



Medtronic

Life with a Cardiac Resynchronisation Therapy (CRT) Device



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If you or someone you know has been diagnosed with heart failure, this brochure can help you understand the heart condition and device treatment options

This brochure provides basic information about heart failure and cardiac resynchronisation therapy devices (CRT), including what to expect before and after you have a CRT device implanted.



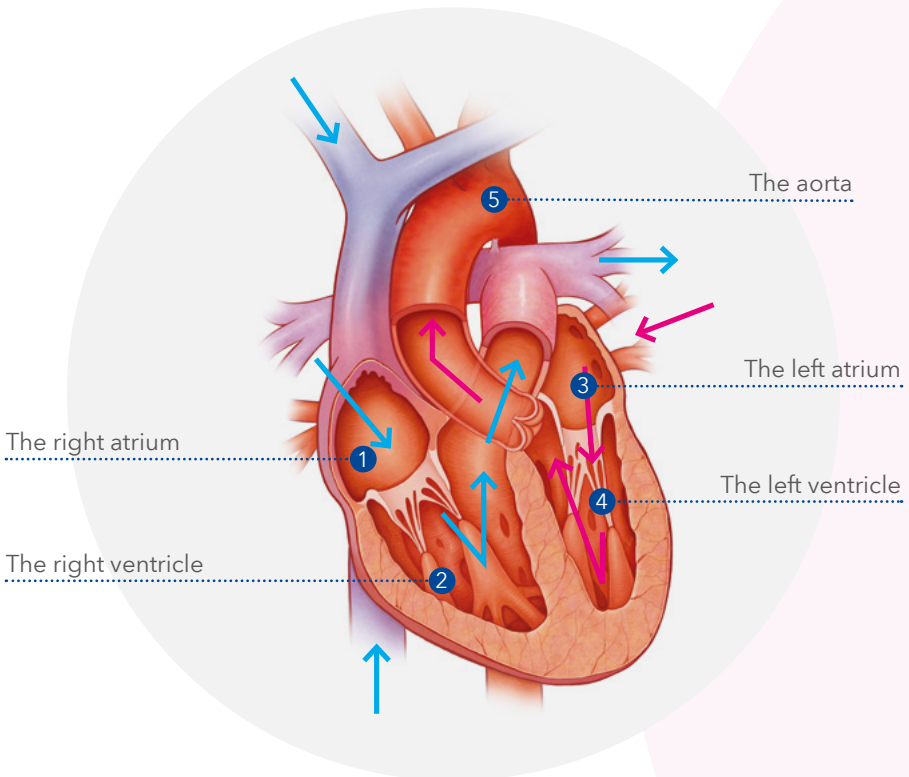
The Heart

The heart is a fist-sized organ that acts as a pump to send oxygen-rich blood throughout the body. Regular, rhythmic electrical signals keep the heart pumping blood. The heart has four chambers:

- Two upper chambers - a right atrium and a left atrium
- Two lower chambers - a right ventricle and a left ventricle

The right atrium (1) takes in oxygen-depleted blood from the rest of the body and pushes it to the right ventricle (2) which then sends it to the lungs. The lungs oxygenate the blood which travels to the left atrium (3), and then onto the left ventricle (4), which pumps oxygen-rich blood to the rest of the body via the aorta (5).

- Oxygen-rich Blood
- Non-oxygenated Blood



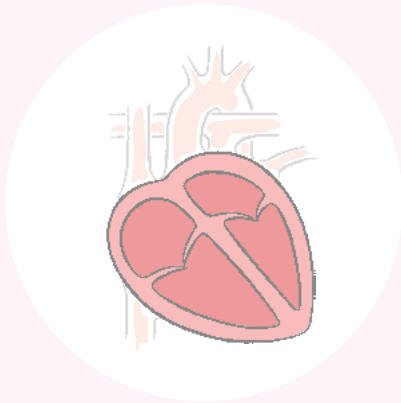
What is heart failure?

The term heart failure does not mean your heart has stopped pumping; rather, your heart muscle is not able to pump enough blood to meet your body's needs.

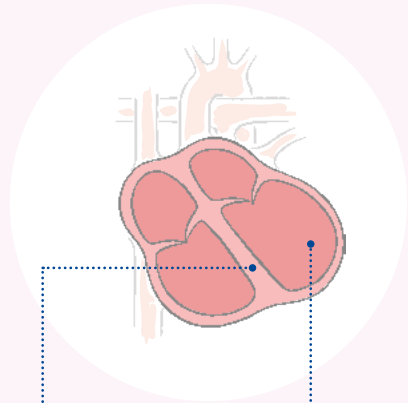
As a result, you may feel tired, lack energy, experience shortness of breath and notice excess fluid collecting in your body.

In a healthy heart, each chamber contracts (squeezes) in a coordinated effort. If the heart is not beating in a coordinated fashion, then the body will not receive an adequate amount of blood to function properly. During heart failure, the heart attempts to compensate for lost pumping power, which may change its shape and result in an uncoordinated (or unsynchronised) and inefficient heartbeat.

