KATARZYNA MACKENZIE

PLASTIC SURGEON

Breast Reconstruction

Breast reconstruction surgery is the creation of a new breast shape following mastectomy which allows women the chance to rebuild their bodies after the trauma of cancer surgery and for some to regain a sense of their femininity.

If breast reconstruction is an option, women may choose this as a part of their treatment for breast cancer and opt for immediate reconstruction. For others, the decision is delayed until some time after mastectomy. One of the great difficulties is being able to fathom the choices that are available to you whilst trying to come to terms with the diagnosis of breast cancer.
While some women may choose not to undergo breast reconstruction, it is vital that it is offered and discussed with all and that those who wish to do so, can avail of it.

Length of surgery	3-8 hours
Anaesthesia	General anaesthetic
Hospital stay	3-6 nights (depending on the type of reconstruction)
Risks/complications of surgery	Frequent: Bleeding, infection, swelling, pain Infrequent: flap failure, fat necrosis, implant complications, delayed wound healing, asymmetry, poor scarring, bulges/hernia, implant complications
Recovery (depends on type of reconstruction)	2-3 weeks until socialising with close friends and family 2 weeks abdominal binder for DIEP 4-8 weeks until return to work and normal social engagements 6-8 weeks until swelling and bruising disappears 4-8 weeks travel abroad 6-12 weeks until return to gym and other strenuous activities 3-9 months until final result
Driving	2-6 weeks
Sleeping position	Sleep on your back
Follow up	1 week, 6 weeks, 3 months, 6 months
Duration of results	Long-lasting (depending on type of reconstruction)

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Breast reconstruction information sheet

Any plastic surgery procedure is a very personal choice and understandably there are a number of questions that arise. This information sheet is a general guide for patients considering breast reconstruction under the care of Dr Mackenzie. It should provide the answers to some questions that you may have. There are many factors that can affect your individual operation, your recovery and the long-term result. Some of these factors include your overall health, previous breast and abdominal surgery, radiotherapy, chest size and body shape, adjuvant therapy, any bleeding tendencies that you have and your healing capabilities, some of which will be affected by smoking, alcohol and various medications. Such issues that are specific to you need to be discussed with Dr Mackenzie and are not covered here. Please feel free to ask her any further questions before you sign the consent form.

Introduction

Mastectomy is the removal of the entire breast. The long-term prospects of living without a breast or part of one affects every woman differently. The choice for one woman won't necessarily be right for another. It's a very personal decision, and it's often not easy to make.

Breast cancer treatment is a complex and often a multi-staged process, in which plastic surgery has a vital role to facilitate optimal reconstructive outcomes.

You can have reconstruction at the same time as breast cancer surgery (immediate reconstruction) or months or years later (delayed reconstruction). Breast reconstruction often involves several operations to give you the best outcome possible.

There are different options available for breast reconstruction, some are relatively simple and some are quite complicated. The option chosen depends on the size and shape of the breast to be reconstructed, if it is one breast or both, if radiotherapy is or was needed, the availability of tissue in other parts of the body eg abdomen, inner thigh, buttock or back and of course, what option the woman would prefer. The first basic choice is between autologous reconstruction (using the patient's own tissue to reconstruct the breast) or implant-based reconstruction or a combination of both.

It is essential that you are assessed and informed of the technique that would be suitable for you by someone who knows about all the options available. Discussing your cancer surgery with a plastic surgeon before undergoing mastectomy is crucial, because the proposed cancer removal surgery may significantly affect the choices and the results of any type of breast reconstruction.

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What is the goal of breast reconstruction?

The goal of breast reconstruction is to restore one or both breasts to near normal shape, appearance, symmetry and size following mastectomy, lumpectomy or congenital deformities.
However, even with the best outcome, there will be differences between the remaining breast and the reconstructed one, and sometimes surgery on the other side can help. This can be done at the same time as the reconstruction, but waiting for the reconstruction to heal and settle into position is usually recommended.
Importantly, breast reconstruction also aims to help with your body image and self-esteem at a difficult time, aiding the process of recovery on a physical, emotional and psychological level.

Who is a good candidate for breast reconstruction?

