

## Basics Questions and Answers about Medical Imaging

*Dr. Ahmed Elshahawy*

### What is an X ray simple definition?

**X-rays** are a type of radiation called electromagnetic waves. **X-ray** imaging creates pictures of the inside of your body. ... Calcium in bones absorbs **x-rays** the most, so bones look white. Fat and other soft tissues absorb less and look gray.

### What is X ray used for?

When **X-rays** are used

**X-rays** can be **used** to examine most areas of the body. They're mainly **used** to look at the bones and joints, although they're sometimes **used** to detect problems affecting soft tissue, such as internal organs. Problems that may be detected during an **X-ray** include: bone fractures and breaks.

### Where do X rays come from?

**X-rays** and gamma **rays** can **come from** natural sources, such as radon gas, radioactive elements in the earth, and cosmic **rays** that hit the earth from outer space.

### Why are X rays suitable for medical imaging?

They are a form of nuclear **radiation**. High energy waves such as **X-rays** and **gamma rays** are transmitted through body tissues with very little absorption. This makes them **ideal** for internal **imaging**. **X-rays** are absorbed by dense structures like bones, which is why **X-ray** photos are used to help identify broken bones.

### What rays are used for medical imaging?

**X-ray** technology is one of the oldest and most common forms of medical imaging used by doctors. **X-rays** are a form of electromagnetic radiation that send small waves through the body, which are then absorbed in **different amounts depending on** the materials they pass through.

### How does an X ray produce an image?

Today's **x-ray** machines **produce** a stream of electromagnetic radiation that interacts with an anode in an **x-ray** tube. ... When **x-rays** come into contact with our body tissues, they **produce an image** on a metal film. Soft tissue, such as skin and organs, cannot absorb the high-energy **rays**, and the beam passes through them.

### What imaging method uses X rays?

The most common **methods** of **X-ray** in medical **imaging** are **X-ray** radiography, computed tomography (CT), mammography, angiography and fluoroscopy.

### What are the benefits of medical imaging?

With medical imaging, doctors see a clear picture of what's going on in the patient's body. A much better view enables a better understanding of your condition. Moreover, with medical imaging, doctors can accurately predict the likelihood of you developing a disease, such as **cancer**.

### What is the most common form of medical imaging?

#### The Most Common Types of Medical Imaging

- X-Rays. X-rays are among the **most commonly used forms of medical imaging**. ...
- MRI. Magnetic resonance **imaging**, more commonly referred to as an MRI, involves using a magnetic field and radio waves to create highly detailed images of the organs and the tissues inside the body. ...
- CT Scans.

### Which is better MRI or xray?

MRIs are more versatile, and doctors use them for examining many medical conditions. For example, x-rays are used more for examining broken bones, but they can also help detect diseased tissue. MRIs are better for evaluating soft tissues such as tendon and ligament injuries, brain tumors or spinal cord injuries.

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### What is difference between MRI and xray?

Overall, the biggest **difference between** an X-ray and **MRI** is the technique used. The **MRI** uses magnetic wave, whereas the X-ray uses radiation. They both can take pictures of the inside of the body and can be used for a better diagnosis of an injury or illness

### What is the difference between radiology and medical imaging?

Practitioners of **radiology** are called **radiologists**, and they utilize **imaging** technology **in the** diagnosis and treatment of patients. ... **Medical imaging** is a technology which is used by **radiologists**, particularly for **diagnostic** purposes.

### Which imaging technique is the safest?

Ultrasound

**Ultrasound.** **Ultrasound** is the safest form of medical imaging and has a wide range of applications. There are no harmful effects when using **ultrasound** and it's one of the most cost-effective forms of medical imaging available to us, regardless of our speciality or circumstances

### What are the types of imaging?

**Common types of imaging include:**

- X-rays.
- CT (computed tomography) scan.
- MRI (magnetic resonance **imaging**)
- ultrasound.
- nuclear medicine **imaging**, including positron-emission tomography (PET)

### Does MRI show nerve damage?

MRI is sensitive to changes in cartilage and bone structure resulting from injury, disease, or aging. It can detect herniated discs, pinched nerves, spinal tumors, spinal cord compression, and fractures.

### Do MRI show inflammation?

Both ultrasound and **MRI** can detect synovitis, **inflammation** of the lining of the joints, and tendon abnormalities. In addition, **MRI** detects areas of increased fluid (edema) in bone marrow that is a predictor for the development of bony erosion

### Which is best CT scan or MRI?

**Magnetic resonance imaging** produces clearer images compared to a **CT scan**. In instances when doctors need a view of soft tissues, an **MRI** is a **better** option than x-rays or CTs. **MRIs** can create **better** pictures of organs and soft tissues, such as torn ligaments and herniated discs, compared to **CT** images

### Which is better ultrasound or MRI?

To evaluate damage to cartilage, bone or other structures inside and around a joint, **MRI** is the **better** choice. **MRI** is also preferred for conditions that impact deep or large areas since **ultrasound** can evaluate only a small area at a time.

