

Preventing and Treating Carpal Tunnel Syndrome

Carpal tunnel syndrome (CTS) is a common condition that causes pain, numbness, and tingling in the hand and arm. The condition occurs when one of the major nerves to the hand – the median nerve – is squeezed, irritated, inflamed or compressed as it travels through the wrist. In most patients, carpal tunnel syndrome gets worse over time, so the earlier it's diagnosed and treated, the better.

WHAT'S HAPPENING?

The carpal tunnel is a narrow passageway in the wrist, about an inch wide. The floor and sides of the tunnel are formed by small wrist bones called carpal bones. The roof of the tunnel is a strong band of connective tissue called the transverse carpal ligament. Because these boundaries are very rigid, the carpal tunnel has little capacity to "stretch" or increase in size.

The median nerve is one of the main nerves in the hand, originating from a group of nerve roots in the neck. These roots come together to form a single nerve in the arm. The median nerve goes down the arm and forearm, passes through the carpal tunnel at the wrist, and goes into the hand. The nerve provides feeling in the thumb and index, middle, and ring fingers. The nerve also controls the muscles around the base of the thumb. Tendons that bend the fingers and thumb also travel through the carpal tunnel. These tendons are called flexor tendons.

CTS occurs when the tunnel becomes narrowed or when tissues surrounding the

flexor tendons swell, putting pressure on the median nerve.

When there is swelling, it takes up space in the carpal tunnel and, over time, crowds the nerve, putting pressure on it which results in pain, numbness, tingling, and weakness or clumsiness in the hand.

WHAT ARE THE RISK FACTORS?

Most cases of CTS are caused by a combination of factors. Studies show that women and older people are more likely to develop the condition.

Other factors include:

- **Heredity.** This is likely to be an important factor. The carpal tunnel may be smaller in some people or there may be anatomical differences that change the amount of space for the nerve – and these traits can run in families.
- **Repetitive hand use.** Repeating the same hand and wrist motions, or activities over a prolonged period of time, may aggravate the tendons in the wrist, causing swelling that puts pressure on the nerve.
- **Hand and wrist position.** Doing activities that involve extreme flexion or extension of the hand and wrist for a prolonged period of time can increase pressure on the nerve.
- **Pregnancy.** Hormonal changes during pregnancy can cause swelling.
- **Health conditions.** Diabetes, rheumatoid arthritis, and thyroid gland imbalance are conditions that are often associated with carpal tunnel syndrome.
- **Sports.** Activities that involve a lot of grasping like tennis or golf.
- **Machinery.** For example drills and lawnmowers with excessive vibration can cause carpal tunnel syndrome.

WHAT ARE THE SYMPTOMS?

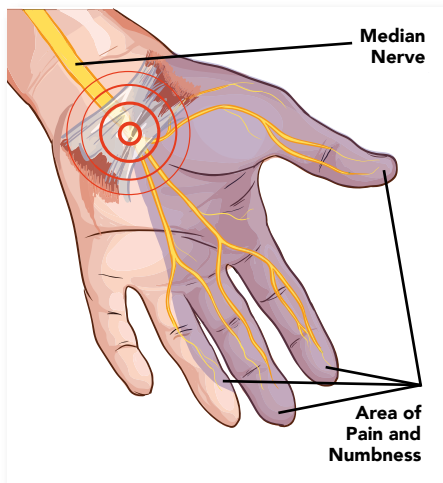
- **Numbness, tingling, burning, and pain** – primarily in the thumb and index, middle, and ring fingers. Especially at night or after use of the hands.
- **Occasional shock-like sensations** that radiate to the thumb and index, middle, and ring fingers
- **Pain or tingling** that may travel up the forearm toward the shoulder
- **Weakness and clumsiness** in the hand – this may make it difficult to perform fine movements such as buttoning your clothes
- **Dropping things** – due to weakness, numbness, or a loss of proprioception (ie. awareness of where your hand is in space).

In most cases, the symptoms of CTS begin gradually – without a specific injury and sometimes the symptoms come and go at first. However, as the condition worsens, symptoms may occur more frequently or may persist for longer periods of time.

Night-time symptoms are very common. Because many people sleep with their wrists bent, symptoms may awaken you from sleep. During the day, symptoms often occur when holding something for a prolonged period of time with the wrist bent forwards or backwards, such as when using a phone, driving, or reading a book.

WHAT CAN BE DONE ABOUT IT?

If diagnosed and treated early, the symptoms of CTS can often be relieved without surgery. If your diagnosis is uncertain, or if your symptoms are mild, your doctor will recommend non-surgical treatment first.