Breast reconstruction is a highly individualized procedure. The following are common reasons why you may want to consider breast reconstruction:

- If you think reconstruction will give you a sense of psychological well being
- To help restore your feelings of femininity and confidence in your appearance
- To improve symmetry if only one of your breasts is affected
- To allow you to wear low-cut necklines and normal swimwear
- If the breasts are an important part of your body image, self-esteem and sexuality
- Results are best if you are not overweight (body mass index is under 30)
- Radiation therapy significantly affects the timing and even the type of breast reconstruction you will undergo. It delays wound healing and can cause the skin to darken and tighten. Reconstruction, which may be delayed for months after radiation, may include the use of your own tissue to help replace some affected skin
- Chemotherapy following mastectomy can also affect the timing of your reconstruction
- Previous surgical history, past medical history and coexisting illnesses are factors in determining whether this surgery is suitable for you

Breast reconstruction may be a good option for you if:

- You do not smoke as smoking slows down the healing process and increases the risk of serious complications during and after surgery
- You are able to cope well with your diagnosis and treatment
- You are in a good general health and you are not pregnant or breastfeeding
- You have realistic expectations for restoring the breast and body image

Are there any reasons for a patient to not have breast reconstruction?

You should not have blood-flow (circulation) problems or other serious health problems, such as high blood pressure and heart disease. Diabetes and autoimmune diseases, such as rheumatoid arthritis and scleroderma, increase the risk of wound healing problems and infections.

Clotting disorders may increase the risks of breast reconstruction using flaps, and bleeding disorders and agents used to prevent blood clots increase the rate of postoperative bleeding. Medication such as aspirin or warfarin may need to be stopped (if this is not for an essential or life-threatening condition) at the appropriate time before surgery. This should be discussed with Dr Mackenzie or GP.

Smoking interferes with blood flow and can cause problems after surgery, delay healing, wound infection, and lead to larger scars. It is advisable to not consume nicotine in any form for six weeks before the breast reduction and a similar time after.

What are the limitations of breast reconstruction?

The outcome of the operation will be partly determined by the shape and size of your breasts and the quality of your skin and tissues before surgery.

- A reconstructed breast will not have the same sensation or feel as the breast it replaces
- A reconstructed breast will not look the same as the breast you have lost – it will often be a slightly different size and shape. However, any differences should not be noticeable when you are clothed, even in a bra or in swimwear
- Visible incision lines will always be present on the breast, whether from reconstruction or mastectomy
- If you lose or gain weight, this will affect the natural breast but not the reconstructed breast, causing a difference in shape and size
- Several visits to the hospital for appointments and further operations are often needed to get the best cosmetic result
- Compared with a mastectomy without reconstruction, there is a higher risk of complications, and this may delay further treatment
- Certain surgical techniques will leave incision lines at the donor site, commonly located in less exposed areas of the body such as the back, abdomen or buttocks
- If you need radiotherapy after your reconstruction, this can affect the appearance of your reconstructed breast
- A natural breast will change over time and droop as you get older. Reconstructed breasts (especially those using implants) will not change in the same way. Over time the differences between a natural and reconstructed breast may become more obvious, and you may need further surgery to restore symmetry

- Where a muscle has been used to cover an implant or is part of the reconstruction you may see movement of the reconstructed breast as that muscle contracts

When is the best time to have breast reconstruction?

The timing is based on your preference and lifestyle, medical condition, breast cancer stage and cancer treatment. You can choose to have it done during the same operation to remove the breast, or months or years after a mastectomy. Choosing whether or not to have breast reconstruction is a very personal decision. Some women feel reconstruction is necessary to restore their confidence; others prefer to wear an external breast form (prosthesis); and some women choose not to have reconstruction and not to wear a prosthesis.

If you've started any chemotherapy or radiation treatments, reconstruction is usually postponed until you complete those treatments. Your breast surgeon and Dr Mackenzie can help you decide the right timing for you.

Immediate breast reconstruction

An immediate breast reconstruction is performed at the same time as your mastectomy. Sometimes immediate reconstruction is not recommended or possible. This could be because of your health status, the type of tumour or the need for further treatments such as radiotherapy. Your breast surgeon may discuss a skin-sparing mastectomy which is removal of the breast and nipple area without removing much of the overlying skin of the breast.