Healthy heart



Heart failure



Walls may thicken to handle the increased stress

Chambers enlarge to handle increased fluid

Symptoms of heart failure

Heart failure is a progressive condition, meaning it will gradually worsen. At first you might not experience any symptoms, but over time your heart's pumping ability will continue to weaken and you may experience some or all of the following symptoms:

- Chronic lack of energy
- Shortness of breath
- Swelling of feet and legs
- Swollen or tender abdomen with loss of appetite
- Difficulty sleeping at night due to breathing problems
- Increased urination at night
- Confusion and/or impaired memory
- Cough with frothy sputum

Causes of heart failure

Heart failure usually develops slowly after an injury to the heart. There is no single cause, and sometimes the cause is unknown. Some of the most common causes of heart failure are:

- Previous heart attack (myocardial infarction)
- Coronary artery disease
- High blood pressure (hypertension)
- Heart valve disease
- Infection of the heart (myocarditis)
- Congenital heart disease (condition you were born with)
- Endocarditis (infection of the heart's inner lining)
- Diabetes (the body does not produce or properly use insulin)

Risk of a poorly pumping heart:

In heart failure, the heart muscle must work harder to pump blood to the body. This may cause the heart to beat faster, which can lead to dangerously fast or irregular heart rhythms. These abnormal heart rhythms can lead to a condition called Sudden Cardiac Arrest (SCA).

What is sudden cardiac arrest?

Sudden Cardiac Arrest (SCA) results from an electrical problem with the heart that triggers a dangerously fast heart rhythm (ventricular fibrillation). The rapid, irregular heart rhythm causes the heart to quiver rather than contract or pump. When the heart stops pumping blood, oxygen cannot reach the body and brain. If not treated immediately, SCA can be fatal. Sudden cardiac arrest is one of the top killers and claims more lives than breast cancer, AIDS, or lung cancer.¹

Heart attack and SCA: What are the differences?

Sudden cardiac arrest is not the same as a heart attack, although the two are often confused.

| | Heart attack | Sudden cardiac arrest (SCA) |
|----------------------|---|---|
| What kind of problem | A circulation or plumbing problem | An electrical problem |
| Cause | Blockage in a vessel that supplies blood to the heart muscle, which may permanently damage part of the heart | Electrical malfunction of the heart that results in no blood flow to the body and brain |
| Risk factors | High cholesterol, high blood pressure, obesity, smoking, family history of a heart attack, diabetes | Previous heart attack, heart failure, abnormal heart rhythm, low ejection fraction (EF \leq 35%), family history of SCA |
| Symptoms | May be accompanied by pressure in the chest, pain radiating to the arm, shortness of breath, sweating, nausea | Generally no symptoms, may experience racing heartbeat, lightheadedness, dizziness, fainting |

Who is at risk of sudden cardiac arrest?

Generally, sudden cardiac arrest strikes without warning. People who are at a higher risk for SCA include:²

- Those who have had a heart attack
- People who have heart failure
- Survivors of a previous SCA or those who have a family member who has had an SCA event
- People with a low ejection fraction (EF)

Know your Ejection Fraction (EF)

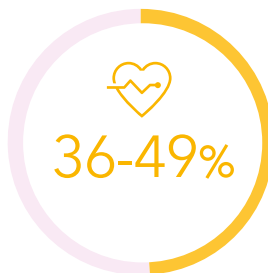
EF - or **Ejection Fraction** - is the percentage of blood that is pumped out of your heart with each heartbeat. Your doctor uses your EF number to determine how well your heart is pumping. It can change over time, so it is important for you and your doctor to check your EF number regularly.

The most common way to measure EF is with an **echocardiogram**. This test is usually performed in a doctor's office or hospital's diagnostic area.

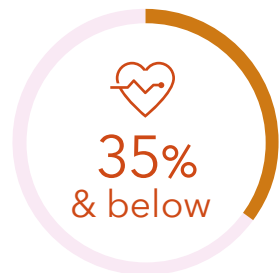
Chart of typical EF ranges³



Heart's pumping ability is **normal**



Heart's pumping ability is **below normal**

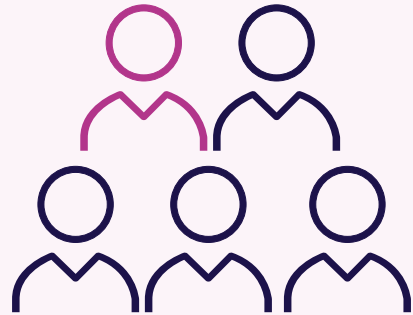


Heart's pumping ability is **low**

A healthy heart has an EF between 50% and 75%. This indicates the heart is pumping well and able to deliver enough blood to the body and brain. Even a healthy heart does not pump 100% of blood out of the heart during each beat—some blood always remains in the heart.

People with a low EF - 35% or below - are at an increased risk for SCA³.

Sudden cardiac arrest causes around **20% of all deaths in Europe**⁴.



The most effective way to treat SCA is through defibrillation². Defibrillation involves delivering an electrical shock to your heart to restore a normal heartbeat.

There are two primary forms of defibrillation:

- An **automated external defibrillator, or AED**, is a portable device that is used by emergency response teams or the general public to shock the heart
- An **implantable heart device (called ICD or CRT-D)** that is implanted under the skin. The implantable heart device delivers electrical pulses or shocks to treat fast, irregular rhythms

94%



survival rate **with an implantable defibrillator (CRT -D)**⁵

Treating heart failure

Heart failure is a progressive condition. Your doctor may prescribe a variety of treatment options that may slow the progression of the disease, strengthen your heart and improve your quality of life. Some of these treatments may include medications, lifestyle changes, exercise, device therapy or a combination of these.

