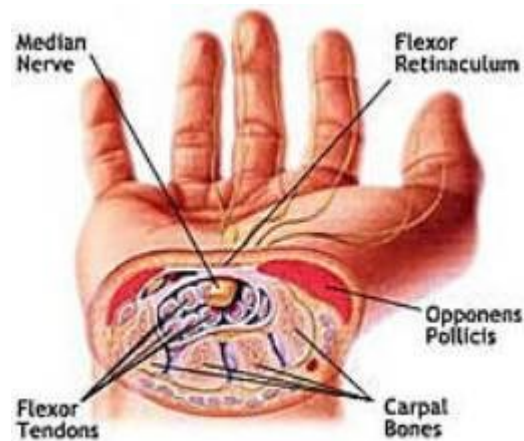


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FROM THE ELBOW TO THE FINGERTIP
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CARPAL TUNNEL SYNDROME



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.

What are the symptoms of carpal tunnel syndrome?

Symptoms usually start gradually, with frequent burning, tingling, or itching numbness in the palm of the hand and the fingers, especially the thumb and the index and middle fingers. Some carpal tunnel sufferers say their fingers feel useless and swollen, even though little or no swelling is apparent. The symptoms often first appear in one or both hands during the night. A person with carpal tunnel syndrome may wake up feeling the need to "shake out" the hand or wrist. As symptoms worsen, people might feel tingling during the day. Decreased grip strength may make it difficult to form a fist, grasp small objects, or perform other manual tasks. In chronic and/or untreated cases, the muscles at the base of the thumb may waste away. Some people are unable to tell between hot and cold by touch.

What are the causes of carpal tunnel syndrome?

Carpal tunnel syndrome is often the result of a combination of factors that increase pressure on the median nerve and tendons in the carpal tunnel, rather than a problem with the nerve itself. Most likely the disorder is due to a congenital predisposition - the carpal tunnel is simply smaller in some people than in others. Other contributing factors include

trauma or injury to the wrist that cause swelling, such as sprain or fracture; overactivity of the pituitary gland; hypothyroidism; rheumatoid arthritis; mechanical problems in the wrist joint; work stress; repeated use of vibrating hand tools; fluid retention during pregnancy or menopause; or the development of a cyst or tumor in the canal. Carpal tunnel syndrome is also associated with pregnancy and diseases such as diabetes, thyroid disease, or rheumatoid arthritis. In some cases no cause can be identified.

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. Repeated motions performed in the course of normal work or other daily activities can result in repetitive motion disorders such as bursitis and tendonitis.

Who is at risk of developing carpal tunnel syndrome?

Women are three times more likely than men to develop carpal tunnel syndrome, perhaps because the carpal tunnel itself may be smaller in women than in men. Persons with diabetes or other metabolic disorders that directly affect the body's nerves and make them more susceptible to compression are also at high risk. Carpal tunnel syndrome usually occurs only in adults.

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 three times more common among assemblers than among data-entry personnel. A 2001 study by the Mayo Clinic found heavy computer use (up to 7 hours a day) did not increase a person's risk of developing carpal tunnel syndrome.

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.

Physicians can use specific tests to try to produce the symptoms of carpal tunnel syndrome. 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.

How is carpal tunnel syndrome treated?

Treatments for carpal tunnel syndrome should begin as early as possible, under a doctor's direction. Underlying causes such as diabetes or arthritis should be treated first. Initial treatment generally involves using wrist splints at night.

Non-surgical treatments

Drugs - Corticosteroids (such as prednisone) or the drug lidocaine can be injected directly into the wrist or taken by mouth (in the case of prednisone) to relieve pressure on the median nerve and provide immediate, temporary relief to persons with mild or intermittent symptoms. (Caution: persons with diabetes and those who may be predisposed to diabetes should note that prolonged use of corticosteroids can make it difficult to regulate insulin levels. Corticosteroids should not be taken without a doctor's prescription.) Additionally, some studies show that vitamin B⁶ (pyridoxine) supplements may ease the symptoms of carpal tunnel syndrome.

Alternative therapies - Acupuncture and chiropractic care have benefited some patients but their effectiveness remains unproved. An exception is yoga, which has been shown to reduce pain and improve grip strength among patients with carpal tunnel syndrome.

Surgery

Carpal tunnel release is one of the most common surgical procedures in the United States. Generally recommended if symptoms last for 6 months, surgery involves dividing the band of tissue around the wrist to reduce pressure on the median nerve. Surgery is done under anesthesia and does not require an overnight hospital stay. The following are types of carpal tunnel release surgery:

Open release surgery, the traditional procedure used to correct carpal tunnel syndrome, consists of making an incision up to 2 inches in the wrist and then cutting the carpal ligament to enlarge the carpal tunnel. The procedure is generally done under local anesthesia on an outpatient basis, unless there are unusual medical considerations.

Limited or "Mini-" open release surgery, is performed through a small 2 cm incision in the palm, often within a palmar crease. The release of the ligament is performed under direct vision and allows both visualization as well as palpation to confirm the completeness of the release.

Endoscopic surgery involves two incisions (about ½ inch each) in the wrist and palm, inserts a camera attached to a tube, observes the tissue on a screen, and cuts the carpal ligament under indirect vision. Single portal endoscopic surgery for carpal tunnel syndrome is also available and can result in less post-operative pain and a minimal scar.

Dr. Purdy's experience has been that the mini-open technique balances the safety of direct visualization and palpation with the goal of minimizing post-operative pain and scarring. Following complete healing, the incision is frequently imperceptible. All surgeries involve risk, but Dr. Purdy feels that the risk of injury to the nerve, surrounding nerves, tendons, and vessels, are the least with open techniques. In some cases, such as for patients that depend upon their hands for weight-bearing because of paralysis, Dr. Purdy will recommend evaluation by a surgeon that performs the endoscopic techniques.

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