The advantages of immediate breast reconstruction are:

- Patients have less psychological morbidity than those who have delayed reconstruction
- Eliminate a second surgery and anesthesia
- Provide a quality of life similar to that enjoyed preoperatively
- The nipple can sometimes be preserved
- No time spent without breast
- More of the breast skin be preserved
- Better aesthetic result then delayed- this is because more of the native breast skin is available to envelope the reconstructed breast
- Surgeon does not have to work with irradiated tissue most of the time

Disadvantages:

- Inability to determine adequately which patients will require post-mastectomy radiation therapy

- With subsequently irradiation, patients can have increased rates of fat necrosis, volume loss, and flap and/or capsular contracture
- Can interfere with the delivery of postmastectomy radiation therapy
- Higher complication rate than delayed

Delayed breast reconstruction

A delayed breast reconstruction is performed months or even years after mastectomy. During this time you may adapt to your mastectomy and feel that you no longer want to go through further surgery.

The advantages of delayed breast reconstruction are:

- Patient has time to consider the operation and make firm decision
- Lower risk of complications that immediate
- Your cancer treatment can proceed without delay
- The surgery is carried out in two stages, resulting in an easier and shorter recovery following each procedure

Disadvantages:

- Inferior cosmetic result compared to immediate reconstruction
- Mastectomy scar on the chest
- Psychological implications for the patient
- Complexity of reconstruction increased due to radiation

What to expect from breast reconstruction consultation?

You would normally meet Dr Mackenzie for at least two pre-operative consultations. The first of which is mainly about assessment and the formulation of an operative plan specific to your breast reconstruction. You should then have a cooling-off period before booking surgery and meeting Dr Mackenzie again for a second consultation. Dr Mackenzie usually summarises this consultation in a letter to you and if you decide to move forward towards surgery, a second consultation is scheduled to go over things once more and discuss the possible complications in more detail. It is usual for Dr Mackenzie to write to your GP but often patients do not want this, in which case no communication is made.

During your breast reconstruction Dr Mackenzie will discuss:

- Your surgical goals
- Your psychosocial support

- What outcome do you expect from the surgery? What is your chief motivation in undergoing breast reconstruction?
- Your complete medical history, social history, drug allergies
- Your previous breast surgery and breast cancer history
- Your current prescription medications, including vitamins, herbal supplements, alcohol, tobacco and drug use. Make sure to tell your doctor about any herbal supplements you take, as some of them may cause bleeding problems

Dr Mackenzie will also:

- Evaluate your general health status and any risk factors
- Examine and measure your breasts, including detailed measurements of their size and shape, asymmetry, skin quality, radiotherapy changes and placement of your nipples and areolas, possible donor areas
- Take the photographs
- Discuss your expectations with you. An honest discussion will help determine a satisfactory outcome
- Discuss your options
- Discuss likely outcomes of breast reconstruction and any potential complications
- Mammogram, blood tests, a heart trace (ECG), chest X-ray and CT angiogram of the abdomen may need to be organised

Preparation for breast reconstruction surgery

It is important to avoid taking any aspirin or products containing aspirin for 2 weeks either side of the operation since aspirin has an adverse effect on bruising as it thins the blood. The same is true for non-steroidal anti-inflammatory drugs (such as Brufen, Nurofen and Voltaren) and vitamin E tablets. You may also be asked to stop taking naturopathic substances such as garlic, ginko, ginseng and St John's Wort as they may affect clotting and anaesthesia. Always tell your surgeon EVERYTHING you are taking.

For procedures lasting longer than 1 hour it is normal practice to stop the contraceptive pill one cycle before the date of surgery. For smaller procedures may not be necessary and you should discuss this with Dr Mackenzie before surgery.

Some patients find homeopathic remedies such as arnica helpful to reduce bruising although it is very difficult to "prove" their efficacy scientifically. If you wish to use arnica you should begin 2-3 days before the operation and continue for a week afterward.

If you are a smoker it is absolutely imperative that you to stop for 6 weeks before surgery and for 6 weeks afterwards so as not to restrict the circulation to the skin. This restriction applies to all forms of nicotine including patches, inhalers and nicotine chewing gum!