What is a Cardiac resynchronisation therapy (CRT) device?

When people refer to a cardiac resynchronisation therapy (CRT) device, they are actually discussing the system - the CRT device and the leads.

- A **CRT device** is a device implanted under the skin, typically just below the collarbone. The device delivers therapies to coordinate the heart's pumping action and treats fast, irregular or slow heart rhythms depending on the type of CRT device. This device may also be referred to as a heart failure device, a pacemaker for heart failure, biventricular device, three-lead CRT device, CRT-P (pacemaker) or a CRT-D (defibrillator)
- **Leads** are thin, soft insulated wires about the size of a spaghetti noodle. The leads carry the electrical impulse from the CRT device to your heart and relay information about the heart's activity back to the CRT device

How does a CRT work?

A cardiac resynchronisation therapy device monitors your heart rhythm 24 hours a day and sends electrical pulses to pace the lower chambers of your heart (ventricles) to help them beat in a more coordinated rhythm. This coordinating or "resynchronisation" therapy improves the heart's ability to pump blood and oxygen more efficiently to the body.

Your doctor will program the CRT device to deliver the most effective therapies for your specific heart condition.

In response to abnormal heart rhythms, a CRT device may also provide the following therapies:

- **Pacing therapy** for slow heart rhythms - electrical impulses are delivered to the heart when the heart's own rhythm is too slow or irregular.
- **Defibrillation therapies** for fast or irregular heart rhythms - a shock therapy is delivered to the heart to interrupt fast heart rhythms and restore a normal heart rate.



CRT-D real size versus 1 Euro coin

There are two types of CRT devices—a **CRT pacemaker (CRT -P)** and a **CRT defibrillator (CRT -D)**. CRT-D devices, like all defibrillators, have a pacemaker function in them. Both devices help to coordinate the heart's pumping action and deliver pacing therapy for a slow heart rate. However, the CRT-D can also treat fast heart rhythms.

All cardiac resynchronisation therapy devices are designed to use **three** leads. One lead is placed inside the right atrium, another lead is placed inside the right ventricle and the third lead is placed inside a vein on the outside of the left ventricle.



CRT-P with leads



CRT-D with leads

The CRT battery:

The energy needed for the CRT to work comes from a battery inside the device. How long your battery lasts depend on several factors. Some of these factors include the type of CRT you have, the nature of your heart condition, and how often your CRT provides therapy to your heart.

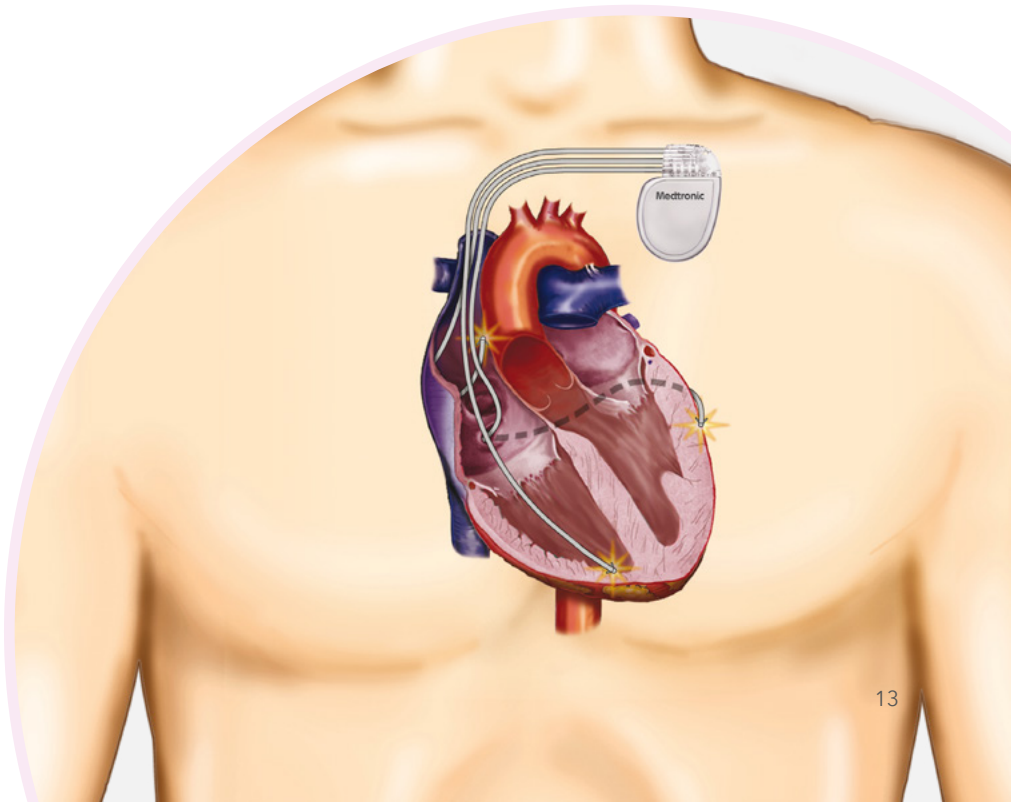
Because your CRT operates using a battery sealed inside the device, the entire device will need to be replaced when battery power falls to a low level. The leads only need to be changed in exceptional cases.

