TEST

Bone scan

A bone scan uses a radioactive tracer and camera to show bone activity.

WHAT IT MEASURES
Areas of increased or reduced bone repair activity

SAMPLE
None; nuclear medicine imaging after a tracer injection

FASTING NEEDED?
No, unless your imaging centre gives different instructions

HOW LONG IT TAKES
Usually 3-5 hours, including tracer uptake time

RESULTS IN
Usually 1-3 days; varies by laboratory or imaging service

USED FOR
Diagnosis and monitoring of bone disease or injury

MAIN LIMITATION
Abnormal uptake is not specific to one condition

Overview

A bone scan is a nuclear medicine imaging test. It shows areas where bone is breaking down or rebuilding more actively than expected.

A small amount of radioactive material, called a radiotracer, is injected into a vein. It travels through your bloodstream and collects in your bones. A special camera detects radiation from the tracer and creates images of your skeleton.

A bone scan is different from a bone density scan, which measures bone strength and helps assess osteoporosis. Some bone scans include SPECT, which produces three-dimensional images, or SPECT/CT to show an abnormal area's exact location.

Why the test is ordered

A bone scan can examine most or all of the skeleton in one test. It may be used to investigate:

It can also monitor known bone disease or treatment response. However, it cannot usually identify the cause of an abnormal area by itself.

- Unexplained or persistent bone pain
- Stress fractures or fractures that are difficult to see on an X-ray
- Bone infection
- Cancer that may have spread to bone
- Problems around a joint replacement
- Conditions causing unusual bone growth or repair

Who should have the test

A bone scan may be useful when symptoms, medical history or another imaging test suggests a bone problem. It is not normally used to screen people without a specific reason.

The best test depends on what your healthcare team needs to find out. An X-ray, CT, MRI or PET scan may be more suitable in some situations.

Tell the imaging team if you are pregnant, could be pregnant or are breastfeeding. Radiation can affect pregnancy and requires extra planning; another test may be preferred.

How to prepare

You can usually eat and drink normally. Fasting is not generally needed, so coffee is normally allowed unless the imaging centre says otherwise.

Tell the team about:

Do not stop prescribed medicines unless specifically instructed.

Wear comfortable clothing and leave jewellery at home if possible. You may need to remove metal objects. You will usually be encouraged to drink water after the injection, so ask beforehand if a heart or kidney condition means you must limit fluids.

- Pregnancy, possible pregnancy or breastfeeding
- Recent scans using radioactive tracers, barium or contrast material
- Recent fractures, surgery or joint replacement
- All medicines and supplements, especially products containing bismuth

What happens during the test

A healthcare professional places a needle into a vein, usually in your arm or hand, and injects the radiotracer. This feels similar to a routine blood test.

You then usually wait 2 to 4 hours while the tracer enters your bones. You may be able to leave the department during this period. You will generally be asked to drink water and empty your bladder regularly.

If infection or another specific problem is suspected, images may also be taken during and immediately after the injection. This is called a three-phase bone scan.

For the main images, you lie on a table while a gamma camera moves slowly over or around you. It may come close but does not usually enclose you like an MRI scanner. Imaging commonly takes 30 to 60 minutes, and you must remain as still as possible.

Understanding your results

A radiologist or nuclear medicine specialist reviews the pattern of tracer uptake.

Areas collecting more tracer are sometimes called "hot spots." They indicate increased bone activity and can be caused by a healing fracture, arthritis, infection, surgery or cancer involving bone.

Areas collecting less tracer are called "cold spots." These may occur when bone has reduced blood supply or is damaged without producing much new bone.

Hot or cold spots are not a diagnosis. Their location and pattern must be interpreted alongside your symptoms, history and other tests.

There is no universal numerical reference range. Interpretation varies with clinical context, age, medicines and factors such as pregnancy. Children and teenagers, for example, normally have greater uptake around growing bones.

What affects the results

Factors that may change or obscure the images include:

Provide a complete recent medical history so the specialist can interpret the scan accurately.

- A recent fracture, operation, biopsy or joint replacement
- Arthritis, older injuries or recent strenuous exercise
- Poor hydration or reduced kidney function

- A full bladder, which can hide parts of the pelvis
- Movement during imaging
- Tracer leaking around the injection site
- Recent barium, contrast or nuclear medicine tests
- Bismuth-containing medicines
- Cancer treatments or medicines that affect bone turnover

Accuracy and limitations

A bone scan can find abnormal bone repair before changes appear on an X-ray, but it cannot reliably show why activity is abnormal. Arthritis, injury, infection and cancer may look similar, so further tests are often needed.

It may miss very small or early abnormalities. Conditions that mainly affect bone marrow, or destroy bone without triggering much repair, may show little uptake. Some bone-destroying cancer deposits and multiple myeloma may be better assessed with CT, MRI or PET.

Widespread abnormal uptake can occasionally appear deceptively even. SPECT/CT, previous scans and other clinical information can help clarify uncertain findings.

Risks and complications

The needle may cause brief discomfort, bruising or light-headedness. Significant reactions to the tracer are uncommon.

A bone scan exposes you to a small amount of ionising radiation. The tracer loses radioactivity and leaves mainly through urine. Drinking fluids and emptying your bladder regularly for the rest of the day helps clear it.

Follow the imaging centre's instructions about breastfeeding and close contact with pregnant people or young children. Advice varies according to the tracer and dose.

Seek immediate help while at the imaging centre if you develop breathing difficulty, facial swelling or widespread hives after the injection. These reactions are rare.

What happens next

You can normally return to usual activities and drive after the scan unless you were given a

sedative, which is uncommon. Continue drinking fluids if it is safe for you.

The report is sent to the healthcare professional who requested the scan. Follow-up may include reviewing previous images or arranging an X-ray, CT, MRI, PET scan or blood test.

An abnormal scan does not automatically mean cancer or another serious condition. Common causes such as arthritis and healing injuries can increase bone activity.

Do not wait for routine results if you develop new severe back pain with leg weakness, numbness around the groin, or loss of bladder or bowel control. Seek urgent medical assessment because these symptoms may indicate pressure on the spinal nerves, regardless of the scan result.

Common questions

Can I drink coffee before a bone scan?

Usually, yes. Bone scans do not normally require fasting. Follow the imaging centre's instructions if another test is being performed at the same time.

Does the time of day matter?

Usually not. The important timing is the waiting period between the tracer injection and imaging. Allow several hours for the appointment.

Can I exercise beforehand?

Light activity is generally fine. Avoid unusually strenuous exercise unless the centre says otherwise, because stressed bones and muscles may affect tracer uptake.

Will the scan hurt?

The camera does not usually touch you. The main discomfort is the needle injection and lying still during imaging.

Am I radioactive afterward?

A small amount of radiation remains temporarily while the tracer leaves your body. Follow instructions about fluids, toileting, breastfeeding and close contact with others.

Can I travel after the scan?

You can usually travel normally. Sensitive detectors at airports or borders may detect the tracer temporarily, so ask the centre for documentation if you will travel soon.

Sources

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