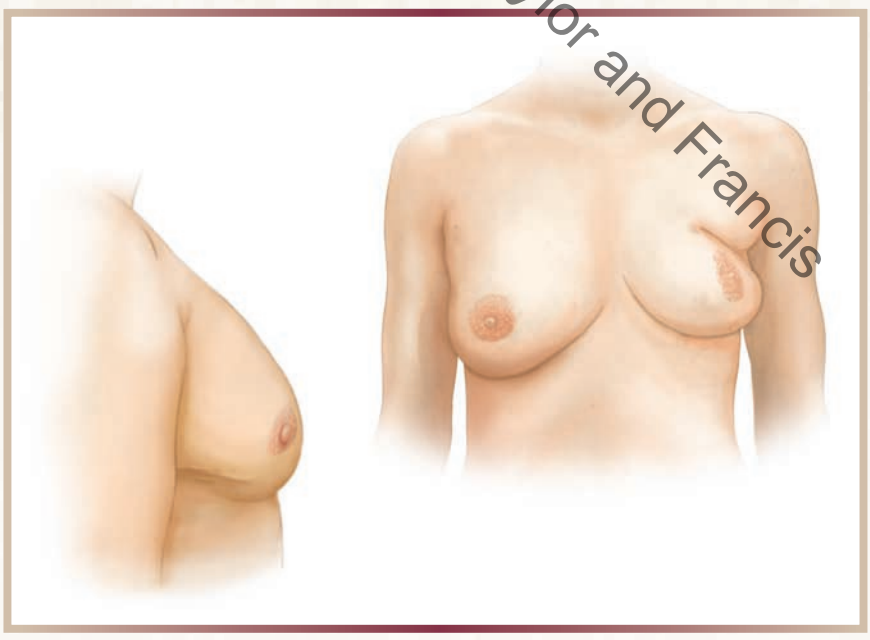
PART V-C

Deformities Associated With Lumpectomy, Partial Mastectomies, and Radiation



One of the major objectives associated with any type of breast reconstruction is the creation of symmetry. However, asymmetry can occur with autologous or implant reconstruction, and partial defects from lumpectomy and radiation can also result in asymmetry. Another problem seen in all types of reconstructive procedures is secondary contour deformities. These can be the result of many contributing factors. In implant reconstructions with expanders, capsular contracture with the final implant can lead to both shape irregularities as well as asymmetry. The incidence of capsular contracture increases significantly in the radiated patient. Also, difficultly with the initial expansion can cause similar problems. With autologous reconstruction, partial flap loss can lead to asymmetry or a contour deformity of the reconstructed breast, and radiation to autologous tissue can lead to significant volume loss over time.

Lumpectomy in appropriately selected patients can lead to excellent results. However, if significant tissue is resected, both asymmetry and a local deformity may result. In addition, radiation treatments can exacerbate these problems due to soft tissue changes, either acute or long term. Numerous options for revision surgery are available for these patients.

Selecting the best procedure to correct asymmetries and contour deformities depends on the original procedure and what reconstructive options are available. Today, fat has become an excellent source of tissue to correct both implant and autologous reconstructions. With implant reconstruction, fat injection can provide soft tissue coverage and correct irregularities not managed by the implant. Fat can also enhance autologous reconstructions to create adequate volume, especially if the original flap failed.

Lumpectomy defects can be managed with multiple options including fat, implants, and autologous tissue transfer. As the number of patients undergoing lumpectomy and radiation increases, the problems associated with this procedure are more numerous. When new tissue is required, the latissimus dorsi and TRAM flaps remain the mainstay of autologous options in this group of patients.

Several cases in which both asymmetry and contour deformities result after lumpectomy and radiation treatment will be presented, and numerous options will be discussed. Not every permutation is discussed, but the following cases provide a good representation of typical problems encountered.

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Complications and Suboptimal Aesthetic Outcomes

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CHAPTER 46

DEFORMITIES AFTER LUMPECTOMY, RADIATION, AND BREAST RECONSTRUCTION

46a Fat Grafting

EMMANUEL DELAY

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

This 38-year-old woman presented with complaints about morphologic alterations after conservative treatment of cancer in her left breast.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

The patient has a major deformity with the absence of the lower outer quadrant of her left breast, along with breast asymmetry.

ANALYSIS OF THE PROBLEM

Although autologous fat grafting has been widely validated for the management of patients with a total mastectomy, its benefit for the correction of the sequelae of breast-conserving treatment, specifically for lumpectomy and radiotherapy, has yet to be confirmed. A clinical trial addressing this question has just been completed.

The spontaneous risk to have a new breast cancer or a recurrence of the primary tumor is high. Strict control—making sure the patient and the team understand the necessity of a regular follow-up—is needed to minimize this risk, which would have potential medicolegal consequences if the patient were not properly informed. The protocol includes complete breast imaging with mammography, ultrasonography, and MRI, performed by a skilled radiologist. The radiologist must agree with the patient's oncologist, who is frequently the doctor who referred the patient for plastic surgery; agreement between the radiologist and the oncologist is also generally required before fat grafting is attempted.

To monitor the outcome, breast imaging by mammography and ultrasonography is repeated 1 year after the fat grafting procedure; if there is any doubt about recurrence, a microbiopsy by the radiologist is recommended. Our study has included 100 consecutive patients with sequelae of conservative treatment undergoing fat grafting and strict imaging follow-up. In our study, the risk of local recurrence did not increase but rather slightly decreased; there was only one case of local recurrence (1%) for an expected rate of approximately 6% (the spontaneous risk of recurrence after great conservative treatment is approximately 1% to 1.5% each year).

The patient presented here was included in the study. She was deemed an excellent candidate for fat grafting to correct her deformity after breast-conserving surgery.

RECOMMENDED SOLUTION TO THE PROBLEM

Because the deformation is major, careful planning is necessary to achieve successful correction of the deformity. Proper planning includes the following steps:

- ☐ Two or three sessions of lipomodeling
  (If we were to try to obtain this correction in just one session, we could only obtain a fat necrosis lesion; for optimal fat grafting, each "spaghetti strand" of fat must have adequate vascularity surrounding it.)
- ☐ Partial breast reconstruction with a latissimus dorsi flap could be considered
  (For us, this solution was deemed a second choice, because it would leave scars. We decided to keep this option in reserve in case the patient has a local recurrence, in which case this solution would result in a good breast reconstruction using the latissimus dorsi.)

TECHNIQUE

Fat grafting was proposed to correct the deformity. Two sessions were performed successively, with placement of 171 and 149 cc of refined fat in the breast. For the first session, the fat was harvested from the abdomen and the supra-iliac areas. For the second session, fat was harvested from the thighs. The oil and debris were then discarded, leaving the purified fat. The fat was centrifuged for 20 seconds at 300 rpm. The fat was transferred with special cannulas designed for breast lipo-

modeling (one 13 cm long and one 20 cm long); if you don't have this cannula, you can use Coleman's cannula. The fat was transferred in the form of slender, spaghetti-like cylinders. The lipoaspirate was injected in these fine strands as the cannula was withdrawn. Good spatial visualization was necessary to form a three-dimensional matrix and to avoid fatty collections that would lead to fat necrosis because of inadequate contact with a blood supply. A simple greasy dressing is applied for 10 days. We recommend avoiding pressure on the treated areas (usually no bra for 15 days).

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

Comparison of the left breast with the right breast 1 year after surgery reveals a significant improvement of the postoperative deformation, notably in the lower outer quadrant of the breast. The breast now has an aesthetic shape and softness. If the patient desires, a third session could be proposed to obtain a nearly perfect result.

Our findings illustrate that fat grafting is a major advance for the management of moderate sequelae with conservative treatment. Fat grafting makes it possible to restore the shape and softness of the breast to an extent never achieved with previous techniques. With a large experience of breast deformation correction with the lipomodeling technique, it is possible to enlarge the indications and to propose this technique even for the correction of larger deformation with the approach of multiple (two or three) sessions.

TEACHING POINTS

Each microtunnel of grafted fat must be designed to be surrounded by well-vascularized tissue. Any fibrous strings and adhesions in the breast can be released through percutaneous fasciotomies by putting the fibrous bands on tension with a Gillies hook or a double hook and cutting the fibrous bands with the tip of a 14-gauge trocar. Fasciotomies must be done with caution: too many fasciotomies increase the risk of fat necrosis.

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46b Capsulectomy With Implant Replacement and Contralateral Reduction Mammaplasty

NEAL HANDEL

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

This 58-year-old Hispanic woman was referred for treatment of breast deformity and asymmetry after having a lumpectomy and radiation therapy for carcinoma of the right breast. She was initially diagnosed with breast cancer at age 41. She stated that her tumor was "small." She was treated with lumpectomy alone and did not receive radiation or chemotherapy. Three years later, she developed a local recurrence, and the lump was excised again, after which she underwent a full course of radiation therapy. After the second lumpectomy and radiation, she developed asymetry and an obvious deformity of the right breast. Four years later, she underwent a "breast reconstruction" in Tijuana, Mexico. The reconstruction consisted of bilateral insertion of saline implants; she was uncertain of the type, style, and volume of implants used.

