



Adrian Deckbar. *Cool Light*. Pastel, 29" × 43". Courtesy of the Hanson Gallery, New Orleans, Louisiana.

*A better understanding
exists of the various methods
of breast reconstruction after
mastectomy.*

Postmastectomy Breast Reconstruction: Current Techniques

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Background: *The techniques of breast reconstruction have evolved and matured over the past 25 years. Recent studies have proven the benefit of breast reconstruction for breast cancer patients.*

Methods: *The authors reviewed the recent literature on the techniques of breast reconstruction and the effects of reconstruction on patients following surgery for breast cancer. The findings in recent studies are correlated with the experience of the authors.*

Results: *A better understanding has been gained regarding surgical techniques of breast reconstruction as well as the proper indications for the various methods. The criteria of patient benefit have been defined by recent long-term studies.*

Conclusions: *Breast reconstruction following mastectomy has been proven to be a safe and beneficial procedure.*

Introduction

In 2001, an estimated 192,200 patients will be diagnosed with breast cancer in the United States.¹ In the next 20 years, the age incidence of breast cancer combined with the aging of the US population is

expected to result in more than 400,000 new cases of breast cancer annually in the United States.

Over the past 20 years, the surgical techniques of breast conservation surgery have been refined and can now be used for nearly three quarters of all breast cancer patients. For patients who need to undergo a mastectomy for adequate surgical treatment of the breast cancer, a variety of reconstruction approaches are available that range from simple to complex.

We believe that breast cancer is unique among the several malignancies in that the treatment has a profound effect on how the patient feels about herself and how the world views her. The alteration of

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body form in the treatment of breast cancer affects the societal, professional, and intimate relationships of the patient. The preservation of a normal breast via breast preservation surgery for breast cancer or breast reconstruction following mastectomy for breast cancer has been proven to be valuable from a psychological viewpoint.

Preoperative Consultation

The patient with recently diagnosed breast cancer is confronted with an overwhelming amount of information from which she must make critical choices. The optimum surgical approach for the removal of the cancer should be recommended by the surgical oncologist. Overall patient survival and local recurrence rate are equivalent for mastectomy and lumpectomy in properly selected patients.² Nevertheless, substantial regional and national differences exist in the use of lumpectomy or breast-conserving surgery. Lumpectomy rates of 10.2% in North Carolina in 1993, 43% in Vermont in 1989, 38% in the United States in 1992, 63.5% in Ontario in 1995, and 79% in United Kingdom in 1996 have been reported.³

Breast reconstruction options should be available to the patient when a mastectomy approach is recommended. Depending on the experience of the surgical oncologist, the patient may not be informed of the options available for reconstruction in her community. In some cases, the patient must seek consultation with a reconstructive plastic surgeon on her own. A close working relationship between the surgical oncologist and a reconstructive surgeon is important for optimum management of the patient.

Skin-Sparing Mastectomy

The mastectomy technique has changed dramatically in the past 50 years from the Halsted radical mastectomy, which sacrificed skin and muscle of the chest wall as well as the axillary anatomy. Today we know that the skin envelope of the breast can safely be preserved in the absence of direct tumor invasion. The breast tissue, the nipple areola complex, and the biopsy scar are included in the resected mastectomy specimen. In many cases, this can be achieved by performing the mastectomy through an obliquely oriented elliptical incision that encompasses the nipple areola complex and the adjacent biopsy scar. If the diagnosis of cancer has been made by fine-needle aspiration or needle-core biopsy, the mastectomy can be accomplished through a periareolar incision in many patients.

Preservation of the infra-mammary fold as well as the skin envelope is critical for an optimum reconstruction. Earlier mastectomy techniques often involved sacrifice of the underlying tissues through the infra-mammary fold area and to the level of the costal margin. This inferior extension is unnecessary for clearance of the cancer. Preservation of the breast skin envelope permits an anatomic reconstruction using either autologous tissue or implants. Several long-term studies have shown equivalent local recurrence rates for patients undergoing conventional mastectomy or skin-sparing mastectomy.^{4,5}

The sentinel node approach to the axilla preserves the axillary lymphatic anatomy in the 70% of breast cancer patients who do not have axillary nodal metastases and in whom only the sentinel nodes are removed. Preservation of the axillary anatomy essentially eliminates the risk of lymphedema and postmastectomy pain syndrome.²

Timing of Reconstruction

Breast reconstruction can begin at the time of mastectomy or anytime following adjuvant treatment. During the early development of breast reconstruction techniques, reconstruction was performed separately following mastectomy. Combining a reconstructive procedure with the tumor ablative procedure presented several concerns — the combination surgery might increase the complication rate, recovery might be prolonged, and the addition of the reconstructive procedure might delay postoperative adjuvant treatment. Over the past 20 years, these concerns have proven to be invalid, and the trend throughout the country is toward more immediate reconstructions.

