

## MRI scan

Magnetic resonance imaging (MRI) is a scan used for a medical imaging procedure. It uses a magnetic field and radio waves to take pictures inside the body. It is especially helpful to collect pictures of soft tissue such as organs and muscles that don't show up on x-ray examinations.

One way to think of an MRI scan is a water 'x-ray' (although no actual x-rays are involved). Normal x-rays image calcium, so they are good to see bones. MRI scans image water; this makes them very useful because all tissues of the body contain various amounts of water. This allows high-resolution pictures of many organs and tissues to be taken that are invisible to standard x-rays.

### How it works

The MRI scan consists of a table that slides into a large cylinder. Inside the cylinder is a magnet that, when operated, creates a powerful magnetic field.

Soft tissue contains water molecules and the magnetic field acts upon microscopic substances (called protons) found in water. The magnetised protons in the soft tissue send out an echo in response to the MRI scan's radio waves. A computer then organises these echoes into images.

The MRI scan operator (radiographer) can take cross-sectional images of the patient's body from almost any angle.

### When an MRI scan is used

The MRI scan is used to investigate or diagnose conditions that affect soft tissue, such as:

- Tumours, including cancer
- Soft tissue injuries such as damaged ligaments
- Joint injury or disease
- Spinal injury or disease
- Injury or disease of internal organs including the brain, heart and digestive organs.

The MRI scan provides clear and detailed images of soft tissue. However, it can't 'visualise' bone very well, since bone tissue doesn't contain much water. That is why bone injury or disease is usually investigated with regular x-ray examinations rather than MRI scanning.

### Medical issues to consider

Medical considerations prior to the MRI scan may include:

- **Metal** – some metal objects can be affected by the magnetic field of the MRI scan. Tell the doctor about any internal device or implant you may have such as a heart pacemaker, metal pins or a medication pump. Don't ever have an MRI scan if you have a heart pacemaker!
- **Pregnancy** – the affect of MRI scanning on a fetus is unknown. Tell your doctor if you are pregnant or if you think you may be pregnant.
- **Fasting** – patients who are undergoing a pelvic or abdominal MRI scan are advised not to eat or drink for at least five hours before the procedure. In most other cases, it is usually not necessary to avoid food or drink prior to the scan. However, be advised by your doctor.
- **Claustrophobia** – tell your doctor if you experience claustrophobia. Some patients find the confined space within the MRI scan unsettling. The doctor may offer you medication to help you relax during the procedure.

- **Children** – often children are given anti-anxiety medication prior to the procedure to help them relax. Talk to your doctor if you have any concerns about this.

## **MRI scan procedure**

Generally this is what will happen:

- You will be asked to remove all metal objects, including wristwatches, keys and jewellery. These items must be left outside the scan room.
- In most cases, you are asked to undress and put on a cotton gown.
- You are instructed to lie on the scanner's table. The table then slides into the cylinder. An intercom inside the MRI scanner allows you to talk with the radiography staff.
- It is important to lie very still. Movement will blur or distort the pictures.
- While it is in operation, the MRI scanner makes noises such as knocks, loud bangs and clicks. (You may be offered earplugs. In some cases, you can listen to music through headphones if you prefer.)
- The scanned area of your body may feel a little warm.
- The scan may take up to an hour, depending on the nature of the investigation.

## **Immediately after the scan**

You may be asked to wait while the radiographer inspects the quality of the pictures. In some cases, you may be asked to get back into the MRI scanner so that more pictures can be taken. If the pictures are satisfactory, you can get dressed and go home.

A radiologist and other specialised doctors will examine and interpret the scan images. A report of the radiologist's findings is sent to your doctor. You will need to make an appointment with your doctor to discuss the results. The MRI scan will help the doctor to plan appropriate treatment, if necessary.

## **Possible complications**

The MRI scan is a very safe procedure. Occasional complications may include:

- Metal objects (such as jewellery) worn during the scan can cause injury.
- The powerful magnetic field of the MRI scanner may damage internal metal devices, such as a heart pacemaker.
- In some cases, such as in the investigation of blood vessels, a contrast dye is injected into a vein immediately prior to the scan. This helps to produce a clearer picture. Rarely, a patient may have an allergic reaction to the contrast dye.

## **Taking care of yourself at home**

The MRI scan is a non-invasive, painless and safe procedure that doesn't require any 'recovery time'. Be guided by your doctor but, generally, there are no special after care instructions.

## **Long-term outlook**

There are no known long-term side effects from undergoing MRI. The MRI scan does not use ionising radiation to achieve its pictures.

## **Alternatives to an MRI scan**

The MRI scanner is a complicated piece of equipment that is expensive to use and found only in specialised centres. Alternatives to MRI depend on the medical condition under investigation, but could include:

- X-ray examination
- Computed tomography (CT), an X-ray scan
- Ultrasound
- Blood test
- Biopsy.

## Where to get help

- Your doctor

## Things to remember

- The MRI scan is a medical imaging procedure that uses a magnetic field and radio waves to take pictures of the body's interior.
- It is used to investigate or diagnose conditions that affect soft tissue such as tumours or brain disorders.
- The MRI scanner is a complicated piece of equipment that is expensive to use and found only in specialised centres.

**This page has been produced in consultation with, and approved by:**

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