When this patient presented to our clinic, she complained of pain, firmness, and distortion of her right breast, in addition to asymmetry, because the left breast was significantly larger and more pendulous than the right breast. Her clothing choices were very restricted because of her breast asymmetry.

Other than her history of breast cancer, this patient was in good health; her only previous surgery was a face lift and chin implant. She has never smoked cigarettes and has no family history of breast cancer.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

This patient is a healthy-appearing, slightly obese woman. Her breasts are significantly asymmetrical. The right breast is much smaller than the left breast by approximately 50%, and it is spherically deformed, very firm, and slightly tender to palpation with Baker grade IV capsular contracture. The lateral breast contour has a noticeable concavity from soft tissue loss as a result of the two previous lumpectomies; there is also a well-healed, transverse lumpectomy scar with adjacent hyperpigmentation of the skin. The soft tissues are indurated in the area of the lumpec-

tomy. The left breast is considerably larger and more pendulous, and the implant appears to be subpectoral. The nipple on the left breast is 5 cm lower than the IMF, and points downward as a result of grade 3 ptosis. There are well-healed periareolar scars bilaterally from the implant insertion. There are no palpable breast masses.

ANALYSIS OF THE PROBLEM

This patient has several of the common deformities that may occur after breast conservation therapy. The right breast is smaller in volume from the two lumpectomies and radiation-induced contraction. In addition, the area at the lumpectomy site is depressed, there are radiation-induced pigmentary skin changes, and she has significant capsular contracture, which is common when an implant is placed in an irradiated field. She has significant asymmetry, and the contralateral breast is pendulous.

A number of approaches were possible in this case. Clearly, the most direct way to achieve symmetry would be to reduce and uplift the left breast. This patient was relatively satisfied with the volume of her right breast, and eager to undergo left breast reduction. She also wished to have her saline implants replaced with silicone gel devices. Therefore we recommended implant removal and replacement on the left side, in conjunction with reduction mastopexy.

The right, irradiated breast was a greater challenge because of the intrinsic damage caused by the multiple previous surgeries, irradiation, and capsular contracture. Whereas one option would be to abandon implant reconstruction and proceed with autologous reconstruction, we thought that the implant reconstruction in this patient could be salvaged and significantly improved with judicious surgery. On the right side, we recommended removal of the saline implant, performing a capsulectomy in conjunction with radial scoring of the lateral breast flap to improve the contour, and placement of a new silicone gel implant of appropriate volume. She was informed of the possibility of autologous fat grafting to the lumpectomy site, but if this was necessary, we recommended that it be performed as a delayed procedure.

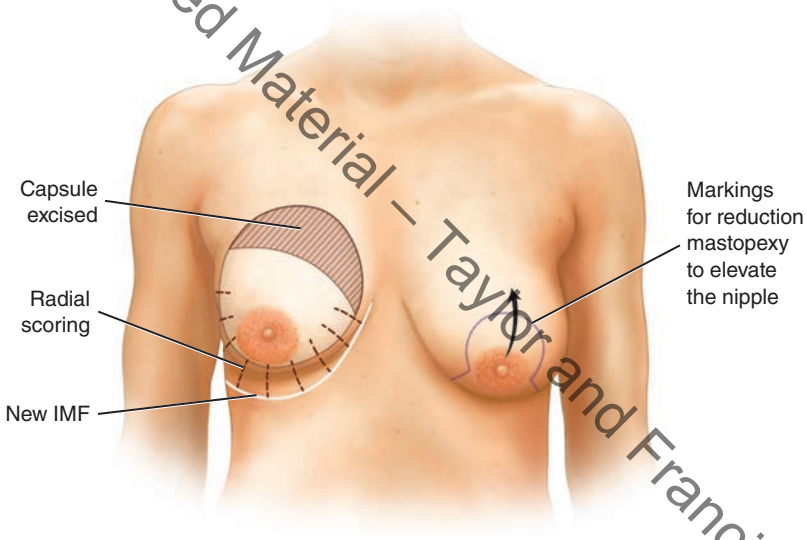
RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Removal of the right saline implant
- ☐ Right capsulectomy and radial scoring to release constricted areas
- ☐ Insertion of a new silicone gel implant on right side
- ☐ Left implant removal and replacement
- ☐ Left reduction mammaplasty

TECHNIQUE

Preoperative measurements and skin markings were made with the patient in the upright position. The proposed level to which the left nipple needed to be elevated to match the right nipple was marked on the breast meridian. The breast was manually displaced, first medially and then laterally, and a line was drawn from the new nipple position to the midpoint of the IMF, to mark the proposed vertical limbs of the Wise pattern mastopexy. The length of the limbs was not delineated, but rather left to be determined intraoperatively, to match the dimensions of the right breast after revision.

The surgical procedure was started on the right side, where the old periareolar scar that was used to insert the saline implant was reincised. The wound was deepened to the capsule, which was opened with electrocautery. The saline implant was inadvertently punctured, the saline aspirated, and the deflated implant removed. The implant was noted to be a 350 cc device; however, the actual fill volume was unknown.



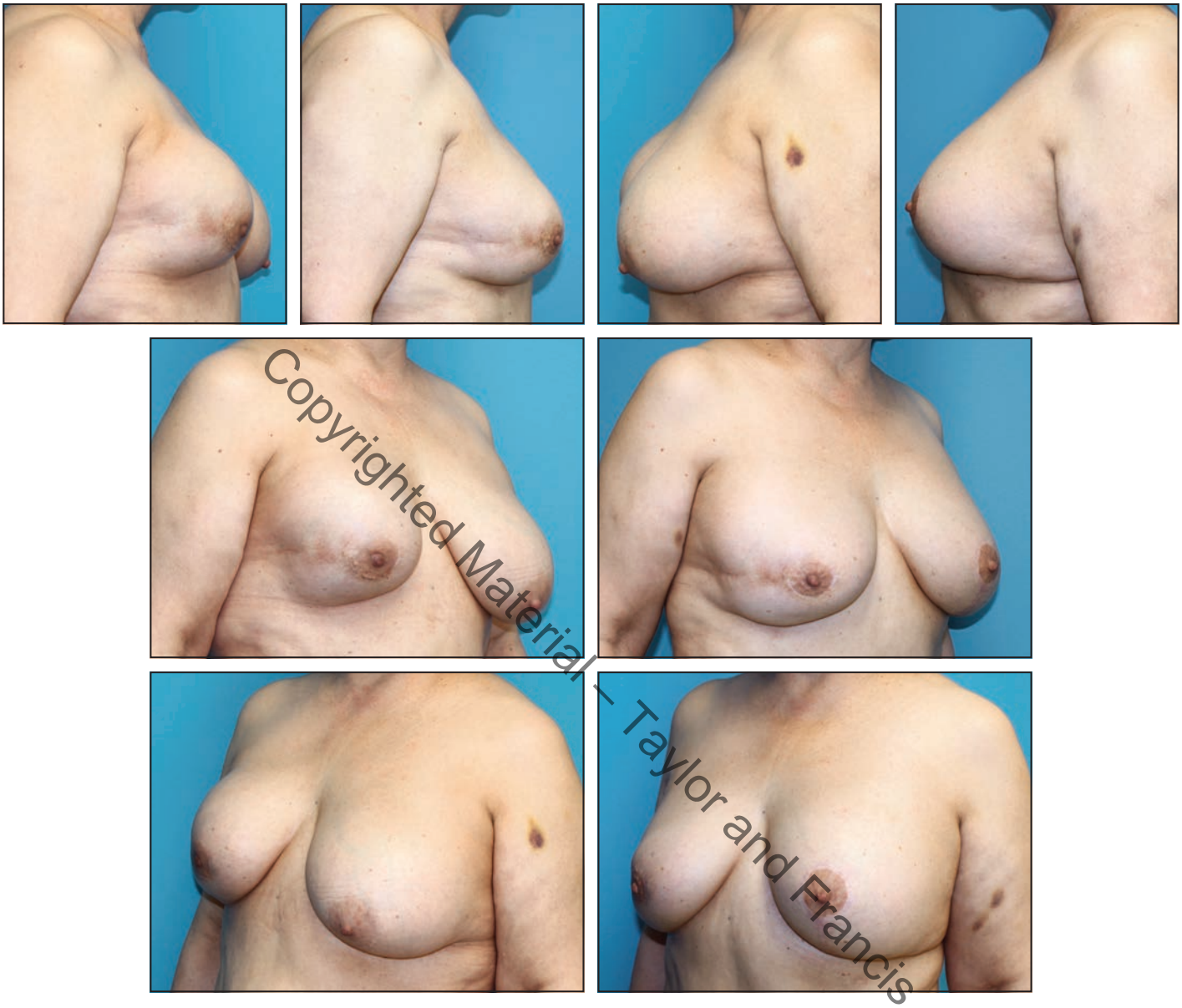
The capsule was uniformly thickened and contracted; a circumferential capsulotomy was performed around the base of the periprosthetic pocket, and the submuscular pocket was enlarged superiorly and medially. Most of the capsule was resected in the upper and medial portions of the breast. Both laterally in the area of the previous lumpectomies and inferiorly where the tissues were thinner, we scored the capsule radially to help release and expand the flaps. Beneath the NAC, where the tissue was very thin, the capsule was left in situ. Sizers were used to determine the appropriate implant for reconstruction. After adequate hemostasis was secured, the pocket was irrigated with double antibiotic solution (bacitracin and neomycin), a 7 mm flat Jackson-Pratt drain placed, and a Mentor (Mentor Corp., Santa Barbara, CA) 475 cc moderate plus profile smooth round gel implant inserted. The incisions were closed in layers.

