PROCEDURE

Muscle biopsy

A muscle biopsy removes a small tissue sample for laboratory testing.

PURPOSE
Examine muscle tissue to help identify a muscle disorder

PROCEDURE TYPE
Diagnostic; minimally invasive needle sampling or open surgical sampling

WHERE IT IS DONE
Outpatient clinic, procedure room, or operating theatre

ANAESTHESIA
Local; sedation or general anaesthesia for selected patients

HOW LONG IT TAKES
Usually 30 to 60 minutes

PREPARATION
Medication review; fasting if sedation or general anaesthesia is planned

RECOVERY
Same day; no driving after sedation or general anaesthesia

MAIN RISKS
Bleeding, infection, scarring, persistent pain, or nerve injury

RESULTS
Usually available within several days to a few weeks

Overview

A muscle biopsy is a procedure that removes a small piece of muscle for examination in a laboratory. It can show changes in muscle fibres, inflammation, abnormal proteins, problems with energy production, or other features that may explain muscle weakness or damage.

The sample is usually taken from the thigh, upper arm, shoulder, or calf. Your healthcare team chooses a muscle that is affected enough to provide useful information but is not severely damaged.

There are two main methods. A needle biopsy uses a hollow needle through a small cut in the skin. An open biopsy uses a larger incision so the clinician can see the muscle and remove a small piece. Open biopsy provides more tissue but usually leaves a larger scar.

A biopsy is one part of an assessment. Its findings are interpreted alongside your symptoms,

examination, blood tests, imaging, electrical muscle tests, and sometimes genetic tests. It does not always provide a definite diagnosis.

Why the procedure is performed

A muscle biopsy may be offered when other tests have not fully explained muscle weakness, muscle pain, raised muscle enzymes, or reduced exercise tolerance.

The laboratory may look for evidence of:

The findings may help narrow the diagnosis, guide further testing, or help your healthcare team choose treatment. In some cases, tissue is stored for additional testing if the first examination does not provide an answer.

- Muscle inflammation, including inflammatory muscle diseases
- Inherited muscular dystrophies or other genetic muscle disorders
- Metabolic or mitochondrial disorders affecting muscle energy
- Abnormal storage of fats, sugars, or proteins
- Blood-vessel inflammation or reduced blood supply
- Certain infections or medication-related muscle injury

Who should and should not have it

A muscle biopsy may be useful if blood tests, genetic testing, imaging, or electrical tests suggest a muscle disorder but do not identify its type. It may also be needed when seeing the tissue directly could affect treatment decisions.

It is not the right test for every person with weakness or muscle pain. Genetic testing can now diagnose many inherited conditions without a biopsy. A biopsy may also be unhelpful if the suspected problem affects nerves rather than muscle.

The procedure may be delayed, avoided, or moved to another site if:

Do not stop a prescribed blood thinner like warfarin or apixaban on your own. Your treating team should weigh the risk of bleeding against the reason you take the medicine.

- There is an infection or broken skin over the planned biopsy area
- A bleeding disorder or blood-thinning medicine creates an unsafe bleeding risk
- The selected muscle is severely wasted or was recently injured

- Recent injections, surgery, or needle testing could alter that muscle's appearance
- Sedation or anaesthesia would create more risk than expected benefit

How to prepare

The treating facility's own instructions take priority because preparation differs between needle and open biopsy and according to the anaesthesia planned.

Tell the team about all prescription medicines, over-the-counter products, vitamins, and supplements you use. They especially need to know about blood thinners, antiplatelet medicines, bleeding conditions, allergies, pregnancy, and previous problems with anaesthesia.

You may be asked to:

Fasting is often unnecessary when only local anaesthetic is used. Follow the facility's exact instructions rather than fasting unnecessarily.

Ask whether the biopsy site will affect walking, climbing stairs, or using your arm. This can help you plan transport, work, and help at home.

- Have blood tests to check clotting or general health
- Adjust certain medicines under medical guidance
- Avoid food and drink before sedation or general anaesthesia
- Arrange for an adult to take you home and stay with you
- Avoid applying cream or lotion to the biopsy area

What happens during the procedure

Before the biopsy, the team confirms the muscle and marks the site. The choice may be guided by your examination, MRI or ultrasound images, or electrical muscle testing.

You will usually lie on an examination table. The skin is cleaned, and local anaesthetic is injected to numb the area. This injection may sting briefly. You may still feel pressure or pulling, but you should not feel sharp pain.

For a needle biopsy, the clinician makes a very small cut and passes a hollow needle into the muscle. More than one sample may be taken through the same opening.

For an open biopsy, the clinician makes an incision through the skin and tissue covering the muscle. A small piece of muscle is removed, and the incision is closed with stitches, adhesive strips, or skin glue.

