Breast Augmentation Using an Inframammary Incision

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Augmentation mammaplasty with cohesive gel implants provides a stable and precise method for breast reshaping. Although several surgical approaches are available for implant insertion, the inframammary approach has decided benefits. This incision allows access for manipulating the fascia and musculature and affords an excellent view of the implant pocket to achieve hemostasis and ensure proper implant positioning before closure. An inframammary fold incision also permits the use of implants of all sizes and shapes.

INCISION PLACEMENT

The distance from the new inframammary fold position to the border of the areola has to be measured and taken into consideration when the inframammary incision is chosen. Because the fold will move downward when the breast volume increases, the incision line must be located at the future position of the fold so that the scar will be hidden.

RETROGLANDULAR OR RETROPECTORAL IMPLANTATION

Both retroglandular and retropectoral placement of an implant can be easily achieved through an inframammary incision line. Patients desire a well-hidden implant; therefore the surgeon must decide whether, with retroglandular positioning, there will be sufficient overlying tissue to hide the implant. If a pinch test reveals 2 cm of tissue thickness, the implant may be placed retroglandularly to create a natural-seeming breast, because tissue is replaced where it is lacking.

Retropectoral placement leads to a volume gain under the pectoralis muscle, which is less natural but nevertheless mandatory if the patient is very thin and the implant cannot be hidden under breast tissue. Although creating a retroglandular pocket is fairly painless and associated with reduced bleeding, the retropectoral implantation needs greater surgical intervention in the anatomic structures, because the pectoralis muscle must be released from its origin on the sternum. Dissection of the muscle may lead to a higher incidence of bleeding and greater postoperative pain.

The historical advice to massage the implant is no longer valid, because cohesive gel implants may have a textured surface that may allow ingrowth of tissue. Massage would be counterproductive to this process. The complication of implants moving caudally to

create a double-bubble phenomenon occurs only in retropectoral implants. If the pectoralis major muscle is not adequately released from its origin on the sternum, the breast can show deformities when the muscle is activated, especially in athletic women.

PATIENT EVALUATION
Anatomic Considerations

Breast aesthetics is dependent on the size and shape of the breasts, as well as their relationship to the body, thorax, and hips. When performing augmentation mammaplasty it is essential to keep these relationships in mind. They will influence the size, shape, and placement of the implants. For example, thoracic deformities can make it necessary to choose different implant sizes for each breast. To help determine the proper placement choice for an implant, whether retroglandular or subpectoral, the breast tissue is examined above the areola with a pinch test. A thickness of two fingers allows placement over the muscle.

In some patients the surgeon will find challenges such as the following:

- Anorexic patients with an extremely thin layer of tissue covering the implant that will likely exhibit implant edges
- Androgynous patients or intense body-builders with hypertrophic pectoralis muscles and no underlying fatty tissue
- Asymmetry because of rippling
- Patients who want bigger implants
- Patients with deformities caused by capsular contracture
- Patients in whom an implant had to be temporarily removed because of infection

PLANNING
Measurements

The following measurements must be taken (with the skin stretched):

- The jugulum-areola distance (assuming a typical areola diameter of 4.5 cm)
- The width of the breast
- The areola–inframammary fold distance, which generally requires a mastopexy if the distance is more than 7 cm

The distances measured and the volume and shape of the original breast dictate the shape and size of implant chosen. For example, a breast width of 10 cm will need an implant 10 cm wide. A wider implant will result in deformity.

Markings

Preoperative planning and marking are performed with the patient in a standing position or in a sitting position on the OR table (Fig. 1).

First the midline of the thorax is marked. The inframammary folds and the contours of each entire breast are marked using the other hand to gently shift the breast tissue to the skin borders (Fig. 2).

The distances between the jugulum and the areola and between the areola and the inframammary fold are compared on each side (Fig. 3). A bra cup size of B requires a distance of 5 cm from the areola to the inframammary fold, C needs 5.5 to 6 cm, and D needs up to 7 cm and a possible periareolar mastopexy after augmentation. This means that the inframammary fold will shift downward when the breast volume increases.

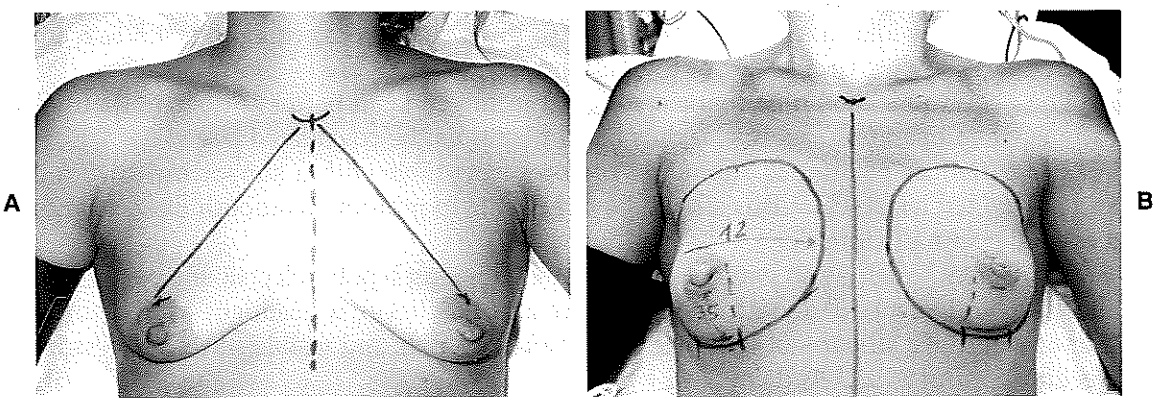

FIG. 1 **A,** The jugulum-areola distance is marked to determine possible ptosis. Here the distance is 19 cm, which is within the normal range. The middle of the thorax is also marked. **B,** Begin marking with the patient asleep in the sitting position. The contour of the breast is marked to determine the implant borders.

