



Magnetic Resonance Imaging

MRI

IS AN AMAZING

TECHNOLOGY

THAT CREATES

IMAGES

FOR A

RADIOLOGIST

TO INTERPRET

FROM THE

WATER IN

YOUR BODY



DIAGNOSTIC IMAGING, INC.



WHAT IS MRI?

MAGNETIC RESONANCE IMAGING (MRI) IS AN AMAZING TECHNOLOGY THAT CREATES IMAGES FOR A RADIOLOGIST TO INTERPRET FROM THE WATER IN YOUR BODY.

GIANT MAGNETS ALLOW YOUR BODY TO RECEIVE RADIO WAVES AND "ECHO" THEM BACK. A COMPUTER USES THE INFORMATION WITHIN THE ECHOES THAT BOUNCE BACK FROM YOUR BODY TO CREATE IMAGES.

THE IMAGES CREATED ARE UNIQUE TO A PATIENT, DEPICTING THEIR ANATOMY AND ANY DISEASE THAT MAY BE PRESENT. THE WHOLE PROCESS IS SAFE AND PAINLESS.

SOME PATIENTS ARE SO COMFORTABLE INSIDE OF THE MAGNET THAT THEY ACTUALLY FALL ASLEEP WHILE THIS IMAGING MAGIC TAKES PLACE.

SHORT BORE TECHNOLOGY

Recent technical advances and developments have created much shorter and less confined magnets, resulting in "short bore" magnets that most all patients find less claustrophobic. Wake Radiology has made every effort to obtain this new technology at all of our MRI sites, hoping to provide the least stressful environment for your MRI experience with us. Of course, for those patients who are uncomfortable even in these new short bore magnets, Wake Radiology will continue to provide a mild sedative, such as IV Valium, to decrease their anxiety and increase their comfort during the examination. Family members or friends who can drive the patient home after the exam must accompany patients who receive intravenous Valium. These patients are advised not to drive or operate dangerous equipment for the remainder of the day.



The powerful magnet inside of the MRI machine is shown suspending a wrench in mid air.

Even though this powerful force is present, humans cannot feel or sense it.



There are several conditions under which MRI is not or may not be safe. Please notify the receptionist or technologist prior to your appointment if:

- You have an implanted pacemaker, defibrillator (AICD), or heart valve
- You have an implanted pump device (such as an insulin or pain medication pump)
- You have an inner ear implant
- You have an aneurysm clip within your brain
- You have ever had metal in your eyes, or were a metal worker of any kind
- You are currently pregnant*
- You have artificial joints or metallic plates**

* Pregnant patients should discuss the examination with the radiologist prior to the appointment/examination. Although there are no known side effects on the developing baby, it is recommended that a pregnant woman wait until the second trimester for MR imaging. There are some exceptions to this rule.

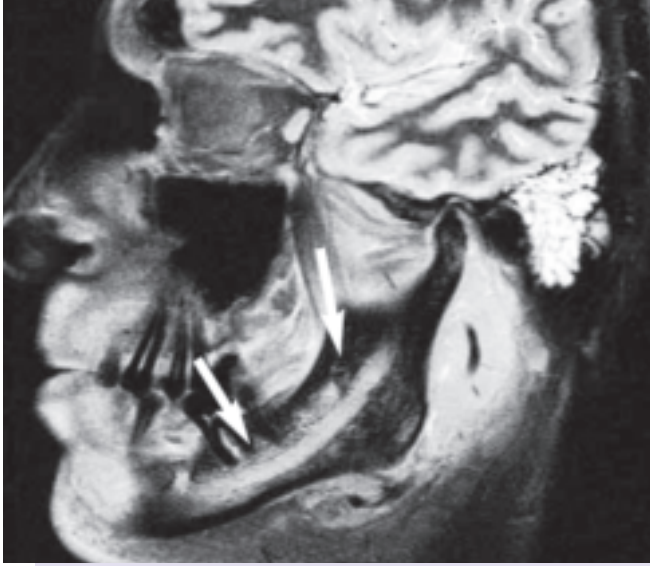
** You can safely undergo MRI if you have orthopedic metallic hardware in your joints - such as a metallic plate or hip replacement. However, if the metal device is located close to the part of the body being examined, the images can be seriously degraded and useless.

