

WHAT IS CORONARY ARTERY DISEASE?

Coronary artery disease is the most common form of heart disease, affecting millions of people worldwide, and a major cause of disability and death.

A family history of heart disease increases your risk of coronary artery disease, as does high blood pressure, diabetes mellitus and high cholesterol.

An unhealthy lifestyle, being overweight and/or smoking accelerates the disease process. The good news is, while you cannot avoid genetic risks, the majority of heart conditions can be treated and, with the right lifestyle interventions, many can be avoided.

THE FUNCTION OF CORONARY ARTERIES

The coronary arteries deliver oxygen to the myocardium (heart muscle). The physiological delivery of oxygen to the heart is carefully controlled. When you are active your heart beats faster and requires more oxygen. If your cardiovascular health is normal, this demand is easily met. If your coronary arteries are diseased, you may find you tire easily and might experience angina, a feeling of pressure or pain in the chest.

Coronary artery disease usually develops as a result of atherosclerosis, a build-up of cholesterol on the inside of a coronary artery. The lumen (opening of the artery) becomes narrowed and the artery is eventually blocked, preventing the delivery of enough oxygenated blood to the heart muscle. This leads to symptoms like fatigue and chest pain.

The disease process is gradual. Many people, especially diabetes patients, are unaware of the disease. In some cases the first indication of coronary artery disease is experiencing symptoms on physical exertion, for example during a stress exercise test, after which the symptoms disappear.

When the disease progresses to the stage where symptoms like discomfort become too severe to allow normal physical activity, it is likely that the coronary arteries are blocked and in danger of being completely occluded. When this happens, the affected part of the heart muscle will not receive needed oxygen, resulting in a heart attack.

The intensity of the heart attack depends on the severity of the damage to the heart muscle. If only a portion of the heart muscle is damaged, a complete recovery is possible but exercise ability may be affected due to permanent damage caused.

WHY IS A CORONARY ARTERY BYPASS GRAFT (CABG) PERFORMED?

If you have symptoms suggestive of coronary artery disease, your cardiologist will order an angiogram. This enables the condition of the arteries to be examined and treatment to be prescribed.

You may be given medication or advised to have a stent. If these options are not suitable, you will be referred to a cardiothoracic surgeon for coronary bypass surgery.

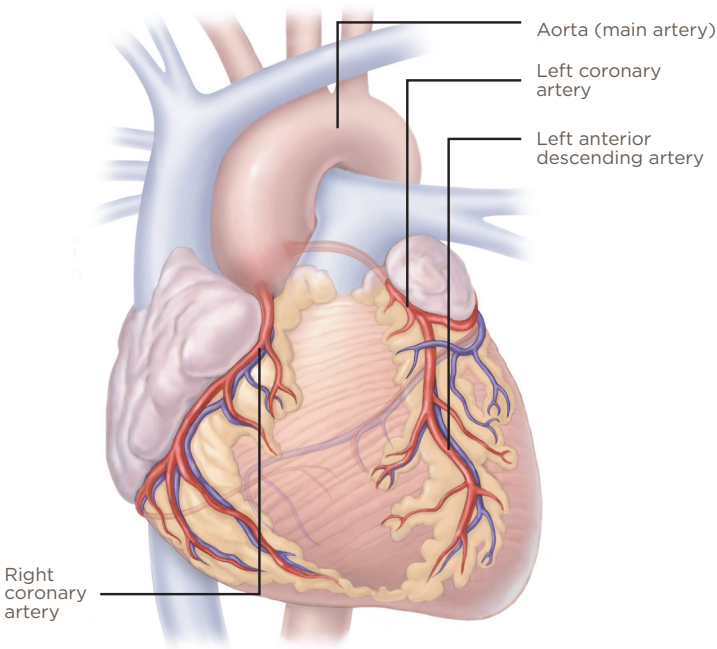
Whether you have had a heart attack or not, bypass surgery will significantly improve your future quality of life. The parts of your heart damaged during a heart attack can regain their function as well as your fitness levels will improve.

HARVESTING OF ARTERIES

The purpose of the CABG procedure is to divert blood around an obstruction in an artery caused by atherosclerosis. Artificial arteries are unsuitable for bypass surgery, which requires a healthy artery to be harvested from the body. Arteries used for CABG include the internal mammary artery, found behind the chest wall, the saphenous vein in the legs and sometimes radial arteries in the lower arms.

Most patients need three to four bypass grafts and may require long incisions to be made on the legs. The function of harvested arteries is taken over by other arteries and will not affect blood circulation. Apart from temporary swelling of the lower leg in the first few weeks, your legs will feel no different than they did before.

After surgery you will experience a rapid improvement in your health, as the transplanted arteries deliver oxygenated blood to your previously struggling heart muscle.



ABOVE: CORONARY ARTERIES SUPPLYING BLOOD TO THE HEART MUSCLE

WHAT IS THE PROCEDURE FOR A CABG?

A few decades ago coronary bypass surgery was unthinkable. Today it's a routine procedure, performed with great success. While no longer the traumatic surgical intervention it once was, a bypass is still a major operation. An incision is made through the sternum (breastbone) to access the heart and damaged arteries. The heart must be stopped to enable the procedure. This requires the use of a heart-lung machine and a ventilator to temporarily take over the function of your heart and lungs.

HEART-LUNG MACHINE

The heart-lung machine is operated by a perfusion technologist and allows the heart and lungs to be bypassed during surgery, while keeping the body oxygenated and protecting the internal organs.

A catheter (tube) is placed into the right atrium of the heart to drain the deoxygenated blood from the body. The blood is artificially oxygenated in an oxygenator, before being pumped back into the body, via a cannula inserted into the aorta.

At the end of the operation the heart-lung machine is switched off and the heart resumes its normal function.

In certain cases, where heart function is exceptionally weak and the constricted arteries can be easily reached, a bypass operation can be performed on a beating heart, without the need for the heart-lung machine. This procedure is called an off-pump CABG.

