

What is a pacemaker?

A pacemaker is a small electronic device that is implanted just under the skin below your collarbone on the left or right side of your chest.

How does a pacemaker work?

An implanted pacemaker has two parts:

- **The pulse generator-** A small battery-powered unit that sends electrical signals to your heart to help it beat normally.
- **Pacing leads-** The pulse generator is connected to your heart by one or more small wires (pacing leads). These insulated wires are placed in one or more chambers of your heart to send electrical signals to adjust your heart rate.

How does a leadless pacemaker work?

A **leadless pacemaker** doesn't use "leads" or wires to send electrical signals to your heart. It is a small self-contained enclosed device placed directly in the right ventricle (bottom chamber) of your heart. The device includes the pacemaker electronics and battery.

What are the different types of pacemakers?

The type of pacemaker you need depends on your specific heart condition and the symptoms you experience. Your provider will help you decide which type you will receive based on your needs. There are multiple types of pacemakers available:

- **Single-chamber pacemaker:**

This type of pacemaker has one lead that connects the pulse generator to one chamber of your heart. We use this type to control heartbeat pacing by connecting the lead to either the right atrium (upper chamber) or right ventricle (lower chamber).

- **Dual-chamber pacemaker:**

With two leads, this type of pacemaker connects to both chambers on the right side of your heart, the right atrium and right ventricle.

- **Biventricular pacemaker:**
This pacemaker is also known as a cardiac resynchronization therapy (CRT) device. It has 3 leads connected to the right atrium and both ventricles of your heart.
- **Rate Responsive Pacemaker:**
This type of pacemaker makes adjustments to your heartrate based on your activity level. It will pace faster when exercising and slower when you are at rest.
- **Leadless Pacemaker:**
This pacemaker is inserted directly into the right ventricle (bottom chamber of the heart) of your heart. It doesn't use leads or need to be placed under your skin, which lowers your risk of infection.

Why do I need a pacemaker?

Pacemakers are used for many conditions. You may need a pacemaker if:

- Your heart beats too slow or too fast
- Your heart doesn't beat regularly
- There is a block in your heart's electrical pathway

What are the risks of having a pacemaker implanted?

Problems from pacemaker implant surgery are uncommon but can include the following:

- Infection at the incision site.
- Allergic reaction to the dye or anesthesia used during your procedure.
- Swelling, bruising, bleeding or blood clots at the implant site. If you take blood thinners, you are at a higher risk for bleeding.
- Damage to your blood vessels or nerves near the pacemaker.
 - Leadless pacemakers may cause damage to the blood vessel in the groin used to insert the device.
- Puncture of a lung.
- Damage to the heart muscle.

Tell your health care provider if:

- You are pregnant or suspect that you may be pregnant.
- You are breastfeeding.

There may be other risks depending on your specific medical condition. Be sure to discuss any concerns with your provider **before the procedure**.

How do I find out more information?

Each device company has patient information located on their websites. Here are links to the commonly implanted devices:

- Abbott/St. Jude Medical
 - Living With Your Device: <https://www.cardiovascular.abbott/us/en/patients/living-with-your-device.html>
- Biotronik
 - Pacemaker Implantation: <https://www.biotronik.com/en-us/patients/procedure/pacemaker>
- Boston Scientific
 - Pacemakers: <https://www.bostonscientific.com/en-US/patients/about-your-device/pacemakers.html>
- Medtronic:
 - Pacemakers for Bradycardia: <https://www.medtronic.com/us-en/patients/treatments-therapies/pacemakers.html>
 - Living With a Heart Device: <https://www.medtronic.com/us-en/patients/treatments-therapies/living-with-heart-device.html>

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