Surgery requiring general anaesthesia is most safely conducted when patients are fit and healthy. General anaesthetic is unwise in patients who are unwell with viral illness or colds.

On the night before surgery we would ask that you eat well and remain well hydrated. In most cases you will be asked to come to the hospital at 7:00am on the morning of surgery, having had nothing to eat from midnight. Clear water can be drunk up to 2 hours before surgery and tea without milk or coffee without milk can also be taken. Milk is considered to be solid food and cannot be taken within 6 hours of the start of surgery.

On the morning of surgery, you will be admitted to the ward. You will meet the anaesthetist who will discuss the anaesthetic with you in detail and you will also see Dr Mackenzie who will mark the surgical site as required and complete the consent form for surgery with you.

While making preparations, be sure to arrange for someone to drive you home after your surgery and to help you out for a few weeks at home.

What are the types of breast reconstruction?

There are several options in breast reconstruction. Not all will be available to each patient, and all have advantages and disadvantages. Breast reconstruction falls into three main categories:

- Reconstruction using implants (implant based reconstruction)
- Reconstruction using the patient's own tissue (autologous reconstruction)
- A mixture of tissue and implants

Implant based breast reconstruction

Implant surgery is the most straightforward, although technically demanding, way of creating a new breast after mastectomy, without taking tissue from elsewhere on the body. Implant based procedures use either a temporary expandable prosthesis (saline filled) that is exchanged at a later date for a fixed volume silicone implant or the patient's own tissue, or a fixed volume silicone implant inserted under the muscle and skin to replace the breast that has been removed at the time of mastectomy. It can be performed at the same time as mastectomy (immediate) or at a later date (delayed).

What are the advantages of implant based breast reconstruction?

Implant based reconstruction may be suitable if both breasts are to be reconstructed or if other procedures are not deemed appropriate. Implants may be offered to you if you are unsuitable for reconstruction using your own tissue. This might be for a variety of reasons, such as:

- You have no spare tissue to use
- Your health does not permit a longer and more complex reconstruction
- You do not wish to have the additional scars associated with a tissue reconstruction

What are the disadvantages of implant based breast reconstruction?

Implant based reconstruction is generally not recommended if you require, or have undergone radiotherapy treatment due to the high risk of capsular contracture, risk of implant exposure and poor aesthetic outcome. Radiotherapy affects the overlying skin and can cause it to be very tight and inelastic.

Possible disadvantages of implant based breast reconstruction include:

- Does not produce the most natural looking or feeling breasts
- Rarely matches the shape of the other breast unless this is particularly uplifted
- Tends to produce a breast mound with no droop. For that reason it is more suited to slimmer women with small opposite breast that does not have any sagging of the tissue
- May be maintenance surgery required after about 10 years
- Not suitable for a large breast reconstruction
- Reconstructed breast does not age naturally like the other breast
- Often the other breast will need to be adjusted to improve the shape, size and position
- Potential problems associated with implant (capsular contracture, rupture, rippling, ALCL). Please refer to the breast augmentation information sheet

For an immediate implant based breast reconstruction, an implant reconstruction can usually be performed in one stage at the same time as mastectomy. In such cases Dr Mackenzie will place a breast implant under the skin and muscle. The implant may be covered by Acellular Dermal Matrix (animal/human-derived products) to support the implant like an internal bra, helping to prevent migration or rotation of your implant after surgery. ADM is a natural tissue that has had its cells removed to leave behind collagen and extracellular matrix components. ADM is like a scaffold network that provides support and acts as a framework for the patient's tissues to grow into. ADM may be used to convert this two-stage prolonged treatment journey to a one-step reconstruction. Instead of expanding the chest muscle and breast skin over a period of several weeks after your mastectomy to create a pocket big enough to hold an implant, Dr Mackenzie will stitch a patch of ADM inside the breast skin to the sides of the muscle and along the inframammary fold. This creates a pocket without

delay and also covers the implant edges very well. The breast skin of patients who have had previous radiotherapy will not integrate well into an ADM and hence Dr Mackenzie will not use it in these patients. The described post-operative complications include infection, skin necrosis, seroma.