MRI of the BRAIN and SPINE

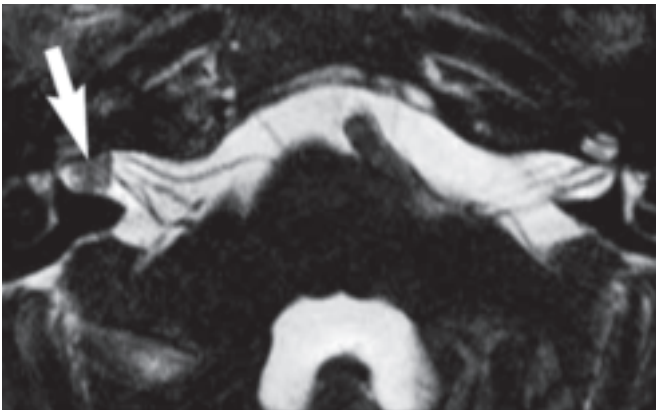
Most all imaging of brain and spine involves the patient lying on their back for 30-60 minutes. In some cases, the radiologist may determine that the patient must be injected with contrast. This is not a sign that something is wrong, but merely that additional information is required/requested. An examination that requires contrast is not an unpleasant experience. The contrast material is completely safe and most patients do not even notice the injection.

Patient Preparation:

No special preparation is required for these examinations.

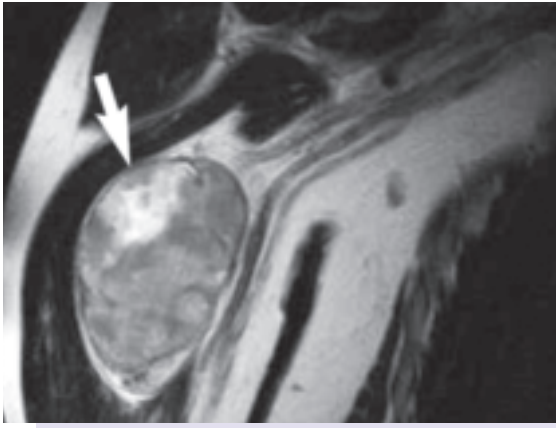


MRI has the ability to image in any plane, any orientation. This is especially important for tumors of the face and neck, which have some of the most complex anatomy. This picture shows a tumor growing along the nerve canal leading to the teeth of the jaw (arrows).



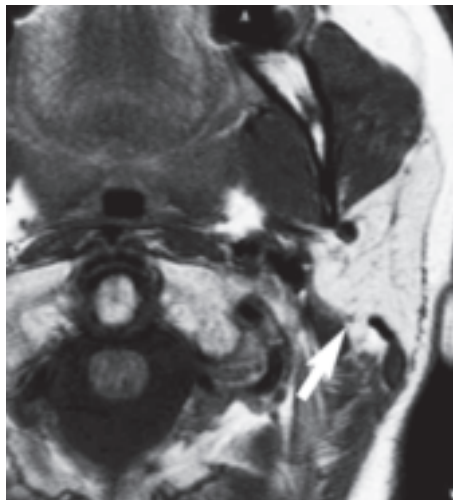
This new method of imaging the nerves that allow us to hear (nerves to the ear) can be accomplished in only a few minutes. It accurately depicts tumors (arrow) that are only a few millimeters in size.

This image shows a tumor (arrow) involving the nerves that allow the arm and hand to move.



This image shows tumors growing out from the spine (arrows) in a child. This rare disease, called neurofibromatosis, causes benign tumors throughout the body.

High-resolution picture of the left salivary gland, showing the fine structure (arrow) within the normal gland. Note the tongue in the upper left and the spine in the lower left.



