



HEAD & NECK CANCER
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RECONSTRUCTIVE SURGERY: BONY FREE FLAPS





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RECONSTRUCTIVE SURGERY: BONY FREE FLAPS

This information aims to help you understand the operation, what is involved and some common complications that may occur. It may help answer some of your questions and help you think of other questions that you may want to ask your cancer care team; it is not intended to replace advice or discussion between you and your [cancer care team](#).

AN OVERVIEW TO RECONSTRUCTIVE SURGERY USING BONY FREE FLAPS

Surgery for head and neck cancer can lead to some major changes in the appearance of your head and neck, and in functions such as eating, talking and breathing.

RECONSTRUCTIVE SURGERY:

- may be needed to rebuild the area if a large area of tissue or bone was removed during surgery.
- will be planned by considering:
 - how to get the tissue to heal quickly, to avoid a long stay in hospital
 - how best to protect vital organs, such as major blood vessels
 - what is safe
 - how you will look following the surgery
 - how best to improve functions such as speaking, breathing, chewing and swallowing.
- There are different ways of rebuilding the tissue including:
 - [Skin grafts](#) – a layer of skin laid on the wound
 - [Local flaps](#) – moving tissue with a blood supply from next to the wound
 - [Regional flaps](#) – moving tissue on a stalk (blood vessels) from somewhere near the head and neck, like the chest
 - [Free flaps](#) – moving tissue from somewhere else in the body with its own blood vessels. This includes bone and soft tissue free flaps.

BONY FREE FLAPS:

- are often used after surgery to remove cancers from the upper and lower jaw, they are called 'bony' because they involve taking bone from somewhere else in the body.
- often include soft tissue like skin and muscle, to form a seal over the bone. This is called a composite free flap.
- use tissue from another part of the body such as the lower leg, hip, back or forearm. The area where the flap is taken from is called the **donor site**.
- Are different to bone grafts because they have their own blood supply called the **pedicle** (an artery and a vein from its original location) which is moved with the bone to keep it alive
- involves specialised surgery under the microscope (microvascular anastomosis) so that the blood vessels of the flap are connected to the blood vessels in the neck.
- require a team of surgeons with special expertise and takes many hours to perform. A [multidisciplinary team](#) is often involved in planning and undertaking the operation and helping you recover after the operation.

TYPES OF BONY FREE FLAPS:

There are many different types of bony free flaps. They use different types of tissue depending on what is needed for the reconstruction. Some of the common flaps include:

- **Fibula flap:** Uses the bone from the outside of the lower leg called the fibula. Usually the skin over the bone and some of the surrounding muscle is included with the bone. The fibula bone is long and thin. It can be safely used because there are two bones in the lower leg. The other bone, called the tibia, is very strong. The fibula is the most common flap used to reconstruct the lower jaw after a [mandibulectomy](#). Usually a skin graft is needed to cover the area where the flap was taken from (donor site). A plaster is often put on the leg until the skin graft takes. Removal of the fibula should not affect the function of your leg, though you may have some difficulty raising your big toe. The scar is quite noticeable if you wear shorts.
- **Iliac crest or deep circumflex iliac artery (DCIA) flap:** Uses bone from the pelvis called the iliac crest. Usually this is either combined with muscle from the abdomen (internal oblique muscle) or skin over the bone. The iliac crest is broad and thick. It can be safely



used because the pelvic bones are very large and strong. The iliac crest is commonly used to reconstruct the lower jaw after a mandibulectomy or the upper jaw after a [maxillectomy](#). The donor site is closed directly so no skin graft is needed but a synthetic mesh may be used to replace the internal oblique muscle to prevent hernias. Removal of the iliac crest should not affect the function of your hip, but it may be painful to walk for a few weeks. The scar is well hidden by clothes but there may be a noticeable hollowing in the area where the bone was taken if you wear a bikini.

- **Scapula flap:** Uses bone from the wing-bone (scapula) on your back. Usually this is combined with muscle or skin from the same area. The scapula is broad but quite thin, compared to the iliac crest. It can be safely used because it avoids areas that are important for shoulder movement. The scapula is less commonly used than the fibula but can be used to reconstruct the lower jaw after a mandibulectomy or the upper jaw after a maxillectomy. The donor site is closed directly so no skin graft is needed and the scar is well hidden by clothes. Removal of part of the scapula will restrict your shoulder movement for a month or two after the surgery but this should return to normal in the long term. The scapula is a good option in patients who have peripheral vascular disease or difficulty walking because it avoids the leg and hip regions.
- **Radius flap:** Uses bone from the forearm called the radius. Usually this is combined with skin from the forearm called the radial forearm flap, which is one of the most common soft tissue free flaps. The radius is a very important bone and so only a small portion can be taken for use elsewhere and sometimes a plate is put on the remaining bone to prevent it breaking. The radius can be used to replace smaller portions of the upper and lower jaw bones and other areas of the face. The donor site is usually closed with a skin graft. Removal of part of radius should not affect the function of your forearm or hand. The scar is quite noticeable if you wear a short sleeve shirt.