The extent of the transition to immediate rather than delayed reconstruction has varied widely from one area to another throughout the country. In a National Cancer Database study, Morrow and colleagues⁶ reported on 155,463 patients undergoing mastectomy between 1985-1990 and on 68,348 patients between 1994-1995. They found that 3.4% of mastectomy patients had immediate reconstructions between 1985-1990 and 8.3% had immediate reconstruction in the 1994-1995 period. Patient age, income, geographic location, type of hospital where treatment occurred, and tumor stage all influenced the use of reconstruction. Patients under 50 years of age with early-stage cancer in higher income groups treated at a National Cancer Institute-designated cancer center in regions other than the Midwest or South had higher rates of immediate reconstruction. Currently at our institute, 85% of patients undergoing reconstruction initiate it at the time of mastectomy.

Immediate reconstruction can safely be performed even in the presence of locally advanced breast cancer. In a report from the M.D. Anderson Cancer Center,⁷ the outcomes of patients with locally advanced breast cancer who underwent immediate reconstruction were assessed and compared with patients with less extensive disease who also underwent immediate breast reconstruction. Between 1990-1993, 540 patients underwent modified radical mastectomy with immediate breast reconstruction. Of these patients, 50 presented with locally advanced breast cancer and underwent preoperative chemotherapy in addition to postoperative radiation and chemotherapy. The addition of the reconstructive procedure did not adversely affect the adjuvant treatment. The local and distant relapse rates were similar for patients with locally advanced breast cancer undergoing modified radical mastectomy with or without immediate breast reconstruction.

Delayed reconstruction is preferable for some patients. Those who are overwhelmed by the diagnosis of breast cancer and the discussion of surgical and medical approaches to treatment may not be able to make a sound decision regarding their preferences for breast reconstruction at the time of the mastectomy. For such patients, a step-by-step approach that addresses tumor management first and the reconstructive procedures later may be more appropriate. Delayed reconstruction may also be preferable in patients with extensive tumor involvement of the breast and in those with inflammatory carcinoma and/or extensive lymph node involvement who will likely undergo extensive postoperative chemotherapy and radiation. The best approach for the reconstruction will depend on the overall status of the patient and the condition of the breast area soft tissues following treatment.

Implant Reconstruction

All breast reconstructions require more than one operation, and the process may extend over many months. Breast reconstruction using implants is the simplest technique and is the approach chosen by three fourths of the patients undergoing breast reconstruction at our institution. Reconstruction of the breast form begins with the placement of a tissue expander beneath the pectoralis muscle and laterally beneath the anterior aspect of the serratus anterior muscle. The tissue expander is a saline-filled envelope to which saline can be added in stages postoperatively. Some fluid is placed in the tissue expander at the time of expander placement. The patient is usually hospitalized overnight if immediate tissue expander reconstruction is performed. When the tissue expander is placed in a

delayed fashion sometime after the mastectomy, the operation is performed on an outpatient basis.

Following complete healing in 3 to 4 weeks, additional volumes of saline are added at the rate of 60 mL per visit, which usually occurs on a weekly basis. The tissue expander is removed, and the permanent implant is placed at least 3 months following the initial procedure or after the completion of chemotherapy. The removal of the tissue expander and the placement of the permanent implant are performed on an outpatient basis.

The permanent implants may be filled with either saline or silicone gel. In 1992, the US Food and Drug Administration established a moratorium on the use of silicone gel-filled implants for breast augmentation. Since that time, these implants have been available under protocol from the companies for reconstructive purposes.

Over the last 10 years, the majority of breast reconstructions have utilized saline implants. Several problems have been associated with the use of saline implants. Wrinkling of the implant in the upper quadrant of the breast due to the thin soft-tissue cover occurs in 30% of patients undergoing reconstruction. Recommendations have been made to overfill the saline implant in an effort to reduce the incidence of wrinkling. While this may reduce wrinkling of the breast implant, the overfill technique produces a breast form that is excessively firm. Perhaps the best breast contour patient can be achieved with anatomical or teardrop-shaped saline implants. However, overfill of the anatomical implants may cause a loss of the anatomical shape.

