Intermountain® Healthcare

Pacemaker Placement

What is a pacemaker?

A pacemaker is a small device that corrects your heart rhythm. Your heart's natural pacemaker is called the **sinus node** — a cluster of cells that sends electrical impulses to make the heart beat. If the sinus node doesn't work properly, an artificial pacemaker can keep your heart beating at the right pace.

Types of pacemakers

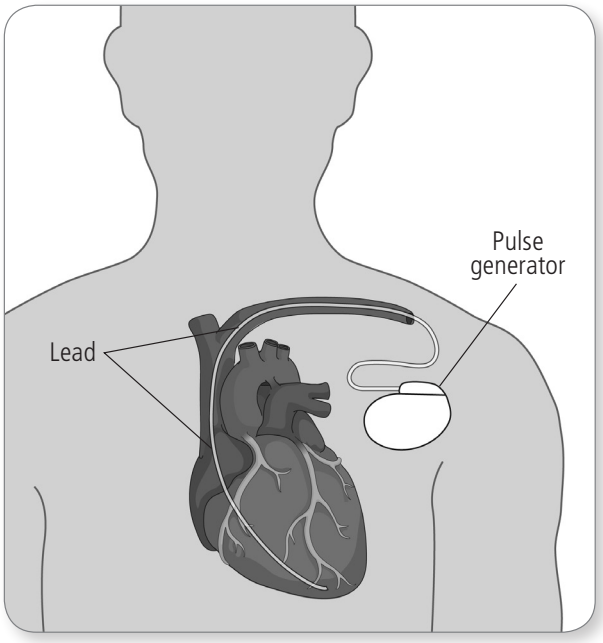
There are two types:

- An **on-demand** pacemaker is set for a certain heart rate, and turns on only when your heartbeat slows below this rate.
- A **rate-responsive** pacemaker can monitor breathing, blood temperature, and other factors. It uses these to change the rhythm based on how active you are.

Parts of a pacemaker

A pacemaker has two parts:

- A **pulse generator** — the battery and circuits that create low-energy electrical pulses. The generator is a little larger than a quarter and less than ¼ inch thick.
- **Leads** — thin insulated wires that deliver the 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 pacemaker has three leads. They are placed in the right upper chamber, right lower chamber, and left lower chamber.



Pacemaker placement involves inserting the pulse generator and threading leads through a vein to the heart.

Why do I need it?

A pacemaker is used to correct:

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

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

How do I prepare?

There are several things you can do to get ready for the procedure and make it go more smoothly:

- **Arrange for time off work.** You can return to work when your doctor says it's okay, usually after a week or so.
- **Tell your doctor about medications and allergies.** Along with prescription medications, include over-the-counter drugs, herbs, and vitamins.
- **Follow your doctor's directions about medications.** You may be asked to stop taking certain blood thinners before the procedure.
- **Arrange for a ride.** Ask someone to drive you to and from the hospital.
- **Fast for 6 to 8 hours before the procedure.** If the procedure is in the morning, don't eat or drink anything after midnight the night before.

What happens before?

When you arrive, here's what will happen:

- You will fill out some paperwork and change into a hospital gown.
- An IV (intravenous) line will be placed in your arm or hand. You'll be given medication through the IV to make you feel relaxed and drowsy.
- Blood might be drawn for lab tests.
- The left or right side of your chest will be shaved, if necessary, and cleaned. (The site for the signal generator is below the collarbone, and is usually on the side opposite your dominant hand.)
- You'll be moved to the cardiac cath lab. The room may feel cool, but you will be covered with sterile drapes. You can also ask for a blanket.
- You'll lie on your back. Your arms will be secured at your sides, because it is important for your arms to be still during the procedure.
- Your face may be covered with the draping during the procedure. The staff will try to make you as comfortable as possible.

What happens during?

This procedure usually takes one to two hours. You'll be relaxed but awake. Here's what will happen:

1. **Monitoring and local anesthetic.**
   - Devices will be attached to keep track of your heart rate, blood pressure, and breathing.
   - The doctor will inject numbing medication in the site where the pulse generator will be inserted. The injection usually feels like a pinprick with some burning, and only lasts a few seconds. After that, your chest will be numb and you should feel no pain.
2. **Incision.** The doctor makes a small incision (cut) in the skin below your collarbone. This makes a "pocket" for the pulse generator.
3. **Inserting one or more leads.** The doctor inserts a needle into a vein in your upper chest, and inserts each lead using the needle. Using X-ray guidance, the lead is threaded through the vein into your heart.
4. **Testing the leads.** The medical team takes electrical measurements to make sure each lead is in the correct place. Each lead might be slightly moved once or twice, and retested each time, until it is perfectly positioned.
5. **Attaching the pulse generator.** The pulse generator is connected to the leads and inserted under your skin, into the "pocket" beneath your collarbone.
6. **Programming the pacemaker.** The pacemaker is then 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.
7. **Closing the incision.** Your doctor will close the surgical cut with a few stitches, and you will be moved to recovery.