Sedation or general anaesthesia may be used for some open biopsies, for children, or when remaining still would be difficult. With general anaesthesia, you are unconscious. With sedation, you are relaxed and sleepy but may not be fully unconscious.

The sample must be handled carefully because different tests require different preparation. It is sent to a specialist laboratory after the wound is covered with a dressing.

Recovery and what to expect afterward

Pain: Mild soreness, bruising, or a pulling feeling is common around the biopsy site. Use the pain relief recommended by your team. Contact them if pain is becoming worse instead of gradually improving.

Eating: You can usually eat normally after local anaesthetic. After sedation or general anaesthesia, start according to your discharge instructions, especially if you feel nauseated.

Activity: Keep the dressing and wound clean as directed. Limit strenuous exercise, heavy lifting, and forceful use of the sampled muscle until the wound is healing. The exact restriction depends on the biopsy site and whether the procedure was needle-based or open.

Driving: Do not drive after sedation or general anaesthesia. You will need someone to take you home, and you should follow the facility's stated driving restriction. After local anaesthetic alone, driving may still be unsafe if pain, weakness, or the dressing limits control of the vehicle.

Work: Many people return to desk-based work within a day or two. A larger open biopsy or physically demanding work may require more time away. Your team can advise based on the muscle sampled and your job.

Risks and possible complications

Most biopsy wounds heal without a serious problem. Possible complications include:

Removing a small sample does not usually cause a meaningful loss of muscle function. However, the risk depends partly on the location and size of the sample.

Sometimes the tissue does not show a clear abnormality or is not suitable for every planned test. Further testing, and occasionally another biopsy, may then be discussed.

- Bleeding, bruising, or a collection of blood under the skin
- Infection at the incision
- A visible or tender scar

- Ongoing pain, numbness, or altered skin sensation
- Injury to a nearby nerve or blood vessel
- Temporary weakness or stiffness in the sampled muscle
- A reaction to sedation or anaesthesia

Results and follow up

A specialist pathologist examines the sample under a microscope. Additional tests may study muscle proteins, enzymes, inflammation, stored substances, or the structures that produce energy inside cells.

Some findings are available within several days. Special staining, electron microscopy, enzyme testing, or tests sent to another laboratory may take a few weeks.

Your healthcare team will arrange routine follow-up to explain:

An unclear result does not mean your symptoms are not real. Muscle disorders can affect muscles unevenly, and some conditions do not produce distinctive biopsy changes.

- What the sample showed
- Whether the findings match your other tests
- Whether more blood, genetic, imaging, or electrical tests are needed
- How the result affects treatment or monitoring

Alternatives

The alternatives depend on what your team is trying to find. They may include:

Ask what information the biopsy is expected to add and whether its result is likely to change your care.

- Blood tests: Easier and less invasive, but they usually cannot show the exact pattern of tissue damage
- Genetic testing: Can confirm many inherited disorders without surgery, but may not find every genetic change or explain whether inflammation is active
- Electromyography and nerve-conduction studies: Test electrical activity in muscles and nerves, but do not show tissue under a microscope

- MRI or ultrasound: Can identify affected muscles and guide biopsy selection, but may not identify the specific cause
- Skin or nerve biopsy: Useful for selected nerve, blood-vessel, or metabolic conditions, but examines different tissue
- Clinical monitoring: Avoids an immediate procedure, but may delay a diagnosis or treatment decision

When to call your healthcare team

Contact your healthcare team during routine hours if you have questions about the dressing, stitches, activity limits, or when to return to work. Also call if soreness is not gradually improving.

Seek prompt, same-day medical advice for increasing redness, warmth, swelling, drainage, fever, worsening pain, new numbness, or bleeding that continues despite firm pressure.

Seek emergency help for uncontrolled heavy bleeding, fainting, severe breathing difficulty, or swelling of the face or throat after medicines or anaesthesia.

Common questions

Will I be asleep?

Usually not for a needle biopsy. Local anaesthetic numbs the area while you remain awake. Sedation or general anaesthesia may be used for an open biopsy or in selected patients.

Can I drive home?

Not after sedation or general anaesthesia. Arrange a ride home. Even after local anaesthetic, do not drive if the biopsy site affects safe control of the vehicle.

How painful is a muscle biopsy?

The numbing injection can sting. During the biopsy, you may feel pressure or pulling. Mild soreness afterward is common, while severe or increasing pain needs medical advice.

Will the biopsy make my muscle weaker?

The sample is small and usually does not cause noticeable long-term weakness. Temporary soreness or stiffness may make the area feel weaker during healing.

When will I know the result?

Some findings may be ready within several days, but specialized laboratory tests can take a

few weeks. Ask when and how your team will discuss the report.

Will I have stitches or a scar?

A needle biopsy may need only adhesive strips or a small dressing. An open biopsy usually needs wound closure and leaves a larger scar.

Sources

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