MRI of the BONES and JOINTS

Most all imaging of bones or joints involves the patient lying on their back for 30-60 minutes. Occasionally, other positions are required to image small joints or special areas. In some cases, the radiologist may determine that the patient must be injected with contrast. This is not a sign that something is wrong, but merely that additional information is required/requested. An examination that requires contrast is not an unpleasant experience. The contrast material is completely safe and most patients do not even notice the injection.

Some special types of joint imaging require "arthrograms," in which the patient is injected with contrast material inside of the joint prior to MR imaging. Patients having these examinations will be instructed to arrive earlier than usual, and only on specific days of the week, so that a specially trained radiologist may be present to administer the contrast into the joint.

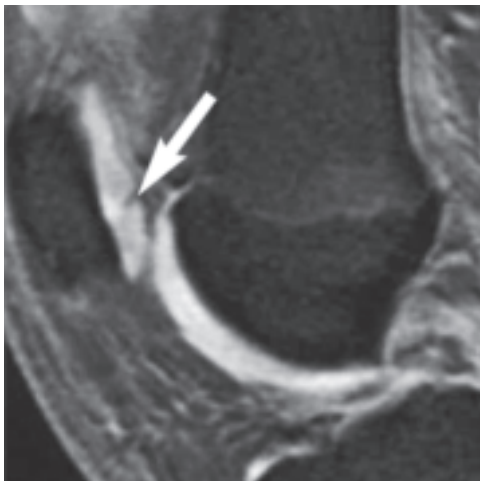
Patient Preparation:

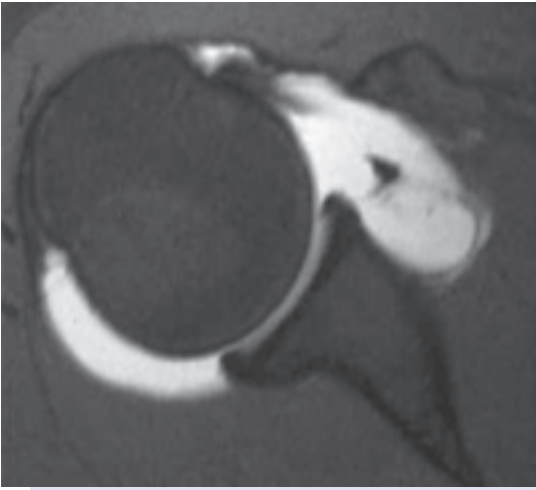
No special preparation is required for these examinations.



MRI is the best method for depicting joints. This is because it can see ligaments, tendons and cartilage. Most other methods just see bones.

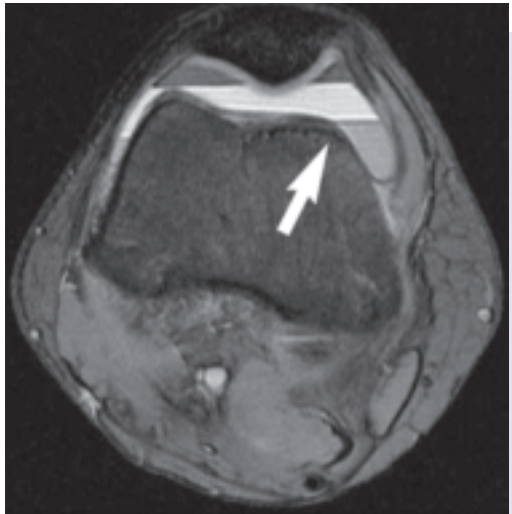
Here is a small tear in the cartilage of the knee joint (arrow).





MR arthrograms are used to detect small abnormalities of the shoulder and other joints. This picture shows the shoulder joint filled with contrast material.

MR can detect serious injuries in the joints and even show bleeding that occurs with fractures. Here, layers of blood and fluid (arrow) in this knee joint indicate that a fracture is present.



This image shows infection (arrow) in the bones of the great toe of a patient with diabetes. MRI is the most sensitive method for detection of bone infections.

