ASSIGNMENT

on

"Two page write-up on any 5 medical devices from the list of 800 medical devices."

Topic: " Camera Pill, MRI, Magnetic Stimulator, Dental X-Rays , Pace Maker "

Submitted by

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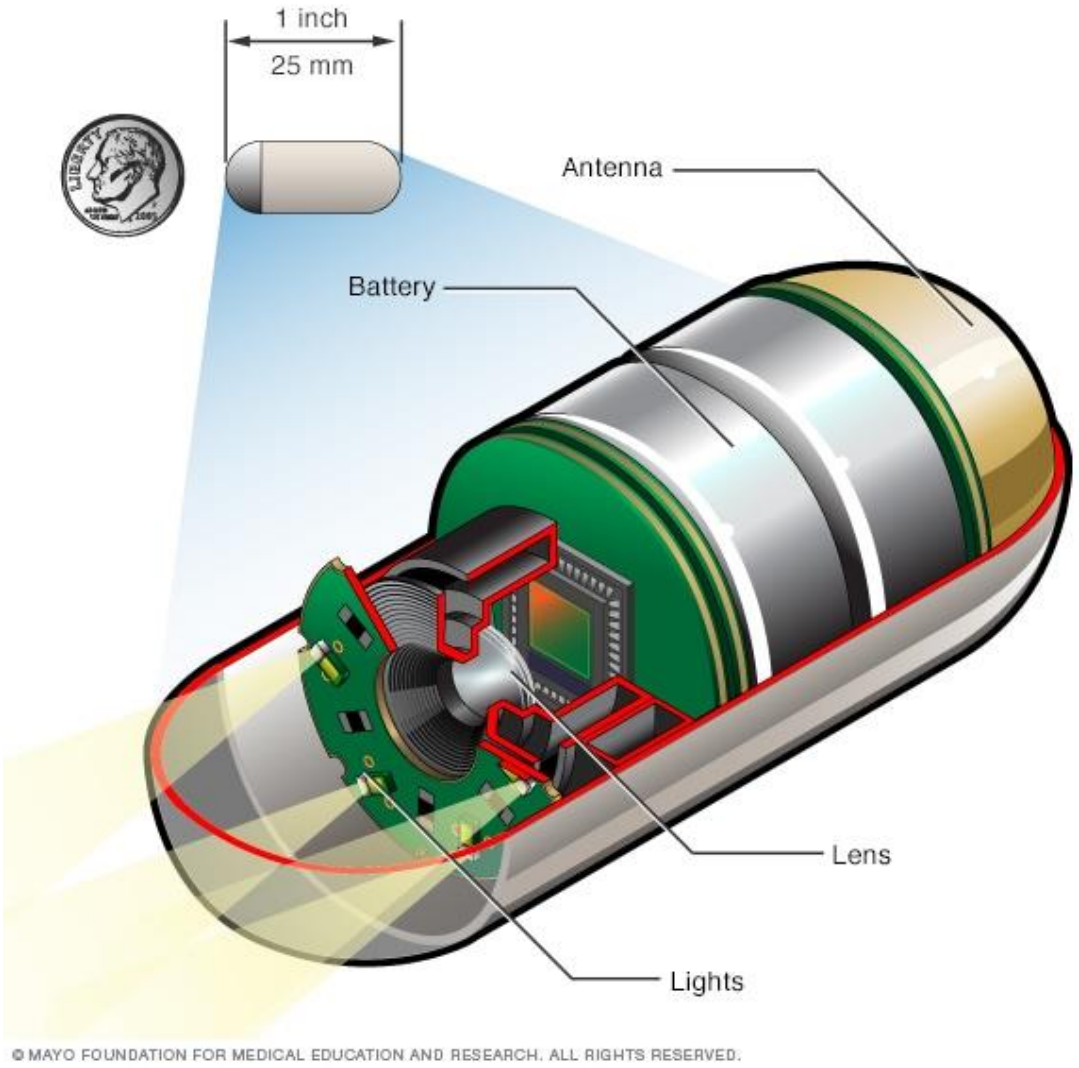
1)Camera Pill

Overview

Camera Pilli’s a procedure that uses a tiny wireless camera to take pictures of your digestive tract. A Camera Pill sits inside a vitamin-size capsule you swallow. As the capsule travels through your digestive tract, the camera takes thousands of pictures that are transmitted to a recorder you wear on a belt around your waist.

Camera Pill helps doctors see inside your small intestine — an area that isn't easily reached with more-traditional endoscopy procedures. Traditional endoscopy involves passing a long, flexible tube equipped with a video camera down your throat or through your rectum.



Why it's done

A doctor might recommend a Camera Pill procedure to:

- **Find the cause of gastrointestinal bleeding.** The most common reason for doing Camera Pilli’s is to explore unexplained bleeding in the small intestine.

- **Diagnose inflammatory bowel diseases, such as Crohn's disease.** Camera Pill can reveal areas of inflammation in the small intestine.
- **Diagnose cancer.** Camera Pelican show tumors in the small intestine or other parts of the digestive tract.
- **Diagnose celiac disease.** Camera Pilli’s sometimes used in diagnosing and monitoring this immune reaction to eating gluten.
- **Examine your esophagus.** Camera Pill has had also been approved to evaluate the muscular tube that connects your mouth and your stomach (esophagus) to look for abnormal, enlarged veins (varices).
- **Screen for polyps.** People who have inherited syndromes that can cause polyps in the small intestine might occasionally undergo capsule endoscopy.
- **Do follow-up testing after X-rays or other imaging tests.** If the results of an imaging test are unclear or inconclusive, your doctor might recommend Camera Pill to get more information.

Risks

Camera Pilli’s a safe procedure that carries few risks. However, it's possible for a capsule to become lodged in your digestive tract rather than leaving your body in a bowel movement within several days.

