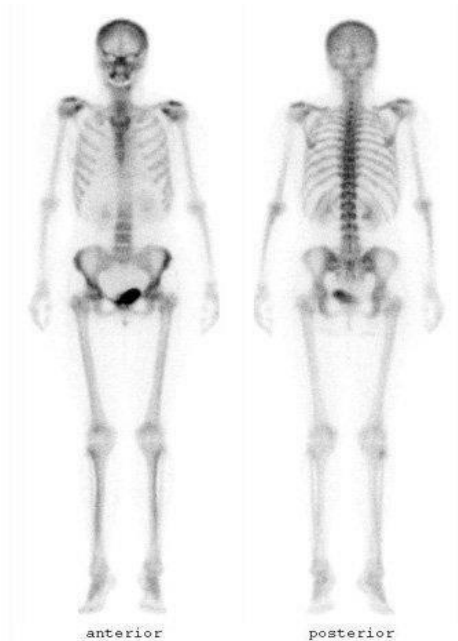


HARRIS ORTHOPAEDICS AND SPORTS MEDICINE

Bone Scans



Why are bone scans done?

A bone scan is a nuclear imaging test that helps diagnose and track several types of bone disease. Other reasons for performing a bone scan procedure may include, but are not limited to, the following: Your doctor may order a bone scan if you have unexplained skeletal pain suggesting bone loss, bone infection or a bone injury undetectable on a standard X-ray.

A bone scan is also an important tool for detecting cancer from another area, such as the breast, lung, kidney, thyroid gland, or prostate gland that has spread (metastasized) to the bone. **See a picture of a bone scan showing the spread of cancer**

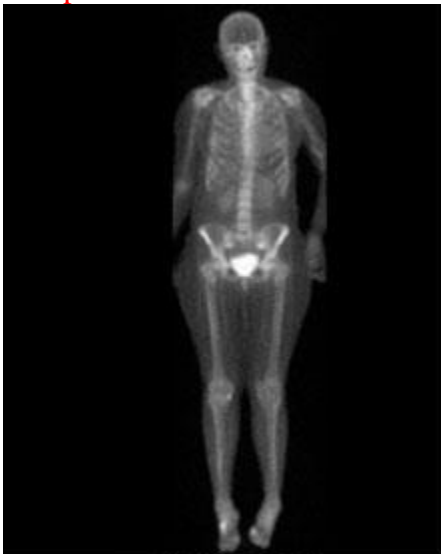


Figure 1

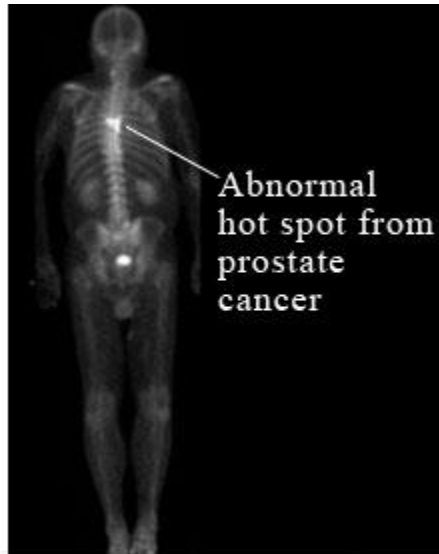


Figure 2

A bone scan can detect some abnormalities related to leukemia and lymphoma. Bone scans can also help diagnose the cause or location of unexplained bone pain, such as ongoing low back pain. A bone scan may be done first to help determine the location of an abnormal bone and can also help diagnose broken bones, such as a hip fracture or a stress fracture, not clearly seen on an X-ray.

Why are bone scans done continue...

