

## INFORMATION ABOUT BREAST RECONSTRUCTION

The purpose of breast reconstruction is to restore body image and to enable you to wear all types of clothes without restriction. Most women can wear the most revealing styles with complete confidence after breast reconstruction. It is usually impossible to tell which side is the reconstructed side while dressed. The need for an awkward and sometimes embarrassing external prosthesis is eliminated by permanent reconstruction of the breast.

No method of breast reconstruction will precisely duplicate a normal breast. It is not possible, for example, to restore normal feeling. Some techniques have limitations in terms of creating a soft breast as well as imitating the natural sag of a mature breast. It is impossible to eliminate the scar that results from mastectomy although it can frequently be integrated into the reconstruction so that it is less obvious. Despite these shortcomings, the vast majority of women are very pleased with the results achieved by breast reconstruction.

Breast reconstruction is a complex subject. This information letter contains detailed information about the techniques currently in use. Although it will answer most of your questions it will be necessary to read this several times to absorb all of the material presented. Certain parts of this letter will be more relevant to your care than others. After your consultation you will be able to focus specifically on the parts that pertain most to you.

### Reconstruction with Breast Implants

The most common form of breast reconstruction utilizes a breast implant to rebuild the breast mound. This technique does not add new scars to the body. Implant reconstruction requires less extensive surgery but more procedures are required to complete the process. Implants may be silicone gel or saline filled. Both implants have an outer silicone shell.

Not all women are candidates for implant reconstruction. Those with small breasts that do not sag are the best candidates. Breasts that are large or have a lot of sag are difficult to simulate with an implant. Larger breasts usually require a reduction and lift on the normal side in order to achieve symmetry.

Those who have received chest wall radiation prior to reconstruction generally are not candidates for standard implant techniques, with rare exception. The chance of complications requiring removal of the implant is very high in this setting. Other alternatives are available for those who have received radiation and this is presented in greater detail later.

### Breast Implant Controversies

Breast implants are thin-walled containers made of silicone elastomer which are filled with saline (salt water) or silicone gel. They have been in use for over thirty years and have an excellent safety record. Although there has been concern that the *silicone gel* in silicone filled implants may cause the development of autoimmune diseases, no studies to date have shown this to be true. Saline filled implants have not been implicated in this regard. After extensive study, the FDA approves the use of both types of implants.

Some consumer advocate groups have warned that breast implants may cause cancer. Cancer caused by an implant has *never* been reported in humans. Moreover, the laboratory evidence on which this conjecture is based is highly suspect.

### Implant Rejection, Capsule Formation, and Other Issues

True "rejection" of an implant is extremely rare. The hard silicone plastic used to make the implant shell is one of the most biologically nonreactive materials known. However breast implants, like any other foreign material placed in the body, can become infected and require removal.

The body normally forms a layer of scar tissue around any artificial material implanted beneath the skin. In most women the "capsule" that forms in response to a breast implant remains thin and pliable. In some patients the capsule is unusually strong and results in a firm breast.

The variability in capsule formation is a reflection of each individual's biologic response to an implant. As a result, this factor is both unpredictable and uncontrollable.

Excessive capsule formation can be painful and distort breast shape. This condition, called "capsular contracture", may require surgery to relieve symptoms. Fortunately severe capsular contracture is rare.

Saline implants, like all man-made devices, wear out eventually. The majority last at least ten years but the actual lifespan of currently used implants is unknown. When the implant shell fails after many years the saline fluid is released and is absorbed by the body without harm. The situation becomes obvious when this occurs because the breast goes flat almost immediately. Replacement requires a short surgical procedure performed on an outpatient basis. It is best if the implant is replaced within seven to ten days of deflation, if possible. Gel implants ultimately suffer the same fate and the outer capsule may rupture. In the case of gels, however, this event may be undetectable as the capsule, which has formed over time, acts as an outer shell keeping the gel in place. Whether the implant is removed or left in place is decided by mutual agreement of the patient and the surgeon and this may be decided over time.

Saline implants have some aesthetic limitations compared to silicone gel implants. In thin patients, rippling of the upper breast skin can occur. This may require adjustment by surgery if the ripples are quite prominent. Sometimes a small fold in the implant cover can be felt through the skin. Although this may be of concern when discovered for the first time, this is harmless and does not require treatment.

For more information about breast implant safety, go to [www.breastimplantsafety.org](http://www.breastimplantsafety.org).

## The Role of Tissue Expanders in Implant Reconstruction

A mastectomy normally removes a variable amount of breast skin with the nipple. The amount removed depends on tumor size and also the location of the biopsy scar. The skin circulation and its healing ability are also compromised by mastectomy. Both of these factors prevent the immediate placement of a permanent implant at the time of mastectomy in virtually all patients. Tissue expansion is a process that replaces the missing skin in preparation for placement of a permanent implant later.

