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Magnetic Resonance Imaging
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Magnetic resonance imaging is a common procedure used to detect many diseases located in tissues, or tears and damage to ligaments or muscles.

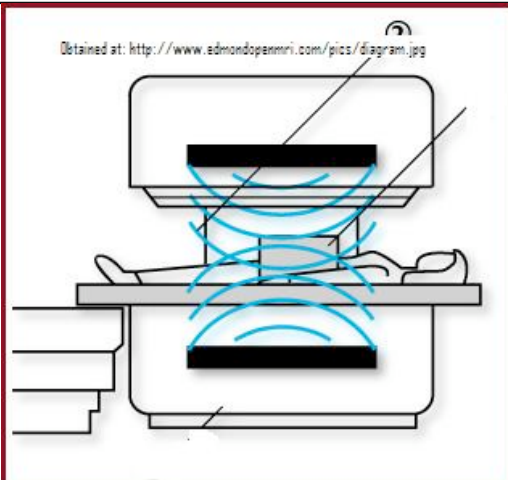
The MRI machine resembles a long narrow tube that the patient can be positioned throughout it by a board that slides on an axis at the base of the machine. This enables the technicians to access and position localized magnetic fields produced by magnets to receive images of a designated area.

Different types of magnets are used in these MRI machines. A permanent magnet is a large, bulky magnet that produces a stable, yet weak magnetic field and is fairly inexpensive to upkeep. Another magnet which is a solenoid is fairly inexpensive to use, but requires a lot of power to operate and in the long run can be inefficient. Finally the superconductive electromagnet is used currently that when cooled at around -452 degrees F, becomes a super conductor.

When the patient is correctly positioned inside the MRI, a homogenous magnetic field is applied that aligns the hydrogen atoms in the direction of the magnetic field. Now a radio frequency is emitted which will change the direction of the hydrogen particles to spin or “precess” in a different direction of the magnetic field.

A series of gradient magnets are now positioned to produce a more concentrated magnetic field of different powers along the body. As this process occurs, the particles will absorb the energy produced by the RF frequency and as the particles return to their natural state, they give off signals which are picked up by a coil. These signals are then transmitted by a computer which is then converted into an image using Fourier transforms.

The particles of damaged or suspicious tissue react differently to this stimulation and are recorded in the image. This gives the technicians the ability to see damaged areas of tissue located within the body.



References:

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