All breast implants are synthetic products with a finite life span. If the saline breast implant ruptures, the saline is absorbed by the surrounding tissues over a period of a few hours. This is not dangerous, but the implant should be removed and/or replaced within a few weeks. Long-term studies have defined the expected life span of the saline implants. A multicenter study reviewed the outcome of 882 saline-filled breast implants placed in 450 patients between 1980-1986 with a mean patient follow-up of 13 years. Excluding known iatrogenic or traumatic deflations, the implant actuarial survival was 98.8%-99.5% at 5 years and 97.9%-99.5% at 10 years (95% confidence interval).⁸

We believe the silicone gel-filled implant provides a more satisfactory breast reconstruction for patients requiring implants of 350-500 mL and in whom the soft-tissue coverage is relatively thin. The silicone gel-filled implant provides a softer breast form, and the



Fig 1. — Right breast reconstruction with submuscular 660-mL saline-filled implant, bowtie nipple reconstruction, and tattoo of nipple areola complex.

anatomical shapes available have been acceptable to many of our patients.

The systemic safety of silicone gel-filled implants has been confirmed by several studies over the past 10 years in addition to a satisfactory clinical experience of nearly 40 years. A recent extensive meta-analysis⁹ reviewed nine cohort studies, nine case-control studies, and two cross-sectional studies that met stringent inclusion criteria. No evidence was found to indicate that silicone gel-filled breast implants were associated with a significant increase in the summary adjusted relative risk of individual connective tissue diseases, including systemic lupus erythematosus, scleroderma, Sjögren's syndrome, all connective tissue diseases combined or other autoimmune or rheumatic conditions.⁹

Silicone gel-filled breast implants may rupture at some point in time. If the implant should fail, the silicone gel can be expected to be contained by the scar tissue capsule that forms around the implant. The intracapsular free gel may stimulate an increased thickness of the scar tissue capsule. The patient may notice

increased firmness of the breast, which may cause soreness in the breast area. Mammography, ultrasonography, or magnetic resonance imaging can reveal a rupture of a silicone gel-filled implant. However, radiology techniques may yield false-negative or false-positive results. Intraoperative examination is the only certain method to evaluate implant integrity. Removal and replacement of the implant are indicated if rupture occurs.

Nipple areola reconstruction begins 3 months after placing the permanent implant. The nipple is constructed using a bowtie-type flap procedure of the breast skin. Three months later, the areola is created using a tattoo technique (Fig 1).

There are practical limits to the size of the breast that can be reconstructed using implant techniques. The risk of wound-healing problems and late breakdown of the relatively thin overlying soft tissue increases if the implant volume exceeds 600 mL.

Autologous Tissue Reconstruction

A practical approach to the use of the patient's own tissues for breast reconstruction began in 1977 with the reintroduction of the latissimus dorsi flap. Earlier approaches to reconstruction of the breast using tissue flaps involved multiple procedures with extensive scarring and generally unsatisfactory breast form creation. The latissimus dorsi myocutaneous flap was the method of choice for autologous tissue breast reconstruction until the introduction of the transverse rectus abdominis musculocutaneous (TRAM) flap in 1982.¹⁰

The latissimus dorsi muscle with overlying skin ellipse can be transferred from the back to the breast area.¹¹ An implant placed beneath the flap is usually necessary to provide adequate bulk for the breast



Fig 2. — (A) Preoperative view. Status post right modified radical mastectomy. (B) Right breast reconstruction with latissimus dorsi flap plus 440-mL saline-filled submuscular implant, bowtie right nipple reconstruction, and tattoo of the nipple areola complex. Left breast is augmented for symmetry with 310-mL saline-filled implant.

reconstruction. This flap is reliable, with flap loss reported to be less than 1%.¹¹ In most cases, we plan the placement of a tissue expander implant beneath the latissimus dorsi flap when the flap is constructed. Three months later, the tissue expander is removed and a permanent implant is placed (Fig 2). A 2-day hospitalization is usually required for a mastectomy with either immediate or delayed latissimus dorsi flap plus tissue expander reconstruction. Early long-term follow-up studies have reported a high incidence of firm capsular contracture in patients who have undergone latissimus dorsi flap implant breast reconstructions.¹² Experience with this technique at our center in the last few years using saline or third-generation silicone implants has been favorable. We have not seen any patients with firm capsular contractures that required secondary procedures.