SURGICAL PROCEDURE

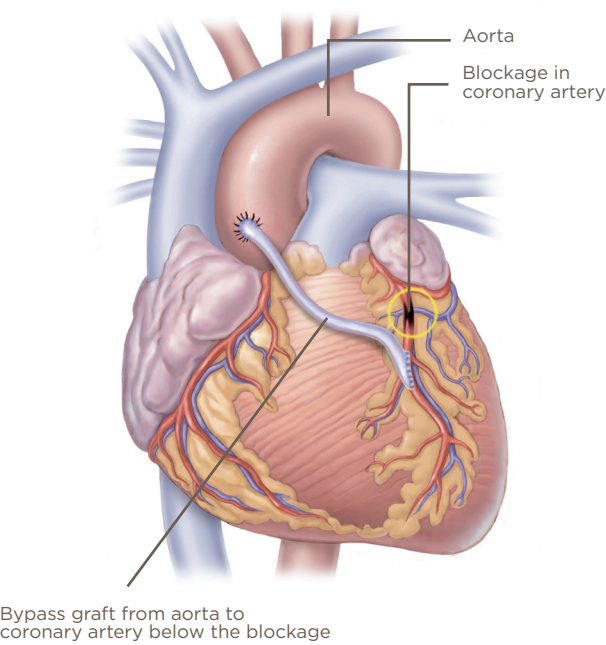
During surgery, the harvested artery is affixed between the aorta (main artery) and the blocked artery. The sternum is then returned to its original position and wired together, or fixated, with screws and plates. These remain in place permanently after the operation, with the chest reattachment process taking about six weeks.

Cardiac bypass procedures are usually completed in four to six hours, depending on the number of bypasses and associated procedures required. It is important to remember that the bypass merely restores the blood supply to the heart muscle, it does not remove the cause of the problem, namely atherosclerosis. To prevent another attack you need to reduce risk factors such as smoking, excess weight, poor diet and lack of exercise.

WHAT PREPARATION IS NECESSARY PRIOR TO A CABG?

Bypass and heart valve replacement surgeries are major operations, requiring your written consent. It is important that your cardiologist and cardiothoracic surgeon have consulted regarding the images of your angiogram and agreed on the necessity of your operation.

In some cases, when a heart attack is imminent, emergency cardiac bypass surgery is performed.



ABOVE: POSITIONING OF THE BYPASS GRAFT TO RESTORE BLOOD SUPPLY TO THE HEART

TESTS AND PROCEDURES

Several tests and procedures are carried out in preparation for the surgery and again during recovery.

CHEST X-RAYS

These indicate the size of the heart, the position of the aorta and provide some evidence of the lung condition. Any problems that develop after the operation can be easily identified by comparing the pre- and post- surgery X-rays and treated accordingly.

FULL BLOOD COUNT

This is a routine procedure to check the levels of red and white blood cells, platelets and haemoglobin (the oxygen-carrying component in red blood cells).

- The full blood count is used to:
- Evaluate internal organ function and health.
 - Assess blood clotting and platelet function.
 - Check for blood disorders, such as anaemia.
 - Diagnose disease, infection and certain cancers.
 - Test for HIV.

UREA AND ELECTROLYTES (U&E) TEST

To confirm normal kidney function and check for any abnormalities in blood chemistry.

THYROID FUNCTION TEST (TFT)

To test thyroid function and avoid thyrotoxic crisis, an uncommon acute event which can be precipitated by stress and trauma, particularly in people with untreated or undertreated hyperthyroidism or Graves' disease.

SHAVING

Your chest, arms, legs and groin area may be shaved, depending on the surgery you are having. This is important, particularly in men, as hair in wounds can cause infection. Shaving also makes it easier to apply and remove plasters comfortably.

ANTISEPTIC SOAP

This is supplied for bathing and washing to inhibit the growth of bacteria normally found on the skin.

THEATRE CLOTHES

You will be required to dress in a theatre gown before the operation. Dentures, nail polish and jewellery must be removed. For your own security, it is preferable to send all valuables home.

CONSULTATIONS

You will be visited by the following members of the surgical/healthcare team:

Surgeon

Your surgeon will explain the procedure, the number of arteries to be bypassed and discuss any possible risks and complications that might occur.

Anaesthetist

The anaesthetist will establish your medical history and identify any risk factors you may have. He or she will discuss the most appropriate method of anaesthesia and pain management. You will also be given a tranquiliser to take a few hours before going into theatre.

Physiotherapist

It is important that your lungs are kept clear of secretions before and after surgery as well as while you are on the heart-lung machine. The physio-therapist will explain and perform the pulmonary treatment done to clear your airways and improve lung function before surgery.

The Bird Machine will be explained, the machine is to assist with breathing exercises after surgery. You will also be shown how to support your wound when you cough, to clear your lungs and airways.

Social worker, psychologist or trauma counsellor
Heart surgery can be traumatic for both patients and family members and counselling is very helpful. The counselling service is free of charge and can be contacted to provide emotional support for you and your family.

Operating theatre staff
A staff member will visit you to discuss theatre procedures and answer any questions on theatre routines and equipment.

CTCCU nursing practitioner
The nursing practitioner will inform you on what to expect after surgery as well as post-surgery treatment routines and equipment you may need.

WHAT TO EXPECT IN THE CTCCU
After the operation, while you are still anaesthetised and on the ventilator, you will be transferred to the CTCCU. When your doctors are satisfied that your normal physiology is restored, you will be woken up and the ventilator will be disconnected.

Equipment in the CTCCU monitors the function of your heart, internal organs and brain.

MONITORS

- These measure the pressure levels in your heart chambers, as well as your heart rate and rhythm, blood pressure, temperature and oxygen levels.
- Monitors are very finely calibrated and alarms can be activated with the slightest movement or vibration.
- An alarm does not necessarily mean something is wrong. Should an alarm sound, the nursing practitioner monitoring your care will be at your bedside to make sure all is well and recalibrate the monitor.

