

Breast Reconstruction

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Introduction

The aim of this booklet is to help you consider breast reconstruction and to answer the questions people usually ask.

The booklet can take you through the process of reconstruction in your own time and in a step-wise progression.

It will talk about the different types of reconstruction and hopefully help you decide whether you want to do it and which is likely to be the best one for you.

The booklet does not replace a proper consultation with a breast reconstruction surgeon.

Format of the Booklet

The following are questions frequently asked by women thinking about a breast reconstruction.

The order in which the questions are given attempts to follow the pathway a breast reconstruction takes.

Glossary of Terms

Flap – this is a piece of tissue from your body which can consist of skin and fat, or skin and muscle. It is used to replace the breast that is removed by the mastectomy.

Implant – these can be of 2 types:

Permanent volume – a “standard” silicone implant of a fixed volume (Figure 1).

Expander – a silicone implant with a hollow central cavity which can be inflated with saline via a port. The port can either be connected to the expander via a tube or be on the implant itself (Figure 2).

When can I undergo breast reconstruction after having a mastectomy?

You can have a breast reconstruction whenever you wish. Performing it at the time of the mastectomy (immediate reconstruction) means that the breast skin can be used and so the scarring is less obvious (see Figure 8 versus Figure 11). However, it really is all down to you. Some people “never want to be without a breast” and so want the reconstruction straightaway. Others want to get the cancer treated first and so only want to contemplate reconstruction when the cancer has been treated. There is no right or wrong answer and it is a purely personal choice.

If the reconstruction is not performed immediately at the time of mastectomy, then the reconstruction should be performed when the mastectomy scar has had time to settle down, which can take between 6 months and a year, but also depends on the requirement for chemo or radiotherapy as this should be completed first.

Does reconstruction interfere with any chemo or radiotherapy that may be required?

If you undergo an immediate reconstruction then usually the answer is no. Occasionally, if a wound infection occurs during chemotherapy then the chemotherapy may have to be delayed to let it heal, which may be in the order of several weeks. This is because the chemotherapy can suppress your white cells making them less able to fight bacteria. These heal in time (see Figure 9).

Radiotherapy can change the shape of the reconstruction by making it tighter and firmer, particularly if an implant has been used. Recent studies have shown that up to 30% of women who have an implant-based reconstruction and have had radiotherapy require some revisional surgery in the future and this will be discussed later.

Reconstruction does not increase the likelihood of the cancer recurring and does not make it harder to detect cancer if it were to return.

How is breast reconstruction performed today?

Breast reconstruction can be done in 3 ways:

1. By using a silicone implant.
2. By using your own tissue.
3. By using both an implant and your own tissue.

What is the difference between the procedures?

Apart from the nature of the reconstruction such as using an implant or your own tissue, the key differences are:

1. The final outcome – how your reconstructed breast looks and behaves both in and out of a bra.
2. The risks associated with the type of reconstruction to be used.
3. The length of time the operation takes.
4. The length of time of your hospital stay.
5. Whether any further surgery is required.

Points 2, 3 and 4 will be dealt with when describing each reconstruction separately later on. With regard to the first point...

What does “how the reconstructed breast looks and behaves” mean?

To understand this requires understanding 2 concepts:

1. Static symmetry - This is where the reconstructed breast looks like the normal breast when both breasts are held in a bra. The breasts have equal projection and volume, but are for all intents and purposes, shaped by the bra.

2. Dynamic symmetry - This is where the reconstructed breast also has static symmetry (as above), but when the bra is removed, it droops the same as the normal breast. It therefore has dynamic symmetry as well.

So why can't all reconstructions have symmetry?

This is because of a number of reasons:

1. If your other breast is big then it can be difficult to match the volume with any form of reconstruction.
2. If your other breast is droopy, then that droopiness can also be difficult to match as there would be a lot of tissue required to copy it.
3. If an implant is used to reconstruct, then this will not match any droop of the normal breast. Implant reconstructions will really only give static symmetry as the implant will remain high up on the chest compared to the normal breast, which will not contain an implant and so it will still droop. Even if the normal breast were to have an implant in it, the implant would still have to be smaller than the reconstructed side because the breast is still there on that side giving it more volume. It will therefore always be more droopy in comparison (see Figure 4).

