

About

Basics of carpal tunnel syndrome

Carpal tunnel syndrome (CTS) is a condition that can cause pain, tingling, numbness, and weakness in the fingers and thumb.

Specifically, carpal tunnel syndrome is the compression of the median nerve located in the wrist (see figure 1). This nerve supplies feeling to the thumb, index, middle and ring finger. The carpal tunnel is a well defined space in the palm at the wrist. The two walls of this anatomical tunnel are formed by bones that support the wrist. The roof of the tunnel is the thick transverse carpal ligament. Several tendons and the median nerve pass through this tunnel. Space in the tunnel decreases when tendons swell or the ligament thickens. Pressure inside the tunnel increases and restricts blood flow to the nerve. The pressure is most noticeable when the wrist is fully extended or flexed.

Prognosis

CTS often affects both hands. If not treated, it can lead to permanent nerve and muscle damage. With early diagnosis and treatment, however, there is an excellent chance of complete recovery.

Carpal tunnel syndrome may improve with rest and splinting or may require surgery. It is important that it be treated before permanent nerve and muscle loss take place.

Daily activities

Carpal tunnel syndrome may force changes in daily activities, because the person with CTS:

- drop objects more than usual,
- have trouble grasping or pinching objects, or
- have trouble using hands for certain tasks, such as buttoning a shirt, writing with a pen, or opening a jar lid.

Incidence

Carpal tunnel syndrome affects many people. It can occur at any age. CTS from non-work causes usually affects people in their 50s, while CTS from work causes is highest between the ages of 20 and 40. The condition is more common in women than in men.

Acquisition

Some believe that carpal tunnel syndrome is related to computer use. Many computer manufacturers include warnings about CTS in their consumer information, although there is no proven connection between the two.

Symptoms

Symptoms of carpal tunnel syndrome include:

- Pain, tingling, or numb fingers, especially the thumb, index and middle fingers
- Hand pain and numbness, especially at night
- Tingling in the entire hand
- Morning or daytime numbness relieved by shaking the hand
- Occasional hand weakness and loss of coordination, especially in the morning
- Pain travelling up the forearm as far as the shoulder
- A swollen feeling in the fingers—even though they may not be visibly swollen

Progression

CTS can begin suddenly or gradually.

At first the symptoms come and go, usually affected by excessive use of the hand. When the hand is rested, there may be no symptoms. As the condition worsens and pressure on the nerve becomes greater, the person may experience numbness all the time.

Conditions with similar symptoms

Although many medical conditions and activities are known to be related to carpal tunnel syndrome, most patients with carpal tunnel syndrome have no specific medical problem associated with it. Some conditions that are associated with carpal tunnel syndrome include:

- Thyroid disorders
- [Diabetes](#)
- Aging
- [Arthritis](#)
- [Pregnancy](#) or use of birth control pills (both may cause swelling in hands)
- Amyloidosis, a disease in which a protein substance collects in body organs

Causes

The numbness, tingling, and weakness from CTS are due to pressure on the median nerve (see figure 2). This nerve carries signals between the hand and brain. In the wrist, the median nerve and several tendons that allow the fingers and thumb to bend pass through the carpal tunnel, a "tunnel" created by the carpal (wrist) bone and other tissue. The most common cause of CTS is swelling or inflammation around the tendons and nerve, which increases the pressure within the carpal tunnel. This increased pressure affects median nerve function, causing the symptoms of CTS.

In most patients with CTS, the cause is not known. However, anything that causes swelling on the tendons or produces repeated pressure on the median nerve can lead to CTS or make it worse if the condition already exists.

Possible causes of pressure on the median nerve include:

1. Injuries, such as a blow to the wrist. This may break one or more of the carpal bones and damage the median nerve.
2. Arthritis-related diseases, such as [rheumatoid arthritis](#). These diseases cause pain and swelling in joints and other parts of the body. They can cause swelling of tissues in the carpal tunnel, resulting in pressure on the median nerve.
3. Work activities and hobbies that require highly repetitive wrist or finger motion, especially in combination with forceful pinching or gripping or activities involving vibrating hand tools or instruments that put pressure at the base of the palm. Some examples are:
 1. meat, fish, and poultry processing
 2. construction and carpentry
 3. electronics assembly
 4. logging and sawmill operations
 5. supermarket cashiering and scanning
 6. activities of hairdressers, factory and farm workers, and mechanics
 7. needlework or knitting
 8. typing or working at a computer keyboard

Diagnosis

To diagnose carpal tunnel syndrome, a doctor will review a patient's medical history and examine the hand and wrist. A doctor may look for strength, sensation and sensitivity of the hand to help diagnose carpal tunnel syndrome.

Diagnostic tests

One or all of the following [tests](#) may be done to help confirm a diagnosis of CTS.