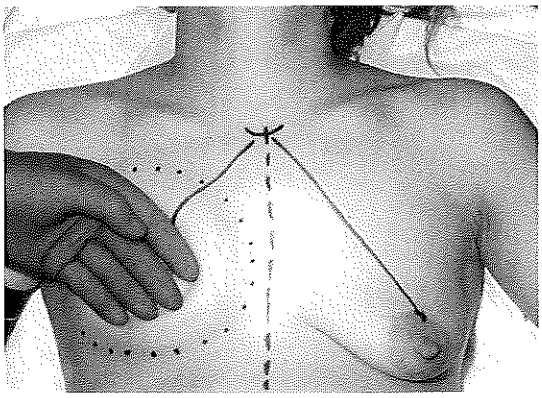

FIG. 2 The breast is shifted to the sides to determine the borders of the breast. This is especially useful with very small breasts. Note the markings indicating the borders.

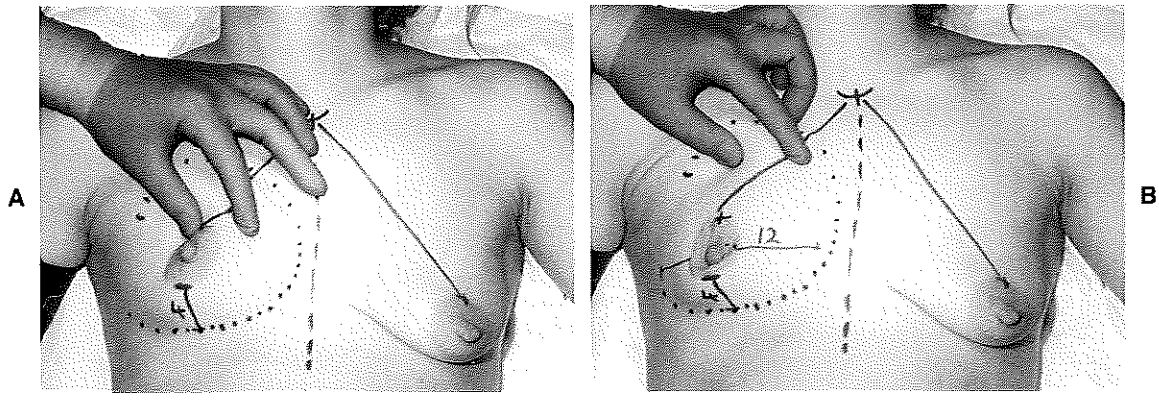

FIG. 3 **A,** The distance between the inframammary fold and the areola complex is shown, which is 4 cm in this patient. **B,** The breast width in this patient is 12 cm. This measurement is important in helping choose the right implant width. The implant width should be no more than 0.5 cm less than the breast width.

The incision line is marked in the newly planned inframammary fold. It must be determined exactly so that it will be hidden in the new fold. The incision begins at the point on the new fold that vertically aligns with the medial areola rim and is 4.5 to 5 cm in length, depending on the size of the implant (Fig. 4).

The perforators should be marked so that the surgeon can better anticipate their locations when operating, because if they bleed they must be coagulated (Fig. 5).

The patient is positioned supine on the operating table with a supporting knee roll and cushioned heels. Her arms should be at her side to promote a smooth dissection to a relaxed pectoralis muscle.

Instruments such as an extended Bovie tip and a long bipolar electric forceps for coagulation will ensure a smooth operative course. In addition, a headlight or lighted retractor will make all parts of the implant pocket accessible and visible so that necessary bleeding control is achieved effectively.

Injecting anesthesia with adrenaline in the incision line helps minimize bleeding during creation of the pocket. Sometimes it is useful to inject approximately 100 cc of tumescent solution to facilitate creation of the pocket.

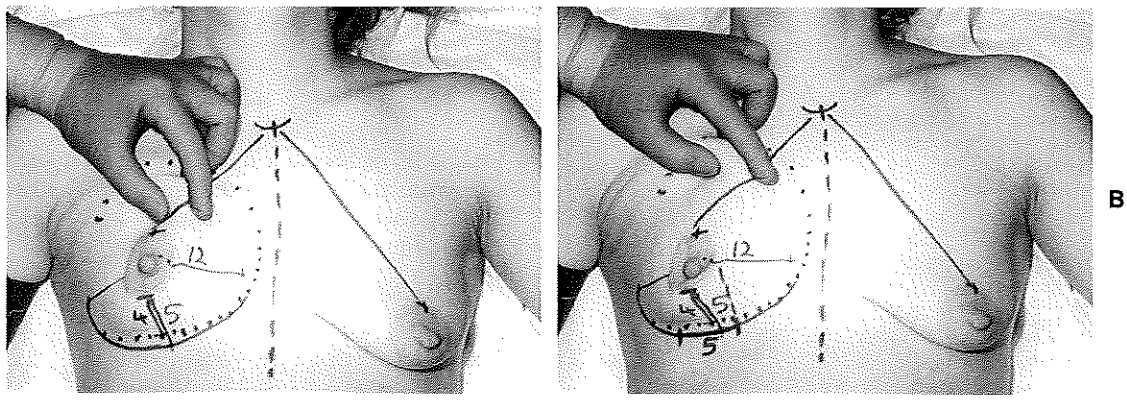

FIG. 4 **A,** The new inframammary fold is marked at 5 cm. **B,** A 5 cm inframammary incision is marked.