VENTILATOR (BREATHING MACHINE)

- You are connected to the ventilator via a tube passed through your mouth into your lungs.
- The ventilator doesn't prevent you from breathing on your own, but supports your efforts to breathe.
- You will not be able to speak while on the ventilator but will be able to do so as soon as the tube is removed.
- Once you are awake, breathing normally and oxygen levels in the blood are adequate, the ventilator will be removed (usually within 16 hours post-surgery).
- While you are ventilated, excess mucus from the lungs will be suctioned out.
- When the ventilator is removed you will be given an oxygen mask to wear over your mouth and nose. This should only be removed when you eat, wash your face, shave or brush your teeth.

GASTRIC TUBE
Inserted through your mouth into your stomach, this is used to drain gastric juices and prevent vomiting, or the aspiration of stomach contents into the lungs. Prescribed medication is also administered through this tube, which is usually removed at the same time as the endotracheal tube (used to keep your airway open when you are ventilated).

PACEMAKER WIRE
This thin wire is attached to your heart and protrudes from your chest. It is used to attach a backup or emergency pacemaker should one be required.

OUR 'CASTLE KEEP' UNIT LAYOUT ENSURES THAT NURSING PRACTITIONERS HAVE DIRECT VISIBILITY OF PATIENTS AT ALL TIMES.



CENTRAL VENOUS PRESSURE (CVP) LINE

A CVP line is inserted into a neck vein. Intravenous medication is administered through the CVP line, which also measures pressure levels in your heart chambers. The CVP line is also useful should rapid fluid administration be needed.

ARTERIAL LINE

This is inserted into a radial artery in the pulse area to measure your blood pressure. To ensure accuracy, it's important to keep your arm as still as possible. The arterial line is also used to draw blood if required.

URINARY CATHETER

A urinary catheter is inserted to measure hourly urine output which plays an important role in balancing fluid levels. It can also be used to monitor bladder temperature and provide an accurate measurement of core body temperature during open heart surgery.

UNDERWATER DRAINAGE (UWD)

Attached via chest tubes a closed drainage system, or UWD, is used to remove blood, fluids and air from the pleural cavity (space around the lungs) and prevent a build up of pressure which could collapse the lungs. Chest tubes are also used to drain blood or fluid that collects in the pericardium (the sac around the heart) to prevent pressure being placed on the heart. The closed drainage, or Sinapi system, is connected to negative suction, which can sometimes cause discomfort.

INFUSION PUMPS

Pumps situated above your bed carefully regulate the fluids delivered by infusion lines (drips), which remain attached throughout your hospital stay. Drips are used to administer medication and additional fluids, regulate blood pressure and for pain management. They can also be used to administer sedatives and inotropes (drugs which have a positive effect on the contractility of the heart muscle).

CTCCU TREATMENT ROUTINES

Day and night staff relieve each other at 06:45 and 19:00. While you are on a ventilator you will have a nursing practitioner allocated to your care

day and night. Doctors' rounds are after 07:00 every morning. X-rays of your chest will be taken at your doctor's request, as will blood samples for testing, should this be required.

BATH TIMES

These are usually in the early morning and early evening. You will be washed (and shaved) in your bed.

MEALS

On the first day you will only receive liquids. Thereafter you will be given a light diet, followed by a normal diet, or as recommended by your doctor or dietician.

Visitors play an important role in your recovery but because patients need ample rest, we have set guidelines for visitors in the unit:

- While you are in theatre your family can wait in the waiting area outside the CTCCU (Unit O or P).
- After your surgery your surgeon will call for them to discuss the operation and introduce them to the nursing practitioner in charge of your care.
- Only two family members may visit you at a time.
- Due to infection risk, children under the age of 12 are not allowed in the unit.
- All persons entering the CTCCU must wash their hands or rub them with antiseptic fluid (available at the doors to the CTCCU).

PHYSIOTHERAPY

Once you have been transferred from the CTCCU to the unit, you will continue to receive physiotherapy and start a progressive mobilisation programme, designed to get you moving and assist your recovery. Physiotherapy forms a crucial part of the recovery process and may be needed two to three times a day to ensure healthy lung function.

A large amount of mucus can accumulate in your lungs after surgery, especially if you are a smoker, putting you at risk of pneumonia. You may also experience pain on breathing after your procedure and start to breathe shallowly to alleviate it. This can result in a fluid build up, which could cause the lower part of your lungs to collapse.

The physiotherapist will help you to:

- Get moving, first by moving to a chair and later taking short walks in the corridor.
- Show you how to cough effectively, to remove mucus and keep your lungs clear.
- Assist you with deep breathing exercises, using a Bird Machine, to strengthen your lung function.

WOUNDS

Wounds are dressed when oozing occurs, or if a dressing change is requested by your doctor.

PAIN

Your pain relief medication is administered via a continuous drip. If you find that pain is not sufficiently relieved, your dosage can be increased to make you more comfortable. Don't hesitate to alert a member of your healthcare team if you experience pain.

WHAT TO EXPECT IN THE CARDIOTHORACIC UNIT

If there are no complications, you will be transferred to the cardiothoracic unit about three days after your procedure. Drips, chest drainage tubes and the urinary catheter are normally removed in the CTCCU before your transfer, but your CVP line may remain in place.

- You will start to increase your mobility, with the help of the physiotherapist.
- You can resume doing basic things like showering, shaving, dressing and going to the toilet.
- Your bowel function will return to normal.
- Your nursing practitioner will show you and your family how to dress your wounds at home.
- You will be prepared for discharge and advised about what to expect when you go home.
- The walking programme will be explained, as will the lifestyle changes you need to adopt.
- The counsellor will provide emotional support should you or a family member request it.

MEDICATION

Your doctor will issue a private prescription for any medication you need to take at home:

- Make sure you understand how and when to take your medication and that you and your family know why each tablet has been prescribed.

- You are advised not to interrupt or stop taking your medication without first consulting your cardiologist, surgeon or doctor.