Getting a CRT implanted

The procedure to implant a CRT does not require open heart surgery, and most people go home within 24 hours. Before the surgery, medication may be given to make you sleepy and comfortable. Generally, the procedure is performed under local anesthesia.

General steps of an implant procedure:

- A small incision, approximately 5 to 10cm long, will be made in your upper chest area, just below your collarbone
- Three leads will be guided through a vein into your heart, and the leads will be connected to the CRT device
- The CRT device settings will be programmed, and the device will be tested to ensure it is working properly to meet your medical needs
- The CRT device will be inserted beneath your skin, and the incision in your chest will be closed



After your procedure, you will be given an **CRT identification card**. Always carry it with you as it contains important information about the implanted device.

Allow yourself a few weeks to get used to your CRT.

It is important to keep your wound dry for the first few days while it heals. Also avoid wearing tight clothing that could irritate your wound. You should not move the affected shoulder too energetically during the first few days so as not to impair the healing process. Avoid lifting heavy objects. Do not make sweeping movements with your arms, as these can cause undesirable tension on the leads. Consult your doctor in case of specific question.

Replacement procedure

The CRT device has been developed to let your doctor know when the battery power falls to a low level. As the battery is an inherent component of the CRT device, the entire CRT device must be replaced during a replacement procedure. The surgeon makes an incision over the old scar and removes the old device. The electrodes are fastened securely and, after they have been checked, a new device is connected, tested and inserted into the existing skin pocket. The leads only need to be changed in exceptional cases.



Follow up care and monitoring

Your doctor will set follow-up appointments. During such follow-ups, you should not only mention the symptoms that may have occurred during action of the CRT device, you should also take this opportunity to ask any questions you may have and talk about your concerns and potential fears.

The follow-up appointments enable the defibrillator to be thoroughly checked.

During these check-ups, your doctor may:

- Monitor the battery status of the CRT device
- Check the leads to determine how they are working with the CRT and your heart
- Review and adjust (if needed) your defibrillator settings to ensure they are programmed appropriately for your medical needs

This is done through a **programmer**, a small computer kept at your doctor's office. Your doctor will use the programmer to retrieve information stored in your CRT.

In addition to these appointments, you should call or visit your doctor in specific situations:

- If the **scar** becomes red, moist or swells
- In case of an **alert (beeping tone)**: your CRT performs self-checks automatically. The beeping tone lets you know that something needs attention from your doctor. It is designed to get your attention, not to alarm you. If you hear a beeping tone, just contact your doctor for instructions. Should you hear a solid, 10 second tone, it simply means your device came into close contact with a strong magnet and you should move away from the magnet
- In case of a **shock**: with current technology, your CRT-D will deliver a shock only if needed. An inappropriate or unnecessary shock is very unlikely. If tachycardia occurs, the CRT-D will first try to stop it as gently as possible. If this is not successful, cardioversion or defibrillation will be carried out

Some people are unconscious when their CRT-D delivers a shock, but others are not and may be aware of what's happening. Different people perceive the shock from the CRT-D very differently. The shock can feel like a vigorous or even painful kick in the chest. The muscles in the chest and upper arm may contract so strongly that you jump up in fright. You should not worry about this, as it simply means that the CRT-D is doing its job. People generally regard this action as necessary and comforting. If you receive a shock, anyone touching you may feel the shock as a muscle spasm or a tingle, although it is unlikely. A shock can be startling, but it will not hurt a person touching you.

Shocks may be uncomfortable. It is normal to be concerned about getting a shock but be reassured this can **save your life**.

Discuss this with your doctor and he/she will provide a **detailed plan** of what to do should a shock occur.

An example of a **shock plan** could be:

- If you got one shock, feel ok and don't have symptoms (i.e you don't have chest pain, shortness of breath, rapid heartbeat) then you can call your doctor during regular business hours
- If you passed out or if you have symptoms like chest pain, shortness of breath, lightheadedness/confusion, dizziness, rapid heartbeat or if you got shocked more than once (within 24 hours), **get in touch with your doctor immediately or go to the emergency department**. If you are followed remotely by a remote monitoring system, you may be asked to send a transmission right then.



Ask your doctor for their recommended shock plan as this may differ between doctors.





Remote monitoring of your CRT

We understand it is important to stay connected to your care team from the comfort of your home or wherever you're traveling - **remote monitoring*** allows for this flexibility.

Today, millions of people implanted with heart devices are remotely monitored.

Remote monitoring has been shown to:

- Communicate any heart rhythm and device changes which require attention
- Reduce hospitalisations and ER visits
- Increase Quality of Life
- Provide you with a sense of security and peace of mind

How remote monitoring works

A small **bedside monitor or an app on your smartphone/tablet** is used to send information from your CRT to your clinic. Information is sent automatically when scheduled by your doctor. Your CRT is also able to send a notification to your doctor when it detects an irregular rhythm for example.

Once received, your clinic can review your information on a secure website. Remote monitoring provides easy access to information that allows your doctor to manage your device and heart condition.