For a delayed implant based breast reconstruction, two operations are required as the skin and soft tissue needs to be stretched using an expander to accommodate the implant. A balloon-like tissue expander is put under the skin and chest muscle. Through a small valve under the skin, Dr Mackenzie will then inject a salt-water solution in the outpatients clinic at fortnightly intervals to fill the expander over 2 to 3 months. Expanders do not contain silicone gel and are replaced by the definitive implant or a flap some months later in a second operation when the skin envelope has been stretched up enough by the expander. The two-stage method allows time for other treatment options like radiation to be undertaken. If radiation is not needed, Dr Mackenzie can start the tissue expansion straight away (expander in this case preserves the space).

What does the implant based breast reconstruction involve?

An implant reconstruction takes about an hour, although it may be longer if combined with a mastectomy and some axillary surgery. It is always performed under a general anaesthetic.

Implant based reconstruction requires a hospital stay of 3-4 days. After the first night, you will need to do some exercises to get your arm and shoulder moving properly again. Your nurse or physiotherapist will show you what to do and explain when to do the exercises. While doing the exercises it helps to wear a supportive and comfortable bra that is not under-wired. You will wear a non-wired supportive bra for 6 weeks.

Drains are routinely used in most forms of breast reconstruction. They will normally come out three or four days after the operation. If a large amount of fluid is drained however, then the drains may stay for several more days until this amount has reduced to an acceptable level.

Once you go home from hospital you will feel very tired initially, and should have someone around to help you. After the first week you should be starting to look after yourself and begin to resume some light activities. Within 6 weeks you should be back to normal.

If you experience shortness of breath, chest pains or unusual heartbeats, seek medical attention immediately.

When all the wounds are healed, you will be asked to tape your wounds with Micropore tape available form pharmacy for 6 weeks. Then you can massage it twice daily using hypoallergic cream.

What are the complications of implant based breast reconstruction?

Complication rates associated with implant-based breast reconstruction can approach 40-50%. It is important to remember that for operations that involve both a mastectomy and reconstruction, it is important than each of the surgeons involved in your operation explain the potential complications of their own part of the procedure. The potential complications associated with implant based reconstruction include:

- Bleeding (hematoma)-may require return to theatre for wash out
- Seroma-collection of fluid after drains are removed. This may need to be drained off in a clinic or by the radiologist
- Infection- when infection occurs in the implant space, implant removal is necessary with delayed secondary reconstruction after wound healing and scar maturation are achieved
- Wound healing problems
- Skin envelope necrosis- when skin necrosis is more extensive, unless the implant is well covered with muscle, implant exposure may occur, and subsequent removal may become necessary
- Asymmetry
- Reduction in breast skin sensation-may recover over 12-18 months
- Implant rippling, exposure, rupture and rotation
- Expander deflation
- Scarring
- ADM associated complications
- Anaplastic Large Cell Lymphoma

Autologous breast reconstruction (from body tissue)

Autologous breast reconstruction can give excellent and long term results. Surgery involves taking tissue from a donor site, usually the abdomen (DIEP), or inner thigh (TUG), leaving scars in those areas.

The DIEP flap is regarded as the gold standard procedure for breast reconstruction and can be used for immediate or delayed reconstruction. The acronym stands for Deep Inferior Epigastric Perforator Flaps and it is called DIEP because the blood vessels taken from the abdomen are called the deep inferior epigastric perforator blood vessels. DIEP flap is the name given to the process of moving a piece of skin and fat from the abdomen and using it to rebuild the breast after mastectomy. No muscle transfers are used in a DIEP flap operation. The tissue and its blood vessels are carefully detached from your abdomen before being reconnected to a new blood supply in your chest.

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What are the advantages of autologous breast reconstruction?

- Uses your own tissue which means that your new breast will resemble the normal breast
- It gives warm and soft breast
- Reconstructed breast behaves and has the same texture as the opposite side
- The reconstructed breast will change with the opposite breast-if you put on weight the breast will increase in size and similarly a loss of weight will mean the breast will reduce
- Can leave the patient with a flatter tummy
- Reconstruction ages with you naturally
- Abdominal muscle is left intact, only fatty tissue is taken from donor site
- One main operation
- The finished result tends to improve over the years and rarely needs any surgical adjustments

What are the disadvantages of autologous breast reconstruction?