The risk, which is small, might be higher in people who have a condition — such as a tumor, Crohn's disease, or previous surgery in the area — that causes a narrowing (stricture) in the digestive tract. If you have abdominal pain or are at risk of a narrowing of your intestine, your doctor likely will have you get a CT scan to look for a narrowing before using capsule endoscopy. Even if the CT scan shows no narrowing, there's still a small chance that the capsule could get stuck.

If the capsule hasn't passed in a bowel movement but isn't causing signs and symptoms, your doctor might give the capsule more time to leave your body. However, a capsule causing signs and symptoms that indicate bowel obstruction must be removed, either by surgery or through a traditional endoscopy procedure, depending on where the capsule is stuck.

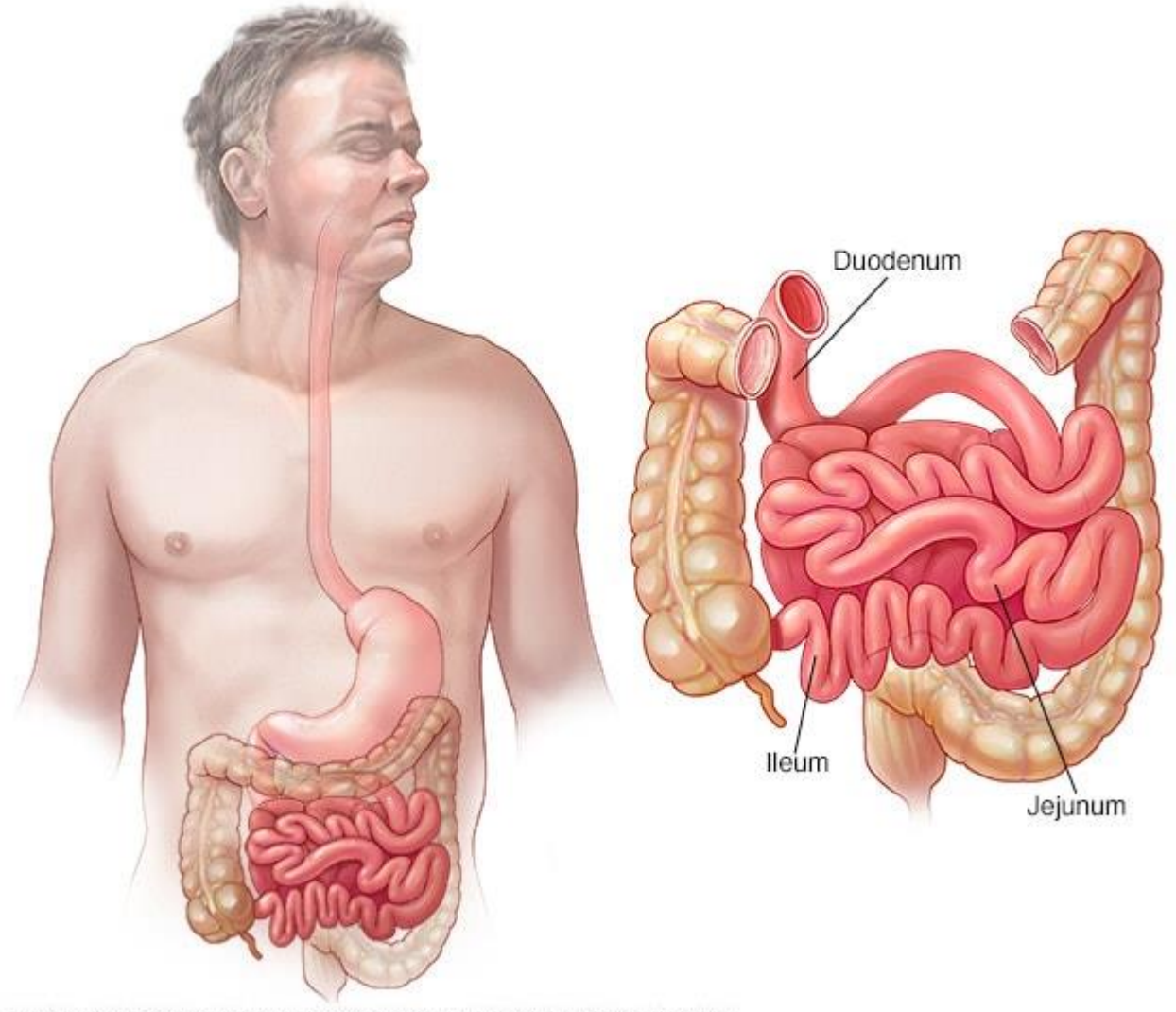
How you prepare

Before your capsule endoscopy, your doctor is likely to ask that you take steps to prepare yourself. Be sure to follow your doctor's instructions in preparing for your capsule endoscopy. Failure to follow the directions may mean that your Camera Pill has to be rescheduled.

Food and medications

To help the camera capture clear images of your digestive tract, you'll be asked to stop eating and drinking at least 12 hours before the procedure. In some cases, your doctor may ask you to take a laxative before your Camera Pill to flush out your small intestine. This has been shown to improve the quality of the pictures collected by the capsule's camera.

To keep the medication from interfering with the camera, your doctor might ask you not to take certain medications before the procedure.



Other precautions

In most cases, you'll be able to go about your day after you swallow the camera capsule. But you'll likely be asked not to do strenuous exercise or heavy lifting. If you have an active job, ask your doctor whether you can go back to work on the day of your capsule endoscopy.

What you can expect

Before the procedure

On the day of your capsule endoscopy, your health care team will review the procedure. You might be asked to remove your shirt so that adhesive patches can be attached to your abdomen. Each patch contains an antenna with wires that connect to a recorder. Some devices don't require patches.