TAKING YOUR MEDICATION

- Be meticulous about taking medicines regularly.
- Take the dose evenly over 24 hours, for example, every eight hours.
- Contact your doctor if you experience side effects such as low blood pressure, shortness of breath or pain.
- Renew your prescriptions in time so you do not run out of medication.

WHY ARE HEART VALVE REPLACEMENTS PERFORMED?

When a heart valve does not close properly, a backwash, leakage or blockage of the blood flow occurs. This leads to an enlargement of the heart chambers affected and reduces the effectiveness of the heart muscle. The signs and symptoms of heart valve disease may present as exhaustion, shortness of breath, lightheadedness, angina (chest pain) and even fainting.

WHAT DO HEART VALVES LOOK LIKE?

The tricuspid and mitral valves of the heart look very similar. They divide the atria (upper chambers of the heart) from the ventricles (lower chambers).

The aortic valve forms the exit from the heart to the aorta (main artery) and the pulmonary valve separates the heart from the pulmonary artery, the only artery in the body that carries deoxygenated blood to the lungs.

HOW IS A HEART VALVE REPAIRED?

Two procedures can be performed to repair valves:

- The valve can be repaired by inserting a ring into it.
- The valve can be surgically removed and replaced with a tissue or mechanical valve.

WHAT HAPPENS AFTER VALVE REPLACEMENT SURGERY?

Valve replacement patients are treated much the same as cardiac bypass patients, except that they don't require vein harvesting.

ONE OF THE MOST IMPORTANT MEASURES OF A SUCCESSFUL OUTCOME IN PATIENT CARE IS EFFECTIVE PAIN MANAGEMENT.





Anti-embolism stockings

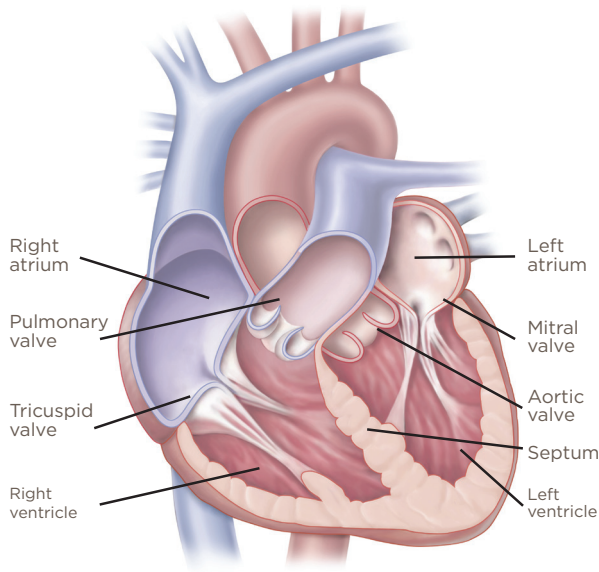
To prevent the formation of blood clots, some doctors advise the wearing of tight, white, anti-embolism stockings on both legs for a period of about six weeks post-surgery.

If you have been advised to wear them, it is essential you wear them both and pull them tight. You may take them off at night when you go to sleep. The stockings should be worn continuously for six weeks and thereafter only when your feet are swollen. This six week period may be shortened, in consultation

with your surgeon. Remember not to cross your legs when you sit, as this hampers blood flow.

Warfarin®

If you have had a mechanical valve replacement, you will probably have to take an anticoagulant, called Warfarin®, for the rest of your life. The new mechanical valve is seen as a foreign object by your body's immune system. Warfarin® helps to prevent blood from clotting around the new valve by extending blood coagulation time.



ABOVE: CROSS SECTION OF THE HUMAN HEART

Warfarin® is very important but can be dangerous if not taken correctly. It must be taken with water, at the same time every day.

Regular blood tests at a laboratory are essential to ensure that your anticoagulant therapy is working. The blood tests are called PI (Prothrombin Index) or INR (International Normalised Ratio) and your anticoagulant dosage is determined on the basis of the results. Usually PI is kept between 30 and 50 percent and INR between 2.0 and 3.5.

It is important that you and your family members are informed about risk factors, such as prolonged bleeding time and internal bleeds, associated with

Warfarin® and are able to recognise any symptoms that require medical assistance.

Contact your doctor immediately if you experience:

- Blood in the urine or stool.
- Small pinpoint bleeding on the skin, or large blue bruises.
- Blood spots in the mucus when coughing.
- Nose bleeds.

The following should not be taken with Warfarin®:

- Aspirin.
- Certain antibiotics.
- Anti-inflammatory medication.
- Vitamin K.
- Alcohol is permitted but intake should be limited to a maximum of two glasses a day.
- Certain food types that affect the absorption of Warfarin® in the intestine.

Dietary recommendations

Some foods affect Warfarin as it works by interfering with how the liver uses the vitamin K in our diet. Due to this, its effect is affected by the amount of vitamin K in the diet. If the diet is reasonably consistent then the amount of vitamin K in your diet will be matched by the Warfarin dose. Do not make changes to your diet without talking to your doctor or dietician.

Please note:

If you visit a doctor or dentist, or need any medical treatment, you must inform the practitioners involved that you are on anticoagulation therapy. In case of an emergency, it is also advisable to wear a Medic-Alert bracelet.



MECHANICAL VALVE



VALVE RING



TISSUE VALVE



TISSUE VALVE WITH VALVE RING

WHAT HAPPENS AFTER I AM DISCHARGED?

The length of hospitalisation required differs from patient to patient. You will only be discharged once your condition is stable and your cardiologist and cardiothoracic surgeon are satisfied with your progress.

The amount of sick leave you need will depend on the type of work you do but is usually about six to eight weeks.

WOUND HEALING

The area around your wound can become itchy, swollen and painful. You should examine the wound regularly for danger signs, such as redness, pain, a warm feeling, fever or oozing.

NUMBNESS

You may experience numbness at the incision site as a result of manipulation of the nerves during surgery. It can take several months for full sensation to return.