Your CRT has built-in safeguards that protect your device and your device data to prevent any outside parties from accessing your device (often referred to as "hacking"). The data sent to your clinic is encrypted. Your CRT can only be programmed by your doctor using the programmer in their office.

*subject to local availability

MRI Scan access

A magnetic resonance imaging (MRI) scan is a type of diagnostic that creates an internal view of the body. Traditionally, most CRTs are not considered safe in an MRI environment because the MRI could change the settings, temporarily affect the normal operation of, or potentially damage the CRT. Most Medtronic CRT systems are approved for use in the MRI environment, having a unique design developed so that under specific conditions, people may safely undergo MRI scans. Your doctor should discuss all potential benefits and risks of an MRI scan with you.



The CRT in your daily life

Most people adjust rapidly to their CRT. Once the wound has completely healed, there is no problem with taking walks, working in the garden, playing sports or bathing. You may want to avoid activities which cause pressure to be exerted on your chest or possibly dangerous types of sports or activities where a brief fainting spell could endanger you or others. As long as your doctor has no objections, you can resume all the activities you enjoyed before getting your CRT.



Speak with your family and friends about the CRT as it can make you feel more secure. Support groups and associations can be of valuable assistance.

CRT devices are built with protective shields, so the majority of items that you use or come into contact with will not affect the normal operation of your CRT.

However, items that generate or use electricity, or transmit wireless signals have electromagnetic fields around them. **Electromagnetic compatibility** is the relationship between these electromagnetic fields and your CRT. If the electromagnetic fields surrounding an item are too close to your CRT - and your device happens to detect these fields - this may temporarily affect its normal function. This same effect may also occur if the item being touched is not in good working order or properly wired, causing electrical current to flow into your body. In either situation, this may temporarily cause your CRT to deliver a therapy that is not needed or withhold a therapy that is needed. For this reason, we recommend you only use items that are in good working condition. In addition, we recommend you maintain a minimum distance between certain items and your CRT. This will help to avoid any temporary effect on your heart device.

What to do if you think an item is affecting your heart device?

If you feel dizzy, lightheaded, a change in heart rate, or receive a shock while using an item, simply release whatever you're touching or move away from it. Any temporary effect is unlikely to cause reprogramming or damage to your CRT. Your device is designed to return to normal operation. Of course, if your symptoms continue or do not improve, contact your doctor as soon as possible.

Commonly asked questions

1. Use of a cell phone

Mobile devices are safe to use as long as you maintain proper distance between them and your CRT. When using a cell phone, tablet computer or other mobile device, keep the device 6 inches/15 centimeters from your CRT as it could create interference. It is recommended to use your phone on the ear opposite your CRT and to avoid placing the cell phone in a pocket near your CRT.

2. Activities and intimacy

The goal is for you to lead a normal life as soon as possible. Generally, your device will not keep you from most **activities and hobbies** (e.g., bowling, golfing, playing tennis, gardening, fishing, etc.). However you should discuss your underlying condition with your doctor to confirm.

Most people are able to return to work after device implant. You and your doctor will make this decision. The timing will depend on many things, including the type of work you do.

Intimacy is a normal part of life. We understand people resume sexual activity when they feel comfortable. Your CRT is programmed to allow your heart to normally rise without treatment shocks being delivered. Your device should only deliver a shock when your heart rate meets the specific criteria programmed by your heart doctor. If you receive a shock during intimacy or other activities, contact your physician. Your doctor will then determine the cause of the shock and may also make adjustments in the programming of your heart device.

3. Anti-theft detectors and airport security systems

It is unlikely that your CRT will be affected by metal detectors (walk-through archways and hand-held wands) or full body imaging scanners (also called millimeter wave scanners and 3D imaging scanners) such as those found in airports. To minimize the risk of temporary interference with your CRT while going through the security screening process, do not stop or linger in a walkthrough archway; simply walk through the archway at a normal pace. If a hand-held wand is used, ask the security operator not to hold it over your implantable defibrillator and not to wave it back and forth over your CRT. You may also request a hand search as an alternative. If you have concerns about these security screening methods, show your device ID card, request alternative screening and then follow the instructions of the security personnel. Flying is perfectly safe for people with a CRT (there are no issues with pressurization or altitude)

4. Travelling

Consult your doctor in advance of undertaking long journeys. They can provide you with the addresses of hospitals in the countries you are visiting in case you need to find a hospital in an emergency situation. They can also help you to find a cardiologist in these hospitals for a follow-up visit if needed.

5. Driving

People with a CRT have an ongoing risk of sudden incapacitation that might cause harm while driving a car. Driving restrictions vary across different countries in Europe⁶.

Talk to your doctor about the restrictions that may apply to you.

6. Household appliances

Most household appliances are safe to use as long as they are properly maintained and in good working order. This includes microwave ovens, major appliances, electric blankets and heating pads.

7. Magnets

Even though most electromagnetic fields in the home environment will rarely affect the function of your CRT, it is recommended you keep any item containing magnets away (at least 6 inches/15 centimeters) from your device. The reason for this is because there is a small sensor built into the electronics of CRT devices which prevents the device from delivering treatment therapies when it detects a strong magnetic field. If this is the case, your CRT will emit a solid, 10 seconds tone reminding you that you are too close to a magnet. You should simply locate the magnet and move it away from your device. There is no need to contact your doctor should you hear this magnet tone as no harm will come to your device.