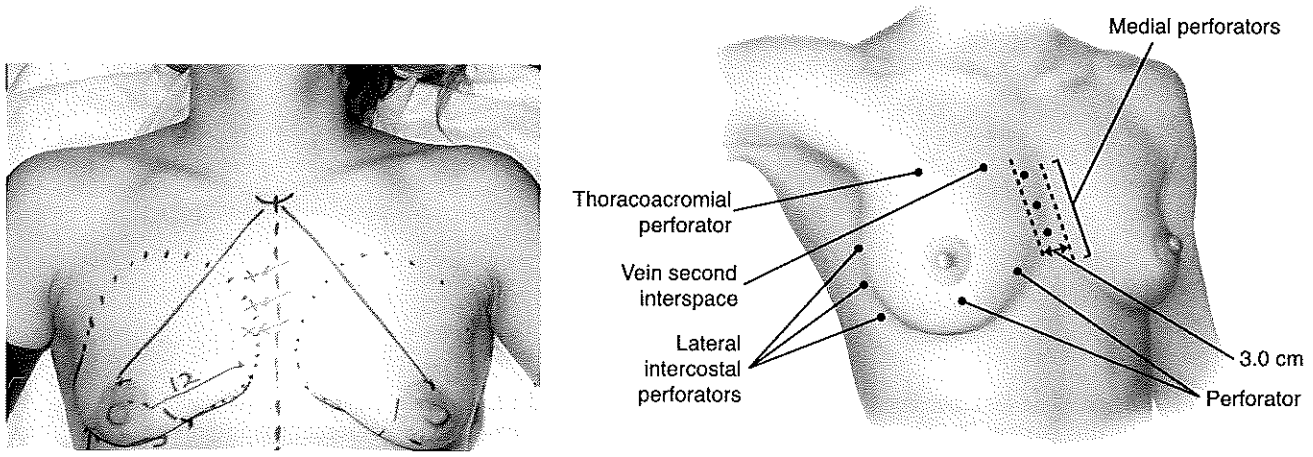

FIG. 5 The most important and consistent perforators are marked.

SURGICAL TECHNIQUE

The skin incision is made with a No. 15 blade. Sharp dissection of the subcutaneous tissue continues with the 15 blade or a cautery blade until the fascia of the thorax is encountered and the border of the breast tissue and muscle is revealed. When the edge of the muscle is clearly identified, the pocket is developed either retroglandularly or subpectorally. Blunt dissection with the index finger helps reduce bleeding because the vessels contract by intimal spasm. Fibrotic fibers are dissected sharply with the cautery blade and with the help of a headlight. The pocket is created so that it precisely follows the preoperative markings of the borders of the breast. To check the created pocket, the surgeon's index and middle fingers can be used to seal the incision and hold air in the pocket. The ballooned pocket will exhibit every irregularity and provide the surgeon with guidance for more precise dissection.

Care should be taken not to dissect too much on the lateral border of the breast (Fig. 6). The cranial border should be 1 to 2 cm longer than the implant to avoid kinking the implant, which creates a deformed breast with a visible edge. The size of the pocket should be slightly larger than the implant to avoid wrinkles but not large enough to cause rotation and shifting of the implant. A sizer implant is useful if the patient has two different breast shapes or volumes or if the size is not easily determined during preoperative planning.

Bleeding is controlled with bipolar forceps; moist towels are placed in the pocket and the other pocket is created. When the towels are removed they will reveal any residual bleeders.

A 10- to 12-gauge drain is recommended and is mandatory for a secondary implant exchange. It is placed laterocranially in the axilla in the caudal border of the pocket extending into the region of the sternum. The wound is irrigated with a minimum of 200 ml Ringer's lactate solution, and there should be no residual bleeding.

If a subpectoral pocket is necessary, the rim of the muscle should be identified and digitally dissected to the border of the sternum. Here the muscle has to be dissected sharply from the medial border until the height of the areola is reached. The complete dissection can be checked again digitally and should show subcutaneous fat. The borders of the implant pocket can be dissected accordingly.

If the implant is to be completely covered with muscle, the dissection needs to begin in the region of the lateral border of the serratus anterior muscle above the sixth rib. The incision is made there and the muscle is dissected. The cranial border of the muscle is elevated with forceps, and the muscle is elevated using scissors. At the beginning of the fifth rib a digital dissection can be performed to create the pocket.

Implantation is performed with the "no-touch" technique. During this procedure the surgeon changes gloves, and the scrub nurse passes the implant in its inner package

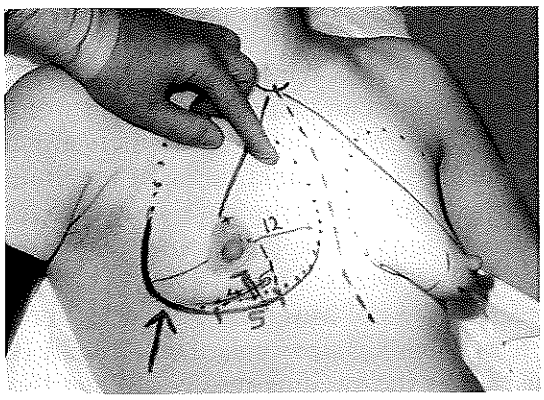

FIG. 6 It is especially important to maintain the lateral border, otherwise the implant can be displaced laterally toward the latissimus border.

without touching it. Povidone-iodine solution is poured over the implant and the incision lines are again cleaned with povidone-iodine solution. The retractor is also bathed in povidone-iodine solution before holding the wound open. The implant is inserted into a sterile plastic bag to avoid skin contact and pushed into the pocket while constantly controlling its position. The drain, not yet connected, eases the insertion by letting air out of the pocket. The exact position of the anatomic implant can be determined by the marking point on the implant. The surgeon's index finger is used to straighten the implant, correcting any folds and checking that the implant pocket is the right size. If the pocket is too small, then a retractor must be used to move the implant aside while the pocket is cut larger. If the pocket is too large, then the implant must be removed, and the pocket must be made smaller using nonresorbable stitches.

After the second implant is inserted, the patient is placed in an upright position and the surgeon checks breast symmetry from the side and front. In most cases further correction can be performed bluntly with a finger while protecting the implant with a spatula.

Each pocket is closed in three layers. A 3-0 Monocryl suture is used to close the thoracic fascia and the fascia of the breast tissue at the height of the new inframammary fold to avoid future ptosis. Subcutaneous closure is done with intracutaneous 4-0 Monocryl, which is used to close the superficial layers.

The incision line is covered with tape, and the drains are connected to an evacuation bottle. A sports bra is applied, and an additional supporting strap is fitted on the upper pole of the breast to hold the implant in position.

A perioperative antibiotic is useful in some cases but is not mandatory (in Germany).

Postoperative Care

The patient can remove the tape by herself after 5 days. The sutures are absorbable and do not have to be removed. The drains can be removed if less than 30 ml of drainage is evident in a 24-hour period. This helps prevent hematomas, seromas, and future capsular contracture. A sports bra is worn for 6 weeks, and the supportive strap is worn for 2 weeks. Normal daily activities can be resumed in 8 days.

