York and Scarborough Teaching Hospitals
NHS Foundation Trust

Permanent Pacemaker

Information for patients, relatives and carers

ⓘ For more information, please contact:

The staff at your consultation

or

The Pacemaker Clinic
Tel: 01904 726525
The York Hospital, Wigginton Road, York, YO31 8HE

Drs Hayes, Pye, Megarry, Durham, Crook, Gupta, Ghosh, Houghton and Ahmad

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Introduction

You have either had or are about to have a pacemaker implanted.

You will be joining millions of people worldwide who, thanks to this electronic device can enjoy a normal life again.

This leaflet is designed to help you understand what is about to happen to you before, during and after the implantation of your pacemaker. This will hopefully alleviate some of your concerns. In addition to this general information, your doctor will discuss anything that is unique to your specific care.

Why do I need a pacemaker?

A pacemaker is usually recommended when a person has experienced symptoms that are due to an unusually slow heart rate. The two most common disorders causing these symptoms are:

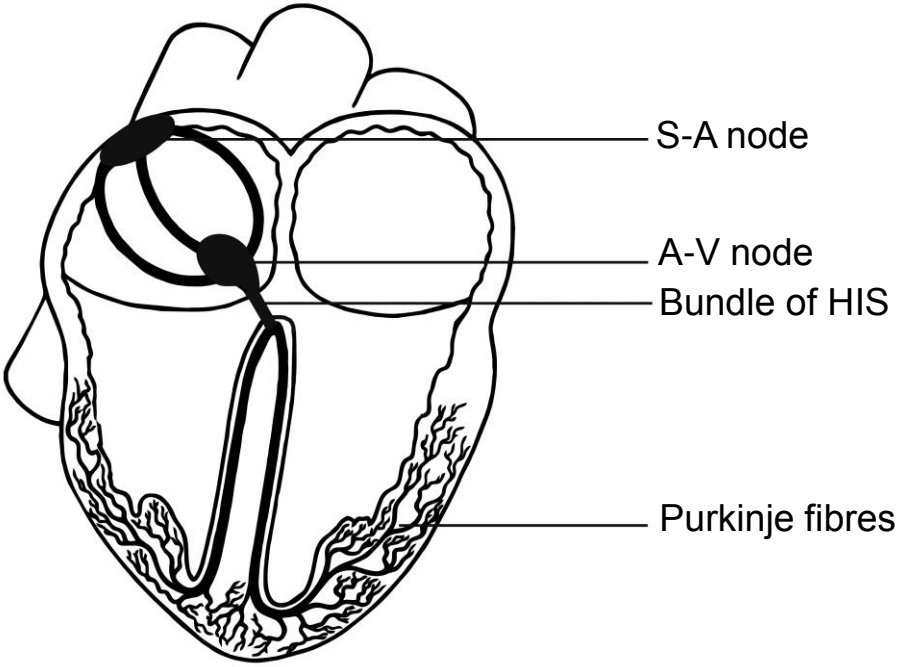
- **Sinus Node Dysfunction**
  This is where the heart's own 'pacemaker' (the sino-atrial node) does not function correctly. Impulses are generated either irregularly or too slowly. The heart may not be capable of adapting the heart rate to increase sufficiently with exercise.

- **A-V Block**
  This is sometimes called heart block. This is when the heart's own 'wiring system' fails to send impulses from the atria in the top of the heart to the ventricles (pumping chambers) either partially or totally. This causes the heart to generate a slow rhythm 'to keep you going' but may make you feel lethargic or breathless and in some cases causes blackouts.

You may have had ECG recordings, 24 hour monitoring or an event monitor to establish what is happening to you during times of your symptoms. These recordings will have helped the doctor decide which type of pacemaker will be best for you.

Background Information

The heart works as both a pump and an electrical organ. It is able to beat because it produces electrical impulses. These impulses travel through the electrical pathways of your heart, causing the muscle to contract. This pumps blood throughout your body. These impulses usually start in a small area of heart tissue called the Sino Atrial Node (S A Node). This is the heart's natural pacemaker and along with another small area of tissue called the Atrio Ventricular Node (A V Node) it co-ordinates the heart beats into a steady rhythm.



At rest, a healthy heart beats 60 to 100 times a minute; this is about 100,000 a day. During exercise or emotional stress, the body has a greater need for oxygen. To adapt to this situation the heart rate (pulse) will be raised to more than 100 beats per minute.

