PROCEDURE

Carpal tunnel biopsy

A carpal tunnel biopsy removes a small tissue sample, usually during release surgery, to check for amyloid or another abnormal process.

PURPOSE
Detect and identify amyloid or another abnormal tissue process

PROCEDURE TYPE
Diagnostic surgical biopsy, usually during therapeutic carpal tunnel release

WHERE IT IS DONE
Outpatient operating theatre or procedure room

ANAESTHESIA
Usually local; sedation, regional, or general anaesthesia sometimes used

HOW LONG IT TAKES
About 15-30 minutes with carpal tunnel release

PREPARATION
Medication review; fasting if sedation or general anaesthesia planned

RECOVERY
Same day; no driving while sedated or hand control limited

MAIN RISKS
Bleeding, infection, nerve injury, persistent scar pain

RESULTS
Several days to two weeks for pathology

Overview

A carpal tunnel biopsy removes a small piece of tissue from the wrist for examination in a laboratory. It is usually done during carpal tunnel release surgery rather than as a separate operation.

The sample often comes from the tenosynovium, the thin tissue surrounding the tendons that pass through the carpal tunnel. A sample may also be taken from the transverse carpal ligament, the strong band of tissue cut during release surgery.

The main reason for this biopsy is to look for amyloid. Amyloid is an abnormal protein that can build up in tissues. Carpal tunnel tissue may contain amyloid before related problems become noticeable elsewhere. However, finding amyloid in the wrist does not by itself prove that it is affecting the heart or other organs.

A biopsy may occasionally investigate unusual inflammation, crystal deposits, infection, or a mass. The laboratory tests requested should match the reason for taking the sample.

Why the procedure is performed

Your surgeon may discuss a biopsy if you are already having carpal tunnel release and your medical history raises the possibility of amyloidosis, the condition caused by amyloid deposits.

Features that may lead to this discussion include carpal tunnel syndrome affecting both hands, symptoms returning after previous release surgery, or other findings sometimes associated with amyloid. These can include certain heart problems, spinal canal narrowing, or a previous biceps tendon rupture. None of these features alone means that you have amyloidosis.

During laboratory testing, a stain called Congo red can show whether amyloid is present. If it is found, further testing should identify the protein type. This is important because transthyretin amyloid and light-chain amyloid have different causes, assessments, and treatments.

The biopsy does not improve the results of carpal tunnel release itself. Its purpose is to provide diagnostic information while the surgeon already has access to the tissue.

Who should and should not have it

A carpal tunnel biopsy may be reasonable when:

Routine biopsy for everyone having carpal tunnel surgery is not universally recommended. The chance of finding amyloid increases in selected groups, but there is no single screening rule that applies to every person. Your age, health history, type of surgery, and what would happen after a positive result should be considered.

A biopsy may not be appropriate if you do not need carpal tunnel surgery and there is a safer way to investigate the concern. Taking tissue may also offer little value if the result would not affect your decisions or care.

The procedure may be delayed because of an active infection near the wrist, an uncontrolled bleeding problem, or a medical condition that makes surgery or anaesthesia unsafe at that time. Blood-thinning medicines require an individual plan; they are not always stopped.

If an endoscopic release is planned, obtaining tissue may require a separate or larger incision. The added value of the biopsy should be weighed against that change.

- You are having open carpal tunnel release and the result could change your care

- Amyloidosis is suspected because of your history, examination, or other tests
- The surgeon sees thickened, inflamed, or otherwise unusual tissue
- A specific infection, crystal deposit, or abnormal growth needs investigation

How to prepare

Follow the treating facility's own instructions first, because they take priority over general information.

Give the surgical team a current list of prescription medicines, non-prescription products, and supplements. Mention aspirin, anticoagulants such as warfarin, and other medicines that affect clotting. Do not stop a blood thinner like warfarin or apixaban unless the clinician responsible for the procedure tells you when and how to do so.

Ask whether you need to stop eating or drinking. Fasting is often unnecessary for local anaesthesia alone but may be required if sedation or general anaesthesia is planned.

Arrange transport home if you will receive sedation or general anaesthesia. You may also need help because a bandaged or sore hand can make driving unsafe.

Tell the team about allergies, previous anaesthesia problems, implanted devices, and any new illness. Remove rings from the hand before arriving, as swelling can make them difficult to take off later.

What happens during the procedure

The team confirms the wrist, planned operation, and reason for the biopsy. Your skin is cleaned, and sterile coverings are placed around the area.

Local anaesthetic may be injected to numb the wrist and hand. Some people also receive medicine to relax them, a regional nerve block that numbs the arm, or general anaesthesia that makes them unconscious.

During an open carpal tunnel release, the surgeon makes an incision in the palm and divides the transverse carpal ligament. This creates more space for the median nerve, which supplies feeling and movement to parts of the hand.

The surgeon removes a small sample of tissue from around the flexor tendons or from the ligament. Taking the sample usually adds only a few minutes. It is labelled and sent to a pathology laboratory.

The incision is then closed and covered with a dressing. You are monitored briefly before going home unless your health or anaesthetic requires a longer stay.

Recovery and what to expect afterward

Pain is usually related mainly to the carpal tunnel release rather than the small biopsy. Tenderness, bruising, and swelling around the palm are expected at first. Use prescribed or recommended pain relief as directed, and keep the hand raised if instructed.

You can usually eat and drink normally after local anaesthesia. If you had sedation or general anaesthesia, begin according to the recovery team's advice, especially if you feel nauseated.