Follow-Up

The patient receives an implant identification card with all significant information about the surgery and the implants used. The surgeon should register the procedure in a national or an international implant survey. A follow-up visit is recommended 3 months postoperatively and then yearly so changes can be detected promptly.

COMPLICATIONS

Immediate complications include pain, hematoma, and wound infection. To treat pain, ibuprofen is usually sufficient. A hematoma usually will occur within 24 hours of surgery (a 24-hour clinic stay is therefore recommended), and immediate surgical intervention should follow. A compression garment is helpful in cases of rapid filling of the drain when an open vessel lies directly next to the drainage tube; interrupting the vacuum for a few hours is also useful. A wound infection usually requires explantation. A secondary implantation must be delayed for a minimum of 6 to 8 weeks.

Delayed complications include an uncorrectable loss of sensation caused by nerve damage, usually on the lateral border of the breast. A wrong-size implant will usually be revealed when the patient sees her new breasts after the swelling resolves. When this

occurs, most patients will ask for a bigger implant. This situation arises when preoperative discussion of implant choices with the patient has been inadequate.

Late complications include incorrect implant positioning, breast deformities, implant rippling, and capsular contracture. Slow upward movement of a subpectoral implant can occur because muscle contracture forces the lower pole of the implant upward. Visible folds and wrinkles on the skin are most often seen with soft, underfilled implants as tissue heals into the textured surfaces and pulls on overlying skin. The implant should be changed in such a case or when a painful contracture of grade 3 or 4 occurs.

CASE STUDIES

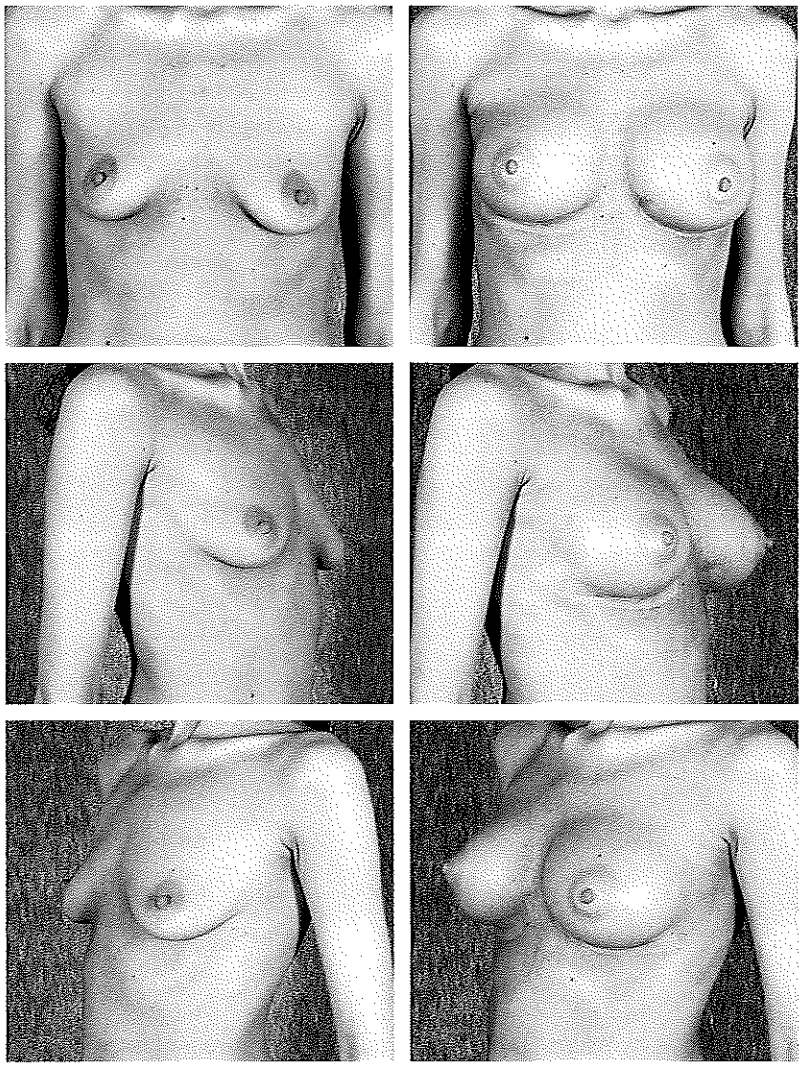

FIG. 7

This 25-year-old woman requested breast augmentation to treat atrophy after pregnancy and breast-feeding. Her breasts were augmented with 320 cc anatomic cohesive gel implants placed through an inframammary incision in the subglandular position. She is shown 3 months postoperatively.

