



Breast Reconstruction

A guide for patients and families.

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Introduction

Do I qualify for breast reconstruction?

Most patients will qualify for some kind of breast reconstruction. Your surgeon will talk about your options after looking at your medical history and what your health situation is right now.

The Women's Health and Cancer Rights Act (WHCRA) of 1998 says that all group health plans that pay for mastectomy must also cover prostheses and reconstructive procedures. Health insurance plans are often required to cover medically necessary breast cancer treatments. This includes lumpectomies (taking only the part of the breast that has cancer) under broader cancer treatment coverage policies, even if the WHCRA does not specifically talk about lumpectomies.

Why should I think about breast reconstruction?

In breast reconstruction surgery, a plastic surgeon recreates all or part of a breast that has been removed through surgery. This may be done using implants or by using your own tissue. The goal of reconstruction is to give your breast a natural look once again.

Good candidates for this surgery are women who have been:

- Diagnosed with breast cancer and will have a mastectomy (surgical removal of the whole breast).
- Diagnosed with breast cancer and will have a lumpectomy (surgical removal of part of the breast that has cancer).
- Found to have defects in their genes (genetic mutations) and would like to have a risk-reduction mastectomy (removing noncancerous breasts to prevent cancer).

Breast reconstruction does not affect your chances of finding cancer or having cancer come back again in that area. Also, you can still get cancer-related treatments.

What are my breast reconstruction options?

Breast reconstruction is a very personal decision. After meeting with you, the plastic surgeons will make a plan that is best for you. They will think about what you want, and also your:

- Body shape.
- Other medical conditions.
- Cancer treatment.
- Surgeries you've already had.

The plastic surgeons will talk with you about the risks and benefits, and they will also give you information about your breast reconstruction options.

What are my surgical options for breast cancer treatment?

Please remember that breast cancer treatment is more important than reconstruction. This is because breast cancer is a serious and possibly life-threatening disease. Getting the right treatment is very important for your long-term health. Breast reconstruction can easily be made a part of your cancer treatment plan. Based on the stage and location of the cancer, you and your breast surgeon will decide on the best surgery option. Here is some information about 3 of the options: an excisional biopsy or lumpectomy, a nipple-sparing mastectomy or a skin-sparing mastectomy.

Excisional biopsy or lumpectomy:

Part of your breast is removed. This may cause a contour deformity that looks like a dent in your breast. The surgical cut (incision) is either made around the areola (periareolar) or directly on the breast. Some of the reconstruction options are tissue rearrangement, fat grafting, breast lift or breast reduction (oncoplastic reconstruction), or local tissue transfers from the armpit or back.

Nipple-sparing mastectomy:

All of your breast tissue is removed, but your nipple and areola are saved (or preserved). There are several places the surgical cut (incision) can be made: at the natural crease under the breast (inframammary incision), a vertical incision, a periareolar incision, or a periareolar incision with extension to the breast either horizontally or vertically. Some reconstruction options are getting an implant or using your own tissue (autologous tissue).

Skin-sparing mastectomy:

All of your breast tissue is removed, including your nipple and areola. Usually, an elliptical periareolar surgical cut (incision) is used. Reconstruction options include getting an implant or using your own tissue (autologous tissue).



Surgical Timeline

Immediate versus delayed reconstruction:

Breast reconstruction may be done at the time of your lumpectomy or mastectomy (immediate reconstruction), or reconstruction can be done later (delayed). This could be in the weeks, months or even years after (called delayed reconstruction).

The decision about whether to have immediate or delayed breast reconstruction depends on many things. Some of these are:

- The patient’s overall health and medical conditions.
- The stage of the cancer and treatment plan.
- What the patient wants and their lifestyle.
- Recommendations of the health care team.

Our team can help patients make an informed decision that matches their medical needs and their personal goals. Here is some information about both options:

	Advantages:	Disadvantages:
Immediate reconstruction:	• Less social and emotional stress. • Most times it gives the best cosmetic result (appearance). • Fewer procedures are needed.	• Surgery can last longer. • Higher risk of complications, such as mastectomy skin flaps necrosis. • Other cancer treatments, if needed after the mastectomy, can be delayed if there is a complication.
Delayed reconstruction:	• Other cancer treatments needed after mastectomy, such as radiation, have less effect on reconstruction. • More time to think about reconstructive options.	• Sometimes more difficult to reconstruct because of scarring. • May not give the best cosmetic result (appearance). • Can have a long-term psychological impact.

