PROCEDURE

Bone marrow aspiration

Bone marrow aspiration uses a needle to remove liquid marrow for laboratory testing.

PURPOSE
Examine marrow cells to diagnose or monitor blood disorders

PROCEDURE TYPE
Diagnostic, minimally invasive needle procedure

WHERE IT IS DONE
Outpatient clinic, procedure room, or bedside

ANAESTHESIA
Local anaesthesia; sedation sometimes offered

HOW LONG IT TAKES
About 15 to 30 minutes

PREPARATION
Review medicines; fasting only when required for sedation

RECOVERY
Same day; no driving after sedation

MAIN RISKS
Bleeding, infection, ongoing pain, sedation reactions

RESULTS
Most in days; specialized tests may take several weeks

Overview

Bone marrow is the soft tissue inside certain bones. It makes red blood cells, white blood cells, and platelets. Bone marrow aspiration removes a small amount of the liquid part of this tissue so it can be examined in a laboratory.

The sample usually comes from the back of your pelvic bone, near the hip. A clinician passes a hollow needle through the numbed skin and outer bone into the marrow space.

Aspiration is often performed with a bone marrow biopsy. Aspiration collects liquid and individual cells. A biopsy removes a narrow core of tissue, which shows how the cells are arranged. The two samples provide different information.

This is usually an outpatient procedure, meaning you go home the same day.

Why the procedure is performed

Your healthcare team may recommend bone marrow aspiration when blood tests do not fully explain an abnormal finding or when information from the marrow could affect treatment.

It may help to:

Being offered this procedure does not mean you have cancer. It is used for many possible conditions, and the reason should be explained before you consent.

- Investigate unexplained changes in blood cell counts
- Diagnose or classify leukemia, lymphoma, myeloma, and other blood disorders
- Check whether another cancer has reached the bone marrow
- Look for some infections or problems with blood-cell production
- Measure iron stored in the marrow in selected situations
- Monitor a known condition or assess its response to treatment
- Collect cells for specialized genetic, chromosome, or molecular tests

Who should and should not have it

Bone marrow aspiration may be appropriate when the result is likely to clarify a diagnosis, guide treatment, or show whether treatment is working. Your healthcare team should explain what question the test is intended to answer and whether a biopsy will be performed at the same time.

The procedure may need to be delayed or changed if you have:

An allergy does not always prevent the procedure because another medicine may be available. Low platelet counts also do not automatically rule it out, but your team may take added precautions.

Tell the team if you are pregnant or could be pregnant, particularly if sedation or imaging guidance is being considered.

- An infection, open wound, or significant skin irritation over the planned site
- A bleeding problem that has not been adequately managed
- Medicines that increase bleeding risk and require a procedure-specific plan
- A medical condition that makes positioning or sedation unsafe

- A previous severe reaction to a local anaesthetic or sedative

How to prepare

Follow the treating facility's instructions first, because its preparation and medication rules take priority over general information.

Give the team a current list of prescription medicines, over-the-counter products, vitamins, and supplements. Make sure they know if you take a blood thinner or medicine that affects platelets. Do not stop these medicines unless the team performing the procedure tells you to do so.

Also tell them about allergies, previous bleeding problems, reactions to anaesthesia or sedation, and any implanted medical devices.

You can usually eat and drink normally if you are having only local anaesthesia. If sedation is planned, you may need to stop eating and drinking beforehand. The facility will give you specific times.

Wear comfortable clothing. Arrange for an adult to take you home if you will receive sedation. You may also want support if you feel anxious about the procedure, even when sedation is not planned.

What happens during the procedure

You will usually lie on your side or stomach so the back of your pelvic bone can be reached. The team checks your identity, the planned procedure, and the sample site.

The skin is cleaned, and sterile coverings are placed around the area. A local anaesthetic is injected to numb the skin and tissues over the bone. This may sting briefly. You can still feel pressure even when the area is numb.

The clinician guides an aspiration needle through the outer layer of bone. When the liquid marrow is drawn into a syringe, many people feel a brief, sharp, pulling, or cramping sensation. This part usually lasts only a few seconds. More than one sample may be needed.

If a core biopsy is also planned, a different needle collects a thin piece of marrow tissue. This can cause pressure or pushing but should not cause prolonged sharp pain. Tell the team if you need a pause or additional numbing medicine.

After the needle is removed, firm pressure is applied. The site is then covered with a dressing.

Recovery and what to expect afterward

The area may feel bruised, tender, or sore for several days. Simple pain relief may be enough, but ask your team which medicine is suitable for you. Some pain relievers can increase bleeding risk.

You can usually eat and drink normally after local anaesthesia. After sedation, begin according to the facility's instructions; nausea can occasionally occur.

Keep the dressing and procedure site dry for the period your team recommends. Avoid strenuous exercise, heavy lifting, or activities that pull on the hip area for at least the rest of the day, or longer if instructed. Gentle walking is usually reasonable.