You wear the recorder on a special belt around your waist. The camera sends images to the antenna patches on your abdomen, which feed the data to the recorder. The recorder collects and stores the images.

During the procedure

Once the recorder is connected and ready, you swallow the camera capsule with water. A slippery coating makes it easier to swallow. Once you swallow it, you shouldn't be able to feel it.

You'll then go about your day. You can drive, and you might be able to go to work, depending on your job. Your doctor will discuss restrictions — for example, avoiding strenuous activity, such as running and jumping — with you.

After the procedure

Wait two hours after you swallow the capsule to resume drinking clear liquids. After four hours, you can have a light lunch or a snack unless your doctor tells you otherwise.

The Camera Pill procedure is complete after eight hours or when you see the camera capsule in the toilet after a bowel movement, whichever comes first. Remove the patches and the recorder from your body, pack them in a bag and follow your doctor's instructions for returning the equipment. You can flush the camera capsule down the toilet.

Once the procedure is finished, your body might expel the camera capsule within hours or after several days. Each person's digestive system is different. If you don't see the capsule in the toilet

within two weeks, contact your doctor. Your doctor might order an X-ray to see if the capsule is still in your body.

Results

The camera used in Camera Pill takes thousands of color photos as it passes through your digestive tract. The images saved on the recorder are transferred to a computer with special software that strings the images together to create a video. Your doctor watches the video to look for abnormalities within your digestive tract.

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2)MRI

Overview

Brain tumor MRI

Magnetic resonance imaging (MRI) is a medical imaging technique that uses a magnetic field and computer-generated radio waves to create detailed images of the organs and tissues in your body.

Most MRI machines are large, tube-shaped magnets. When you lie inside an MRI machine, the magnetic field temporarily realigns water molecules in your body. Radio waves cause these aligned atoms to produce faint signals, which are used to create cross-sectional MRI images — like slices in a loaf of bread.

The MRI machine can also produce 3D images that can be viewed from a different angle

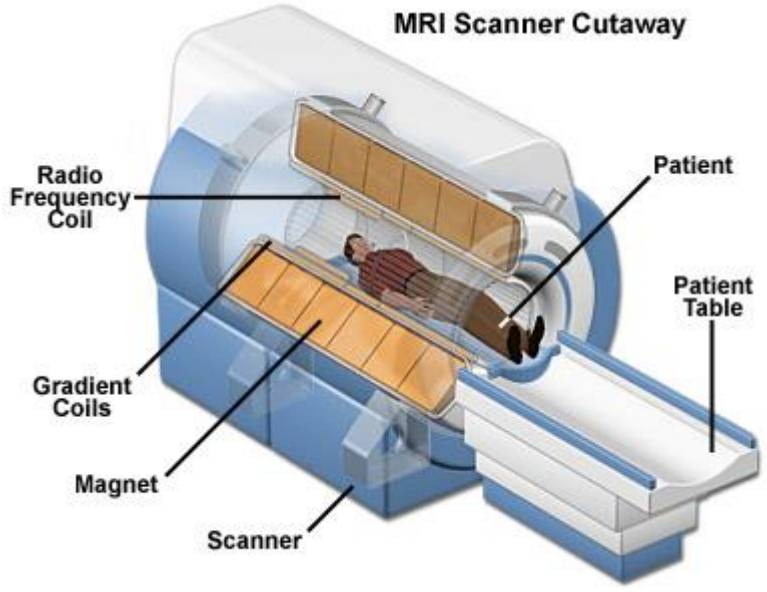
Why it's done

MRI is a non-invasive way for your doctor to examine your organs, tissues, and skeletal system. It produces high-resolution images of the inside of the body that help diagnose a variety of problems.

MRI of the brain and spinal cord

MRI is the most frequently used imaging test of the brain and spinal cord. It's often performed to help diagnose:

- Aneurysms of cerebral vessels
- Disorders of the eye and inner ear
- Multiple sclerosis
- Spinal cord disorders
- Stroke
- Tumors



- Brain injury from trauma

A special type of MRI is the functional MRI of the brain (fMRI). It produces images of blood flow to certain areas of the brain. It can be used to examine the brain's anatomy and determine which parts of the brain are handling critical functions.

This helps identify important language and movement control areas in the brains of people being considered for brain surgery. Functional MRI can also be used to assess damage from a head injury or from disorders such as Alzheimer's disease.

MRI of the heart and blood vessels

MRI that focuses on the heart or blood vessels can assess:

- Size and function of the heart's chambers
- Thickness and movement of the walls of the heart
- Extent of damage caused by heart attacks or heart disease
- Structural problems in the aorta, such as aneurysms or dissections
- Inflammation or blockages in the blood vessels

MRI of other internal organs

MRI can check for tumors or other abnormalities of many organs in the body, including the following:

- Liver and bile ducts
- Kidneys
- Spleen
- Pancreas
- Uterus
- Ovaries
- Prostate

MRI of bones and joints

MRI can help evaluate:

- Joint abnormalities caused by traumatic or repetitive injuries, such as torn cartilage or ligaments
- Disk abnormalities in the spine
- Bone infections
- Tumors of the bones and soft tissues