What happens after?

- You'll probably **stay in the hospital overnight**, so your healthcare team can monitor your heartbeat. The next morning you'll have a device check to make sure the leads and generator are working well.
- You'll get a **pacemaker ID card** that identifies the type of pacemaker you have, when it was placed, and who performed the procedure. You'll get a permanent card in the mail in a few weeks. Carry the ID card with you at all times.

What should I do when I go home?

When you go home, you'll need to take care of your incision, report problems, gradually increase your activity, and adjust to a few basic restrictions (see **"Life with a Pacemaker"** on the last page).

Take care of your incision

After about a week, the stitches will dissolve or your doctor will remove them. Here's how to care for your incision:

- **Keep the incision clean and dry.** Don't immerse the incision in water for the first week, or until it heals. Cover it with plastic if you shower. Don't scrub the site — clean it with antiseptic as directed by your doctor. If the dressing becomes wet or soiled, remove the dressing and clean the site with antiseptic or soap and water, as directed by your doctor. Avoid using creams, ointments, or lotions on the site.
- **Wear loose clothing around the site.** If you want to wear a bra, place a gauze pad over the pulse generator to reduce rubbing on the stitches.
- **Expect some soreness** for the first few days and **slight swelling** for about two to four weeks.

When should I call the doctor?

Call your doctor if you experience any of these:

- Redness, swelling, or drainage around the wound
- A wound that separates or isn't healing
- A fever over 101°F
- Joint stiffness, pain, or weakness in your arm
- Fainting, or feeling light-headed or dizzy
- Very fast or slow heartbeat
- Swelling in your hands or ankles
- Constantly feeling tired
- Hiccups that won't go away
- Chest pain, or a kicking sensation in your chest
- Twitching muscles in your chest or abdomen

Gradually increase your activity

- **Follow your doctor's instructions about keeping your arm still for the first few days.** You might need to wear a sling for the first 24 to 48 hours. Don't lift your arm above the shoulder level on the side of the pacemaker for _____ days.
- **Ask your doctor about when to resume sexual activity.** You may need to avoid sex for the first week. Pacemaker activity will generally not interfere with sexual activity after the first 7 days.
- **Check with your doctor** about activity during the first 6 or 8 weeks, and about when you can return to work. Ask specifically about:
  - Lifting objects or driving
  - Activities that involve raising your arms, such as golfing, bowling, tennis, swimming, or diving
  - Activities that could bump or jar the pacemaker site, such as contact sports, using an air hammer, or firing a rifle
- **Talk to your doctor** about exercises that will gradually increase your range of motion.

Life with a pacemaker

Along with a better heartbeat, a pacemaker brings a few other changes to your life. Follow these guidelines to help your pacemaker work safely and effectively.

Let people know

- **Carry your 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 healthcare providers** that you have a pacemaker before any procedures that involve needles or incisions (cuts).
- **Tell your dentist.** Your dentist can avoid using devices that produce electromagnetic fields that can interfere with the device.

Protect the pulse generator

Follow these guidelines:

- **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, 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
  - Radio transmitters, such CB radios, ham radios, or antennas used to control toys
- **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 or MP3 player.** Keep it 6 to 12 inches away from the pacemaker. Hold the cell phone against the opposite ear, and don't keep the phone or player in your shirt pocket.
- **Computers and small household appliances are safe** as long as they are in good working order.
- **Airport screening is safe.** Screening devices may set off an alarm, but they won't harm the device. 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.

Monitoring and maintenance

Here's how the pacemaker will be maintained:

- **Follow-up appointments.** Your healthcare provider 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 — like 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 healthcare provider if this is needed.
- **Replacing leads.** In rare cases, the leads can become cracked. Your healthcare provider will check the leads and replace them if needed.

Talking with your doctor

The table below lists the most common potential benefits, risks, and alternatives for this procedure. Other benefits and risks may apply in your unique medical situation. Talking with your healthcare provider is the most important part of learning about these risks and benefits.

Benefits	Risks and Complications	Alternatives
• Relief of symptoms, such as dizziness or fainting • Better supply of oxygen to the body, which can relieve shortness of breath or fatigue	• 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	• There is currently no alternative to a pacemaker if you have a slowed heartbeat. • If your heartbeat goes too fast, sometimes or your heart muscle is weakened. Your doctor may consider an implantable cardioverter device (ICD) instead of a pacemaker.

© 2008-2014 Intermountain Healthcare. All rights reserved. The content presented here is for your information only. It is not a substitute for professional medical advice, and it should not be used to diagnose or treat a health problem or disease. Please consult your healthcare provider if you have any questions or concerns. More health information is available at **intermountainhealthcare.org. Patient and Provider Publications 801-442-2963 FS036 - 02/14** *Also available in Spanish.*