Surgical Options

Reconstruction after lumpectomy:

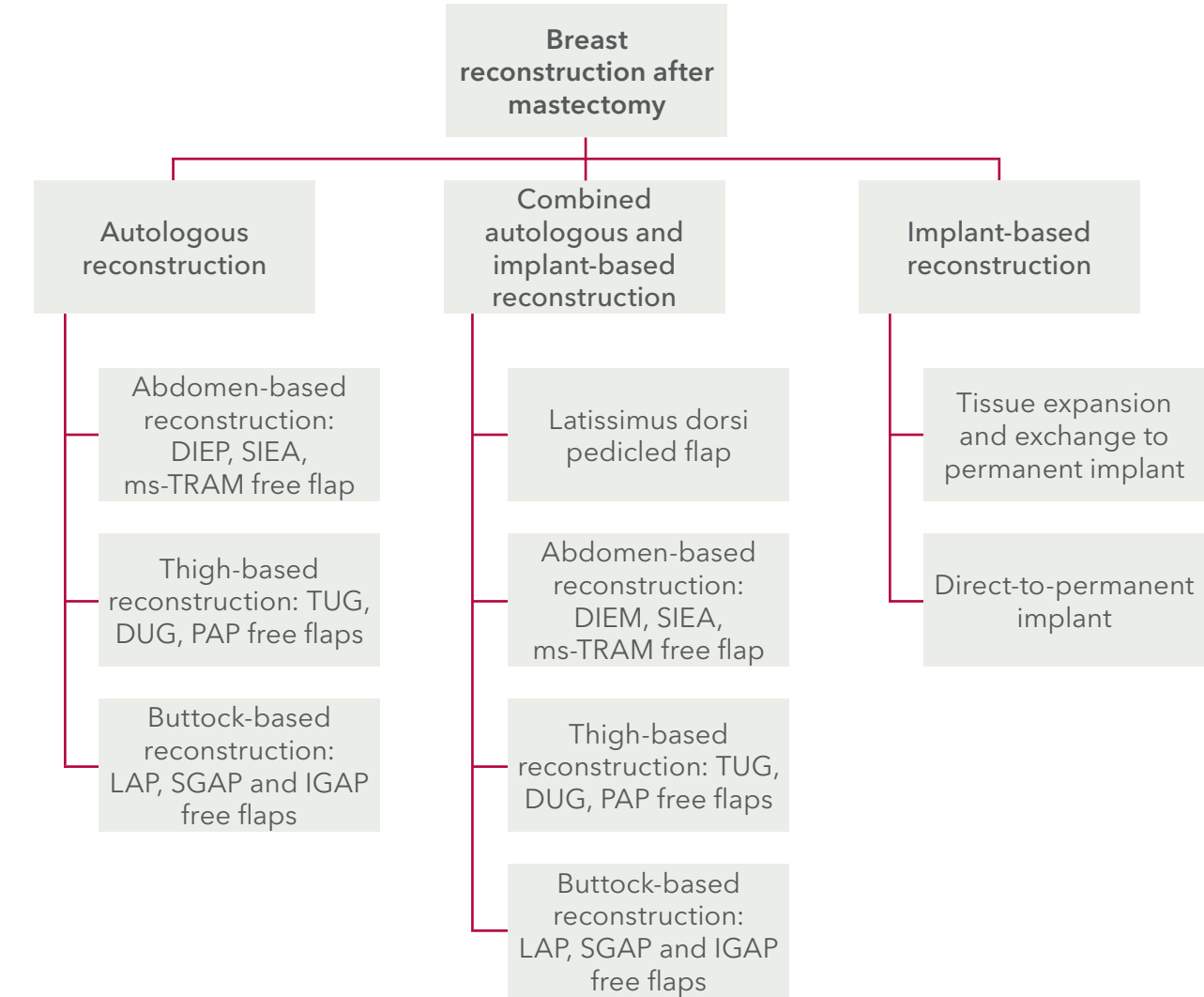
If you have had a lumpectomy to remove an early-stage breast cancer, you may want to think about oncoplastic breast reconstruction. This may be the best option if the breast shape is not normal, such as having an indent or a bulge from the surgery.

There are many things to think about, and there are many options for reconstruction. The shape of the breast can be fixed and rebuilt by:

- Rearranging the tissue in the area.
- Injecting fat tissue from another area of your body (lipofilling).
- Transferring tissue from other areas (under the shoulder or back). This may include a procedure on the other breast to make it look the same.

Reconstruction options after mastectomy:

The chart below shows the basic options after having a mastectomy. These options will all be explained in more detail in this booklet:





Autologous Tissue Reconstruction

Your plastic surgeon may offer you breast reconstruction using your own tissue (called autologous reconstruction). In an autologous breast reconstruction procedure, tissue (or a flap) is moved from another place on your body to reconstruct the breasts. There are 2 types of flaps that may be used, based on how the blood vessels are attached. The 2 types are:

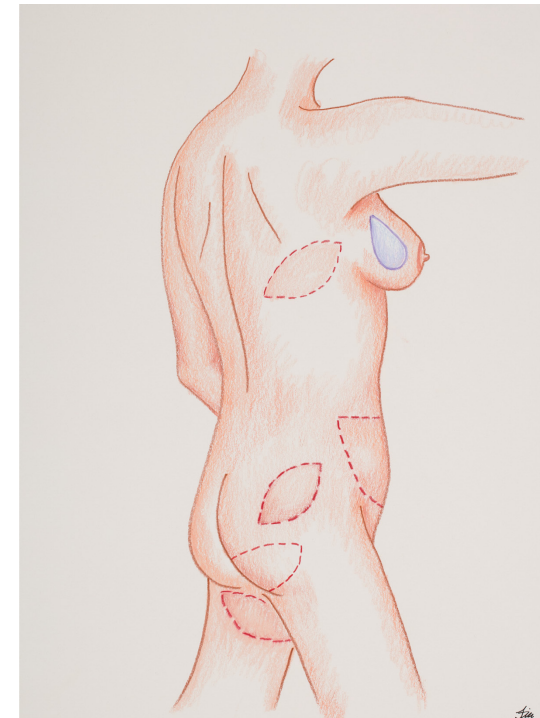
- **Pedicled flap:** The artery and vein stay attached to the tissue that will be moved.
- **Free flap:** The artery and vein are disconnected from the tissue at the donor site and reconnected in the chest.