- Tinel's sign test: The doctor will gently tap the front of the wrist. If this causes tingling or pain in the hand or forearm, it may be due to CTS.
- Phalen's sign test: The doctor will ask the patient to bend your wrist down as far as it will go and to hold this position from 15 seconds to three minutes. If the patient feels tingling or pain, it may be due to CTS.
- Nerve conduction velocity (NCV) study: This measures the nerve's ability to send electrical impulses to the muscle. If the electrical impulses are slowed down in the carpal tunnel, then CTS may be present.
- X-rays of the hands and blood tests may be used to find out if there are any other medical problems that are causing CTS.
- Studies called Electromyogram and nerve conduction velocity or EMG/NCV tests map the function of the nerve and help to confirm whether the condition is mild or severe. This electrical study can also help to identify other diseases or conditions that may mimic carpal tunnel syndrome. Certain other conditions can place pressure on nerves at different sites such as the neck and elbow.

Treatment

Mild cases of carpal tunnel syndrome may be treated with braces, medicines, injections, or self-management techniques. Moderate and severe cases of CTS are sometimes treated with surgery.

Streaming video



Dr. Trumble discusses hand injuries and surgery in the UWTV video, "Carpal Tunnel Syndrome: Advances in Treatment".

Self-management

Adjusting your daily work activities may help prevent and/or relieve CTS symptoms. Here are some ways you can do this:

- Rest your wrists and hands from time to time
- Alternate tasks to reduce the pressure on your wrist
- Delegate tasks that bother your hands to co-workers or family members
- Modify or change any daily activities, including hobbies, that put too much pressure on your wrist.

If you think your CTS may be due to activities at your [job](#), talk to your doctor and your manager. They may be able to help you make some changes that will relieve the problem. This could include adjusting your work area or reducing the amount of time you spend at particular tasks. An occupation therapist can help you find ways to modify your activities or suggest tool modifications to put less stress on your wrists.

Diet

CTS related to a vitamin deficiency can be treated with Vitamin B6, though most patients with a normal diet do not have significant vitamin deficiencies.

Medications

Oral [anti-inflammatory medicines such as aspirin or ibuprofen](#) can reduce inflammation, swelling, and pain.

Surgery

For moderate and severe cases of CTS, surgery is generally recommended. Although braces or medications may help, they will not relieve all the symptoms of pain, numbness or tingling. Without surgery to relieve pressure on the nerve, these symptoms may become permanent.

The procedure, called carpal tunnel release, releases the transverse carpal ligament to relieve the pressure on the median nerve. This can be done through:

- an incision from the palm to the wrist,
- a limited incision in the palm only, or
- an endoscopic carpal tunnel release using a special fibro-optic instrument.

The last two options decrease the length of the scar, which can speed recovery.

This is usually a simple operation that can be done on an outpatient basis.

After surgery, you will probably have some use of your hand within two weeks or so, but you should avoid activities that put too much stress on your wrist.. Usually, you will regain full use of your hand about six to 10 weeks after surgery. (Recovery time may be three to four months for those people who do a lot of manual labor.) Your restrictions after surgery will depend on whether or not you had surgery on your writing hand. Limitations may include:

- Driving: Most people can drive one to two days after surgery.
- Writing: Although you can do some writing one week after surgery, it will often take 4-6 weeks to write comfortably.
- Gripping and pulling: Light activities may be possible within 6-8 weeks, but full grip strength does not return for 10-12 weeks. Our surveys have shown that grip strength continues to improve for up to one year.

Possible side effects and complications of the surgery include:

- Pain and soreness at the surgical site can be quite common.
- Symptoms can return even when precautions are taken to avoid excess vibration or flexion after surgery.
- Although nerve injury during surgery is extremely rare, it can occur, especially if the nerve follows an unusual path across the wrist.

Results from surgery are generally quite good if severe weakness has not developed.

Joint aspiration

Injections of [corticosteroids](#), or cortisone-like medications, into the wrist can may reduce the swelling that causes pressure on the median nerve. These injections often bring significant relief for many people with CTS.

Splints or braces

A wrist splint or brace (see figure 3) may be used to keep the wrist in a straight position while you sleep. The brace prevents extreme wrist motion. You may be requested to wear a daytime splint if the symptoms persist during your daily activities. The splint helps reduce swelling that may be causing CTS.

An occupational therapist can make a splint that will meet your needs. A wrist brace may be prescribed for symptoms of a few weeks or months.

Credits

Some of this material may also be available in an [Arthritis Foundation](#) brochure. Contact the Washington/Alaska Chapter Helpline: (800) 542-0295. If dialing from outside of WA and AK, contact the National Helpline: (800) 283-7800.

Some of this information was adapted from the pamphlet originally prepared for the Arthritis Foundation by Charles H. McKenna, M.D., Lynn Yasuda, MSED, Jeffrey N. Katz, M.D., M.S., William Marras, Ph.D. and Lewis Millender, M.D. This material is protected by copyright.

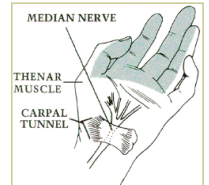


Figure 1 - Pressure on the median nerve may cause pain, numbness, and tingling in the shaded areas

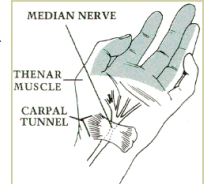


Figure 2 - Pressure on the median nerve

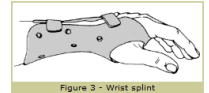


Figure 3 - Wrist splint

Carpal Tunnel Syndrome.

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