Static symmetry can be more-or-less achieved at one operation. Dynamic symmetry usually requires a second procedure after the reconstruction (months after). In the vast majority of cases, this will be to the other normal breast and, depending on what the difference is between the two, could take the form of an uplift, reduction or augmentation. However, remember, if an implant is used to reconstruct, then dynamic symmetry is rarely obtained unless the normal breast is very small to start with and then an implant can also be used on that side. In general, it is fair to say that to get dynamic symmetry usually requires a second operation approximately 6 months after the reconstruction is performed and this is to the normal breast.

So how can you make a choice between static and dynamic symmetry?

There are several questions you need to answer and some merge with each other:

1. Are you happy with your normal breast?

If you could, would you make your normal breast bigger (augmented), smaller or uplifted (mastopexy) or an appropriate combination of these. If you want your normal breast to change then the reconstruction can first be made to create the breast you

would wish to have in terms of its size and its position on the chest. The normal breast can then be changed to match at a later date.

2. Are you happy to have surgery on the normal breast and therefore more than 1 operation?

To lift up, reduce or enlarge the normal breast requires surgery to be performed on it. This would be done approximately 6 months after the reconstruction when the reconstruction has had time to settle down and the final shape and size is known so it can then be matched.

3. Are you happy with the potential complications associated with the larger, more complex procedures that give good dynamic symmetry?

This question will be addressed in the next section when each reconstruction is discussed in turn.

The next thing to think about is the types and methods of reconstruction and therefore which one would probably suit you.

You may also want to think about the timing of the reconstruction if you are about to have a mastectomy ie whether you want an immediate or a delayed reconstruction.

Which is the best type of reconstruction for me?

This is a very open-ended question because:

1. It is influenced by what you want to achieve in terms of the final result as mentioned above – static versus dynamic symmetry.
2. Whether you are able to or want to undergo a reconstruction using your own tissue.
3. Whether you are happy with a breast implant or want to use purely your own tissue.

So tell me about the reconstructive options?

As mentioned, there are 3 types of reconstruction and these will be taken in order:

1. *Implant only*

- This is the “simplest” type of reconstruction.
- An expander implant is used and inserted under the muscle on your chest (the pectoralis major muscle).
- The expander is inflated (though not fully) with saline after insertion whilst you are asleep and the port sited usually lower down away from the implant.
- After 2 weeks the port is used to inject saline into the expander (approximately 100ml at a time). This is usually done on a weekly or twice weekly basis.
- Expansion continues until the desired volume is reached.

Placing an expander reconstruction takes approximately 1 to 2 hours.

If all goes well then you will be discharged home after approximately 1 to 2 days.

Operation and hospital stay may be longer if the reconstruction is after an immediate mastectomy.

Possible complications specific to implant reconstruction:

- Bleeding – if large can create a collection called a haematoma that will need draining (2 – 5%)
- Infection – if severe may result in the implant having to be taken out as it can then act as a source for the infection (5%).
- Capsule formation – the implant is recognised as foreign by your body and so surrounds it with scar tissue. In approximately 10% of cases this will be firm and can be painful and this can manifest after a year and at anytime afterwards. Radiotherapy increases the chances of this happening by up to 30%.

In general, implant-only reconstructions are not performed nowadays due to the distortion, poor symmetry and high complication rate associated with them.

2. Implant and Latissimus dorsi muscle flap reconstruction (Figures 3, 4 and 5)

This is where an implant (either permanent volume or expander-type) is used and then covered using a muscle from the back (called the latissimus dorsi muscle).

The muscle may well have some skin attached to it which can either replace the skin lost when a mastectomy was performed previously or, with an immediate reconstruction, replace the nipple and areola removed at this operation.

The latissimus dorsi muscle gives an added protective layer over the implant, particularly if radiotherapy is required. It also helps to disguise the presence of the implant more as the muscle gives a sloping “take-off” quality to the breast superiorly and not the sharp take-off which an implant only can do.