Advantages of using your own tissue (autologous) for reconstruction:

- Usually, you do not need an implant.
- The reconstructed breasts have a shape and feel that is close to your original breasts.
- The place where they take the tissue from (called the donor site) will have a better shape because the tissue that is taken is not needed.

Disadvantages of using your own tissue (autologous) for reconstruction:

- This procedure is technically more difficult to do.
- There is a very small risk that the reconstruction fails. This means the tissue that was used to recreate the breasts does not stay alive (survive).

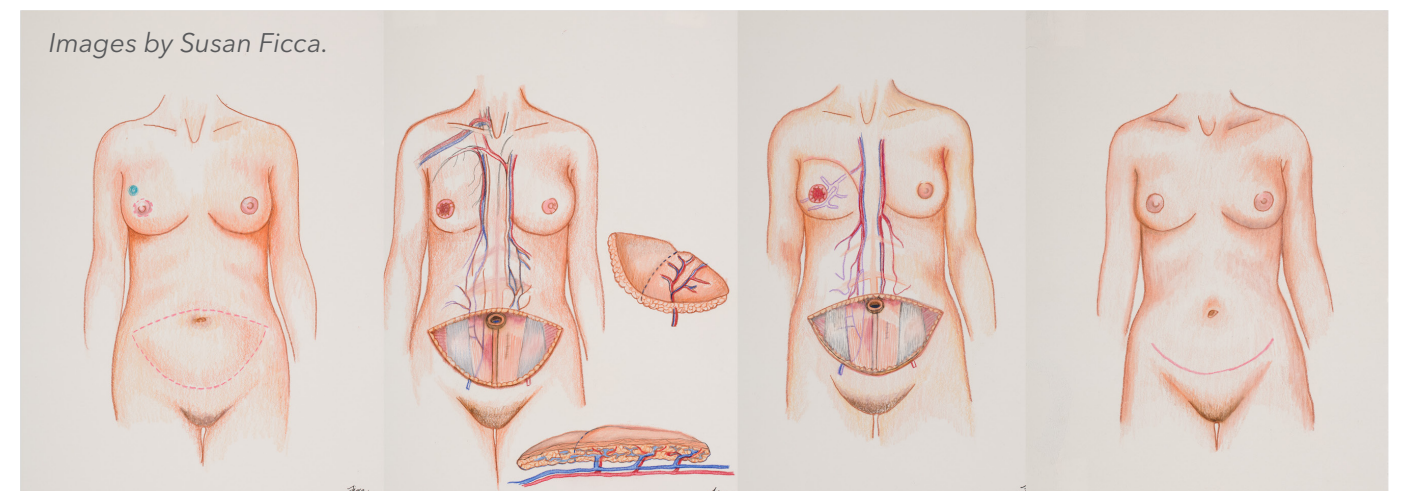


Potential donor sites for autologous reconstruction.
Images by Susan Ficca.

Types of autologous tissue reconstruction:

Reconstruction using your belly (abdominal) tissue.

Reconstruction using belly (abdominal) tissue is the most common type of autologous breast reconstruction (using tissue from your body):



1. DIEP flap skin markings.

2. Elevation of flap.

3. Final belly incision at donor site.

4. Final location of belly scar.

Reconstruction using your belly (abdominal) tissue. (cont.)

- **Deep inferior epigastric perforator (DIEP) free flap:** Breast reconstruction using tissue from the belly can give patients one of the most natural results of all the breast reconstruction options. DIEP flap surgery is done by:
 - Taking tissue from the belly and the related blood vessels.
 - Moving the tissue to the chest.
 - Reconnecting the blood vessels of the flap to the blood vessels of the chest wall.
 - After this surgery, there will be a scar from hip bone to hip bone, and another scar around the belly button.
- **Superficial inferior epigastric artery (SIEA) free flap:** The free flap is made up of skin from the belly, tissue from under the skin (subcutaneous) and the related blood vessel in the lower belly (superficial inferior epigastric artery and vein), and the veins that let the blood pass through (perforators). Like the DIEP, the SIEA flap surgery is done by:
 - Taking tissue from the belly and the related blood vessels.
 - Moving the tissue to the chest.
 - Reconnecting the blood vessels of the flap to the blood vessels of the chest wall. This helps to provide blood flow to the flap that will be used to make the new breast.

After this surgery, there will be a scar from hip bone to hip bone, and another scar around the belly button.