A tissue expander is a balloon like device made from elastic silicone rubber. It is inserted into a pocket under the skin and muscle of the chest. It is similar in construction to a saline implant but the shape is different, it has an adjustable capacity, and it contains a metal port for fluid injection.

The expander is usually placed in its collapsed form at the time of mastectomy. Beginning about two weeks after surgery fluid is introduced by needle into the tissue expander to partially inflate it. This is repeated during weekly office visits to gradually expand the skin of the chest.

Expansion is completed in approximately eight weeks. Four weeks are then allowed for the skin to stabilize and loosen. After this time the tissue expander is replaced with an implant as a separate surgical procedure. If needed, an augmentation, a reduction, or a lift of the opposite side is usually performed at the same time.

Many women ask why two procedures are mandatory. The main reason is that it is not possible to control the shape accurately enough to match the opposite breast as skin expansion progresses. Therefore a second procedure is required both to place a permanent implant of the appropriate volume and to tailor the expanded skin into a natural breast shape. In addition, it is often necessary to adjust the expander pocket position on the chest as well as redefine the natural crease under the breast.

Tissue expanders, like implants, can become infected. Although this happens rarely, the expander usually must be removed if this happens. After the infection has subsided it is safe to begin the process again.

The expansion process causes a sensation of pressure in the chest which can be uncomfortable. The amount of pressure created is directly related to the amount of fluid added to the expander at each visit. This amount is adjusted on an individual basis so that discomfort is minimized.

If you are an implant candidate and Dr. Zenn and your surgical oncologist deem you to be a candidate for a skin-sparing mastectomy, then you may be eligible for an immediate single stage reconstruction without the need for tissue expansion. In these cases, there will be enough healthy, viable skin left after mastectomy that a final implant can be placed under a "sling" constructed of pectoralis muscle and a biologic substitute (Alloderm™, Stratus™, etc.). Most candidates will be a C cup or smaller or candidates for nipple sparing mastectomy where the entire breast envelope will be saved. Risks and complications of implant reconstruction remain but the tissue expansion process is avoided.

### Reconstruction with Body Tissue

A breast mound can also be created with tissue borrowed from another part of the body. Breasts reconstructed in this fashion are soft and have a natural shape. It is therefore much easier to match the remaining breast with this technique. Fewer procedures are required to complete the reconstruction compared to implant techniques. The reconstruction is permanent and rarely requires "touch up" procedures later in life. The main disadvantages are that there will be a scar left at the site where the tissue is taken from and that the operation takes a long time. The most common area used to donate tissue for breast reconstruction is the lower abdomen. This is called a TRAM flap or DIEP flap. The back tissues can be used sometimes and this is called a latissimus dorsi flap. Often times an implant must be used with this latissimus dorsi flap to create adequate breast projection. This can be done at the time of mastectomy or in a delayed fashion. The buttock, or gluteal area, is also used but only in special situations.

## TRAM Flap Reconstruction

You must have sufficient tissue in the lower abdomen to be a candidate for this procedure. The scar that results when the abdomen is used is conspicuous in that it extends from side to side at a level midway between the navel and the pubic hair area. "Tummy tucks" that are done for purely cosmetic reasons have a lower scar. The contour of the abdomen following a TRAM flap procedure is usually improved but the abdomen is never perfectly flat, particularly in those who are significantly overweight to begin with. It must be kept in mind that the primary goal of this procedure is to reconstruct the breast, not tighten the abdomen. Complete recovery from this procedure takes six to eight weeks.

The excess skin and fat from the lower abdomen is moved to the chest area by sliding it underneath the upper abdominal skin to reach the mastectomy site. The tissue remains attached to one of the abdominal muscles which is loosened enough to allow the tissue to move upward. The rectus muscle provides blood supply to the skin and fat tissue that will form the breast.

Use of the muscle can result in abdominal weakness because one of the two main abdominal muscles is no longer functional. Use of the entire muscle is also responsible for much of the abdominal discomfort experienced right after surgery. After recovery from surgery most women do not notice a change in abdominal strength or abdominal function after sacrifice of one of the muscles. If two muscles are sacrificed the change in strength is more noticeable, however most women continue to be fully functional.

## Free TRAM flap or DIEP flap

There is another technique to move tissue from the abdomen. Instead of sliding the fat and skin tissue still attached by muscle, the entire piece of tissue is completely detached from the body, moved to the chest, and then its blood vessels are reattached using microsurgery. A large block of tissue that is completely detached from the body in this way is referred to as a "free flap".