PAIN

Pain around the wound area can be felt as muscular or referred pain and may also be felt below the shoulder, or shoulder blade. This pain is uncomfortable but will gradually disappear. Do not hesitate to take the pain medication you have been prescribed.

CONSTIPATION

This can be prevented by staying active, drinking enough water and eating foods that are high in fibre.

When to call for medical assistance

Contact your doctor immediately should you experience any of the following symptoms:

- Angina (chest pain).
- Oozing from or any other concerns regarding your chest wound.
- A fever that lasts for two days.
- Flu symptoms that last for more than two days (pain, cold, shivers, lack of appetite, fatigue).
- Shortness of breath that continues after activity is stopped.
- Nausea, visual disturbances, dizziness.

WHAT DAILY ACTIVITIES ARE RECOMMENDED?

Regular activities and exercise are vital for your recovery and future health. The early discharge cardiac walking programme can be started two weeks after you are discharged from hospital and should be strictly adhered to.

As your heart and lungs become stronger, you will be able to walk faster and fatigue and shortness of breath will ease.

The following guidelines will help you to plan your daily routine:

WEEK ONE

- Your level of activity should be about the same as when you were discharged from hospital.
- Rest between activities.
- Get up every day, shower or take a bath, shave and wash your hair at a relaxed pace.
- Avoid excessively hot or cold water when bathing or showering.
- You can travel short distances by car but do not drive yourself.
- Keep yourself busy with light activities, like reading, watching TV, sewing or caring for indoor plants.
- Rest at least twice a day for 20-30 minutes at a time.
- Limit visitors and telephone calls to a certain time of day.
- Don't stand for long periods.
- Avoid severe weather conditions.
- You can perform light household tasks but don't make your bed.
- Support your chest when sneezing or coughing.

WEEK TWO

- All activities mentioned in week one.
- Perform light household activities and tasks.
- Straighten bedding but don't make the bed.
- Follow exercise guidelines and begin the walking programme, progressing as advised.
- Go on outings, such as shopping trips.
- Don't carry heavy bags or parcels.
- Don't leave home for more than two hours at a time and don't drive.
- Perform light desk work, such as writing letters.

CARDIAC REHABILITATION IS THE SUM OF ALL ACTIVITIES REQUIRED TO ENSURE THE BEST POSSIBLE PHYSICAL, MENTAL AND SOCIAL CONDITIONS SO THAT YOU MAY, BY YOUR OWN EFFORTS, RESUME AS NORMAL A PLACE AS POSSIBLE IN THE LIFE OF YOUR COMMUNITY.



WEEK THREE

- All the activities mentioned in week two.
- Walking programme as advised.
- Take longer outings but do not drive.
- Shopping but don't carry parcels heavier than 2kg.
- Perform light household activities and gardening tasks.

WEEK FOUR

- All the activities mentioned in week three.
- Continue with the walking programme.
- Perform light household tasks.
- Enjoy social outings of a light and relaxed nature, such as going to a movie.

WEEK FIVE

- All the activities mentioned in week four.
- Continue with the walking programme.
- You can resume sexual activities.
- Increase household tasks, gardening and social engagements.

WEEK SIX

- All the activities mentioned in week five.
- Consult your doctor for a follow-up stress ECG.
- Return to work if advised.
- Continue with the walking programme.
- Consult your biokineticist for advice on further exercise progression once follow-up stress ECG is completed.

WHAT SHOULD I AVOID DOING AFTER SURGERY?

WEEKS ONE TO FOUR

- Lifting objects heavier than 2kg, such as suitcases, groceries, children and pets.
- Opening and closing heavy doors or security gates
- Moving heavy furniture.
- Twisting off tight lids.
- Forcing windows open.
- Excessive stretching movements.
- Walking uphill.
- Strenuous gardening.
- Competitive activities.
- Painting and woodwork.
- Driving.

WEEKS FIVE TO SIX

- Lifting objects heavier than 4kg.
- Walking up steep hills.
- Mowing the lawn and digging in the garden.
- Driving.

HOW CAN I BEST ASSIST MY RECOVERY?

It is important to remember that recovery takes six to eight weeks and differs from person to person. Listen to your body and take your pre-surgery fitness into account when starting an exercise programme. Increase your activities gradually and rest when you need to.

STOP SMOKING

Smoking increases your heart rate, narrows your blood vessels, increases blood pressure, scars lungs and can cause spasm of the arteries. This can lead to a recurrence of the condition that caused the need for open heart surgery.

GET ENOUGH REST

Make sure you rest for 30 to 60 minutes a day and try to get eight to ten hours of sleep every night. Try to space your activities so you get adequate rest between them.

EXERCISE REGULARLY

Exercise helps control weight, reduces stress, improves circulation, reduces total cholesterol and

increases your fitness level, helping you to perform daily activities with greater ease. In order to gain the full benefit, you must exercise faithfully and with commitment.

CARDIOVASCULAR EXERCISE

Cardiovascular exercise is important for heart and lung fitness and plays an essential role in optimal cardiac rehabilitation.

In conjunction with the correct balanced diet, cardiovascular exercise helps to remove the plaque from the arterial walls, open the arteries and improve the blood supply to the heart. As your fitness level increases, you should try to exercise for 30-60 minutes, at least every other day.

HOW HARD SHOULD I EXERCISE?

Your heart rate gives a measure of how hard your body is working. The harder you exercise, the higher your heart rate. Ask your cardiologist or doctor at what maximum heart rate limit you should exercise and do not exceed this.

If you are on beta-blockers, use the rate of perceived exertion (RPE) to gauge your exercise intensity. Do not exceed the feeling of your exercise being ‘somewhat hard’. You should be able to maintain a conversation while exercising.

We recommend that you focus on walking during the first six to eight weeks. During the first week, limit this to walking about indoors. In week two you can start walking 200m at a time and gradually increase this weekly, as recommended. Try to walk twice daily. After four weeks you should be able to walk 2km without discomfort.