### Are radiologists real doctors?

**Radiologists** are **medical doctors** that specialize in diagnosing and treating injuries and diseases using **medical** imaging (**radiology**) procedures (exams/tests) such as X-rays, computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine, positron emission tomography (PET) and ultrasound.

### What does medical imaging mean?

**Medical imaging** refers to several different technologies that **are** used to view the human body in order to diagnose, monitor, or treat **medical** conditions

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### How difficult is radiology?

Becoming a **radiologist** isn't easy. It takes a lot of dedication and hard work—medical students and residents often have **difficulty** coping with the pressure. That's why it's so important to make sure becoming a doctor is what you really want before you commit.

### What are two major disadvantages of MRI scans?

**Drawbacks of MRI scans** include their much higher cost, and patient discomfort with the procedure. The **MRI scanner** subjects the patient to such powerful electromagnets that the **scan** room must be shielded.

### What is the best brain imaging technique?

- Electroencephalography (EEG) EEG could be considered the father of neuroimaging techniques, since it is the first technique used to measure (electrical) activity of the living brain. ...
- **Magnetic Resonance** Imagery (MRI) ...
- Near InfraRed Spectroscopy (NIRS) ...
- Positron emission tomography (PET)

### How many types of scanning are there?

By using Medmo, you can book over two hundred **different types** of medical imaging tests, including MRI, CT (CAT) **scan**, PET **scan**, ultrasound, mammography, DEXA (bone density), and X-Ray.

### What do you mean by imaging?

**Imaging** is the capture, storage, manipulation, and display of image s. ... In graphical **imaging**, the emphasis is on the manipulation of created images in order to achieve special effects through rotating, stretching, blurring, resizing, twirling, and other changes to the original image.

### What is imaging test?

An **imaging test** is a way to let doctors see what's going on inside your body. These **tests** send forms of energy (like x-rays, sound waves, radioactive particles, or magnetic fields) through your body. Your body tissues change the energy patterns to make an image or picture

### Will MRI show arthritis?

**MRI** is the most effective way to diagnose problems within any joint and the image sensitivity makes it the most accurate imaging tool available in detecting **arthritis** and other inflammatory changes. **MRI** is also a key diagnostic tool when patients have lower back pain, radiating pain or hip/groin pain

### What MRI cannot detect?

CT scan vs. MRI quick comparison of differences

CT scans use radiation (**X-rays**), and MRIs do not. MRIs provide more detailed information about the inner organs (soft tissues) such as the brain, skeletal system, reproductive system and other organ systems than is provided by a CT scan

### Can MRI detect pain?

**Will an MRI show your pain?** Pain is something that you feel but that we cannot measure. **MRI** scans **show** details of spinal anatomy; unfortunately, they **do** not “light up” and **show** the source of **pain**. Your **MRI** does not **show** your **pain**

### Which is better for back pain MRI or CT scan?

A **CT scan** is **better** than an **MRI** for **imaging** calcified tissues, like bones. **CT scans** produce excellent detail used to diagnose osteoarthritis and fractures. Joseph Spine is an advanced center for spine, scoliosis and minimally invasive surgery.

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### Does an MRI show bones?

In orthopedics, an **MRI** may be used to examine **bones**, joints, and soft tissues such as cartilage, muscles, and tendons for injuries or the presence of structural abnormalities or certain other conditions, such as tumors, inflammatory disease, congenital abnormalities, osteonecrosis, **bone** marrow disease, and herniation..

### Does an MRI use radiation?

Because **radiation** is not used, there is no risk of exposure to **radiation** during an **MRI** procedure. However, due to the **use** of the strong magnet, **MRI** cannot be performed on patients with: Implanted pacemakers.

### Are ultrasounds harmful?

All medical procedures have risk. But, there's no evidence to show a prenatal **ultrasound** done properly will **harm** a mother or her unborn child. Done properly means it's performed by a physician or a trained technician, called a sonographer. **Ultrasound** does not use radiation, as other procedures, such as X-rays, do

### What is an imaging procedure?

**Imaging procedures** are medical tests that allow doctors to see inside the body in order to diagnose, treat, and monitor health conditions. Doctors often use medical **imaging procedures** to determine the best treatment options for patients.

### Are there any negative effects of an MRI?

The magnetic fields that change with time create loud knocking noises which may **harm** hearing if adequate ear protection is not used. **They** may also cause peripheral muscle or nerve stimulation that may feel like a twitching sensation. The radiofrequency energy used during the **MRI** scan could lead to heating of the body.

### How has MRI changed the world?

**MRI** imaging **has** given a variety of medical professionals, including chiropractors, dentists, orthopedic specialists and surgeons, an improved ability to diagnose and treat patients. Many animals use ultrasonic waves, also known as ultrasound, to give them detailed images of the **world** around them.

### Are there any side effects after having an MRI?

**There** are no known **side effects** of an **MRI** scan. The benefits of an **MRI** scan relate to its precise accuracy in detecting structural abnormalities of the body. Patients who have **any** metallic materials within the body must notify their physician prior to the examination or inform the **MRI** staff

### What is the purpose of brain imaging?

**Brain imaging** methods allow neuroscientists to see inside the living **brain**. These methods help neuroscientists: Understand the relationships between specific areas of the **brain** and what **function** they serve. Locate the areas of the **brain** that are affected by neurological disorders.