WHY IS A BONY FLAP NEEDED?

- There are a several reasons why a bony free flap is used. These include:
 - The hole (defect) is too large too close reliably with a bone graft or prosthetic material
 - The tissue will not function well without a flap, such as:
 - Restoring your ability to speak and chew when the jaw bone is removed



- Maintaining the position of the eye when part of the eye socket is removed
- Providing bone that implants can be placed into to support a denture
- Your appearance will be affected without a flap, such as when the bone that provides the contour of your face has been removed.
- The tissue is unlikely to heal without a flap, such as when you have had previous radiotherapy or many operations
- Reconstructive surgery may be performed at the same time as the primary surgery, or at a later date. Your doctor will discuss these options with you.

HOW TO PREPARE FOR THE OPERATION

BEFORE THE OPERATION:

- You will need to fast (have nothing to eat or drink) for 6 hours before your operation (unless advised differently by your surgeon or anaesthetist) because the reconstructive surgery is performed under a general anaesthetic (you will be asleep and will not remember what happens during the operation).
- Your surgeon will explain the details of your operation. Be sure to bring up any questions or concerns, and share your needs and wishes with your cancer care team (**see box**).
- If you are having a flap taken from your arm, make sure that a drip (intravenous cannula) is NOT placed in the same arm
- Let your surgeon know if you have had:
 - Problems with the blood vessels in your arms or legs such as blocked arteries or clots in the legs (deep venous thrombosis - DVT)
 - Previous surgery in the area where the flap will be taken from (donor site)
- Let your surgeon know if:

Possible questions that you may want to ask your cancer care team

- What are the side effects of taking tissue from another part of the body (donor site)?
- If I have a flap taken from somewhere else, how will it look in its new location?
- Can the flap replace the normal function of the tissue it is replacing?
- What will the donor site look like?
- I do manual labour, will the flap affect my ability to work?
- I enjoy some sports, will the flap affect my ability to play sport?
- Are there any things I will find more difficult to do as a result of the flap?
- Is there an alternative donor site that will have less side effects for me?
- Will I be able to feel the



- o Your work involves manual labour that could be affected by the flap
- o You enjoy sports that could be affected by the flap
- o Your career depends on how you look or speak
- You should speak to your doctor about how to manage aspects of your lifestyle, such as smoking, drinking alcohol and chronic conditions (e.g. diabetes and obesity) that may increase the risk of complications.
 - o If you take blood thinning medication for a heart condition or blood clots (such as Warfarin, Plavix, Aspirin or Pradaxa), make sure your surgeon is aware. Some of these medications need to be stopped more than a week before the operation. Sometimes a short-acting blood thinner (such as Clexane) is used before and after the surgery.
- Talk to your [cancer care team](#) about any likely side effects to expect following the operation, such as speech, swallowing, breathing and appearance. You may find it useful to talk to a dietitian, speech pathologist or specialist head and neck nurse about these issues.

Visit the [Head and Neck Cancer Australia website](#) for further information on the health professionals who may be part of your cancer care team

WHAT TO EXPECT DURING THE OPERATION

Reconstructive surgery may be done at the same time as the primary surgery for the removal of your cancer. Sometimes it is done months or years after the original cancer surgery. Visit the Head and Neck Cancer Australia website for further information about the specific surgery you are having for your particular cancer and for questions to ask your doctor.

- **Bony free flap surgery involves:**
 - o Finding suitable blood vessels in the neck to join to the flap.
 - o Preparing the bone flap from a suitable part of the body; this may include a piece of skin and sometimes muscle, along with the bone and its blood vessels. The choice of the donor site depends on the defect needed to be repaired.
 - o The bone flap is transferred to the defect in the head or neck region needing repair and the donor site is closed using stitches or sometimes a skin graft.
 - o The blood vessels of the bone flap are connected to vessels in the neck using microvascular surgical techniques (very small sutures and a microscope).



- The surgery may take several hours; during this time in the operating theatre you will be kept warm and protected from getting pressure sores.
- If the reconstructive surgery involves areas such as the mouth, lower jaw bone, neck or throat, a [tracheostomy](#) (or opening) may be made in the windpipe assist with breathing after the surgery.