Only a small amount of muscle is harvested with a free TRAM flap, so initial recovery is easier than a standard TRAM.

If possible, a free TRAM can be harvested with no muscle, just the perforating blood vessels. This is called a perforator flap (Deep Inferior Epigastric Perforator flap or DIEP flap). The decision regarding how much muscle will be harvested will be decided in the operating room depending on your anatomy.

The microsurgical approach (free TRAM or DIEP) has become the preferred method of transfer of abdominal tissue in my practice. I feel that it provides the best blood supply and the least amount of abdominal problems (like weakness or bulges).

Although there are distinct advantages to a free flap approach to TRAM reconstruction, there is one major potential problem. In a certain percentage of patients the microsurgery portion of the procedure is not successful. If this happens the entire piece of transferred tissue is lost. Breast reconstruction must then be done by another technique at a later date. The donor site scar remains and great effort will have been expended in an unsuccessful attempt to reconstruct the breast. Women who smoke and those who have other risk factors such as obesity and diabetes are more likely to have this problem. However this same group derives the most benefit from a microsurgical approach because of the superior circulation provided to the tissue by this technique. Those who have a history of back problems are also good candidates for the microsurgical option because only a small portion of one abdominal muscle is used.

A small piece of artificial material (usually Prolene mesh) is sometimes used to strengthen the area where the muscle is taken from. This material is well tolerated by the body and does not cause problems once healing is complete. In rare instances, this mesh can get infected and may require removal. Occasionally a bulge will develop in the lower abdomen despite taking this precaution. Rarely, additional surgery may be indicated to correct the bulge if it is significant.

Every attempt is made at the time of TRAM flap reconstruction to finalize the shape of the reconstructed breast. However due to swelling that develops during surgery it is often not possible to match the volume and shape precisely. It may therefore be necessary to touch up the shape later, either at the time of nipple reconstruction or as a separate procedure. This procedure,

called revision of the reconstructed breast, is beneficial from an aesthetic point of view. Like breast reconstruction itself, it is optional.

Some women report a pulling sensation in the abdomen, tightness, and numbness of the skin (as a result of lifting it to move the skin and fat). These symptoms almost always improve with time although it may take six months or longer. Some patients may experience permanent numbness or abdominal pain from TRAM flap harvest. Irregularities of the skin and abdominal contour are sometimes evident after surgery. These conditions are also amenable to correction at the time of a later procedure such as nipple reconstruction.

### Gluteal "Free Flap" Reconstruction

Both the upper and lower buttocks are another source of skin and fat for breast reconstruction. There is a mild flattening of the buttock contour but this is imperceptible in normal clothing. If a larger piece of tissue is necessary to make the breast, a depression can sometimes be created at the donor site which is more evident. The best candidates for a gluteal free flap reconstruction are women less than 45 years of age who have a flat abdomen (no TRAM donor site) and a small or medium size breast with little natural sag.

Breast reconstruction with buttock tissue requires microsurgery because the tissue must be completely detached from the body in order to move it to the chest. The role of microsurgery, just as described above as an option in TRAM flap reconstruction, is to restore circulation to the transplanted block of skin and fat tissue. This procedure is also associated with a two to four percent chance of failure resulting in complete loss of the transplanted tissue.

### Selection of a Reconstruction Technique

The best method of reconstruction is influenced by a variety of factors including the size and the degree of sagging of the breasts, and the amount of tissue available in possible donor sites such as the abdomen, back, and buttock. Either an implant or tissue reconstruction is favored based on these physical characteristics. Half of my patients are reconstructed with implants, the other half use their own tissue.



Your preference can be accommodated when more than one method is suitable provided that you have a thorough understanding of the pros and cons of each alternative. There is a comparison of implant and tissue reconstruction listed below.

	<u>Expander/Implant</u>	<u>Tissue Reconstruction</u>
<b>Surgery</b>	Two separate 1- 2 hour procedures	One 6 - 8 hour procedure
<b>General Anesthesia</b>	Required	Required
<b>Hospitalization</b>	Overnight with mastectomy, Outpatient if done later	4-5 days with or without mastectomy
<b>Scars</b>	No new scars	Additional donor site scar
<b>Shape</b>	No natural sag, flat across the front; firm	Very natural shape and consistency, very soft
<b>Opposite breast</b>	More changes usually required	Less changes usually required
<b>Uncommon problems</b>	Breast hardening with shape change	Abdominal pain, weakness or bulge (TRAM flap)

### Reconstruction after Radiation - A Special Situation

Some women have had radiation therapy prior to reconstruction. This is most common in those who have previously been treated by lumpectomy and radiation. A mastectomy is usually recommended if a new problem develops in the same breast later. The difficulty with reconstruction is due to the detrimental effect that radiation has on skin circulation. The skin is permanently compromised and breast reconstruction performed in this setting is more prone to wound healing complications.

