

Understanding MRIs and CTs

What is MRI?

Magnetic Resonance Imaging (MRI) is primarily used to diagnose illnesses. Instead of using ionizing radiation such as X-rays and CTs, MRI machines use a strong magnetic field and radio-waves to generate high-quality images of areas inside the body. MRI is especially useful in imaging the brain, spine, the soft tissue of joints, and the inside of bones, abdomen and pelvis.

MRI can detect brain and spinal diseases, several forms of cancer, musculoskeletal disorders and several cardiovascular conditions.

The MRI machine, about the size of a car and weighing several tons, is shaped like a large cylinder with a hole through the centre. The patient lies on a platform that moves into the machine, which makes a loud hammering sound as it scans the body.

Fast Facts

- First MRI scan on a human – **July 1977** (Dr. Raymond Damadian, Downstate Medical Center lab)
- Number of MRI machines currently in public hospitals – **49**
- Number of MRI machines currently in repatriated Independent Health Facilities – **3**
- Number of MRI exams to be achieved in 2005-2006 – **329,909**
- Median wait time for MRI (July 2003 survey) – **4 months** (range from 2 weeks to 18 months)

How Does it Work?

A person's body consists mainly of water, containing hydrogen atoms, which are used in creating an MRI scan. The MRI machine creates a strong magnetic field that is 10,000 to 30,000 times stronger than the earth's magnetic field and causes the protons in the hydrogen atoms to line up parallel to each other. A strong pulse of radio waves then knocks the protons out of alignment. As the protons return to alignment, they produce a detectable radio signal that can be converted into an image by a computer.

The procedure is not harmful, although care must be taken to ensure no metal objects are in the room, and patients with certain metal implants (such as pacemakers, aneurysm clips, defibrillators) may not be scanned.

What is a CT?

Computed Tomography (CT) uses a series of X-rays to create image "slices" of a patient's body. The x-rays are taken from different angles and then a computer is used to integrate these images to create a two-dimensional image of the body. When the "slices" (usually about one-slice per millimetre) are stacked together, they can produce a 3-D image useful for diagnosing illness or planning radiation treatment.

How Do MRI and CT compare?

An MRI scan is considered the best for soft tissue scans, while bone is better imaged by conventional X-rays, and CT is preferred for patients with severe bleeding. X-rays and CTs use ionizing radiation, which is potentially harmful. MRIs use magnetism and radio waves, which do not appear to have any harmful side effects. An MRI scan typically produces the highest quality of image, but it costs more and is more time consuming than a CT scan.