MRI of the CHEST, ABDOMEN and PELVIS

Some of the latest advancements in imaging have occurred in MRI of the chest, abdomen and pelvis, or "Body MRI." Tumors sometimes can be classified as benign or malignant solely upon the information provided by MRI.

Body MRI examinations are the most specialized of all MRI applications. All examinations require the patient to lie on his/her back for 30-70 minutes, as still as possible. Many body examinations require the patient to hold their breath, repeatedly, for up to 30 seconds.

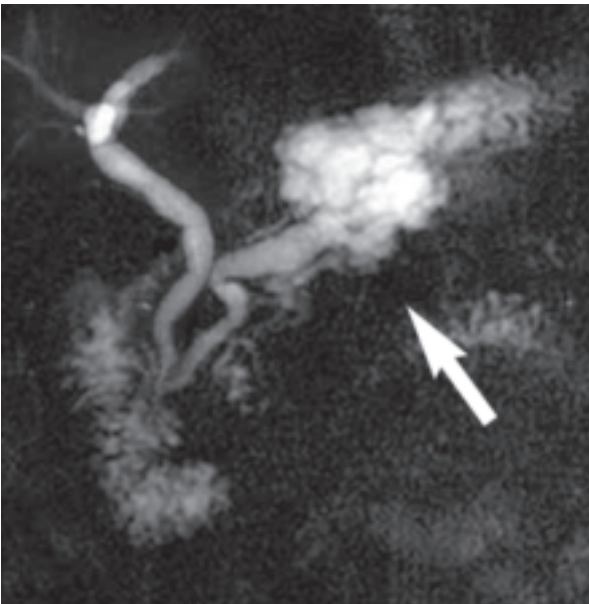
If you are scheduled for a MRI of the chest, abdomen or pelvis and have difficulty holding your breath, you should alert the MRI staff upon your arrival. Sometimes, coaching before the examination is successful in achieving an adequate breath-hold for imaging. However, some patients will find that they cannot hold their breath adequately, and an alternate imaging method, such as CAT (CT) scan or ultrasound, may be recommended instead of MRI.

In some cases, the radiologist may determine that the patient must be injected with contrast. This is not a sign that something is wrong, but merely that additional information is required/requested. An examination that requires contrast is not an unpleasant experience. The contrast material is completely safe and most patients do not even notice the injection.

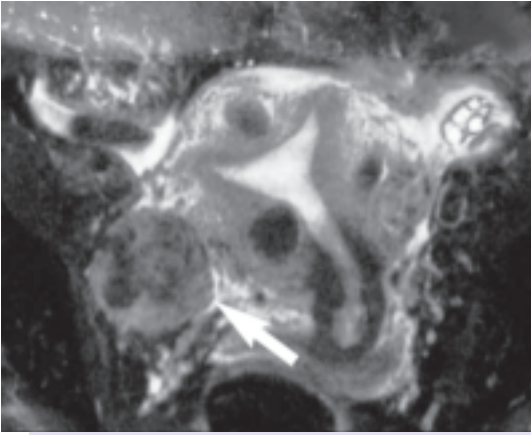
Some patients may be injected with Glucagon, a synthetic hormone that reduces bowel motion for about 60 minutes. Bowel motion can cause significant blurring of images in the abdomen and pelvis, potentially rendering images useless. The injection is given in the muscles of the arm, much like an immunization. This drug may induce hypoglycemia (low blood sugar) in patients approximately 90 minutes after injection, causing some nausea, dizziness, and trembling. Because eating can prevent these symptoms nearly completely, patients are required to eat chocolate, or other forms of sugar, prior to leaving the facility. Patients are also instructed to eat a meal soon after the examination. Diabetics, typically, will not be given this injection, so please inform the staff if you have this condition.