On the left side, with the breast skin under modest tension to simulate closure over a new implant, the length of the vertical limbs was marked to match the distance from the IMF to the areola on the right side, which was 8 cm. The remainder of the Wise skin pattern was then marked. A 4 cm circular template was used to delineate the new areolar border. The incisions were made and superior and inferior vertical pedicles created by deepithelializing the flap both above and below the NAC. Inferiorly, the width of the pedicle was maintained at 7 cm to ensure adequate blood supply to the NAC. We excised a triangle of skin and breast tissue medially and laterally, all the way down to and including the anterior capsule around the implant. An intact saline implant was removed and noted to weigh 385 cc. A total capsulectomy was performed, except along the undersurface of the vertical dermal and parenchymal pedicle, where the capsule was left in situ to enhance circulation to the NAC.

An inflatable sizer was placed in the pocket, the mastopexy incisions were temporarily closed with skin staples, and the patient was placed in the full sitting position on the operating table. The sizer was gradually inflated to determine the volume that would best match the right breast. The patient was re-placed in the supine position, the sizer deflated and removed, and a final check made to ensure complete hemostasis. The pocket was irrigated with antibiotic solution, a 7 mm flat Jackson-Pratt drain placed, and a Mentor 300 cc moderate plus profile smooth round gel implant inserted. The incisions were closed in customary fashion.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

The patient had an uneventful postoperative course and has enjoyed a good result. Postoperative photographs depict her appearance 1½ years after the procedure. Breast symmetry has been significantly improved. The NACs are at a similar level on both sides. Capsular contracture on the right side has been eliminated, and this patient continues to have a Baker grade I capsule at 18 months.



The contour deformity of the lateral aspect of the right breast has been improved, although the depression has not been entirely eliminated. The constriction of the lower pole of the right breast has been released so that the shape matches the left side much better. This patient is satisfied with her result. Additional minimally invasive procedures could be undertaken to further enhance the result, including fat grafting to the residual contour irregularity of the lateral right breast and the application of topical bleaching agents to reduce hyperpigmentation of the skin adjacent to the old lumpectomy scar.

TEACHING POINTS

This case illustrates some of the strategies that may be employed to improve the disfigurement and asymmetry that sometimes results from breast conservation therapy. Caution must always be exercised when performing reoperative surgery on an irradiated breast. Radiation causes significant, irreversible damage to the blood supply of all tissues within the path of the ionizing beam. To reduce the risk of flap ischemia and prevent delayed wound healing, the surgical approach on the right side was through the old periareolar scar instead of the lumpectomy scar. An aggressive capsulectomy was performed to try to reduce the risk of recurrent contracture, but the capsulectomy was restricted to areas of the breast where the flaps were thicker and less likely to have sustained significant radiation damage. In areas at high risk, such as the lateral and inferior poles of the breast, radial capsulotomy was performed. The capsule was spared in the thinnest area, the subareolar region, which had a surgical scar immediately adjacent to it.

There are several reasons that we performed surgery on the right side before initiating surgery on the left breast. First, the degree to which irradiated tissues will stretch and conform to an implant is always unpredictable; therefore the final dimensions of the reconstructed right breast cannot be known until the skin closure has been completed. Second, when trying to match asymmetrical breasts, it is a good general principle to complete the surgery on the more difficult side first, because there is more flexibility on the easier side for matching both volume and shape. For example, in this patient, the vertical length of the mastopexy flaps on the left side was not determined until the final dimensions on the right side had been ascertained. Likewise, the implant volume and profile used on the left side was decided only after the final size and shape of the right breast were known.

Because of the unpredictability and increased risks associated with operating on irradiated tissues, patients must be thoroughly educated about this before surgery. It is important to emphasize the increased risks of flap necrosis, wound dehiscence, implant exposure, infection, delayed wound healing, recurrent capsular contracture, suboptimal aesthetic outcomes, and the need for additional procedures. Despite the increased risks, significant improvement can be achieved in most patients with careful preoperative planning and judiciously performed surgery.

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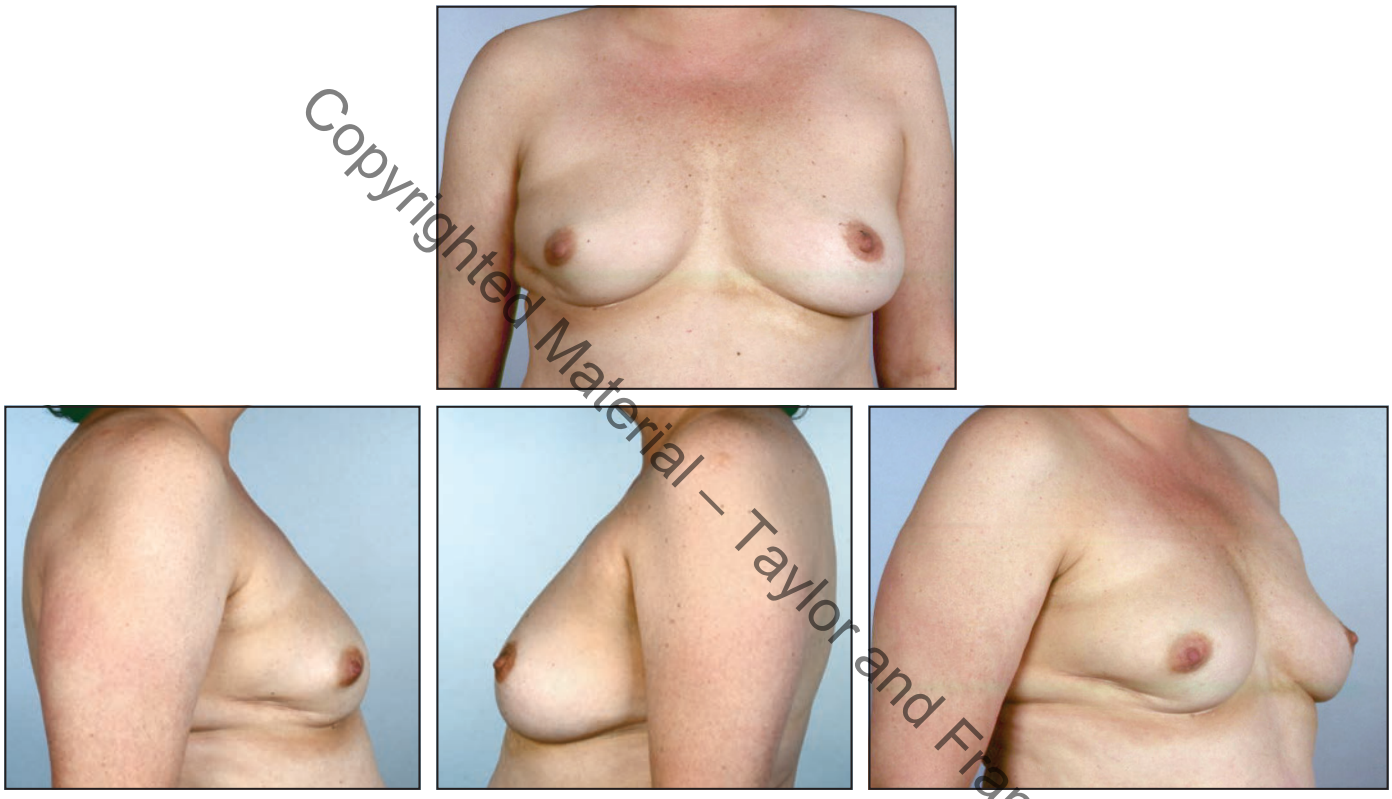
46c Correction of a Lumpectomy Defect With a Latissimus Dorsi Flap and Implant

JACK FISHER

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM



The patient requested a breast augmentation to increase her breast volume. She had hoped that a simple augmentation would also improve the appearance of her right breast, which had a deformity from a lumpectomy and radiation several years previously. She also complained of asymmetry: the right breast was slightly smaller after the lumpectomy and radiation. The right NAC location was also distorted from the previous treatment.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

On physical examination, it is apparent that the lumpectomy has created a soft tissue defect in the right breast, with the majority of the volume loss in the lateral inferior quadrant of the breast. There is distortion of the IMF, which is pulling the NAC laterally and inferiorly. The tissue around the lumpectomy is firm from irradiation, and the entire breast is somewhat immobile and firm. There is also hyperpigmentation along the right lateral IMF, and a transverse crease in the upper pole of the irradiated right breast extends laterally and crosses the anterior axillary line.