The advantage of the TRAM flap procedure is the provision of adequate soft-tissue bulk to provide a breast reconstruction without the use of implants. The TRAM flap consists of a skin ellipse and the underlying subcutaneous tissue from the mid abdomen pedicled on one or both of the vertical abdominal rectus muscles. The principal blood supply of the pedicled flap is the superior epigastric artery, a terminal branch of the internal mammary artery. The TRAM flap can be transferred as a microvascular free flap based on the inferior epigastric artery. When transferred as a microvascular free flap, a smaller segment of the rectus muscle is sacrificed. There is a significant learning curve to master the free flap technique. The experience of one center performing 185 free TRAM flaps demonstrated a nearly 50% complication rate among the first 50 patients.¹³ However, an eventual complication rate of approximately 20% was achieved as experience was gained.

The microvascular free TRAM flap approach has been extended by the development of the deep inferior epigastric perforator (DIEP) flap in which the skin and subcutaneous tissue island are transferred based only on the perforating branches of the deep inferior epigastric vessels. This is a more challenging technical operation. In a study of 23 patients with a DIEP flap compared with 27 patients with the free TRAM flap performed by the same surgeons, the DIEP group experienced less abdominal wall weakness, and the TRAM group reported a higher level of abdominal pain and more functional difficulties. Even with preservation of essentially all the rectus muscle anatomy in the DIEP group, some abdominal wall weakness was noted.¹⁴

The TRAM flap can provide skin cover for the breast, and if the breast skin envelope is adequate, the skin ellipse of the TRAM flap can be de-epithelialized



Fig 3. — TRAM flap right breast reconstruction

and placed beneath the skin of the breast for added bulk. The skin of the TRAM flap can replace the area of the areola in patients who have undergone mastectomy through a periareolar incision. The TRAM flap reconstruction can best match a pendulous or ptotic opposite breast. A unipedicle TRAM flap right breast reconstruction is illustrated in Fig 3. The procedure tightens the skin of the abdomen, which many patients consider an additional benefit of the operation.

The TRAM flap breast reconstruction is currently the first choice for patients desiring autologous tissue reconstruction. It can provide a satisfactory breast form that, when completed, represents a permanent lifelong result. However, this is a formidable operation both for the patient and the surgeon. A 4- or 5-day hospitalization is required, and realistic time for recovery to normal physical activities is 6 to 8 weeks. The anatomy and strength of the abdominal wall are affected by the removal of one or both vertical rectus muscles. Some permanent limitation of normal activities occurs. Hernia formation, which may occur in up to 5% of patients, may require additional surgery. The procedure should be avoided in patients who are significantly overweight, and many surgeons will not perform the operation in patients who smoke. If the flap were to fail due to vascular perfusion problems, the patient would have been put through a major operation that resulted in considerable morbidity, necessary reconstructive surgery, and no benefit.

Effects of Radiation Therapy on Breast Reconstruction

The use of radiation therapy in the adjuvant treatment of breast cancer has increased in the past few years due to its positive effect in decreasing local recurrences as well as its recently proven benefits in patient survival. Some of the issues raised concerning breast reconstruction in patients who have had or potentially

require radiation include its effects on soft tissues, the role of timing of radiation in patients who present with breast cancer, and, most importantly, the choice of breast reconstruction that will provide an optimal aesthetic result.

Despite the well-documented therapeutic effects of radiation therapy, it can be a source of potential problems. Changes to the skin caused by radiation have been well documented.¹⁵ Radiation acts directly on cells to chemically damage them, thereby impairing replication. The earliest skin effect is characterized by erythema and desquamation. Immediately after radiation therapy, the breast is edematous with continued generalized erythema. The erythema gradually gives way to the chronic phase, which is characterized by fibrosis, loss of skin elasticity, and contraction. Two major areas of concern after radiation treatment involve the status of the chest wall soft tissues and the viability of the vascular pedicle when using autologous tissue such as the TRAM flap.

