

X-ray/Fluoroscopy

What is an X-ray (Radiography)?

An x-ray (radiograph) is a painless medical test that helps physicians diagnose and treat medical conditions. Radiography involves exposing a part of the body to a small dose of ionizing radiation to produce pictures of the inside of the body. X-rays are the oldest and most frequently used form of medical imaging.

A bone x-ray makes images of any bone in the body, including the hand, wrist, arm, foot, ankle, knee, leg or spine.

An X-ray is Used To:

- determine whether a bone has been fractured or if a joint is dislocated.
- ensure that a fracture has been properly aligned and stabilized for healing following treatment.
- determine whether there is a build up of fluid in the joint or around a bone.
- guide orthopedic surgery, such as spinal repair, joint replacement and fracture reductions.
- evaluate injury or damage from conditions such as infection, arthritis, abnormal bone growths or other bone diseases, such as osteoporosis.
- assist in the detection and diagnosis of cancer.
- locate foreign objects.
- evaluate changes in bones.

How should I prepare for the procedure?

Most bone x-rays require no special preparation.

You may be asked to remove some or all of your clothes and to wear a gown during the exam. You may also be asked to remove jewelry, eye glasses and any metal objects or clothing that might interfere with the x-ray images.

Women should always inform their physician or x-ray technologist if there is any possibility that they are pregnant. Many imaging tests are not performed during pregnancy because radiation can be harmful to the fetus. If an x-ray is necessary, precautions will be taken to minimize radiation exposure to the baby. See the Safety page for more information about pregnancy and x-rays.

How does the procedure work?

X-rays are a form of radiation like light or radio waves. X-rays pass through most objects, including the body. Once it is carefully aimed at the part of the



body being examined, an x-ray machine produces a small burst of radiation that passes through the body, recording an image on photographic film or a special image recording plate.

Different parts of the body absorb the x-rays in varying degrees. Dense bone absorbs much of the radiation while soft tissue, such as muscle, fat and organs, allow more of the x-rays to pass through them. As a result, bones appear white on the x-ray, soft tissue shows up in shades of gray and air appears black.

X-ray images are maintained as hard film copy (much like a photographic negative) or, more likely, as a digital image that is stored electronically. These stored images are easily accessible and are sometimes compared to current x-ray images for diagnosis and disease management.

How is the procedure performed?

The technologist, an individual specially trained to perform radiology examinations, positions the patient on the x-ray table and places the x-ray film holder or digital recording plate under the table in the area of the body being imaged. When necessary, sandbags or pillows will be used to help the patient hold the proper position. A lead apron may be placed over the patient's pelvic area to protect it from radiation.

The patient must hold very still and may be asked to keep from breathing for a few seconds while the x-ray picture is taken to reduce the possibility of a blurred image. The technologist will walk behind a wall or into the next room to activate the x-ray machine.

The patient may be repositioned for another view and the process is repeated. At least two images (from different angles) will be taken and often three images are needed if the problem is around a joint (knee, elbow or wrist).

An x-ray may also be taken of the unaffected limb, or of a child's growth plate (where new bone is forming), for comparison purposes.

When the examination is complete, the patient will be asked to wait until the technologist determines that the images are of high enough quality for the radiologist to read.

A bone x-ray examination is usually completed within 5 to 10 minutes.

What will I experience during and after the x-ray procedure?

A bone x-ray examination itself is a painless procedure.

You may experience discomfort from the cool temperature in the examination room. You may also find holding still in a particular position and lying on the hard examination table uncomfortable, especially if you are injured. The technologist will assist you in finding the most comfortable position possible that still ensures x-ray image quality.

What is Fluoroscopy?

Fluoroscopy is an imaging technique commonly used by physicians to obtain real-time images of the internal structures of a patient through the use of a fluoroscope. In its simplest form, a fluoroscope consists of an x-ray source and fluorescent screen between which a patient is placed. However, modern fluoroscopes couple the screen to an x-ray image intensifier and CCD video camera allowing the images to be played and recorded on a monitor. The use of x-rays, a form of ionizing radiation, requires that the



potential risks from a procedure be carefully balanced with the benefits of the procedure to the patient. While physicians always try to use low dose rates during fluoroscopy procedures, the length of a typical procedure often results in a relatively high absorbed dose to the patient. Recent advances include the digitization of the images captured and flat-panel detector systems which reduce the radiation dose to the patient still further.

Common procedures using fluoroscopy

Investigations of the gastrointestinal tract, including barium enemas, barium meals and barium swallows, and enteroclysis.

Orthopaedic surgery to guide fracture reduction and the placement of metalwork.

Angiography of the leg, heart and cerebral vessels.

Placement of a PICC (peripherally inserted central catheter)

Placement of a weighted feeding tube (e.g. Dobhoff) into the duodenum after previous attempts without fluoroscopy have failed.

Urological surgery – particularly in retrograde pyelography.

Implantation of cardiac rhythm management devices (pacemakers, implantable cardioverter defibrillators and cardiac resynchronization devices)

Another common procedure is the modified barium swallow study during which barium-impregnated liquids and solids are ingested by the patient. A radiologist records and, with a speech pathologist, interprets the resulting images to diagnose oral and pharyngeal swallowing dysfunction. Modified barium swallow studies are also used in studying normal swallow function.