

Let's Talk About...

Pacemakers

What is a pacemaker?

A pacemaker is a small device that corrects your child's heart rhythm when it doesn't naturally beat at the right pace.

Why does my child need a pacemaker?

Your child may need a pacemaker to correct:

- Damage to the sinus node that makes it fire slowly
- A problem with electrical signals moving through the heart
- A slowed or irregular heartbeat caused by heart failure or heart medicines (like beta blockers)

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

What are the types of pacemakers?

There are two types of pacemakers:

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

What are the parts of a pacemaker?

A pacemaker has two parts:

- A pulse generator is the battery and circuits that create low-energy electrical pulses. The generator is a little larger than a quarter and less than 1/4-inch thick.



- Leads are thin insulated wires that deliver electrical pulses to your child's 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, placed in the right upper chamber, right lower chamber, and left lower chamber.

How is a pacemaker implanted?

A pacemaker is implanted through surgery in the hospital operating room. In older children and teens, the healthcare provider may make a small incision (cut) just under the collarbone to insert the pacemaker. In younger children, the healthcare provider may make a small incision in the abdomen to insert the pacemaker.

How can I prepare for my child's pacemaker surgery?

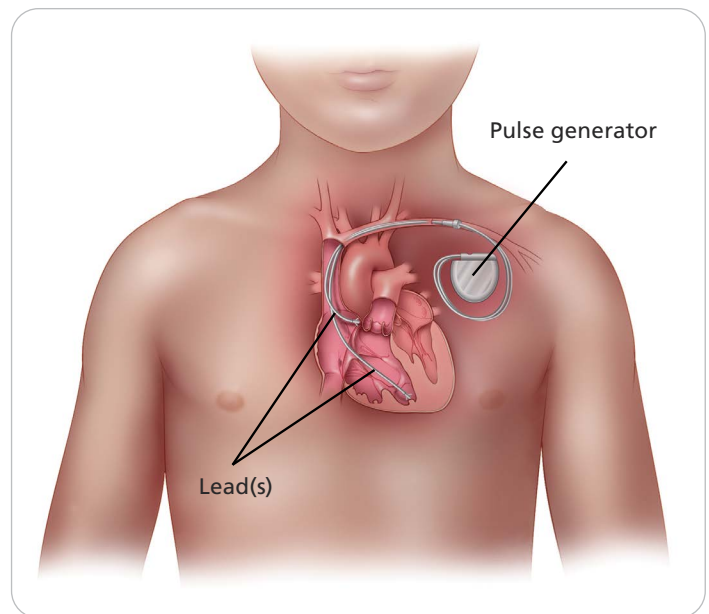
There are several things you can do to get ready for the procedure and make it go more smoothly.

- Arrange for time off school. Your child can return to school when the doctor says it's okay, usually after a week or so.
- Tell your child's doctor about medicines and allergies. This includes prescriptions, over-the-counter drugs, herbs, and vitamins.
- Follow the doctor's directions about medicines. Your child may need to stop taking certain blood thinners before the procedure.
- Have your child fast (have no food or drink) for 6–8 hours before the surgery. If the surgery is in the morning, your child should not eat or drink anything after midnight the night before.

What happens before my child's pacemaker surgery?

When your child arrives for pacemaker surgery:

- You will fill out paperwork, and your child will change into a hospital gown.
- An IV (intravenous line, a small tube that goes into the vein) may be placed in your child's arm or hand. Your child may receive medicine by mouth or through a mask before the IV is placed.
- A healthcare provider may test your child's blood for lab tests.
- A healthcare provider will clean your child's chest and shave it, if necessary.
- Your child will be moved to the cardiac cath lab. The room may feel cool, but your child will be covered with sterile drapes and a blanket.
- Your child will lie on their back and receive medicine through the IV so they sleep through the surgery.
- Your child's arms may be secured at their sides so they're still during surgery.



What happens during pacemaker surgery?

During the pacemaker surgery, healthcare providers will:

- Attach devices to your child to monitor their heart rate, blood pressure, and breathing
- Make a small incision (cut) in the skin to make a “pocket” for the pulse generator
- Insert a needle into a vein and insert each lead using the needle. Using x-ray guidance, they will thread the leads through the vein into your child's heart.
- Test the leads with electricity to make sure each one is in the correct place. Each lead might be moved, and retested each time, until it is perfectly positioned.
- Connect the pulse generator to the leads and insert it under your child's skin
- Set the pacemaker to the rate your child's heart needs. The medical team might also adjust other settings.
- Close the surgical cut with a few stitches and move your child to a recovery room

This surgery usually takes several hours.