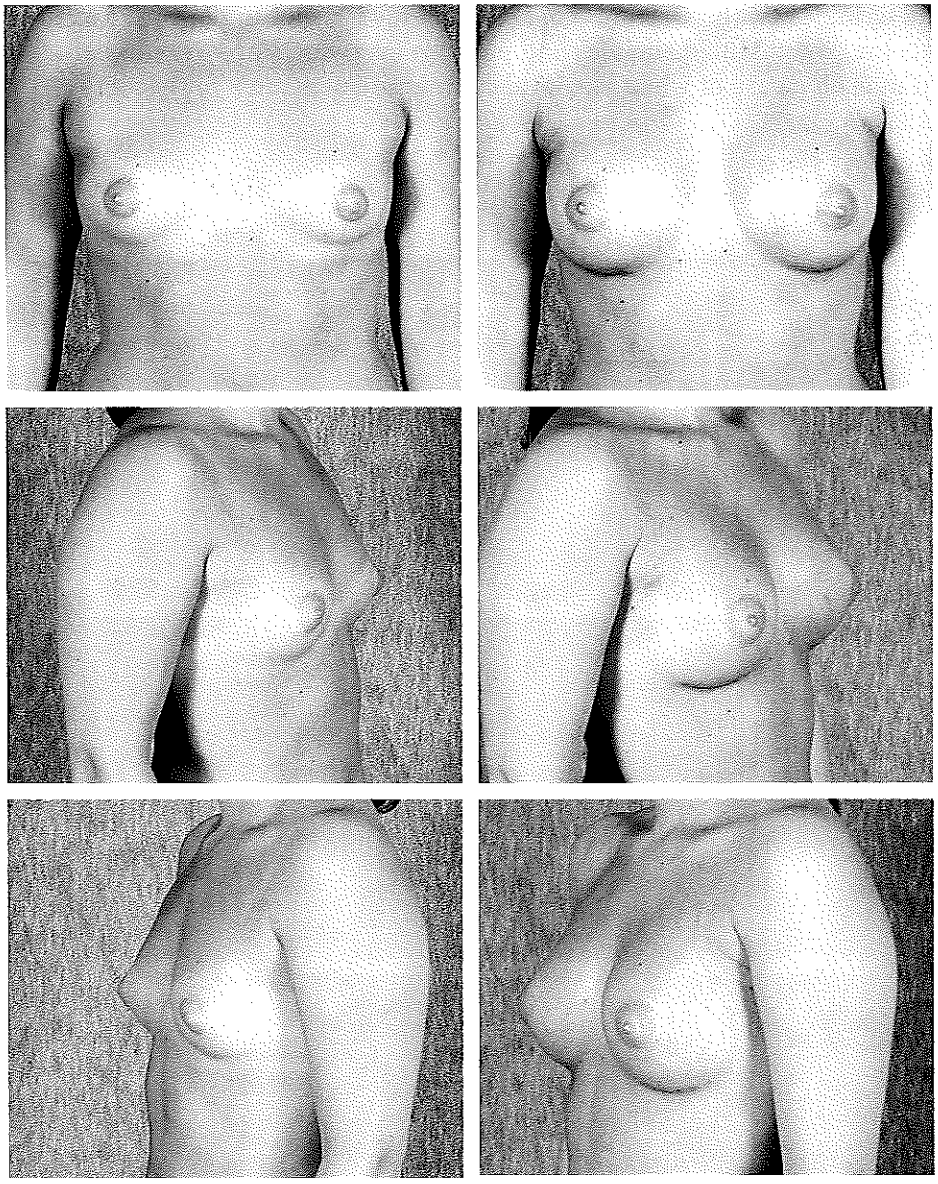

FIG. 8

This young nulliparous woman had micromastia. Her breasts were augmented with 215 cc medium height, anatomic, cohesive gel implants. She is shown 1 month postoperatively.

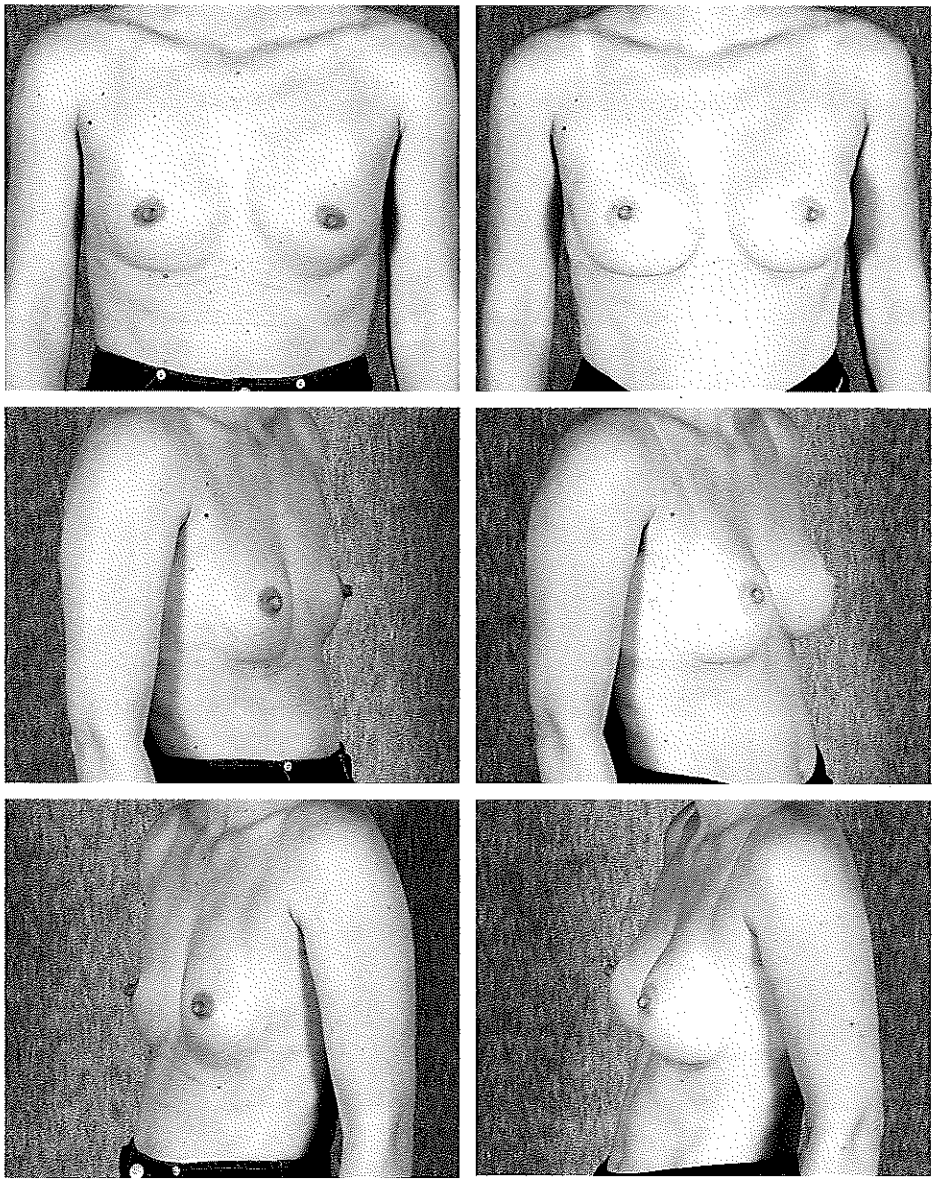

FIG. 9

This 35-year-old woman had micromastia. She had three children but had not breast-fed. Her breasts were augmented with 215 cc anatomic cohesive gel implants. She is shown 3 months postoperatively.