When performing breast reconstruction, plastic surgeons should recognize that each case begins as reconstructive but ends as aesthetic. When an additional factor such as radiation therapy is added to the equation, suboptimal aesthetic results need to be minimized. Reports from the literature generally agree that autologous reconstruction such as a TRAM flap or latissimus dorsi flap yields aesthetic results superior to implant reconstruction in the patient undergoing radiation.¹⁶⁻¹⁸ Nevertheless, some patients refuse autologous reconstruction, and others are not good candidates due to age, body habitus, or general health status. Several reports substantiate that implant reconstructions followed by radiation therapy are fraught with complications. The reported complication rate for immediate breast reconstruction with a tissue expander/implant followed by radiation therapy is as high as 30%.¹⁹ Complications such as infection or wound dehiscence can delay the completion of radiation therapy. Determining which patients will need radiation therapy is difficult to predict with reliability; therefore, caution is needed in recommending a tissue expander/implant for immediate breast reconstruction.

Many radiation oncologists believe that the window of time for achieving an optimal response to radiation therapy is relatively narrow, and if radiation is not delivered in a timely manner, the outcome can be compromised. If a tissue expander/implant is the preferred method of reconstruction, consultation with the oncologist is recommended. Changes in the mastectomy flaps following radiation therapy can affect tissue expansion or implant placement beneath the remain-

ing tissues and can result in disappointment for both the surgeon and the patient.²⁰

Autologous reconstruction with the TRAM flap or latissimus dorsi flap is currently the best option of breast reconstruction for patients undergoing radiation therapy. Autologous tissue provides well-vascularized tissue, and additional skin can be brought into the area. The result is a breast form that improves with age and has a warm, natural feel. Williams et al¹⁷ described the effects of radiation treatment after autologous TRAM flap reconstruction. They found that receiving radiation before or after construction does not change the complication rate, but the nature of the complication changes (fat necrosis to fibrosis). However, with the increasing use of free or microvascular transfer of autologous tissue in an irradiated bed, the complication rates of fat necrosis and fibrosis have decreased due to the improved vasculature over that of the traditional pedicled TRAM flaps.²¹

Treatment of the Contralateral Breast

Breast reconstruction rarely produces a breast that is symmetrical with the unaffected contralateral breast. Implant breast reconstructions produce a rounded breast form of a B- or small C-cup size. The implant reconstruction technique cannot produce a pendulous breast form. The TRAM flap technique can potentially produce a more ptotic breast of a larger volume. The transfer of large volumes of tissue in the TRAM flap, however, may lead to increased operative and postoperative complications. Therefore, breast reconstruction by any technique should be limited in volume. This may require alteration of the opposite breast to achieve symmetry. The options available for the contralateral breast include mastopexy, implant augmentation, breast reduction, and prophylactic mastectomy with reconstruction.

A mastopexy (or breast lift procedure) is one of the least satisfactory breast procedures. A pendulous or ptotic breast form is caused by relaxation and stretching of the breast skin. The mastopexy procedure involves incisions and resulting scars on the breast, and recurrence of the breast ptosis is common. The patient is then faced with not only a similar deformity, but also a pattern of breast scars.

The reconstruction of a small breast is unsatisfactory by either implant or autologous tissue techniques. Small-volume implants tend to produce a ball-shaped breast. A minimum volume of tissue must be transferred with the TRAM flap, and this may exceed the volume of a small opposite breast. Therefore, augmenta-

tion of the opposite breast is an option for small-breasted patients undergoing mastectomy. However, the subglandular or submuscular placement of an implant in the opposite breast can make the mammographic follow-up of that breast more difficult. A firm capsule around the implant may also interfere with follow-up physical examination.

For patients with large-volume breasts, reduction of the opposite breast is an option that can yield a satisfactory symmetry with the reconstructed breast. Some patients question whether surgery on the opposite breast will increase the risk of developing cancer in that breast, but there is no evidence that the breast reduction procedure increases their risk. From a cohort of 31,910 women who had undergone breast reduction surgery, a Swedish study reported on 161 patients who developed breast cancer and 483 who did not. The authors found a reduction in breast cancer risk corresponding to the weight of breast tissue removed.²² This suggests that reduction of the contralateral breast decreases the risk of developing breast cancer on that side.