- It is a major operation, usually 5-6 hours of surgery and a 7 night hospital stay
- The flap is monitored every hour for the first three days in a High Dependency Unit (HDU). There is a small risk of failure of the flap at this stage and this could result in emergency surgery
- 6 week recovery period
- The failure rate is increased by factors such as obesity, smoking, diabetes, radiotherapy and other medical conditions
- There will be an abdominal scar similar to that following a 'tummy tuck'
- Secondary operation for nipple reconstruction, and in some cases re-sculpturing of the breast with liposuction or auto fat injections to gain symmetry between the breasts
- The reconstructed breast will have no feeling or sensation

Who is a good candidate for a DIEP flap?

In general, it is a good choice if you do not want an implant and need to have either one or both breasts reconstructed, and have an adequate amount of tissue on your tummy. You can still have a DIEP reconstruction if you've had some abdominal surgery (hysterectomy, caesarean section, appendectomy, bowel surgery) unless the scarring on your abdomen is extensive. If you are very slim, very overweight, smoke or have health problems like diabetes then the procedure may not be suitable for you.

What does the operation involve?

A CT scan is always carried out prior to surgery. This is used to visualize and assess the flow patterns of arteries and veins and provides information about the best place to the take the tissue from before the operation begins.

A DIEP reconstruction is a major operation performed under a general anaesthetic which takes 5-7 hours. It usually requires a hospital stay of 4-6 days. A urinary catheter is used to drain urine while you are confined to bed during the first few hours after the operation.

After the skin, fat and perforators (small vessels of the flap) have been carefully dissected, the DIEP flap is transferred to the chest and shaped into a breast while the artery and veins are connected to blood vessels in the chest wall using a specialized technique called microvascular surgery. Dr Mackenzie then shapes the flap to create the new breast. Rarely, if the flap of tissue doesn't have a good blood supply it will die and the reconstruction will fail.

You will have an incision on your breast, which is usually oval, and on the abdomen – usually below the bikini line stretching from hip to hip. The belly button (umbilicus) is repositioned during this type of surgery, leaving a circular scar around it. The breast incision will contain a patch of visible skin from the tummy so that Dr Mackenzie and her team can check that the flap is working well. All the sutures are dissolvable.

Some drains are positioned in the abdomen and the breast. These are usually removed in the three days following surgery. You will be given some intravenous antibiotics for 48 hours to help reduce the chances of early post-operative infection. You will also be given a blood-thinning injection of heparin to reduce the risk of deep vein thrombosis.

What can you expect immediately after the autologous breast reconstruction?

The first night after surgery is usually spent in a high dependency area or in a room with your own dedicated nurse. This is so that the flap can be checked regularly as it is important.

It is usual to feel drowsy and a little disorientated for some time post-operatively. If you have pain or feel sick, you should tell the nursing staff so that they can give you the appropriate medication.

A warming blanket is usually in place for the first night to stop you getting cold, and some intermittent compression devices on the calves to keep the blood circulating in the legs and again reduce the chances of deep vein thrombosis.

The breast(s) will feel a little sore after surgery particularly when the arms are moved, but this rapidly improves over the first few days. It is likely that your hips and knees will be bent, perhaps on cushions or with the bed bent in the middle, to take the strain off the abdominal wound. You will be given sufficient pain relief to keep you completely comfortable and a warming blanket is also usually in place for the first night to stop you getting cold.

You will be given a device to control your own pain-killing medication (PCA or Patient Controlled Analgesia). The nurse will teach you how to use this, but essentially you press the button on the control

if you feel pain. There is a lock-out on the device so that it is impossible for you to overdose on the medication.

What is the recovery like?

After the first night, you are then usually transferred to the ward for standard nursing care. On the first day following surgery, a physiotherapist will help you sit out in a chair for a short time. You can usually get out of bed by yourself two days after the operation.

Soon after surgery you'll be encouraged to move your arms, but not for any forceful activity like pulling yourself up, getting out of bed, or lifting heavy objects. Nurses will help you in and out of bed. The day after surgery, you will be able to sit in a chair beside the bed. On the second day, most patients are walking without help.

After the operation, you will have an injection into your tummy or thigh for 7-14 days to thin your blood and prevent clots developing.

