

# Carpal Tunnel Syndrome

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Doctors have been dealing with carpal tunnel symptoms for over a hundred years. The carpal (wrist) tunnel (see diagram on page 4) is a narrow corridor formed by bones and ligament on the palm side of the wrist. Its job is to protect the median nerve, which runs through it to carry feeling and movement to the thumb and all fingers except the little finger. When pressure is placed on that nerve, the result is the numbness, pain and weakness known as CTS.

## CAUSES

What causes this condition is the question. Median nerve compression is attributed to swelling or thickening in the carpal tunnel, which for years was blamed by some on repetitive use of the hand and wrist. Dozens of occupations (and even hobbies) require forceful and awkward hand-intensive movements, and it was thought that overuse in this manner could bring on CTS.

A recent study by doctors in Boston takes a second look at this thinking. Although much is still unknown about the cause of increased median nerve pressure, this study suggests there is strong evidence to believe it has little to do with activity.

Data used to determine the cause of CTS was evaluated according to Bradford Hill-based criteria, a well-established method for demonstrating causal relationships. Average scores for such factors as genetics, race, age and other biological components were double those of occupational factors, which involve repetitive and vibrating hand use and other such elements. Furthermore, the average strength of a cause-and-effect association was about three times as strong for biological factors as it was for occupational ones.

The strongest risk factors for CTS were genetic. Many in the medical

community now contend there is a genetic predisposition to CTS. They say there never was strong scientific evidence linking repetitive stress to CTS. Indeed, a Mayo Clinic study in 2001 found heavy computer use did not increase the chances for developing CTS.

Clearly, not everyone who does a particular action has carpal tunnel problems. How do we account for the fact that two similar polio survivors could continually use the same hand/wrist motion in the same forceful way to propel their manual chairs for the same period of time each day – and yet one of them might get CTS related to this activity, but not the other one? Is the incidence of CTS higher among polio survivors using manual chairs than for the general population?

## OTHER PREDISPOSING FACTORS

Not all carpal tunnel swelling is related to repetitive hand/wrist use. Certain physical conditions such as diabetes, arthritis, hypothyroidism, uremia, obesity, high blood pressure, pregnancy, menopause and other disorders that may be associated with swelling are sometimes linked to CTS and could place one at higher risk. Or, some people simply have a much narrower carpal tunnel. Or, others may have injured their wrists.

continued, page 4

Not long ago, if the topic of carpal tunnel syndrome (CTS) came up, someone would likely say, “Oh yeah, that’s what people get when they sit at their computers typing too long. You know – all that repetitious activity that causes big problems in the wrist and hand.”

Since a Boston research team presented their study findings at the 74th Annual Meeting of the American Academy of Orthopaedic Surgeons in February, however, people are beginning to think differently about CTS.

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continued from page 3

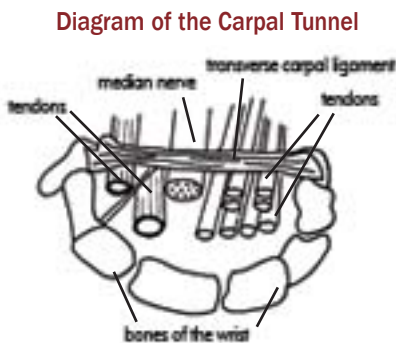
There is even the suggestion that individuals with “a generalized nerve problem” may be susceptible to developing CTS. Could this group include those who had polio? Could polio be considered a predisposition that adds up to CTS when triggered in certain polio survivors by, for example, repeated flexing of the wrist as we force weight onto our canes/crutches?

### INCIDENCE

The US National Institutes of Health reports that three times more women than men develop CTS. The condition occurs most often in people between the ages of 30 and 60, seldom in children.

### SYMPTOMS

Symptoms often occur in the night (or upon awakening) or when using the hands in a certain way over a period of time, like grasping a steering wheel or a newspaper when reading it. They generally begin mildly, perhaps with aching, tingling and numbness in the palm and all fingers except the little finger. Pain can extend from the wrist on the palm side to the fingers or up the arm. Weakness may make it difficult to grip objects or to continue certain hand/wrist activities, and reflexes may become impaired. In untreated cases, muscles at the base of the thumb may atrophy or people may lose the ability to feel the difference between hot and cold.