You may not always know if an item has a magnet in it. However, if you use household items as they are intended, and they are properly maintained, they should have no effect on your device. This includes microwaves, kitchen appliances, cordless phones, radios, televisions, video games, CD players, hair dryers, electric shavers, electric toothbrushes, electric blankets, leaf blowers, lawn mowers, garage door openers, computers, children's toys and small shop tools. If you mistakenly place a magnet too close to your CRT, simply move the item away.

Removing the magnet returns the CRT to its previous, normal programming. The use of magnetic mattress pads and pillows is not recommended since it would be difficult to keep a 6 inches/15 centimeters separation from your device.

Welding and chainsaws

Unlike most other household power tools, welding with currents above 160 amps may have a higher tendency to temporarily affect the normal function of your CRT. It is recommended you avoid using welding currents above 160 amps. Follow the safety precautions below to minimize the risk of interfering with your CRT while welding with currents under 160 amps.

- Work in a dry area with dry gloves and shoes
- Maintain a 2-foot (60 centimeter) distance between the welding arc and your device
- Keep the welding cables close together and as far away as possible from your heart device. Place the welding unit approximately 5 feet/1.5 meters from the work area
- Connect the ground clamp to the metal as close to the point of welding as possible. Arrange the work so the handle and rod will not contact the metal being welded if they are accidentally dropped
- Wait several seconds between attempts when having difficulty starting a weld
- Work in an area that offers firm footing and plenty of room for movement
- Work with an informed person who understands these suggestions
- Immediately stop welding and step away from the area if you start feeling lightheaded or dizzy or if you believe your CRT-D has delivered a shock

Since welding equipment may temporarily affect the normal operation of your heart device, any decision you make to use this equipment should be made in consultation with your heart doctor.

Your doctor can advise you as to the degree of risk these responses pose for your medical condition. Aprons or vests will not effectively shield your device from the electromagnetic energy generated by welding equipment.

The electromagnetic energy generated by a chainsaw is similar to other electric and gasoline powered tools. If electromagnetic interference occurs with your CRT and you experience symptoms such as becoming dizzy or lightheaded, a running chainsaw may present a higher risk of injury to you than other power tools.

Follow the safety precautions below to minimize the risk of interfering with your CRT while using a chainsaw:

- Maintain a 6-inch/15 centimeters distance between the motor of an electric chainsaw and your CRT. Also, be sure the equipment is properly grounded.
- Maintain a 12-inch/30 centimeters distance between the components of the ignition system of a gas-powered chainsaw and your CRT. Also, it is better to use one that is built with the spark plug located away from the hand grips
- Immediately stop cutting and turn off your chainsaw if you start feeling lightheaded
- Do not work on the engine while it is running
- Do not touch the coil, distributor or spark plug cables of a running engine



Recommended precautions

The following tables provide a summary of recommended precautions for different categories:

- Household & Hobby Items
- Tools & Industrial Equipment
- Communications & Office Equipment
- Medical & Dental Procedures

Household & Hobby Items

Most household and hobby items are unlikely to affect your heart device when the items are in good working condition, used as intended, and the recommended distances are maintained. For items that transmit power through an antenna, it is recommended that you follow the noted distances between the antenna and your implanted heart device.



Special considerations

Maintain at least the recommended distance between the item and your heart device:

12-inch/30 centimeters distance

- Car/Motorcycle – from components of ignition system
- Electric Fence
- Transformer Box (green box in yard)

2-foot/60 centimeters distance

- Beach Comber Metal Detector—from search head
- Induction Cooktop Stove

Not Recommended

- Ab Stimulator
- Electronic Body Fat Scale
- Magnetic Mattress Pad/Pillow



Minimal risk

Maintain at least a 6-inch/15 centimeters distance between the item and your heart device:

- Electric Grocery Cart/Golf Cart—from motor
- Electric Kitchen Appliances—hand-held (electric mixer or knife)
- Electronic Pet Containment Fence—from collar, remote and base antenna
- Electric Shaver—corded
- Electric Toothbrush Charging Base
- Exercise Bike—from magnet in wheel
- Hair Dryer—hand-held
- Hand-Held Back Massager
- Magnetic Therapy Products
- Radio-Controlled Items—from antenna
- Sewing Machine/Serger—from motor
- Small Magnet (household magnet)
- Speakers
- Tattoo Machine
- Treadmill—from motor
- Ultrasonic Pest Control Device
- Vacuum Cleaner—from motor



No known risk

If the item is used as intended and in good working condition, there is no known risk:

- Battery Charger—for household batteries
- Casino Slot Machine
- CD/DVD or Recorder
- Curling Iron
- Dishwasher
- Electric Blanket
- Electric Guitar
- Electric Toothbrush
- Electronic Weight Scale
- Garage Door Opener
- Hair Straightener
- Heating Pad
- Hot Tub
- Ionized Air Filter
- Iron
- Kitchen Appliances –small and large
- (blender, can opener, refrigerator, stove, toaster)
- Low Voltage Residential Power Lines
- Massage Chair/Pad
- Medical Alert Necklace
- Microwave Oven
- Remote Control (CD, DVD Player, TV)
- Salon Hair Dryer
- Sauna
- Shaver/Trimmer– battery powered
- Tanning Bed
- Television

Tools & Industrial equipment

It is important that your power tools and/or equipment be in good working order and properly wired (three-prong plug, if applicable) and used as intended by the manufacturer of the product. It is recommended that corded electrical items be plugged into a safety outlet device called a ground fault circuit interrupter (GFCI or GFI).