It is not possible to use tissue expanders to stretch radiated skin. Attempts to do so are associated with a very high failure rate. Even in those in whom expansion proves to be technically feasible, the aesthetic result is usually poor. Therefore the best option is one that brings new skin to the reconstruction site. An abdominal (TRAM/DIEP) flap is an excellent choice for those with the appropriate physical characteristics. A gluteal free flap can be performed in the radiated patient but there may be technical limitations regarding the microsurgery portion of the procedure which limit its use.

There is another type of breast reconstruction available for those who have had radiation but are not good candidates for a TRAM/DIEP flap. This involves a combination of both implant and tissue reconstruction techniques. It is called a latissimus dorsi flap and is named after one of the back muscles. This muscle helps with upper arm motion but is not essential for normal function. Through a diagonal back incision of ten to twelve inches, this muscle with its overlying fat and skin can be moved from the back to the mastectomy site. Unlike the TRAM flap there is usually not enough fat volume available to form a breast mound without the addition of a breast implant. Like implant reconstruction, a tissue expander is placed at the time of the latissimus dorsi flap and the permanent implant is placed later after the new skin is expanded.

This type of reconstruction yields good results. It can be used in both the irradiated and non-irradiated patient, but does combine the disadvantages of both implant and tissue reconstruction methods. This technique leaves a donor site scar and is also subject to problems seen in implant reconstruction such as capsular contracture and implant deflation. In contrast to the TRAM flap however, using the back as a donor site is not associated with functional problems as a result of using the muscle.

Due to the problems encountered with radiation and reconstruction, I highly recommend that all patients who have had radiation or will have radiation delay any reconstructive surgery to limit complications and maximize success.

### Steps in the Process of Breast Reconstruction

Breast reconstruction can never be totally completed in a single operation, regardless of the method used. The first one or two operations create the breast mound and establish symmetry by adjustment of the reconstructed breast, the normal breast, or both. The last step is nipple reconstruction. The breasts are allowed to settle for several months prior to nipple reconstruction so that its position on the breast can be determined accurately.

Each of the separate stages in the reconstruction process requires general anesthesia. In selected patients, nipple reconstruction can be performed with local anesthesia. Not all procedures require an overnight stay in the hospital. The later stages can usually be performed on an outpatient basis. There is considerable flexibility that allows each stage to be scheduled around work and family schedules.

### Immediate Reconstruction vs. Reconstruction Later

Breast reconstruction can be begun either at the time of mastectomy or several months later. The timing does not influence the quality of the result. The concept of immediate reconstruction is attractive because it saves on hospitalization, one general anesthetic, and the reconstruction is already underway while the mastectomy wound is still healing. The negative impact of

mastectomy on body image may be less when reconstruction is begun immediately. Immediate breast reconstruction using a tissue expander can be done even if there is a requirement for six months of chemotherapy beginning soon after surgery. Expansion is completed in the office as usual but the next surgery (exchange for a permanent implant, reshaping of the breast, and opposite side adjustment) is delayed until one month after chemotherapy is finished. If a tissue reconstruction is performed the chemotherapy issue is usually not relevant as the major portion of the reconstruction is completed before chemotherapy is scheduled to start. If radiation therapy is in the treatment plan, a delayed reconstruction will likely be recommended. If radiation has been decided upon after placement of the tissue expander, expansion can usually be completed prior to radiation therapy. Extra time (4-6 months) is allowed to let the skin heal from the treatment prior to exchange for a permanent breast implant.

#### Treatment of the Opposite (Normal) Breast

In the case of large breasts, a reduction and lift is usually necessary on the normal side in order to match the reconstruction. Smaller breasts that have considerable sagging may require only a lift to improve shape and establish symmetry. Reductions and lifts add permanent scars. The scars are located around the edge of the areola, in the crease under the breast, and along a vertical line connecting the middle of the breast crease with the bottom of the areola. It is sometimes necessary to extend the scar in the crease quite far to the side if the breast is both large and wide. A reduction or lift does not alter the ability to detect tumors in the normal breast by mammography. All the tissue removed from the opposite breast will be sent to pathology for examination. Some women only need a lift of the normal breast without a reduction in volume. Although in many this will require the same scar pattern as just described, sometimes the scar around the edge of the areola is all that is needed.