- An “island” of skin is designed on the back. The design can differ but generally it slopes down as shown in the picture.
- The mastectomy scar is opened and a pocket created – ideally copying your normal breast.
- The island of skin (black outline) is raised along with all the muscle (blue) and then the flap is passed through the armpit under the armpit skin and into the chest.
- A size of implant (either permanent volume or expander-type) which can be agreed beforehand is then placed on the chest wall and the latissimus dorsi muscle covers it and the island of skin stitched into place (Figure 4).

Performing this operation takes approximately 3 to 4 hours.

If all progresses well then discharge home usually occurs approximately 10 days after the operation. It is frequently the drains which are placed in your back and your chest which will keep you in hospital as they tend to drain a lot. You may be let home with these drains still in and be told when they can be safely removed.

If an expander has been used then this will be inflated every 1 to 2 weeks until the appropriate size is reached (as per implant only reconstructions).

Possible complications specific to implant with latissimus dorsi reconstruction

- Flap failure – the flap has been reported to die in under 1% of cases. It is very rare but can still happen.
- Scarring – the scar on the back will be positioned at the lower end of the rib-cage. It can sometimes stretch.
- Bleeding – the area of operation is quite large and involves muscle which can bleed after the operation. If this is excessive then a haematoma can result (large blood clot) and this would require a return to theatre.
- Infection – This can happen in both wounds (back and chest) but like implant-only, if it involves the implant then this frequently requires its removal.
- Seroma – this is a straw-coloured fluid which usually drains from the back and happens because the area of operation is large. Sometimes it can collect after the drains have been removed and will need drawing off with a needle and syringe. It usually requires several removals and occurs over several weeks post-operation.
- Capsule formation – like implant-only, capsular contracture can occur. Radiotherapy, as mentioned earlier, will increase this risk significantly.
- Breast size – the breast size can reduce over time as the latissimus dorsi muscle wastes away through its lack of use. As a result, the implant becomes much more obvious and rippling is seen where the underlying implant effectively is lying closer to the skin surface.
- Breast movement – the latissimus dorsi muscle usually keeps its nerve supply and this can make the muscle move occasionally to the side. Keeping the nerve helps to preserve some muscle bulk but some surgeons may well divide it to prevent this from happening.

It is important to say that studies have shown that the revision rate for women who have undergone an implant-based reconstruction and have had radiotherapy is almost 30%. This is because the radiotherapy induces thicker scar formation around the implant leading to distortion and in some cases discomfort.

The following reconstructions use purely your own tissue. The medical term for this is an autologous reconstruction.

3. The TRAM flap and the DIEP Flap (Figures 6, 7, 8, 9 and 10)

- TRAM flap stands for Transverse Rectus Abdominis Myocutaneous flap.
- DIEP flap stands for Deep Inferior Epigastric Perforator flap.
- The rectus abdominis muscle is the 6-pack muscle on our stomachs of which there are 2, one on each side of the middle as shown.
- Both flaps are based on a piece of skin and fat that lies between the belly button and the pubic hair and extends from one hip to the other (black outline).
- The blood supply to this skin comes from blood vessels that are called the Deep inferior epigastric artery and vein (shown coming in from the groin).
- The TRAM flap was the first of this kind of reconstruction to be performed and took the whole of the rectus abdominis muscle on one side.
- Nowadays we can take several perforators (red dots) only leaving the vast majority of the muscle intact. This is the DIEP flap – a so called “perforator” flap.

Nowadays, a special scan called a CTA (a form of a CT scan) can be performed to help identify these “perforators” before the operation. This helps by showing which are the best ones to go for (biggest) and therefore shortens the time of the operation.

At operation

- The skin island is designed as shown in the diagram.
- The perforating vessels are identified and followed through the muscle to the main branch in the groin.
- The pocket is created on the chest to receive the reconstruction. With an immediate reconstruction, the pocket is already present after the mastectomy.
- The artery and vein on the flap are joined with an artery and vein behind the sternum (breast bone)

- The flap can then be shaped to make a new breast.

The operation takes between 6 to 8 hours.

The first 48 hours is a little intense afterwards and requires close monitoring of the flap.

However, the recovery after this 48 hour period is relatively quick and on average, discharge is after 5 days.