- **Muscle-sparing TRAM (MS-TRAM) free flap:** Depending on the size of the blood vessels and how many there are, a flap may be made using skin, tissue from under the skin (subcutaneous), and a small portion of muscle. There will be a scar from hip bone to hip bone, and another scar around the belly button.
 - **Advantages of breast reconstruction using belly tissue are:**
 - Natural breast shape and feel.
 - No breast implants are needed.
 - Better body shape at the place where the tissue was taken from (the donor site) by taking tissue that is not needed.
 - **Disadvantages of breast reconstruction using belly tissue are:**
 - Longer surgery (compared with reconstruction surgery using an implant).
 - Being in the hospital longer and having a longer recovery.
 - This surgery must be done using an operating microscope (microsurgeon).
 - Complications at the place where the tissue was taken (donor site), such as scarring on the belly.
 - Risk of weakened belly wall or hernia.

Reconstruction using your thigh tissue.

- **Transverse upper gracilis (TUG) free flap:** Patients who want to use their own tissue for breast reconstruction but do not have enough tissue from their belly can choose to use tissue from their inner thigh. This thigh tissue is made up of skin, fat, muscle and the blood vessels under the skin in the area.

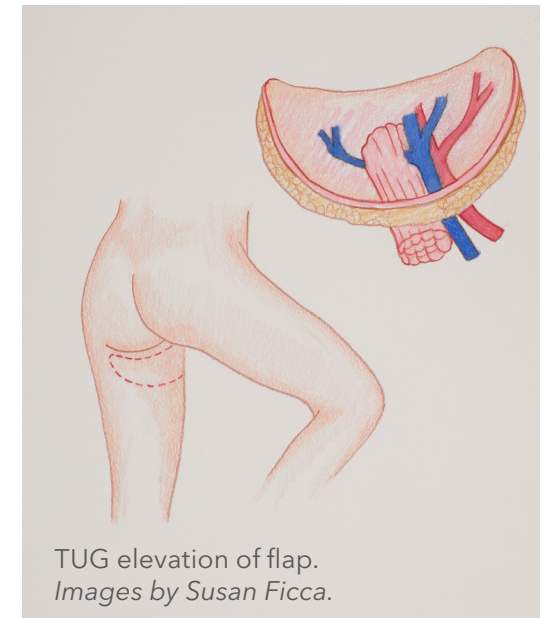
The main difference with the TUG flap is the direction of the final scar after surgery. The direction of the scar is horizontal in your upper inner thigh area. Most surgeons will hide the scar in the crease of your thigh and buttocks.

- **Profunda artery perforator (PAP) free flap:** Patients that want to use their own tissue (autologous) for breast reconstruction but do not have enough tissue from their belly can choose to use tissue from the inner thigh. The tissue is made up of skin and fat from the upper middle (medial) and back of (posterior) the thigh.

The direction of the scar is most often horizontal in your upper inner thigh, but it could be in a different direction. Most surgeons will hide the scar in the crease of your thigh and buttocks.

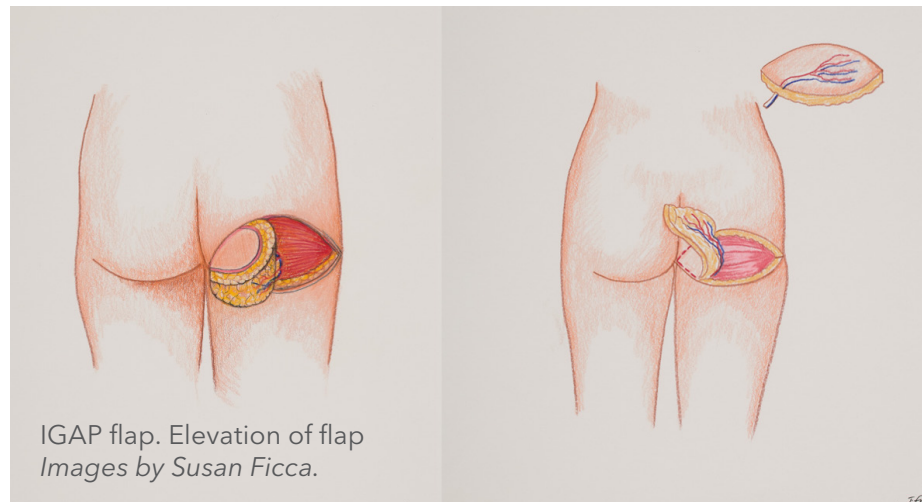
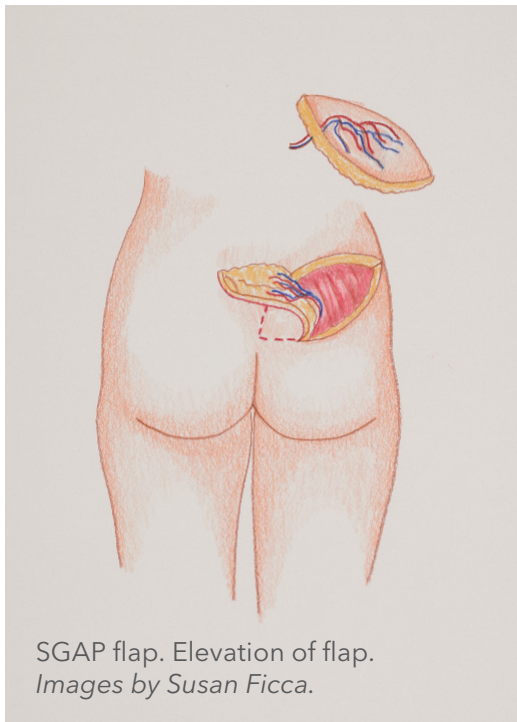
- **Diagonal upper gracilis (DUG) free flap:** Like the TUG flap, the DUG flap uses a patient's own tissue from the inner thigh to make a new breast after a mastectomy. The free flap is made up of skin, fat and muscle along with the blood vessels in that area. The main difference between the DUG flap and the TUG flap is the direction of the final scar after surgery. The DUG flap scar is diagonal in your upper inner thigh:

