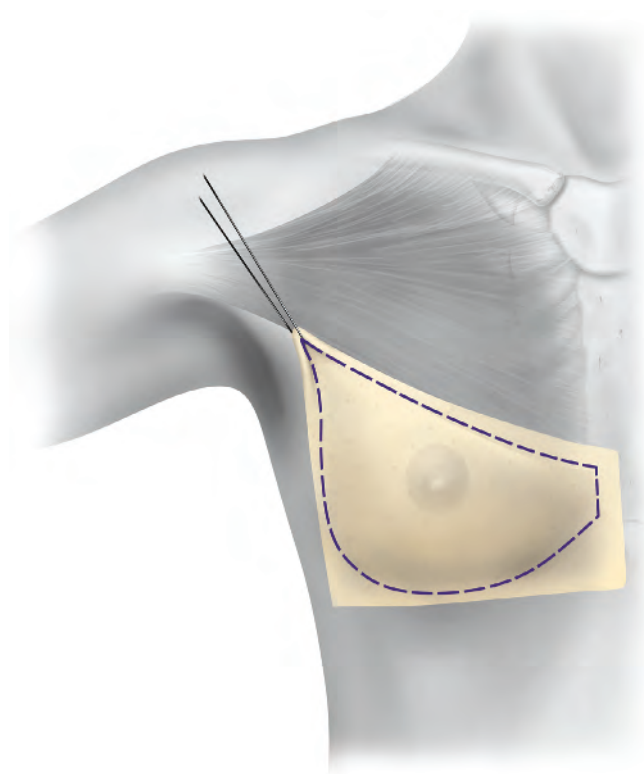


Figure 9-35



Figure 9-36 A trapezoidal sheet of ADM is shown overlying the defect marked with dotted lines. In this drawing, there is about one interspace of division of pectoralis off of the sternum. If the muscle is higher up, there will be a longer vertical component to fill along the sternum, and if it was not divided off of the sternum, the muscle will meet the pectoralis at an apex.

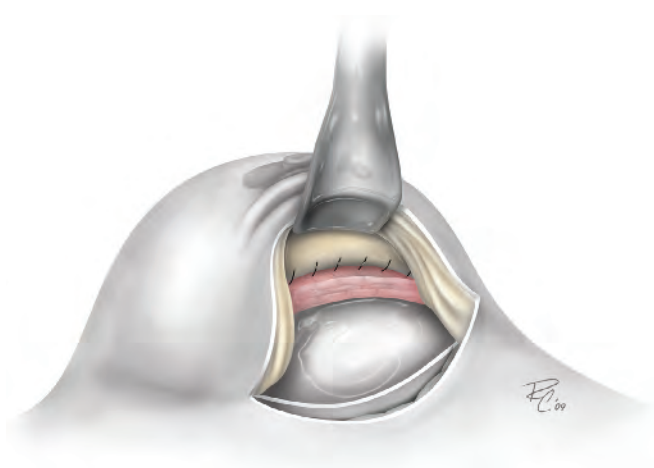


Figure 9-37 The ADM overlaps the edge of the pectoralis muscle so that the muscle cannot scar up to the overlying gland.

an apex, but rather is the vertical distance along the lateral sternum between the IMF inferiorly and the last fibers of the pectoralis muscle left intact superiorly. Internal rotation of the ADM is helpful in these cases. Then draw lines radiating from the edges of the ADM out on to the skin surface. Place silk stay sutures at each of these marks on the ADM, and pull the suture from inside the patient to exit by the corresponding hatch mark on the skin surface. Be sure that the sutures do not go through the muscle, but go between muscle and gland, so that when the sutures are pulled up, it brings the ADM into the body overlapping the inferior edge of the pectoralis muscle. Start tacking this into place with interrupted sutures, stopping occasionally to place in a sizer. Expect to remove and replace sutures in order to get the ADM to lay smoothly. While you are doing this, be sure that the ADM has enough height to be successful sewn along the IM without flattening out the lower pole of the implant. If you will need a larger piece, it

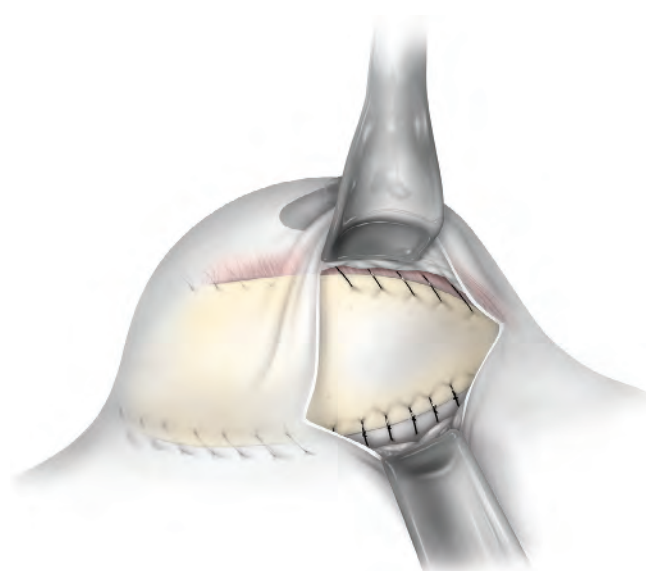


Figure 9-38 This drawing shows the gap between muscle and inframammary fold being closed far laterally. Usually, however, there is not enough ADM to completely cover the implant this far laterally. Improvement of animation deformity does not require significant lateral coverage.

is better to realize this now than after sewing it in. (Fig. 9-38). The sizer is then replaced and these sutures continue along the inferior edge as it is trimmed. There is a tendency to over trim to make everything look too smooth, but then when the patient stands up, the lower pole can be too tight.