Over the next few days the drains and catheter are removed, showering is commenced and mobilization is increased. On the day of discharge, you will be given an information sheet and be asked to attend a Dressing Clinic appointment approximately seven to ten days after the operation. At that appointment, the dressings will be removed by a nurse and the wound checked. You should continue to shower daily but it is inadvisable to soak in the bath with the wounds submerged for at least three weeks.

After two to three weeks you may go back to non-physical employment and resume driving a car, but this will depend on your recovery. It is also important to check with your insurance company as some policies do vary. Four weeks after your operation you may resume gentle exercise, but strenuous exercise or manual labour are inadvisable for six to eight weeks.

If you have had a DIEP reconstruction you will need supportive knickers to wear for six weeks. These should be firm and come up to under your bust.

Anti blood clot stockings need to be worn for 2 weeks or until return to normal activity.

The mastectomy and breast reconstruction will leave areas of numbness where the surgery was performed. Instead of feeling pain where the tissue was taken, you may feel numbness and tightness. In time, some feeling may return in your breasts.

Where will the incisions be?

All operations result in scarring of some sort and the position and size of scars after breast reconstruction depends entirely on the technique used. In general, implant techniques give shorter scars confined only to the breast, whereas flap techniques give longer scars, which will be on the breast and where the tissue has been taken from (the abdominal incision will be a long, curved line across your tummy at or just above the bikini line. There will also be an incision around the belly button). However, scars on the abdomen or buttocks can be hidden by bathing suits and underwear.

All incisions produce scars, which usually settle down over several months. All scars can be expected to be lumpy at first and will go through a period of being pink, red and raised. They will usually then gradually become flat and pale. This process can take as long as two years to happen.

However, some scars can be troublesome. Hypertrophic scars are red, raised and itchy for several months following the operation. These can be treated but may result in a wide stretched scar. Keloid scars are larger and more difficult to treat but these are extremely rare following breast reconstruction.

What are the potential complications of autologous breast reconstruction?

Any invasive surgical procedure has risks such as infection, haematoma (blood clot), changes in sensation, post-operative pain, and delayed wound healing. The most common complications include:

- Bleeding and haematoma-if it occurs a short operation would be required to drain the haematoma and stop the bleeding (the risk of this is about 2%). If post-operatively you feel the breast reconstruction or the abdomen getting larger, especially if it is associated with pain or you feel light-headed, then you should tell a member of the nursing or medical team as soon as possible
- Flap loss or failure (1-5%)- sometimes there is a problem with the blood supply to the flap and part or all of the flap may die. If this happens you may need another operation to remove the dead parts of the flap. Very rarely the new tissue in the breast fails and an alternative method of reconstruction is needed
- Infection-antibiotics are given at the time of the surgery to reduce the chances of infection occurring. Most infections resulting from surgery appear within a few days of the operation and require a further course of antibiotics
- Seroma- build-up of fluid under the wound site This sometimes happens after the abdominal or breast drains have been removed, but it usually gets better within a few weeks. It occurs in approximately 1 in every 10 women. The fluid can be simply drained at an out-patient appointment, using a needle connected to another drain bottle. If the seroma formation is a recurrent problem then very rarely, an injection of steroid needs to be applied to the abdominal wound to reduce the production of the fluid. The seroma or its treatment does not usually have any long-term consequences

- Lack of sensation in new breast-the breast reconstruction flap will have little or no light-touch sensation. Over 18 months, the periphery of the reconstruction does regain some sensation and most patients can feel movement of the breast on the chest wall
- Asymmetry-most women's breasts are asymmetrical and with advancing age, the breast also tends to droop. Although every effort is made to create a new breast to match the opposite healthy one, it is rarely possible to achieve perfect symmetry
- Abdominal bulge or hernia-weakness of the abdominal wall after a DIEP flap procedure may produce a bulge on one side but this is rare. Post-operative abdominal exercises can sometimes improve on this over time. Very rarely, damage to the muscle may produce a hernia that will require additional surgery for correction. This is an extremely rare complication because the abdominal muscle is left intact, which is the great advantage of the DIEP technique compared to the previously used TRAM flap breast reconstructions
- Fat necrosis- fat necrosis and partial flap necrosis can occur in all autologous reconstructions. It tends to settle over time
- Mastectomy skin flap necrosis is more common in large-breasted skin-sparing mastectomies, obese patients, and smokers. Small areas can be left to demarcate with subsequent bedside debridement and healing by secondary intention. Larger areas may require skin grafting

Implant and tissue breast reconstruction

One type of flap transfer for breast reconstruction uses the latissimus dorsi muscle from the back along with an overlying patch of skin. This muscle has a good blood supply from the vessels emerging from the armpit, which makes it extremely useful for breast reconstruction.