WHAT TO EXPECT AFTER THE OPERATION

- **After the operation, once you are fully awake, you will be moved to a bed in the hospital or intensive care unit.**
- Your treatment team will carefully look after and check the flap by:
 - carefully checking the colour and warmth of the flap.
 - Using a Doppler (special ultrasound) to listen to the blood flowing through the flap
 - Occasionally pricking or scratching the flap to check that it bleeds. Don't worry this will not hurt because the flap does not have any feeling.
 - Keeping your head in a neutral (straight position) while you sleep to prevent the blood vessels from kinking
- The flap is checked every hour for a few days so that if a clot develops and there is not enough blood flow, this can be fixed immediately before the flap fails (dies).
- **Your anaesthetist and surgical team will give you medicine to help control any pain and nausea after the operation.**
- You may have surgical drains from the site of the operation to allow blood or fluid to escape and prevent swelling. These will be removed before you go home.
- Your anaesthetist and surgical team will give you medicine to help control any pain and nausea after the operation. You may also have a button to push that delivers strong pain killers (patient controlled analgesia, or PCA), or you may have to ask the nurse for extra pain medication.
- You may have a drip in your arm to provide fluid and a feeding tube to help you receive nutrition. The drips and tubes will be removed when they are no longer needed and before you go home.
- **You may have a breathing tube in your lower neck to assist you breathing. This is called a tracheostomy and is usually temporary. This will make it difficult to talk, and you may need to write things down that you want to say to people. It is useful to have a pen and**



paper, mini white board or iPad/tablet in hospital to write down anything you want to say.

- Tracheostomy tubes need to be suctioned regularly to stop them clogging with phlegm and mucus. This will make you cough and it can feel uncomfortable to start with. Visit the [Head and Neck Cancer Australia website](#) for further information on Tracheostomy.
- It can be very difficult to sleep in the first two days after surgery because of everything going on. You might feel tired, fatigued, upset and get a bit irritated with people trying to help you. This is normal but it helps to prepare yourself so you don't get too frustrated.
- Most patients stay in hospital for around 1–2 weeks.

POSSIBLE RISKS OF RECONSTRUCTIVE SURGERY USING BONY FREE FLAPS

All operations carry some risks such as blood clots, wound infections, bleeding, chest infection, adverse reactions to anaesthetic, and other complications. These risks will be explained by your cancer specialist and anaesthetist.

Your doctor will explain details of the operation, general risks and side effects of the operation, they may recommend:

- stopping blood thinners (e.g. aspirin) before surgery to reduce the risk of bleeding
- a blood thinner (called heparin) may be injected before and after surgery to reduce the risk of blood clots
- antibiotics to reduce to risk of wound infection
- early mobilisation to reduce the risk of blood clots and chest infection
- special stockings to reduce the risk of blood clots.

Free flap reconstructions are big operations but they have become very common after major head and neck surgery. Many hospitals do hundreds of these operations safely every year. There are some specific risks to be aware of:

- **Clots in the flap (flap failure):** The most serious complication of free flap surgery is blockage of the blood vessels that provide blood to the flap to keep it alive. If this happens



or is suspected, you will need to return to the operating theatre to unblock the blood vessels. Despite the best efforts, approximately 5% of the soft tissue flaps cannot be saved (salvaged).

- **Infection.** The mouth and throat contains lots of bacteria, which may cause an infection in the wound after the surgery. The surgeon will prescribe antibiotics to prevent this occurring, but if an infection still occurs, it might require opening part of the wound to allow any pus to drain out.
- **Abnormal opening or fistula:** The flap may pull away from the tissue it was stitched to. This makes a hole which may result in fluid (such as saliva) leaking into the wound causing an infection. This can be a very serious complication and might require opening a wound to allow it to drain or another operation to fix the seal.
- **Plate complications:** Bony free flaps require metal plates to hold them in place. Usually these plates remain forever but if they get infected, become visible or break they will need to be removed.
- **Donor site complications:** Each bone flap has its own specific risks related to important structures that are nearby. Some examples are
 - **Nerve damage:** The nerve that raises the foot wraps around the fibula bone. If this is injured it will cause a 'foot drop'
 - **Fracture:** If too much bone is removed from the radius the bone can come weak and break.
 - **Inadequate blood supply:** There are three blood vessels that supply the foot. One of these is removed with the fibula bone. If the other two are blocked, then the blood supply to the foot will be compromised.
 - **Pain:** The nerve that gives feeling to the side of the thigh (lateral femoral cutaneous nerve) has to be moved during an iliac crest flap. Sometimes this can cause pain the thigh.
 - **Wound complications:** Sometimes it can take a long time for the donor site wounds to heal. This is particularly common in the lower leg if a skin graft is required or if the blood supply is poor.