There are many reasons why the natural heart rhythms are disturbed, such as disease, age related processes or even some medications given to regulate the heart. Very common disorders are problems in the conduction system or possible blockages of the impulse pathways. As a result, the heart may beat irregularly and or too slowly. In that case, the body especially under physical stress will not have enough oxygen, causing dizziness, a feeling of weakness or tiredness. The medical name for slow heart rhythms is Bradycardia. Sometimes the heart rhythm will “pause” altogether for a short time, which if untreated, can lead to blackouts.

What is a pacemaker?

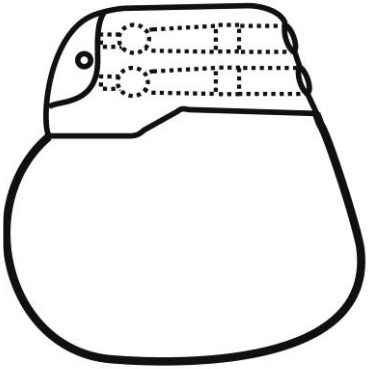
When we speak of a pacemaker we actually mean a pacing system. This consists of the pacemaker and either one, two or three pacing leads.

The pacemaker itself is a pulse generator consisting of a miniaturised electronic circuit, a compact battery and memory chip. All modern pacemakers only take action in the absence of a natural heartbeat. These are also known as a demand pacemakers. The pacemaker must be able to recognise or sense your own heart's activity. When the pacemaker does not detect or sense any heart beats it will release an electrical impulse to make the heart muscle contract, likewise when it does see you own heart beat is enough it will sit in the background and let this happen.

The pacemaker is connected to the pacing leads, which are thin, electrically insulated wires that are placed either in the right atrium, right ventricle or both chambers of your heart. The leads also feed back to the pacemaker the information on your own heart beat so it can decide if it needs to pace the heart or just 'listen'.

Some specialised pacemakers have three leads, where the third lead is in contact with the left side of the heart via a coronary vein. These are implanted for very specific heart conditions such as heart failure and are called Cardiac Re-synchronisation Therapy Pacemakers (CRT-P).

An example of a pacemaker



The Single Chamber System

This type of pacing system has only one lead attached to the pacemaker and paces and senses the heart in one chamber only. This can be either the right atrium or right ventricle. This has been widely used in the past and is still used today for arrhythmias which are not appropriate for dual chamber pacing.

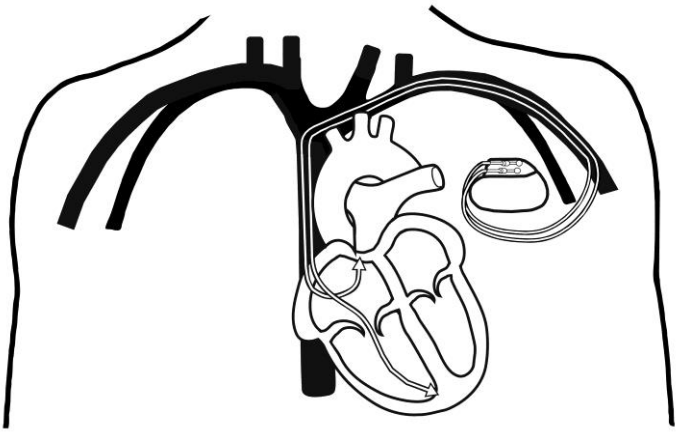
The Dual Chamber System

As the name implies this pacemaker system has two leads attached to the pacemaker. One is sited in the right atrium and one in the right ventricle. These two leads synchronise the heartbeats from the top and bottom chambers of the right side of the heart. It is able to ‘listen’ to the heart’s own pacemaker and deliver the signal to the bottom chamber when this is necessary.

The Rate Responsive System

This is not another pacing system but an additional feature to both single and dual chamber pacing. In both pacing systems, it will increase the pacing heart rate when physical activity increases. These changes could be during physical activity such as running or swimming or some sensors have the ability to increase heart rate due to stress or anxiety.

Due to on-going research and development from the pacemaker industry, the devices are smaller, safer and lighter. They are much more technologically advanced, being able to store information about changes in heart rhythms and even suggest other programmes that may help.



The position of the pacemaker in the body

Implanting your pacemaker

Pacemaker implantation today is a very common procedure and will on average take about an hour to complete. At York Hospital it will be performed in the Vascular Imaging Unit (VIU). This is situated on the Ground Floor of the Hospital close to the South Entrance.