### What is the full body scan called?

A **full-body scan** is a **scan** of the patient's entire **body** as part of the diagnosis or treatment of illnesses. If computed tomography (CAT) **scan** technology is used, it is **known as a full-body CT scan**, though many medical imaging technologies can perform **full-body scans**.

### What is the difference between object and image?

**Difference between object and image**, is that **object** is a thing that has physical existence while **image** is an optical or other representation of a real **object**; a graphic; a **picture**

### What is difference between MRI and CT scans?

**CT scans** and **MRIs** are both used to capture images within your body. The biggest **difference** is that **MRIs** (magnetic resonance **imaging**) use radio waves and **CT (computed tomography) scans** use X-rays

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### What is an MRI scan used to diagnose?

Magnetic resonance imaging (**MRI**) uses a large magnet and radio waves to look at organs and structures inside your body. Health care professionals use **MRI scans** to **diagnose** a variety of conditions, from torn ligaments to tumors. MRIs are very useful for examining the brain and spinal cord.

### Does an MRI show muscle pain?

**MRI** is especially valuable for imaging **muscles**, ligaments, and tendons. **MRI can** be used if the cause of **pain** is thought to be a severe soft-tissue problem (for example, rupture of a major ligament or tendon or damage to important structures inside the knee joint). CT is useful if **MRI** is not recommended or unavailable.

### How long it takes to get MRI results?

The **results** from an **MRI** scan are typically interpreted within 24 hours, and the scans themselves are usually given immediately to the patient on a disc after the **MRI** is complete.

### Why do MRIs take so long?

**MRI takes long** time because one has to listen to a very weak signals of nuclear spins (nuclei of hydrogen atom which are abundant in the body), and that has to be done by tuning and exiting them by external radiofrequency signal ( a kind like scanning radar) in every voxel (volume pixel) of the image.

### How harmful is CT scan?

Are There Any **Risks**? **CT scans** use X-rays, which produce ionizing radiation. Research shows that this kind of radiation may damage your DNA and lead to cancer. But the risk is still very small -- your chances of developing a fatal cancer because of a **CT scan** are about 1 in 2,000.

### How bad is CT Scan Radiation?

At the low doses of **radiation** a **CT scan** uses, your risk of developing cancer from it is so small that it can't be reliably measured. Because of the possibility of an increased risk, however, the American College of Radiology advises that no imaging exam be done unless there is a clear medical benefit.

### How much radiation is safe per year?

The current federal occupational limit of exposure **per year** for an adult (the limit for a worker using **radiation**) is "as low as reasonably achievable; however, not to exceed 5,000 millirems" above the 300+ millirems of natural sources of **radiation** and any medical **radiation**

### Can MRI kill you?

A man in India has reportedly died after being yanked toward a magnetic resonance imaging (**MRI**) machine, according to news reports. **MRI** imaging is quite safe for human tissue, but introducing metal near the machines **can** be deadly

### Can I have 2 ultrasounds in a week?

Dec. 2, 2004 -- Having **multiple ultrasound** examinations during pregnancy is unlikely to cause any lasting harm to the developing fetus, according to a new study that confirms the long-term safety of the commonly used procedure

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### Is MRI safer than CT scan?

**CT scans** are quick, painless, and noninvasive. **MRI scans** are not invasive, but they are noisy, take more time, and may cause claustrophobia (anxiety due to being in the enclosed space of the machine). **MRI scans** are costlier **than CT scans**. **MRI** scanners may cause a safety issue due to its strong magnets.

### Is MRI for whole body?

While highly effective imaging single **body** areas such as the spine, liver or brain, **MRI** is also capable of scanning the **entire body** for physical abnormalities, tumours in the earliest stages of formation, or simply an overall snapshot of one's general health.

### What is the difference between real and virtual image?

A **real image** and a **virtual image** are **different** forms of **image**. The main **difference between real and virtual images** lies in the way in which they are produced. A **real image** is formed when rays converge, whereas a **virtual image** occurs where rays only appear to diverge.

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### Does an MRI scan show everything?

Possible findings, it is possible that an **MRI** may **show** that **everything** is completely normal; however, there are several things that could be seen on an **MRI** and this will vary depending on where in the body the **scan** is being done. An **MRI** is very good at showing up problems with soft tissues such as muscles and ligaments

### Can MRI results be wrong?

Sangeorzan said. "It is a very sensitive tool, but it is not very specific. That's the problem." And scans almost always find something abnormal, although most abnormalities are of no consequence. "It is very rare for an M.R.I. to come back with the words 'normal study,' "

### How does radiology help the community?

**Radiology** plays a huge role in disease management by giving physicians more options, tools, and techniques for detection and treatment. Diagnostic imaging allows for detailed information about structural or disease-related changes. With the ability to diagnose during the early stages, patients may be saved.

### What is the purpose of Radiology?

It is used to diagnose or treat patients by recording images of the internal structure of the body to assess the presence or absence of disease, foreign objects, and structural damage or anomaly. During a radiographic procedure, an x-ray beam is passed through the body