Follow your surgeon's instructions about dressings, washing, finger movement, lifting, and wound care. Gentle finger movement is often encouraged, but forceful gripping and heavy lifting are limited while the incision heals.

Do not drive on the day of sedation or general anaesthesia. After local anaesthesia, wait until you can grip and control the vehicle safely, the anaesthetic has worn off, and your insurer's requirements are met.

Returning to work depends on which hand was treated and what your job involves. Desk work may be possible sooner than work requiring strong gripping, tools, vibration, or heavy lifting. Your surgical team can give restrictions based on the release operation and wound.

Risks and possible complications

The biopsy adds little tissue removal, but it shares the risks of hand surgery. These include bleeding, a collection of blood under the skin, infection, delayed wound healing, and a tender or thickened scar.

Nearby nerves, tendons, or blood vessels can be injured, although this is uncommon. Some people have ongoing palm pain, stiffness, weakness, numbness, or incomplete relief after carpal tunnel release. Complex regional pain syndrome, which causes persistent pain and sensitivity, is a less common surgical complication.

A sample may be too small or damaged to interpret. A negative biopsy does not completely exclude amyloidosis. A positive result can also require more tests because local amyloid in wrist tissue does not show which other organs, if any, are affected.

Results and follow up

A pathologist examines the sample under a microscope. Results commonly take several days, but specialized staining or protein typing can take longer.

If no amyloid or other abnormality is found, your clinician will explain whether any further assessment is still needed. The biopsy result should be considered alongside your history and other tests.

If amyloid is found, the next step is to confirm its type. Techniques may include immunohistochemistry, which uses antibodies to identify proteins, or mass spectrometry, which analyzes the proteins directly.

Further evaluation may include blood and urine tests for abnormal antibody proteins, heart tests, imaging, or referral to an amyloidosis specialist. These tests assess whether the finding is limited to the wrist or part of a wider condition. Keep the routine postoperative appointment even if the pathology result is not yet available.

Alternatives

You can have carpal tunnel release without a biopsy. This avoids removing extra tissue, but it gives up the opportunity to test tissue that is already accessible during surgery.

If surgery is not otherwise needed, observation may be reasonable while the reason for possible amyloidosis is assessed. This avoids an incision but provides no tissue diagnosis.

Other options may include:

The most useful alternative depends on why amyloidosis or another tissue disorder is being considered.

- Blood and urine testing: Non-invasive and useful for detecting abnormal light-chain proteins, but these tests do not directly show amyloid in tissue
- Abdominal fat-pad aspiration: Uses a needle to collect fat and is less invasive, but a negative result can miss amyloidosis
- Bone-tracer heart imaging: Can support a non-invasive diagnosis of transthyretin cardiac amyloidosis in selected circumstances, but it does not replace the required blood and urine assessment
- Biopsy of another tissue or affected organ: May answer a more specific question, but some sites carry greater bleeding or organ-injury risks

When to call your healthcare team

Contact the surgical team promptly for increasing redness, warmth, drainage, fever, an opening wound, or pain and swelling that worsen rather than settle. New or increasing numbness, weakness, or difficulty moving the fingers also needs timely assessment.

Seek emergency care for bleeding that will not stop with firm pressure, rapidly increasing swelling with severe pain, or fingers that become cold, pale, or blue. Call emergency services for trouble breathing, fainting, or signs of a severe allergic reaction.

Mild incision soreness, limited bruising, and gradual improvement can usually be discussed at routine follow-up. Use the contact instructions provided by the treating facility if you are uncertain.

Common questions

Will I be asleep?

Usually not. Many carpal tunnel releases and biopsies are done with local anaesthetic while you are awake. Sedation, a regional block, or general anaesthesia may be offered in some settings.

Can I drive home?

No if you received sedation or general anaesthesia. Even after local anaesthesia, a numb, painful, or heavily bandaged hand may prevent safe control of a vehicle. Arrange a ride if instructed.

How painful is it?

The biopsy itself should not hurt while the anaesthetic is working. Soreness afterward mainly comes from the incision and carpal tunnel release. It should generally improve as the wound heals.

When will I know the result?

Initial pathology commonly takes several days. Confirming that a deposit is amyloid and identifying its protein type may take longer, sometimes up to two weeks or more.

Does a positive biopsy mean I have heart amyloidosis?

No. It confirms amyloid in the sampled wrist tissue. Further tests are needed to identify the type and determine whether other parts of the body are affected.

Sources

- Sperry BW, Reyes BA, Ikram A, et al. "Tenosynovial and Cardiac Amyloidosis in Patients Undergoing Carpal Tunnel Release." Journal of the American College of Cardiology . 2018;72(17):2040-2050.
- Donnelly JP, Hanna M, Sperry BW, Seitz WH Jr. "Carpal Tunnel Syndrome: A Potential Early, Red-Flag Sign of Amyloidosis." Journal of Hand Surgery American Volume . 2019;44(10):868-876.
- Kittleson MM, Ruberg FL, Ambardekar AV, et al. "2023 ACC Expert Consensus Decision Pathway on Comprehensive Multidisciplinary Care for the Patient With Cardiac Amyloidosis." Journal of the American College of Cardiology . 2023;81(11):1076-1126.
- Garcia-Pavia P, Rapezzi C, Adler Y, et al. "Diagnosis and Treatment of Cardiac Amyloidosis: A Position Statement of the ESC Working Group on Myocardial and Pericardial Diseases." European Heart Journal . 2021;42(16):1554-1568.
- American Academy of Orthopaedic Surgeons. Management of Carpal Tunnel Syndrome: Evidence-Based Clinical Practice Guideline . 2024.