Once you reach this level you should be able to resume sexual activity. From four weeks post-operatively, you can substitute walking for stationary bike riding, performed for ten minutes, twice a day.

Do not do anything that causes pain. If you need more specific guidelines on how to gauge your exercise intensity and know your limits, please contact your biokineticist for a consultation.



RPE SCALE

6	
7	VERY VERY LIGHT
8	
9	VERY LIGHT
10	
11	FAIRLY LIGHT
12	
13	SOMEWHAT HARD
14	
15	HARD
16	
17	VERY HARD
18	
19	VERY VERY HARD

THE CARDIAC REHABILITATION WALKING PROGRAMME

Walking is a fantastic way to increase your circulation, muscle tone, strength and self-confidence. While your capacity is low, take several short walks rather than one long one. Gradually increase your distance and speed and remember to start out walking on flat surfaces and avoid walking in extreme temperatures. If you feel tired or short of breath, stop and rest.

Walking is beneficial for the following reasons:

- It strengthens your heart, increases fitness and reduces the strain placed on your heart by everyday activities.
- The oxygen supply to your heart increases, so it does not have to work as hard.
- Improved efficiency in the completion of everyday tasks improves your quality of life.
- Increased functionality makes you more independent, improving your self-esteem.
- Cardiovascular risk factors, such as high

- blood pressure, high cholesterol and high blood glucose levels are reduced.
- The chances of your suffering a second cardiac event are significantly reduced.

BEFORE YOU START

Remember to ask your doctor for your safe heart rate zone and do not exceed this.

- A rate of perceived exertion (RPE) of approximately 13 (conversational pace) is advisable.
- Exercise must at no time feel more than somewhat hard.
- Never exercise through pain.
- Walk according to time or distance and don't forget to perform the recommended exercises and mobilisation stretches daily.
- Do not perform any of the exercises suggested without your doctor's consent.

AS YOU GET FITTER

After your six week check-up visits to your surgeon and cardiologist, you should be ready for more comprehensive and challenging exercise.

We recommend that you join a cardiac rehabilitation programme, where you can exercise under the direct supervision of a biokineticist. If no such facility is available in your area, consult your doctor about how to best increase your exercise programme, or visit our biokinetics team for assistance in designing a home- use programme.

It is very important that once you start an exercise programme you follow it regularly, at least twice a week. Exercising on and off or intensively only once a week is not recommended. If you only exercise twice a week, you should also continue with the walking programme and recommended exercises.

Aerobic exercise

To improve your general level of fitness and particularly cardiac fitness, you must choose a form of exercise that is aerobic, or dynamic. This includes any rhythmic, repetitive activity that makes use of the large muscles and is carried out continuously for at least 15 minutes.

Aerobic exercises include walking, jogging, cycling and even dancing. Static exercises, like weight lifting and arm-wrestling, demand strength and increase blood pressure and are not recommended.

Before participating in any sport you have to make sure you are sufficiently fit and your blood pressure and heart rate respond as required. When considering a new activity, or resuming a sport you played previously, consult your doctor or biokineticist for an individualised exercise programme prescription.

It is important to always do warming-up exercises for five to ten minutes prior to activity. This ensures a gradual increase in heart rate and breathing, and prepares your body for the exertion to follow. Remember, the road to fitness should be a positive and not a painful, or unpleasant experience.



WEEK	WALKING ACCORDING TO DISTANCE: 2 X PER DAY	WALKING ACCORDING TO TIME: 1 X PER DAY
2	Walk at least 200m, rest as you need to	7 minutes slow 5 minutes fast 3 minutes slow
3	Walk at least 250 to 300m	7 minutes slow 7 minutes fast 5 minutes slow
4	Walk at least 350 to 400m Plus: <ul style="list-style-type: none">• 6 repetitions of 'sit to stand' exercises using a chair to support you• 1 stair climbing session (10 steps) Complete exercise routine once daily.	5 minutes slow 11 minutes fast 5 minutes slow Plus: <ul style="list-style-type: none">• 6 repetitions of 'sit to stand' exercises using a chair to support you• 1 stair climbing session (10 steps) Complete exercise routine once daily.
5	Walk at least 700 to 1000m Plus: <ul style="list-style-type: none">• 2 x 6 repetitions of 'sit to stand' exercises• 2 x stair climbing sessions (10 to 15 steps each) Complete exercise routine once daily.	5 minutes slow 18 minutes fast 3 minutes slow Plus: <ul style="list-style-type: none">• 2 x 6 repetitions of 'sit to stand' exercises• 2 stair climbing session (10 steps each) Complete exercise routine once daily.
6	Walk at least 1 to 2km Plus: <ul style="list-style-type: none">• 3 x 6 repetitions of 'sit to stand' exercises• 3 x stair climbing sessions (10 to 15 steps each) Complete exercise routine once daily.	25 minutes brisk of brisk walking daily Plus: <ul style="list-style-type: none">• 3 x 6 repetitions of 'sit to stand' exercises• 3 x stair climbing sessions (10-15 steps) Complete exercise routine once daily.



**WHAT SYMPTOMS WILL I
EXPERIENCE DURING RECOVERY?**

Do not get anxious if you experience some pain after discharge. Pain is usually due to the surgical procedure and will improve over time. If you have any concerns or questions do not hesitate to contact your doctor.

CHEST PAIN

Chest pain after a coronary bypass is generally due to the steel sutures in the sternum and the stretching of the rib muscles during the operation. Any excessive movements can cause muscle injury, resulting in chest pain. The pain is usually localised and worsens or improves with pressure to the area, breathing or changing position. It may last for hours, or days and may also be felt in other areas of the chest, such as below the shoulder blade. There are a number of things you can do to control or prevent chest pain:

- Limit excessive movements above the shoulders, head and below the trunk to activities like washing, brushing and drying hair and putting on anti-embolism stockings and shoes.
- Establish which activities cause pain and avoid these.
- Take your painkillers regularly, at least two to three times a day, for the first two to three weeks and thereafter as necessary.
- Do not try taking as few painkillers as possible.
- Don't wait until pain becomes unbearable before taking painkillers.