- **Advantages of using inner thigh tissue:**
 - The tissue has a high fat content that is very good for sculpting a breast. This gives a natural look and feel.
 - A good choice for slender women who do not have enough tissue to do a belly flap. Also a good choice for women who had belly surgery in the past and want to use their own tissue (autologous) for reconstruction.
- **Disadvantages of using inner thigh tissue:**
 - There will be a scar on the leg.
 - The breast may have an abnormal shape (called a contour deformity) that may need another procedure (called a symmetry procedure) to fix.



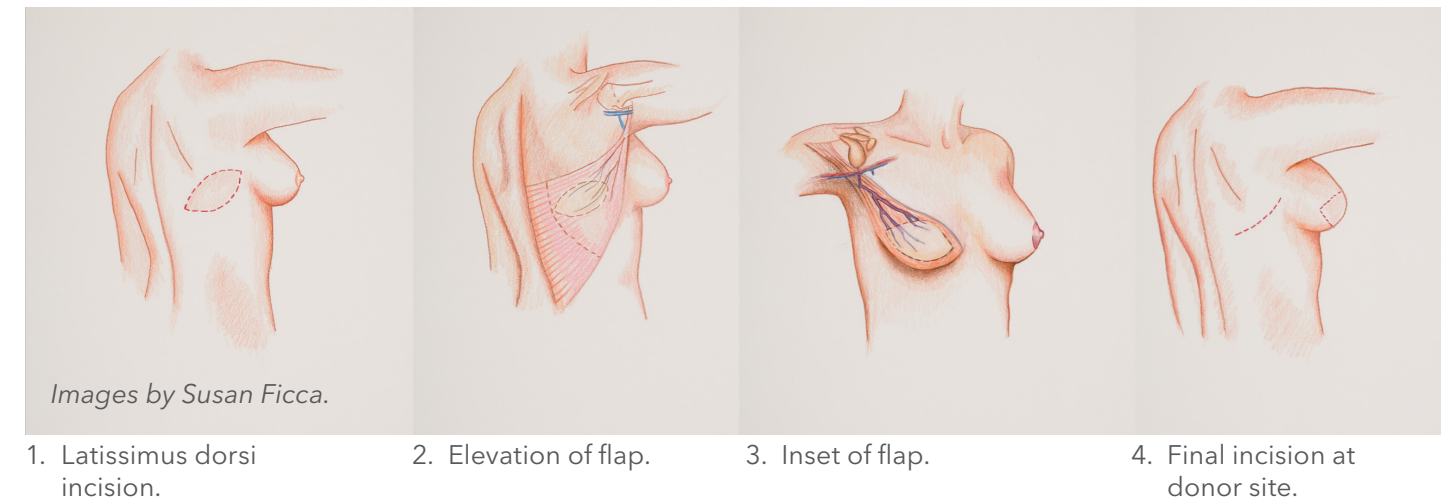
Reconstruction using your buttock tissue.

- **Superior gluteal artery perforator (SGAP) free flap:** Patients that do not have enough tissue from their belly to use their own tissue (autologous) for breast reconstruction may choose to use tissue from the buttock. The tissue is made up of fat taken from the buttock area including the skin, fatty tissue and the blood vessels in that area. The scar will be on the lower back, just above the upper buttock.
- **Inferior gluteal artery perforator (IGAP) free flap:** Patients that do not have enough tissue from their belly to use their own tissue (autologous) for breast reconstruction may choose to use tissue from the buttock. The tissue is made up of fat taken from the buttock area including the skin, fatty tissue and the blood vessels in that area. The scar will be on the bottom crease of your buttock:
 - **Advantages of using buttock tissue:**
 - Leaves all or most of the buttock muscle in place.
 - **Disadvantages of using buttock tissue:**
 - Technical difficulties related to the flap.
 - Problems with the shape (called a contour deformity) that may need a symmetry procedure to fix.
 - Scarring on the buttock.



Reconstruction using your back tissue.

- **Latissimus dorsi myocutaneous pedicled flap:** Sometimes, an implant may be made from the latissimus dorsi myocutaneous flap that is found on your back. Most women do not have enough fatty tissue on the back to recreate a breast, so a tissue expander or an implant will also be used. The direction of the scar is horizontal or slightly slanted on your back (the same side as the rebuilt breast). Your surgeon will usually try to hide the scar where your bra strap can cover it:
 - **Advantages of reconstruction using back tissue are:**
 - Less surgery and recovery time (compared with free flaps surgeries).
 - Brings healthy, non-radiated skin to the breast.
 - Better coverage over the implant.
 - May need only 1 surgery, if the implant is placed right away.
 - **Disadvantages of reconstruction using back tissue are:**
 - Will likely need to use an implant for better volume and projection.
 - Complications of the donor site, such as collection of fluid or blood under the incision (seroma, hematoma) and scarring on the back.
 - Muscle weakness in the back that affects active people, such as rock climbers, swimmers and tennis players.