ANALYSIS OF THE PROBLEM

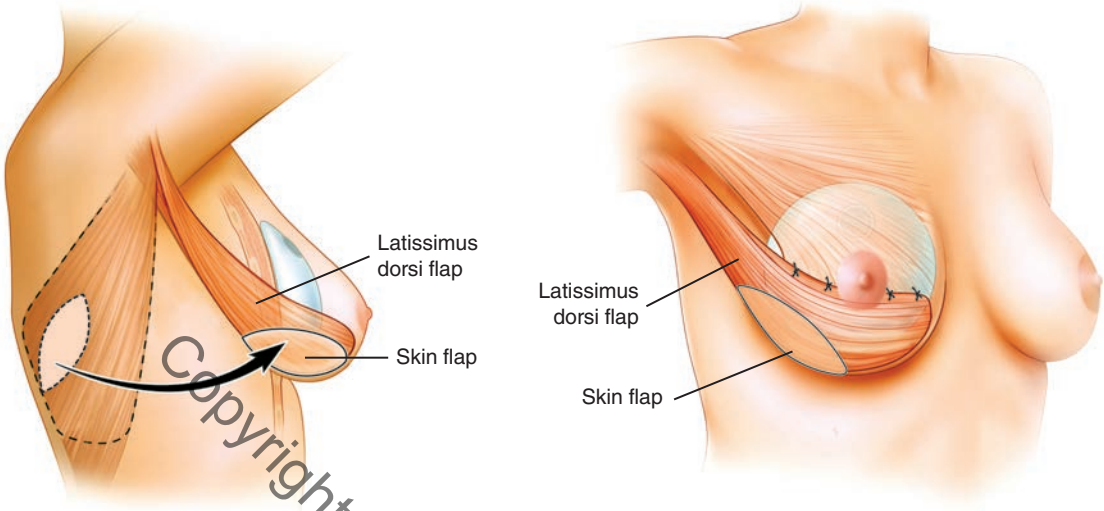
This patient demonstrates several problems associated with lumpectomy and radiation treatment. Her deformity is particularly pronounced because the lumpectomy was close to the lateral IMF, which has distorted the lower pole of the breast. Lumpectomies create greater distortion in volume and shape in patients with relatively small breasts than in patients with larger volume breasts. Involvement of the IMF often requires the transfer of autologous tissue in the form of a muscle flap to not only restore volume but also correct fold problems. The breast is also less compliant after irradiation; therefore simply inserting an implant may not release the contracted tissue adequately.

It was explained to the patient that new tissue with a healthy blood supply was necessary and that either an implant or expander would also be required. Because the patient was hoping for a single-stage procedure, an adjustable implant expander was more likely to correct both volume and shape.

RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Excision of the contracted scar around the lumpectomy site
- ☐ Use of a small latissimus dorsi flap to release the contracted lateral inferior breast mound with muscle and a skin island
- ☐ Insertion of an adjustable saline implant subpectorally on the right side and a subpectoral standard saline implant on the left

TECHNIQUE



There were several goals in this case. This was not a simple breast augmentation, as the patient had hoped, because of the loss of volume, contracture, and general stiffness of the entire right breast.

The first step in the operating room was excising the transverse irradiated scar of the right breast and releasing the tissue in the surrounding area. In these cases, the defect is frequently larger than expected after the contracture is released, and it is important to wait until after the release before committing to the size of the latissimus dorsi skin island. Once the dimensions of the defect were determined, the patient was rotated onto her side, and an 8 by 4 cm skin island with underlying muscle was elevated from the right side of her back. This was passed through a subcutaneous skin tunnel under the axilla into the surgical defect. The latissimus dorsi muscle was sutured to the pectoralis muscle above it so that there would be total muscle coverage of the implant. It is important to design the skin island on the myocutaneous flap so that as it is rotated onto the anterior chest, the skin island is inferior and the muscle extends superiorly. Very little muscle was needed inferiorly; most muscle was needed superiorly to attach to the pectoralis muscle. This method provided complete muscle coverage of the device, which is critical in irradiated patients.

An adjustable saline implant was inserted subpectorally, and the repair was closed superiorly between the latissimus dorsi and pectoralis muscles. On the left breast, a standard saline implant was placed in the subpectoral position.

The filling valve on the right side was placed subcutaneously on the lateral chest wall. This valve was used to serially fill the right device to match to the left static implant.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

This result would not be achievable with just a standard augmentation. The breasts now have volume symmetry in both frontal and lateral projection, and the superior fullness of the breasts is also symmetrical. The one downside to this solution is the appearance of a patch of skin on the right lower lateral breast. In addition, the nipple has remained slightly lateral and inferior as a result of general contracture of the breast from the radiation treatment. Overall, this is a good result in a patient with this common problem that occurs after lumpectomy and radiation.

TEACHING POINTS

It is very difficult to insert an implant in many patients after lumpectomy and radiation to correct segmental deformation. In this patient, simply placing an implant in the right breast would have increased the volume but would not have corrected the deformity in the lateral lower pole of the breast. After irradiation, the entire breast is usually affected, with general stiffness and loss of tissue compliance. The addition of autologous tissue replaces the soft tissue defect and brings in new blood supply. Defects along the IMF are especially difficult to correct; therefore this is where a latissimus dorsi flap is particularly useful. Because the flap is in a lateral superior direction, it gives added support to the lower lateral portion of the breast. A TRAM flap also could have been used; however, a pedicled TRAM flap tends to pull the breast inferiorly and does not provide as much muscle volume as does a latissimus dorsi flap.

The benefit of an adjustable implant is that it takes several months before the final volume of the right side can be determined because of swelling and progressive latissimus muscle atrophy. As the volume changes, the adjustable implant can be filled to maintain symmetry.

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46d Latissimus Dorsi Flap Reconstruction and Contralateral Mastopexy

STEVEN J. KRONOWITZ, KEITH M. BLECHMAN

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

Approximately 1 year before presenting, this 51-year-old woman with T2 N0 invasive ductal carcinoma of the inferior left breast underwent neoadjuvant chemotherapy and then a partial mastectomy and postoperative whole-breast radiotherapy of 50 Gy in 25 fractions plus a tumor bed boost of 10 Gy in 5 fractions. She had no other significant medical or surgical history and was a nonsmoker. Her bra size was a 38C. She sought the opinion of a plastic surgeon regarding the resulting deformity of her left breast after her cancer treatment.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

The patient has significant volume deficiency of the inferior pole with overlying hyperpigmented, retracted, irradiated skin. A well-healed partial mastectomy scar is located inferolaterally, and she has inferior displacement of her left nipple because of the contracture of the irradiated skin. The contralateral breast has grade 2 ptosis. The distance from her sternal notch to her nipple was 27 cm on the right and 25.5 cm on the left. Her IMF-to-nipple distance is 6.5 cm on the right and 3.5 cm on left.

ANALYSIS OF THE PROBLEM

Significant breast asymmetry warranting correction may occur in up to 35% of women receiving breast conservation therapy with partial mastectomy and adjuvant radiotherapy, as is the case for this patient. She had a severe deformity in the inferior aspect of the left breast with tethering of the NAC causing it to become inverted inferiorly. Retraction from the radiation created a paucity of skin and volume, and notable NAC malposition, compared with the right side. A pedicled latissimus dorsi flap could replace both skin and volume, and help to buttress the NAC back to its proper position.

In addition to the deformity of the left breast, this patient had Baker grade II ptosis of the right breast. A mastopexy would improve symmetry.

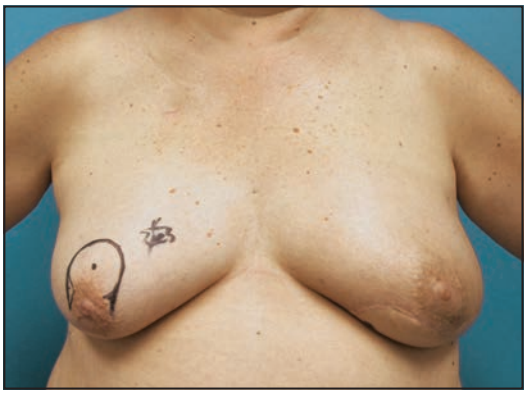
RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Pedicled ipsilateral latissimus dorsi myocutaneous flap
- ☐ Staged contralateral mastopexy

TECHNIQUE

In the supine position, we re-created the left breast defect by releasing the tethered, inelastic skin with excision and radial scoring. This patient was then turned to the left lateral decubitus position, and a pedicled ipsilateral latissimus dorsi myocutaneous flap was harvested.