Follow-up evaluation then may be done with a computed tomography (CT) scan or magnetic resonance imaging (MRI). A bone scan does not distinguish between normal and abnormal bone growth by itself. So bone scan results must be interpreted along with your symptoms and the results of X-ray tests. In addition, other tests such as computed tomography (CT), magnetic resonance imaging (MRI), blood tests, or a biopsy may also be needed to further evaluate abnormal bone scan results. Some types of cancer or diseases cannot be identified on a bone scan.

[Related Documents: A Patient's Guide to MRI athrogram](#)

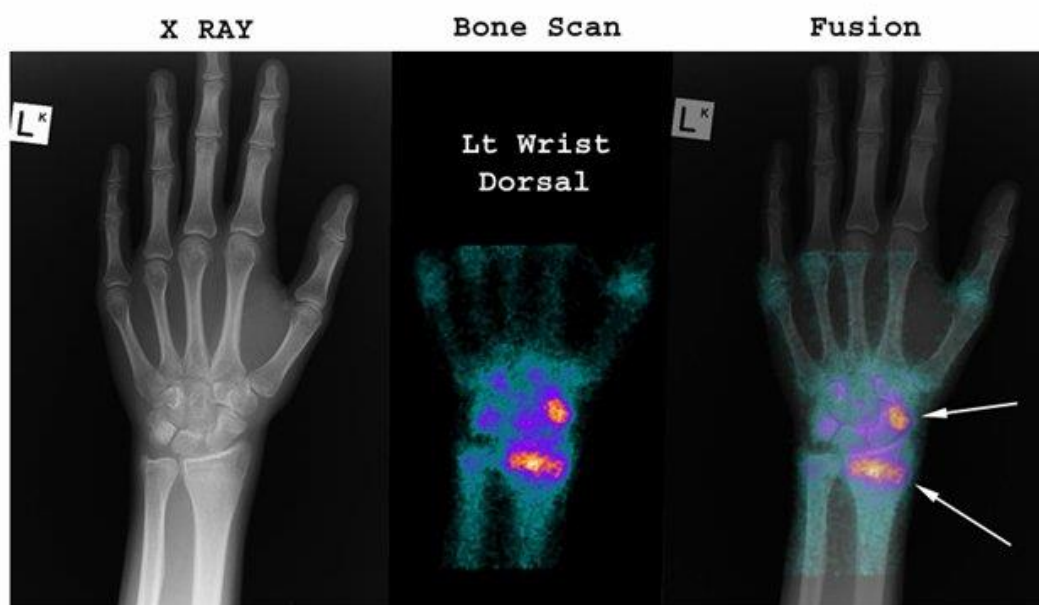
[Related Documents: A Patient's Guide to CT Scan](#)

So what are bone scans and how are they different then an x-ray?

A bone scan falls under the category of nuclear medicine procedures in which tiny amounts of radioactive material is used during the test. A bone scan identifies new areas of bone growth or breakdown. It can be done to evaluate damage to the bones, find cancer that has spread (metastasized) to the bones, and monitor conditions that can affect the bones (including infection and trauma). A bone scan can often find a problem days to months earlier than a regular X-ray test.

For a bone scan, a tiny amounts of radioactive materials called tracers (radionuclides) are injected into a vein in the arm. The tracer then travels through the bloodstream and into the bones. This process may take several hours. A special camera (gamma) takes pictures of the tracer in the bones. This helps show cell activity and function in the bones. Areas that absorb little or no amount of tracer appear as dark or "cold" spots, which may indicate a lack of blood supply to the bone (bone infarction) or the presence of certain types of cancer. Areas of rapid bone growth or repair absorb increased amounts of the tracer and show up as bright or "hot" spots in the picture below. Hot spots may indicate problems such as arthritis, the presence of a tumor, a fracture, or an infection. A bone scan may be done on the entire body or just a part of it.

In a sense, a nuclear procedure, such as a bone scan, is the opposite of a standard X-ray examination. An X-ray passes radiation into or through your body to create an image on film placed on the other side of your body. In a nuclear scan, the source of radiation is inside your body and travels to the surface, where a camera detects it.



