

Pacemaker Placement

What is a pacemaker and why do I need it?

A pacemaker is a small device that corrects your heart rhythm. A pacemaker is used to correct:

- **Damage to the sinus node** that makes it fire slowly—usually caused by aging or heart disease
- **A problem with electrical signals** moving through the heart
- **A slowed or irregular heartbeat** caused by heart failure or by heart medicines you must take (such as beta blockers)

These problems can cause symptoms such as dizziness, lightheadedness, shortness of breath, fatigue, or fainting.

What are the possible benefits, risks, and complications of a pacemaker?

The table below lists the most common possible benefits, risks, and complications for this procedure. Other benefits and risks may apply in your unique medical situation. Talk with your doctor about these risks and benefits. Be sure to ask any questions you might have.

Possible benefits	Risks and possible complications	Alternatives
<ul style="list-style-type: none"> • Relief of symptoms, such as dizziness or fainting • Better supply of oxygen to the body, which can relieve shortness of breath or fatigue 	<ul style="list-style-type: none"> • Bleeding or infection where the pacemaker’s pulse generator was inserted • Problems related to the anesthetic • Nerve or blood vessel damage • Problems caused by electronic devices 	<ul style="list-style-type: none"> • There is currently no alternative to a pacemaker if you have a slowed heartbeat. • If your heartbeat goes too fast or your heart muscle is weakened, your doctor may consider an implantable cardioversion device (ICD) instead of a pacemaker.

What do I need to do next?

- 1 Arrange for time off work or school.** You can return to work or school when your doctor says it’s okay, usually after a week or so.
- 2 Tell your doctor about all the medications you are taking.** This includes prescription medicines, over-the-counter remedies (such as cough syrup, allergy pills, or pain relievers), inhalers, patches, vitamins, and herbal supplements.
- 3 Follow your doctor’s directions about medicines.** You may be asked to stop taking anticoagulants (sometimes called “blood thinners”) before the procedure.
- 4 Arrange for a ride.** You will need someone to drive you to and from the hospital.
- 5 Follow all instructions on when to stop eating and drinking before the procedure.** This is to help avoid any problems with anesthesia. If you don’t follow directions, the procedure may have to be postponed.

What types of pacemakers are available?

There are 2 types of pacemakers:

- 1 **On-demand.** These pacemakers are set for a certain heart rate, and turn on only when your heartbeat slows below this rate.
- 2 **Rate-responsive.** These pacemakers can monitor breathing, blood temperature, and other factors. It uses these to change your heart rhythm based on how active you are.

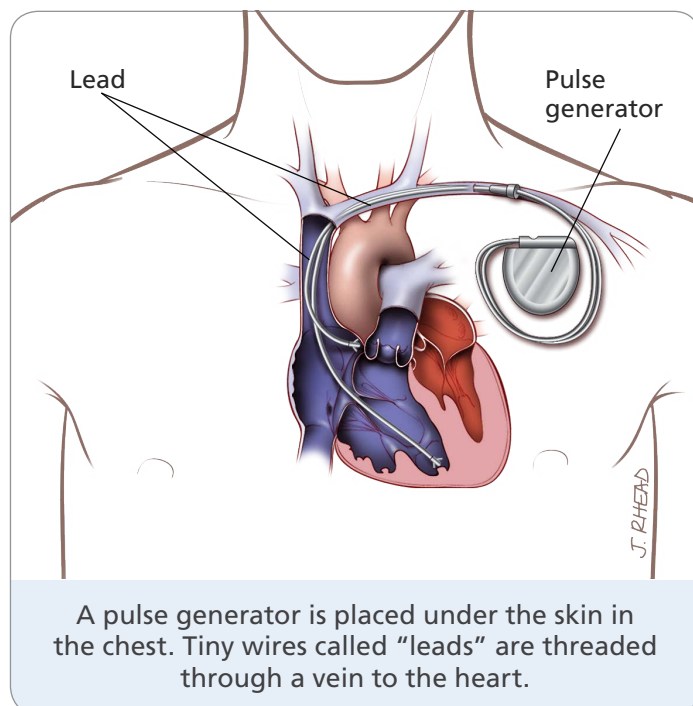
What are the parts of a pacemaker?

