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ELE 482
Magnetic Resonance Imaging

Magnetic Resonance Imaging or MRI, is a process in which a machine takes pictures of the tissue in your body non-invasively, through the use of a magnetic field.

On July 3, 1977 the first MRI was performed on a human being. It took over 5 hours to produce a single image. This machine (then known as the Indomitable) was developed in the course of 7 seven years by a team of doctors; Dr. Raymond Damadian, Dr. Larry Minkoff and Dr. Micheal Goldsmith

The MRI machine is generally a cube shape (7x7x10), while newer models are smaller. There is a horizontal tube running through the magnet from front to back. This tube is known as the bore of the magnet. The patient lies on their back and slides in the bore either head first or feet first depending on the type of exam. The machine forms 2-D and 3-D images of the tissue and then assembles them in a model for a radiologist to analyze.

The magnet used is in the .5 – 2.0 Tesla range. There are 3 types of

magnets commonly used, they are the Resistive, Permanent and Superconductive magnets. The superconductive is found in most machines. Metal objects can be very dangerous around these magnets since the magnetic force increases exponentially as you get closer to the magnet. The powerful magnetic force causes the hydrogen atoms of the body to line up along the field, forming a picture. A radio frequency is then applied causing the protons to spin, this is known as the resonance. A specific portion of the body can be seen with the use of 3 gradient magnets turning on/off rapidly altering the field. This way, the person or machine doesn't have to be moved. When the RF pulse shuts off, the H atoms begin to realign and release excess stored energy. This is picked up by the coil and sent to the computer and through the use of a Fourier transform, a picture is made.

There are many benefits to receiving this test compared to few drawbacks. Many ails of the body can be detected and treated because of the MRI.