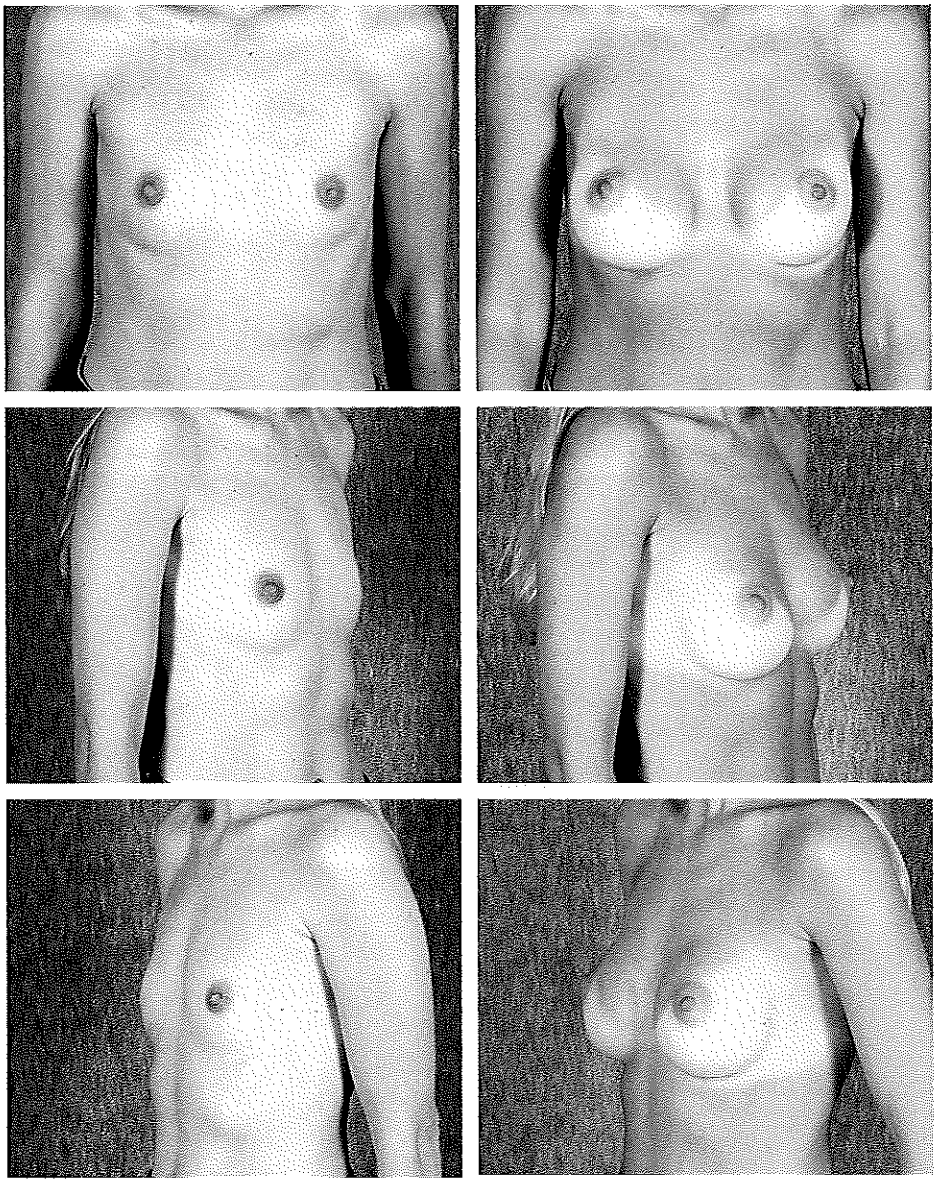

FIG. 10

After one pregnancy and breast-feeding her baby, this 31-year-old patient exhibited signs of micromastia and requested augmentation to achieve larger, fuller breasts. Her breasts were augmented with 245 cc anatomic cohesive gel implants, and she is shown 3 months postoperatively.

The following series of patients demonstrates longer-term follow-up after augmentation using cohesive gel implants. Note how well results have held up over time; the breasts appear soft and symmetrical.

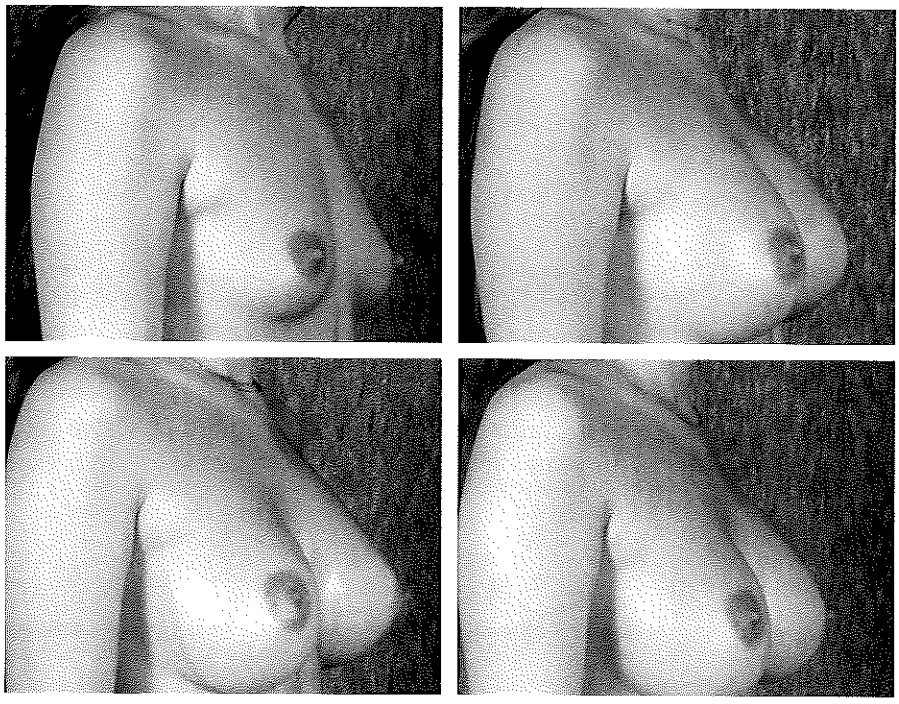

FIG. 11

This patient was 31 years of age when she requested augmentation mammaplasty. Her breasts were augmented with 315 cc cohesive gel implants placed prepectorally. She is shown before surgery and at 5 months, 7 months, and 2 years after surgery.