What happens after surgery?

- Your child will probably stay in the hospital overnight so the healthcare team can monitor their heartbeat.
- The next morning, your child will have a device check to make sure the leads and generator are working well.
- Your child will get a pacemaker ID card. This lists the type of pacemaker, when it was placed, and who performed the procedure. They will get a permanent card in the mail in a few weeks. Make sure your child has the ID card at all times.
- When your child has recovered from sedation and the surgery, the nurse will send you and your child home with instructions from the cardiologist.

What are the risks of having a pacemaker?

Risks after pacemaker surgery may include:

- Bleeding or infection where the pulse generator was inserted
- Leads becoming dislodged
- Nerve or blood vessel damage

How do I care for my child's incision?

Your child's incision may be sore for the first few days and swell slightly for 2–4 weeks. To protect your child from infection:

- Keep the incision clean and dry. Your child may shower after 48 hours, but cover the incision with plastic so water doesn't hit the incision. Don't immerse the incision in water for the first 10 days or until it heals. Don't scrub the site, and avoid using creams, ointments, or lotions on or around the incision.
- Have your child wear loose clothing around the site. You can put a gauze pad over the pulse generator to reduce rubbing on the incision.

When can my child return to normal activities?

After pacemaker surgery, you should help your child slowly return to activity. Follow the doctor's instructions about keeping your child's arm still for the first few days. Your child might need to wear a sling for a while, which may reduce pain.

Ask your child's doctor when your child can return to school. You should also ask about activity during the first 6–8 weeks, including:

- Lifting objects or driving
- Activities where your child raises their arms, like golfing, bowling, tennis, swimming, or diving
- Activities that could bump or jar the pacemaker site, like contact sports

When should I call my child's healthcare provider?

Call the doctor if your child experiences any of these after pacemaker surgery:

- Redness, swelling, or drainage around the wound
- A wound that separates or isn't healing
- A fever higher than 101°F
- Very fast or slow heartbeat
- Swelling in their hands or ankles
- Hiccups that won't go away

How can I protect my child during other healthcare procedures?

- Make sure your child has their pacemaker ID card at all times. The ID card tells healthcare providers important information in an emergency. It's also helpful if the pacemaker sets off a metal detector or other alarm.
- Tell healthcare providers your child has a pacemaker before any procedures that involve needles or incisions.
- Tell your child's dentist about the pacemaker. The dentist can avoid using devices that produce electromagnetic fields that can interfere with the device.

How do I protect the pacemaker's pulse generator?

To protect the pulse generator, which powers the pacemaker:

- Don't let anything hit or rub the device. Make sure your child is careful about contact sports or other activities that may jar the pulse generator.
- Have your child avoid strong electromagnetic fields, including:
 - High-intensity power lines or radio towers
 - Magnetic resonance imaging (MRI) equipment
 - Combustion motors (They should never touch spark plugs or distributors on a running car or lawnmower)
 - Radio transmitters like CB radios, ham radios, or antennas used to control toys
- Don't let your child linger around anti-theft detection devices at store or building entrances. They should walk through them at a normal pace.
- Have your child keep any cell phone or mp3 player 6 inches away from the pacemaker if it is on.
- Ask airport security not to search your child with a handheld screening wand, since it contains a magnet.

Your child can safely use computers and small household appliances as long as they are working right. Airport screening is safe. Though screening devices may set off an alarm, they won't harm the pacemaker. If your child sets off a metal detector, show the security officer the pacemaker ID.

How do I take care of my child's pacemaker?

To make sure your child's pacemaker is working well:

- Set follow-up appointments with your child's healthcare provider so they can test the pacemaker regularly and adjust settings if needed
- Check the pacemaker over the phone with your child's healthcare provider using a transmitter
- Have their healthcare provider replace the battery if needed (average battery life is 5–10 years)
- Tell their healthcare provider if the leads become cracked and need to be replaced (this is rare)

Questions for my doctor

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