How is it done?

A bone scan can be divided into two basic parts:

- **The injection.** You will receive an injection of tracers into a vein in your arm, and depending on the reason your doctor orders the scan, images of the injection may be taken immediately. You'll then wait between two and four hours to allow the tracers to circulate and be absorbed by your bones. You may be allowed to leave the radiology department during this time. Your doctor will ask you to drink extra water to remove unabsorbed radioactive material from your system.
- **The scan.** During the scan, you'll be asked to lie still on a table while a machine with an arm-like device supporting the gamma camera passes over your body to record the pattern of tracer absorption by your bones. This is painless. A scan of your entire skeleton takes as long as 60 minutes. Scanning a limited area of your body takes less time.



In some cases, your doctor might order a three-phase bone scan, which includes a series of images taken at different times. A number of images are taken as the tracer is injected, then shortly after the injection, and again three to four hours later.

For certain conditions your doctor might also order additional imaging called single-photon emission computerized tomography (SPECT). This can help analyze conditions that are especially deep in your bone or in places that are difficult to see with static or two-dimensional (planar) images. The additional SPECT images take approximately 30 minutes.

How to Prepare

No special preparation is required on your part before a bone scan, though you may be asked to remove jewelry or other metal objects. In most cases, you can eat or drink anything you like before the test (check with your doctor).

Before the bone scan, tell your doctor if:

- As with most tests, tell your doctor if you're pregnant or think you might be pregnant. Bone scans aren't usually performed on pregnant women because of concerns about radiation exposure to the fetus
- You are breast-feeding. Use formula (discard your breast milk) for 1 to 2 days after the scan until the radioactive tracer has been eliminated from your body.
- Within the past 4 days, you have had an X-ray test using barium contrast material (such as a barium enema) or have taken a medicine (such as Pepto-Bismol) that contains bismuth. Barium and bismuth can interfere with test results.

You may wish to limit your fluids for up to 4 hours before the test because you will be asked to drink extra fluids after the radioactive tracer is injected. You will empty your bladder right before the scan.

You usually have to wait 1 to 3 hours after the radioactive tracer is injected before your bone scan is done. So you may want to bring some reading materials or a project to pass the time during this waiting period. You may be asked to sign a consent form before the test. Talk to your doctor about any concerns you have regarding the need for the test, its risks, how it will be done, or what the results will mean.

What the Radiology Department Needs to Know before having a Bone Scan:

Before your Bone scan, tell your health professional and the Bone scan technologist if you:

- Are allergic to any medicines. If you have a known allergy to the contrast material used for a bone scan, tell your health professional before having the test. Sometimes the benefits of having this test may outweigh the risks.
- Within the past 4 days before having the bone scan done, tell the radiology department if you have had an X-ray test using barium contrast material (such as a barium enema) or have taken a medicine such as Pepto-Bismol.
- For women, tell your doctor and radiology department if you are pregnant or suspect that you are pregnant? Are you using an IUD or diaphragm, breastfeeding an infant?
- Have any other health conditions, such as kidney problems or sickle cell anemia.
- If you have diabetes or are on kidney dialysis? Do you take metformin (Glucophage) for your diabetes? Talk to your health care provider before the test about your risks.
- Do you have asthma?
- Are you being treated now for any kind of infection?
- Do you have a history of claustrophobia?

What the Radiology Department Needs to Know before having a Bone Scan continue...

- Have arthritis that is bothering you at the time of your test?
- You may need to arrange for someone to drive you home after the test, if you are given a medicine (sedative) to help you relax.

Please be sure your doctor and the bone scan staff are aware of any of these conditions. If you have any questions, be sure to ask!

How is it done?

A bone scan is usually done by a nuclear medicine technologist. The scan pictures are usually interpreted by a radiologist or nuclear medicine specialist.

You will need to remove any jewelry that might interfere with the scan. You may be asked to wear a hospital gown.