Possible complications specific to TRAM/DIEP flap reconstruction

- Flap failure – this is where the blood flow in the reconstruction does not work. Worldwide the failure rate is between 5 and 10%. In the author's hands, failure rate is less than 1%. If the flap dies, then it will need to be removed.
- Scarring – there will be a scar low down across the abdomen and around the belly button (Figure 14). There are scars around the reconstruction and these depend on whether your reconstruction is an immediate one or delayed.
- Bleeding – you will have drains in the abdomen and the reconstruction. Occasionally a blood collection (haematoma) will form and this may require a return to theatre.
- Infection – there is always a chance for infection but this should settle with antibiotics and as there is no implant present then there should be no long-lasting problems.
- Abdominal bulging – Occasionally if a section of muscle has been taken then this can lead to a bulge on the abdomen. This section is reinforced at the time of operation by placing a piece of mesh over the muscle. A bulge can still occur even if this has been done.
- Seroma – this can form on the abdomen as it can do on the back as with a latissimus dorsi flap. It is treated in the same way by drawing off the fluid. You may go home with drains in the abdomen to prevent this from happening which is likely to happen if the drains are removed too soon.

On a practical level, the TRAM/DIEP flap from the abdomen is made entirely of fat whereas the normal breast is fat and breast tissue. If you were to gain or lose weight then the reconstruction will gain or lose weight more than the normal breast.

4. Other autologous reconstructions

The SGAP reconstruction

This reconstruction uses tissue from the top of the buttock (Figure 16).

It is bulky tissue and has a denser feel to it than tissue from the abdomen (DIEP).

It is really the only other area on the body that gives sufficient fat tissue to shape into a breast on its own.

The technique and aftercare is almost identical to the DIEP except that in the first 2 weeks it is advisable to lie on the opposite side or back and to either be standing or lying and not to sit on the scar on the buttock.

Other areas of tissue on the body can be taken to reconstruct the breast but again, invariably, they are small in volume and the amount of skin provided. If appropriate, they can be discussed with your surgeon.

In general, it is fair to say that using your own tissue (autologous reconstruction) gives a breast that looks and behaves as a normal breast does compared to an implant-based breast reconstruction. However, it is a more extensive operation and may have a greater chance of complications. Ask your surgeon about their failure rates.

What is going to prevent me from having a certain reconstruction?

The main problems surround the TRAM/DIEP flap.

- If you have had an abdominoplasty (tummy tuck) in the past then all the perforators feeding the skin have been divided so the flap would not survive.
- If you have had a vaginal hysterectomy then a scan would be needed to check the vessels supplying the flap have not been damaged.

- An extended caesarean section scar would also require a scan to ensure the vessels are still intact.
- Any vertical scarring down the abdomen will mean that a smaller piece of tissue (ie half) could only be used as blood cannot flow across the scar.
- If you are thin, then there may not be sufficient tissue to make a reconstruction purely using your own tissue.

So how can I make a choice?

You now need to ask yourself the following questions:

1. Do you want a more realistic reconstruction or a reconstruction that looks similar to a breast when in a bra/ under clothing? – static or dynamic symmetry.
2. Do you want a quicker operation or does a more complex one not concern you overly?
3. Are you happy with implants or do you want to use purely your own tissue?
4. Are you happy with the possible raised risk of failure and the more intensive surgery that occurs when using your own tissue?
5. Are you willing to accept the increased risk of revisional surgery with implant-based reconstructions.

Hopefully by now you will have an idea as to which reconstruction you wish to have and whether you want to have your other breast altered.

Remember altering the other breast occurs approximately 6 months to a year after the reconstruction, giving the reconstruction time to settle down.

The reconstruction would ideally be the size and shape that you wanted and so the other normal breast can be altered to match it.

What happens when the normal breast is altered?

The usual situation is for the normal breast to be uplifted (mastopexy) and possibly be reduced at the same time.

This takes the form of a standard breast reduction operation but with the reduction designed to match the reconstructed breast in size and shape.

Possible complications:

- Scarring – there will be a scar that will go around the nipple and areola, vertically down to the chest wall and then travel in the breast crease under the breast (so-called “anchor” shape).
- Infection – there is a 5% chance approximately that the wounds may get infected.
- Bleeding – occasionally a haematoma (blood clot) may collect in the breast and this would require a return to theatre.
- Nipple loss – there is a less than 1% chance that the blood supply to the nipple may not be enough to keep it alive and part or all of it may die. This is very rare.
- Nipple sensation – there is a small risk that the nipple may become numb.
- Asymmetry – although the surgeon will make great attempts to make the breasts match, this cannot be guaranteed.