A latissimus dorsi flap uses muscle, fat and skin from the back tunneled carefully to the mastectomy site and remains attached to its donor site, leaving blood supply intact (pedicled latissimus dorsi flap). Some of the skin on the flap is used to form the new skin of the reconstructed breast while the muscle and the fat are used to form the volume of the breast.

For a small breast, latissimus dorsi pedicled flap may be enough on its own but for most breast reconstructions, an implant is needed as well to match the volume needed for the breast. The additional coverage of muscle and back skin over the implant protects it more and gives a more natural appearance the breast.

Although it can be used when radiotherapy has been given, as there is usually an implant used as well, it too will give a better result when radiotherapy has not been given.

The scar on the back is usually horizontal and hidden along the bra line, or it can be diagonal. The scar on the breast will vary depending on your shape, the size of your breast and whether you have the reconstruction done at the same time as your mastectomy or at a later date.

If the volume in the flap isn't quite big enough, but not small enough to warrant an implant then additional fat can be added to the reconstruction. This is usually taken from your thighs or tummy by liposuction and injected into the flap – this is called lipomodelling.

Indications for latissimus dorsi/implant reconstructions are:

- Patient's motivations, the anatomy of the breast as well as of the back, the nature of underlying breast disease
- The latissimus dorsi is helpful for breast reconstruction after a skin-sparing mastectomy when a breast prosthesis is part of the plan
- It is best for small to medium sized breast reconstructions
- It can be ideal for relatively heavily built women who have small- to medium-sized breasts
- The latissimus dorsi skin can be used to replace the missing skin at the site of the nipple-areola, and the muscle can be used to provide improved soft tissue coverage of the breast implant or expander
- Placement of a tissue expander under the latissimus muscle allows postoperative adjustment of breast volume and ultimately better symmetry with the opposite breast
- Useful for partial mastectomy or lumpectomy deformities
- Following failed DIEP flap
- Patients desiring pregnancy
- If can't have DIEP flap

Contraindication to latissimus dorsi flap reconstruction include:

- Posterolateral thoracotomy in which the latissimus muscle had been divided
- A relative contraindication is an atrophic latissimus dorsi muscle after division of the thoracodorsal nerve during an axillary dissection
- Patients needing latissimus dorsi for activity, eg tennis players, professional swimmers
- Use of the latissimus flap electively with skin-sparing mastectomy before radiation therapy is probably unwise

Advantages of latissimus dorsi flap reconstruction include:

- Reliable, low rates of failure (<1%)
- Can produce a natural feeling breast
- Large volume reconstruction possible (may require an expander)
- Can be used for a bilateral reconstruction

Disadvantages of latissimus dorsi flap reconstruction:

- It does result in quite a long scar on the back, but this can usually be positioned to be concealed by most clothing and underwear
- Back skin may have a colour mis-match with the natural chest wall skin
- Difficult to achieve symmetry
- Weakness of the shoulder muscles during everyday activities. This usually responds well to physiotherapy and strengthening exercises. However, possible weakness will be an important consideration if you're very active, for example if you regularly swim, climb, row, play tennis or golf. So consider this when deciding which method of reconstruction is best for you
- Not suitable if you have had some forms of previous surgery, for example a thoracotomy, on that side

It can be difficult to match a reconstructed breast exactly to the natural breast on the other side or in bilateral cases to get both breasts symmetrical. Therefore, it is common to have further procedures to try and match both breasts better. This may involve fat transfer or liposuction to do small adjustments. Or it may involve a breast lift or size reduction or implant placement on the opposite breast. Of course, it is an individual woman's choice whether to undergo further symmetrising surgery or not.