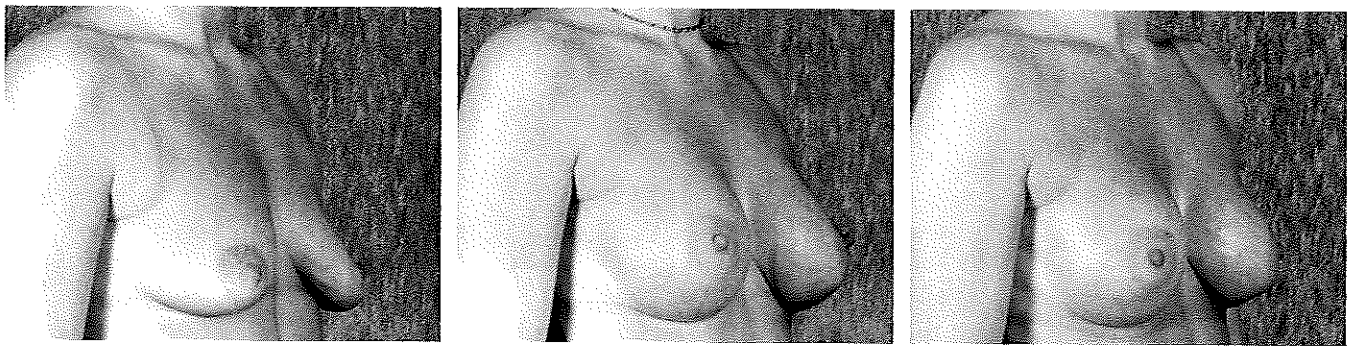

FIG. 12

This 43-year-old patient had bilateral prepectoral augmentation with 280 cc cohesive gel implants. She is shown preoperatively and at 10 months and 4 years postoperatively.

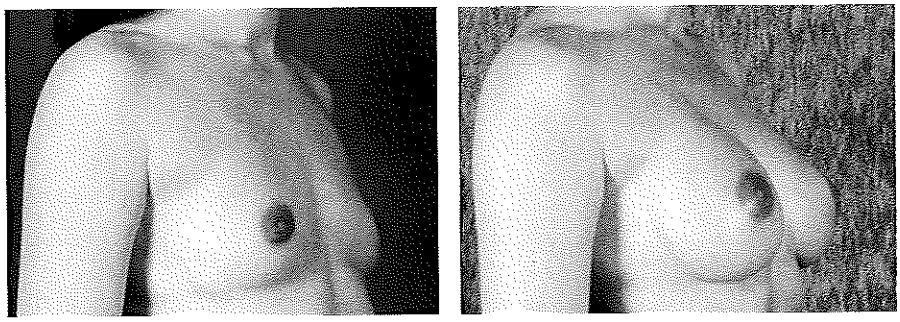

FIG. 13

This patient is shown before and 5 years after augmentation with cohesive gel implants placed prepectorally. She was 35 years old at the time of surgery.

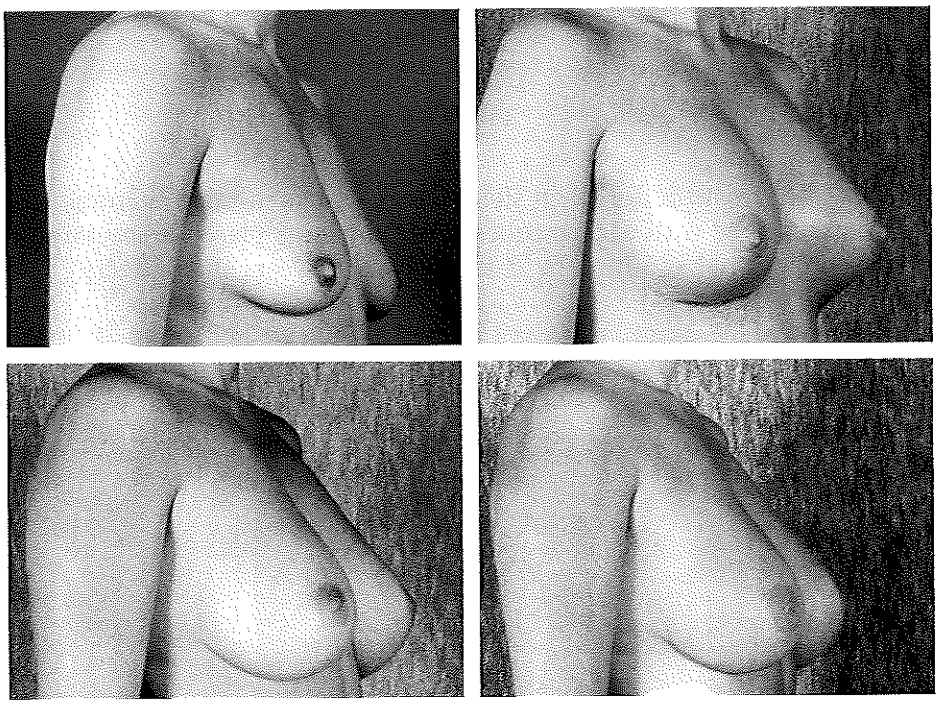

FIG. 14

This 32-year-old patient is shown before breast augmentation and 3 months, 1 year, and 4 years after augmentation with 315 cc implants.

