Carpal Tunnel Syndrome Fact Sheet

You are working at your desk, trying to ignore the tingling or numbness you have had for months in your hand and wrist. Suddenly, a sharp, piercing pain shoots through the wrist and up your arm. Just a passing cramp? More likely you have carpal tunnel syndrome. This is 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 nerve that runs from the forearm into the hand (*median nerve*), 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). That nerve also controls impulses to some small muscles in the hand, that allow the fingers and thumb to move. The narrow, rigid passageway of ligament and bones at the base of the hand (*carpal tunnel*) houses the median nerve and tendons. Sometimes, thickening from irritated tendons or other swelling narrows the tunnel. The narrowing causes the median nerve to be compressed. The result may be pain, weakness, or numbness in the hand and wrist that moves (*radiates*) up the arm. Although painful sensations may indicate other conditions, carpal tunnel syndrome is the most common and widely known of the entrapment neuropathies. These are conditions in which the body's peripheral nerves are compressed or traumatized.

SYMPTOMS

- Symptoms usually start gradually, with:
  - Frequent burning.
  - Tingling.
  - Itching numbness in the palm of the hand and the fingers.

This is especially true in the thumb and the index and middle fingers.

- Some carpal tunnel sufferers say their fingers feel useless and swollen. They may feel this way even though little or no swelling is apparent.
- The symptoms often first appear in one or both hands during the night, since many people sleep with flexed wrists. 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.
  - 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.

CAUSES

- 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. It is usually not a problem with the nerve itself.
- Most likely the disorder is due to a congenital predisposition. This means that the carpal tunnel is simply smaller in some people than in others.
- Other 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.
- The development of a cyst or tumor in the canal.

- 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. Writer's cramp, a condition in which a lack of fine motor skill coordination and ache and pressure in the fingers, wrist, or forearm is brought on by repetitive activity, is not a symptom of carpal tunnel syndrome.

WHO IS AT RISK OF DEVELOPING CARPAL TUNNEL SYNDROME?

- Women are three times more likely than men to develop carpal tunnel syndrome. This may be the result of the carpal tunnel being smaller in women.
- The dominant hand is usually affected first and produces the most severe pain.
- Diabetes or other metabolic disorders that directly affect the body's nerves make people more susceptible to compression.
- 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. However, it is especially common in those performing assembly line work, such as:
  - Manufacturing.
  - Sewing.
  - Finishing.
  - Cleaning.
  - Meat packing.

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.

- During 1998, an estimated three of every 10,000 workers lost time from work because of carpal tunnel syndrome. Half of these workers missed more than 10 days of work. The average lifetime cost of carpal tunnel syndrome is estimated to be about $30,000 for each injured worker. This includes medical bills and lost time from work

DIAGNOSIS

- 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. An exam can rule out other painful conditions that mimic carpal tunnel syndrome.
- The wrist is examined for:
  - Tenderness.
  - Swelling.
  - Warmth.
  - Discoloration.
- Each finger should be tested for sensation. The muscles at the base of the hand should be examined for strength and signs of shrinking (*atrophy*).
- Routine laboratory tests and X-rays can reveal:
  - Diabetes.
  - Arthritis.
  - Fractures.
- Physicians can use specific tests to try to produce the symptoms of carpal tunnel syndrome.
  - In the Tinel test, the caregiver taps or presses on the median nerve in the patient's wrist. The test is

positive when tingling in the fingers or a shock-like sensation occurs.
  - The Phalen or wrist-flexion test involves having the patient hold their 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 is felt in the fingers within 1 minute.
  - Caregivers 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. The electrical activity is viewed on a screen. The activity can determine the severity of damage to the median nerve.
  - Ultrasound imaging can show impaired movement of the median nerve.

TREATMENT

Treatments for carpal tunnel syndrome should begin as early as possible. It should be done under a caregiver's direction. Underlying causes such as diabetes or arthritis should be treated first. Initial treatment generally involves:

- Resting the affected hand and wrist for at least 2 weeks.
- Avoiding activities that may worsen symptoms.
- Immobilizing (keeping from moving) the wrist in a splint.

These things are all done to avoid further damage from twisting or bending. If there is inflammation, applying cool packs can help reduce swelling.