A pacemaker has 2 parts:

- 1 **Pulse generator.** This is made up of a battery and circuits that create low-energy electrical pulses. The generator is a little larger than a quarter and less than $\frac{1}{4}$ -inch thick.
- 2 **Leads.** These are thin insulated wires that send electrical pulses to your heart.
 - A **single chamber** pacemaker uses one lead to send pulses to the heart's upper or lower chamber.
 - A **dual chamber** pacemaker uses two leads—one in the upper chamber and one in the lower chamber.
 - A **biventricular** [by-ven-TRIC-yu-lar] **pacemaker** has three leads. They are placed in the right upper chamber, right lower chamber, and left lower chamber.
 - Some pacemakers, called **leadless pacemakers**, are made up of a small battery and computer chips sealed in a small case about the size of a AAA battery. It is placed directly in the lower right chamber of the heart and sends signals directly to the heart muscle without wires.

What happens during the procedure?

You'll be relaxed but awake during the procedure. Numbing medicine is injected into the area where the pulse generator will be placed. A small incision (cut) is made in the skin below your collarbone. This makes a "pocket" for the pulse generator.



If you are getting a pacemaker with leads:

- 1 A needle is inserted into a vein in your upper chest to insert each lead. The doctor uses X-ray guidance to move the lead through the vein into your heart.
- 2 Each lead is tested to make sure it is in the right place. The leads may be moved once or twice, and retested each time, until it is perfectly positioned.
- 3 The pulse generator is connected to the leads and inserted into the "pocket" in your skin beneath your collarbone.

If you are getting a leadless pacemaker:

- 1 The pacemaker is moved into place with a thin, flexible tube called a catheter which is inserted through a blood vessel in the groin.
- 2 The doctor uses X-ray guidance to move the pacemaker through the vein into your heart.

When in place, the pacemaker is set to the rate your heart needs. The medical team might also adjust other settings. You'll probably hear them calling numbers to each other as they do this. They might also ask you to take some deep breaths.

The incision (if you have one) is closed with adhesive (glue) or stitches, and you are moved to recovery. With leadless pacemakers, a special closure device is placed on the insertion site to help prevent bleeding.

What happens after the procedure?

You will probably stay in the hospital overnight so your healthcare team can monitor your heartbeat. The next morning, your pacemaker will be checked to make sure it is working as expected.

Living with a pacemaker

Let people know

- **Carry your pacemaker ID card at all times.** Your ID will give healthcare providers important information in an emergency. It will also be helpful if the pacemaker sets off an alarm.
- **Tell all other healthcare providers.** They need to know you have a pacemaker before doing any procedures that involve needles or incisions.
- **Tell your dentist.** Your dentist can avoid using devices that produce electromagnetic fields which can interfere with the device.

Protect the pulse generator

- **Avoid letting anything hit or rub the device.** Be careful about contact sports or other activities that may jar the pulse generator under your skin.
- **Avoid strong electromagnetic fields.** Stay away from:
 - Magnetic resonance imaging (MRI) equipment
 - Arc welding equipment, industrial equipment, and induction furnaces
 - High-intensity power lines or radio towers
 - Combustion motors. Don't lean over the hood of a running car, or touch the spark plug or distributor on a running car or lawn mower
- **Don't linger around anti-theft detection devices** at store or building entrances. Walk through them at a normal pace.
- **Be careful with your cell phone (and other portable electronics).** Keep devices 6 to 12 inches away from the pacemaker. Hold your phone against the opposite ear, and don't keep it in a shirt pocket.

Airport screening is safe

Screening devices may set off an alarm, but they won't harm the pacemaker. If you set off an alarm, show your device ID. Ask them not to search you with the hand-held screening wand, since it contains a magnet.

Computers and small household appliances are safe as long as they are in good working order and grounded.

Monitoring and maintenance

- **Follow-up appointments.** Your doctor will ask you to set up follow-up appointments. To check the pacemaker, you'll have various kinds of tests. For example, a pacemaker programmer (such as a small portable computer) will check your device using a wand placed over the pacemaker. Your doctor might also adjust the pacemaker's settings.
- **Checking the pacemaker over the phone.** A transmitter might be used at home to send pacemaker signals to your doctor.
- **Replacing the battery.** The average battery life is 5 to 10 years. Follow-up appointments will tell your doctor if replacement is needed.
- **Replacing leads.** In rare cases, the leads can become cracked. Your doctor will check the leads and replace them if needed.

Questions for my doctor

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