

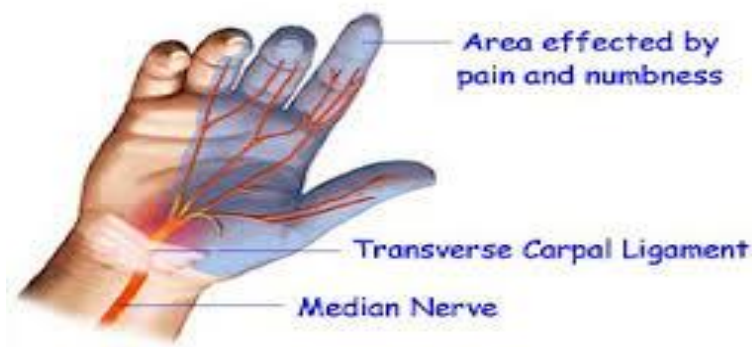
## Carpal Tunnel Syndrome

You're working at your desk, trying to ignore the tingling or numbness you've had for months in your hand and wrist. Suddenly, a sharp, piercing pain shoots through the wrist and up your arm. Is it just a passing cramp? Well, more likely you have carpal tunnel syndrome, a painful progressive condition caused by compression of a key nerve in the wrist.



### What is carpal tunnel syndrome?

Carpal tunnel syndrome occurs when the median nerve, which runs from the forearm into the palm of the hand, becomes pressed or squeezed at the wrist. The median nerve controls sensations to the palm side of the thumb and fingers (although not the little finger), as well as impulses to some small muscles in the hand that allow the fingers and thumb to move. The carpal tunnel - a narrow, rigid passageway of ligament and bones at the base of the hand - houses the median nerve and tendons. Sometimes, thickening from irritated tendons or other swelling narrows the tunnel and causes the median nerve to be compressed. The result may be pain, weakness, or numbness in the hand and wrist, radiating up the arm. Although painful sensations may indicate other conditions, carpal tunnel syndrome is the most common and widely known of the entrapment neuropathies in which the body's peripheral nerves are compressed or traumatized.



## What are the symptoms of carpal tunnel syndrome?

Carpal tunnel syndrome usually starts gradually with numbness or tingling in your thumb, index and middle fingers that comes and goes. This may be associated with discomfort in your wrist and hand. Common carpal tunnel syndrome symptoms include:

- **Tingling or numbness.** You may experience tingling and numbness in your fingers or hand, especially your thumb and index, middle or ring fingers, but not your little finger. This sensation often occurs while holding a steering wheel, phone or newspaper or, commonly, waking you from sleeping. The sensation may extend from your wrist up your arm. Many people "shake out" their hands to try to relieve their symptoms. As the disorder progresses, the numb feeling may become constant.
- **Weakness.** You may experience weakness in your hand and a tendency to drop objects. This may be due to the numbness in your hand or weakness of the thumb's pinching muscles, which are controlled by the median nerve.

### When to see a doctor

If you have persistent signs and symptoms suggestive of carpal tunnel syndrome, especially if they interfere with your normal activities and sleep patterns, see your doctor. If you leave the condition untreated, permanent nerve and muscle damage can occur.