Implant-based Reconstruction

This is a popular breast reconstruction option. It gives patients a good cosmetic outcome without having to take tissue from another part of the body. There are many options for the type of implant you can choose, including the fill, size, shape and profile of the implant.

Even though there have been some issues with silicone implants in the past, they are FDA-approved for breast reconstruction. The implant can be placed above or below the breast muscle (pectoralis major). Your surgeon will help decide which implants are best for you, and where the best implant placement is (such as above or below the pectoralis muscle)

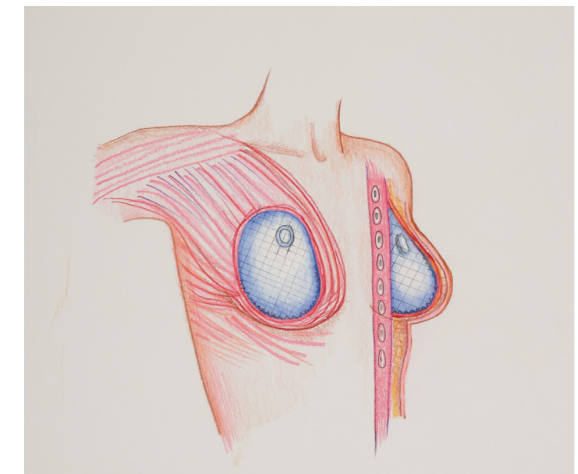
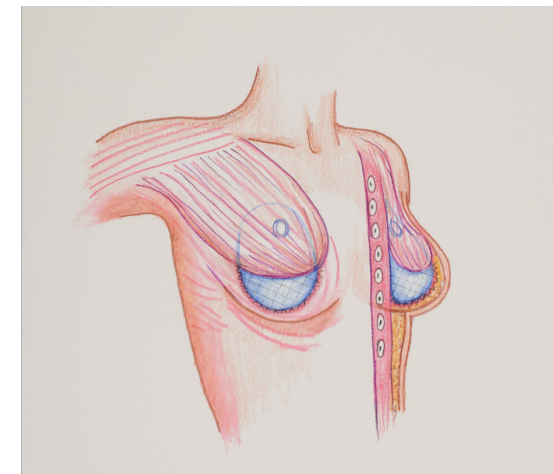
Types of Implant-based reconstruction:

Tissue expander with an exchange to a permanent implant (2 stages): When you have your mastectomy, the plastic surgeon will place a tissue expander into the breast pocket. The tissue expander allows the plastic surgeon to safely stretch the skin so they can put in the implant. With tissue expansion, you will need to come in for regular office visits to have saline injected into the tissue expander. The amount of fluid that is injected each time depends on the tightness of the skin. Tissue expansion often takes between a few weeks to 3 months after your mastectomy. It may take longer if time is needed for other cancer treatments, such as radiation therapy. After the breast pocket has reached the correct size, the tissue expander is left in place for at least another 2 to 3 months. This will help your skin get used to the shape.

After the correct size is reached with the expander, surgery is scheduled to exchange the tissue expander for a permanent implant. Other procedures may be done during the second stage, such as autologous fat grafting to the breast.

Direct-to-permanent implant (single stage): Some women can get permanent implants at the time of the mastectomy. There are many things that will help your doctor decide if you can get a direct-to-permanent implant reconstruction. These are:

- The health and thickness of the skin flaps after the mastectomy is done.
- Your current breast shape and size.
- The breast size you want.



Submuscular tissue expander placement (right) and prepectoral tissue expander placement (left).
Images by Susan Ficca.

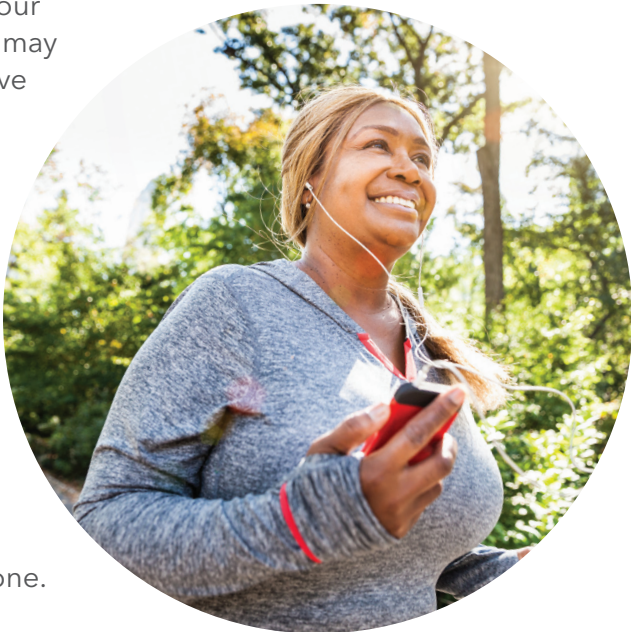
Acellular dermal matrix (ADM): ADM is a biomaterial that comes from human or animal tissues. It has been processed to remove all the donor cells and it is also sterilized. What is left is a mesh-like framework made up of structural proteins, such as collagen and elastin. This structure can support the body's own cells to regrow and promote tissue regeneration and healing. Dermal matrices are not FDA-approved for this use.