Contralateral prophylactic mastectomy is an option in some patients. Factors likely to influence patients in choosing a contralateral prophylactic mastectomy include family history of breast cancer in first-degree relatives, difficulty in contralateral breast follow-up by palpation or mammography due to dense breast tissue, and the presence of lobular carcinoma in situ in the affected breast. Gershenwald and associates²³ reported a study of 155 patients who underwent synchronous prophylactic contralateral mastectomy and immediate breast reconstruction. Pathology on the contralateral breast revealed lobular carcinoma in situ in 6.5%, ductal carcinoma in situ in 2.7%, and invasive ductal carcinoma in 1.3%. The authors concluded that the use of contralateral prophylactic mastectomy cannot be justified if the only oncologic criterion considered is the incidence of occult synchronous contralateral disease. Nevertheless, in certain high-risk patients a contralateral mastectomy may be the best choice from the standpoint of the patient's peace of mind. For the small subset of patients positive for BRCA1 or BRCA2 genes, prophylactic mastectomy is considered in view of their high risk for the development of breast cancer.

Patients who request contralateral prophylactic mastectomy should understand that the prophylactic procedure will remove the normal breast and that reconstruction can achieve a reasonable breast form at best. The reconstructed breast will feel different from the normal breast. Normal skin sensibility will be lost, and complications associated with the mastectomy and reconstructive procedures may arise.

Patient Benefits of Breast Reconstruction

Several recent studies have reported on the reasons for choosing breast reconstruction as well as the effects of various procedures on the well-being of the patient. In an Australian study,²⁴ 60 women who wore an external postmastectomy breast prosthesis and 31 women who had postmastectomy breast reconstruction were evaluated. The most frequently reported reasons given by patients desiring reconstruction were to avoid external prosthesis, to wear different types of clothing, to regain femininity, and to feel whole again. Among the reasons women decided against reconstruction were fear of complications and the perception of themselves as being too old for the procedure.

Postsurgical studies have confirmed that patients are happier with breast-preserving lumpectomy than with mastectomy or mastectomy with reconstruction. In England, 577 patients who underwent lumpectomy, mastectomy, or mastectomy with breast reconstruction were assessed for psychological outcome and satisfaction. Patient satisfaction of cosmetic outcome and psychosocial aspects was greater with lumpectomy than with either mastectomy alone or mastectomy with breast reconstruction. Significant statistical differences existed in the areas of anxiety, depression, body image, sexuality, and self-esteem. The greatest morbidity was seen in patients undergoing mastectomy without reconstruction.²⁵

In another study, 1,957 breast cancer survivors at 1 to 5 years after diagnosis were examined by standardized measures of health-related quality of life, body image, and physical and sexual functioning.²⁶ Fifty-seven percent of the women underwent lumpectomy, 26% had mastectomy alone, and 17% had mastectomy with reconstruction. Women in both mastectomy groups reported more physical symptoms related to the surgeries than women in the lumpectomy group. The women reported no differences in emotional, social, or role function. However, women who underwent mastectomy with reconstruction were most likely to report that breast cancer had a negative impact on their sex lives. The authors concluded the psychosocial impact of the type of primary surgery is largely in the realm of body image and feelings of attractiveness and that women who underwent lumpectomy had the most favorable outcome.

It is also clear from the literature that immediate rather than delayed reconstruction is beneficial for patients. A retrospective analysis of the psychological advantages of immediate vs delayed reconstruction was undertaken in England.²⁷ A total of 121 patients who

underwent different types of breast reconstruction were assessed for anxiety, depression, body image, self-esteem, sexuality, and satisfaction. Ninety-five percent of the patients who underwent immediate reconstruction preferred the technique, and 76% of the delayed reconstruction group would have preferred immediate reconstruction. Patients who underwent immediate reconstruction recalled less distress and had better psychosocial well-being than those who underwent delayed reconstruction.

Conclusions

For patients with breast cancer, breast conservation is the preferred treatment approach, but mastectomy continues to be the appropriate treatment choice for selected patients. For those patients undergoing mastectomy, the preservation of a normal breast form through breast reconstruction is important to their physical and mental quality of life.

Over the last decade, most breast reconstructions have utilized saline implants, and the systemic safety of silicone gel-filled implants has been demonstrated in several studies. The latissimus dorsi myocutaneous flap was the method of choice for autologous tissue breast reconstruction until the introduction of the TRAM flap in 1982. Options in the treatment of the contralateral breast include mastopexy, implant augmentation, breast reduction, and prophylactic mastectomy with reconstruction.

The surgical treatment of breast cancer can be accomplished in most patients with preservation of both breast and axillary anatomy. Immediate reconstruction has been shown to yield the greatest patient benefit and should be the treatment of choice for most patients. However, delayed reconstruction is preferable for patients who are unable to make a sound decision regarding reconstruction at the time of mastectomy.

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