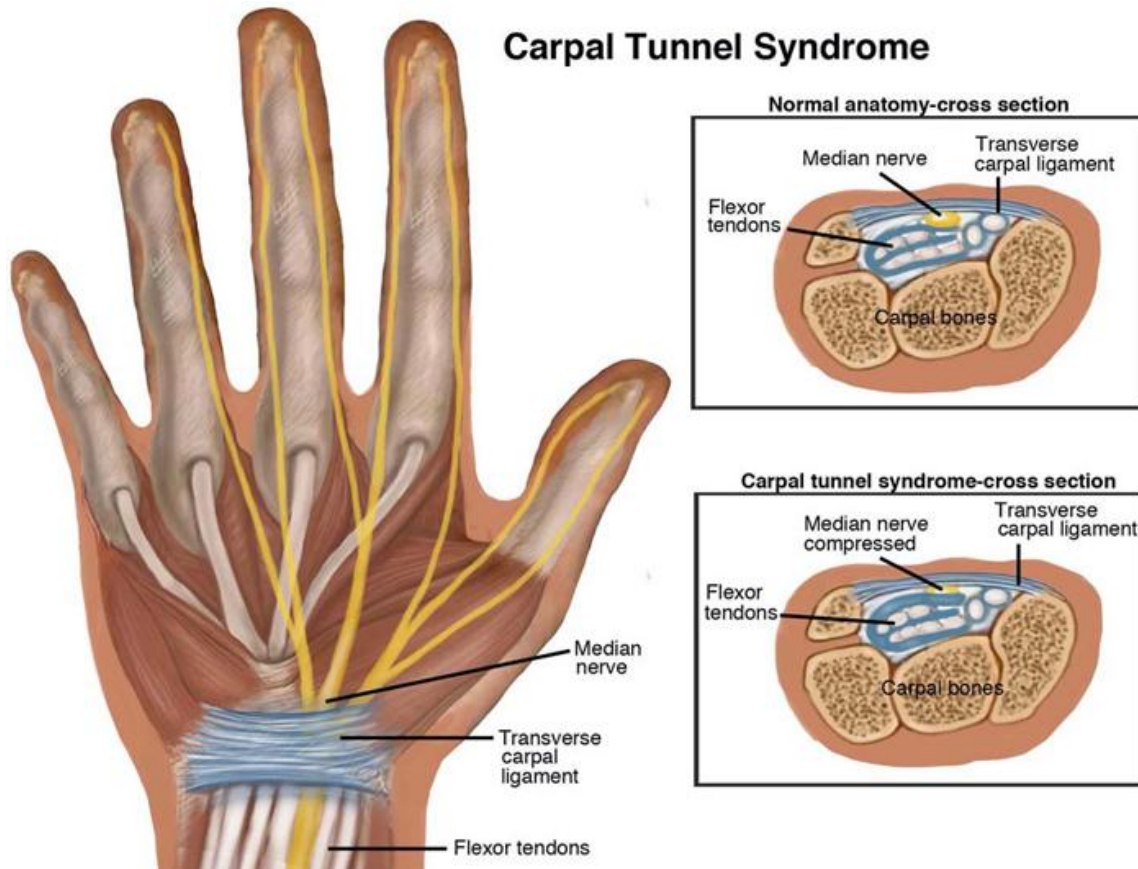
## What are the causes of carpal tunnel syndrome?

Carpal tunnel syndrome occurs as a result of compression of the median nerve.

The median nerve runs from your forearm through a passageway in your wrist (carpal tunnel) to your hand. It provides sensation to the palm side of your thumb and fingers, with the exception of your little finger. It also provides nerve signals to move the muscles around the base of your thumb (motor function).

In general, anything that crowds, irritates or compresses the median nerve in the carpal tunnel space can lead to carpal tunnel syndrome. For example, a wrist fracture can narrow the carpal tunnel and irritate the nerve, as can the swelling and inflammation resulting from rheumatoid arthritis.

In many cases, no single cause can be identified. It may be that a combination of risk factors contributes to the development of the condition. There is little clinical data to prove whether repetitive and forceful movements of the hand and wrist during work or leisure activities can cause carpal tunnel syndrome.



## Who is at risk of developing carpal tunnel syndrome?

A number of factors have been associated with carpal tunnel syndrome. Although by themselves they don't cause carpal tunnel syndrome, they may increase your chances of developing or aggravating median nerve damage. These include:

- **Anatomic factors:** A wrist fracture or dislocation that alters the space within the carpal tunnel can create extraneous pressure on the median nerve. People with smaller carpal tunnels may be more likely to have carpal tunnel syndrome.
- **Sex:** Generally more common in women. This may be because the carpal tunnel area is relatively smaller than in men, and there may be less room for error. Women who have carpal tunnel syndrome may also have smaller carpal tunnels than women who don't have the condition.
- **Nerve-damaging conditions:** Some chronic illnesses, such as diabetes, increase your risk of nerve damage including damage to your median nerve.
- **Inflammatory conditions:** Inflammatory illnesses such as rheumatoid arthritis, can affect the tendons in your wrist, exerting pressure on your median nerve.
- **Alterations in the balance of body fluids:** Fluid retention which is common during pregnancy or menopause may increase the pressure within your carpal

tunnel thus irritating the median nerve. Carpal tunnel syndrome associated with pregnancy generally resolves on its own after childbirth.

- **Other medical conditions.** Certain conditions, such as menopause, obesity, thyroid disorders and kidney failure, may increase your chances of carpal tunnel syndrome.
- **Workplace factors.** It's possible that working with vibrating tools or on an assembly line that requires prolonged or repetitive flexing of the wrist may create harmful pressure on the median nerve or worsen existing nerve damage. There are not enough consistent evidence to support extensive computer use as a risk factor for carpal tunnel syndrome, although it may cause a different form of hand pain. The risk of developing carpal tunnel syndrome is not confined to people in a single industry or job, but is especially common in those performing assembly line work - manufacturing, sewing, finishing, cleaning, and meat, poultry, or fish packing. In fact, carpal tunnel syndrome is 3 times more common among assemblers than among data-entry personnel.