Special considerations

Maintain at least the recommended distance between the item and your heart device:

12-inch/30 centimeters distance

- Boat Motor
- Car Battery Charger
- Gasoline Ignition Systems—from components of ignition system
- Gasoline Powered Tools—from components of ignition system (lawn mower, snowblower, weed whacker, chainsaw)

2-foot/60 centimeters distance

- Bench Mounted/Free Standing Tools—for motors 400 horsepower or less (air compressor, drill presses, grinder, pressure washer, table saw)
- Jumper Cables
- Welding Equipment (with currents under 160 amps)

Not Recommended

- Welding Equipment (with currents over 160 amps)



Minimal risk

Maintain at least a 6-inch/15 centimeters distance between the item and your heart device:

- Circular Saw—skill saw
- Drills—battery and electric powered
- Electric Chainsaw
- Grinder (hand-held)
- Hedge Trimmer—electric powered
- Lawn Mower— electric powered
- Leaf Blower—electric powered
- Reciprocating Saw (Sawzall™*)
- Router
- Sander
- Screwdriver— battery powered
- Soldering Gun
- Weed Whacker—electric powered



No known risk

If the item is used as intended and in good working condition, there is no known risk:

- Calipers–battery powered
- Flashlight–battery powered
- Laser Level
- Soldering Iron
- Stud Finder



Communications & Office Equipment

Guidelines for safe operation of communications and office equipment include such factors as transmitting power, frequency and antenna type. For items that transmit wireless signals through an antenna, it is recommended that you follow the noted distances between the antenna and your implanted heart device.



Special considerations

Maintain at least the recommended distance between the item and your heart device:

12-inch/30 centimeters distance

- Amateur Radio, Ham Radio, Marine Radio, Walkie Talkie – between 3-15 watts –from antenna
- Citizens Band (CB) Radio–5 watts or less–from antenna
- Uninterrupted Power Source (UPS)

2-foot/60 centimeters distance

- Amateur Radio, Ham Radio, Marine Radio, Walkie Talkie – between 15-30 watts–from antenna





Minimal risk

Maintain at least a 6-inch/15 centimeters distance between the item and your heart device:

- Amateur Radio, Ham Radio, Marine Radio,
- Walkie Talkie –3 watts or less—from antenna
- Cellular Phone—3 watts or less—from antenna
- Cordless Headphone Sending Unit (i.e., T V Ears™*)
- Digital Music Player (iPod™*) –transmitting
- Disney Magic Bands (6" from band reader, band itself has no known risk)
- Electronic Reader/Reading Devices
- Electronic Tablets (i.e., Kindle™*, iPad™*, Surface™*)
- Home Wireless Electronics—from antenna
- On Star™* Technology—from antenna
- Remote Keyless Entry—key fob (such as Smart Key)
- Remote Car Starter
- Smart Meter (utility companies)
- Security Badge Wall Scanner
- Wireless Communication Devices
- (computers, headsets, modems, routers, smartphones, Bluetooth™*)
- Wireless Controllers
- (video game consoles, Xbox™*, Playstation™*, Nintendo™*)



No known risk

If the item is used as intended and in good working condition, there is no known risk:

- Activity bands (FitBit™*, Body Bug™*, Nike+™*, Jawbone™*)
- Calculator
- Copy Machine
- Desktop/Laptop Computer
- Digital Music player (iPod™*)—non-transmitting
- Fax Machine
- Global Positioning System (GPS)
- Barcode Scanner
- Medical Alert Pendant
- Printer
- Radio AM/FM
- Scanner

Medical & Dental Procedures

Many medical procedures will not affect your heart device; however, certain medical procedures can result in serious injury, damage to your heart device, or device malfunction. Before undergoing any medical procedure, it is recommended that you advise your treating doctor or dentist that you have an implanted heart device and consult with your heart doctor to evaluate any possible associated risk.



Not recommended

- Diathermy (high frequency, short wave and microwave)
- MRA (Magnetic Resonance Angiography) for Non MR-Conditional Devices
- MRI*
- Virtual Colonoscopy with MRI* for Non MR-Conditional Devices

* Unless the device is MR Conditional, then see MRI guidelines for that device.
Visit www.mrisurescan.com for more information.