Can the nipple be reconstructed?

Yes it can. A nipple can be created using your own tissue on the reconstructed breast or a stick-on nipple can be made which is modelled on the nipple from your normal breast. The nipple made from your own tissue can be done at the same time as the normal breast is uplifted/ reduced so the nipples will be at the same height and position on the chest.

One of the commonest problems with nipple reconstruction is that over time the nipple flattens off. This is because it does not have the erectile tissue in it which a normal nipple has that makes it stand out.

It is therefore common to originally make the nipple approximately twice the length of the normal nipple as it will flatten off over time.

Is there anything further?

The reconstructed nipple can later be tattooed to match the colour of your normal nipple and areola.

Not only does this give a good colour match but it helps to cover the scars from the nipple reconstruction.

Overall

Breast reconstruction is a pathway with stages along it and the individual can go as far as they want to obtain the result that they wish.

To a degree, the reconstruction can be tailored to the individual and this can be discussed at the consultation.

Breast reconstruction has now become a popular and successful adjunct in the overall treatment of breast cancer.

Figures for Breast Reconstruction



Figure 1: A “standard” permanent volume implant used for breast reconstruction.



Figure 2: An expander implant used for breast reconstruction. Note the port connected to the implant via a tube. The port sits under the skin and saline injected into it using a needle and syringe.



Figure 3: The latissimus dorsi flap for breast reconstruction. The muscle is outlined in blue and the piece of skin taken outlined in black. The blood supply is shown in red coming from the armpit.

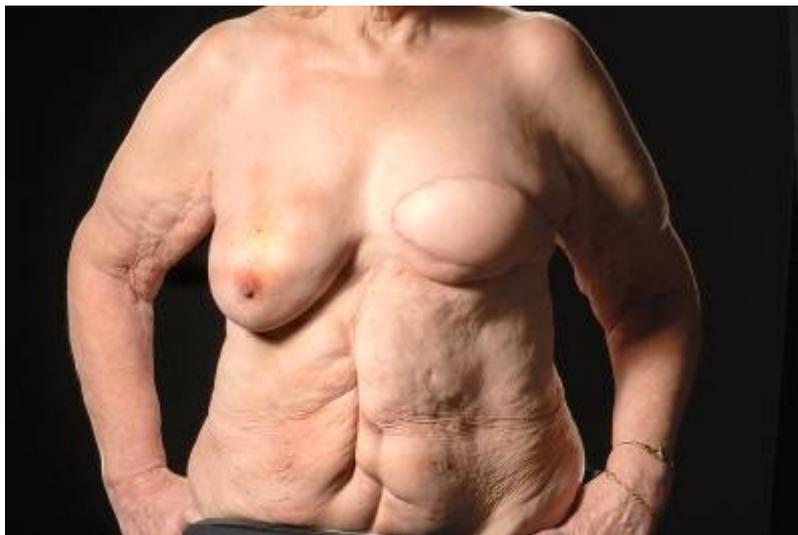


Figure 4: Left breast reconstruction with a latissimus dorsi flap and permanent volume implant. Good static symmetry is obtained within the bra but the implant prevents dynamic symmetry and the normal breast droops more out of the bra.



Figure 5: Scar from a latissimus dorsi breast reconstruction.