MRI of the breasts

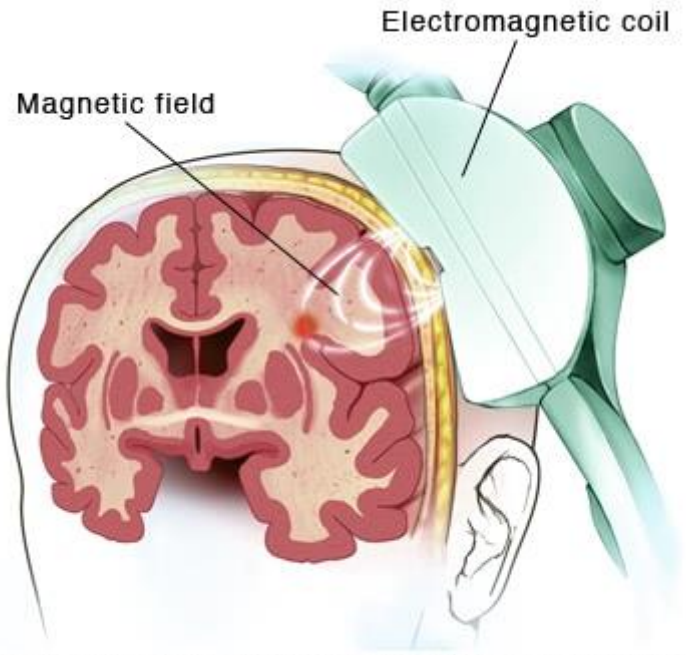
MRI can be used with mammography to detect breast cancer, particularly in women who have dense breast tissue or who might be at high risk of the disease.

3) Magnetic Stimulator

Overview

Transcranial magnetic stimulation (TMS) is a noninvasive procedure that uses magnetic fields to stimulate nerve cells in the brain to improve symptoms of depression. TMS is typically used when other depression treatments haven't been effective.

This treatment for depression involves delivering repetitive magnetic pulses, so it's called repetitive



TMS or rTMS.

How it works

Repetitive transcranial magnetic stimulation (rTMS)

During an rTMS session, an electromagnetic coil is placed against your scalp near your forehead. The electromagnet painlessly delivers a magnetic pulse that stimulates nerve cells in the region of your brain involved in mood control and depression. It's thought to activate regions of the brain that have decreased activity in depression.

Though the biology of why rTMS works isn't completely understood, the stimulation appears to impact how the brain is working, which in turn seems to ease depression symptoms and improve mood.

There are different ways to perform the procedure, and techniques may change as experts learn more about the most effective ways to perform treatments.

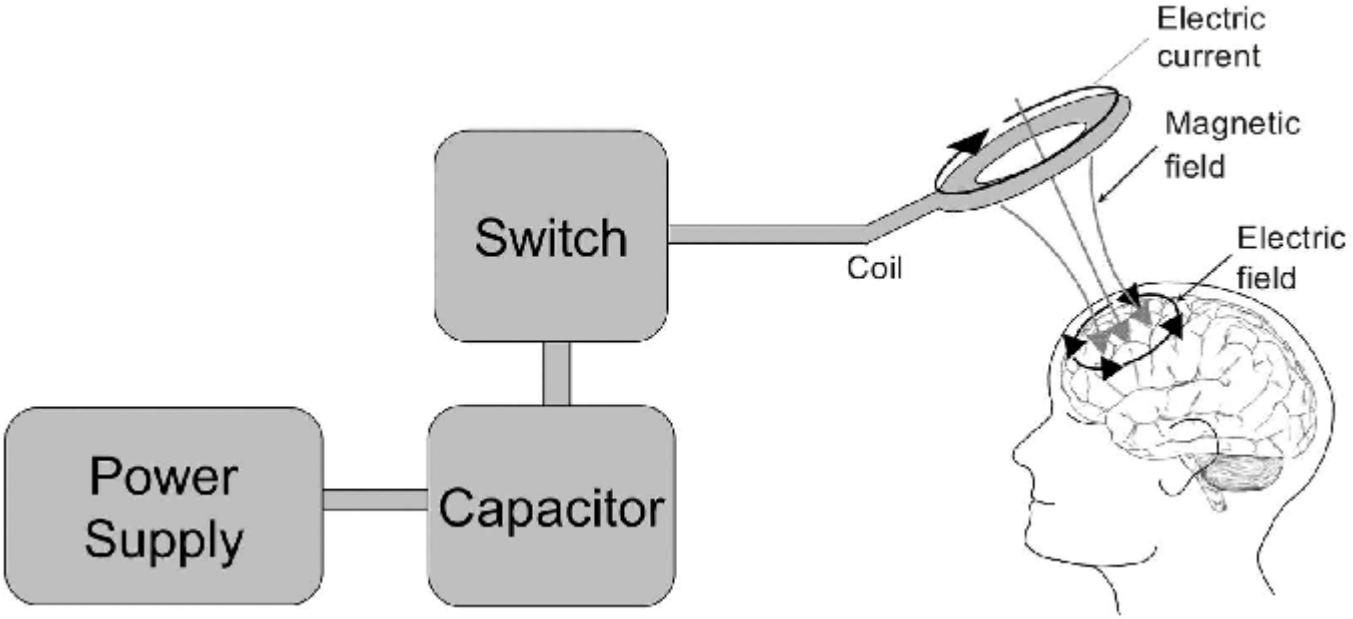
Why it's done

Depression is a treatable condition, but for some people, standard treatments aren't effective. Repetitive TMS is typically used when standard treatments such as medications and talk therapy (psychotherapy) don't work.

Risks

Repetitive TMS is a non-invasive form of brain stimulation used for depression. Unlike vagus nerve stimulation or deep brain stimulation, rTMS does not require surgery or implantation of electrodes. And, unlike electroconvulsive therapy (ECT), rTMS doesn't cause seizures or require sedation with anesthesia.

Generally, rTMS is considered safe and well-tolerated. However, it can cause some side effects.



Common side effects

Side effects are generally mild to moderate and improve shortly after an individual session and decrease over time with additional sessions. They may include:

- Headache
- Scalp discomfort at the site of stimulation
- Tingling, spasms, or twitching of facial muscles
- Lightheadedness

Your doctor can adjust the level of stimulation to reduce symptoms or may recommend that you take over-the-counter pain medication before the procedure.