Consult your doctor if you experience:

- A burning, intense chest pain, accompanied by difficulty breathing.
- Pressure on the chest, pain that spreads to the throat, jaw and arms.

HEART PALPITATIONS

Palpitations are felt when the heart beats unusually fast, slowly or irregularly and can be brought on by activities which cause fatigue.

Consult your doctor if you experience:

- Heart palpitations with associated sweating, lightheadedness or dizziness.

FATIGUE

After your surgery you will find you tire easily and may experience shortness of breath, especially when you are active. It is normal to feel frustration when you find you cannot meet deadlines or accomplish tasks. If you perform and complete the activities recommended, as well as following the walking programme, your heart and lung fitness will improve and your energy levels will soon increase. Give your body a chance to recover, remember not to overdo things and be very careful not to damage your sternum.

DEPRESSION

Exhaustion and tiredness are often accompanied by depression after a major surgical procedure. Bear in mind that your emotions will fluctuate and try to evaluate your feelings each day. It is natural to experience good and bad days. Try to balance your activities and avoid slipping into lethargy when you feel down. The exhaustion and depression are normal and will improve with time.

LACK OF CONCENTRATION AND INTEREST

The anaesthetics, painkillers and sleeping tablets you were given in hospital will still be in your system when you are discharged. You may struggle to concentrate, forget things easily and lack interest in things around you.

It is quite normal to become forgetful and fall asleep in front of the TV, or with a book on your lap. Concentration will improve with time. Try to extend your interests, perhaps by developing a hobby which you previously did not have time for and leave signing important documents and making major life decisions until you are sufficiently recovered.

LOSS OF APPETITE AND NAUSEA

You may experience loss of appetite, be unable to

smell or taste food and find that some foods make you nauseous. This is often due to medication you are taking and can be reduced by:

- Taking your medicine with meals to prevent adverse effects on your stomach.
- Eating smaller portions more often. For example, breakfast, tea, lunch, afternoon tea, dinner and something small about an hour before you go to bed.
- Eating and drinking enough to absorb the nutrients needed to build up your strength.
- Asking your pharmacist to recommend a nutritional supplement.

LACK OF ENERGY

You are likely to lack energy after a cardiac bypass. To combat this, start out with lighter activities you enjoy, progressing gradually to heavier tasks when you feel stronger.

Plan your day ahead to conserve energy:

- On waking, get up, have a bath or shower and get dressed.
- Enjoy a leisurely breakfast.
- Do not go back to bed, no matter how great the temptation.
- If you become very tired, sit in an easy chair with your feet up.
- Alternate easy and difficult tasks.
- Make sure you have a rest in the late morning and again during the afternoon.

TROUBLE SLEEPING

Many patients report trouble sleeping for five to seven weeks after surgery. The cause of sleeping problems is unknown but may be attributed to changes in your circadian rhythm, or body clock, while in hospital.

Be patient and take care not to sleep for hours during the day, as this can contribute to sleepless nights.

NIGHT SWEATS

If night sweats are associated with high fevers they could indicate a serious problem and should be reported to your doctor. In most cases night sweats experienced after major surgery resolve within a month or two.

NUMBNESS

Numbness is another frequent complaint post-surgery. Usually felt in the left chest area, or left breast in women, it seems to be more common in patients whose left internal mammary artery was used for their bypass graft.

Patients who have veins harvested from the legs may experience numbness around the ankle area. This can be related to damage caused to the nerves that intertwine with the saphenous vein and usually subsides within a couple of months.

Some patients have numbness or tingling in their little fingers, or last two fingers, in either one or both hands. This is thought to be related to the chest retractor stretching the ulnar nerve during surgery and usually subsides within five to six weeks.

VISUAL DISTURBANCES

You may find your spectacles are a bit out of focus. This problem is not specific to heart surgery but occurs following all types of major surgery. Ophthalmologists usually advise waiting a couple of months before changing your spectacle prescription, as visual acuity tends to return.

MEDICATION REQUIREMENTS

Surgery and post-operative hospitalisation can affect the need for and/or dose of certain medications.

Antihypertensives

Being confined to a hospital bed for a few days causes the tone in the blood vessels to relax. This results in some patients finding they need less or no blood pressure medication after surgery.

As they become more mobile and active, vessel tone returns and by four to six weeks post-surgery it is usually back to its former level. This necessitates a return to the same dose of medication needed before the operation.

Insulin and oral glycaemics

Patients with diabetes may have different insulin requirements after heart surgery. Those who are not on insulin, or on low doses, may not need any medication initially but after five to seven weeks generally return to the same doses of medication they needed before.

A TUGGING SENSATION WHEN LYING ON ONE’S SIDE

Many patients express concern about their heartbeat being much more noticeable post-surgery, particularly when they lie on their left side. Although worrying, this is a common symptom. It is usually caused by adhesions that have formed around the heart during the healing process. The sensation felt is caused by the tugging of the adhesions as the heart beats. Over time the adhesions will stretch and the problem will resolve.

LUMP AT THE TOP OF THE STERNUM

A red and tender lump on the breastbone could indicate an infection. A lump of tissue on the breastbone is more commonly due to stitches used to close the incision. The lump occurs because the layer of fat under the skin has a cottage cheese-like consistency which does not hold stitches well. This means the stitches have to be placed deeper, which tends to bunch the tissue up around them. Deeper stitches are also placed because the skin along the middle of the breastbone tends to pull away towards the arms.

Tissue lumps usually even out with time and the breastbone returns to normal.

SENSITIVITY TO COLD

You may find you feel the cold more easily after surgery than you did before. This is a common occurrence and sensitivity usually returns to normal in six to seven weeks.

HOW WILL SURGERY AFFECT ME?

Being told you need heart surgery is a life-changing event, not only for you, but also for your family. They will have unique experiences in terms of their reactions to the news and their associated emotions and fears.