This patient was then returned to the supine position and the flap was inset; this restored skin and volume to the breast, and allowed the NAC to be repositioned appropriately.



Six months postoperatively, the incisions had healed well and a good cosmetic result had been achieved. Residual asymmetry from the ptosis on the right side was then addressed using a concentric mastopexy with a Benelli-type circumareolar suture.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

At 3 months after having the mastopexy, which was 9 months after getting the flap, this patient has healed well and is satisfied with her result. The left breast has been restored to its original volume, and the nipple has been properly repositioned. There is good symmetry. The scar from the inset of the latissimus dorsi flap is in full view anteriorly; however, it is easily concealable under clothing.

TEACHING POINTS

Unfortunately it is only after whole breast radiation therapy that patients who have undergone a partial mastectomy most frequently present to plastic surgeons for aesthetic concerns. Repairing deformities in these patients oftentimes requires local flap transfer, typically a latissimus dorsi or thoracodorsal artery perforator, because local tissue rearrangement or breast reduction techniques are susceptible to high complication rates when there is a history of whole breast irradiation. These more extensive flap procedures are not ideal, because the skin replacement that is often necessary introduces conspicuous scars on the breast and juxtaposes discordant surface textures and pigment shades. Choosing to use a local flap in the setting of a partial mastectomy defect would also eliminate this reconstructive option in the future if a completion mastectomy must be performed because of recurrence. In cases with significantly distorted breasts, it may even be preferable to perform a completion mastectomy with a total breast reconstruction rather than attempt a partial repair, which would leave breast tissue that may be at risk of recurrent disease.

Probably the most important point is that whenever feasible, oncoplastic repair *before* whole breast irradiation is preferable because it has the lowest complication rate and is simple because it uses the remaining breast tissue, which maintains the color and texture match of the breast. Recruiting additional skin is rarely necessary before irradiation. Only later, after the effects of radiation have caused skin contracture, may new skin be required, even though no skin was actually removed during the partial mastectomy. In cases of significant volume resection with skin preservation, a latissimus dorsi flap with a deepithelialized skin paddle can be considered as an option for immediate reconstruction.

Management algorithms using immediate reparative techniques allow the plastic surgeon to participate in the planning of the surgical approach to tumor resection and may mitigate any need for subsequent breast reconstruction that would likely be more complex in nature. Adhering to this approach should reduce the incidence of a partial mastectomy leading to severe deformities that develop after whole breast radiation therapy.

It should be noted, however, with the increasing use of partial breast irradiation as an alternative to whole breast irradiation, manipulation of the remaining breast tissue for reconstruction may become a viable option, because this surrounding breast tissue suffers less damage and remains more soft and pliable.

This is an example of a 56-year-old woman who presented with a similar deformity as described in the previous case, also 1 year after partial mastectomy. However, this patient received partial breast irradiation using brachytherapy with a MammoSite device 34 Gy over 5 days. In contrast to whole breast irradiation, the partial breast irradiation used in this patient created an opportunity to use the remaining breast tissue for the repair. Because the surrounding breast tissue had not been irradiated, a breast reduction technique using a superomedial dermoglandular pedicle was now possible as a reconstructive option. Although this patient proceeded to develop some localized contracture in the affected left breast, no wound healing problems developed.

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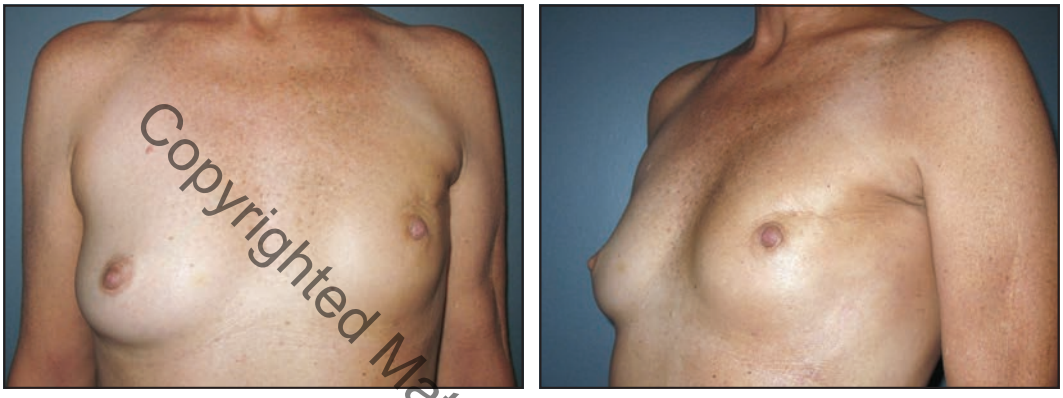
46e Combined Latissimus Dorsi Myocutaneous Flap With Implants and Fat Transfer

ALBERT LOSKEN

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM



This 44-year-old woman with a history of left breast cancer underwent a lumpectomy and radiotherapy 7 years ago. She presented with a deformity resulting from breast-conserving therapy (BCT) and desired better symmetry and possibly a slight increase in the volume of both breasts. She was otherwise healthy.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

This patient has a Clough II BCT deformity, which is defined as an obvious deformity associated with some asymmetry and some distortion of the NAC. She has a scar in the upper outer quadrant of her left breast, with some radiation fibrosis of the mound and radiation changes to the skin envelope. The NAC is retracted superolaterally. She has nipple asymmetry as well as mound asymmetry, with the left breast mound being smaller and higher. She has no ptosis on the left.

ANALYSIS OF THE PROBLEM

The goal in correcting BCT deformities is to improve the overall shape and symmetry. In this patient, the nipple position needs to be lower and more medial. This will require replacement with skin and volume in the location of the defect to restore contour and essentially push the nipple inferiorly and medially. The left breast is smaller in volume, and the IMF is higher on that side.

RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Reconstruction of the defect
- ☐ Use of a latissimus dorsi myocutaneous flap for skin and volume
- ☐ Insertion of implants to add volume, improve symmetry, and allow IMF adjustment
- ☐ Fat injections for contour

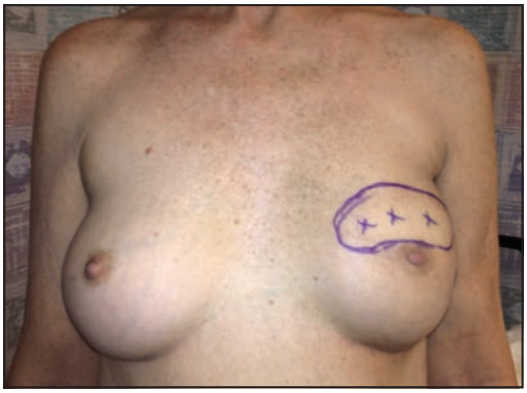
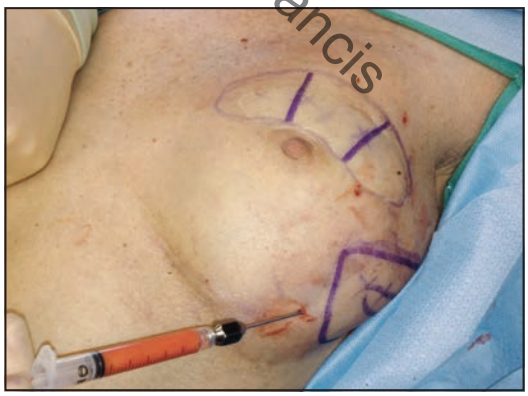
TECHNIQUE

The patient was initially prepared in the supine position, and the lumpectomy defect was opened. The defect was essentially opened down to the chest wall, and all tight scar tissue was released and resected where necessary. The humeral insertion was identified and thoracodorsal vessels dissected.

She was then prepared again in the lateral decubitus position, and an elliptical skin island and muscle-sparing latissimus dorsi flap was harvested. Subscarpal fat was preserved for volume. The defect was filled to correct the nipple position. A contralateral augmentation was performed to increase the volume on the right side.


This resulted in improved nipple position; however, the left IMF was still higher and the volume of the left breast was less.


An implant was placed in the subglandular position on the left side, which corrected the volume asymmetry and lowered the IMF.

To improve contour, 25 cc fat injections were then performed laterally.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

The latissimus flap repositioned the nipple and provided better contour to allow placement of an implant. The augmentation was conservative; however, it did improve the volume. The contour was corrected laterally with fat injections. Improved symmetry in shape, contour, and nipple position was achieved. The patient is shown at 14 months postoperatively. She is likely to be at increased future risk for capsular contracture on the left side because of the history of irradiation on that side.

TEACHING POINTS

The majority of BCT deformities, especially in women with small breasts, require some type of flap reconstruction. Multiple procedures are often required to repair complex defects. Although the augmentation was requested by the patient, this approach allowed adjustment in the IMF position as well as correction of volume differences. Implants are not typically indicated for the correction of a BCT deformity, but they can be helpful when used in conjunction with a flap in a patient with a contour irregularity.