Uncommon side effects

Serious side effects are rare. They may include:

- Seizures
- Mania, particularly in people with bipolar disorder
- Hearing loss if there is inadequate ear protection during treatment

More study is needed to determine whether rTMS may have any long-term side effects.

How you prepare

Before having rTMS, you may need a:

- **Physical exam** and possibly lab tests or other tests
- **Psychiatric evaluation** to discuss your depression

These evaluations help make sure that rTMS is safe and a good option for you.

Tell your doctor or mental health provider if:

- **You're pregnant** or thinking of becoming pregnant.
- **You have any metal or implanted medical devices** in your body. In some cases, people with metal implants or devices can have rTMS. However, due to the strong magnetic field produced during rTMS, the procedure is not recommended for some people who have the following devices:
    - Aneurysm clips or coils
    - Stents
    - Implanted stimulators
    - Implanted vagus nerve or deep brain stimulators
    - Implanted electrical devices, such as pacemakers or medication pumps
    - Electrodes for monitoring brain activity
    - Cochlear implants for hearing
    - Any magnetic implants
    - Bullet fragments

    - Any other metal device or object implanted in your body
- **You're taking any medications,** including prescription or over-the-counter medications, herbal supplements, vitamins or other supplements, and the dosages.
- **You have a history of seizures** or a family history of epilepsy.
- **You have other mental health disorders,** such as substance misuse, bipolar disorder or psychosis.
- **You have brain damage from illness or injury,** such as a brain tumor, a stroke or a traumatic brain injury.
- **You have frequent or severe headaches.**
- **You have any other medical conditions.**
- **You've had prior treatment with rTMS,** and whether it was helpful in treating your depression.

Before your first appointment

Repetitive TMS isn't invasive, doesn't require anesthesia, and can be performed on an outpatient basis. You don't need to arrange for someone to drive you home after treatment — unless, for the first treatment, you prefer a driver until you get a sense of how you'll feel afterward.

Before considering treatment, check with your health insurance company to see whether rTMS is covered. Your policy may not cover it.

What you can expect

Repetitive TMS is usually done in a doctor's office or clinic. It requires a series of treatment sessions to be effective. Generally, sessions are carried out daily, five times a week for four to six weeks.

Your first treatment

Before treatment begins, your doctor will need to identify the best place to put the magnets on your head and the best dose of magnetic energy for you. Your first appointment typically lasts about 60 minutes.

Most likely, during your first appointment:

- **You'll be taken to a treatment room,** asked to sit in a reclining chair, and given earplugs to wear during the procedure.
- **An electromagnetic coil will be placed against your head** and switched off and on repeatedly to produce stimulating pulses. This results in a tapping or clicking sound

that usually lasts for a few seconds, followed by a pause. You'll also feel a tapping sensation on your forehead. This part of the process is called mapping.

- **Your doctor will determine the amount of magnetic energy needed** by increasing the magnetic dose until your fingers or hands twitch. Known as your motor threshold, this is used as a reference point in determining the right dose for you. During the course of treatment, the amount of stimulation can be changed, depending on your symptoms and side effects.

During each treatment

Once the coil placement and dose are identified, you're ready to begin. Here's what to expect during each treatment:

- **You'll sit in a comfortable chair,** wearing earplugs, with the magnetic coil placed against your head.
- **When the machine is turned on,** you'll hear clicking sounds and feel tapping on your forehead.
- **The procedure will last about 40 minutes,** and you'll remain awake and alert. You may feel some scalp discomfort during the treatment and for a short time afterward.

After each treatment

You can return to your normal daily activities after your treatment. Typically, between treatments, you can expect to work and drive.

Results

If rTMS works for you, your depression symptoms may improve or go away completely. Symptom relief may take a few weeks of treatment.

The effectiveness of rTMS may improve as researchers learn more about techniques, the number of stimulations required and the best sites on the brain to stimulate.

Ongoing treatment

After completion of an rTMS treatment series, standard care for depression — such as medication and psychotherapy — may be recommended as ongoing treatment.

It's not yet known if maintenance rTMS sessions will benefit your depression. This involves continuing treatment when you are symptom-free with the hope that it will prevent the return of symptoms.

However, if your depression improves with rTMS, and then later you have another episode of symptoms, your rTMS treatment can be repeated. This is called re-induction. Some insurance companies will cover re-induction.

If your symptoms improve with rTMS, discuss ongoing or maintenance treatment options for your depression with your doctor.

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4)Dental X-Rays

Overview

Dental X-rays (radiographs) are images of your teeth that your dentist uses to evaluate your oral health. These X-rays are used with low levels of radiation to capture images of the interior of your teeth and gums. This can help your dentist to identify problems, like cavities, tooth decay, and impacted teeth.

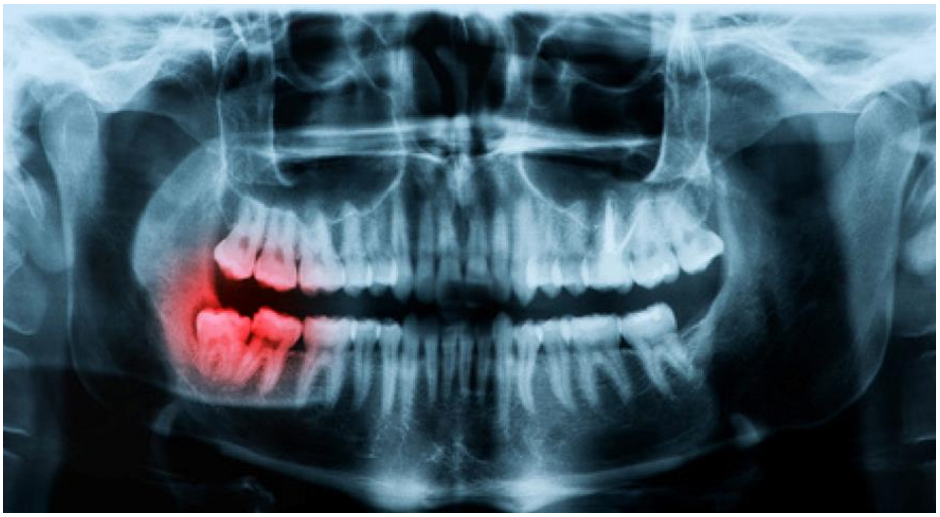
Dental X-rays may seem complex, but they’re actually very common tools that are just as important as your teeth cleanings.