Acceptable with precautions

Inform your treating physician that you have a heart device implanted and/or consult with your heart doctor/clinic. Medical procedures that require some precautions:

- Ablation (specifically, microwave ablation and radiofrequency ablation)
- Acupuncture with AC-Alternate Current Stimulus
- Argon Plasma Cautery
- Blood Bag Dielectric Sealing Equipment
- Bone Growth Stimulator Alternating Magnetic Field
- Bone Growth Stimulator Introducing AC Current
- Colonoscopy–polyp removal
- Computerized Axial Tomography (CT or CAT) Scan
- ECT (Electroconvulsive Shock Therapy)
- Electrolysis
- Electrosurgery and other procedures that use an electric probe to control bleeding, cut tissue or remove tissue
- EMG Electromyography–automated sequence
- EMG Electromyography–single stimulus
- External Defibrillation, AED and Elective Cardioversion
- Hyfrecator
- Hyperbaric Oxygen Therapy (HBOT)
- Interferential Electrical Current Therapy
- Lithotripsy
- Magnetic Therapy
- MET (Microcurrent Electrical Therapy) Alpha-Stim 100™*
- Mechanical Ventilation with a Respiration Rate Monitor



Acceptable with precautions

- Muscle Stimulators and other devices sending current into your body
- Neutron Radiation
- Radiation Therapy (external x-ray, Gamma Knife™* or radiosurgery)
- Radiotherapy (Including high-energy radiation therapy)
- Stereotaxis
- Therapeutic Ultrasound
- TMS (Transcranial Magnetic Stimulation)
- Transcutaneous Electrical Nerve Stimulation (TENS) (including Neuro Muscular Electrical Stimulation (NMES))
- Transmitting Loop for Digital Hearing Aid
- Transurethral Needle Ablation (TUNA™* Therapy)
- TUMT (Transurethral Microwave Thermotherapeutic Device)
- TURP Prostate Test (Transurethral Resection of the Prostate)
- Virtual Colonoscopy Performed with CAT Scan (CT Scan)



Acceptable

If the item is used as intended and in good working condition, there is no known risk:

- Acupuncture—no electrical stimulus
- Acupuncture DC— direct current
- Bone Density Test (x-ray)
- Bone Density Ultrasound—on heel or hand
- Bone Growth Stimulator Direct Current
- Capsule Endoscopy
- Colonoscopy—diagnostic only



Acceptable

- Dental Apex Locator (root locator)
- Dental Drills
- Dental Pulp Tester
- Dental Ultrasonic Scalers/Cleaners
- Dental X-Ray
- Diagnostic Ultrasound (Sonogram)
- Diagnostic X-Rays (fluoroscopy)
- Digital Infrared Thermal Imaging (DITI)
- Echocardiogram
- EECp–Enhanced External Counter Pulsation Therapy
- Electrocardiogram (ECG/EKG)
- Electroencephalography– EEG
- Electronystagmography (Audiology–ENG)
- Hearing Aid (in or behind ear)
- Heart Rate Monitor
- Iontophoresis (drug patch)
- Laser Surgery
- Lasik Eye Surgery
- Lie Detector Test
- Mammography
- Medical Helicopter
- Nuclear Stress Test
- PH Capsules
- Positron Emission Tomography (PET Scan)
- Relief Band™*
- Sleep Apnea Machine

* Unless the device is MR Conditional, then see MRI guidelines for that device.
Visit www.mrisurescan.com for more information.

Shaping a positive attitude towards living with a CRT

Remind yourself of the benefits - Remind yourself that your CRT protects you from the serious consequences of irregular heartbeats

Block negative thinking - Catch yourself if you are imagining the worst case scenarios. Remind yourself that most people feel positive about having their CRT.

Discuss concerns - Make a list and discuss any worries you might have about your condition or heart device with your doctor and with your loved ones. Develop a plan about how to cope with your concerns

Plan your quality of life - The goal of your ongoing care is to achieve the best quality of life possible. Take an inventory of the activities that are most important to you and discuss plans to return to those activities with your doctor

Explore the unknown - Learn about your medical condition and your heart device from your doctor, nurse, device manufacturer, and websites. Often learning about your heart device helps reduce anxiety

Educational resources & support

You can rely on Medtronic as your experienced partner when you have a question around your heart device or patient monitoring solution.†

00800-266-632-82*

Official country language(s)
Monday-Friday 8am-4pm**

medtronic.eu
asktheicd.com
bhf.org.uk



BeConnected

† Subject to local availability

* Free-of-charge number

** Ability to leave voicemail outside of office hours

References:

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- 2 Priori S et al. 2015 ESC Guidelines for the management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: The Task Force for the Management of Patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death of the European Society of Cardiology (ESC). *Eur Heart J* 2015 ; 36(41) : 2793-2867
- 3 Ponikowski P et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. *Eur Heart J* 2016 ; 37(27) : 2129-2200
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- 6 Vijgen J, et al. Consensus statement of the European Heart Rhythm Association: updated recommendations for driving by patients with implantable cardioverter defibrillators. *Eur J Cardiovasc Nurs.* 2010. PMID: 20170847



Life with a Cardiac Resynchronisation Therapy device

Information contained herein does not replace the recommendations of your healthcare professional. See the device manual for detailed information regarding the instructions for use, indications, contraindications, warnings, precautions, and potential adverse events. For further information, contact your Health Care Professional.

For applicable products, consult instructions for use on www.medtronic.com/manuals. Manuals can be viewed using a current version of any major internet browser. For best results, use Adobe Acrobat® Reader with the browser.

Important Reminder: This information is intended only for users in markets where Medtronic products and therapies are approved or available for use as indicated within the respective product manuals. Content on specific Medtronic products and therapies is not intended for users in markets that do not have authorization for use.

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