## How is carpal tunnel syndrome diagnosed?

Early diagnosis and treatment are important to avoid permanent damage to the median nerve. A physical examination of the hands, arms, shoulders, and neck can help determine if the patient's complaints are related to daily activities or to an underlying disorder and can rule out other painful conditions that mimic carpal tunnel syndrome. The wrist is examined for tenderness, swelling, warmth, and discoloration. Each finger should be tested for sensation, and the muscles at the base of the hand should be examined for strength and signs of atrophy. Routine laboratory tests and X-rays can reveal diabetes, arthritis, and fractures.

Physicians can use specific tests to try to produce the symptoms of carpal tunnel syndrome. In the Tinel test, the doctor taps on or presses on the median nerve in the patient's wrist. The test is positive when tingling in the fingers or a resultant shock-like sensation occurs. The Phalen, or wrist-flexion, test involves having the patient hold his or her forearms upright by pointing the fingers down and pressing the backs of the hands together. The presence of carpal tunnel syndrome is suggested if one or more symptoms, such as tingling or increasing numbness, is felt in the fingers within 1 minute. Doctors may also ask patients to try to make a movement that brings on symptoms.

Often it is necessary to confirm the diagnosis by use of electrodiagnostic tests. In a nerve conduction study, electrodes are placed on the hand and wrist. Small electric shocks are applied and the speed with which nerves transmit impulses is measured. In electromyography, a fine needle is inserted into a muscle; electrical activity viewed on a screen can determine the severity of damage to the median nerve. Ultrasound imaging can show impaired movement of the median nerve. Magnetic resonance imaging (MRI) can show the anatomy of the wrist but to date has not been especially useful in diagnosing carpal tunnel syndrome.

## How is carpal tunnel syndrome treated?

Carpal tunnel syndrome should be treated as early as possible after you begin to experience symptoms.

Some people with mild symptoms of carpal tunnel syndrome can ease their discomfort by taking more frequent breaks to rest their hands, avoiding activities that worsen symptoms and applying cold packs to reduce occasional swelling.

If these techniques don't offer relief within a few weeks, additional treatment options include wrist splinting, medications and surgery. Splinting and other conservative treatments are more likely to help you if you've had only mild to moderate symptoms for less than 10 months.

### Nonsurgical therapy

If the condition is diagnosed early, nonsurgical methods may help improve carpal tunnel syndrome. Methods may include:

- **Wrist splinting:** A splint that holds your wrist still while you sleep can help relieve nighttime symptoms of tingling and numbness. Nocturnal splinting may be a good option if you're pregnant and have carpal tunnel syndrome.
- **Nonsteroidal anti-inflammatory drugs (NSAIDs):** NSAIDs such as ibuprofen, voltaren, arcoxia & celebrex may help relieve pain from carpal tunnel syndrome in the short term.
- **Corticosteroids:** Your doctor may inject your carpal tunnel with a corticosteroid such as cortisone to relieve your pain. Corticosteroids decrease inflammation and swelling, which relieves pressure on the median nerve. Oral corticosteroids aren't considered as effective as corticosteroid injections for treating carpal tunnel syndrome.
- If carpal tunnel syndrome results from an inflammatory arthritis, such as rheumatoid arthritis, then treating the arthritis may reduce symptoms of carpal tunnel syndrome, but this hasn't been proved.

### Surgery

If your symptoms are severe or persist after trying nonsurgical therapy, surgery may be the most appropriate option. The goal of carpal tunnel surgery is to relieve pressure on your median nerve by cutting the ligament pressing on the nerve.

The surgery may be performed with two different techniques. Discuss the risks and benefits of each technique with your surgeon before surgery. Surgery risks may include incomplete release of the ligament, wound infections, scar formation, and nerve or vascular injuries. The final results of endoscopic and open surgery are similar.

- **Endoscopic surgery.** In endoscopic surgery, your surgeon uses a telescope-like device with a tiny camera attached to it (endoscope) to see inside your carpal tunnel and cut the ligament through one or two small incisions in your hand or wrist. Endoscopic surgery may result in less pain than does open surgery in the first few days or weeks after surgery.
- **Open surgery.** In open surgery, your surgeon makes a larger incision in the palm of your hand over the carpal tunnel and cuts through the ligament to free the nerve. This procedure may also be conducted using a smaller incision, which may reduce the risk of complications.

Although symptoms may be relieved immediately after surgery, full recovery from carpal tunnel surgery can take months. Some patients may have infection, nerve damage, stiffness, and pain at the scar. Occasionally the wrist loses strength because the carpal ligament is cut. Patients should undergo physical therapy after surgery to restore wrist strength. Some patients may need to adjust job duties or even change jobs after recovery from surgery.

Recurrence of carpal tunnel syndrome following treatment is rare. The majority of patients recover completely.