Those who have very small breasts may benefit aesthetically by augmenting the normal breast with an implant and reconstructing the missing breast larger than its original size. This sometimes improves the final symmetry of a reconstruction because you are matching two breast implants and minimizing the natural sagging of the augmented breast. Placement of an implant

behind the normal breast tissue does not compromise physical examination for breast masses. However all implants impair mammography to some degree. There are mammography techniques available that minimize this effect but do not eliminate it. If you are considering this option you should discuss it with your breast surgeon.

### Reconstruction of the Nipple and Areola

Nipple and areola reconstruction is the final step in the reconstruction process. The nipple is usually made from the skin and fat of the reconstructed breast. If the normal nipple is overly large a portion of it can be used as a graft to make a new nipple for the reconstructed side. Nipple reconstruction is performed on an outpatient basis, usually in the office. There usually is very little discomfort associated with this procedure. The areola is made by tattoo technique done in the office, usually several months after healing has occurred. The aftercare following tattoo is minimal.

### Complications

Smokers have a greater risk of wound healing complications. **If you are an active smoker, you are not a candidate for breast reconstruction.** Smokers who have quit must be nicotine-free (no gum, patches) for 2 months prior to reconstructive surgery.

Complications are not common in breast reconstruction. Although they may lengthen the treatment period and cause anxiety they usually do not affect the quality of the final result. The types of complications possible are related to the method of reconstruction used. Many of these problems have already been mentioned.

Implant reconstruction complications include severe capsule formation which may be painful and possibly require additional surgery, uneven contour, rippling of the skin, size or shape discrepancy between the two sides, infection, and implant deflation. Tissue expanders are similar to implants and are subject to some of these same problems. Tissue expanders may deflate unexpectedly during the expansion process due to a manufacturing defect. Rarely, a puncture may occur either during a "fill-up" session or as a result of removal of the fluid that will

sometimes accumulate in the armpit as a result of mastectomy. A deflated tissue expander requires replacement by surgery.

Uncommon problems seen with tissue reconstruction include partial or complete loss of the transferred tissue, partial hardening of the tissue, delayed wound healing of the reconstructed breast or the donor site, and abdominal muscle weakness (TRAM flap). The weakness may result in a lower abdominal bulge that may require a surgical procedure for correction. Infection can occur at either the donor site or the reconstructed breast although this is unusual. Sometimes an additional procedure is needed if Prolene mesh was used to reinforce the abdominal wall and becomes involved in a donor site infection. The navel can be lost if both muscles are needed for TRAM flap reconstruction.

In some individuals the scars that result from surgery can be thick and prominent regardless of the method selected for reconstruction. All scars created in the process of mastectomy and breast reconstruction are permanent.

Tissue transfer that requires microsurgery is not successful in a certain percentage of patients. In this case all of the tissue is lost and breast reconstruction will have to be done by another method.

Possible complications related to reduction or lifting of the opposite breast include complete or partial nipple loss (usually in very large breasts), permanent decrease in nipple sensation, thick scars that may itch and have poor appearance, delayed wound healing, and recurrence of breast sagging. There are very few problems that can occur in nipple reconstruction. The most significant are partial loss of the nipple graft, and decreased sensation in the normal nipple (if part of it was borrowed to make the new nipple).

As with any major surgery there is the remote possibility of a major life-threatening complication such as heart attack, a blood clot in the lung, or the possibility that blood transfusion may be required should there be a bleeding complication. Measures are taken at the time of surgery and postoperatively to avoid these types of complications and fortunately they are very rare.

These potential problems are mentioned not to alarm or frighten you but to provide full disclosure. Most patients do not have any complications associated with their surgery.

## **SUMMARY**

In summary, you are considering being treated for the loss of one or both breasts by breast reconstruction. This is a quality of life issue. This surgery is elective and you do not need it in order to live a normal life-span. The goal of reconstruction is to restore the size, shape, and appearance of the breast(s) as closely as possible. This will aid in the restoration of body image and make it possible for you to wear virtually all types of clothing with confidence.

Medicine is not an exact science and breast reconstruction in particular is as much an art as it is a science. There are limitations with all currently available techniques. It is rare to be able to produce an exact duplicate of the normal breast. As is common in nature, the two breasts may vary somewhat in size, shape, or position following reconstruction. Surgical scars are permanent and variable in their final appearance. Complications can occur with any type of procedure and may require additional surgery for correction. Despite this, most women are very pleased with their results.

It is important that you are fully informed about the process of breast reconstruction. It is unlikely that all of your questions will be answered at the first consultation. You may have additional questions after you have considered the discussion further. It is often helpful to schedule a second consultation if there is confusion about a number of points.