There are many brand names such as AlloDerm, DermACELL, Cortiva, SimpliDerm and FlexHD. Other reinforced tissue matrices, such as OviTex, can be used. Other types of mesh can also be used for this purpose. These products are used in most patients going through breast reconstruction who have implants. It is very useful because it gives more soft tissue coverage over the implant, which makes it look better. Your surgeon will talk about these options with you to decide what is best for you.

Procedures to Make Your Breasts Look Alike (Symmetry)

There are many ways we can make the overall look of your breasts better and make them both look the same. We may do liposuction and use your own fat as a graft to improve the curve of the breast. During this procedure, a small, hollow tube (called a cannula) is used to get fat from different areas of your body. Your surgeon will decide what areas work best for you. The fat is then processed and injected into your breasts using a thin tube to help you have a better looking (cosmetic) outcome.

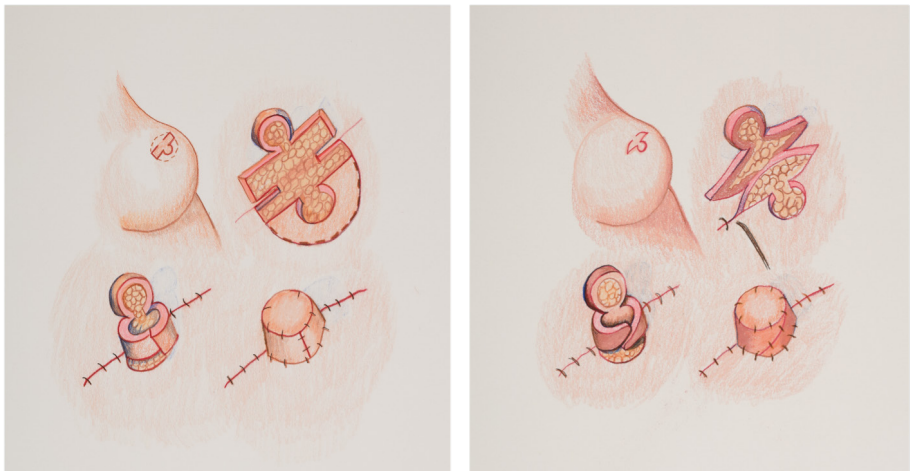
A breast reduction, breast lift or breast augmentation may be done on the breast that does not have cancer. Choosing which procedures will make your breasts look alike is a very personal decision. You and your plastic surgeon will talk about what is best after the major reconstruction has been done.



Nipple and Areola Reconstruction

Once you are happy with the shape and size of your breast reconstruction and you have had time to heal, you may want your nipple to be rebuilt as well. If you would like this done, most often we will take a small piece of skin to make a new nipple.

The areola (the colored part around the nipple) can be made with a skin graft from the lower waist, groin, thigh or other areas. Nipple reconstruction and areolar reconstruction with a skin graft may mean that you need to have another surgery. Nipple and areolar tattooing is also an option and is usually done in the office. Tattooing may need to be reapplied after a few years.



Nipple reconstruction using local flaps.
Images by Susan Ficca.