There are many reconstructive tools available to correct a BCT deformity. Correction can require many different procedures, depending on the anatomic steps that must be taken. These procedures can be performed simultaneously, yet it is often safer to separate the variables and correct various aspects at different stages. The patient would accept additional procedures if they would result in better symmetry.

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46f Repair With a Latissimus Dorsi Flap and an Adjustable Implant

JACK FISHER

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

The patient presented 14 years after undergoing immediate breast reconstruction with an expander and implant.

Preoperative

2 years after reconstruction with expander and implant

6 years after reconstruction

At the patient's 2-year follow-up, we noticed that she was starting to develop a contracture with slight elevation of the reconstructed left breast mound. The process of contracture and elevation of the implant continued; when the patient was seen 14 years postoperatively, she had both severe contracture and significant elevation of the reconstructed IMF. During this time, she had undergone multiple mastopexies of her right breast in an unsuccessful attempt to maintain symmetry.

Fourteen years after reconstruction, the patient was seen in our clinic; she complained of difficulty wearing clothing because of the significant asymmetry. Also, her left breast had become flat with a lack of projection, and she needed to wear padding in her clothing. She was a healthy 62-year-old with no other abnormalities or deformities of the chest wall.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

The patient has significant elevation of the left IMF, compression of the implant beneath the muscle, and elevation of the NAC. On her right side, she has progressive ptosis. She has gained some weight over the 14-year interval since her original surgery, and the ptosis has progressed despite her having multiple previous mastopexies. The patient desires a single surgical procedure if it is feasible.

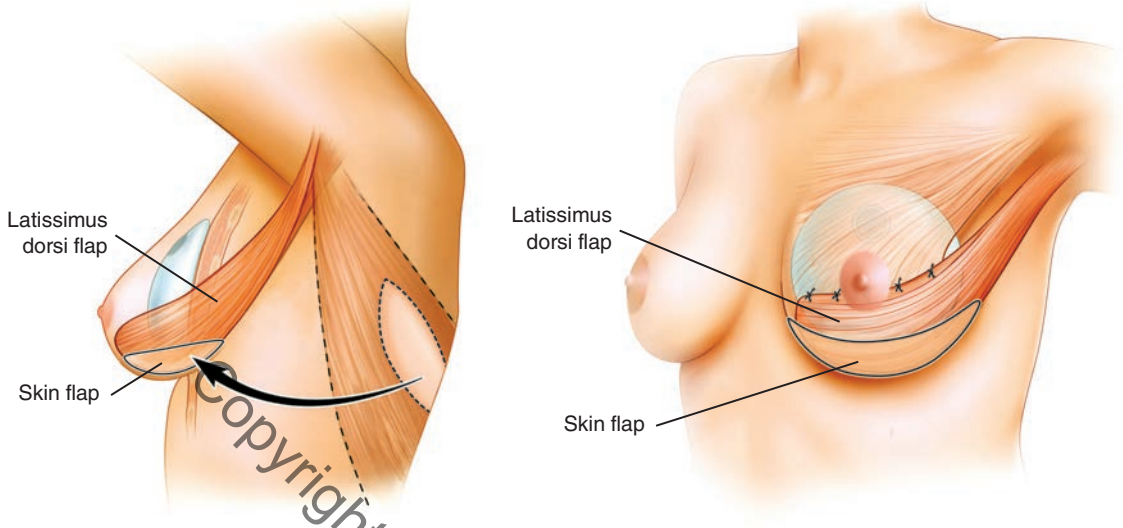
ANALYSIS OF THE PROBLEM

Unfortunately, recurrent capsular contracture and implant distortion are not uncommon among expander-implant reconstructive patients. Analysis of the problem requires an assessment of the amount of skin and soft tissue in the contracted area. In some patients, there is such a small amount of tissue remaining that an autologous tissue transfer is required. Attempts at reexpansion in these patients can be frustrating, and there is a high failure rate.

RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ An autologous tissue transfer to create breast symmetry
  (This was necessary because of the loss of the entire lower half of the patient's reconstructed breast mound)
- ☐ Re-creation of the entire length of the IMF by using a latissimus dorsi myocutaneous flap with a relatively large skin island
- ☐ Placement of an adjustable saline expander-implant (Spectrum, Mentor Corp, Irving, TX)
  (Because this patient wanted a single operation, and because the latissimus dorsi flap would not create adequate volume by itself, and a tissue expander is therefore necessary in such cases)
- ☐ Regulation of contour postoperatively, and maintenance of symmetry with the right side by placing an adjustable implant on the left side

TECHNIQUE



A latissimus dorsi myocutaneous flap was harvested from the left side of the patient's back. The skin island was designed so that when the unit is rotated onto the anterior chest wall, the skin would sit at the lower pole of the breast, and the majority of the muscle would fill the superior breast mound. An adjustable saline expander-implant was placed under the muscle, with the filling valve along the chest wall.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

This patient was able to obtain significant symmetry in a single operation. The postoperative photos demonstrate good position of the new IMF and adequate volume using the inflatable device. Interestingly, her left NAC, which appeared very high preoperatively, descended as a result of the expansion, and its position is significantly better, although not perfectly symmetrical.

TEACHING POINTS

In patients with severe contracture after implant reconstruction, autologous tissue transfer is frequently necessary. If the loss of tissue is in the lower pole of the reconstructed mound, the best option is to set the flap along a new IMF. Adjustable implants can be a good alternative in the attempt to achieve symmetry.

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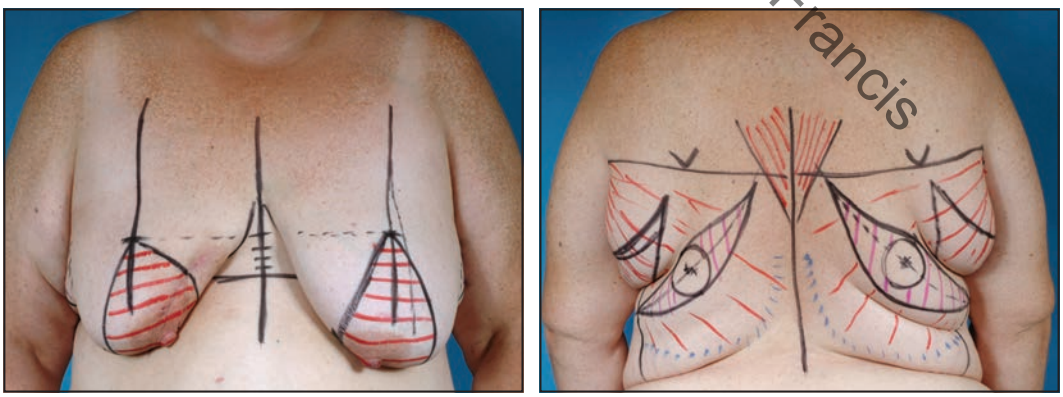
46g Revision of TRAM Flap Breast Reconstruction

