

## **Aortic Root Replacement Surgery via a Bentall or David Procedure**

### **Understanding Your Heart and Aorta**

Your heart is a pump with four chambers. Each chamber has a valve that ensures blood flows in one direction. Blood is pumped from the heart to the lungs to receive oxygen, then returns to the heart before being pumped out through the aorta to supply oxygenated blood to the entire body.

The aorta is a large artery made up of several layers of connective tissue. These layers help it withstand the high pressure required to circulate blood around the body. Problems can occur when the aorta is affected by connective tissue disorders, such as Marfan's syndrome, or by hardening of the artery caused by plaque build-up or long-standing high blood pressure. These conditions can cause the aorta to become thin or stretched, known as an aneurysm. When this occurs, there is an increased risk of aortic dissection, which is a tear in the inner layer of the aorta, or rupture of the aorta.

If an aneurysm or dissection is diagnosed, surgery may be recommended at an appropriate time to reduce the risk of serious complications. In some cases, the increased pressure within the aorta also affects the aortic valve. When this happens, the valve may need to be replaced with either a tissue valve or a mechanical valve.

### **Symptoms**

Some people first visit their general practitioner because they experience shortness of breath. This is often caused by the aortic valve not opening or closing fully. Other people have no symptoms at all, and problems with the aorta or aortic valve are discovered incidentally during investigations for other health conditions or during routine health check-ups.

In certain situations, people report a sudden tearing sensation in the upper chest or upper back. This pain can range from mild to very severe and is treated as a medical emergency. When this occurs, surgery is usually arranged urgently.

People who have a known connective tissue disorder are monitored regularly with imaging such as CT scans to assess the size of the aorta. If the aorta becomes enlarged and is considered at risk of rupture, surgery will be recommended in accordance with established aortic guidelines.

## The Surgery

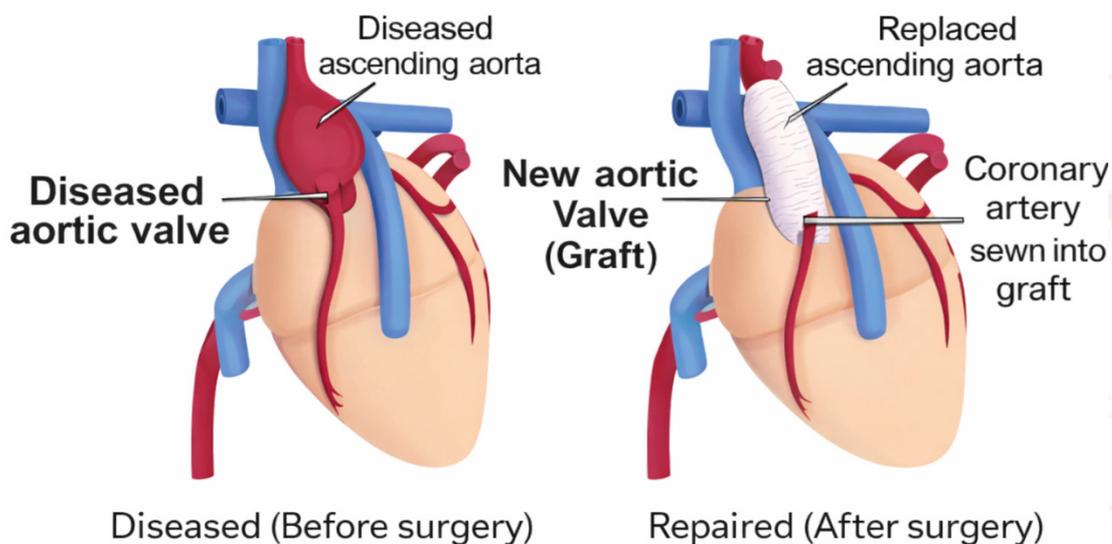
To gain access to the heart, the surgeon makes an incision through the breastbone, also known as the sternum. This allows the heart to be seen clearly. During the operation, a heart–lung machine is used to supply oxygen to the body and brain while the heart is temporarily stopped.

The major blood vessels are identified, and the affected section of the aorta is removed.