If you attend for a pacemaker implant as a planned case, you will be admitted onto the Day Ward which is attached to the VIU. There may be occasions when a bed on a general ward may be made available; if you need to stay overnight or occasionally you may have a pacemaker fitted during an inpatient stay. The team looking after you will include doctors, nurses, cardiac physiologists, radiographers and health care assistants, all having a specific role in your care.

You will be checked in for the procedure in VIU and wait in your bay until it is your turn; other procedures are also undertaken on this Unit. If you have not already done so, you will be asked to confirm your consent to the implantation by signing a consent form (reference FYCON95-3 Implantation of a permanent pacemaker). A copy of this form will be held in your patient notes and you will be offered a copy for your records.

The implantation procedure is performed in a sterile area so you will be taken into the X-ray Theatre of the Unit where you will be prepared for the surgery. Monitoring leads will be attached to you and the area just under your left shoulder will be cleaned with an antiseptic solution. Sterile sheets will cover you to keep the area clean. The doctor will then administer some local anaesthetic to the area so you will not feel any pain throughout the procedure. You may feel some pressure or movement but it should not be painful. Let the nurse know if you feel any pain as other pain relief medication can be given if required.

It is important you are awake for the procedure, as your co-operation is needed at a later stage when the leads are connected. The doctor makes an incision in the skin between six and ten centimetres long just below the collarbone. Through this incision, the pacing lead or leads will be passed into a vein and pushed along using x-ray guidance towards your heart. The leads will be manoeuvred into the best anatomical and electrical position and tested using specialised equipment. You may feel a few ‘extra beats’ at this stage and you may be asked to take some deep breaths and cough, this is to help is ascertain if the leads are in a stable position. If all is well, the pacemaker will be connected to the leads and placed into a pocket formed just under your skin. The incision is then closed with sutures. The skin will be closed with stitches, staples or steri-strips. It will then be covered with a dressing. You will then be disconnected from the monitoring and taken back out to the Recovery Area.

You will be recovering in the Day Ward area for approximately four hours, where your pulse and blood pressure readings will be taken at regular intervals. Later in the day a Cardiac Physiologist will attend and check your pacemaker function and make any alterations to the programmed pacemaker settings to tailor the device to your individual needs.

On leaving the Vascular Imaging Unit, if staples or non-absorbable stitches were used you will be asked to contact your GP for removal in approximately 7-10 day's time. Sometimes however absorbable stitches are used and these do not require removal. You will be advised at the time which were used.

What are the benefits of having a pacemaker?

A pacemaker will correct an abnormally low heart rate. Many patients get relief from symptoms such as light-headedness, dizziness and fainting or blackouts and some may feel they have more energy. It will also give many patients ‘peace of mind’ knowing it will keep their hearts beating regularly.

What are the alternatives to having a pacemaker?

Your doctor will have discussed possible alternatives with you before deciding that having a pacemaker is the best option for you.

What are the risks of having a pacemaker?

A very small number of patients may develop complications from the pacemaker implanting procedure itself.

These can include:

- Excessive bleeding and or bruising, one in hundred patients (1%).
- Large haematoma (a collection of clotted blood) requiring intervention, (1%).
- Infection (1%) (usually happens within the first 12 months of having the device fitted). Symptoms of a pacemaker infection include a high temperature of 38C (100.4F) or above and pain, swelling and redness at the site of the pacemaker.
- Perforation of lead less than (1%).
- Tamponade (fluid or blood build up in the space between the heart and the pericardium (the sac around the heart) this can put pressure on the heart and reduce blood flow to the body, on occasion requiring needle decompression (less than 1%).

Call your GP or cardiologist as soon as possible for advice if you're worried you've developed an infection. If this isn't possible, call NHS 111 or your local out-of-hours service. A pacemaker infection is usually treated using a combination of antibiotics and surgery to remove and then replace the pacemaker. If an infection isn't treated, it could spread into your lungs (pneumonia), the lining of your heart (endocarditis), or your blood (sepsis);

- pneumothorax (punctured or collapsed lung). As the vein the pacemaker wires are inserted into lies very close to one of the lungs, there's a risk of the lung being accidentally punctured during the procedure. This means air can leak from the affected lung into the chest area. It happens in less than 2% of implantation procedures. In most cases, the leak is very small and gets better on its own without treatment.