### DIAGNOSIS

A variety of methods is used to test for carpal tunnel problems:

◆ **A physical exam** – checking hands, arms, shoulders and neck to determine their condition and to rule out carpal tunnel mimics. Checking wrists for

tenderness, swelling, warmth and discoloration; fingers and hands for sensation, strength and deterioration. Lab tests and x-rays can show such problems as fractures, arthritis, diabetes and other conditions.

◆ **Tinel test** – used to see if tingling in the fingers occurs when a doctor presses on the median nerve.

◆ **Phalen test** – a wrist-flexion test used to see if various symptoms appear when the hands and fingers are held in a certain position for a length of time.

◆ **Electrodiagnostic tests** – an electromyogram checks for muscle damage when a needle is inserted into a muscle to record electrical activity in that muscle at rest and when contracted. A nerve conduction study uses electrodes taped on the hand and wrist to measure the speed at which electrical impulses are transmitted in the carpal tunnel. Ultrasound can show impaired movement in the median nerve.

◆ **NC-stat** – a controversial automated device supposedly used by over 12,000 physicians, often general practitioners, to check patients for nerve disease and help diagnose such conditions as CTS.

### TREATMENT

Methods of treatment vary, depending on the severity of the problem. Any underlying conditions will be treated first.

**Nonsurgical treatments** – Mild to moderate cases may be helped by wearing a wrist splint. Nonsteroidal anti-inflammatory drugs (NSAIDs such as aspirin or ibuprofen) may help if an inflammatory condition is present. Corticosteroids (such as prednisone) or the drug lidocaine

can be administered to ease swelling and pain. A therapist may help with stretching and strengthening exercises. Pain reduction and improved grip strength have been accomplished through yoga.

**Surgery** – The ligament pressing on the nerve is cut, usually either endoscopically (from which one may recover function faster) or by traditional open release surgery. Local anesthesia can be used for both. Although most patients recover fully with only rare reoccurrence of CTS, it may take months to regain full use of the hand and wrist, often with the help of a therapist. Most do better if they don't smoke or take more than two alcoholic drinks a day, and if they avoid repetitive, forceful activity.

## WHAT WE CAN DO

**Pay attention.** Keep the wrist at a relaxed middle position, without bending it completely up or down. Use a relaxed grip. Use less hand and finger force when performing tasks. Strive for good posture so that neck and shoulder muscles don't compress nerves in the neck, which affects the wrists and hands.

**Take a break.** Rest, stretch and bend hands and wrists about every 20 minutes. Alternate tasks. Change work position frequently. Watch for headaches, fatigue and muscle pain – and if they come on, switch activities. NSAIDs may help.

**Wear the right thing.** Keep hands and wrists warm and flexible by wearing fingerless gloves. A splint can keep wrists straight; some suggest wearing it at night, others say to try it while on the job.

**Find assistance.** CTS support groups can provide information and understanding. Relaxation techniques such as those found in yoga can help reduce stress and pain. Water therapy, heat and massage might be useful in relieving symptoms.

**Check out ergonomics.** Design the workplace so it meets needs efficiently and effectively. A huge variety of equipment is available to ensure correct posture and good wrist position, including many styles of keyboards, pointing devices (even hands-free mousing), wrist and forearm supports, splints and braces, work surfaces, chairs and other innovative devices. Take care to adjust equipment to avoid stress from awkward body positioning and wrist angles.

## FINALLY

The US Bureau of Labor reports that repetitive motion results in the longest absences from work. Some say that the new research findings will affect disability, workers' compensation, and personal injury claims. While carpal tunnel syndrome isn't usually considered a serious condition, it can be painful and frustrating.

It's inconvenient not to be able to carry out ordinary tasks, and when this interferes with such things as driving a car or doing the job at work, it can even become depressing. Taking steps to prevent the problem in the first place (just in case one is in the "predisposed" category) seems the best solution. ▲

**A list of the twelve resources used in writing this article is online at [www.post-polio.org/ipn/pph23-2ctsresources.html](http://www.post-polio.org/ipn/pph23-2ctsresources.html)**