Patient Preparation:

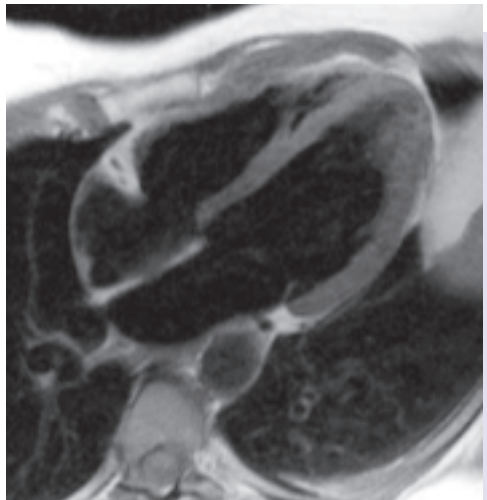
Only patients undergoing MR examination of the gallbladder will be asked to not eat prior to imaging. No special preparation is required for other body examinations.



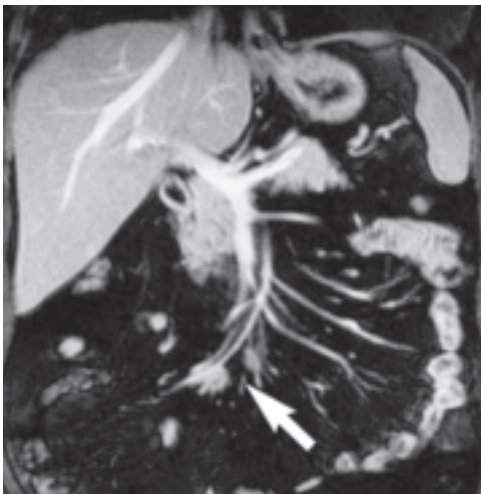
MR can image the bile ducts and pancreas in ways that no other imaging method can. Here is an example of a rare cystic tumor of the pancreatic duct (arrow).



Many women have tumors develop in the pelvis near the uterus and ovaries. Many of these can be proven to be benign by MRI, as in the case of this fibroid (arrow), and thus left alone. If found to be malignant, MRI can help the surgeon plan the operation carefully.



The newest advances are being made in imaging of the heart. We can now detect many heart diseases and can even watch the heart beating like a movie. We can also detect heart attacks, and help determine if patients need bypass surgery or not.



MRI creates amazingly clear images of the entire abdomen. In special cases, MRI can determine if tumors are benign or malignant without need of a biopsy or surgery. This image shows a small tumor, only an inch in diameter (arrow), in the intestine.

MRI of the BLOOD VESSELS (MRA, or MR Angiography)

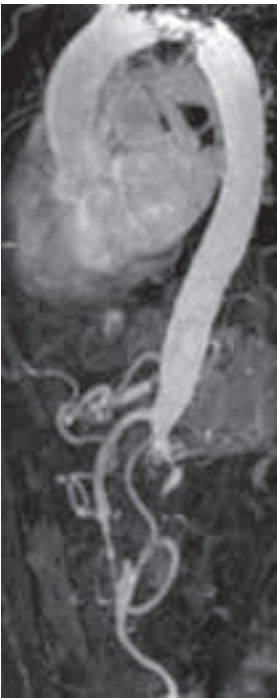
When physicians need to see blood vessels, they create images called "angiograms." Typical angiograms require admission to a hospital for the procedure. MR angiograms can be performed without risk or hospitalization in 30-70 minutes, depending upon the body part to be imaged.

Patients undergoing MR angiography of any part of the body except the head will receive an injection of contrast material in the vein of an arm. In some cases, a second contrast injection may be required for some parts of the body. MR Angiograph of the head (Circle of Willis, COW MRA) can be performed without a contrast injection.

Because very large amounts of data are created during these studies, they can easily have hundreds of images that require hours of manipulation to interpret. Referring physicians will be notified of results as soon as possible.

