

Magnetic Resonance Imaging

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Before the MRI it was always difficult to determine the condition of person's internal organs. Common procedure was to have surgery to physically see inside the patient's body. The problem with this procedure is that surgery should always be a last resort. So if the problem ends up being one that never would have required surgery at all, the risk of surgery was taken when it was never needed. In 1977 the MRI was created. It was a device that could "look" it to the human body with out any surgery. It was completely non invasive. The first device created took over five hours to create a single poor quality image; however, it avoided the use of surgery. It created 2-D and 3-D images.

An MRI is essentially a huge magnet with a hole in it. It is about seven feet tall and about ten feet long. Newer MRI's work the same, but are reduced in size and much more efficient. The quality of the image is more precise and the time required is reduced by hours.

The way in which an MRI works is directly from its name. Magnetic Resonance Imaging. The magnet in the MRI creates a magnetic field once turned on. While the patient is inside the magnetic field has an effect on the body's atoms. However, only the hydrogen atoms are cared about because of there single proton and large magnetic moment. The magnetic field acts on the hydrogen atoms by causing them to line up in the direction of the field.

The field runs down the center of the tube so that the atoms are lined up the long way "head to foot". From this

some proton will be going in different directions which will cancel each other out. However, there are always about two out of every million that do not pair up, these are the ones to be focused on.

Nest a radio frequency special to hydrogen is emitted into the part of interest in the body. The protons of the atoms absorb energy and begin to spin in a different in respect to the rest of the atoms. This is the resonance of the name MRI. When the RF is switched on and off rapidly it causes the atoms to alter the magnetic field so to fid the position the area. When the RF is turned off the energy from the proton is released and the coil of the magnet picks up and sends it to the computer to be processed.

MRI's are completely safe with only a few draw backs. Patients with any metal implants cannot enter one due to the magnet. Also do to the cost of creating such a large magnetic field and the cost of making the magnet the cost and procedure are very expensive.



Sources:

- <http://health.howstuffworks.com/mri.htm>
- http://en.wikipedia.org/wiki/Magnetic_resonance_imaging#Nomenclature
- <http://www.radiologyinfo.org/en/info.cfm?pg=bodymr&bhcp=1>