  If a lot of air leaks into the chest, this may need to be sucked out using a needle and placing a special drain into the chest area. If a drain is required, you may need to stay in hospital for an extra day or two;

- rhythm disturbance. Happens in less than 1% of patients. In extremely rare circumstances these can be dangerous, for example some patients have temporary atrial fibrillation: rapid and irregular heartbeats;

- It is also possible that the implanted lead or leads may dislodge, usually seen soon after the implant procedure. This may lead to the procedure having to be repeated;

- reaction to the dye used during the surgery;

- damage to a blood vessel (rare).

These complications can usually be corrected or cured and only occur in a **very small** number of procedures. Occasionally a pacemaker that needs to pace nearly all the time can cause some reduction in heart capacity. This is rare and if it occurs an upgrade to a three lead pacemaker may be necessary.

Problems with the Pacemaker

As with any electronic device, there's a small chance your pacemaker could stop working properly. This is known as a pacemaker malfunction.

A pacemaker can go wrong if:

- the lead gets pulled out of position
- the battery of the pulse generator fails
- the circuits that control the pacemaker are damaged after being exposed to strong magnetic fields
- the pacemaker hasn't been properly programmed

It's estimated pacemaker leads become dislodged in approximately one in 100 cases, but a problem with the pacemaker itself is extremely rare thanks to the comprehensive research and development and rigorous manufacturing processes pacemakers are subject to.

Signs there may be an issue with your pacing system:

- Abnormally slow heart rate, less than the programmed rate of your pacemaker
- dizziness
- constant hiccups or regular twitching in the stomach or diaphragm
- fainting or nearly fainting

Seek immediate medical advice if you're concerned your pacemaker has failed.

Back at home

As you recover from your pacemaker implant, you will find that you will be able to gradually return to your normal lifestyle and activities. It is important you become actively involved with your recovery by following these instructions.

- Report any redness, swelling or oozing from the incision site which may be a sign of infection.
- Avoid lifting your arm on the pacemaker side above your head or stretching your arm across your body.
- Avoid lifting heavy objects until instructed by the clinic.
- Contact your doctor if you develop a fever that does not go away in two to three days.
- Avoid rubbing your pacemaker site or the surrounding chest area.
- Avoid rough contact that could result in blows to the implant site.
- Do not drive for one week after the implant if you have a class I licence (car or motorcycle) and six weeks if you have a class II licence (HGV or PSV).

  You must inform the DVLA that you have a pacemaker fitted before you start driving again.

Contact your doctor if you notice anything unusual or unexpected such as new symptoms or symptoms similar to those experienced before you had the pacemaker.

The Pacemaker Clinic

Once you have had your pacemaker fitted, the Pacemaker Clinic will routinely follow you up. The clinic is part of the Cardiorespiratory Department at York Hospital. It is situated on the First Floor in the Out Patient area. The telephone number is 01904 726525.

The first appointment at the Pacemaker Clinic will be within 8 weeks of the initial implant. A thorough check of the pacemaker system will be performed at each clinic appointment and will take approximately 15 to 20 minutes to complete. After the first appointment you will usually be followed up annually until there are any other specific issues that need closer surveillance.

The Pacemaker Clinic is run by the Cardiac Physiologists at York Hospital so routinely you will not see a doctor unless it is necessary at the time.

Medications

Your pacemaker system is designed to help treat your heart rhythm. However, you may still need to continue taking certain medications. Your doctor will advise you on this, do not stop taking anything previously prescribed unless you are instructed to do so.

Will I still be able to use electrical appliances?

Most electrical appliances you have at home will be safe for you to continue using provided they are in good working order.

If you are unsure, consult the handbook for the specific electrical item and contact the pacemaker clinic on 01904 726525 for advice if required.

Can I use a mobile phone?

You may still use a mobile phone as long as it is **not** carried over the pacemaker and you use the ear on the opposite side of the pacemaker site. You must maintain a distance of 15 centimetres (six inches) away from your device.

Can I still use heavy electrical equipment?

Some heavy equipment can be used so long as it is 30 centimetres (12 inches) away from your pacemaker.

These include:

- Lawn mowers;
- Drills and
- Chain saws.

Are there any equipment or appliances I should not use?

There is some equipment, which it is not advisable to use after you have had a pacemaker implanted. This is usually because of strong electromagnetic fields or vibrations from this equipment. If it is important that you still use this equipment, please ask your doctor for advice.

These include:

- Arc and MIG welders;
- Heavy drilling equipment (not household drills);

Any heavy industrial equipment that run on voltage higher than domestic mains voltage of 240 Volts.

Will having a pacemaker affect what treatment I can have in the future?

Please inform all doctors, dentists and physiotherapists you have a pacemaker before you have any treatment as some may affect your device.