Patient Preparation:

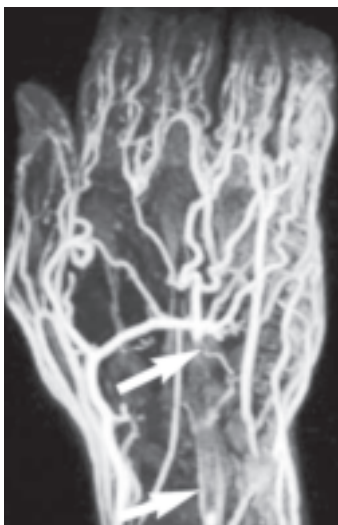
No special preparation is required for these examinations.



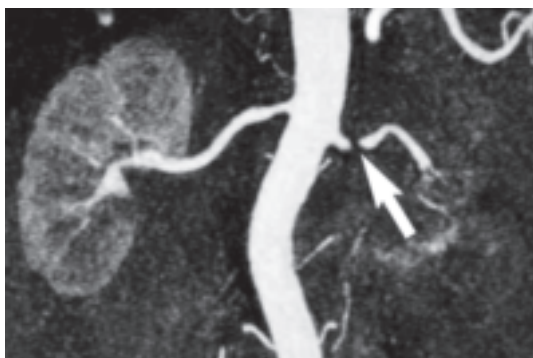
New MR methods can depict all of the major arteries of the chest, abdomen and pelvis at the same time, in a single breath-hold (30 seconds).



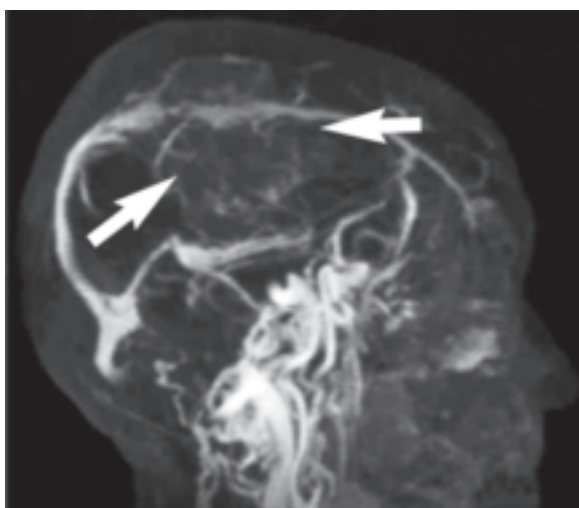
This high-resolution image of the blood vessels of the neck was acquired in less than one minute with a small injection of contrast in an arm vein. This method allows patients to avoid the risks of conventional angiography, which are higher for the neck vessels than any other vessels of the body.



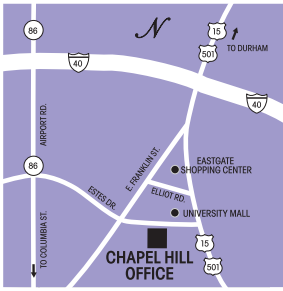
MR angiograms can be performed in any part of the body. This picture reveals an occluded artery (arrows) in the palm after a crushing injury.



One of the treatable causes of high blood pressure is a narrowing in the blood vessels of the kidneys (arrow). MR Angiography is a fast, accurate and risk-free method of proving that the renal arteries are normal or not.



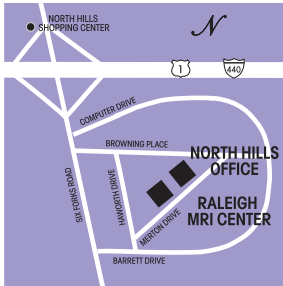
These methods can be used to detect if tumors have damaged blood vessels and help determine the best, safest surgical approach for the removal of the tumor. This picture shows the veins in a person's head (note the nose and chin to the right edge of the image). A large tumor is shown invading a major vein of the skull, near the top of the image. The tumor is a ghost-like circle (arrows).



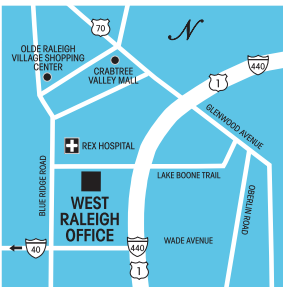
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