It is very important that any distress associated with heart surgery be identified and dealt with effectively. This requires coming to terms with the clinical procedures required and the physical and emotional changes that take place throughout the recovery process.

It is important to remember that there are no right or wrong emotions. The challenge is to address



negative emotions. This is best done through a therapeutic process, with the help of a social worker or psychologist.

- Taking control of the emotional situation includes:
- Feeling free to ask questions.
 - Embarking positively on the road to recovery, even if this means dealing with unresolved issues from the past.
 - Learning new life skills, like relaxation and visualisation.

EMOTIONS YOU MAY EXPERIENCE BEFORE SURGERY:

- Shock and disbelief. Hearing you need heart surgery can be paralysing.
- Feelings of expressed anger. ‘How dare this happen, it’s not fair, why now?’
- Sadness and depression. You may feel you have lost control.

- Dependence. Feeling dependent on medical practitioners and other members of your medical team is normal.
- Disruption. Of your future perspective, daily routines and peace of mind.
- Fear and uncertainty. About what lies ahead and your ability to deal with responsibilities, be they medical, work or family related.

These feelings are normal and occur either because you feel that your body and life have failed you, or you feel guilty about the lifestyle (smoking, poor eating habits, stress etc.) that led to the event. Accept that facing up to heart surgery is a challenge and try to live life one day at a time. In this way you will continue making memories that are special and lasting and you will feel inspired to live a full life.

EMOTIONS YOU MAY EXPERIENCE

DURING HOSPITALISATION:

- A fear of pain and unfamiliar medical procedures.
- Fear of dying.
- Anxious recollections of what happened before you were hospitalised, for example, having a heart attack.
- Gratitude that you are still alive, tempered by a strong realisation of your mortality.
- An overwhelming awareness of your heart.
- Concern about your life outside the hospital (work commitments, financial matters, your family).

EMOTIONS YOU MAY EXPERIENCE

WHEN YOU RETURN HOME:

- Mood swings and anxiety because you are no longer in the safe environment of the hospital. Console yourself with the knowledge that your doctor would not have discharged you unless completely satisfied with your condition. Acknowledge that you have had a cardiac bypass and adjust to it.
- Despondency, depression, irritability, poor memory, bouts of crying, concentration problems, bad dreams and insomnia are common after a cardiac bypass. With time the negative feelings will gradually decrease and become more positive, as you learn to accept the cardiac bypass and deal with its implications.
- Your physical abilities will not be what they used to be before surgery. Your body as a whole must recover. Fight depression with a positive attitude towards rehabilitation. Stay constructively busy and do the things you enjoy. Don't sit around doing nothing as this can lead to negative feelings.
- If a counsellor did not visit you during your stay in hospital and you would like access to such a service, phone the hospital for contact details.

WHEN CAN LIFE GO BACK TO NORMAL?

RESUMING SEXUAL RELATIONS

- If you had satisfying sexual relations before your surgery, there is no reason why this should change.
- If you find that your medication affects your sexual functioning, discuss it with your doctor.

- Fears and uncertainties can lead to sexual problems, which may impact on your relationship with your partner.
- Talking honestly about your feelings when sexual activities are resumed will help prevent long-term problems.
- Touching and caressing your partner is important after your cardiac bypass, but try to avoid sexual activities for the first four to six weeks. If caressing leads to intercourse during this period, it is not necessarily dangerous, as your pulse only increases to a rapid pace for a few seconds.
- Sexual intercourse demands the same amount of energy as climbing two sets of stairs quickly. If it causes angina, it's advisable to restrict sex to times when you are well rested, for example, in the early morning or over weekends.

RETURNING TO WORK

- You should be able to return to work six to eight weeks after surgery. When you do, it is important to determine your priorities. Put the most important tasks first and never let your work to take priority over your health.
- Use stress in a healthy way to help you function effectively.
- Learn to say 'no' and to delegate tasks.
- Use tea and meal times to relax. Do not eat and drink while sitting at your desk, it is very important to take regular breaks from your work.
- It is equally important to continue the walking programme, get enough sleep and eat properly.

MAINTAIN A GOOD POSTURE

- If you are not taking your painkillers regularly, it is easy to adopt bad posture, such as walking with a slouch, or turning your body and head simultaneously. Try to avoid this.
- Sit and stand up straight, use good posture and keep your back straight when you walk.
- Bend your knees when you stoop and keep your back straight.
- Don't bend to pick up heavy objects, use a pulling as opposed to a lifting action.

USE GOOD BODY MECHANICS

- Work with both hands and perform daily activities at a comfortable working height.
- Place apparatus, equipment or supplies within easy reach.

- Don't do too many activities above your head, at shoulder height, or which require you to bend down.
- Try to work at waist height and avoid too much bending or stretching.

WHAT ACCOUNTS CAN I EXPECT FROM THE HOSPITAL?

The hospital account is for hospital-related costs only and does not include all the treatment and services you may have received. Consultants in private practice will send you their accounts individually.

You can expect accounts from the following private service providers:

- Anaesthetist
- Blood transfusion service
- Cardiologist
- Cardiothoracic surgeon
- Dietician
- Pathologist
- Perfusion technologist
- Physiotherapist
- Private doctors involved in your treatments
- Radiologist

If you have any queries regarding hospital bills and payment, please do not hesitate to contact the accounts department.

TIPS FOR YOUR PARTNER, CHILDREN AND OTHER FAMILY MEMBERS

- There will be times when your partner or parent experiences difficulty in dealing with their cardiac bypass.
- They may be grumpy and sullen at times, or downhearted and depressed.
- They might be scared to exercise or become over enthusiastic.
- They may resort to excessive use of alcohol, or experience extreme religious fervour.
- The cooperation of the whole family is necessary to help support them through this difficult but temporary period of adaptation.
- Remember that your partner or parent is still the same person they were before the operation.
- They are still just as entitled to carry out duties and bear responsibilities.
- Don't exclude them from any decisions or problems that should be faced together, there is no need to do so.