The following treatments will **not** affect your pacemaker:

- X-ray, ultrasound or mammography and
- Dental treatments such as fillings and extractions.

The following **could** affect your pacemaker function:

- Radiation;
- Lithotripsy;
- TENS (Transcutaneous Electrical Nerve Stimulation);
- MRI (Magnetic Resonance Imaging) and
- Electrocautery.

Please check with your doctor if it is possible for you to have this treatment.

Questions often asked by patients

Will I feel my pacemaker working?

Most people do not. The pacemaker works using a low level of electricity that only affects the heart and surrounding tissue. Some people have a mild awareness of the pacemaker “kicking in” but that is all. If however, you do experience any symptoms when your pacemaker is working then please contact the clinic.

How long do the batteries last?

This depends on several factors such as how much you use the pacemaker and how high a voltage is required to pace your heart effectively. Pacemaker batteries generally last between six to ten years for a dual chamber pacemaker, and a few years longer for a single chamber pacemaker. However the longevity of the pacemaker will depend on how it is used. What is more important is that it works safely even if it needs changing more often. After the pacemaker has been implanted for a while, the cardiac physiologists in the pacemaker clinic will be able to give you a more accurate estimation of how long your pacemaker will last.

Can I go through security systems?

Yes. If you are at an airport or port, please remember to carry your Pacemaker ID card. This will be recognised across many countries and you will be allowed through an alternative security gate. If you are in a shop with an anti-theft security sensor at the door, please pass through these quickly. Do not loiter in the doorway.

Will I need my leads replacing?

No, you will not usually have the leads replaced when the pacemaker is changed. There may be occasions when the leads will require changing. This is not routinely done at replacement time and makes the procedure much less complicated.

What will happen when I die?

The pacemaker can only adjust your heart rhythm when it is functioning normally. In the event of death the electrical signal will have no effect on your heart. If you are to be cremated then the pacemaker will need to be removed but if you are to be buried it may stay with you.

What if I move to another area?

If you move away, your new doctor will need to request your medical notes from us. Your pacemaker details can be copied and sent to your new follow up centre. If you know you are about to move and let the pacemaker clinic know before you go, they may be able to help you find the nearest hospital to your new home.

Useful Information

Pacemaker Clinic at York Hospital

The Pacemaker Clinic is situated within the Cardiorespiratory Department. It is on the first floor in the Out Patient area. Enter the hospital through the main entrance. Turn left on entering and go to the end of the patient waiting area. Turn left again and a staircase will be facing you, go up the stairs to the first floor and book in at the reception desk. If you cannot use the staircase go alongside the stairs and you will find a lift to take you to the first floor. The Clinic's telephone number is 01904 726525.

To change an appointment you can ring the office telephone number.

If you require hospital transport please ring the Patient Transport Service on 0845 056 7060.

York Wheels can provide transport for a small charge, please ring 01904 630080.

The Driving Licence Authority (DVLA)

The Driving Licence Authority requires you to let them know if you have had a pacemaker fitted.
Tel: 0300 790 6806 (8.00am. to 5.30pm. Mon – Fri) & (8.00 am. to 1pm. Saturday)
Write: Drivers' Medical Group, DVLA, Swansea SA99 1TU

Tell us what you think of this leaflet

We hope that you found this leaflet helpful. If you would like to tell us what you think, please contact:
Dr Hayes, Consultant, Cardiology Department,
The York Hospital, Wigginton Road, York, YO31 8HE or telephone 01904 726525.

Teaching, training, and research

Our Trust is committed to teaching, training, and research to support the development of health and healthcare in our community. Healthcare students may observe consultations for this purpose. You can opt out if you do not want students to observe. We may also ask you if you would like to be involved in our research.

Patient Advice and Liaison Service (PALS)

PALS offers impartial advice and assistance to patients, their relatives, friends and carers. We can listen to feedback (positive or negative), answer questions and help resolve any concerns about Trust services.

PALS can be contacted on 01904 726262, or email pals@york.nhs.uk.

An answer phone is available out of hours.

Leaflets in alternative languages or formats

Please telephone or email if you require this information in a different language or format, for example Braille, large print or audio.

如果你要求本資 不同的 或 式提供 ，
電或發電

Jeżeli niniejsze informacje potrzebne są w innym języku lub formacie, należy zadzwonić lub wysłać wiadomość e-mail

Bu bilgileri değişik bir lisanda ya da formatta istiyorsanız lütfen telefon ediniz ya da e-posta gönderiniz

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