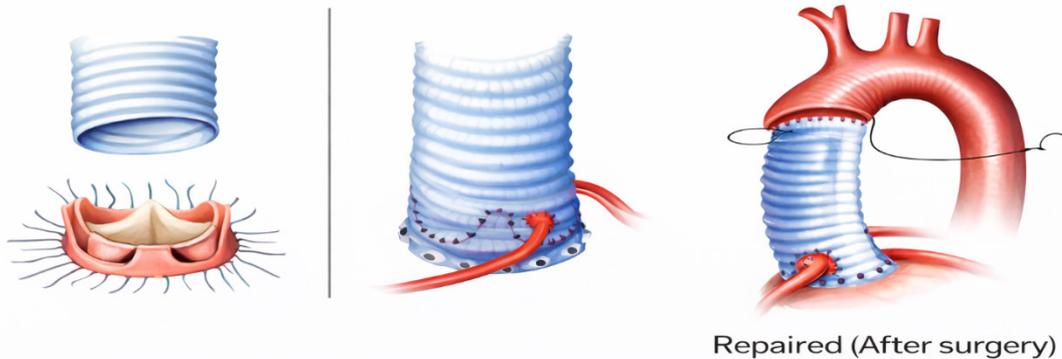
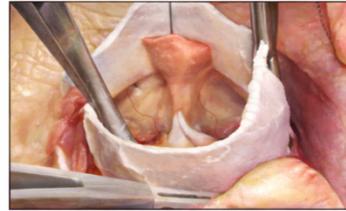
If the aortic valve also requires replacement, the surgeon will perform a **Bentall procedure**. In this operation, the damaged aortic valve is removed and replaced with a new valve sewn into a synthetic Dacron tube. This graft is attached to the heart, and the coronary arteries are carefully reattached and checked for leaks.

If the aortic valve does not require replacement, the surgeon may perform a **David procedure**. This procedure preserves your own aortic valve, which is reimplemented into a synthetic Dacron tube to replace the affected section of the aorta. The graft is then attached to the heart, and the coronary arteries are reattached and checked for leaks.

## Bentall Procedure



## “David” Procedure Aortic Root replacement with reimplantation of Aortic Valve



Once the surgery is complete, the heart–lung machine is removed and the heart is restarted.

At the end of the operation, drains are placed around the heart to remove any excess fluid and air. Pacing wires are attached to the outer surface of the heart, with the ends brought through the skin and connected to a pacing box. These wires allow the medical team to correct your heart rhythm if it becomes irregular after surgery.

The sternum is closed using surgical wires, and the skin is closed with dissolvable sutures. A thin dressing is applied and is usually left in place for up to six weeks.

### After the Surgery

After your surgery, you will be cared for in the Intensive Care Unit (ICU) for approximately 48 to 72 hours. During this time, you will be closely monitored to ensure your heart, brain, and kidneys are functioning well.

When you first return from the operating theatre, you will be asleep and have a breathing tube in your mouth connected to a ventilator. This usually remains in place for around 6 to 12 hours. As your condition stabilises, the sedation medications will be gradually reduced, and the breathing tube will be removed.

Chest drains are typically removed two to three days after surgery. You will be helped to sit up in bed and encouraged to take deep breaths and cough to clear your lungs. When coughing, you will be shown how to support your chest using a small cushion to protect your breastbone.

Once your heart rate and rhythm are stable, the pacing wires will be removed. When you are medically ready, you will be transferred from the Intensive Care Unit to the ward.

During this period, you will receive regular pain relief to help you move comfortably and cough effectively to clear any mucus from your chest. Your physiotherapist and nurse will guide you on how to move safely in bed and how to get in and out of beds and chairs. They will also explain current recommendations for sternal, or breastbone, precautions. Your exercise program after surgery will include early mobilisation such as walking, sitting out of bed, and regular deep breathing and coughing exercises. These activities are an important part of your recovery and help reduce the risk of complications that could delay healing or prolong your hospital stay.

## Recovery

Most people take around three to six months to fully recover from aortic surgery. If your job is not physically demanding, it may be possible to return to work within six to twelve weeks. Your breastbone takes approximately six weeks to heal, and during this time it is important to protect your chest when sitting up in bed or getting out of a chair. You should avoid lifting heavy objects, and you will likely need some assistance at home with daily chores. After six weeks, you can gradually begin lifting light items, resuming household activities, and driving, as advised by your healthcare team.

Some people worry about becoming dependent on pain-relieving medications. Taking pain relief as prescribed is important, as it allows you to breathe deeply, cough effectively, and perform gentle exercises and daily activities. Strong pain relief medications, such as opioids, can cause constipation. Drinking plenty of fluids, particularly water, and eating a high-fibre diet can help prevent or relieve this. As your recovery progresses at home, you will usually need less strong pain relief and may be able to manage your pain with paracetamol (Panadol) alone.

It is common to feel very tired or low in mood after surgery. You may also notice difficulty concentrating, sleeping, or completing everyday tasks. Be kind to yourself and remember that recovery from major surgery takes time. Most people gradually return to their usual level of activity over several months.

Continue to perform your prescribed exercises and slowly increase the amount of walking you do each day. After discharge from hospital, contact your local public hospital to arrange attendance at a Cardiac Rehabilitation program, which provides supervised exercise, education, and support during your recovery.