SIDE EFFECTS AND THEIR MANAGEMENT

As with all operations, there is a chance that reconstructive surgery using bony free flap may lead to a number of side effects. You may not experience all of the side effects. Speak with your doctor if you have any questions or concerns about treatment side effects. Side effects common for bony free flap surgery may include:

- **Nausea:** General anaesthetic may cause nausea. This will settle down soon after the operation and can be treated with medications.
- **Sore throat:** Your throat may be sore initially because of the breathing tube placed during the operation.
- **Pain:** Your anaesthetist will give you pain medicine during the operation to keep you comfortable when you wake up, and you may continue on pain medicines to ensure pain is under control. Ensure you take pain relief medications as prescribed by your doctor and speak to your cancer care team if the pain is not under control, gets worse or if the medication causes any side effects. You may want to download further information about pain management, which is available on the [Head and Neck Cancer Australia website](#).

Reconstructive surgery is used to help healing, function and your appearance. Despite this some people undergoing reconstructive surgery may also experience:

- **Changes in appearance:** Your appearance may change and it may be hard to accept. Seek support from the cancer care team, and family and friends. Contacting other patients through a support group may also assist.
- **Changes in eating and speaking:** Cancer surgery may affect eating and speaking so it may be useful to have a tablet/portable device or pen and paper to write down what you want to say. The speech pathologist and dietitian will provide any assistance needed to help with your speaking and eating during recovery.

There are also side effects due to the surgery needed to remove your particular cancer, if this is done at the same time as the reconstructive surgery. For these side effects, refer to the information on the website about the particular [surgery](#) you are having for your cancer.

BEFORE GOING HOME

- Any particular instructions for [wound care](#) or medications will be provided to you before you go home. You may want to download further information about wound care on the [Head and Neck Cancer Australia website](#).
- You may need dressings, especially if you had a skin graft, for several weeks after going home. This is often done by a community nurse.
- Your doctor may prescribe pain medications to help relieve pain following the operation. Ensure you take the pain relief medications as prescribed by your doctor and speak to your cancer care team if the pain is not under control, gets worse or if the medication causes any side effects. You may want to download further information about pain management, which is available on the [Head and Neck Cancer Australia website](#).
- You will be assessed by the team involved in your care before you go home and follow-up will be arranged with your surgeon and GP.
- Follow-up may also be arranged with any other allied health professionals that may assist you with supportive care
- Your recovery at home may vary and you should allow time for your body to recover and heal. Regular follow-up helps to assess your progress.

SYMPTOMS TO WATCH FOR AFTER DISCHARGE FROM HOSPITAL

- **Significant swelling:** You will have some swelling after your surgery. This is normal and may last for some weeks or months in varying degrees. However, contact your surgeon, GP or the hospital, if the swelling becomes very noticeable and affects your swallowing or breathing.
- **Difficulty breathing or swallowing:** You should be able to breath normally after your surgery. If you are having difficulty breathing or swallowing, immediately go to hospital emergency department or contact your surgeon.

- **Discharge from the wound:** If your wound becomes red, hot and starts to discharge, these are signs of an infection. Contact your surgeon's office or your GP, as you may need some antibiotics.
- **Fever:** Contact your surgeon or GP if you develop a fever.

FOLLOW-UP CARE

- After your operation, you will continue to have regular follow-up visits with your specialist doctor and cancer care team. Most patients with head and neck cancer will be monitored for five years after surgery, sometimes more.
- Any additional reconstruction, cosmetic procedures or treatments that you may need are planned after discharge. This enables time for you to recover from the initial operation, get results of the pathology that examined the tissue removed at the operation, and make the arrangements for any additional treatment or next steps.

For further information about the operation for cancer and what to expect, you can also refer to [Understanding Surgery: a guide for people with cancer, their families and friends](#).

QUESTIONS TO ASK YOUR DOCTOR

- What will happen if I decide not to have the surgery?
- When will the cancer surgery be undertaken?
- How much will the surgery cost? Will my health insurance cover it?
- What are the possible side effects of treatment? How can they be prevented or controlled?
- What scar am I likely to expect?
- Will I be able to lead a normal life?
- What follow-up tests will I need after the operation?
- Am I suitable for any clinical trials?
- Who are the health professionals that I will need to see as part of my follow-up care?



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You may want to write specific questions here to ask your doctor or cancer care team

About Head and Neck Cancer Australia

Head and Neck Cancer Australia (formerly Beyond Five) is Australia's only charity dedicated to providing information and support to people living with head and neck cancer, caregivers, family and healthcare professionals.

Head and Neck Cancer Australia's mission is to improve the quality of life of everyone affected by head and neck cancer through education and access to support and to raise awareness of head and neck cancer nationally.

Head and Neck Cancer Australia supports people through their cancer journey, from diagnosis to treatment and life after cancer by providing comprehensive, easy to understand and easy to access information. We have the only Directory of Head and Neck Cancer services and support groups available in Australia and New Zealand helping people to find the right services and support when they need it most.

Phone: 1300 424 848

Email: contact@headandneckcancer.org.au

Web: www.headandneckcancer.org.au

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First Published: 2016

Last updated: November 2020