Why dental X-rays are performed

Dental X-rays are typically performed yearly. They can happen more often if your dentist is tracking the progress of a dental problem or treatment.

Factors affecting how often you get dental X-rays may include:

- your age
- your current oral health
- any symptoms of oral disease

- 

If you're a new patient, you'll probably undergo dental X-rays so that your new dentist can get a clear picture of your dental health. This is especially important if you don't have any X-rays from your previous dentist.

Children may need to have dental X-rays more often than adults because their dentists might need to monitor the growth of their adult teeth. This is important because it can help the dentist determine if baby teeth need to be pulled to prevent complications, such as adult teeth growing in behind baby teeth.

Risks of dental X-rays

While dental X-rays do involve radiation, the exposed levels are so low that they're considered safe for children and adults. If your dentist uses digital X-rays instead of developing them on film, your risks from radiation exposure are even lower.

Your dentist will also place a lead "bib" over your chest, abdomen, and pelvic region to prevent any unnecessary radiation exposure to your vital organs. A thyroid collar may be used in the case of thyroid conditions. Children and women of childbearing age may also wear them along with the lead bib.

Pregnancy is an exception to the rule. Women who are pregnant or believe they may be pregnant should avoid all types of X-rays. Tell your dentist if you believe you are pregnant because radiation is not considered safe for developing fetuses.

Preparing for dental X-rays

Dental X-rays require no special preparation. The only thing you'll want to do is brush your teeth before your appointment. That creates a more hygienic environment for those working inside your mouth. X-rays are usually done before cleanings.

At the dentist's office, you'll sit in a chair with a lead vest across your chest and lap. The X-ray machine is positioned alongside your head to record images of your mouth. Some dental practices have a separate room for X-rays, while others perform them in the same room as cleanings and other procedures.

Types of X-rays

There are several types of dental X-rays, which record slightly different views of your mouth. The most common are intraoral X-rays, such as:

- **Bitewing**. This technique involves biting down on a special piece of paper so that your dentist can see how well the crowns of your teeth match up. This is commonly used to check for cavities between teeth (interdental).

- **Occlusal**. This X-ray is done when your jaw is closed to see how your upper and bottom teeth line up. It can also detect anatomical abnormalities with the floor of the mouth or the palate.
- **Occlusal**. This technique captures all of your teeth in one shot.
- **Panoramic**. For this type of X-ray, the machine rotates around the head. Your dentist may use this technique to check your wisdom teeth, plan for implanted dental devices, or investigate jaw problems.
- **Periapical**. This technique focuses on two complete teeth from root to crown.

ExtraoralX-rays may be used when your dentist suspects there might be problems in areas outside of the gums and teeth, such as the jaw.

A dental hygienist will guide you through each step of the X-ray process. They might step outside of the room briefly while the images are being taken. You'll be instructed to hold still while the pictures are recorded. Spacers (film holders), if they're used, will be moved and adjusted in your mouth to obtain the proper images.

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5) Pace Maker :

Overview

A pacemaker is a small device that's placed (implanted) in the chest to help control the heartbeat. It's used to prevent the heart from beating too slowly. Implanting a pacemaker in the chest requires a surgical procedure.