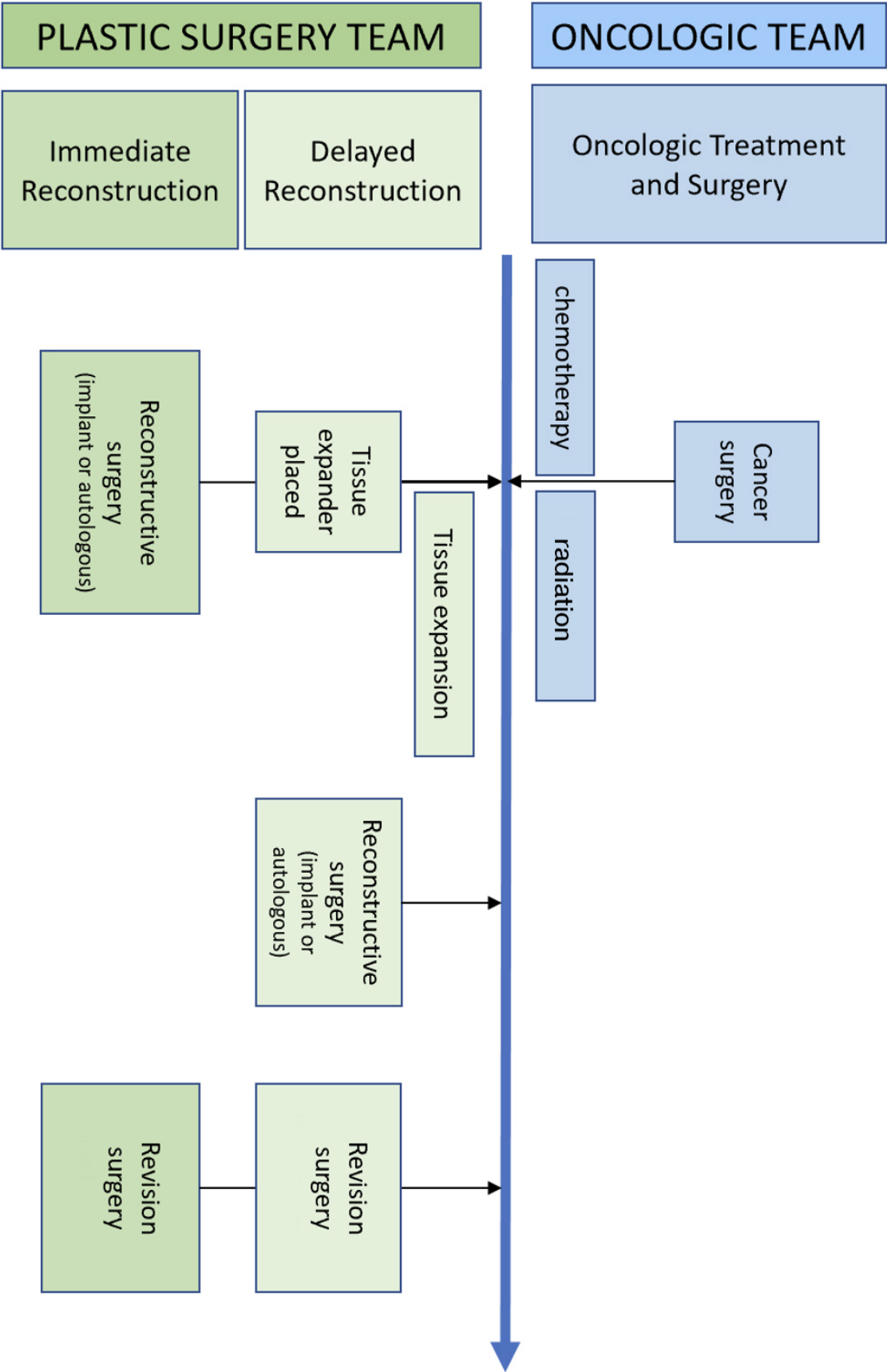


Getting Feeling (Sensation) Back After Reconstruction

Being able to get the feeling back (called sensory recovery) in your breast after breast reconstruction is an important part of your procedures. During a mastectomy, the breast tissue is removed. This means the nerves are cut that provide feeling to the breast and nipple (if preserved). When nerves are cut, the nerve signals are interrupted. This can cause numbness and the loss of feeling in the breast area. Getting feeling back is different for each person. This is true when implants are used, and also when your own tissue (autologous) is used for reconstruction.

Resensation is a new technique for breast nerve repair called neurotization. It may bring back (restore) some feeling as part of breast reconstruction surgery after a mastectomy. Resensation uses your own nerve tissue to rebuild and reconnect the nerves in your chest and the nerves in your reconstructed breast tissue. The goal of this part of the operation is to get some sensation back. The data we have is not very conclusive, but it is promising. Many studies are being done right now to look at the effect of connecting nerves in the chest to nerves in the rebuilt breast tissue.

Timeline:



Comparing Breast Reconstruction Options

	Direct-to-permanent implant:	Tissue expander (with exchange to implants):	Pedicled flap:	Free flap:
Surgery time: (Not including mastectomy surgery.)	• 1 to 2 hours (1 side). • 2 to 3 hours (both sides).	• 1 to 2 hours (1 side). • 2 to 3 hours (both sides).	• 2 to 3 hours (1 side). • 4 to 6 hours (both sides).	• 5 to 8 hours (1 side). • 6 to 12 hours (both sides).
How long in the hospital:	0 to 1 day.	0 to 1 day.	1 to 2 day.	2 to 4 day.
Time for total process:	3 to 6 months	6 to 12 months	6 to 12 months	6 to 12 months
Possible number of surgeries:	2	2 to 3	2 to 3	1 to 3
Use of implants:	Yes	Yes	Most often, yes	Most often, yes
Goals and final results:	• Must use implants. • Keeps the breast shape. • Symmetry.	• Must use implants. • Keeps the breast shape. • Symmetry.	• May need an implant. • More natural looking.	• Natural looking. • Soft to touch. • Better contour at donor site.
Reasons to choose this option:	• Shorter surgery and recovery time. • Both breasts reconstructed.	• Shorter surgery and recovery time. • Both breasts reconstructed.	• Has had radiation. • 1 breast reconstruction. • Larger body type.	• Has had radiation. • Want natural looking breasts. • Enough body tissue at donor site.
Reasons you should <i>not</i> choose this option:	• You are a smoker. • Do not want implants.	• You are a smoker. • Do not want implants. • Not able to commit to regular clinic visits in the first 6 to 8 weeks.	• You are a smoker. • Do not want implants. • Not able to commit to regular clinic visits in the first 6 to 8 weeks.	• You are a smoker. • Do not have time for longer recovery.

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