You may drive after a local anaesthetic if you feel well and can safely control the vehicle. Do not drive after sedation. You will need someone else to take you home, and the facility may advise that an adult stay with you for a period afterward.

Many people return to desk work the next day. You may need more time if your work is physically demanding, the site remains painful, or you received sedation.

Risks and possible complications

Bone marrow aspiration is generally well tolerated, but it is not risk-free.

Possible complications include:

Bleeding risk may be higher if you have a platelet or clotting problem or take certain medicines. The team may review blood tests and adjust the plan based on your circumstances.

Injury to nearby structures is uncommon when the usual pelvic site is used. Your clinician can explain any risks related to a different sampling site or image-guided approach.

- Bleeding or a collection of blood under the skin
- Infection at the needle site
- Bruising, tenderness, or pain that lasts longer than expected
- Fainting or light-headedness during or shortly after the procedure
- A reaction to local anaesthetic or sedation
- An inadequate sample that requires another attempt or procedure

Results and follow up

A laboratory specialist examines the marrow cells. The report may describe the types and numbers of cells, how mature they are, and whether they look or behave unusually.

Some findings may be available within a few days. Tests involving cell cultures, chromosomes, flow cytometry, or detailed molecular analysis can take longer, sometimes several weeks. Results from aspiration and core biopsy may arrive at different times.

Ask when and how you will receive the results. A follow-up appointment is often needed because marrow findings must be interpreted alongside your symptoms, examination, blood counts, imaging, and other tests.

An unclear or inadequate sample does not by itself establish a diagnosis. Your team may recommend reviewing the slides, repeating the procedure, or using another test.

Alternatives

The realistic alternatives depend on what your healthcare team needs to learn.

Blood tests are easier and less invasive. They can measure circulating cells and identify some abnormal proteins or genetic changes. However, blood may not show a problem that is limited to the marrow.

Imaging such as CT, MRI, or PET scans can identify enlarged organs, bone changes, or areas of active disease. Imaging cannot provide the same cell-level information as a marrow sample.

Observation with repeat blood tests may be reasonable when the finding is mild, stable, and not urgent. This avoids an immediate procedure but can delay a clear answer.

A core bone marrow biopsy may sometimes be performed without aspiration. It shows tissue structure well, but aspiration is often better for examining individual cells and performing certain specialized tests. Using only one method can mean losing complementary information.

An image-guided procedure may help when the usual site is difficult to reach or a specific abnormal area must be sampled. It may take longer and, if CT guidance is used, involves a small amount of radiation.

Choosing not to have the procedure is also an option. Ask what uncertainty would remain, whether treatment would be delayed, and whether another test could answer the same question.

When to call your healthcare team

Contact your healthcare team promptly for:

These concerns are different from routine follow-up about results or mild soreness.

Seek emergency care for heavy bleeding that does not stop with firm pressure, fainting, severe breathing difficulty, chest pain, or signs of a severe allergic reaction such as swelling of the face or throat.

- Increasing pain rather than gradual improvement
- Redness, warmth, swelling, or drainage at the site
- Fever or chills
- Bleeding that returns after initially stopping
- A dressing that repeatedly becomes soaked with blood
- New numbness, weakness, or difficulty walking

Common questions

Will I be asleep?

Usually not. Most aspirations use local anaesthesia, so you are awake but the skin and tissues are numbed. Some facilities offer moderate or deeper sedation, especially if anxiety, age, pain, or another procedure makes it appropriate. General anaesthesia is uncommon.

Can I drive home?

You may be able to drive after local anaesthesia if you feel well and the facility agrees. You must not drive after sedation. Arrange a responsible adult to take you home.

How painful is a bone marrow aspiration?

The numbing injection can sting. You may then feel pressure as the needle enters the bone. Drawing out the marrow often causes a brief, sharp pulling or cramping pain. Tell the team if pain is difficult to manage.

When will I know the results?

Some results return within a few days. Specialized genetic, chromosome, culture, or molecular tests can take one or more weeks. Ask whether your results will be released together or discussed as they become available.

Why do I need both an aspiration and a biopsy?

They answer different questions. Aspiration shows individual marrow cells, while a biopsy shows the structure of the marrow tissue. Doing both can reduce the chance of missing useful information.

What if no marrow comes into the syringe?

This is sometimes called a "dry tap." It can happen for technical reasons or because of changes within the marrow. The core biopsy may still provide useful information, or another sample may be recommended.

Sources

- Bain BJ. "Bone marrow aspiration." Journal of Clinical Pathology . 2001;54(9):657-663.
- Lee SH, Erber WN, Porwit A, Tomonaga M, Peterson LC. "ICSH guidelines for the standardization of bone marrow specimens and reports." International Journal of Laboratory Hematology . 2008;30(5):349-364.
- Mayo Clinic. "Bone marrow biopsy and aspiration." Patient Care and Health Information.
- MedlinePlus Medical Encyclopedia, U.S. National Library of Medicine. "Bone marrow biopsy."
- Merck Manual Professional Edition. "Bone Marrow Aspiration and Biopsy." Clinical Procedures.