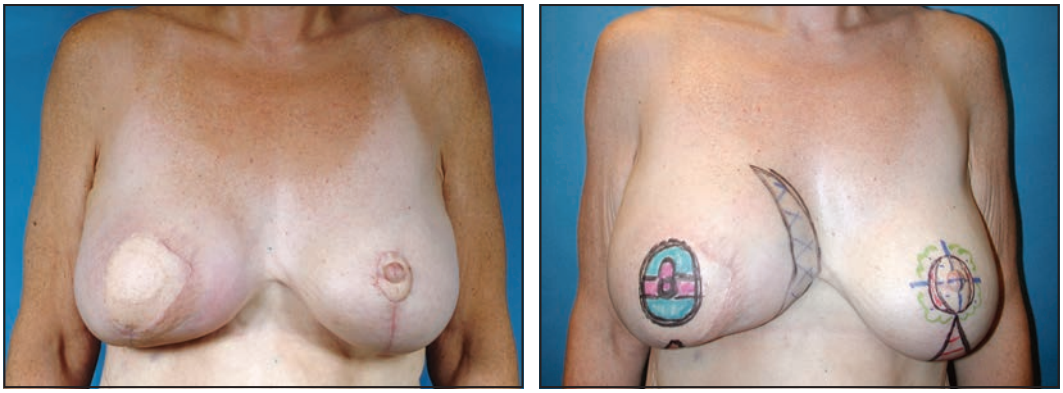
DENNIS C. HAMMOND

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

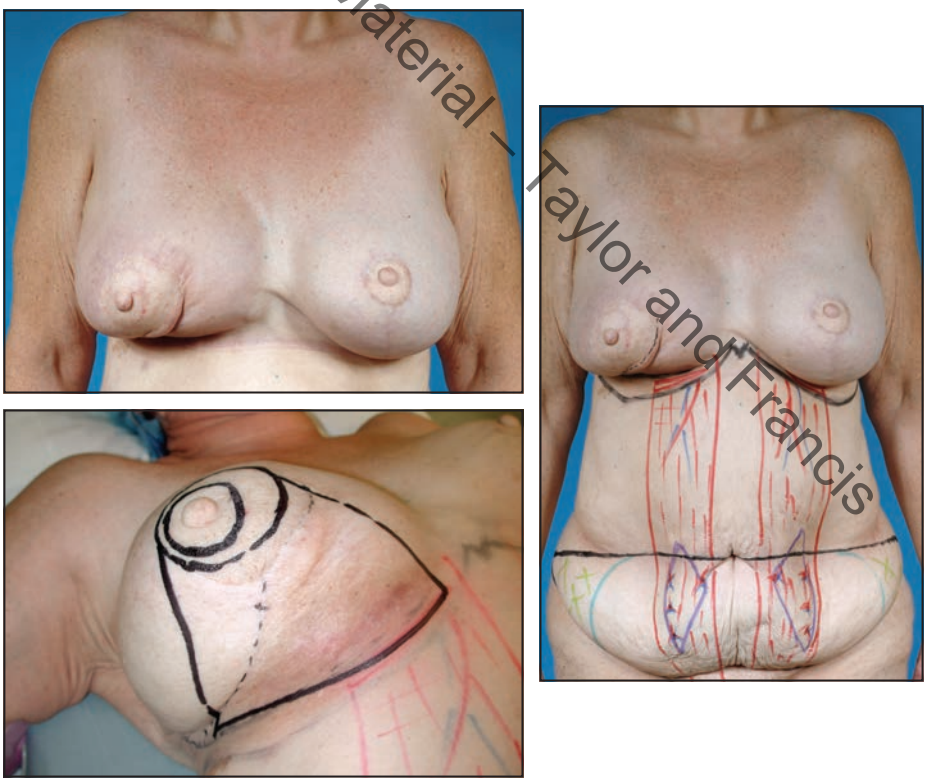
This morbidly obese 42-year-old woman had previously undergone a lumpectomy and radiation for invasive ductal cancer of the right breast. Obtaining adequate resection margins required two separate lumpectomies that resulted in a significant soft tissue defect in the medial aspect of the right breast. This patient's preoperative weight reached as high as 350 pounds. After completion of radiotherapy, she successfully underwent gastric bypass surgery before presenting for definitive bilateral mastectomy because of her continuing concerns about tumor recurrence. At that time she underwent an immediate first-stage bilateral latissimus dorsi myocutaneous flap breast reconstruction along with the placement of tissue expanders.



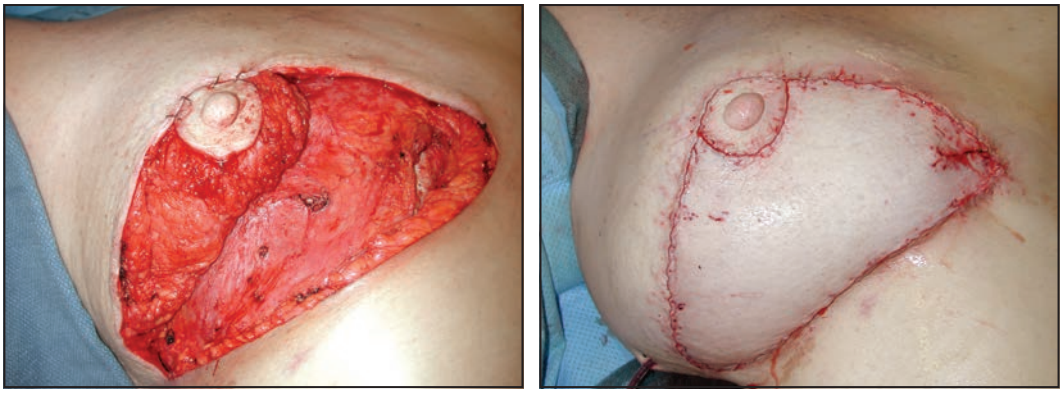
An immediate reconstruction of the left NAC was performed. Over the next year, this patient steadily lost weight, ultimately reaching a stable weight of 190 pounds. Preoperative marks were made in preparation for bilateral skin-sparing mastectomy with immediate latissimus dorsi flap and tissue expander breast reconstruction.



The patient is shown 1 year after expander placement. She had lost approximately 80 pounds from gastric bypass surgery, as shown by the marks in preparation for the bilateral expander replacement with a permanent implant. At that time second-stage reconstruction was performed, exchanging the tissue expanders for permanent 550 cc moderate profile plus smooth round silicone gel implants and reconstructing the right NAC. She subsequently developed a Baker grade IV capsular contracture in the right breast that was treated with capsulectomy.

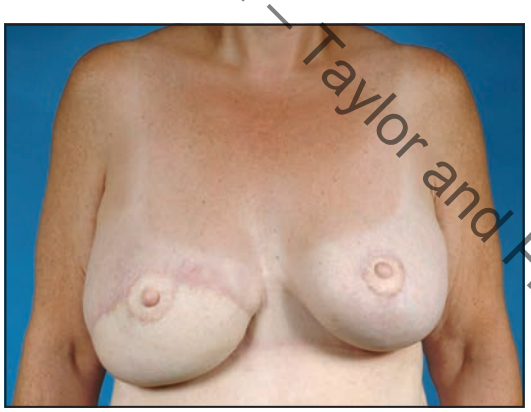


This patient is shown 8 months after capsulectomy on the right with recurrent contracture, soft tissue thinning of the lower pole, and impending exposure of the implant. Preoperative marks were made in preparation for right bipedicle TRAM flap breast reconstruction, and the planned excision of lower pole skin in preparation for TRAM flap insetting.



She is shown after debridement of the lower pole skin. The NAC and the remnant of the previous latissimus flap are left in situ to contribute to the volume and shape of the reconstructed breast. She is shown after insetting of the TRAM flap skin island. Recurrent contracture in the right breast with severe thinning of the skin envelope in the inferior pole, along with impending exposure of the implant, prompted a major revision with conversion to an autologous-based reconstruction using a double pedicle TRAM flap breast reconstruction. Although the TRAM flap survived completely, this patient has presented with an additional deformity in the right reconstructed breast and is seeking additional revision.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS



This patient is shown 8 months after insetting of the TRAM flap. There is asymmetry in the location of the IMF, the position of the NAC, and the shape and volume of the reconstructed breasts. She also has loss of the right IMF, asymmetry in the volume of the breasts and the position of the reconstructed NACs, and an irregularly shaped and redundant TRAM flap skin island. The breast is otherwise soft without any evidence of fat necrosis. The left breast is soft and otherwise without complication.

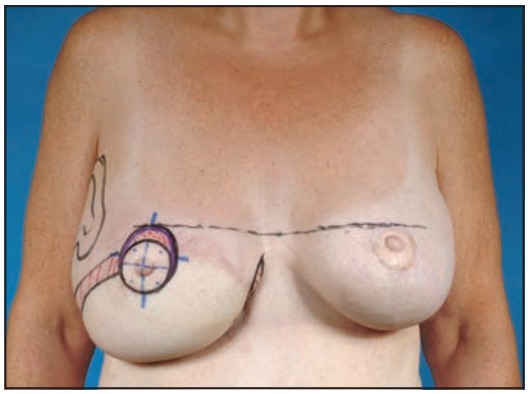
ANALYSIS OF THE PROBLEM

In the process of insetting the TRAM flap, an excessively large TRAM flap skin island was inset into the defect present in the lower pole of the right breast. In addition, during debridement of the compromised skin and management of the previous capsule, the IMF was excessively lowered, creating an asymmetric breast footprint when compared with the left breast. As the swelling associated with the procedure resolved, the entire right breast and NAC drifted even lower, creating a significant asymmetry when compared with the left side.

RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Perform a second-stage TRAM flap revision to the right breast to provide the desired symmetry
- ☐ Artistic reduction of the skin envelope of the TRAM flap so that the lower pole of the right breast is smoothly and accurately reconstructed to match the left side
- ☐ Simultaneous reduction of the volume of the right breast to match the size of the left breast
- ☐ Suture plication of the IMF higher up under the breast to provide a stable foundation to the breast and to create a fold that is symmetrical with the opposite side to allow the patient to wear a support garment comfortably after surgery
- ☐ Incorporation of a small mastopexy cutout in the skin resection pattern superior to the NAC to provide a lift to the NAC position, and preoperative marks in preparation for second-stage TRAM flap revision

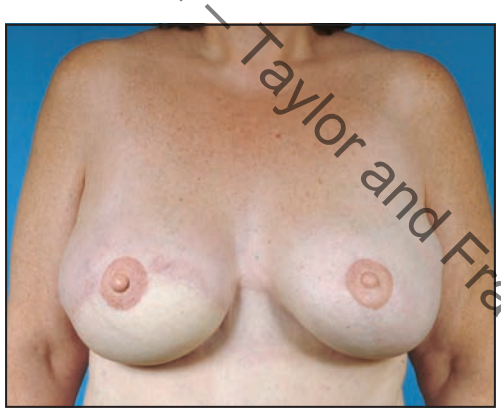
TECHNIQUE



The procedure was performed on an outpatient basis with this patient under general anesthesia. The first maneuver was the repositioning of the IMF to provide a stable foundation to the breast.