NON-SURGICAL

- **Drugs -** In special circumstances, different drugs can ease the pain and swelling.
  - Nonsteroidal anti-inflammatory drugs, such as aspirin, and other non-prescription pain relievers, may ease symptoms.
  - Orally administered diuretics (water pills) can decrease swelling.
  - Corticosteroids such as prednisone or lidocaine can be injected directly into the wrist or taken by mouth. This can relieve pressure on the median nerve. It may provide immediate, but temporary relief to persons with mild or intermittent symptoms. (Caution: persons with diabetes and those who may be predisposed to diabetes should note that long term use of corticosteroids can make it difficult to regulate insulin levels. Corticosterioids should not be taken without a prescription.)
  - Additionally, some studies show that vitamin B6 (pyridoxine) supplements may ease the symptoms of carpal tunnel syndrome.
- **Exercise -** Stretching and strengthening exercises can be helpful in people whose symptoms have decreased. These exercises may be supervised by a physical therapist that is trained to use exercises to treat physical impairments. The exercises can also be supervised by an occupational therapist. This is someone who is trained in evaluating people with physical impairments. They will help them build skills to improve their health and well-being.
- **Alternative therapies -** Acupuncture and chiropractic care have helped some patients. 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 a surgical procedure commonly used. It is generally recommended if symptoms last for 6 months or more. This surgery involves cutting the band of tissue around the wrist to reduce pressure on the median nerve. Surgery is done under local anesthesia. It does not require an overnight hospital stay. Many patients require surgery on both hands. The following are types of carpal tunnel release surgery:

- **Open release surgery**. This is the traditional procedure used to correct carpal tunnel syndrome. It consists of making a cut (*incision*) up to 2 inches in the wrist. Then, the surgeon cuts the carpal ligament to enlarge the carpal tunnel. The procedure is generally done under local anesthesia on an outpatient basis. The only exception is if there are unusual medical considerations.

- **Endoscopic surgery** may allow faster recovery and less postoperative discomfort than traditional open release surgery. The surgeon makes two incisions (about 1/2" each) in the wrist and palm. The surgeon will:
  - Insert a camera attached to a tube.
  - Observe the tissue on a screen.
  - Cut the carpal ligament (the tissue that holds joints together).
    This two-portal endoscopic surgery, generally performed under local anesthesia, is effective and minimizes scarring and scar tenderness. One-portal endoscopic surgery for carpal tunnel syndrome is also available.

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.
- 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.

PREVENTION

At the workplace, workers can:

- Do on-the-job conditioning, perform stretching exercises.
- Take frequent rest breaks.
- Wear splints to keep wrists straight.
- Use correct posture and wrist position.
- Wearing finger-less gloves can help keep hands warm and flexible.
- Design workstations, tools and tool handles, and tasks to enable the worker's wrist to maintain a natural position.
- Rotate jobs among workers.
- Employers can develop programs in ergonomics. This is the process of adapting workplace conditions and job demands to the capabilities of workers. However, research has not conclusively shown that these workplace changes prevent the occurrence of carpal tunnel syndrome.

WHAT RESEARCH IS BEING DONE?

The National Institute of Neurological Disorders and Stroke (NINDS), a part of the National Institutes of Health, is the federal government's leading supporter of research on carpal tunnel syndrome. Scientists are studying the order of events that occur with carpal tunnel syndrome. They do this to better understand, treat, and prevent this ailment.

WHAT IS PERCUTANEOUS BALLOON CARPAL TUNNEL-PLASTY?

Percutaneous balloon carpal tunnel-plasty is an experimental technique that can ease carpal tunnel pain without cutting the carpal ligament. In this procedure, a 1/4 -inch cut is made at the base of the palm. The caregiver then inserts a balloon through a catheter under the carpal ligament and inflates the balloon to stretch the ligament and free the nerve. Patients in one small study of this procedure reported relief of symptoms with no complications after the surgery. Most of them were back to work within 2 weeks. This experimental technique is not yet widely available.

WHERE CAN I GO FOR MORE INFORMATION?

For more information about carpal tunnel syndrome or other neuropathies of the nervous system, you may wish to contact:

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