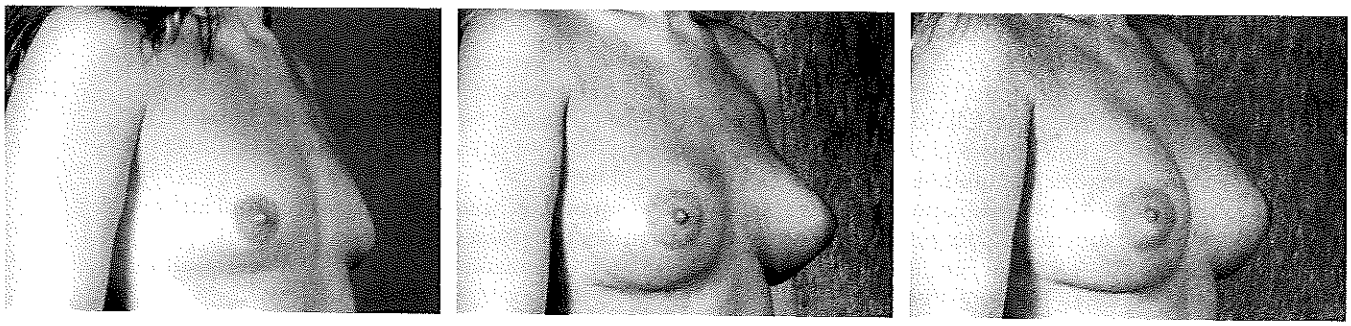

FIG. 15

This 27-year-old patient is shown before breast augmentation and 8 months and 2 years after augmentation with cohesive gel implants placed in a prepectoral position.

SUGGESTED READINGS

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Editorial Commentary

It is interesting how we have come a full circle. In the past almost every implant was placed through an inframammary approach. Then came the transareolar approach, followed by the axillary approach, and, in more recent years, the transumbilical approach. To take the latter first, this seems to fit the American expression, "being a long run for a short slide." I, myself, moved from the periareolar approach to the axillary approach but have, in turn, gone back to the periareolar incision. Certainly the umbilical approach should not be considered for cohesive gel implants, and probably most surgeons have gone for the inframammary approach, which is probably the easiest one to use for this type of more solid implant. The axillary approach can be used, but again is somewhat difficult. Dr. De Lorenzi has very nicely shown that the areolar incision, probably slightly enlarged, allows a cohesive gel implant to be inserted into a submammary or subpectoral position. There is no doubt in my mind that using the areolar approach has been the best for insertion of all implants, whether they be silicone gel or saline-filled. The axillary approach doesn't always result in a good scar, and I believe it is less easy to achieve a good anatomic position with it.

As Professor Olbrisch states, the inframammary incision has been used since the beginnings of breast augmentation surgery, and it should not be disregarded. For many surgeons, it may well be what they consider to be the safest and easiest approach of all. If this results in greater safety for the patient in their hands, then it most certainly should not be dismissed. I certainly feel strongly that, in breast augmentation, the approach to be used is the one that the surgeon is most comfortable with.

Ian T. Jackson, MD

Inframammary fold incisions are very versatile as outlined in this excellent review. The precise location of an inframammary fold incision is sometimes debatable because the skin in this area is sometimes quite mobile, depending on arm position, whether the patient is upright or supine, and the fullness of the breast. The final quality of the scar will be improved if it is made at the correct level on the chest using an appropriate length to prevent tissue maceration during surgery. Postoperatively, if the wound is supported for a prolonged period with plain Micropore Surgical Tape (3M Corporation, St. Paul, MN) (a hypoallergenic paper tape that leaves minimal adhesive residue and is breathable, inexpensive, and minimally irritating to patients). An incision placed slightly too high, so that it ends up on the lower pole of the breast, is much preferable to an incision that is too low on the chest (i.e., below the inframammary fold). The preoperative markings in Figs. 3, 4, and 5 show a dotted line outlining a proposed pocket location that extends above the transverse line across the apexes of the anterior axillary folds. The breast should not in my opinion extend above this line, although in some situations it is necessary to dissect the pocket above this level. Although Professor Olbrisch recommends blunt subpectoral dissection, it is my belief that careful pocket dissection with magnification and electrosurgery to obtain hemostasis is preferable for the patient and the surgeon alike. I agree with Professor Olbrisch that blunt dissection is safe and effective, and that most blood vessels that are avulsed (torn) typically stop bleeding spontaneously and with pressure (as they are apparently designed to do). However, this is not typical of any other plastic surgery technique where we typically pride ourselves in accurate bloodless dissection, and I see no reason why this procedure should be any different. A careful pocket dissection under absolute surgical control will be rewarded with a nice, clean, bloodless pocket that has a lower incidence of postoperative pain and bruising as well as a lower risk of encapsulation (in my opinion, considerable blood in the tissues is a risk factor for capsule formation).

With respect to the amount of pectoralis muscle to release medially, I do not think that the medial border of the pectoralis should be released up to the level of the areola as recommended in the article. If there is some degree of skin laxity, but still some lower pole skin visible in the frontal view (with the patient upright and arms at her side), then some degree of submammary dissection is also required. This releases the breast from the anterior surface of the pectoralis muscle so that the implant can descend in the pocket, preventing a snoopy deformity. The extent of release will depend on the extent of laxity, but it usually does not extend above the nipple. The release of the pectoralis medially should not extend very much above the level of the inframammary crease to prevent breast deformity during pectoralis contraction. I agree with Professor Olbrisch that retromammary placement is superior to retropectoral placement if there is sufficient tissue coverage. If there is insufficient tissue coverage, then retropectoral placement is mandatory.

Extreme care must be taken not to lower the inframammary fold unless it is necessary to do so. In my opinion, the nipple areolar complexes are too high on the breast mounds of the patient shown in Fig. 10. Patients who have constricted breasts have abnormal fold development and require significant manipulation of the inframammary folds, but patients with normal folds should not have them altered unless requesting extreme augmentation that is inappropriate for their anatomy. Instead, it is important for

the surgeon to precisely measure the width of the natural breast and select an implant that will fit appropriately. In addition, the patient in Fig. 10 has medial border implant visibility with a recurved portion visible next to the chest wall—the so called "Baywatch breast." Although I have patients who sometimes request this appearance, it is not natural, and in my opinion surgeons should resist providing this. The long-term sequelae of this are tissue thinning and implant visibility. This article is an excellent summary of the surgical technique, postoperative routine, and required aftercare.

Claudio De Lorenzi, BA, MD