Next the volume was adjusted using standard liposuction to carefully remove the desired amount of volume. Finally, the skin envelope was plicated around the entire periphery of the TRAM flap skin inland using the "hammock effect" of the flap to shape the lower pole. Incorporating a small mastopexy cutout into the skin resection pattern accomplished the desired lift of the NAC position. The photo shows her immediate appearance after revision of the right reconstructed breast.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS


The final result is shown 3 years after the original TRAM flap was performed. The reconstructed NACs have been tattooed. Despite the two different methods of reconstruction, reasonable symmetry between the two breasts has been obtained. Important anatomic landmarks including the IMF, breast volume and shape, and the position of the NAC are quite symmetric, leading to an overall aesthetic reconstructive result.

TEACHING POINTS

Despite a long reconstructive process, the final result shows an excellent aesthetic result, particularly when considering the fact that multiple complications have been overcome. Most of these complications can be traced back to the original preoperative condition when radiation to the right breast compromised these tissues and led to the original and most significant complications of capsular contracture. In addition, this case highlights the challenges presented by a "delayed" breast reconstruction, in which a TRAM flap is inset into a defect using not only the volume of the flap but also the skin island of the TRAM to shape the breast together. Adjusting the TRAM skin island to the proper dimensions is an artistic challenge that very often requires a secondary revision to get it "just right." However, when all of these elements are managed appropriately, outstanding aesthetic results can still be achieved.

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46h Completion of Previous Lumpectomy and Radiation With Nipple-Sparing Mastectomy and a Buried TRAM Flap

JACK FISHER

PATIENT HISTORY LEADING TO THE SPECIFIC BREAST PROBLEM

This 49-year-old patient had undergone a bilateral breast augmentation with subglandular implants 8 years previously. Two years after the original augmentation, she developed cancer in her right breast and was treated with lumpectomy and radiotherapy. The original breast implant had been left in place. She then developed recurrent capsules with Baker grade IV firmness and underwent multiple capsulectomies unsuccessfully. At the time she was seen, she had already had three open capsulectomies and complained of a tight, hard breast with pain and discomfort.

ANATOMIC DESCRIPTION OF THE PATIENT'S CURRENT STATUS

On physical examination, the right breast is firm and displaced superiorly. Her right IMF is elevated, and the breast is essentially fixed to the chest wall. The right NAC is in a fairly good position, and she has fairly good symmetry although her right breast is slightly smaller compared with her left breast.

The patient has had previous pregnancies and has adequate lower abdominal fat for use with potential breast reconstruction.

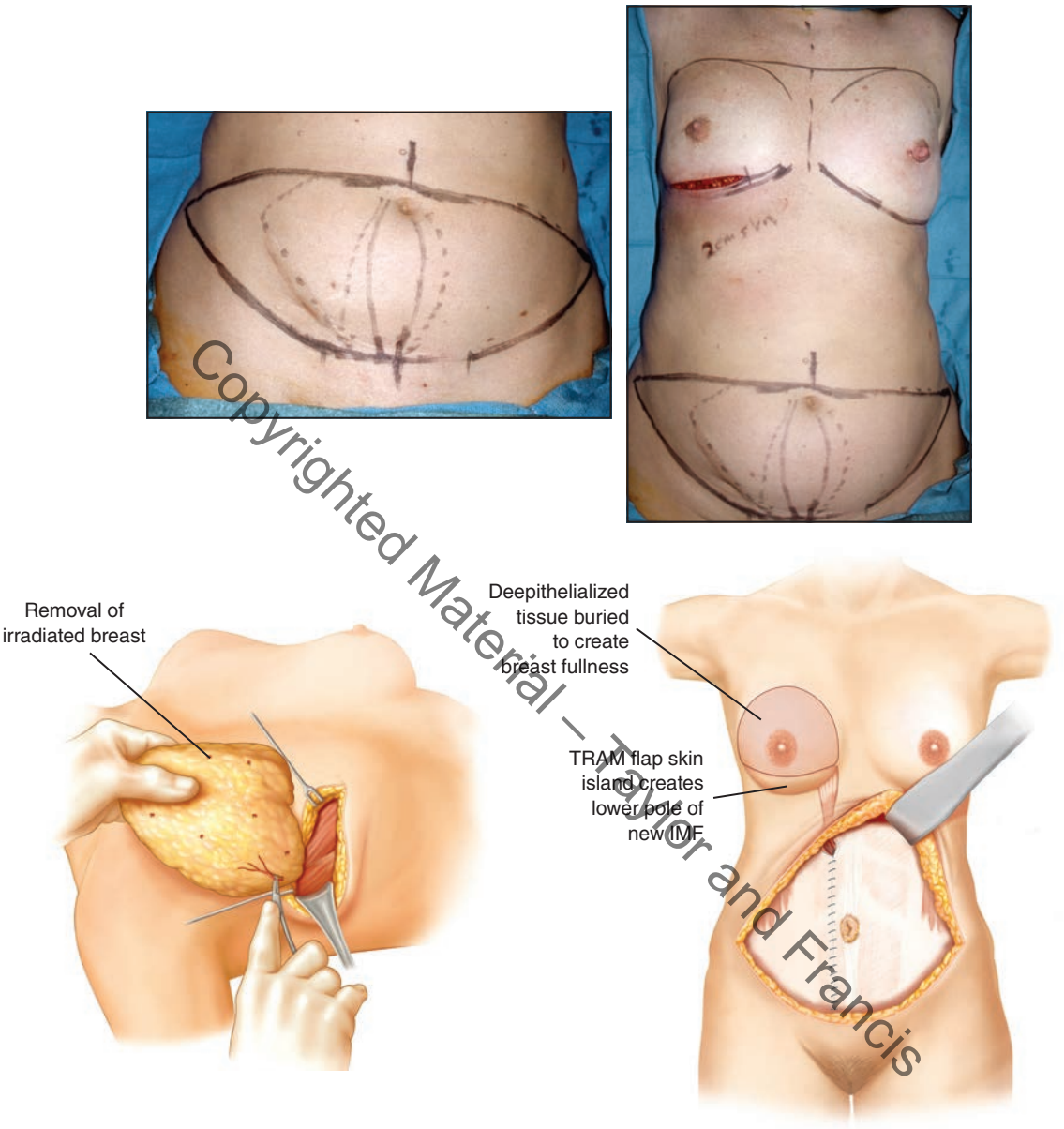
ANALYSIS OF THE PROBLEM

It is common for patients with implants in place to have significant problems with capsular contracture after radiotherapy. If the implant is in the subglandular space, severe capsular contracture is almost guaranteed after radiation treatment with lumpectomy. The fact that the patient had recurrent capsular contracture after three open capsulectomies demonstrates that surgery cannot solve the underlying biologic problem in this patient. The only solution is replacement with healthy vascularized tissue to replace the tissue that was damaged by the radiation treatments. Because this patient has remaining breast tissue that is at risk for recurring cancer, an important option to consider is a completion mastectomy at the time of breast reconstruction.

RECOMMENDED SOLUTION TO THE PROBLEM

- ☐ Performing a nipple-sparing mastectomy through an inframammary incision
- ☐ Simultaneous use of a unilateral deepithelialized TRAM flap with a small skin island to reconstruct the breast
- ☐ Repositioning of the contracted IMF as a result of the radiation treatment
- ☐ At the time of the nipple-sparing mastectomy, transmit tissue cores from the subareolar area for study to assess for any disease requiring removal of the NAC (results were negative)

TECHNIQUE



An inframammary incision was made along the length of the contracted right breast. Using sharp dissection, the overlying skin flap was separated from the underlying breast tissue. The firm, irradiated breast mound was then dissected off the underlying musculature and removed through the inframammary incision. The breast specimen was appropriately marked for pathologic evaluation. A TRAM flap with a vertical skin island along the medial portion of the flap was raised in a unilateral fashion. Except for the small ellipse of skin, the entire flap was deepithelialized while it was still sitting on the abdominal wall. A muscle-sparing pedicle was elevated and the flap was inset, with the skin island re-creating the previously constricted IMF.

POSTOPERATIVE PHOTOGRAPHS AND CRITICAL EVALUATION OF RESULTS

The patient obtained an excellent result with both adequate volume and contour. The skin island allowed the lower pole of the breast to relax, and it also created a new IMF. The patient is shown preoperatively, 8 months after surgery, and again 3 years after surgery. At 8 months after surgery, the patient maintained a soft breast with good contour, and she continued to have an excellent result at 3 years after surgery.

TEACHING POINTS

Irradiated subcutaneous implants almost always develop severe capsular contracture. In this case this is verified by the fact that the patient had three unsuccessful open capsulectomies. The skin envelope after radiotherapy is usually retracted; frequently, a small skin island is required to reestablish the original surface area. Because irradiated tissue remaining in the breast is at risk, it was appropriate to do a completion mastectomy before flap reconstruction.

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