

In today's society almost everyone has heard of carpal tunnel syndrome. However, few people actually know what carpal tunnel syndrome is, how it starts, and how to prevent it. First I'll describe the condition, and then I'll discuss treatment and prevention.

Carpal tunnel syndrome is often classified as a Repetitive Stress Disorder. However, it is more accurately considered a Cumulative Trauma Disorder. This is because small amounts of damage, called microtrauma, have a cumulative affect on nerves. Microtrauma occurs as the result of repetitive motions, sustained motions or postures, and vibrations. These causes of carpal tunnel syndrome can usually be prevented when individuals and employers are aware of them.

Carpal tunnel syndrome is the result of irritation of the median nerve. This irritation of the nerve occurs primarily in the wrist, but the nerve can also be affected by irritation anywhere along its course.

The median nerve originates in the nerve roots of the lower neck, passes under the lateral neck muscles, over the first rib, through the armpit, elbow, and wrist to the hand.

Along its course, the median nerve can be irritated or injured at any of these points. When irritated in the neck at the level of the nerve root a condition called radiculitis results. Compression injury of the median nerve can occur in the armpit if crutches are used incorrectly or are improperly adjusted. Injury to the median nerve also occurs from compression at the elbow and the wrist. When compressed or irritated at the wrist, the condition is called carpal tunnel syndrome.

The median nerve passes through the carpal tunnel at the wrist. The carpal tunnel is a space formed between the bones of the wrist – called carpals - and the transverse carpal ligament. This ligament runs across the front of the wrist.

Besides the median nerve several other structures pass through the carpal tunnel. These structures include the tendons to the fingers and blood vessels which, along with the median nerve, almost completely fill the carpal tunnel.

The median nerve, connective tissue and tendons within the carpal tunnel can be easily irritated. They are all very sensitive and even small pressures can cause severe pain and inflammation. Any motion of the wrist may increase the irritation, and your wrist is in almost constant motion.

The tendons that run through the carpal tunnel begin near the elbow or along the forearm. When these muscles become irritated from repetitive trauma or overuse, it can result in swelling of both the muscles and the tendons. The swollen tendons then take up space in the carpal tunnel and irritate the nerve.

Carpal tunnel syndrome can produce symptoms of pain, tingling, or weakness in the hand. Decrease in the sense of touch and grip strength is often noted. Individuals with

carpal tunnel syndrome frequently drop things and often find that even the weight of a coffee cup is too much to hold up.

Sensory loss and pain are generally in the thumb, index, middle, and one-half of the ring fingers. The pain can range from a mild irritation to incapacitating. Interestingly, the palm of the hand is usually spared the sensory changes. This is because the sensory nerve to the palm does not go through the carpal tunnel, but over it.

Women are five times more likely to develop symptoms than men. Conditions that cause fluid retention such as pregnancy, premenstrual syndrome, menopause and birth control pills can lead to a decreased circulation in working tissues. In some women the hormonal shifts associated with these disorders causes them to become more sensitive to inflammation which makes them more susceptible to carpal tunnel syndrome.

The development of carpal tunnel syndrome may begin slowly as a tingling in the fingers. It usually begins at night and sufferers notice it on waking. Eventually it may become severe enough that the pain and tingling wakes them at night. The pain may progress to severe cramping or burning. There is very often neck pain associated with the development of carpal tunnel syndrome. This may appear to be a separate condition, but it is often related to the carpal tunnel syndrome.

Irritation of the nerve in the neck can cause the nerve to be irritated along its entire course. Neck pain, fatigue or altered posture can lead to increased muscle tension in the muscle in the neck. This in turn may irritate the median nerve. The neck condition doesn't always cause carpal tunnel syndrome but it can contribute to it and it certainly aggravates it. In most cases, treating the neck condition is critical if carpal tunnel surgery is to be avoided.

Carpal tunnel syndrome is diagnosed by its symptoms and confirmed by a nerve conduction velocity test. In this test, mild electrical currents are sent along the course of the nerve to measure how well the nerve is conducting its signals. This test can determine if there is compression along the course of the nerve.

Early treatment of this condition is rest. That is, avoiding the activities that stress the carpal tunnel. Wearing a splint often helps a great deal. The splint may need to be worn only at night or during both the day and the night. Vitamin B6 has been shown to reduce the inflammation in the nerve sheath and may provide significant relief as well. In cases where the muscles of the forearm are inflamed or too tight, myofascial release techniques will often improve the condition. Manipulation of the neck and the joints of the wrist and forearm are usually necessary to correct mechanical problems in these joints that are either causing carpal tunnel syndrome or which were caused by it.

Additionally, specific stretching and range of motion exercises for the wrist and neck must be performed. These gentle rehabilitative exercises prevent stiffness, increase circulation, prevent scarring and adhesions from forming.

It is important to note that ignoring the symptoms of carpal tunnel syndrome is a bad idea. Sustained and prolonged irritation of the nerve can lead to irreparable damage. This may cause permanent loss of sensation and grip strength even if the pain is gone. Significant nerve damage is often permanent.

The best treatment, however, is always prevention. Work is often the area of our lives with the greatest potential to cause carpal tunnel syndrome. Sustained grip or pinch, repetitive grip or pinch, or repetitive flexion – forward bending - or lateral bending of the wrist can all cause this condition. Repetitive activities involving the use of fingers can also cause it. The most common of these conditions is computer use. Proper ergonomic design of your typing station is a must if you spend any significant amount of time at this activity. Use of an ergonomic mouse, mouse pad, and keyboard will reduce the stresses in the carpal tunnel.

In occupations with significant vibration, gloves designed to reduce vibration have been shown to be beneficial.

If this condition becomes too prolonged or severe it may require surgery to reduce the pressure in the carpal tunnel. However, without proper follow-up exercises and correction of the initial causes of the condition, it will return.

At home reducing repetitive stresses involves the same considerations. Reduce craft activities such as knitting, sewing, needle-work, as well as other activities requiring fine movements of the fingers. Not overloading your wrist can be accomplished by using two hands to lift heavier objects, such as a container of milk.

If you are at risk you should take the time to perform range of motion and stretching exercises. Do not do too much at once. Give yourself frequent breaks. Maintain a healthy diet high in B vitamins. Maintain good posture. Keep your spine, particularly your neck, healthy and mobile.

If you think you may be developing carpal tunnel syndrome you must take an active role in your recovery. By doing your part, you may be able to avoid having to undergo surgery to reduce your symptoms.

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