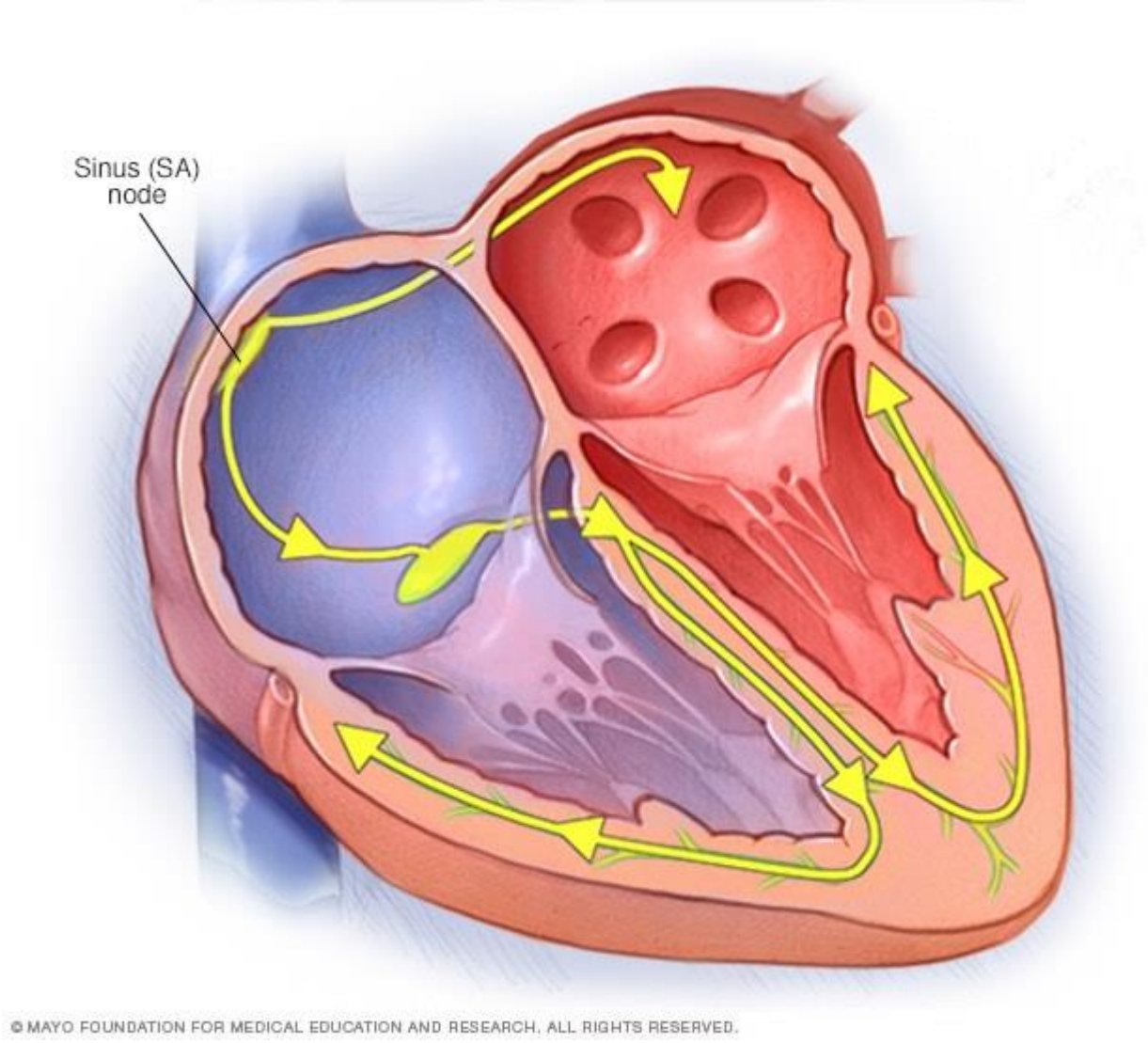
A pacemaker is also called a cardiac pacing device.

Types

Depending on your condition, you might have one of the following types of pacemakers.

- **Single chamber pacemaker.** This type usually carries electrical impulses to the right ventricle of your heart.
- **Dual chamber pacemaker.** This type carries electrical impulses to the right ventricle and the right atrium of your heart to help control the timing of contractions between the two chambers.

- **Biventricular pacemaker.** Biventricular pacing also called cardiac resynchronization therapy, is for people who have heart failure and heartbeat problems. This type of pacemaker stimulates both of the lower heart chambers (the right and left ventricles) to make the heartbeat more efficiently



Why it's done

A pacemaker is implanted to help control your heartbeat. Your doctor may recommend a temporary pacemaker when you have a slow heartbeat (bradycardia) after a heart attack, surgery or medication overdose but your heartbeat is otherwise expected to recover. A pacemaker may be implanted permanently to correct a chronic slow or irregular heartbeat or to help treat heart failure.

The heart's conduction system open pop-up dialog box

How your heartbeats

The heart is a muscular, fist-sized pump with four chambers, two on the left side and two on the right. The upper chambers (right and left atria) and the lower chambers (right and left ventricles) work with your heart's electrical system to keep your heart beating at an appropriate rate — usually 60 to 100 beats a minute for adults at rest.

Your heart's electrical system controls your heartbeat, beginning in a group of cells at the top of the heart (sinus node) and spreading to the bottom, causing it to contract and pump blood. Aging, heart muscle damage from a heart attack, some medications and certain genetic conditions can cause an irregular heart rhythm.

What a pacemaker does

Pacemakers work only when needed. If your heartbeat is too slow (bradycardia), the pacemaker sends electrical signals to your heart to correct the beat.

Some newer pacemakers also have sensors that detect body motion or breathing rate and signal the devices to increase heart rate during exercise, as needed.

A pacemaker has two parts:

- **Pulse generator.** This small metal container houses a battery and the electrical circuitry that controls the rate of electrical pulses sent to the heart.
- **Leads (electrodes).** One to three flexible, insulated wires are each placed in one or more chambers of the heart and deliver the electrical pulses to adjust the heart rate. However, some newer pacemakers don't require leads. These devices, called leadless pacemakers, are implanted directly into the heart muscle.

Risks

Complications related to pacemaker surgery or having a pacemaker are uncommon, but could include:

- Infection near the site in the heart where the device is implanted
- Swelling, bruising or bleeding at the pacemaker site, especially if you take blood thinners
- Blood clots (thromboembolism) near the pacemaker site
- Damage to blood vessels or nerves near the pacemaker
- Collapsed lung (pneumothorax)
- Blood in the space between the lung and chest wall (hemothorax)
- Movement (shifting) of the device or leads, which could lead to cardiac perforation (rare)

How you prepare

Before your doctor decides if you need a pacemaker, you'll have several tests done to find the cause of your irregular heartbeat. Tests are done before you get a pacemaker could include:

- **Electrocardiogram (ECG or EKG).** This quick and painless test measures the electrical activity of the heart. Sticky patches (electrodes) are placed on the chest and sometimes the arms and legs. Wires connect the electrodes to a computer, which displays the test results. An ECG can show if the heart is beating too fast, too slow or not at all.
- **Holter monitoring.** A Holter monitor is a small, wearable device that keeps track of the heart's rhythm. Your doctor may want you to wear a Holter monitor for 1 to 2 days. During that time, the device records all of your heartbeats. Holter monitoring is especially useful in diagnosing heartbeat problems that occur at unpredictable times. Some personal devices, such as smartwatches, offer electrocardiogram monitoring. Ask your doctor if this is an option for you.
- **Echocardiogram.** This non-invasive test uses sound waves to produce images of the heart's size, structure, and motion.
- **Stress test.** Some heart problems occur only during exercise. For a stress test, an electrocardiogram is taken before and immediately after walking on a treadmill or riding a stationary bike. Sometimes, a stress test is done along with echocardiography or nuclear imaging.