Nonsurgical treatments may include:

- 1 **Bracing or splinting.** Wearing a brace or splint at night will keep you from bending your wrist while you sleep. Keeping your wrist in a straight or neutral position reduces pressure on the nerve in the carpal tunnel. It may also help to wear a splint during the day when doing activities that aggravate your symptoms.
- 2 **Nonsteroidal anti-inflammatory drugs (NSAIDs).** Medications such as ibuprofen and naproxen can help relieve pain and inflammation.
- 3 **Activity changes.** Symptoms often occur when your hand and wrist are in the same position for too long – particularly when your wrist is flexed or extended. If your job or recreational activities aggravate your symptoms, changing or modifying these activities can help slow or stop progression of the disease. In some cases, this may involve making changes to your work site or work station. Your physical therapist can help with advice on correct workspace and computer set-up.
- 4 **Nerve gliding exercises.** You may benefit from exercises that help the median nerve move more freely within the confines of the carpal tunnel. Specific exercises may be recommended by your physical therapist.
- 5 **Steroid injections.** Corticosteroid, or cortisone, is a powerful anti-inflammatory agent that can be injected into the carpal tunnel. Although these injections often relieve painful symptoms or help to calm a flare up of symptoms, their effect is sometimes only temporary. A cortisone injection may also be used by your doctor to help diagnose your carpal tunnel syndrome.
- 6 **Physical therapy treatment.** Treatments can include mobilising the carpal bones and stretching the carpal tissues to open up the space. Soft tissue mobilisation/massage can relieve pain and tension in the muscles of the hand and forearm. Mobilisation and manipulation of the bones of the neck and upper back cervical have been beneficial in treating CTS

releasing the nerves from their origin in the neck. Strengthening exercises for grip, pinch and forearm flexor/extensor muscles is crucial in treating and preventing CTS.

SURGICAL MANAGEMENT

If other treatments are unsuccessful, surgery can help to correct a condition that has been prevalent for years at a time. If nerve damage has occurred, surgery can help to correct the problem. Surgery involves cutting the ligament that forms the roof of the carpal tunnel. In doing so, the pressure on the median nerve is relieved, which will help to ease the symptoms associated with CTS.

HOW CAN CTS BE PREVENTED?

If you use a computer keyboard, there are several things you can do to lower your chances of developing CTS. Proper seating is crucial to good ergonomics. The height of your seat and the position of your backrest should be adjustable. The chair should be on wheels so you can move it easily.

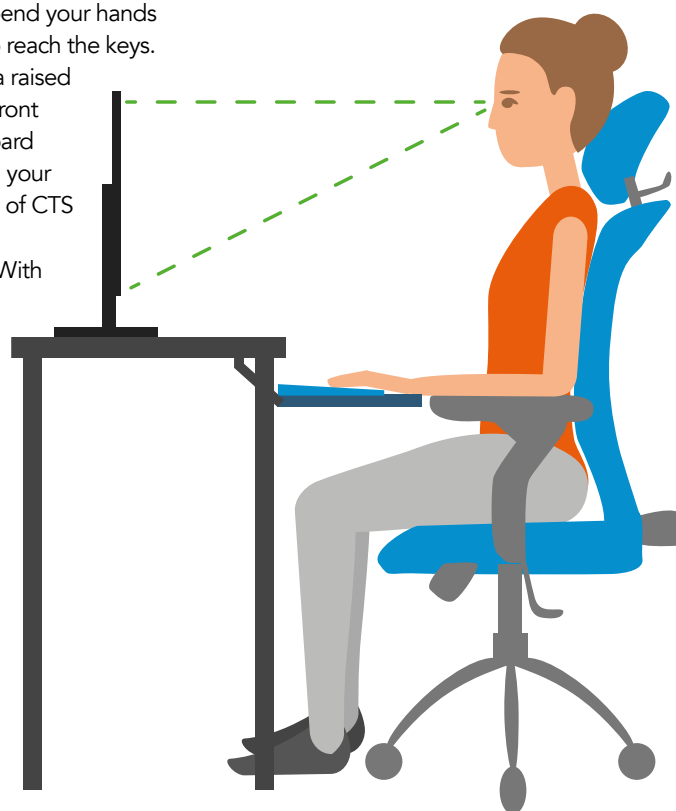
- **If your keyboard is positioned properly your wrists should be able to rest comfortably on the table in front of it.** Some keyboards are very thick or deep and they require you to bend your hands uncomfortably upward to reach the keys. If so, it will help to place a raised wrist rest on the table in front of the keyboard. A keyboard that requires you to bend your wrists is a common cause of CTS among computer users.
- **Chair and table height.** With your hands resting comfortably at the keyboard and your upper arms vertical, measure the angle between your forearm and your upper arm (the elbow angle). If it is less than 90 degrees, raise the seat of your chair. If the angle is greater than 90 degrees, lower the seat. Try to hold your elbows close to your sides to help minimise “ulnar displacement”

the sideways bending of the wrist (as when reaching for the “Z” key). Arm rests on the chair, though optional, are often helpful.

- **You need very little recovery time between keystrokes to cool and lubricate the flexor tendons.** If you type constantly, however, the need for recovery builds. In addition, working with your hands bent upward at the wrists or frequently bending your wrists sideways heightens the friction within the carpal tunnel. It takes longer to recover from these motions. Working under stress (deadline pressure, anger, or other anxiety) can make matters even worse. Take regular short breaks to relieve the repetitive stress.

Variety is the key. CTS occurs most frequently when motions are not only repetitious but are also kept up for hours at a time. If you use a keyboard, structure your workdays to include a mix of activities that require different physical actions each hour.

Physical therapy and massage therapy can both assist in helping you to prevent and treat this stubborn condition and the earlier you tackle it, the more quickly and effectively you'll be able to treat it.



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