The technologist cleans the site on your arm where the radioactive tracer will be injected. A small amount of the radioactive tracer is then injected.

It takes about 2 to 5 hours for the tracer to bind to your bone so that pictures can be taken with the gamma camera. During this time you may be asked to drink 4 to 6 glasses of water to help eliminate in your urine any of the radioactive substance that does not collect in your bones. Just before the scan begins, you will usually be asked to empty your bladder to prevent any radioactive urine from blocking the view of your pelvic bones during the scan.

You will lie on your back on a table and a large scanning camera will be positioned closely above you. It may move slowly above and around your body, scanning for radiation released by the tracer and producing pictures as the tracer moves into your bones. The camera does not produce any radiation, so you are not exposed to any additional radiation while the scan is being done.

You may be asked to move into different positions so the area of interest can be viewed from other angles. You need to lie very still during each scan to avoid blurring the pictures.

A bone scan takes about 1 hour.

How does it feel?

You may feel nothing at all from the needle puncture when the tracer is injected, or you may feel a brief sting or pinch as the needle goes through the skin. Otherwise, a bone scan is usually painless. You may find it difficult to remain still during the scan. Ask for a pillow or blanket to make yourself as comfortable as possible before the scan begins.

The test may be uncomfortable if you are having joint or bone pain. Try to relax by breathing slowly and deeply.

Risks

A bone scan's sensitivity to variation in bone metabolism and its ability to scan the entire skeleton make it very helpful in diagnosing a wide range of bone disorders. The test poses no greater risk than do conventional X-ray procedures. The tracers used in a bone scan produce very little radiation exposure.

You might find the injection and the need to lie still during the scanning procedure mildly uncomfortable. The risk of an allergic reaction to the tracers is extremely rare. Patients who are allergic to or sensitive to medications, contrast dyes, shellfish, or latex should notify their physician.

Allergic reactions to the radioactive tracer are rare. Most of the tracer will be eliminated from your body (through your urine or stool) within a day, so be sure to promptly flush the toilet and thoroughly wash your hands with soap and water. The amount of radiation is so small that it is not a risk for people to come in contact with you following the test.

Occasionally, some soreness or swelling may develop at the injection site. These symptoms can usually be relieved by applying moist, warm compresses to your arm. There may be other risks depending upon your specific medical condition. Be sure to discuss any concerns with your physician prior to the procedure.

After Your Bone Scan

Once inside your body, the tracers don't remain active for long. The radioactivity is mostly removed after one day and completely eliminated by two days. You should feel no side effects after the procedure, and no aftercare is necessary.

Obtaining Your Test Results

The radiologist looks for evidence of abnormal bone metabolism on the scans. These show up as darker "hot spots" and lighter "cold spots" where the tracers have or haven't accumulated.

Although a bone scan is very sensitive to abnormalities in bone metabolism, it's less helpful in determining the exact cause of the abnormality. However, a thorough medical history often reveals the cause, such as a suspected fracture, infection or bone tumor. Other tests may be performed to help establish the diagnosis. For instance, in order to rule out bone cancer, your doctor may need further imaging studies (computerized tomography or magnetic resonance imaging) or a biopsy, which is a sample of bone tissue that's removed for examination.

The findings from your test are reviewed and interpreted by the radiologist. Your doctor and radiologist looks for evidence of abnormal bone metabolism on the scans. These can show up as darker "hot spots" and lighter "cold spots" where the tracers have or haven't accumulated. These results will be given to your referring doctor, who will also interpret the reading share them with you during your follow-up visit.

Although a bone scan is very sensitive to abnormalities in bone metabolism, sometimes it is hard to determine the exact cause of the abnormality. However, a thorough medical history often reveals the cause, such as a suspected fracture, infection or bone tumor. After your doctor has seen the CT results and/or any other results, further tests, treatment with medicine, physical therapy, or surgery may be recommended

* References available upon request