Complete the closure until you have just as much opening left as is necessary to remove the sizer and place the final implant. Remove the sizer, again irrigate with Adam's solution and check for hemostasis, and place a drain. Change gloves, place in the new implant that has been soaked in triple antibiotic solution, and finish the final closure of the pocket with great care to avoid damage to the implant.

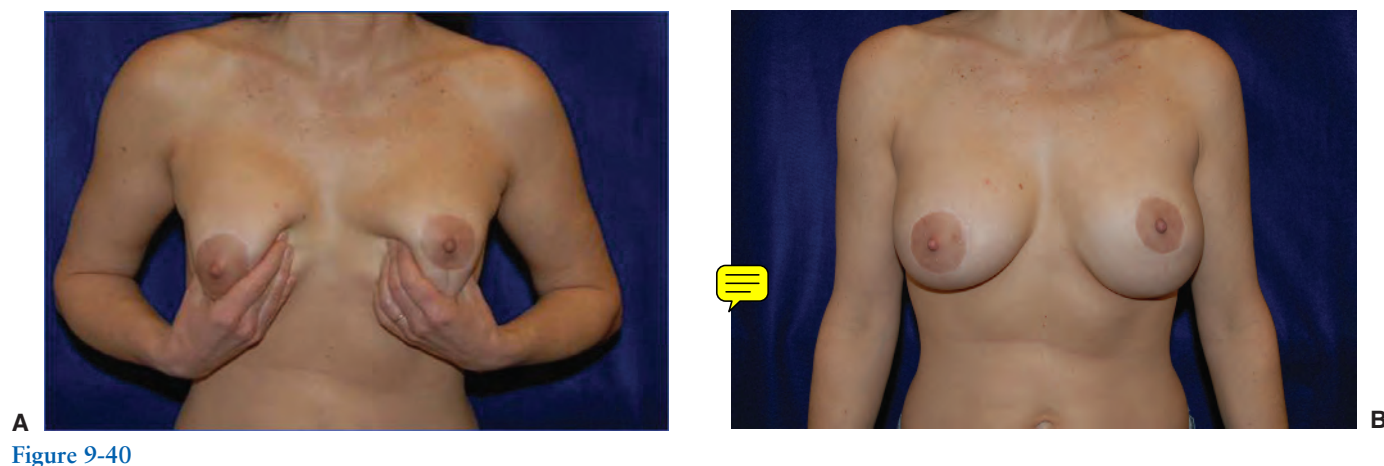


A



B

Figure 9-39



A
Figure 9-40

3. **Pitfalls:** The most conspicuous pitfall is failing to meet patient objectives for the procedure. Even in the most successful operation to correct hyperanimation deformities, some motion will exist. Patients must be prepared for this preoperatively. In addition, this is an extensive operation that brings with it the potential for new problems, such as asymmetry in IMF height and lower pole fill as a result of the size/location/tightness/integration of the graft. Other complications specifically of the graft such as infection and even its cost must be considered.

Technically, it is easy to place the graft too tight if it is sewn in without a sizer under it; however, with the sizer under it, it is often difficult to see where to put the sutures, and even the sizer can be easily damaged. Therefore, one must be ready to frequently introduce and remove a sizer, assuring that the ADM can adequately expand to accommodate the implant until the surgeon develops a good understanding of the interaction of the ADM and the surrounding breast tissues.

Seroma formation is a recognized complication with ADM, but the incidence can be reduced if drains are left in until output is low.

4. **Pearls:** Because the graft material is expensive, it is tempting to order a smaller piece. But be sure to have

larger pieces on hand in case the muscle is pulled higher than you had anticipated preoperatively.

Make frequent use of the sizer while determining how exactly to fit the ADM into the pocket.

Document clearly preoperatively that the patient understands that there will remain some postoperative animation and that she preferred this to creation of a submammary pocket.

IMPLANT CONSIDERATIONS

There is disagreement as to which implant works the best in this situation. Some surgeons prefer a smooth implant that will be malleable and mobile underneath the contracting muscle. Others prefer a textured implant, particularly a highly cohesive one with an aggressively textured surface, so that it stays in place and mostly resists the deforming effects of muscle contracture.

CLOSURE

Given the presence of a foreign body and the risk of seroma formation, a running, watertight deep closure should be made, followed by closure of the fascia and skin with the surgeon's preferred method.