What you can expect

Before the procedure

You'll likely be awake during the surgery to implant the pacemaker, which typically takes a few hours. A specialist will insert an IV into your forearm or hand and give you a medication called a sedative to help you relax. Your chest is cleaned with a special soap.

Most pacemaker implantations are done using local anesthesia to numb the area of the incisions. However, the amount of sedation needed for the procedure depends on your specific health conditions. You may be fully awake or lightly sedated, or you may be given general anesthesia (fully asleep).

During the procedure

One or more wires are inserted into a major vein under or near your collarbone and guided to your heart using X-ray images. One end of each wire is secured at the appropriate position in your heart, while the other end is attached to the pulse generator, which is usually implanted under the skin beneath your collarbone.

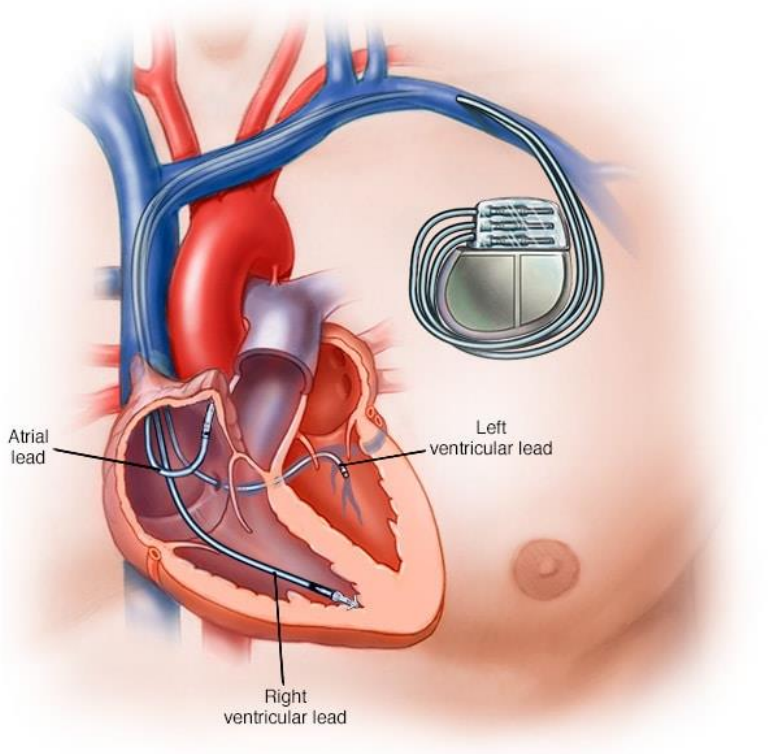
A leadless pacemaker is smaller and typically requires a less invasive surgery to implant the device. The pulse generator and other pacemaker parts are contained in a single capsule. The

doctor inserts a flexible sheath (catheter) in a vein in the groin and then guides the single component pacemaker through the catheter to the proper position in the heart.

After the procedure

You'll likely stay in the hospital for a day after having a pacemaker implanted. Your pacemaker will be programmed to fit your heart rhythm needs. You'll need to arrange to have someone drive you home from the hospital.

Your doctor might recommend that you avoid vigorous exercise or heavy lifting for about a month. Avoid putting pressure on the area where the pacemaker was implanted. If you have pain in that area, ask your doctor about taking medicines available without a prescription, such as an acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin IB, others).



Special precautions

It's unlikely that your pacemaker would stop working properly because of electrical interference. Still, you'll need to take a few precautions:

- **Cellphones.** It's safe to talk on a cellphone but keep your cellphone at least 6 inches (15 centimeters) away from your pacemaker. Don't keep your phone in a shirt pocket. When talking on your phone, hold it to the ear opposite the side where your pacemaker was implanted.

- **Security systems.** Passing through an airport metal detector won't interfere with your pacemaker, although the metal in the pacemaker could sound the alarm. But avoid lingering near or leaning against a metal-detection system.

  To avoid potential problems, carry an ID card stating that you have a pacemaker.

- **Medical equipment.** Make sure all your doctors and dentists know you have a pacemaker. Certain medical procedures, such as magnetic resonance imaging, CT scans, cancer radiation treatment, electrocautery to control bleeding during surgery, and shock wave lithotripsy to break up large kidney stones or gallstones could interfere with your pacemaker.

- **Power-generating equipment.** Stand at least 2 feet (61 centimeters) from welding equipment, high-voltage transformers, or motor-generator systems. If you work around such equipment, ask your doctor about arranging a test in your workplace to determine whether the equipment affects your pacemaker.

Devices that are unlikely to interfere with your pacemaker include microwave ovens, televisions and remote controls, radios, toasters, electric blankets, electric shavers, and electric drills.

Results

Having a pacemaker should improve symptoms caused by a slow heartbeat such as fatigue, lightheadedness, and fainting. Because most of today's pacemakers automatically adjust the heart rate to match the level of physical activity, they may allow you to resume a more active lifestyle.

Your doctor should check your pacemaker every 3 to 6 months. Tell your doctor if you gain weight, if your legs or ankles get puffy, or if you faint or get dizzy.

Most pacemakers can be checked by your doctor remotely, which means you don't have to go into the doctor's office. Your pacemaker sends information to your doctor, including your heart rate and rhythm, how your pacemaker is working, and how much battery life is left.

Your pacemaker's battery should last 5 to 15 years. When the battery stops working, you'll need surgery to replace it. The procedure to change your pacemaker's battery is often quicker and requires less recovery time than the procedure to implant your pacemaker.