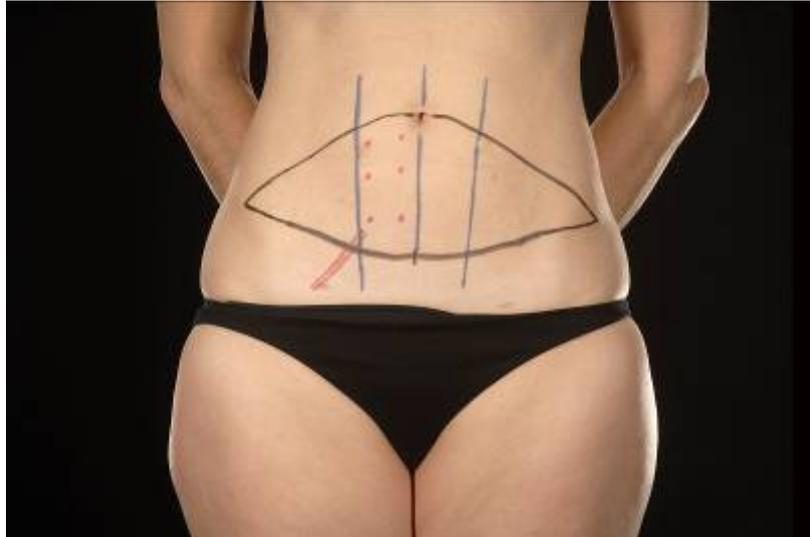


Figure 6: The TRAM/ DIEP flap. The area of skin taken is outlined in black. The blue lines show the rectus abdominis muscle on both sides. The red dots are where the “perforators” that feed the skin come through the muscle and these originate from the blood vessel that comes from the groin as shown in red.

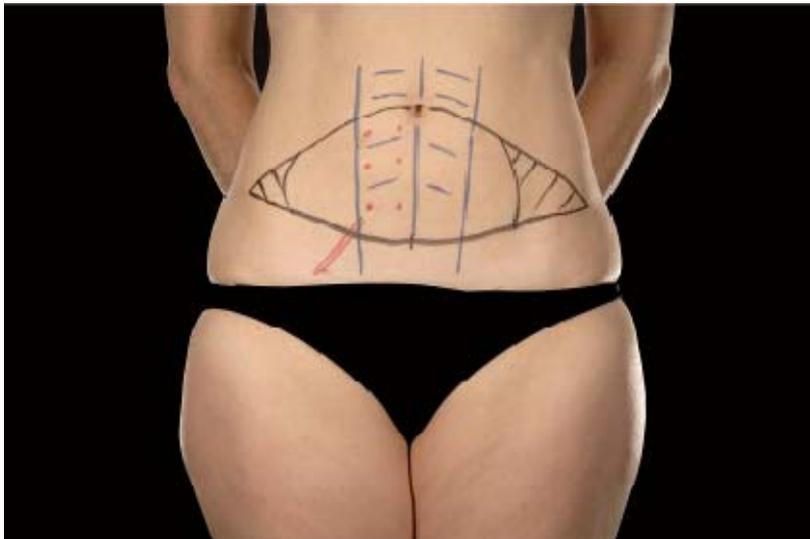


Figure 7: The shaded areas show the tissue that is usually discarded. This will vary with blood supply and is unknown until the time of surgery. The area on the patients left furthest away from the blood vessel is too far for the blood to reach and so will die and has to be removed. The area on the patients right is lost to help with the shaping of the new breast.



Figure 8: Immediate left breast reconstruction using the DIEP flap from the abdomen.



Figure 9: Abdominal scar following TRAM/DIEP flap breast reconstruction. Note the slightly widened area in the middle which is where an infection occurred due to the chemotherapy suppressing her white cells. This is thankfully uncommon.



Figure 10: Early result following a right breast uplift to match the reconstruction.



Figure 11: Delayed breast reconstruction using a DIEP flap. Note the bigger skin paddle needed due to the skin removed at the time of mastectomy. Symmetry is good because adequate tissue was obtained from the abdomen that could match the volume of the normal breast.



Figure 12: Left mastectomy before reconstruction.



Figure 13: Reconstruction using a DIEP flap from the abdomen at 8 weeks.



Figure 14: Abdominal scar from where the flap was taken. Note scar around belly-button too.



Figure 15: A delayed breast reconstruction using a DIEP flap from the abdomen taken at 6 weeks after the operation. The size of the reconstructed right breast is dependent on the amount of tissue available from the abdomen which was less than the left breast. The left breast could be uplifted and reduced to match at a later date if desired.



Figure 16: The left breast was a delayed reconstruction using a DIEP. Patient later developed breast cancer on the right. Patient therefore underwent a right mastectomy and an immediate reconstruction using an SGAP from the buttock. Note recent bilateral nipple reconstructions.