## How can carpal tunnel syndrome be prevented?

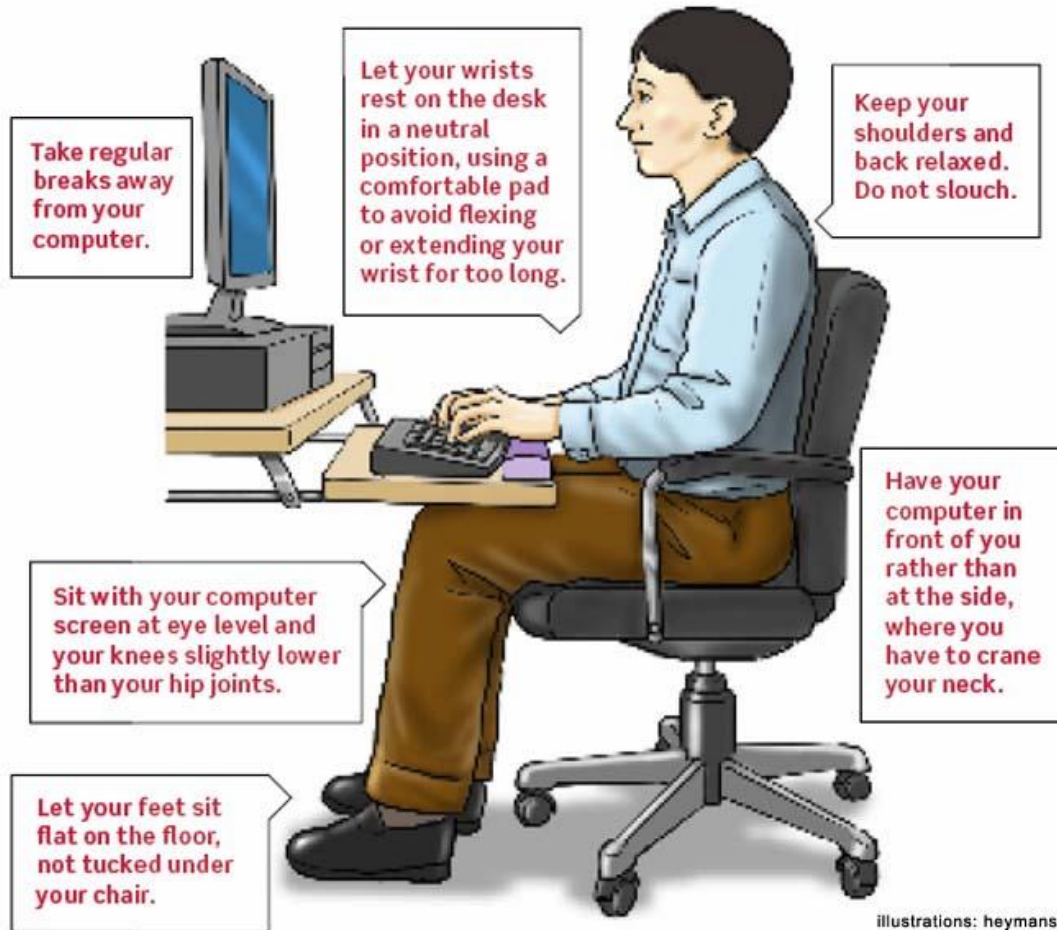
There are no proven strategies to prevent carpal tunnel syndrome, but you can minimize stress on your hands and wrists by taking the following precautions:

- **Reduce your force and relax your grip.** Most people use more force than needed to perform many manual tasks. If your work involves a cash register, for instance, hit the keys softly. For prolonged handwriting, use a big pen with an oversized, soft grip adapter and free-flowing ink. This way you won't have to grip the pen tightly or press as hard on the paper.
- **Take frequent breaks.** Give your hands and wrists a break by gently stretching and bending them periodically. Alternate tasks when possible. If you use equipment that vibrates or that requires you to exert a great amount of force, taking breaks is even more important.
- **Watch your form.** Avoid bending your wrist all the way up or down. A relaxed middle position is best. If you use a keyboard, keep it at elbow height or slightly lower.
- **Improve your posture.** Incorrect posture can cause your shoulders to roll forward. When your shoulders are in this position, your neck and shoulder muscles are shortened, compressing nerves in your neck. This can affect your wrists, fingers and hands.
- **Keep your hands warm.** You're more likely to develop hand pain and stiffness if you work in a cold environment. If you can't control the temperature at work, put on fingerless gloves that keep your hands and wrists warm. Take quick breaks from repetitive activities involving the use of your hands.

- Avoid sleeping on your hands to help ease the pain or numbness in your wrists and hands.

If pain, numbness or weakness recurs and persists, see your doctor.

## Prevent carpal tunnel syndrome with better posture



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